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DHS Survey Design: *Frequently Asked Questions*

DHS Survey Design: Malaria Parasitemia

This document summarizes global recommendations on malaria testing in household surveys. These recommendations are intended to ensure that protocols for malaria testing are harmonized and follow the global standards. If a survey supported with funding from the President's Malaria Initiative (PMI) deviates from this guidance, PMI in-country partners, PMI headquarters staff, and other donor partners should be informed.

Should we include testing for malaria parasitemia in our survey?

Malaria parasitemia testing is a reasonable addition to a Malaria Indicator Survey (MIS) or DHS survey in malaria endemic countries where the national malaria prevalence estimate is >3% among children age 6-59 months. In countries where the national prevalence estimate in children age 6-59 months is <3% in the two most recent population-based surveys, malaria parasitemia testing should not be included in the subsequent survey. Significant changes in national prevalence estimates are difficult to detect between closely-spaced surveys due to wider confidence intervals when prevalence estimates are low, and frequent surveys are also unlikely to be cost-effective, as large sample sizes are required to generate precise estimates of prevalence in low endemicity countries, particularly at the regional level. Exceptions may be made in countries where parasitemia has substantially declined in some regions but remains >3% in others.

Which age groups should we test for malaria?

Malaria parasitemia testing in an MIS or DHS is only recommended for children age 6-59 months. If a country feels strongly that an MIS or DHS include parasitemia testing in additional age groups, PMI funds cannot be used to support the costs associated with the additional testing. The reasons for these recommendations are as follows:

- **Children age 0-5 months:** Newborns may be protected against malaria by maternal antibodies. Inclusion of this age group in national parasitemia prevalence estimates would therefore underestimate overall prevalence.
- **School-age children age 5-14 years:** Gaining access to school-age children is logistically difficult and costly. MIS and DHS survey teams visit households during the daytime when most children age 5-14 are at school. Those school-age children who are at home at the time of the interview are more likely than those at school to be sick. As a result, their inclusion in malaria parasitemia testing could result in selection bias and may overestimate prevalence.
- **Women age 15-49:** If women of reproductive age are included in malaria parasitemia testing, it presents the possibility of testing pregnant women in their first trimester. Some women may not know that they are pregnant or may not disclose that they are pregnant.

Considerations for Inclusion

Validity:

RDTs provide valid estimates of malaria prevalence. Seasonality affects usefulness of data collected.

Effect on sample size:

Malaria parasitemia prevalence is usually factored into the calculations to determine a survey sample size. As countries move toward malaria elimination, this may lead to demands to further increase the sample sizes of surveys that include malaria parasitemia testing.

Impact on cost:

Malaria parasitemia testing increases survey costs as additional training and supplies are needed.

Impact on quality:

Including malaria parasitemia testing in a DHS increases the complexity of a survey and makes it more challenging to implement.

Based on survey testing protocol, if a woman is tested and is positive for malaria, she would be treated with ACTs, which are currently not approved by WHO for treatment during the first trimester of pregnancy. Avoiding inadvertent treatment of women early in pregnancy with ACT would require inclusion of pregnancy testing, which would pose many prohibitive challenges including being deemed unethical by most Institutional Review Boards (IRBs).

Are RDTs a suitable alternative to microscopy for estimating prevalence of malaria parasitemia?

In July 2017, the Roll Back Malaria (RBM) Monitoring and Evaluation Reference Group (MERG) released guidance that malaria RDTs are not only a suitable alternative to microscopy for estimating malaria parasitemia prevalence in a population survey setting but are a more practical choice. In contrast to a clinical setting, the requirements for high quality malaria microscopy are very difficult to meet in an MIS or DHS. An RDT-only approach reduces the requirements of training survey staff, saves money, and speeds the process of reporting results.

Can we use a multi-species RDT?

Multi-species RDTs are generally not recommended to estimate malaria parasitemia prevalence in household surveys. PMI funded countries should only procure single-species RDTs with PMI funds. While PMI is mindful that multi-species RDTs exist in countries and that other partners procure multi-species RDTs, the decision on which type of RDT to procure must be agreed upon by all donors. Limitations of multi-species RDTs are as follows:

- The main non-falciparum species countries wish to measure is P. malariae. However, the accuracy of RDTs to detect P. malariae is poor.
- P. malariae infections are detected in patients with concurrent P. falciparum infections, and mixed Pf/Pm infections are treated with ACTs, exactly as one would treat Pf-only infections.
- Single species RDTs are much simpler to interpret accurately and are less costly. The unit cost of multi-species RDTs is up to 30% greater than single-species RDTs.

How often should we collect malaria parasitemia data?

In low malaria endemicity countries, the frequency of data collection is an important consideration for monitoring and evaluation of malaria control activities. Maximizing the value added from testing for malaria parasites in national surveys requires a balance between the interpretability and utility of the data collected and the cost of the testing. The RBM MERG recommends carrying out no more than 3-4 surveys with malaria parasitemia testing per decade. Meaningful changes in national prevalence estimates are difficult to detect between closely-spaced surveys, and frequent surveys are also unlikely to be cost-effective, as large sample sizes are required to generate reliable estimates of prevalence in low endemicity countries, particularly at the regional level.

How important is seasonality?

A consideration that affects the interpretation of the survey findings is the timing of survey implementation relative to the high malaria transmission season (rainy and early post-rainy seasons). MIS surveys are typically conducted during and immediately after the rainy season and should conclude no later than 4-6 weeks after the rains end because this time frame is associated with peak transmission. For operational reasons, however, DHS surveys may be conducted during the dry season and therefore outside the peak malaria transmission period. As intervention coverage or usage levels may differ significantly between seasons, and malaria morbidity and mortality will differ by season, interpretation of the data obtained must take into account the seasonality of the survey period. It is also important to note that malaria parasitemia data from surveys conducted outside peak transmission periods are not a reliable indicator of peak transmission; therefore, malaria parasitemia testing is recommended during the malaria transmission season only.

The Demographic and Health Surveys Project, implemented by ICF and funded by the United States Agency for International Development (USAID). www.dhsprogram.com

DHS Survey Design
Malaria Data Collection: DHS or MIS?

Since the introduction of malaria questions in 1996, The DHS Program surveys have provided a solid evidence base for malaria monitoring and evaluation. Currently, The DHS Program conducts two types of household-surveys that collect malaria-specific data:

- Demographic and Health Survey (DHS)
- Malaria Indicator Survey (MIS)

While many aspects of data collection are standard across DHS and MIS surveys, there are key differences in their implementation. They are summarized below.

	DHS	MIS
Instruments	Household, Woman's, Man's, and Biomarker Questionnaires	Household, truncated Woman's, and Biomarker Questionnaires
Implementing Agency	Typically the National Statistical Office	National Malaria Control Program, National Statistical Office, or a partnership between these organizations
Malaria Data	Standard	Standard: often includes additional country-specific questions on topics like social behavior change communication
Malaria Biomarkers	Anemia is standard. Malaria parasitemia has been added to some DHS	Anemia Malaria parasitemia
Frequency of Data Collection	Every 5 years	Every 2-3 years
Timing of Data Collection	Typically dry season	Malaria high transmission season
Average Length of Data Collection	5-6 months	2-3 months
Average Length of Time for Data Availability	Key Indicators Report released 3-4 months after field work is completed; Full Final Report released 12 months after field work is completed	Key Indicators table ready for release 3-4 months after field work is completed; Full Final Report released 6-8 months after field work is completed

Resources and References:

Household Survey Indicators for Malaria Control: http://www.malariasurveys.org/documents/Household%20Survey%20Indicators%20for%20Malaria%20Control_FINAL.pdf

President's Malaria Initiative Technical Guidance Document: https://www.pmi.gov/docs/default-source/default-document-library/tools-curricula/pmi-technical-guidance-(february-2017).pdf?sfvrsn=16

Roll Back Malaria Guidance on RDTs: https://drive.google.com/file/d/0B1OT_g2g-ylqWjRhUlNScGVJX3c/view

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