

Antenatal Care (ANC1) Malaria Surveillance Implementation Guide

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METRICS FOR MANAGEMENT



Acronyms

ACT - Artemisinin-based Combination Therapy
ANC - Antenatal Care
ANC1- First Antenatal Care Visit
CHW - Community Health Worker
DHIS2 - District Health Information Software 2
DHS - Demographic and Health Survey
HMIS - Health Management Information System
IRS - Indoor Residual Spraying
ITN - Insecticide Treated Net
LMIS - Logistics Management Information System
MICS - Multiple Indicator Cluster Surveys
MIS - Malaria Indicator Survey
MoH - Ministry of Health
MSF - Médecins Sans Frontières
NMCP - National Malaria Control Program
NMSP - National Malaria Strategic Plan
OPD - Outpatient Department
RDT - Rapid Diagnostic Test
RMNCH - Reproductive, Maternal, Newborn, and Child Health
SOP - Standard Operating Procedure
SMC - Seasonal Malaria Chemoprevention
SMPS - School Malaria Parasite Survey
SNT - Subnational Tailoring
SST - Single Screening and Treatment

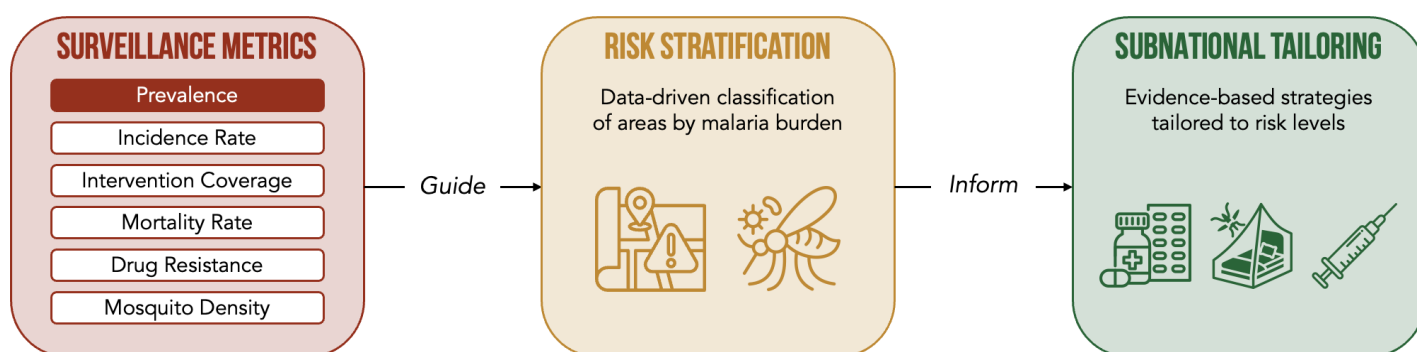
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I. Introduction

Surveillance data is essential for malaria programs to make evidence-based decisions and maximize impact. The **World Health Organization's (WHO) Global Technical Strategy for Malaria 2016-2030** states that surveillance should be a key intervention in the response to malaria ([World Health Organization, 2021](#)). A strong surveillance system provides National Malaria Programs (NMPs) with the data needed to effectively target resources and interventions to areas where they are expected to have the greatest impact. In the face of stagnating progress towards malaria elimination and increasingly constrained resources, it is more critical than ever to make data-driven decisions about resource allocation and subnational intervention tailoring (SNT). Within this context, malaria prevalence is a key metric that supports the triangulation of routine case data, strengthens burden estimation models, and directly informs SNT by identifying geographic heterogeneity in transmission intensity.



Prevalence data are traditionally sourced from Demographic and Health Surveys (DHS) and Malaria Indicator Surveys (MIS), which provide robust population-level estimates but are conducted infrequently, offer insufficient spatial resolution for targeted interventions, and face uncertain sustainability due to funding constraints. Routine health management information systems (HMIS) of outpatient departments (OPD) complement these surveys with timely, facility-level data, though OPD measures incidence rather than prevalence, misses asymptomatic infections common in pregnancy, and reflects biases in care-seeking behavior and healthcare access. Taken together, these characteristics motivate the search for complementary data sources that can fill remaining surveillance gaps.

	OPD HMIS	MIS / DHS	ANC1 Malaria Surveillance
Timely	✓	✗	✓
Spatially granular	✓	✗	✓
Cost-efficient	✓	✗	✓
Free from care-seeking bias for malaria	✗	✓	✓
Representative regardless of ANC attendance	✓	✓	✗
Broadly representative population	✓	✓	✗
Ability to measure malaria-in-pregnancy exposure	✗	✗	✓
Tracks intervention coverage	✗	✓	✓*

Testing all women for malaria at their first ANC visit (ANC1) offers a strategic solution, enabling continuous, high-resolution monitoring of malaria prevalence to inform programmatic decisions. In ANC1 malaria surveillance, all pregnant women and girls coming for their first visit are tested for malaria regardless of malaria symptoms and therefore represent a cross-section proxy of the general population, making them a robust approximation for the community prevalence. While ANC1 malaria surveillance provides a granular, cost-efficient, monthly proxy for community prevalence and is not subject to care-seeking behavior for malaria, it is important to note that barriers to care-seeking of ANC services limit the generalizability of the surveillance data. The figure above illustrates how ANC1 malaria surveillance compares with traditional data sources.

This guide, developed by the [Roll Back Malaria \(RBM\) Surveillance Monitoring and Evaluation \(SME\) Working Group](#), provides practical guidance for NMPs interested in implementing ANC1 malaria surveillance to strengthen their malaria surveillance systems. The guide begins by laying out the strengths and considerations of implementing ANC1 malaria surveillance, followed by a description of key steps to establish an effective ANC1 malaria surveillance system, ranging from building support among key stakeholders to quantifying malaria rapid diagnostic tests (RDTs) and treatments to collecting and analyzing the data generated.

Throughout the guide, green boxes highlight integration opportunities across health system areas (e.g., malaria and maternal health).



■ Pilot Study ■ Implementation at Scale

INTEGRATION:

The guide also includes blue boxes with case studies from countries that have successfully implemented a pilot program or full-scale rollout of ANC1 malaria surveillance. At the time of this guide's writing, ANC1 malaria surveillance has been scaled in Tanzania and piloted in Benin, Burkina Faso, Democratic Republic of the Congo, Kenya, Mozambique, Nigeria, and Zambia.

CASE STUDY:

II. Strengths and Considerations of ANC1 Malaria Surveillance

A growing body of evidence highlights the surveillance value of routine ANC1 malaria testing. Importantly, ANC1 malaria surveillance:

1. **Provides a sentinel population subject to coverage and selection constraints:**

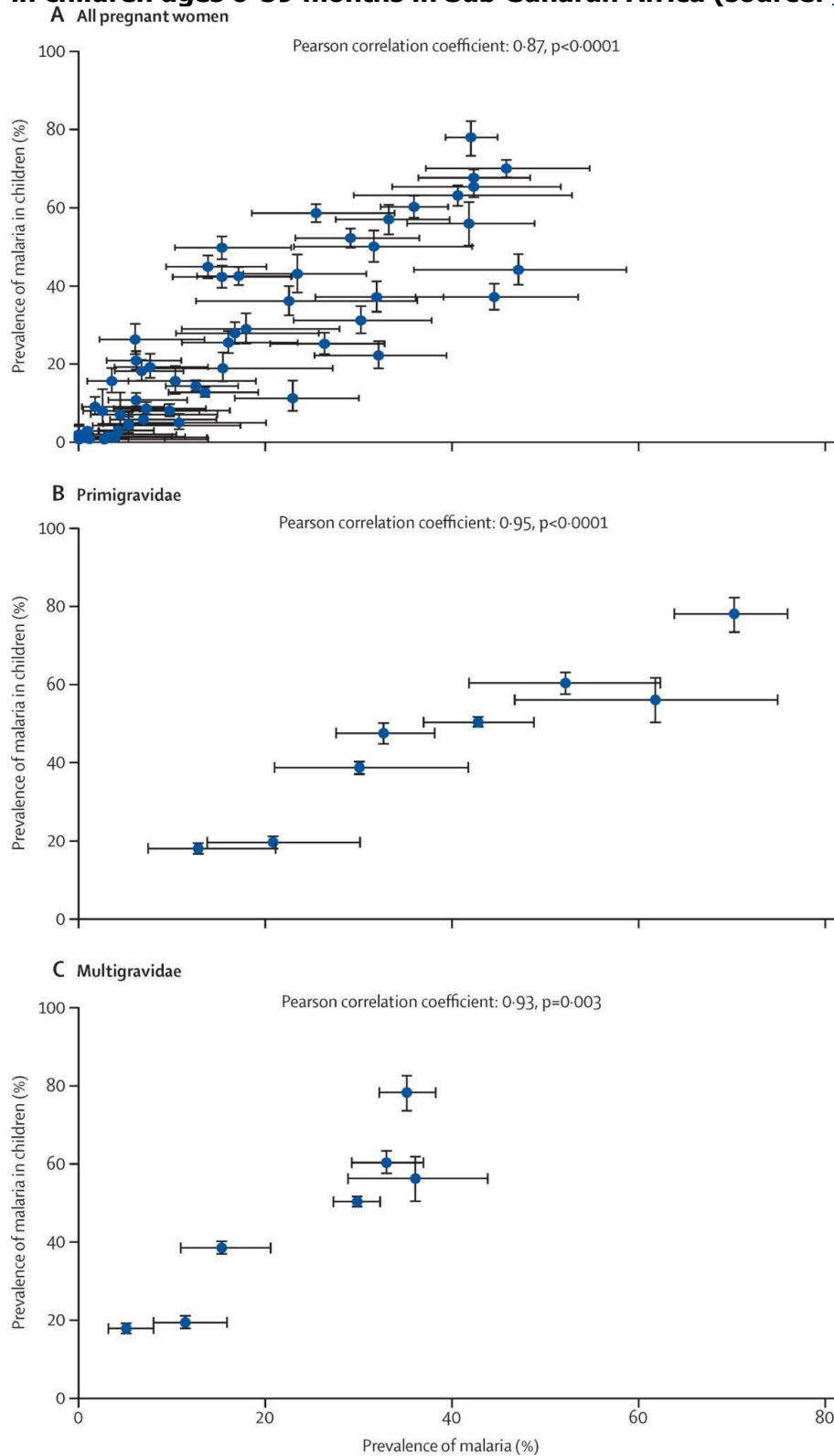
While ANC1 attendees are not a representative sample of the general population and ANC attendance itself is shaped by healthcare access, geographic proximity, and socioeconomic factors — they constitute a defined, systematically tested sub-population that offers several properties unavailable from other routine data sources. Women attending ANC are seeking care independent of malaria symptoms and other illnesses, therefore less affected by variations in health seeking behavior. ANC attendance, for at least one visit, tends to be relatively high, with attendance rates reaching 80% in the 34 sub-Saharan African countries where intermittent preventive treatment in pregnancy (IPTp) is used (World Health Organization, 2024). In settings with high ANC coverage, routine testing of this group regardless of any malaria symptoms offers a more generalizable proxy for community malaria transmission than facility-based OPD data alone ([Mayor, Menéndez, & Walker, 2019](#)).

However, representativeness depends on high and non-biased ANC attendance *and* on all women and girls attending ANC1 receiving a test, regardless of whether they have symptoms. If substantial segments of the population are excluded—because they do not attend ANC, are more likely to be tested if they report symptoms, or seek care at private facilities that do not report their data into the national HMIS—prevalence estimates will be biased.

2. **Correlates well with population-based survey estimates of prevalence in young children:** Malaria prevalence estimates in pregnant women derived from ANC1 malaria surveillance demonstrate strong linear correlation with prevalence estimates in children under five ([Munsey et al., 2023](#); [Munsey et al., 2025](#)) and children two to ten years old ([Pujol et al., 2023](#)) from cross-sectional household surveys, as well as national population-based surveys such as DHS and MIS ([Kitojo et al., 2019](#); [van Eijk et al., 2015](#)). Although adjustments are required to translate ANC1 malaria surveillance data into estimates of community-level malaria prevalence, the resulting estimates closely align with those from household surveys. Given that household surveys are typically conducted infrequently and require substantial resources, the correlation of ANC1-based estimates reinforces their value as a timely and cost-effective surveillance tool.

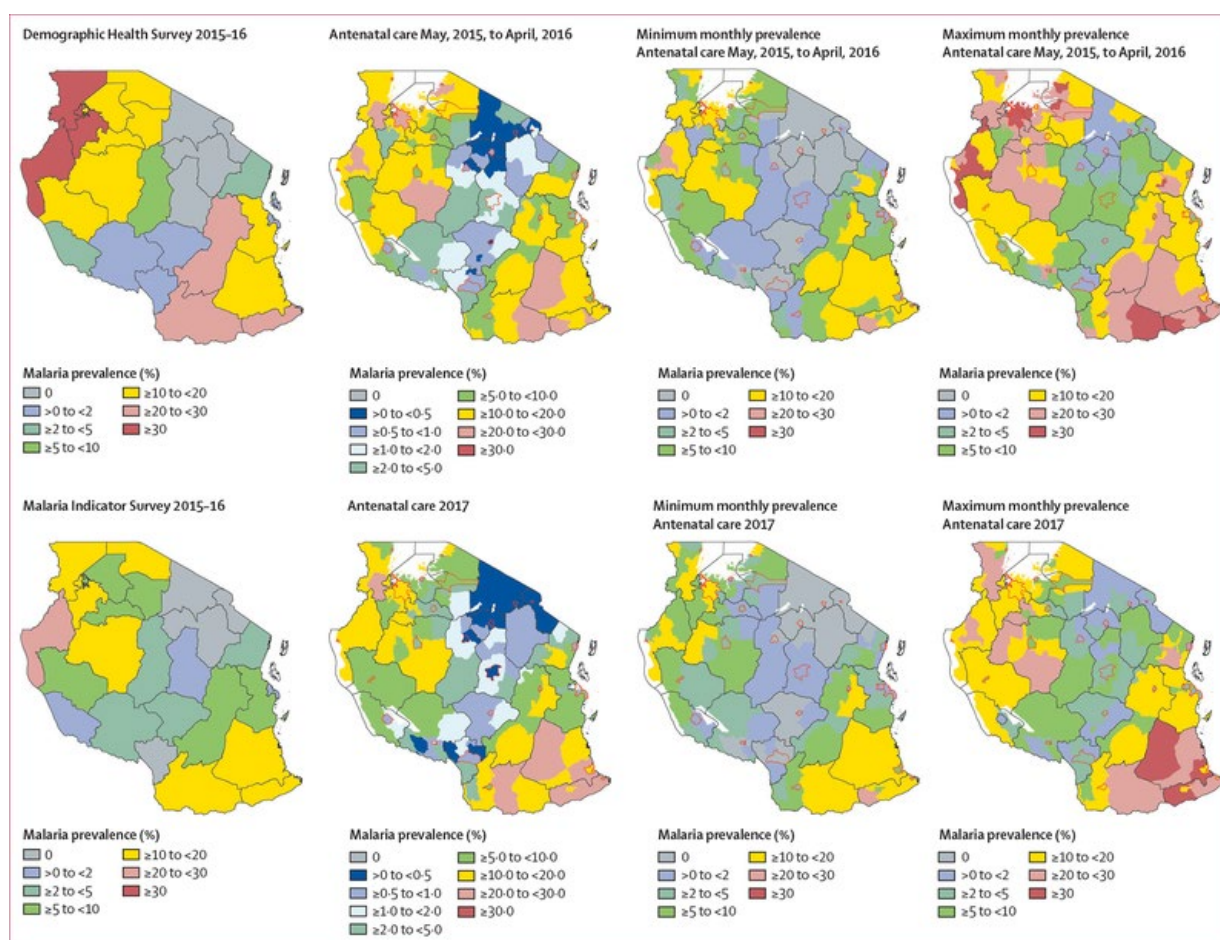
The figure below shows correlations between prevalence in pregnant women and prevalence in children ages 0-59 months from a meta-analysis of ANC1 prevalence data conducted in 2015 ([van Eijk et al., 2015](#)). The figure shows stronger correlations in primigravidae (first pregnancies) than in multigravidae (two or more pregnancies), though overall correlations remain high across all three pregnancy groups.

Correlation between malaria prevalence in pregnant women and malaria prevalence in children ages 0-59 months in Sub-Saharan Africa (source: [van Eijk et al., 2015](#))



3. **Offers continuous and granular insights for program planning, though not suited for outbreak detection:** Similar to other routine surveillance (e.g., HMIS), ANC1 malaria surveillance data offers timely, locally relevant insights that inform program planning and implementation. Routine surveillance, including ANC1 malaria surveillance, enables continuous data collection, allowing for more frequent insight into prevalence as compared to DHS or MIS surveys. Malaria surveillance data from ANC1 is a more timely indicator of community prevalence than data from household surveys; however, community prevalence is inherently a lagged indicator of transmission and incidence trends—a property of prevalence-based surveillance. Studies have found a lag of 2-5 months ([Pujol et al, 2023](#); [Munsey et al, 2023](#)). Consequently, ANC1 data should not be relied upon as an early warning system for detecting outbreaks. Instead, it is best used to monitor broader transmission patterns over time and support strategic planning and evaluation efforts.

Comparison of malaria prevalence by region between DHS, MIS, and ANC1 malaria surveillance (source: [Kitojo et al., 2019](#))



In addition, ANC1 malaria surveillance data provides insight into malaria prevalence at a more granular level than large household surveys. By enabling subnational stratification of malaria transmission at the district level or above, ANC1 malaria surveillance enables

more precise targeting of interventions by establishing the highest burden areas. Routine ANC1 malaria surveillance data may also support ongoing monitoring of program performance. While evidence is still emerging, ANC1 may help capture information on awareness and uptake of interventions such as insecticide-treated nets (ITNs) ([Munsey et al., 2023](#)). Looking ahead, ANC1 data could potentially inform targeting of SMC, PMC, and malaria vaccine rollout, though these applications remain largely unexplored in the literature. However, the inclusion of intervention-related questions must weigh potential programmatic benefits against added time, respondent burden, and risks of social desirability bias.

4. Operationally feasible but resource requirements warrant careful planning:

RDT testing for all women at their first ANC visit can be integrated into the existing panel of routine tests, such as anemia, syphilis, and HIV. Both healthcare providers and pregnant women and girls have responded positively to the inclusion of malaria testing at this initial visit ([Smith et al., 2010](#); [Smith Paintain et al., 2011](#); [Hoyt et al., 2021](#); [Emerson et al., 2023](#)). However, it is important to note that while ANC1 malaria surveillance aligns well with existing clinical workflows, it still requires additional resources to manage RDT and ACT supply chains, train staff, interpret results, and accurately report data. These requirements include consistent RDT and ACT procurement, staff training on test administration and data recording, and robust data management systems for quality assurance — operational costs that warrant careful consideration in resource-constrained settings to ensure sustainability.

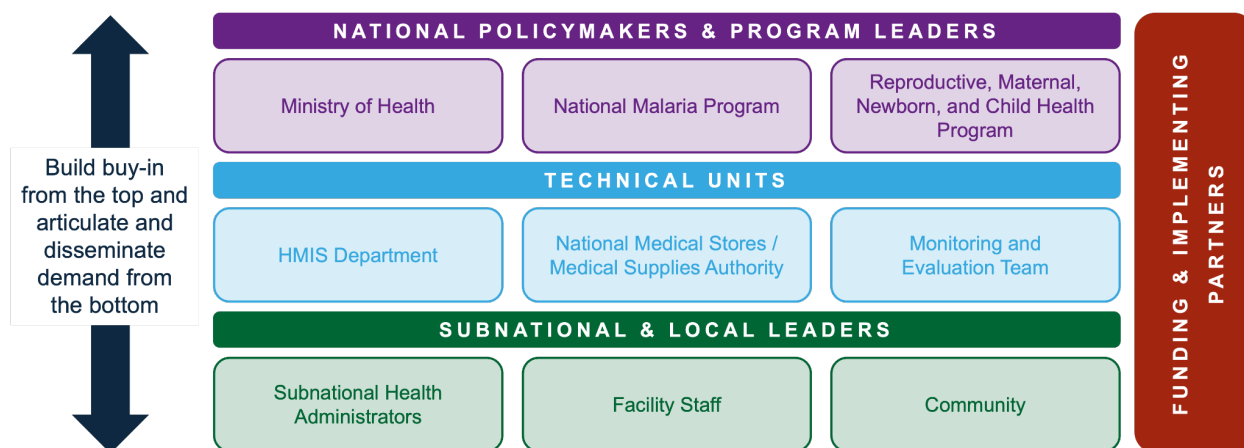
5. Enables early diagnosis and treatment while complementing existing prevention strategies:

ANC1 malaria surveillance uses pregnant women and girls as a sentinel population for surveillance purposes; however, it also enables early identification and treatment of malaria in pregnancy. High-density parasitemia has been shown to pose increased maternal and neonatal health risks ([Accrombessi et al., 2019](#); [Satapathy et al., 2024](#)). Testing for malaria at ANC1 presents an opportunity to identify and treat first-trimester infections, using artemether-lumefantrine as the preferred first-line treatment for uncomplicated *P. falciparum* malaria in the first trimester of pregnancy since sulfadoxine-pyrimethamine (SP) is contraindicated ([World Health Organization, 2024](#)).

Importantly, ANC1 malaria surveillance does not replace IPTp; rather, it complements it. Women and girls who test negative for malaria at ANC1 and are eligible for IPTp should still receive IPTp as per national guidelines. Additionally, all eligible women should continue to receive IPTp at subsequent antenatal visits, in accordance with the national guidelines.

III. Stakeholder Engagement

Successful implementation of a new ANC1 malaria surveillance approach requires early, structured, and ongoing stakeholder engagement across the health system. Strong buy-in at all levels (national, subnational, health facility, and community) is critical for the success of ANC1 malaria surveillance. Building buy-in from the top and articulation and dissemination demand from the bottom helps ensure alignment from national leadership down to the community level.



Rather than treating stakeholder engagement as a standalone activity, it should be embedded within the overall process—from initial planning through piloting, implementation, and routine use. This integrated approach is fundamental to both the scale-up and long-term sustainability of ANC1 malaria surveillance systems. In this section you will find an illustrative list of stakeholders that may need to be engaged throughout the process, role each stakeholder may play in the process, and suggested engagement strategies.

Policy Maker & Technical Stakeholder Engagement

The specific stakeholders that need to be involved will vary by context, but may include:

National policymakers and program leaders provide strategic oversight by approving new initiatives, setting guidelines, and advancing integration strategies.

- Ministry of Health (MoH)
- NMP
- Reproductive, Maternal, Newborn, and Child Health (RMNCH) Program

Technical units support key technical changes for ANC1 malaria surveillance.

- Health Management Information System (HMIS) Department - updates to data collection systems
- National Medical Stores/Medical Supplies Authority - updates to procurement planning to meet increased RDT needs
- Monitoring and Evaluation (M&E) Team - data review and analysis

Subnational and local leaders hold responsibility for day-to-day implementation, including building community acceptance.

- Subnational (regional and district) health administrators
- Facility Staff

Funding and implementing partners provide resources to meet increased commodity needs, pilot implementation, training, or other needs as ANC1 malaria surveillance is rolled out.

- Donors
- Implementing Partner

CASE STUDY: Tanzania has implemented ANC1 malaria surveillance nationwide since 2014. Early and broad stakeholder engagement played an important role in Tanzania's pilot and subsequent expansion of ANC1 malaria surveillance. Notably, the Malaria in Pregnancy Task Force, which brought together the NMCP, Reproductive and Child Health team, Medical Stores Department, and partners, helped guide the initial pilot phase. As the pilot progressed and showed promising results, this group coordinated with teams across the Ministry of Health to incorporate ANC1 malaria surveillance into existing initiatives, including revisions to the Focused Antenatal Care Guidelines and HMIS updates. This group similarly began engaging donors, such as PMI and the Global Fund, before the pilot concluded to secure support for continuation and scale-up.

When engaging stakeholders, it is important that they understand the value of ANC1 malaria surveillance and how it differs from other approaches, as described in the [previous section](#). Different stakeholders may have distinct concerns, and it is important to consider how to communicate effectively with each. For example, the concerns of the national RMNCH program likely differ from those of facility staff.

"But if you can do it, you can demonstrate it within the structures, that it is not too much additional work, it is possible within the human resources that we have, and we can implement it as a routine activity without too much overload on the staff, too much overload in terms of commodities, etc., etc."

- Key informant on gaining Ministry of Health buy-in for an ANC1 malaria surveillance pilot in Zambia

Countries interested in ANC surveillance can draw on the published literature and other countries' experiences to address common concerns. However, if stakeholders want to see context-specific results, a pilot study can help address concerns.

Some common concerns and responses are outlined here:

	Concern	Response
1	Adding malaria testing will overburden health workers.	Multiple levels of stakeholders, from the national down to the local, may be concerned that adding malaria testing to ANC1 visits will overburden already busy health workers. Indeed, studies have found that increased workload is a concern among frontline staff. At the same time, health workers have generally expressed confidence in their ability to absorb malaria testing into existing workflows, provided adequate training is available, even when not limited just to first antenatal care visits (Emerson et al., 2023 ; Hoyt et al., 2021 ; Kitojo et al., 2021 ; Smith Paintain et al., 2011 ; Young et al., 2019).

		A pilot may demonstrate how the approach can be integrated within existing structures without creating undue burden on healthcare staff.
2	Testing all pregnant women and girls at ANC1 is cost-prohibitive.	Implementing ANC1 malaria surveillance incurs an additional cost; however, it is a cost-efficient approach. The additional cost of testing pregnant women is approximately \$0.35 per RDT (Gutman et al., 2023) and the treatment cost for those tested positive. This testing provides timely, granular surveillance data that can be used to support the efficient allocation of malaria program resources. Alternative sources of prevalence data, largely MIS surveys, are expensive to implement and are infrequent. Funding cuts are likely to make these surveys even more infrequent, creating new surveillance gaps.
3	Pregnant women will not want an additional test using the same blood draw for other testing at their first ANC visit.	Studies across multiple countries have found that pregnant women are generally quite accepting of malaria testing when using the same blood draw they are getting for other testing (Hoyt et al., 2021 ; Kitojo et al., 2021) and of completing short questionnaires (Emerson et al., 2023). Community engagement efforts can also help build awareness and support for this approach. For example, in Zambia, engaging community leaders, CHWs, and existing groups such as Safe Motherhood Action Groups helped sensitize the community to ANC1 malaria surveillance and respond to any concerns or misconceptions.
4	ANC1 malaria surveillance will interfere with IPTp implementation.	ANC1 malaria surveillance should complement rather than replace IPTp. This complementarity should be made clear when updating testing and treatment guidelines. As outlined in Section VIII: Procedures for Testing and Treatment , if a pregnant woman or girl is eligible for IPTp and tests negative for malaria, she can receive her first dose of IPTp. If she tests positive, she will receive the appropriate treatment for malaria, but this will not prevent her from being able to receive IPTp at future visits, provided she is eligible. Importantly, ANC1 malaria surveillance offers an opportunity to identify and treat malaria cases in the first trimester when SP is contraindicated.

“One thing they all said was, you know, every single woman wants to be tested because, you know, I guess why wouldn’t you? You know you’re living in a malarious area, then why wouldn’t you want to know if you’ve got malaria?”

-Key informant on ANC1 pilot study in the DRC

Policy Alignment

To implement ANC1 malaria surveillance at scale, it may be necessary to revise policies or protocols. The specific policies or protocols that need updating will depend on the context. Wherever revisions are required, alignment with the [WHO ANC, review of evidence in treatment recommendations](#), and [malaria in pregnancy guidelines](#) should be sought.

Potential policy or guideline updates that may need revision to allow for ANC1 malaria surveillance include:

Guideline/Policy	Potential Revisions Needed
First ANC visit guidelines	May need to be updated to allow malaria testing for all pregnant women and girls at the first antenatal care visit for surveillance purpose. Guidelines should also clearly lay out the proper treatment procedure for women who test positive (following the national treatment guideline of malaria in pregnancy) and that testing at ANC1 complements IPTp.
Treatment of malaria in pregnancy guidelines	Treatment guidelines should reflect the latest WHO guidance .
Data collection and review protocols	Should be updated to include new data elements that will be collected for ANC1 malaria surveillance (see Section IX: Data Collection System). Standard operating procedures (SOPs) for data review meetings should also be updated to include review and analysis of ANC1 malaria surveillance data.
National Malaria Strategic Plan (NMSP)	In some contexts, the NMSP may need to be revised to reflect this new surveillance strategy.

INTEGRATION: Integration should begin at the planning and stakeholder engagement stage, ensuring that ANC1 malaria surveillance objectives align with broader health system priorities and national health strategic plans. An integrated approach to planning promotes system-wide coherence and helps prevent the creation of parallel structures that may fragment the health system.

Recommended actions:

- Align ANC1 malaria surveillance activities with national health sector strategic plans
- Conduct a landscape analysis to identify existing maternal health initiatives and potential synergies
- Identify integration champions within each relevant department to facilitate coordination
- Develop an integrated implementation roadmap with clearly defined milestones
- Establish coordinated timelines that account for complementary activities across health programs

Community Engagement

The success of ANC1 malaria surveillance relies on the active participation of pregnant individuals, making effective community engagement essential for program implementation. Although pregnant women and girls have generally been receptive to malaria testing and survey questions during their ANC1 visits, ongoing community engagement remains crucial to build trust, foster support, and address any concerns that may arise.

Engagement Strategies

1. Leveraging existing community structures: Effective ANC1 malaria surveillance programs utilize established local networks to build trust and increase participation:

- **Community-based groups:** Engage existing committees and groups such as Neighborhood Health Committees and Safe Motherhood Action Groups within the health facility catchment area. These peer-appointed members are already involved in health promotion activities, making them valuable allies in planning and communication strategies for ANC surveillance.
- **Traditional & religious leaders:** Traditional and religious leaders hold significant influence in many communities and can provide critical support for health initiatives. Their endorsement of ANC1 malaria surveillance can increase community acceptance and participation. Engaging these respected figures early in the process helps establish legitimacy for the surveillance activities and facilitates broader community buy-in.
- **Community health workers:** CHWs serve as vital links between health facilities and communities, making them ideal for communicating surveillance objectives and addressing concerns. With their established relationships in the community, CHWs can effectively gather feedback, address misconceptions, and promote ANC attendance among pregnant women and girls.

2. Facility-based engagement: While broader community outreach is important, direct engagement through ANC visits serves as a cornerstone of effective communication.

- **Group information sessions:** Nurses routinely conduct structured group information sessions during ANC visits, particularly targeting first-time pregnant women. These sessions typically cover key topics such as pregnancy care and malaria prevention. Information on the purpose and procedures of ANC1 malaria surveillance should be systematically integrated into these sessions with IPTp provision and other important considerations such as prioritized bednet use.
- **Screening process:** During the screening process, health providers should explain the malaria testing and treatment protocols to pregnant women. The screening process provides an important opportunity to answer questions, address concerns, and correct any misinformation about malaria testing or treatment during pregnancy.

CASE STUDY: In Zambia, community engagement was implemented through a comprehensive, multi-layered strategy. Neighborhood health committees in each health facility catchment area, composed of peer-selected members, actively contributed to facility-level action planning. CHWs and traditional leaders were engaged as key stakeholders, leveraging their trusted roles in local health communication. The initiative also drew on existing structures, including Safe Motherhood Action Groups, to deliver targeted messaging

to women of reproductive age, promoting ANC attendance and facility-based delivery. Throughout, community concerns and misconceptions were addressed through culturally sensitive dialogue, ensuring interventions were both relevant and widely accepted.

Educational Materials and Messaging

Visual Communication Tools

Informational posters and visual displays are powerful tools for increasing awareness and understanding of ANC1 malaria surveillance programs. These materials should be strategically placed in healthcare facilities, community centers, and other gathering places where pregnant women and their families may visit. Educational materials should be developed with input from community representatives to ensure they address local concerns and reflect cultural sensitivities regarding pregnancy care and data collection.

Effective visual materials should:

- Clearly explain the purpose and benefits of testing women for malaria and either treating them or giving them preventative therapy as part of information on how ANC1 visit screening for malaria contributes to improving maternal and child health outcomes
- Use simple, accessible language and culturally appropriate imagery
- Include translations in relevant local languages

Please refer to Annex II for example posters in clinics in Tanzania.

INTEGRATION: Integrating messages about malaria testing, treatment and prevention in community engagement activities enables consistent messaging while reducing community fatigue from fragmented outreach. Coordinated approaches ensure that communities receive clear, comprehensive information and enhance the effectiveness of maternal health programs.

Revise integrated behavior change communication materials that consolidate key messages across multiple aspects of maternal care, ensuring that ANC1 malaria surveillance messaging is embedded within comprehensive antenatal care counseling.

IV. Budget Considerations

ANC1 malaria surveillance is generally considered cost-efficient, as it can be integrated into ANC1 services without requiring substantial additional resources. This section provides guidance for developing budgets to support the implementation of ANC1 malaria surveillance.

Key Budget Components:

To support successful implementation, malaria programs should account for both start-up costs (e.g., training, equipment, system setup) and recurring costs (e.g., data reporting, supervision, supply replenishment). Securing the commitment and endorsement of the NMCP is critical to achieving sustainable budgeting and successful integration of ANC1 malaria surveillance activities. Additionally, coordination with other health programs is essential to leverage shared resources, avoid duplication, and enhance cost-efficiency. The table below outlines key budget components, their specific elements, and related considerations.

Budget Component	Key Elements	Considerations
Training	• Incorporation of 1st visit testing, treatment and prevention protocols into trainings for health workers on ANC1. Stand alone training could be considered for fast roll-out procedures. • Supervision and mentoring during early implementation	A train-the-trainer cascade approach is recommended to build local capacity and optimize resources. Training and supervision should be incorporated into complementary health sector initiatives (e.g., RMNCH, HIV, or HMIS training) to reduce duplication and lower overall costs.
Diagnostic & Treatment Supplies	• Rapid Diagnostic Tests (RDTs) • Artemisinin-based Combination Therapies (ACTs) • Other supplies: gloves, lancets, alcohol swabs, etc.	The most significant cost driver will typically be RDT and additional ACT procurement, as the blood draw for malaria testing should be combined with other recommended testing at ANC1. Forecasting and quantification should be modified and closely aligned with ANC service utilization data to prevent stockouts. All women in their 1st ANC visit should receive an RDT. Cost-sharing should be arranged

		for other supplies.
Data Collection & Management	• Printing and distribution of ANC registers • Integration with and modification of national HMIS platforms to incorporate revised and new variables (see IX. Data Collection System for minimum variables)	Updates to registers, digital tools, and digital platforms should be coordinated across programs to reduce duplication of efforts and lower costs.
Logistics & Supply Chain	• Storage and distribution of RDTs and ANC supplies • Transportation to health facilities	Integrate ANC1 malaria testing supply chain needs within existing national health logistics systems. Joint distribution with other commodities can substantially reduce transport costs.
Monitoring & Evaluation	• Personnel time for data review and validation • Routine reporting and analysis activities • Quarterly or semi-annual review meetings	Allocate a portion of data review, quality assurance, and supportive supervision time for analyzing ANC1 data. This could include developing dashboards and action plans.
Community Engagement	• Community sensitization activities • Information, Education, and Communication (IEC) materials (e.g., posters, flyers, radio messages)	Engagement activities should be budgeted to promote awareness and acceptance of malaria testing during the first ANC visit regardless of symptoms. Costs can often be minimized by aligning with existing maternal health outreach campaigns.
Program Management	• Coordination and planning meetings • Stakeholder and partner engagement • Operational overheads (communications, transport, utilities) • Supportive supervision	Allocate a proportion of existing staff time to ANC1 activities rather than hiring new personnel. This promotes sustainability and alignment with ongoing program management structures.

Diagnostic Tests: Primary Recurring Cost Driver

The most significant recurring budget component is the procurement of additional RDTs to enable testing of all pregnant women at their first ANC visit, regardless of presence or absence of malaria symptoms. Securing adequate funding for RDTs is essential to maintain consistent testing coverage and data reliability. Insufficient supplies or frequent stockouts can compromise

representativeness, introduce sampling bias, and reduce the validity of ANC-based malaria prevalence estimates. For detailed guidance on quantifying RDT requirements, refer to [Section VIII: Supply Chain Preparation](#).

Note that in the initial implementation phase, start-up costs — including staff training, protocol development, coordination, and system preparation — are likely to represent a substantial share of total expenditures. These costs are expected to decrease over time as the surveillance system matures and becomes embedded in routine ANC operations. For detailed guidance on planning these activities, refer to [Section VII: Health Worker Training](#) and [Section IX: Data Collection Systems](#).

Sustainability and Cost Optimization

To ensure long-term viability, programs should:

- Plan for the gradual integration of recurring costs into national health budgets
- Explore cost-sharing and joint financing mechanisms with related programs (e.g., maternal health, HIV, or integrated disease surveillance).
- Periodically review expenditures and adjust budgets based on implementation experience and evolving data needs.

INTEGRATION: Budgeting for ANC1 malaria surveillance should be strategically embedded within broader MoH and NMCP planning processes, leveraging complementary resources from maternal health programs and other health system initiatives. Integrating ANC1 malaria surveillance activities—such as incorporating surveillance modules into RMNCH or HIV refresher training, or aligning supervision visits with routine district health reviews—enhances operational efficiency, reduces implementation costs, and strengthens sustainability by utilizing existing structures rather than creating parallel systems. An integrated budgeting approach facilitates effective resource allocation, identifies cost-saving opportunities through programmatic synergies, and promotes long-term program sustainability.

Key recommended actions:

- Conduct joint budgeting exercises with all relevant stakeholders to align priorities and resources.
- Identify shared cost categories that can be consolidated across programs and establish cost-sharing mechanisms for activities such as training and supervision.
- Develop a resource mapping tool to track contributions from different funding streams.
- Formulate sustainability plans that gradually integrate ANC1 malaria surveillance costs into regular government budgets.

Budget Excel Template

A standardized Excel budget template accompanies this guidance to assist NMCPs in planning and estimating costs for ANC1 malaria surveillance implementation. The template includes predefined categories for all key budget components outlined above and can be adapted to reflect country-specific contexts, resource availability, and programmatic priorities. NMCPs are encouraged to use this tool to promote comprehensive, transparent, and comparable budgeting across implementation sites. In addition, RDTs for ANC services should be quantified in the diagnostic tab of the RBM gap table, including quantifying the number of women attending

ANC1 and a buffer (as every woman coming to ANC1 would be tested, regardless of symptoms).

V. Site Selection

ANC1 malaria surveillance is designed to generate population-level prevalence estimates to inform malaria control programs — it is not a case management protocol, and implementation does not require changes to existing treatment guidelines. With this in mind, site selection should be guided by the goal of producing representative, reliable prevalence data rather than maximizing clinical coverage.

ANC1 malaria surveillance can be conducted using two approaches: a universal approach or a sentinel-site approach. The chosen approach will depend on program priorities, available resources, technical capacity, and existing health information systems infrastructure. To maximize the epidemiological benefits of ANC1 malaria surveillance, a universal approach may be considered where resources, infrastructure, and program capacity allow. At the end of this section, guidance is provided on site selection for pilot testing, which is similar to, but slightly different from, broader ANC1 malaria surveillance site selection.

Universal:

A universal approach involves rolling out ANC1 malaria surveillance to all ANC clinics within a country and is the recommended approach where possible. Overall, comprehensive coverage enables detection of local transmission patterns, identification of geographic disparities in malaria risk, and more precise targeting of interventions. A universal approach maximizes the benefits of ANC1 malaria surveillance by generating representative, granular surveillance data that enables subnational analysis at multiple levels—from national down to facility catchment areas. Facility-level analysis should always be interpreted with caution, but particularly so in facilities with low numbers of attendees; aggregation to the district level is recommended to ensure data stability and reliability. When interpreting facility level data, it is important to have a good understanding of the facility catchment, as women may not attend the facility closest to their house. Universal ANC1 coverage also entails only slight modifications to existing register and reporting systems, with the possibility to seamlessly incorporate ANC1 malaria surveillance into overall routine reporting and review. Additionally, a universal approach provides complete population coverage, making the data directly actionable for program planning at all administrative levels.

Sentinel Sites

A sentinel surveillance approach involves implementing ANC1 malaria surveillance in a strategically selected subset of health facilities. Sentinel sites can provide a continuous source of longitudinal data and may be more feasible in resource-constrained settings or during pilot phases. However, sentinel surveillance inherently involves trade-offs: data from selected sites may not be representative of unsampled areas, limiting generalizability and potentially missing important subnational variation in transmission intensity. For these reasons, the universal approach is preferred for long-term implementation.

When a sentinel site approach is necessary, careful site selection is critical to ensure data quality and alignment with program needs. Selection criteria should include:

- **Alignment with decision-making needs:** Sites should be distributed to capture transmission variation across relevant geographic and epidemiological strata, in alignment with program information needs.
- **Sufficient patient volume:** Even in busy ANC clinics, relatively few pregnant women and girls may be attending their first ANC visit, and therefore be eligible for ANC1 malaria surveillance. Low ANC1 attendance can compromise the reliability of ANC1 malaria surveillance data. Ideally, a sentinel site should have a minimum of 40-50 first ANC visits per month, but no fewer than 30, to generate stable monthly estimates. Settings with lower prevalence will require larger sample sizes to delineate temporal trends. Here a sentinel site could refer to an individual clinic or a subset of clinics within an area. If possible, rather than prioritizing large ANC clinics, which may introduce bias (e.g. towards urban centres), to obtain adequate sample size, sentinel sites should consider drawing from a representative sample of ANC clinics within a given location.
- **Sufficient human resource capacity:** Effective ANC1 malaria surveillance requires a health workforce, primarily nurses, with the capacity to integrate surveillance activities into routine care. Workforce assessments should determine whether sufficient staff are available and whether existing workloads allow time for these tasks.
- **Sufficient RDT and ACT stocks:** Sites must maintain a reliable RDT and ACT supply chain to support ANC1 malaria surveillance. Stockouts would prevent testing of all pregnant women and girls at their first ANC visit, thereby compromising data completeness and quality.
- **Data quality and reporting capacity:** Sites should have demonstrated the ability to collect accurate data and report in a timely manner, especially as these might be parallel systems to routine HMIS reporting.

INTEGRATION: One approach to sentinel site selection is to prioritize facilities where other sentinel surveillance activities are already established. In these settings, staff are typically already trained in surveillance procedures and data collection protocols. This existing capacity can facilitate more efficient implementation of ANC sentinel surveillance. Co-locating multiple surveillance activities also improves cost-effectiveness through shared infrastructure, equipment, and personnel.

Sentinel Site Representativeness

Programs implementing sentinel surveillance should also validate the representativeness of sentinel data on the broad malaria transmission dynamics. Sites that are chosen for non-malaria sentinel surveillance may not be representative of malaria transmission zones throughout the country.

Pilot Testing

Before national rollout, countries may prefer to pilot the approach in a subset of locations to build stakeholder buy-in and identify potential challenges and support needs. Several countries have implemented ANC1 malaria surveillance pilots, including Benin, Burkina Faso, Mozambique, Nigeria, and Zambia. Rigorous documentation of implementation challenges and successful practices during the piloting phase is critical for refining operational strategies and guiding broader scale-up.

The pilot process should begin with carefully selected sites that reflect diverse geographic and demographic contexts, as well as varying malaria transmission intensities. When determining where to pilot test, the following factors should be considered:

- **ANC1 attendance:** ANC attendance rates are high, and ANC1 volumes are sufficiently high to provide relevant data. While not a strict requirement, a minimum monthly volume of 20 ANC1 visits per facility has been used as a selection criterion for pilot sites in previous studies ([Gutman et al., 2023](#)).
- **Commodity supply:** Access to sufficient RDTs and ACT is critical for a successful pilot study. Countries that have completed pilot studies typically partnered with external organizations to guarantee adequate supplies. While this partnership approach ensures pilot success, it may not accurately reflect whether ANC1 malaria surveillance is feasible under routine country conditions without such targeted external support. Therefore, a country should consider re-adjusting quantification requests (of RDTs and ACTs) to district, regional and central stores for each pilot site to guarantee routine national commodity distribution.

CASE STUDY: During an ANC1 pilot in Mozambique, the Chemba district experienced a RDT stockout. In response, staff rightly prioritized testing only symptomatic pregnant women and girls rather than all pregnant women and girls. As a result, the prevalence data collected in this district were upwardly biased. This was eventually corrected by re-quantifying the amount of RDTs that were allowed to be requested by the district to the provincial and central medical stores.

- **Malaria transmission:** A range of different transmission intensities representative of the country is generally recommended for a pilot study; however, this should also align with program objectives. For example, in Zambia, the pilot study focused on lower transmission settings (around 50 cases per 1,000 population) to validate HMIS data in those areas (Zambia key informant).
- **Pilot timing and duration:** Pilot study length may vary, but where malaria is seasonal, it should cover the period before, during, and several months after the seasonal peak, as ANC surveillance may detect the peak up to three months after the community peak.
 - When aligned with the rollout of other interventions, such as indoor residual spraying (IRS) or SMC, ANC1 may be able to track changes in prevalence. However, because the primary objective of piloting is to establish and refine surveillance systems by identifying and addressing operational challenges, data generated during this phase may not yet be sufficiently robust to support a reliable assessment of intervention impact.

VI. Supply Chain Preparation

Maintaining sufficient, uninterrupted commodity supplies is critical to ensuring ANC1 malaria surveillance produces high-quality data and sustains provider and patient confidence in the system. Stock-outs of RDTs can undermine data completeness, introduce bias into surveillance

estimates, and erode trust in ANC services. RDT and ACT supply management for ANC1 malaria surveillance should be integrated into regular supply management systems and processes rather than establishing parallel supply chains, thereby helping ensure sustainability and reducing administrative burden.

RDT Quantification

RDTs are recommended for testing in ANC1 malaria surveillance due to their speed, ease of use, minimal training requirements, and ability to provide immediate results, enabling a rapid transition from diagnosis to treatment. The total number of RDTs needed for ANC1 malaria surveillance should slightly exceed the number of women and girls coming for their first antenatal care visit. Programs can estimate RDT needs by:

- Using historical ANC1 attendance data from the HMIS
- Adding a buffer stock to account for wastage, invalid tests, and unexpected increases in attendance
- Adjusting forecasts based on population growth and expected changes in ANC coverage

This estimation should be included in overall national and subnational estimates of commodity needs and be added in the public commodity needs (both RDTs and ACTs) in NSPs, while filling out RBM Gap tables or in making funding requests.

Example RDT Calculation:

The example below demonstrates RDT calculation using synthetic data on the number of pregnant women attending their first ANC visit at a single facility.

Month	# Women Attending ANC1
January	28
February	25
March	30
April	32
May	35
June	33
July	29
August	36
September	38
October	34
November	31
December	27
Total	378

Total women attending ANC1 over past 12 months: 378

Average number of women per month:

$$378 \div 12 = 31.5 \text{ women/month}$$

Number of RDTs needed per month (rounded up): 32

Number of RDTs needed with 10% buffer:

$$32 \times 1.10 = 35.2 \rightarrow \mathbf{36 \text{ RDTs}}$$

ACT Quantification

Additional ACT needs for ANC1 malaria surveillance can be estimated using the latest test positivity data from existing surveillance systems or, if this is unavailable, from recent prevalence surveys or community-level transmission data. For example, if the test positivity rate is 40%, programs should plan for sufficient ACTs to treat approximately 40% of ANC1 attendees.

ACT needs are likely to vary substantially with malaria transmission seasonality, mirroring patterns observed in outpatient departments (OPDs). Programs should:

- Analyze monthly or quarterly trends in malaria positivity to identify high and low transmission periods
- Adjust ACT procurement and distribution schedules to align with anticipated seasonal peaks
- Monitor ACT consumption rates during initial implementation to refine quantification models
- Coordinate ANC-specific ACT forecasting with broader facility-level quantification to optimize inventory management

These estimations should be included in overall national and subnational estimates of commodity needs and be added in the public commodity needs (both RDTs and ACTs) in NSPs, while filling out RBM Gap tables or in making funding requests.

Example ACT Calculation:

The following example continues from the previous RDT example, using the same synthetic data. In this district, the historical test positivity rate is approximately 40%.

Average number of women per month:

$378 \div 12 = 31.5$ women/month

Number of positive cases per month:

$31.5 \times 0.40 = 12.6 \rightarrow 13$ positive cases/month

Number of ACTs needed (rounded up): 13

Number of ACTs needed with 10% buffer:

$13 \times 1.10 = 14.3 \rightarrow 15$ ACTs/month

INTEGRATION: Integrating ANC1 supply chain needs into the existing national Logistics Management Information System (LMIS) is essential for efficient implementation and sustainable commodity security.

Recommended actions:

- Incorporate ANC1 commodities into national standard procurement processes
- Establish joint quantification and forecasting procedures for integrated supply planning
- Coordinate storage and distribution of RDTs, ACTs, and ANC supplies
- Develop integrated inventory management protocols at all levels of the health system
- Create coordinated quality assurance mechanisms for all relevant commodities
- Establish early warning systems for potential stock-outs that span across programs

VII. Health Worker Training

While health workers are already familiar with the core tasks required for successful ANC1 malaria surveillance—testing with RDTs and accurately recording data in registers—training on the new protocol is necessary for successful implementation.

Training is essential to:

1. Ensure that all pregnant women and girls are tested at ANC1 for malaria, not just those who are symptomatic
2. Refresh health workers' skills on RDT use and quality control measures
3. Reinforce the importance of quality data and the critical role health workers play in its generation
4. If a pilot study is being conducted, training may also need to cover the study protocol and any data collection tools used for the pilot

Training on ANC1 malaria surveillance should ideally not be a standalone malaria activity unless it is part of a pilot study where targeted training is required only for participating health workers. Instead, programs are advised to look for opportunities to integrate such training into existing ANC, malaria, or RMNCH training.

Standard best practices for training should be applied to any ANC1 malaria surveillance training module, including incorporating practical activities to use the training material. After initial training, regular supervision should be conducted to ensure protocols are followed and reinforce learning where needed. During Nigeria's ANC1 malaria pilot study, for example, quarterly supervision visits were conducted to ensure activities were being carried out and documented properly and to build feedback loops for continuous quality improvement.

INTEGRATION: Training should align with complementary health sector initiatives and be integrated in routine training on ANC services (e.g., RMNCH, HIV, malaria, etc.) to reduce duplication and lower overall costs. Integration minimizes disruption to health service delivery and allows for more efficient use of provider time and limited training resources.

Recommended actions:

- Integrate first-visit malaria testing of all women, independent of symptoms, into all ANC curricula that address service delivery components
- Ensure that this integration follows through all cascade training approaches utilizing master trainers and training of trainers
- Create integrated supervision checklists that address multiple program requirements
- Integrate malaria testing in first ANC into job aids that cover all aspects of antenatal care

CASE STUDY: Tanzania has implemented ANC1 malaria surveillance at a national scale for over a decade. Tanzania used a cascade training approach, starting with national trainers training regional and council teams, who then trained facility staff. Importantly, Tanzania did not hold a stand-alone training for ANC1, but rather integrated it into other planned trainings

on malaria case management and focused antenatal care. Practical, quality-focused training included hands-on activities to ensure participants understood the material.

Key topics covered regarding ANC1 in training included:

- An introduction to malaria RDTs, including their clinical value and how to integrate their use into ANC testing routines
- Standard operating procedures for RDT use and ACT use
- Quality control processes
- HMIS/data management

VIII. Procedures for Testing and Treatment

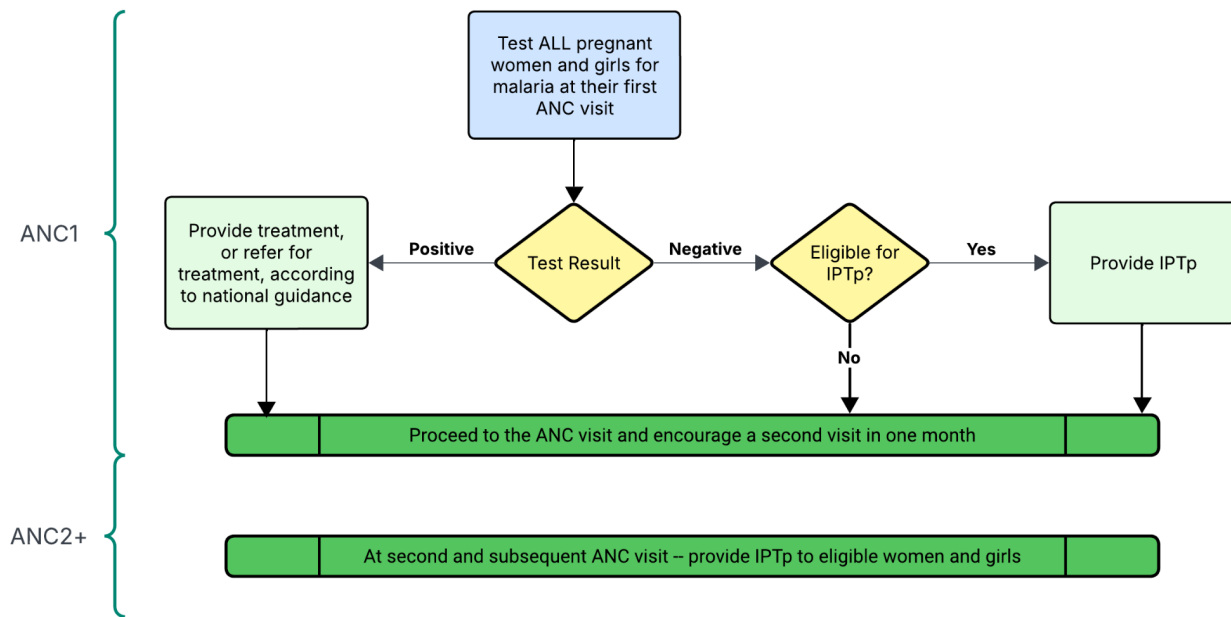
In facilities where ANC1 malaria surveillance is being implemented, **all pregnant women and girls attending their first ANC visit should be tested for malaria**, alongside other tests recommended by national guidelines (e.g., HIV, syphilis); this is true for both census and sentinel site surveillance approaches and is true whether or not the pregnant person has symptoms of malaria. Using a single blood draw minimizes the burden on both patients and staff and prevents the need for additional supplies solely for malaria testing. Malaria test results, along with other relevant information such as gravidity, fever, and other malaria symptoms, should be recorded in the register.

If a malaria test is positive: Women who test positive for malaria should be treated with antimalarials in accordance with national policy. The WHO currently recommends that pregnant women in the first trimester be treated with artemether-lumefantrine ([WHO, 2025](#)). The latest WHO and national treatment guidance should be consulted to ensure safe, context-appropriate treatment protocols.

If testing occurs at a different location (e.g., ANC clinic) than where treatment is provided (e.g., OPD), appropriate care transitions and referrals should be made. Care pathways may differ for minors compared with adults, so these differences should be clearly documented and included in staff training.

If a malaria test is negative: If eligible, women who test negative for malaria should receive their first dose of IPTp, in accordance with WHO guidelines ([WHO, 2025](#)) and national policy.

The figure below shows the appropriate actions for positive and negative test results.



IX. Data Collection Systems

The primary objective of ANC1 malaria surveillance is to generate reliable, timely, and actionable information that directly informs malaria program decision-making. Achieving this requires data-collection systems that balance data quality, provider workload, and operational feasibility. ANC1 malaria surveillance should be integrated into existing data-collection workflows and routine service delivery whenever possible. Standalone or parallel systems established solely for ANC1 malaria surveillance are discouraged, as such approaches are rarely sustainable. This section outlines recommended data elements, register modifications, and strategies for operationalizing data collection.

Core and Recommended Data Elements for ANC1 Malaria Surveillance

The selection of ANC1 malaria data elements should be undertaken in close collaboration with key stakeholders from the NMCP and RMNCH programs, regional, district or facility focal points, the HMIS department and ICT or other departments, to ensure alignment with national surveillance priorities, secure stakeholder buy-in, and support long-term sustainability.

At a minimum, ANC1 registers must capture the following core data elements:

Existing indicators

1. Total number of first ANC visits during the month
2. Total number of women attending their first ANC visit by gravidity (primigravida, multigravida)

Indicators that may need to be added/modified

3. Total number of ANC1 visit women tested for malaria
4. Total number of ANC1 visit women with fever or other malaria symptoms
5. Total number of ANC1 visit women with positive malaria test results
6. Total number of ANC1 visit women treated with ACTs according to national protocol
7. Total number of eligible ANC1 visit women given IPTp, according to national protocol

Each data element is described in the table below.

Data Element	Description	Rationale
Total number of ANC1 visits during the month	Number of pregnant women and girls attending their first antenatal care visit within the reporting period.	Supports planning for RDT and ACT procurement needs, facilitates assessment of the denominator for ANC1, and provides insight into ANC attendance rates and representativeness of ANC1 data.
Gravidity	Number of previous pregnancies; categorized as primigravida (G1) or multigravida (G2+). If unavailable, age may be used as a proxy.	Malaria susceptibility varies with gravidity. ANC1 malaria surveillance data are preferably adjusted by gravidity, as malaria prevalence in primigravida women more closely reflects that in children under five (van Eijk et al., 2015 ; Pujol et al., 2023).
Total number of ANC1 visit women tested for malaria	Number of women and girls tested for malaria at their first ANC visit.	Serves as the denominator for malaria prevalence calculations.
Total number of ANC1 visit women with a fever or other malaria symptoms	Number of first ANC visit women that present or describe a fever, or other malaria symptoms	Serves to be able to calculate the symptomatic and asymptomatic rate of malaria in this population
Total number of ANC1 visit women with positive malaria test results	Number of women and girls with a positive malaria test result at their first ANC visit.	Provides the numerator for prevalence estimates.
Total number of ANC1 visit women treated antimalarials according to national protocol	Number of women and girls receiving antimalarial treatment as per national guidelines following a positive malaria test result.	Monitors adherence to test-and-treat protocols and supports case management quality assessment.
Total number of eligible ANC1 visit women who receive IPTp	Number of women and girls in their first visit who receive IPTp for malaria prevention	Monitors adherence to protocol of giving IPTp to all eligible women in their 1st visit who test negative for malaria

CASE STUDY: Tanzania is currently the only country operating ANC1 malaria surveillance nationwide and has over a decade of experience implementing it. Health facilities submit monthly summary reports on antenatal malaria testing through the DHIS2 platform. These reports capture the following data elements:

- Total number of antenatal care attendees
- Number of attendees tested at their first visit
- Number of attendees who tested positive for malaria
- All data are disaggregated by age group: women under 20 years and women aged 20 years or older
 - Tanzania uses age rather than gravidity. Although gravidity is the preferred indicator, age can be used as a proxy.

Additional Recommended Data Elements

In addition to the core indicators, several supplementary variables are recommended, where feasible, to strengthen the interpretation of malaria prevalence trends. Many of these variables are already routinely collected in ANC registers; however, they may not be consistently tallied and submitted in aggregated reports to the routine health information system.

Data Element	Rationale
Fever Status	The presence of fever is important for determining whether all women attending their ANC1 visit are being tested, or only those presenting with fever. Testing only febrile women introduces selection bias, which can lead to overestimation of malaria prevalence. Note: Cases are intentionally not classified as symptomatic versus asymptomatic, since malaria symptoms may be incorrectly attributed to pregnancy.
Gestational Age	Risk and intervention eligibility vary by trimester, making this important for surveillance and program planning (Gutman et al., 2023).
Place of Residence	District-level residence data enable spatial analysis of transmission trends and support accurate case attribution. This information is particularly important when pregnant women and girls often seek care outside their health facility's catchment area. However, the use of such data requires standard district names or codes. Unless DHIS2 has robust facility and district geo-coding, the data quality required for use and interpretation on this element may present a challenge.

Please refer to Annex II for example ANC register and ANC monthly report in Tanzania.

Register Revision

Once the data elements are finalized, national health registers must be formally updated. Because these registers are revised only periodically, the process requires careful planning and

close coordination with RMNCH, HMIS and DHIS2 teams. ANC1-related updates should be aligned with national register revision procedures and DHIS2 update cycles to ensure efficient use of resources.

Key steps include:

STEP 1: COORDINATION

Coordinate with the MNCH department responsible for ANC services.

STEP 2: HMIS REVISION

Collaborate with the HMIS unit to revise the registers and incorporate all agreed-upon data elements.

STEP 3: DHIS2 REVISION

Work with DHIS2 developers and data managers to create/modify data entry forms, update data elements and indicators, and configure dashboards.

STEP 4: TEST DIGITAL TOOLS

Test new digital forms and reports to verify functionality, usability, and data integrity.

STEP 5: UPDATE PROTOCOLS & GUIDANCE DOCUMENTS

Update data collection protocols and prepare guidance documentation for DHIS2 users.

STEP 6: PRINT & DISTRIBUTE REGISTERS

Print and distribute updated paper registers to health facilities.

STEP 7: TRAIN STAFF

Train facility staff, district health officers, and data clerks on the use of updated registers and digital reporting tools.

If the next register or DHIS2 revision is not scheduled within a reasonable timeframe, ANC1 malaria surveillance implementation should not be delayed. An interim solution can be adopted instead. For example, Tanzania introduced a temporary approach by adding columns to existing registers to capture ANC1 malaria data. If malaria testing for febrile women is already in the register, a temporary solution could be to modify this column to include testing and test results for all women in ANC1, until a register review is possible. This would require all ANC personnel to understand that the testing column should be for all women, regardless of symptoms, and that the test result should be recorded for all cases.

Date of 1st Visit	Name	Age	Gravida	Para	Gest. age at 1st Visit	Tested for malaria	Test results	IPTp 1
05/1/2026	J.F	22	G1	P1	14 weeks	Y	+	N
05/1/2026	T.K	23	G2	P2	14 weeks	Y	-	Y
05/1/2026	M.A	30	G3	P2	4 weeks	Y	-	N

Operationalizing ANC1 Malaria Surveillance Data Collection

The successful implementation of ANC1 malaria surveillance depends on the effective rollout of data collection tools, supported by coordinated efforts to ensure that health facilities are adequately equipped and that personnel are appropriately trained.

- **Data collection tool distribution:** For paper-based systems, facilities should estimate the number of paper registers that need to be printed based on anticipated ANC1 client volume and maintain sufficient stock through the following distribution cycle. Facilities should print extra registers (a buffer of approximately 15% - 20% is recommended) to accommodate unexpected increases in ANC attendance or damage to paper registers. Facilities using electronic data collection systems should also maintain a limited supply of paper registers as a contingency to minimize service disruptions or data recording.
- **Training and capacity building:** Training on ANC1 malaria surveillance data collection requirements and tools should be integrated into ANC1 malaria surveillance training curricula. Sessions should include hands-on practice and should emphasize data quality and accuracy. Detailed guidance on training approaches and implementation is provided in [Section VII: Health Worker Training](#).

HMIS Integration

ANC1 malaria surveillance data should be integrated with the national HMIS. Integrating ANC1 malaria surveillance into existing HMIS platforms minimize redundancy of burden of data collection, entry, sharing, and analysis, while enhancing accessibility and decision-making.

Digital Data Collection

For long-term sustainability, ANC1 malaria surveillance data should be collected through digital systems. To maximize sustainability, countries should leverage existing technological infrastructure where possible to reduce implementation costs. Note that any digital systems should be interoperable with the HMIS platform, and data should flow into the system.

X. Data Quality

Accurate and reliable malaria prevalence estimates from ANC1 malaria surveillance rely on consistent, high-quality data collection across all health facilities. This section presents a structured approach for data quality assurance, emphasizing the critical role of coordinated oversight and collaboration between clinical and data management teams at every level of the health system.

Epidemiological Properties of ANC1 Malaria Surveillance Data That Facilitate Quality Monitoring

A relatively distinctive feature of ANC1 malaria surveillance is that several of its core indicators follow patterns that should be epidemiologically stable and predictable over time — a property that makes unusual results easier to detect, flag, and investigate. Routine malaria indicators often lack this predictability, such as outpatient case counts, which can fluctuate substantially because of changes in care-seeking, besides service provision issues and reporting challenges.

As ANC1 reflects a routine contact expected among pregnant women in the underlying population, monthly counts would usually be expected to change only gradually, for example in line with population growth or gradual shifts in service use. Large sudden increases or decreases should therefore trigger review, as they may reflect reporting problems, missing data, duplication, changes in facility participation, or disruption to services.

ANC1 malaria prevalence has a similar advantage. As a prevalence-based measure in a relatively stable population, it would usually be expected to vary relatively smoothly over time than many routine case-based indicators. In addition, because malaria infection during pregnancy may persist for weeks to months, sharp increases or abrupt month-to-month reversals are less biologically plausible than for some other surveillance metrics. This gives ANC1 prevalence an important quality assurance value: unexpected spikes, drops, or rapid rebounds can be treated as signals for further investigation. Thus, the expected temporal smoothness of ANC1 prevalence is not only a feature of the epidemiology, but also a practical strength of the surveillance system itself.

Core Dimensions of Data Quality

Ensuring the utility and reliability of ANC1 malaria surveillance data requires attention to several core dimensions of data quality: completeness, accuracy, and timeliness.

- **Completeness** refers to the extent to which all required data are collected and available for analysis. This includes complete documentation of individual patient-level data, such as gravidity and test results, as well as consistent monthly reporting from all health facilities. Incomplete data can lead to inaccurate estimates of malaria prevalence and compromise the surveillance system's ability to inform malaria program planning.
- **Accuracy** refers to whether the data is correct and free from errors. Accuracy depends on the correct recording of malaria test results, demographic information, and other patient data, and avoiding errors during data transfer. High accuracy is essential for generating valid estimates of malaria prevalence.
- **Timeliness** refers to the speed with which data are collected, submitted, entered into digital systems, and made available to decision-makers. Delays in reporting reduce the effectiveness of the surveillance system in detecting changes in malaria transmission and hinder the planning of timely interventions.

Multi-Level Data Quality Assurance Approach

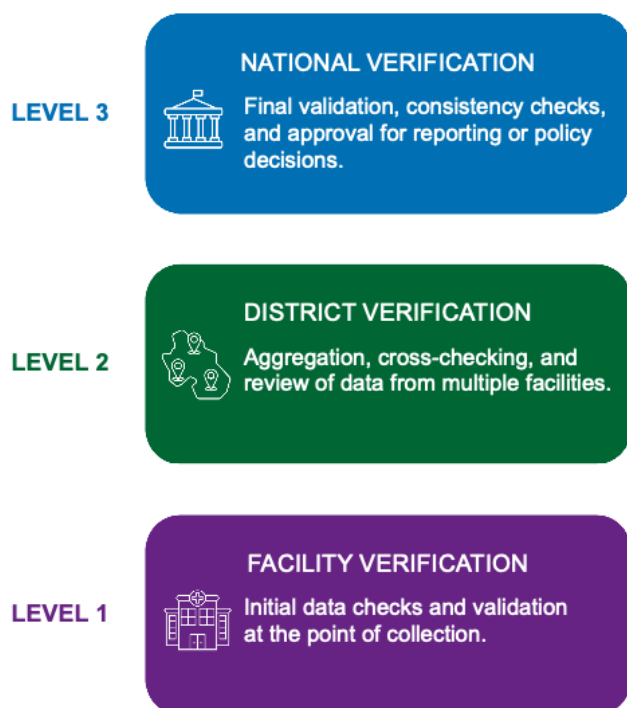
A layered approach to data verification ensures accuracy and consistency through multiple checkpoints at the facility, district, and national levels. ANC1 malaria surveillance data quality processes should be integrated within broader data quality initiatives rather than treated as standalone activities. This section outlines the key data quality assurance steps to be undertaken at the facility, district, and national levels, specifically for ANC1 malaria surveillance.

This guide does not aim to provide comprehensive instructions on data quality; numerous authoritative resources on this topic are available. For reference, the following resources provide additional guidance on data quality reviews and assessments:

- [WHO Malaria surveillance assessment toolkit: implementation reference guide](#)
- [WHO Data Quality Assurance Toolkit](#)
- [Malaria Routine Data Quality Assessment Tool: User Manual](#)
- [Data Quality Review Toolkit](#)
- [PATH Routine Data Quality Audit toolkit](#)

Facility-Level: Health facilities serve as the first line of defense against data quality issues. Quality control should be integrated into routine service delivery. Senior staff should review and compile ANC register entries daily, particularly where paper-based registers are used. Aggregation of ANC register entries should be reproduced with the minimum value set as data quality checks. Facilities should regularly verify the total number of pregnant women and girls attending any ANC visit, the number attending their first ANC visit, and the number tested for malaria during that visit. The number of women and girls attending their first ANC visit should

closely match the number tested for malaria, and significant discrepancies may indicate gaps in testing coverage or data documentation.



Supervisors may also evaluate testing accuracy during site visits, conduct internal reviews to identify any gaps in practice, and implement continuous quality improvement measures to enhance testing procedures and overall data quality.

District-Level: At the district-level, health management teams should incorporate elements of ANC1 malaria testing in the routine data validation procedures and malaria dashboard, to ensure timely and accurate data entry into systems such as DHIS2 and conduct regular comparisons between electronic records and source documents from ANC registers. Comparison should also be made with other routine malaria surveillance data locally to assess alignment.

National-Level: At the national level, activities include monthly consolidated reviews to evaluate completeness, accuracy, and consistency across all reporting facilities. National teams also cross-validate ANC1 data with other malaria surveillance sources to identify discrepancies. Additional guidance on data triangulation is provided in [Section XII: Monitoring and Evaluation](#). Strategic feedback from these reviews informs revisions to ANC1 malaria surveillance protocols, ensuring the system remains robust and responsive.

CASE STUDY: In Tanzania, ANC data is collected at health facilities using paper-based registers, tally sheets, and monthly summary reports, which are then submitted to district health offices. District HMIS staff enter this information into the DHIS2 platform. To enhance data visualization and interpretation, the NMCP, in collaboration with the University of Dar es Salaam, developed the NMCP Interactive Malaria Dashboard within DHIS2. This platform supports the production of quarterly malaria bulletins for dissemination at regional, council, and facility levels. Automated DHIS2 outputs enable data analysis across all tiers of the healthcare system.

Supportive Supervision

Supportive supervision is essential for ensuring data quality, particularly during the initial phases of ANC1 malaria surveillance implementation. During early implementation, structured supervisory visits should be conducted monthly or quarterly, with the frequency gradually reduced as systems mature and become self-sustaining. Key components of supportive supervision include:

- **Verification of universal testing:** Confirm that all pregnant women attending their first ANC visit undergo malaria testing, regardless of fever status.
- **Treatment compliance:** Ensure that all women who test positive receive appropriate treatment in accordance with national guidelines.
- **Testing continuity:** Verify that malaria testing is integrated into routine ANC services, such as HIV and syphilis testing, without disrupting or displacing other essential services.
- **Documentation review:** Assess the completeness and accuracy of ANC registers, ensuring that all required fields (such as those described in [Section IX: Data Collection System](#)) are fully populated and aligned with standard reporting formats.

INTEGRATION: Routine ANC supervision incorporating ANC1 malaria surveillance represents a strategic approach to enhancing operational efficiency. By leveraging existing supervision resources (and potentially across multiple disease areas, e.g., malaria) through conducting integrated visits, health systems can simultaneously reduce operational costs, alleviate facility-level burden, and drive systematic quality improvements throughout the continuum of care.

XI. Monitoring & Evaluation

Effective monitoring and evaluation is essential to ensure that ANC1 malaria surveillance data are not only collected but also transformed into actionable insights that inform public health programming, policy decisions, and resource allocation. This section provides detailed guidance on appropriate levels of data aggregation and analysis, the recommended frequency of data review, and approaches to data triangulation.

Indicators for Analysis

The following core indicators should be routinely analyzed as part of ANC1 malaria surveillance activities:

1. Number of ANC1 visits during the month
2. Number of women attending their ANC1 visit by gravidity (primigravida, secondigravida, multigravida - G3+)

3. Total number of ANC1 visit women tested for malaria
4. Total number of ANC1 visit women with fever or other malaria symptoms
5. Total number of ANC1 visit women with positive malaria test results
6. Total number of ANC1 visit women treated with ACTs according to national protocol

Malaria Prevalence

Malaria prevalence is calculated as the number of women attending their first ANC who had a positive RDT result divided by the total number of women tested at their first antenatal care visit. Within each district, prevalence should be disaggregated by gravidity: primigravida (gravida 1) and secundigravida, multigravida (gravida 3+), or, if such data are not available, a suitable age-based stratification. If data on the number of first ANC visits with fever or other malaria symptoms is collected, the proportion of RDT-positive women with malaria symptoms versus without malaria symptoms should also be calculated.

Data Aggregation and Analysis

To ensure the data are reliable, timely, and useful for decision-making, ANC1 malaria surveillance data should be aggregated and analyzed at multiple administrative levels:

- **Facility-Level (Monthly):** All facilities should review indicators 1–6 listed above. In addition, facilities with sufficient ANC1 volume to generate stable monthly prevalence estimates should review facility-specific prevalence trends. When conducting facility-level analyses, it is important to consider whether pregnant women and girls are accessing ANC services at facilities outside the catchment areas in which they reside.
- **District-Level (Monthly / Quarterly):** Districts should review district-level prevalence monthly, as trends may not be reliably detected at the facility level due to small sample sizes. Monthly prevalence estimates can be used to identify high-risk areas and to support district health management teams in planning and supervision activities. These estimates are also helpful in assessing subnational trends. For data quality review purposes, districts may inspect facility-level data on a quarterly basis.

In countries with multiple administrative levels, disaggregation to smaller administrative units poses additional challenges beyond small sample sizes. Pregnant women may cross administrative boundaries to attend antenatal care, particularly in urban areas, which can affect the accuracy of comparisons at the lowest administrative levels. Districts should take these mobility patterns into account when interpreting subnational data.

- **National-Level (Annually):** The NMCP should aggregate and analyze national malaria prevalence to identify long-term trends, guide strategic planning, allocate resources, and evaluate progress toward malaria elimination goals. Additionally, the NMCP should examine disaggregated data at lower levels, ideally the district level, to support subnational tailoring of interventions.

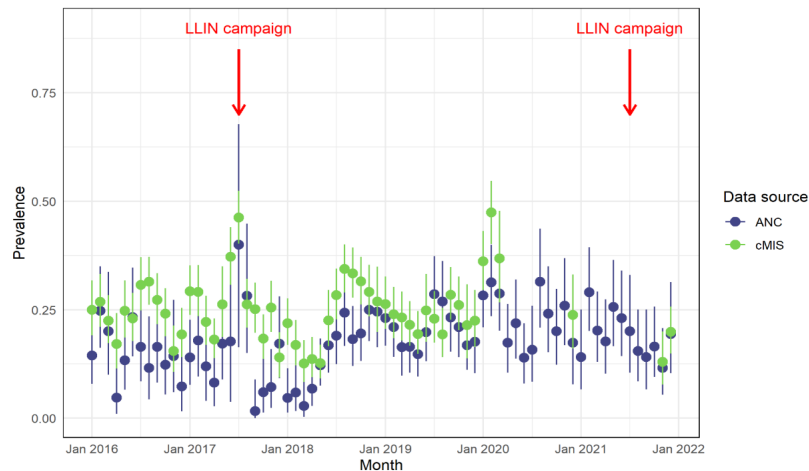
Trend analysis

Routine trend analysis enables program managers to understand temporal and spatial changes in malaria burden among pregnant women. The following analytic dimensions are recommended:

- **Temporal trends:** Examine changes in malaria prevalence over time to assess the effectiveness of interventions.
- **Seasonal patterns:** Assess seasonal variations in malaria prevalence.

- **Geographical heterogeneity:** Map malaria prevalence by district to identify geographic clusters of infection and target resources efficiently. Additionally, assess temporal changes in prevalence within regions to track epidemiological trends.

Example: Comparison of malaria prevalence estimates between ANC1 malaria surveillance vs. continuous Malaria Indicator Survey (cMIS), Rarieda, Kenya (Samuels et al., 2026)



ANC1 malaria surveillance was implemented in nine health facilities serving 14 subcounties in Rarieda, Kenya. This graph displays ANC1 malaria prevalence (blue) and cMIS prevalence (green) over six years. Both data sources demonstrate declines in prevalence following long-lasting insecticidal net (LLIN) campaigns in 2017 and 2021. Notably, cMIS was suspended from early 2020 through 2021 due to the COVID-19 pandemic, while ANC1 malaria surveillance continued uninterrupted throughout this period. This example illustrates how ANC1 malaria surveillance trends closely align with those observed through cMIS and demonstrates the utility of ANC1 malaria surveillance data for assessing temporal trends and evaluating the impact of interventions on prevalence.

Data Triangulation

Effective triangulation begins with understanding and interpreting differences across data sources. Each data stream has distinct measurement properties, populations, and potential biases, and apparent discrepancies between sources are often informative in their own right — signaling where data quality issues, access barriers, or epidemiological heterogeneity may warrant further investigation. Where sources are found to be consistent, triangulation enhances confidence in observed malaria trends. Where they diverge, understanding the reasons for divergence is a prerequisite for drawing meaningful conclusions. Once the availability, reliability, and limitations of each data stream are well understood, integration across sources may offer a further opportunity to produce richer, more actionable intelligence for subnational malaria stratification, resource allocation, and intervention targeting — though this step requires careful consideration of the comparability and quality of the underlying data ([Thawer et al., 2020](#); [Thawer et al., 2022](#)). This section describes the complementary data sources most relevant for triangulation and highlights key considerations for interpreting differences across them.

1. Household Surveys

National or subnational surveys, such as the DHS and MIS, provide representative estimates of malaria prevalence and intervention coverage. These household surveys typically focus on

malaria prevalence among children under five years of age, rather than capturing broader community-level patterns. Studies from several countries (Benin, Burkina Faso, Mozambique, Nigeria, Tanzania, Zambia) have shown a strong correlation between ANC malaria test-positivity and prevalence estimates from population-based surveys ([Brunner et al., 2019](#); [Kitojo et al., 2019](#); [Munsey et al., 2023](#); [Munsey et al., 2025](#)).

When recent survey data are available, ANC1 malaria surveillance can complement and contextualize survey findings by providing continuous seasonality trends at a granular level — a resolution that periodic surveys alone cannot offer ([Kitojo et al., 2019](#)). With the large numbers of women tested continuously throughout the year, ANC1 malaria surveillance data may be particularly sensitive for detecting prevalence trends in low-transmission settings — potentially more so than periodic household surveys — making it especially valuable for monitoring in areas approaching elimination ([Kitojo et al., 2019](#)). However, there are several interpretation considerations when comparing these sources:

Interpretation Considerations

- **Acquired immunity and biological differences:** ANC1-based malaria prevalence is generally lower than prevalence estimates among children under five, reflecting differences in population exposure and immunity rather than measurement error. Pregnant women, particularly multigravidae, generally have greater acquired immunity than young children in areas with higher transmission, leading to lower parasite densities and a higher likelihood of submicroscopic infections undetectable by RDTs or microscopy. Placental sequestration may also yield false-negative peripheral blood results, leading to a lower apparent prevalence among pregnant women in high-transmission areas ([Kitojo et al., 2019](#); [Munsey et al., 2023](#); [Tamir et al., 2025](#)).
- **Transmission patterns:** In areas with seasonal malaria, adult prevalence is more comparable to that of children. In contrast, the relationship was more uncertain in perennial transmission zones: children typically exhibit higher test positivity due to lower cumulative immunity ([Brunner et al., 2019](#)).

2. Outpatient Department (OPD) Data

Routine OPD data from health facilities provide another valuable comparison point. Compared with OPD data, ANC1 malaria surveillance is less influenced by care-seeking behavior. Additionally, ANC1 malaria surveillance captures both current infections and those acquired weeks to months earlier, including persistent or subclinical infections, whereas OPD malaria positivity largely reflects acute, symptomatic disease.

Interpretation Considerations

- **Temporal lag:** Multiple studies have documented a temporal lag of approximately 2–5 months between shifts in community-level malaria incidence and corresponding trends in ANC1 malaria surveillance data ([Pujol et al., 2023](#); [Munsey et al., 2023](#)). This lag suggests that infections detected during antenatal care visits often represent earlier transmission events or chronic infections acquired before conception. From a programmatic standpoint, this temporal displacement limits the utility of ANC1 malaria prevalence data as an early warning system for emerging outbreaks. Rather, ANC1 malaria surveillance data are best suited for monitoring established transmission patterns and informing the strategic timing and geographic targeting of interventions based on historical trends rather than real-time epidemiological shifts.

3. Entomological and Environmental Data

Integrating information on vector density, rainfall, and temperature can improve the interpretation of malaria trends observed in ANC1 malaria surveillance data. Environmental fluctuations often precede or coincide with transmission changes, and triangulating these datasets helps distinguish epidemiological patterns driven by seasonality from those reflecting programmatic impact.

CASE STUDY: Tanzania compares ANC1 malaria surveillance data with three primary sources: the MIS, the School Malaria Parasite Survey (SMPS), and routine health facility incidence data. While the MIS and SMPS provide population-level snapshots, they are conducted infrequently and often released with time lags. In contrast, ANC1 malaria surveillance data are collected regularly, providing timely, localized insights. At the district level, routine health facility incidence data serve as the most directly comparable source. When national survey data are available, ANC1 malaria surveillance findings also align with broader trends. For instance, low-prevalence regions such as Arusha and Manyara similarly report low malaria-in-pregnancy rates. Overall, ANC1 malaria surveillance has proven to be a consistent and reliable proxy for malaria burden, aligning well with both routine case incidence and periodic national surveys.

Modeling Prevalence in the Community

It is important to note that prevalence derived from ANC1 malaria surveillance reflects malaria prevalence among pregnant women attending their first antenatal care visit, rather than the general population. Nonetheless, ANC1 malaria prevalence provides valuable insights into local transmission patterns, seasonal trends, and the relative burden of malaria in the population. When estimates of community-level malaria prevalence are needed—for example, to guide population-wide intervention strategies or assess overall disease burden—modeling approaches can be applied to extrapolate from ANC1 malaria surveillance data. Mixed-effects logistic regression models, which account for factors such as age, gravidity, transmission intensity, and seasonality, can quantify the relationship between malaria prevalence at ANC1 and in the broader community. Given the novelty of having routine, prevalence-based indicator, ANC1 malaria surveillance data also provides a strong signal for temporal changes in transmission well beyond surveys, though capturing temporal trends in transmission and clinical incidence requires more complex tools that account for the lagged nature of community prevalence ([Hellewell et al., 2018](#); [Hicks et al., 2025](#)). Such models should be developed in collaboration with epidemiologists, data scientists, and national malaria programs to ensure both methodological rigor and operational relevance.

A detailed description of these models is beyond the scope of this guidance document; however, the following resources are recommended for understanding commonly used modeling approaches. Click on the title to access each paper:

1. [Malaria Prevalence of Pregnant Women Attending Antenatal Care Disentangles Patterns of Community Malaria Transmission and Burden](#)
2. [Factors determining the occurrence of submicroscopic malaria infections and their relevance for control](#)
3. [Assessing the utility of pregnant women as a sentinel surveillance population for malaria in Geita, Tanzania, 2019 – 2021](#)

4. [Malaria Test-Positivity during First Antenatal Care Visits Reflects Community Malaria Prevalence in Western Kenya](#)
5. [Using ante-natal clinic prevalence data to monitor temporal changes in malaria incidence in a humanitarian setting in the Democratic Republic of Congo](#)

Reporting and Data Use

Results from ANC1 malaria surveillance analyses should be disseminated regularly to stakeholders at all levels through summary dashboards, quarterly bulletins, or annual reports. Emphasis should be placed on using the data—not just collecting it—to guide decisions, improve program performance, and advance malaria control and elimination objectives.

INTEGRATION: Monitoring and evaluation activities should capitalize on shared infrastructure for data collection, analysis, and reporting across malaria surveillance systems and maternal health interventions. This strategic integration yields a more holistic assessment of program effectiveness while optimizing analytical capacity and technical resources.

Key recommended actions:

- Develop a comprehensive, integrated M&E framework that harmonizes indicators and data streams across program areas
- Establish joint data review platforms to facilitate cross-programmatic performance assessment and collaborative problem-solving
- Deploy integrated data visualization dashboards that enable real-time, evidence-based decision-making at all levels of the health system

XII. Programmatic Decision-Making

Currently, decision-making often relies on outdated survey data and HMIS data, which may be affected by variability in healthcare-seeking behavior. ANC1 malaria surveillance presents a significant opportunity to improve both the quantity and quality of data available for informed decision-making. It is important to emphasize that data collection is not an end in and of itself; rather, the goal is to utilize ANC1 malaria surveillance data effectively to accelerate progress toward malaria control and elimination. This section outlines key considerations for applying ANC1 malaria surveillance data to guide programmatic interventions.

Stratification & Targeting

A significant strength of ANC1 malaria surveillance lies in its ability to monitor malaria prevalence trends over time at the Admin 2 level. Evidence supporting this use draws primarily from demonstrated correlations between malaria prevalence in pregnant women and prevalence in children under five ([Kitojo et al., 2019](#); [Munsey et al., 2023](#); [Munsey et al., 2025](#); [van Ejik et al., 2015](#)) and children two to ten years old ([Pujol et al., 2023](#)), which represent the population most commonly used to benchmark community malaria burden. This enables NMCPs to categorize districts by malaria burden and transmission risk, supporting stratified approaches to malaria control. Such stratification allows programs to:

- Inform the development of the National Malaria Strategic Plans
- Tailor control strategies to specific transmission intensities, moving away from one-size-fits-all approaches

- Identify malaria hotspots, particularly in low-transmission or elimination settings
- Support funding applications and procurement planning decisions
- Provide evidence for policy changes regarding targeted interventions

CASE STUDY: In Tanzania, ANC1 malaria surveillance data have been integrated with additional sources, such as school surveys and malaria incidence reports, to develop a composite indicator for subnational malaria stratification. ANC1 malaria surveillance data are particularly valuable for their continuous availability at the subnational geographic level. This stratification approach has supported subnational tailoring of interventions.

Intervention Design, Planning & Evaluation

ANC1 malaria surveillance data provides valuable insights for planning, implementing, and evaluating malaria control measures. ANC1 malaria surveillance data can:

- Inform the selection, procurement, and deployment of appropriate vector control tools such as ITNs and IRS
- Evaluate the impact of malaria interventions (SMC, PMC, etc.) on community transmission
- Monitor intervention awareness and coverage among pregnant women and children to identify areas with lower uptake and guide targeted distribution efforts

CASE STUDY: ANC1 malaria surveillance has demonstrated considerable utility in dynamic and complex settings, such as refugee camps. Médecins Sans Frontières (MSF) has utilized ANC1 malaria surveillance for over a decade to guide risk stratification and inform subnational programmatic decisions. MSF conducts regular data reviews (monthly, quarterly, and annually) of ANC1 malaria surveillance data to monitor trends in malaria prevalence. These analyses inform decisions regarding adjustments to interventions, including mass ITN distributions, IRS, and other malaria control measures.

CASE STUDY: In Nigeria, ANC1 malaria surveillance data were used to evaluate the impact of new mosquito net types compared with standard nets. Researchers used prevalence data from ANC1 malaria surveillance to determine which specific net types were most effective against. Ultimately, this research informed procurement decisions for mass net distribution campaigns and supported funding applications.

Integration with Other Data Sources

For comprehensive decision-making, ANC1 malaria surveillance data should be triangulated with multiple data sources, including outpatient and inpatient department case data, community surveys, climate information, population movement data, and intervention coverage records such as campaign registers. ANC1 malaria surveillance data complements rather than replaces these sources and should be used collectively to guide malaria program decisions. Further guidance on data triangulation is available in **Section XII: Monitoring & Evaluation**.

Authorship

The development of this ANC1 Malaria Surveillance Guide was made possible through the collaborative efforts of numerous individuals and organizations committed to strengthening malaria surveillance systems globally. The RBM Partnership to End Malaria's Surveillance, Monitoring, and Evaluation Working Group (SME WG) and Metrics for Management (M4M) led the coordination and compilation of this comprehensive resource. We extend our profound appreciation to the following experts who contributed their invaluable technical expertise, field experience, and strategic insights throughout the development process:

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Sincerely,

Molly Robertson and Wahjib Mohammed, Co-Chairs of the RBM SME Working Group

References

- Accrombessi, M., Yovo, E., Fievet, N., Cottrell, G., Agbota, G., Gartner, A., Martin-Prevel, Y., Vianou, B., Sossou, D., Fanou-Fogny, N., Djossinou, D., Massougbdji, A., Cot, M., & Briand, V. (2019). Effects of malaria in the first trimester of pregnancy on poor maternal and birth outcomes in Benin. *Clinical Infectious Diseases*, 69(8), 1385–1393. <https://doi.org/10.1093/cid/ciy1073>
- Brunner, N. C., Chacky, F., Mandike, R., Mohamed, A., Runge, M., Thawer, S. G., Ross, A., Vounatsou, P., Lengeler, C., Molteni, F., & Hetzel, M. W. (2019). The potential of pregnant women as a Sentinel population for malaria surveillance. *Malaria Journal*, 18(1). <https://doi.org/10.1186/s12936-019-2999-0>
- Emerson, C., Ulimboka, S., Lemwayi, R., Kinyina, A., Nhiga, S. L., Aaron, S., Simeo, J., Kitojo, C., Reaves, E. J., Drake, M., Hussein, Y., Bungire, L., Gutman, J. R., & Winch, P. J. (2023). Women attending antenatal care as a sentinel surveillance population for malaria in Geita Region, Tanzania: Feasibility and acceptability to women and providers. *Malaria Journal*, 22(1). <https://doi.org/10.1186/s12936-023-04480-y>
- Gutman, J. R., Thwing, J., Mwesigwa, J., McElroy, P. D., & Robertson, M. (2023). Routine healthcare facility– and antenatal care–based malaria surveillance: Challenges and opportunities. *The American Journal of Tropical Medicine and Hygiene*, 108(2_Suppl), 4–7. <https://doi.org/10.4269/ajtmh.22-0182>
- Gutman, J. R., Mwesigwa, J. N., Arnett, K., Kangale, C., Aaron, S., Babarinde, D., Buekens, J., Candrinho, B., Debe, S., Digre, P., Drake, M., Gansané, A., Gogue, C., Griffith, K. S., Hicks, J., Kinda, R., Koenker, H., Lemwayi, R., Munsey, A., Obi, E., Ogouyèmi-Hounto, A., Okoko, O. O., Onikpo, F., Onoja, A., Porter, T., Savaio, B., Tynuv, K., Uhomoibhi, P., Wagman, J., Wolf, K., Zulliger, R., Walker, P., Miller, J. M., & Robertson, M. (2023). Using antenatal care as a platform for malaria surveillance data collection: Study protocol. *Malaria Journal*, 22, 99. <https://doi.org/10.1186/s12936-023-04521-6>
- Hampton, L. M. (2025). Economic Analyses for Disease Surveillance Planning and Advocacy. *The Journal of Infectious Diseases*, 231(4), 837–840.
- Hellewell, J., Walker, P., Ghani, A., Rao, B., & Churcher, T. S. (2018). Using ante-natal clinic prevalence data to monitor temporal changes in malaria incidence in a humanitarian setting in the Democratic Republic of Congo. *Malaria journal*, 17(1), 312.
- Herida, M., Dervaux, B., & Desenclos, J. C. (2016). Economic Evaluations of Public Health Surveillance Systems: a Systematic Review. *European journal of public health*, 26(4), 674–680. <https://doi.org/10.1093/eurpub/ckv250>
- Hicks, J., Munsey, A., Mousa, A., Cairns, M., Hill, A., Gowelo, S., Knock, E., Baguelin, M., Digre, P., Gogue, C., Matambisso, G., Pujol, A., Mayor, A., Wagman, J., Madanitsa, M., Khairallah, C., Kalilani-Phiri, L., Mwapasa, V., Kariuki, S., ... Walker, P. (2025). *Malaria Prevalence of Pregnant Women Attending Antenatal Care Disentangles Patterns of Community Malaria Transmission and Burden*. <https://doi.org/10.2139/ssrn.5184997>
- Hoyt, J., Hill, J., Achieng, F., Ouma, P., Kariuki, S., Desai, M., & Webster, J. (2021). Healthcare provider and pregnant women's perspectives on the implementation of intermittent screening and treatment with dihydroartemisinin–piperaquine for malaria in pregnancy in western Kenya: A qualitative study. *Malaria Journal*, 20, 291. <https://doi.org/10.1186/s12936-021-03826-8>
- Kitojo, C., Gutman, J. R., Chacky, F., Kigadye, E., Mkude, S., Mandike, R., Mohamed, A., Reaves, E. J., Walker, P., & Ishengoma, D. S. (2019). Estimating malaria burden among pregnant women using data from antenatal care centres in Tanzania: A population-based study. *Lancet Global Health*, 7, e1695–e1705.

Kitojo, C., Chacky, F., Kigadye, E. S., Mugasa, J. P., Lusasi, A., Mohamed, A., Walker, P., Reaves, E. J., Gutman, J. R., & Ishengoma, D. S. (2020). Evaluation of a single screen and treat strategy to detect asymptomatic malaria among pregnant women from selected health facilities in Lindi Region, Tanzania. *Malaria Journal*, 19(1). <https://doi.org/10.1186/s12936-020-03513-0>

Kitojo, C., Chacky, F., Kigadye, E. S., Mugasa, J. P., Lusasi, A., Mohamed, A., Reaves, E. J., Gutman, J. R., & Ishengoma, D. S. (2021). Acceptability of single screening and treatment policy for the control of malaria in pregnancy: Perceptions of providers and pregnant women from selected health facilities in Lindi region, Tanzania. *Malaria Journal*, 20, 256.

Mayor, A., Menéndez, C., & Walker, P. G. T. (2019). Targeting pregnant women for malaria surveillance. *Trends in Parasitology*, 35(9), 677–686. <https://doi.org/10.1016/j.pt.2019.07.001>

MEASURE Evaluation. (2020). *Malaria routine data quality assessment tool: User manual* (MS-20-190). University of North Carolina. <https://www.measureevaluation.org/resources/publications/ms-20-190.html>

MEASURE Evaluation. (n.d.). *Data quality review toolkit*. <https://www.measureevaluation.org/our-work/data-quality/data-quality-review.html>

Munsey, A. (2024, October 16). *Utility of ANC Attendees as a Sentinel Surveillance Population: Data from 7 Countries* [Presentation]. RBM SME Working Group Meeting, Geneva, Switzerland

Munsey, A., Kinyina, A., Assenga, M., Almeida, A., Kitojo, C., Reaves, E., Simeo, J., Aron, S., Chacky, F., Nhiga, S. L., Drake, M., Lemwayi, R., Lash, R., Walker, P. G. T., & Gutman, J. R. (2023). Assessing the utility of pregnant women as a Sentinel surveillance population for malaria in Geita, Tanzania, 2019 - 2021. *International Journal of Infectious Diseases*, 136, 57–63. <https://doi.org/10.1016/j.ijid.2023.08.007>

Munsey, A., Digre, P., Hicks, J., Wagman, J., Robertson, M., Alao, M., Ogouyemi Hounto, A., Gansane, A., Debe, S., Candrinho, B., Uhomiohi, P., Okoko, O. O., Lemwayi, R., Aron, S., Kangale, C. C., Kabamba, B. M., Miller, J., Walker, P., & Gutman, J. (2025). Antenatal care surveillance for monitoring malaria prevalence and intervention coverage: A Multicountry analysis. *BMJ Global Health*, 10(9). <https://doi.org/10.1136/bmjgh-2024-018572>

Okell, L. C., Bousema, T., Griffin, J. T., Ouédraogo, A. L., Ghani, A. C., & Drakeley, C. J. (2012). Factors determining the occurrence of submicroscopic malaria infections and their relevance for control. *Nature Communications*, 3, 1237. <https://doi.org/10.1038/ncomms2241>

PATH MACEPA. (2024). *Routine data quality audit toolkit*. PATH. <https://www.path.org/our-impact/resources/routine-data-quality-audit-toolkit/>

Pujol, A., Brokhattingen, N., Matambisso, G., Mbeve, H., Cisteró, P., Escoda, A., Maculuvé, S., Cuna, B., Melembe, C., Ndimande, N., Munguambe, H., Montaña, J., Nhamússua, L., Simone, W., Tetteh, K. K., Drakeley, C., Gamain, B., Chitnis, C. E., Chauhan, V., ... Mayor, A. (2023b). Detecting temporal and spatial malaria patterns from first antenatal care visits. *Nature Communications*, 14(1). <https://doi.org/10.1038/s41467-023-39662-4>

Recht, J., Clark, R., González, R., & Dellicour, S. (2024). *Safety of artemisinin and non-artemisinin antimalarials in the first trimester of pregnancy: Review of evidence*. World Health Organization. <https://www.who.int/publications/i/item/9789240069404>

Samuels, A. M., Wiegand, R., Seda, B., Towlett, O., Kwambai, T. K., Schneider, K., Steketee, R., Slutsker, L., Kariuki, S., Ter Kuile, F. O., & Walker, P. G. T. (2026). Malaria test-positivity during first antenatal care visits reflects community malaria prevalence in western Kenya. [Preprint] *SSRN*. <https://doi.org/10.2139/ssrn.6267980>

Satapathy, P., Khatib, M. N., Gaidhane, S., Zahiruddin, Q. S., Sharma, R. K., Rustagi, S., Al-Jishi, J. M., Albayat, H., Al Fares, M. A., Garout, M., Alrasheed, H. A., Al-Subaie, M. F., Rabaan, A. A., & Sah, R. (2024). Adverse pregnancy outcomes in maternal malarial infection: A

systematic review and meta-analysis. *New Microbes and New Infections*, 62, 101474. <https://doi.org/10.1016/j.nmni.2024.101474>

Smith, L. A., Jones, C., Adjei, R. O., Antwi, G. D., Afrah, N. A., Greenwood, B., Chandramohan, D., Tagbor, H., & Webster, J. (2010). Intermittent screening and treatment versus intermittent preventive treatment of malaria in pregnancy: user acceptability. *Malaria Journal*, 9, 18. <https://doi.org/10.1186/1475-2875-9-18>

Smith Paintain, L., Antwi, G. D., Jones, C., Amoako, E., Adjei, R. O., Afrah, N. A., Greenwood, B., Chandramohan, D., Tagbor, H., & Webster, J. (2011). Intermittent screening and treatment versus intermittent preventive treatment of malaria in pregnancy: Provider knowledge and acceptability. *PLOS ONE*, 6(8), e24035. <https://doi.org/10.1371/journal.pone.0024035>

Tamir, Z., Animut, A., Dugassa, S., Gebresilassie, A., Belachew, M., Abera, A., & Erko, B. (2025). Comparative performance of microscopy, rapid diagnostic tests, and multiplex real-time PCR for detection of malaria parasites among pregnant women in northwest Ethiopia. *Malaria Journal*, 24(1). <https://doi.org/10.1186/s12936-025-05256-2>

Thawer, S. G., Chacky, F., Runge, M., Reaves, E., Mandike, R., Lazaro, S., Mkude, S., Rumisha, S. F., Kumalija, C., Lengeler, C., Mohamed, A., Pothin, E., Snow, R. W., & Molteni, F. (2020). Sub-national stratification of malaria risk in mainland Tanzania: a simplified assembly of survey and routine data. *Malaria Journal*, 19, 177. <https://doi.org/10.1186/s12936-020-03250-4>

Thawer, S. G., Golumbeanu, M., Munisi, K., Aaron, S., Chacky, F., Lazaro, S., Mohamed, A., Kisoka, N., Lengeler, C., Molteni, F., Ross, A., Snow, R. W., & Pothin, E. (2022). The use of routine health facility data for micro-stratification of malaria risk in mainland Tanzania. *Malaria Journal*, 21, 345. <https://doi.org/10.1186/s12936-022-04364-7>

van Eijk, A. M., Hill, J., Noor, A. M., Snow, R. W., & ter Kuile, F. O. (2015). Prevalence of malaria infection in pregnant women compared with children for tracking malaria transmission in sub-Saharan Africa: a systematic review and meta-analysis. *The Lancet. Global health*, 3(10), e617–e628.

Vásquez, A. M., Vélez, G., Medina, A., Serra-Casas, E., Campillo, A., Gonzalez, I. J., Murphy, S. C., Seilie, A. M., Ding, X. C., & Tobón Castaño, A. (2020). Evaluation of highly sensitive diagnostic tools for the detection of *P. falciparum* in pregnant women attending antenatal care visits in Colombia. *BMC Pregnancy and Childbirth*, 20(1). <https://doi.org/10.1186/s12884-020-03114-4>

Young, N., Achieng, F., Desai, M., Phillips-Howard, P., Hill, J., Aol, G., Bigogo, G., Laserson, K., Ter Kuile, F., & Taegtmeyer, M. (2019). Integrated point-of-care testing (POCT) for HIV, syphilis, malaria and anaemia at antenatal facilities in western Kenya: a qualitative study exploring end-users' perspectives of appropriateness, acceptability and feasibility. *BMC Health Services Research*, 19(1), 74. <https://doi.org/10.1186/s12913-018-3844-9>

World Health Organization. (2016). *WHO recommendations on antenatal care for a positive pregnancy experience*. <https://www.who.int/publications/i/item/9789241549912>

World Health Organization. (2021). *Global technical strategy for malaria 2016–2030, 2021 update*. <https://www.who.int/publications/i/item/9789240031357>

World Health Organization. (2023). *Data quality assurance (DQA)*. <https://www.who.int/data/data-collection-tools/health-service-data/data-quality-assurance-dqa>

World Health Organization. (2024). *World malaria report 2024*. <https://www.who.int/teams/global-malaria-programme/reports/world-malaria-report-2024>

World Health Organization. (2025). *WHO guidelines for malaria, 13 August 2025*.
<https://iris.who.int/server/api/core/bitstreams/26a6af2d-060c-4449-8207-1f25e63c6cc3/content>

World Health Organization. (2026). *Malaria surveillance assessment toolkit: Implementation reference guide* (2nd ed.).
<https://www.who.int/publications/i/item/9789240110977>

Annex I. Incorporating Intervention Coverage Questions

In addition to providing prevalence estimates, ANC1 malaria surveillance can generate information on interventions (e.g., ITN use). Several countries, including Benin, Burkina Faso, Mozambique, Nigeria, Tanzania, and Zambia, have piloted the inclusion of intervention coverages within ANC1 malaria surveillance activities (Emerson et al., 2023; [Munsey et al., 2025](#)). Integrating intervention questions into ANC1 malaria surveillance has the potential to yield more granular and timely data than are currently available through household surveys such as DHS and MIS. However, evidence on the concordance between intervention coverage estimates derived from ANC1 malaria surveillance and those from household surveys is still emerging. Moreover, incorporation into routine systems requires careful consideration of how these data elements will be collected and managed, including whether they are captured in existing ANC registers or through a separate electronic survey. Any countries considering the inclusion of intervention coverage questions should plan to evaluate the utility and reliability of the data.

Decision Framework: Adding Intervention Coverage Questions to ANC1 Malaria Surveillance

STEP 1: CRITICAL REQUIREMENT (MUST MEET)

Is there a clear programmatic need for intervention coverage data?

Data collected should directly support program decision-making

IF NO PROGRAMMATIC NEED

Proceed with ANC1 malaria surveillance without intervention coverage questions.

STEP 2: SUPPORTING CONSIDERATIONS (ASSESS EACH)

Assess these supporting factors to determine implementation approach:

A

STAFF CAPACITY

Can staff manage additional questions without being overburdened?

- Current workload and capacity constraints
- Time required per question
- Available training and support

B

DATA FLOW & SYSTEMS

Are data systems set up to support integration of additional intervention coverage questions?

- Integration with existing data collection tools
- Data entry and transmission mechanisms
- Reporting pathways and frequency

C

ACTIONABILITY

Will the collected data be used to inform decision?

- Clear plan for data review and analysis
- Decision-makers committed to using the data
- Regular feedback loops established

GUIDANCE

STRONG 3/3

Consider integrating intervention coverage questions into ANC1 malaria surveillance.

STRONG 2/3

Consider piloting with a smaller set of questions or in limited sites first. Proceed with targeted mitigation for the weaker area.

WEAK 2+

Proceed with ANC1 malaria surveillance without intervention coverage questions

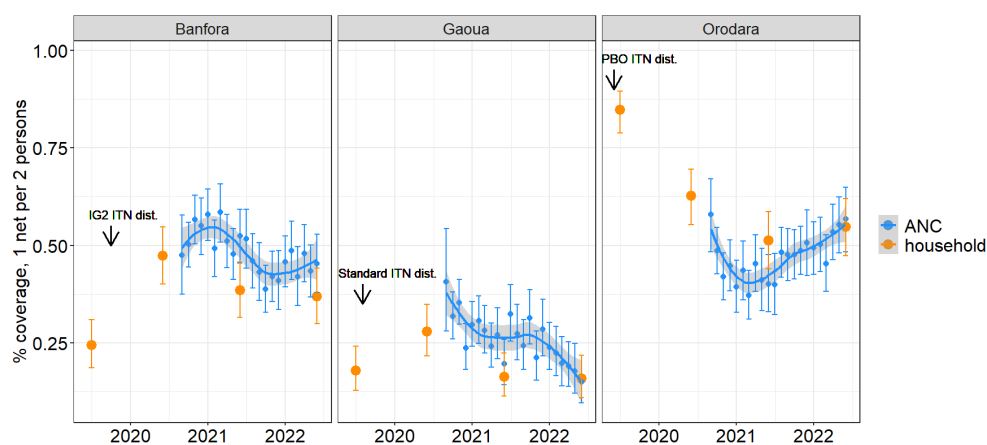
Coverage questions should be added only when their programmatic value clearly outweighs the additional time required from both providers and patients. Achieving an appropriate balance between comprehensive data collection and operational feasibility is essential. In resource-constrained settings with high patient volumes, additional questions can place a significant burden on healthcare providers, potentially affecting service quality and data reliability. If the quality of intervention coverage data is insufficient to support decision-making, collection efforts may not be justified.

Types of Interventions to Consider

ITN Coverage & Use

Emerging evidence indicates that ITN ownership and use indicators collected through ANC1 malaria surveillance show reasonable concordance with household survey data ([Munsey et al., 2025](#)). These data can be used to identify geographic areas that would benefit from targeted ITN distribution campaigns. This approach is most effective in settings with moderate to high variability in ITN ownership. In contexts where coverage is uniformly high, ANC-based questionnaires have limited sensitivity for detecting minor geographic differences in ownership.

Example: ITN Coverage in Burkina Faso



This figure shows ITN coverage across three districts in Burkina Faso. Estimates from community-based household surveys (orange bars) are compared with data collected through ANC1 malaria surveillance (blue bars). ANC-based estimates show moderate to strong correlation with household survey data (Pearson's correlation coefficient: $r = 0.76$ for one net per household; $r = 0.53$ for one net per two people), indicating that ANC1 malaria surveillance can serve as a complementary data source for monitoring ITN coverage at the district level.

Care-Seeking

Questions on treatment-seeking behavior, particularly for childhood illnesses, have shown lower concordance with household survey data ([Munsey et al., 2025](#)). This discrepancy may arise from the limited sample sizes typical of facility-based surveillance systems, which can reduce statistical power and affect the reliability of estimates, as well as from social desirability bias in clinical settings.

For example, a study in Tanzania found that ANC attendees were significantly more likely to report treatment-seeking behavior for children under 5, malaria testing, and receipt of antimalarial medication compared with women recently surveyed in community settings after delivery ([Munsey et al., 2025](#)). These findings indicate that social desirability bias in clinical environments may lead to overestimation of adherence. Thus, it is not recommended for programmatic use at this time.

Other Interventions: SMC, PMC, and Vaccines

Experts have suggested that ANC1 malaria surveillance can also be a valuable avenue for collecting data on mothers' awareness of campaigns (SMC, PMC, vaccines) and whether their children have received the recommended services. While experts see potential value in incorporating questions on these interventions into ANC1 malaria surveillance, they have not yet been formally evaluated in research studies. Consequently, programs should proceed with caution and work closely with technical specialists to test the validity and reliability of the responses collected.

Acceptability to Women & Healthcare Providers

Research on the perspectives of both women and healthcare providers indicates strong acceptability of these intervention questionnaires. Women generally respond positively to questions on household ITN ownership and use, as well as care-seeking behaviors. The additional time required to complete the questionnaire was considered minimal compared with the typical waiting period for services ([Emerson et al., 2023](#)).

Sample Questionnaire:

Question	Response		
	Yes	No	Quantity
Vector Control			
1. Do you have access to a mosquito net/bednet?			
2. How many bednets are available in your household?			-----
3. Did you sleep under a bednet last night?			
4. Has your home been sprayed with insecticide in the past month?			
Seasonal Malaria Chemoprevention (SMC)			
1. Do you have children between 3–59 months of age in your household?			
1a. If yes, how many children?			-----
2. Have any of your children received SMC medication during this malaria season?			
Awareness of Campaigns and Interventions			
1. Are you aware of any malaria prevention campaigns currently running in your community?			
2. Do you know where and how to access preventive interventions (chemoprevention, vaccines) for your children?			

Annex II. Example Materials for ANC1 Malaria Surveillance

Example poster in Tanzania to encourage pregnant women starting their ANC visits early, with free malaria testing being listed as one of the key benefits



Message (in Swahili) translated to English: Pregnant women should start their clinic visits early to receive malaria prophylaxis, medicated bed nets and free malaria testing.

Example ANC1 register in Tanzania with individual record of malaria RDT results

[illegible]

ANC1 malaria surveillance specific indicator included (translated from Swahili): mRDT or BS results: "P" Positive, "N" Negative.

Example ANC1 monthly report in Tanzania (ANC1 malaria surveillance specific indicator in English: Malaria test results using mRDT/BS, those diagnosed with malaria positive)

Fomu ya taarifa ya mwezi kutoka kliniki ya wajawazito (ANC)

Jina la Kituo.								Mkoa								Halmashauri								Mwezi								Mwaka							
Nia	Mawazo	Miaka 10-14	Miaka 15-19	Miaka 20-24	Miaka 25-29	Miaka 30-34	Miaka 35 na zaidi	Jumla	7	Vipimo na vidokezo vya hatari hudhuria la marudio	Miaka 10-14	Miaka 15-19	Miaka 20-24	Miaka 25-29	Miaka 30-34	Miaka 35 na zaidi	Jumla	7d	Valiopima Shinkizo la damu (BP) hudhuria la marudio	Miaka 10-14	Miaka 15-19	Miaka 20-24	Miaka 25-29	Miaka 30-34	Miaka 35 na zaidi	Jumla													
1	Idadi ya Wajawazito Waliolegetewa								7e	Shinkizo la damu (BP $\rightarrow$ 140/90mmHg) hudhuria la marudio								7f	Valiopima sukari kwenye mikojo hudhuria la marudio																				
2a	Umri wa mimba chini ya wiki 12 (<12weeks)								7g	Valiogundulika na sukari kwenye mikojo hudhuria la marudio								7h	Valiopima protini kwenye mikojo hudhuria la marudio																				
2b	Umri wa mimba wiki 12 au zaidi (12+ weeks)								7i	Valiogundulika na protini kwenye mikojo hudhuria la marudio								8	PMTCT	Miaka 10-14	Miaka 15-19	Miaka 20-24	Miaka 25-29	Miaka 30-34	Miaka 35 na zaidi	Jumla													
2c	Jumla ya hudhuria la kwanza (2a + 2b)								8a	Tayari wana maambukizi ya VVU kabla ya kuanza kiniki								8b	Valiopata ushauri nasaha kabla ya kupima VVU kiniki																				
3	Vipimo na vidokezo vya hatari hudhuria la kwanza	Miaka 10-14	Miaka 15-19	Miaka 20-24	Miaka 25-29	Miaka 30-34	Miaka 35 na zaidi	Jumla	8c	Valiopima VVU kipimo cha kwanza kiniki								8d	Valiopata ushauri baada ya kupima																				
3a	Mimba 4 au zaidi								8e	Walokutwa na VVU (Positive) kipimo cha kwanza								8f	Walipiowa VVU na wenza wao (Couple) kwa pamoja katika kiniki ya wajawazito																				
3b	Umri chini ya miaka 20								8g	Valiopima VVU kipimo cha pili umri wa mimba uliwa wiki 32 hadi 36								8h	Walokutwa na maambukizi ya VVU kipimo cha pili umri wa mimba uliwa wiki 32-36																				
3c	Umri zaidi ya miaka 35 kwa mimba ya kwanza								8i	Wenza waliopima VVU kipimo cha kwanza ANC								8j	Wenza waliokutwa na maambukizi VVU (Positive) kipimo cha kwanza ANC																				
3d	Waliohahi kufungua kwa upasuaji "C/S"								8k	Wenza waliopima VVU kipimo cha pili ANC								8l	Wenza waliokutwa na maambukizi VVU (Positive) kipimo cha pili ANC																				
3e	Waliohahi kufungua kwa Vacuum extraction "VE"								8m	Wenza waliokutwa na maambukizi VVU (Positive) kipimo cha pili ANC								8n	Wajawazito na wenza waliopata majibu tofauti (Discordant) baada ya kupima VVU ANC																				
3f	Walioipima kwanza cha damu mwilini (Hb)								9	Homa ya Inl	Miaka 10-14	Miaka 15-19	Miaka 20-24	Miaka 25-29	Miaka 30-34	Miaka 35 na zaidi	Jumla	9a	Walioipima Homa ya Inl aina B																				
3g	Upungufu wa damu <11.Dg/dl – Anaemia								9b	Walioipima Homa ya Inl aina B								9c	Walioipima Homa ya Inl aina B																				
3h	Upungufu mkubwa wa damu <8.5g/dl – Severe Anaemia								9d	Walioipima Homa ya Inl aina B								9e	Walioipima Homa ya Inl aina B																				
3i	Walioipima Shinkizo la damu (BP)								9f	Walioipima Homa ya Inl aina B								9g	Walioipima Homa ya Inl aina B																				
3j	Shinkizo la damu (BP $\rightarrow$ 140/90mmHg)								10	Malaria	Miaka 10-14	Miaka 15-19	Miaka 20-24	Miaka 25-29	Miaka 30-34	Miaka 35 na zaidi	Jumla	10a	Walioipewa LUN																				
3k	Walioipima protini kwenye mikojo								10b	Walioipewa Malaria kutuma mRDT/BS								10c	Walioipewa Malaria Positive																				
3l	Walokutwa na protini kwenye mikojo								10d	Walioipewa IPT2								10e	Walioipewa IPT3																				

Jina la Mtayarishaji:..... Kada:..... Saini:..... Tarehe:...../...../.....

Imepitishwa Na:..... Namba ya simu ya kituo:..... Imepokelewa Halmashauri / DHIS2FP-Tarehe:...../...../.....

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METRICS FOR MANAGEMENT

