

Screen and Treat Strategies for Malaria Elimination: A Review of Evidence



Prompt identification and treatment of infections is key for achieving elimination and eventual eradication of malaria. Passive case detection (PCD) is the foundation of malaria surveillance, but has limitations due to variations in healthcare access and health-seeking behavior. Further, as transmission declines, an increasing proportion of malaria infections are minimally symptomatic or asymptomatic, and will not come to the attention of health facilities. To address this challenge, malaria elimination programs may deploy a variety of active screen and treat (SAT) methods. Proactive case detection may be directed at high-risk areas or populations identified through PCD and can be applied at mass (population-wide) or focal (villages or small clusters) scales, while reactive case detection (RACD) is conducted in a targeted, focal manner in response to passively identified cases or clusters of cases.

SAT activities are resource-intensive, and are not recommended by the WHO as a tool to decrease transmission.¹ However, WHO does recommend SAT as a surveillance tool, leaving malaria programs uncertain about whether and under what circumstances it should be implemented. In recognition of this uncertainty, and in consideration of emerging evidence from recent years, we conducted a systematic review to assess the utility and effectiveness of SAT for malaria surveillance and transmission reduction.

We carried out a comprehensive search of SAT literature published through April 2018 and categorized included studies by study type, year of publication, eco-epidemiological setting, target population size, SAT approach, and diagnostic testing method used. We further examined a subset of studies based on effectiveness in decreasing malaria transmission and ability to detect additional infections. We also described and compared key themes and findings from descriptive studies. Finally, we summarized unpublished evidence on programmatic experience with SAT, including grey literature, program documentation, program survey responses, presentations, and meeting discussions.

1. Global Malaria Programme. Recommendations: the role of mass drug administration, mass screening and treatment, and focal screening and treatment for malaria. 2015. <https://www.who.int/malaria/publications/atoz/role-of-md-a-for-malaria.pdf>

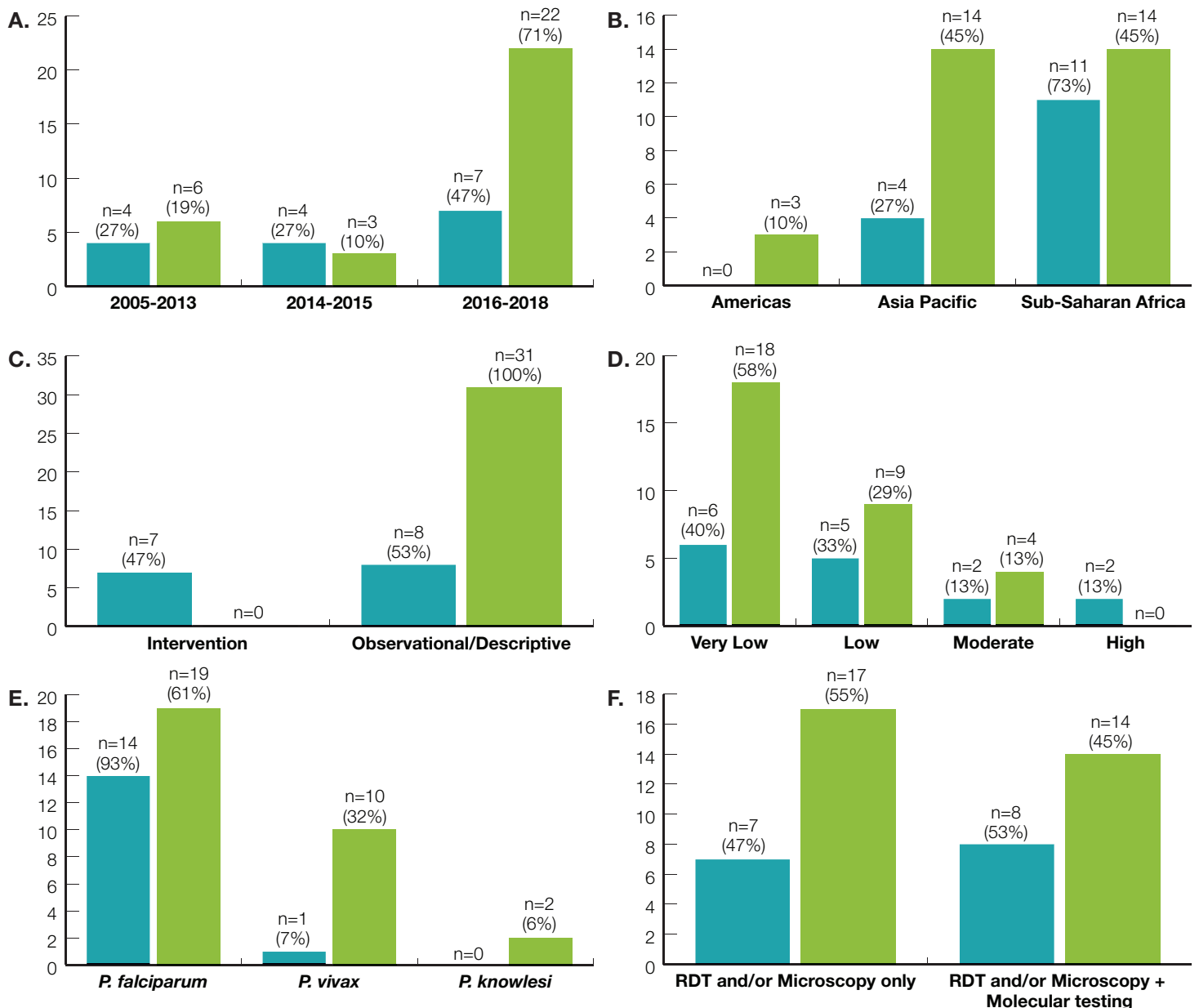
The review yielded 3,299 papers, and 84 were included in the analysis. Roughly half (n=46) of the included studies were quantitative empirical research, including 15 studies of proactive mass screening and treatment (MSAT) and 31 of RACD (Figure 1). The others were qualitative studies of community acceptability, costing/economics, modeling, and programmatic experience. Unpublished materials from 25 national/subnational malaria programs were analyzed.

Summary of Findings and Recommendations

- The sharp increase in SAT literature in recent years indicates a high level of interest in SAT among malaria programs and the research community, particularly for lower transmission settings in sub-Saharan Africa. There are fewer SAT studies from the Americas and Asia Pacific where *Plasmodium* species and high-risk groups are different than those in sub-Saharan Africa, representing an important knowledge gap.
- The quality of evidence is highest for proactive mass SAT using standard diagnostics (rapid diagnostic tests [RDTs] or microscopy) to inform individual or foci-level treatment. Seven intervention studies showed no or limited effect on reducing transmission, suggesting that mass SAT should not be used for transmission reduction.
- Modeling studies suggest that proactive SAT with more sensitive diagnostics may reduce transmission in lower transmission settings, and that combining SAT with vector control can reduce burden in higher transmission settings.
- In sub-Saharan Africa, there is consistent evidence that malaria clusters in index and neighboring households in low/very low *P. falciparum* transmission settings, providing a rationale for RACD.
- In southeast Asia there is some evidence that co-workers/co-travelers of positive malaria cases have increased risk of infection, indicating that RACD among social networks should be considered.
- In low/very low transmission settings, use of molecular diagnostics for RACD increased the detection of infection by 2 to 3 fold compared to standard diagnostics.

Figure 1: Features of empirical research studies – A) Year published, B) Geographic region, C) Study type, D) Transmission setting, E) Parasite species, F) Diagnostic test used

■ MSAT (n=15) ■ RACD (n=31)



- In lower transmission settings, limited sensitivity of standard diagnostics decreases yield for infection detection, thus limiting the effectiveness of SAT. SAT with more sensitive diagnostics is likely to be more effective as well as cost-efficient, since the main cost drivers are human resources and transportation rather than the diagnostic tests.
- Despite the limitations of SAT in detecting low-density infections and a lack of evidence on its efficacy in reducing transmission, malaria programs perceived many benefits of SAT: identification and treatment of cases; outbreak prevention; elimination of active foci in low transmission settings; and provision of more granular surveillance data needed to identify high risk groups and improve targeting of interventions.

- Programmatic gaps identified in the analysis include a lack of clear guidance on the design of practical and epidemiologically-appropriate SAT strategies, the development and implementation of monitoring and evaluation plans, and the analysis, interpretation, and application of data derived from SAT.

The full SAT report is available at shrinkingthemalariamap.org/backgroundpapers/SAT.