RBM Partnership To End Malaria

ANC1 Surveillance Brief
A brief on activities and costing elements

Objective: Integrate malaria testing into routine screening for pregnant women and girls attending their first antenatal care visit to improve surveillance of malaria in pregnancy, estimate community-level parasite prevalence, and inform targeted interventions.

Background:
Surveillance data is essential for malaria programs to make evidence-based decisions and maximize impact. Malaria prevalence serves as a critical surveillance metric for triangulating case trends and informing burden estimation models.

Traditional prevalence data from Demographic and Health Surveys (DHS) and Malaria Indicator Surveys (MIS) have significant limitations: these surveys occur infrequently, lack the granular resolution needed for targeted interventions, and face uncertain sustainability due to funding constraints. This creates a critical surveillance gap that threatens effective malaria control. Antenatal care surveillance (ANC1) offers a strategic solution, providing continuous, high-resolution prevalence monitoring to support real-time programmatic decisions.

Rationale for ANC1 Surveillance:

- **Representative population:** Women attending ANC are a generally healthy, easily accessible population. In settings with high ANC coverage, this group can serve as a broadly representative proxy for the general population, providing reliable insights into local malaria transmission dynamics (Mayor, Menéndez, & Walker, 2019).

- **Comparable to gold standard surveys:** Malaria prevalence estimates derived from ANC1 surveillance demonstrate a high level of concordance with those obtained from population-based household surveys such as the DHS and MIS (van Ejik et al., 2015; Hellewell et al., 2018; Willilo et al., 2016). Given that household surveys are typically conducted infrequently and require substantial resources, the concordance of ANC1-based estimates reinforces their value as a timely and cost-effective surveillance tool.

- **Timely, granular data for programmatic decision-making**: ANC1 surveillance data offers timely, locally relevant insights that inform program planning and implementation. By enabling subnational stratification of malaria transmission, at the district level or above, it allows for the precise targeting of interventions. Routine ANC1 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), seasonal malaria chemoprevention (SMC), perennial malaria chemoprevention (PMC), and malaria vaccines (Munsey et al., 2023). However, the inclusion of intervention-related questions must weigh potential programmatic benefits against added time, respondent burden, and risks of social desirability bias.

- **Resource-effective and well-accepted approach:** 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 RDTs 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 surveillance aligns well with existing clinical workflows, it still requires additional resources to manage RDT supply chains, train staff, interpret results, and accurately report data.

- **First trimester diagnosis and treatment opportunities:** ANC1 surveillance also enables tracking 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 when sulfadoxine-pyrimethamine (SP) is contraindicated. ***We recommend continuing a program of pharmacovigilance for all treatment regimens (WHO Guidelines for malaria, 14 March 2023).***

- **For more information**: Using Antenatal Care as a Platform for Malaria Surveillance Data Collection: Study Protocol

Key Considerations:

- **ANC1 surveillance supports monitoring malaria trends:** ANC1 surveillance serves as a valuable tool for monitoring trends in malaria transmission over time—indicating whether transmission is increasing or decreasing. However, mathematical modeling is required to calculate community-level prevalence from the data captured through ANC1 surveillance.

- **ANC1 prevalence is a lagged indicator of transmission & community case incidence trends:** Malaria surveillance data from ANC1 serves as a valuable indicator of transmission and disease burden; however, it is a lagged indicator of transmission and community case trends (Pujol et. al, 2023; Munsey et. al, 2023). Consequently, ANC1 data should not be relied upon as an early warning system for detecting outbreaks or initiating rapid responses. Instead, it is best used for monitoring broader transmission patterns over time and supporting strategic planning and evaluation efforts.

- **Inconsistent malaria testing introduces bias:** The reliability of ANC1 malaria surveillance data depends on the use of RDTs to test all pregnant women and girls at the first antenatal care visit. In settings where testing is not systematically implemented, data quality will be compromised.

- **Representativeness is dependent on ANC1 attendance:** A key consideration for ANC1 surveillance is ensuring the sampled women represent all pregnant women and girls who might attend antenatal care. If ANC attendance is low or occurring in the private sector and not reported to national data systems, prevalence estimates may be biased.

- **Consider sample composition before conducting granular analyses:** Sufficient sample sizes are required to estimate malaria prevalence among specific

population subgroups or individual facilities. Facility-level analysis may also be limited if individuals seek care outside of their designated catchment area. Aggregating data up to the district level for analysis can help to address these challenges.

- **ANC1 surveillance complements IPTp:** Malaria screening at ANC1 is designed to complement, not replace, intermittent preventive treatment in pregnancy (IPTp). 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.

Integration:

Wherever possible, ANC1 surveillance should be integrated into existing health system initiatives and serve as an opportunity to signpost wider malaria services. This may include:

- **Incorporating ANC1 content into routine MNCH training sessions:** Leverage scheduled MNCH trainings to include ANC1 surveillance components.
- **Coordinating with MNCH teams for joint supervision visits:** Align ANC1 supervision with existing MNCH supervisory structures to promote efficiency and consistency.
- **Updating ANC registers in line with planned revisions:** Ensure ANC registers are updated to accommodate ANC1 data collection and are aligned with any scheduled register revisions.
- **Collaborating with the HMIS team on DHIS2 modifications:** Work closely with the HMIS team to ensure ANC1 data elements are appropriately integrated into DHIS2.
- **Synchronizing digital health initiatives across programs:** Coordinate ANC1 digitalization efforts with other ongoing digital health transformations to reduce duplication and ensure interoperability.
- **Aligning with surveillance and data quality improvement efforts:** Integrate ANC1 activities into broader surveillance and data quality initiatives for streamlined implementation and monitoring.

Step-by-Step Implementation:

1. Policy and Stakeholder Engagement

- Secure Ministry of Health endorsement to expand malaria surveillance by testing all pregnant women and girls for malaria using RDTs during their first ANC visit.
- Engage stakeholders:
  - National Malaria Control Programs (NMCPs)
  - Reproductive, Maternal, Newborn, and Child Health (RMNCH) programs
  - Donors and implementing partners
- Align with the World Health Organization and national ANC and Malaria in Pregnancy guidelines. See the latest World Health Organization guidelines here.

- The introduction of ANC1 malaria testing should be for surveillance purposes and should not disrupt IPTp administration for all eligible malaria-negative women during their first visit and for all women in their subsequent ANC visits (ANC2, ANC3, etc.).

2. Site Selection & Preparation

- Develop an implementation plan. While national implementation is the ideal end goal to generate representative, granular surveillance data that allows for subnational analysis, rollout may occur in stages. If you begin with sentinel site selection, be sure that the choice of sentinel sites aligns with the data that you will need to make key decisions about malaria programming.
- Train health workers on malaria testing and data collection. Emphasize that **all** women and girls attending their first ANC visit should be tested for malaria, regardless of whether they have symptoms. This should also be integrated into pre-service training and can be integrated with other training for first visit testing, including syphilis and HIV.
- Establish a plan for regular supportive supervision to ensure that all pregnant women and girls receive malaria testing during their first ANC visit, and the proportion of women attending their first visit who were tested should be reported monthly.
- Calculate the additional RDTs needed for each participating facility. RDTs are the recommended testing method for ANC1 surveillance due to their speed and ease of use.
    - The total RDT needed should be equal to or slightly exceed the total number of women coming for their 1st ANC visit
    - The number of ACTs should reflect the test positivity in the country.
    - If no data on test positivity is available, the latest prevalence measure could be used as a starting point. For example, if you are in an area with 40% prevalence, you could assume that you would need ACTs for 40% of all women attending their 1st ANC visit. This will depend on seasonality, reflecting ACT needs in OPD.

3. Register Revision

It may be necessary to revise and reprint registers in advance of implementing ANC1 surveillance.

- At a minimum, registers should have the ability to capture:
    - Total ANC 1st visits during the month
    - Total ANC 1st visit women tested for malaria
    - Total ANC 1st visit women positive for malaria
    - Total ANC 1st visit women treated with ACTs according to national protocol
    - Gravidity (preferred; age may be used as a proxy if gravidity is unavailable)

4. Procedures

- All women who come in for their first visit for their current pregnancy should be tested for malaria, along with other testing per national protocol (syphilis, HIV, etc.) before IPTp administration. Ideally, a single blood draw should be used to minimize the burden on both patients and healthcare staff.
    - **Positive malaria test:** Women who test positive for malaria should be treated with ACTs or other antimalarials in accordance with national policy. 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.

    - **Negative malaria test:** If eligible**,** women who test negative for malaria should receive their first dose of IPTp, in accordance with WHO guidelines and national policy.
- Record results in ANC registers and digital platforms (e.g., DHIS2).
- Aggregate data monthly by facility, district, and gravidity or age
    - Several studies have shown that malaria prevalence in primigravidae correlates more strongly with prevalence in children than it does in multigravidae (van Ejik et al., 2015; Hellewell et al., 2018; Willilo et al., 2016).
- Note: For women coming in for all other visits (ANC2, ANC3, ANC4) procedures should NOT change. Malaria testing should be based on symptoms and IPTp should be administered as per national protocol.

5. Monitoring and Evaluation

- Compare ANC1 data with the most recent household survey data.
- Monitor trends in prevalence over time. Track changes in malaria prevalence using ANC1 data to detect emerging patterns or shifts in transmission.
- Use data for subnational stratification and programmatic decision-making. Areas with higher malaria prevalence may warrant targeted interventions such as social and behavior change activities, ITN mass distribution campaigns, or malaria vaccine initiatives, etc.

6. Scale-Up and Sustainability

- Supportive supervision should be conducted regularly to ensure that ANC1 surveillance is implemented as intended, with the testing, recording and reporting of all pregnant women and girls at their first ANC visit.
- Evaluate operational feasibility and cost.
- Integrate into routine HMIS and surveillance systems.

Budgeting for Malaria Prevalence Testing at ANC1

To ensure successful implementation, malaria programs should plan for both **start-up** and **recurring costs**. Below is a breakdown of typical cost categories:

1. Training and Capacity Building

- **Health worker training**: Initial and refresher training on malaria testing, data recording, and counseling. This should be integrated within routine RMNCH training, and can be included in any other refresher training occurring on testing for other diseases (syphilis, HIV, etc).

2. Diagnostic & Treatment Supplies

- **Rapid Diagnostic Tests (RDTs)**
- **Gloves, lancets, and alcohol swabs:** These are shared costs with other RMNCH programs.
- **ACTs** to treat those who test positive for malaria

3. Data Collection and Management

- **Registers and forms**: Printing ANC registers with malaria testing fields.
- **Digital tools**: Tablets or mobile devices if using electronic data capture.

- **DHIS2 integration**: Costs for customization and maintenance if registers are revised.
- **Supervision and mentoring**: Regular site visits and quality assurance should incorporate both supervision of procedures and data collection.

4. Logistics and Supply Chain

- **Storage and distribution** of RDTs and supplies

5. Monitoring and Evaluation

- **Data analysis and reporting**, including HRH and dissemination

6. Communication and Community Engagement

- **IEC materials** to inform pregnant women about testing
- **Community sensitization** activities.

7. Program Management

- **Staff time** for coordination, reporting, and stakeholder engagement
- **Operational overheads**

Excel Budgeting Template

The linked Excel spreadsheet contains the relevant line items for developing a high-level budget for ANC1 surveillance.

Country Spotlight

Since 2014, Tanzania has implemented nationwide malaria screening for all pregnant women through its ANC system (Kitojo et al., 2019). With approximately 98% of pregnant women in the country attending at least one ANC visit, ANC-based testing has been recognized as a practical and reliable source of sentinel surveillance data (Kitojo et al., 2019). Other countries, including Burkina Faso, Mozambique, Nigeria, and Zambia, have also successfully implemented pilot ANC1-based surveillance programs.

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