**malaria
consortium**
disease control, better health

Malaria surveillance and response

Surveillance — the systematic and ongoing collection, collation, analysis, interpretation and timely dissemination of data to decision makers[1] — is crucial to health systems strengthening. It allows governments to assess disease trends accurately, to target scarce resources (such as insecticide-treated nets, diagnostics, medicines and staff) to where they are needed most, and to evaluate the outcomes of interventions to improve cost-effectiveness and impact. With strong surveillance, health systems can become more resilient: epidemics can be rapidly addressed, and even anticipated and prevented.

We have been supporting surveillance activities in Africa and Asia since 2009, particularly with regard

to malaria. We believe that smarter, data-informed strategies will be key to achieving the World Health Organization's (WHO) target of reducing malaria cases and deaths by 90 percent by 2030 (with at least 35 countries eliminating the disease altogether).

We gather evidence by combining health-related data from country programmes with high-quality information from monitoring and surveillance systems through a robust impact evaluation platform. Our efforts actively guide decision-making, empower decision makers to manage programmes more effectively and promote stronger health systems overall.

Malaria Consortium is one of the world's leading non-profit organisations specialising in the prevention, control and treatment of malaria and other communicable diseases among vulnerable populations.

Our mission is to improve lives in Africa and Asia through sustainable, evidence-based programmes that combat targeted diseases and promote child and maternal health.

Our approach and scope

Our approach to surveillance and response is guided by a clear vision: with strengthened surveillance, health systems can tailor and target actions to ensure the sustained and accelerated reduction of disease risk and occurrence. Ongoing surveillance tracks disease incidence and outbreaks, providing valuable data and fostering responsive and timely feedback loops on how health resources and facilities are used. This information is important not only for evaluating the performance of interventions and how best to improve them, but also for adaptive management practices. Moreover, evidence can be shared with partners and communities to improve coordination and social accountability.

As the figure below illustrates, our approach embeds four priority components into our programmes. Based on this, we have developed and delivered numerous surveillance-focused projects with funding from large multilateral and bilateral donors and private foundations, such as the Bill & Melinda Gates Foundation, UK aid, the United States Agency for International Development and WHO. We routinely publish our findings in international, peer-reviewed journals including JMIR Public Health and Surveillance, Malaria Journal and PLoS One.

COLLABORATION

data quality ⇄ functional, integrated systems ⇄ data-to-action

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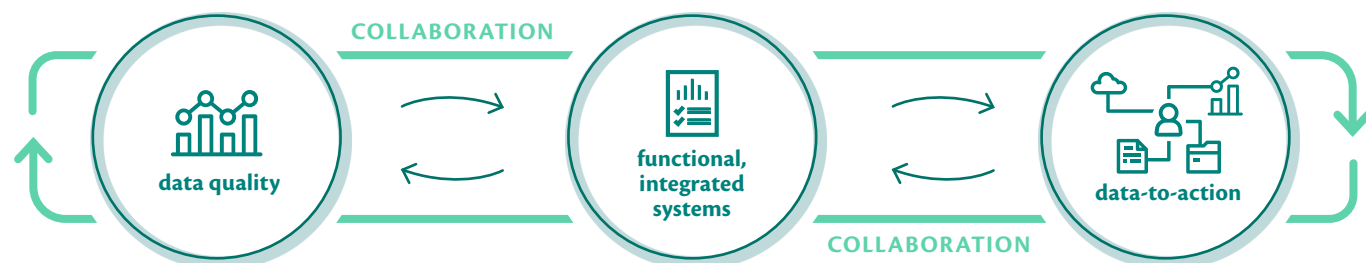
Our expertise

1. Improving data quality

High-quality surveillance data are critical for informed public health action. We improve data quality by designing and assessing surveillance and monitoring and evaluation tools.

The countries in which we operate tend to have complex, under-resourced health care systems characterised by 'disconnected' levels. Different stakeholders — including the private sector, community/health facilities and hospitals, operational districts, local governments, provincial and state departments, and central ministries — frequently operate in silos, often using parallel databases and systems to collect and report data. This lack of integration can greatly compromise data quality.

Identifying obstacles to surveillance in Mozambique

Following the development of Mozambique's landmark National Malaria Surveillance Roadmap in 2017, we supported a comprehensive assessment of the country's Malaria Information System (MIS) in 2018. Results showed that MIS performance was suboptimal. Data tended to be of poor quality and were not being used effectively by decision makers. We found that a range of behavioural, organisational and technical factors was also impeding MIS processes (e.g. stock-outs of reporting forms were affecting the timeliness and accuracy of data), and identified critical gaps in training and supervision.

The assessment provided a full analysis of the core obstacles to effective surveillance, outlining actionable recommendations for strengthening and upgrading the MIS. On this basis, between 2019 and 2022, we are: developing a malaria-specific integrated information system capable of collecting and responding to both aggregated and case-based data; comprehensively training and supervising staff at all levels; enhancing data quality and management by harmonising and adapting existing data tools; and developing context-specific guidelines and policies to operationalise surveillance activities.

Further reading: https://bit.ly/2SWDgDl

2. Enhancing the functionality and integration of reporting systems

We believe that the best way to improve the functionality and sustainability of surveillance systems is to integrate them into existing health information reporting systems.

A well-functioning health information system should ensure the production, visualisation, analysis, dissemination and use of reliable and timely information on health determinants, health system performance and health status. However, low- and middle-income countries often suffer from fragmentation in their reporting of data. Developing disease-specific information systems can create 'parallel' or 'vertical' data flows that are disconnected from routine health system information. This generates systems that are unable to communicate. Not only is this inefficient, but it can also result in duplication of reporting across administrative levels, which compromises functionality. In the context of malaria elimination, it is critical to ensure that a case-based surveillance system can elicit the most appropriate disease-focused response, in a way that that strengthens the overall health information system.

Supporting malaria elimination in Cambodia

For the last decade, we have been supporting the Government of Cambodia to reach its target of eliminating malaria by 2025. In 2009, we advised the National Center for Parasitology, Entomology and Malaria Control on developing and piloting an MIS, which is now in use in 45 of Cambodia's 162 districts.

In 2014, we upgraded the MIS, helping the Ministry of Health (MoH) transition from a local to a web-based reporting system to facilitate the capture of elimination-focused, case-based data. We developed new functionality (e.g. data visualisation) and operational aspects (e.g. data quality), while ensuring that the MIS remained responsive to country-specific needs and incorporated flexibility to allow for possible future changes in policy or operation. The system integrates automated dashboards into the existing user interface, enabling rapid up-to-date data visualisation. It also obtains and communicates data through different platforms, incorporating data from private sector outlets and the national health management information system.

The MIS now processes case-based malaria data from all levels of service provision and provides health staff with the information necessary to respond to malaria outbreaks and individual cases as the country moves towards elimination.

Further reading: https://bit.ly/2MS1rj7

Strengthening malaria surveillance in Mozambique

Through the project Strengthening Malaria Surveillance for Data-driven Decision-making in Mozambique, we are supporting the government to operationalise an integrated malaria information storage system (iMISS) that is responsive to all transmission strata across the country. Under the leadership of the National Malaria Control Programme, we are engaging with national and provincial stakeholders to implement the iMISS at district and health facility level.

The iMISS will integrate and store malaria data across various thematic programme areas and will include automated dashboards for users at all levels to facilitate routine data visualisation and use. To this end, we are executing intervention packages that focus on: enhancing and developing existing data collection tools; integrating programmatic data into the iMISS; and targeting the procurement and distribution of malaria recording forms/equipment. Moreover, we are comprehensively training and supervising health facility and district level staff to monitor key indicators, assess the impact of interventions and report data for necessary to implement responses. We are supporting the surveillance-related adaptations needed in the context of malaria elimination through the establishment and integration of individual case-based notifications and reactive case detection activities in Maputo province.

Further reading: https://bit.ly/2LkFGrd

Malaria Consortium staff record the monthly figures during a meeting of MMWs and VMWs at the Nhang Health Clinic, Cambodia

Our work improves data reporting at all levels to promote data-informed decision-making.

The rapid use of high-quality data to trigger timely responses and appropriate decision-making is one of the primary goals of a well-functioning health information system. A feedback mechanism is also critical to ensure decisions and problem-solving actions are effectively embedded across all levels to maximise the system's efficiency. We focus on ensuring timeliness, simplicity and triangulation of data sources, with a clear data-to-action framework across all levels of service delivery. By applying these principles and pooling together different data sources, we achieve a better understanding of the determinants and contributory factors of disease risk, which can in turn guide evidence-based decision-making around policy and practice.

Supporting improved data use in Uganda

Through the Strengthening Uganda's Response to Malaria project, we are supporting the country to reduce malaria morbidity and mortality via improved use of data in decision-making. We have developed sub-county geospatial maps to identify areas with high numbers of malaria cases and high test-positivity rates to target our responses. We have also developed the capacity of health facilities to actively monitor malaria trends through routine data gathering, enabling them to identify significant deviations in data, predict malaria upsurges and pinpoint hotspots for targeted interventions. At the community level, we have trained and mentored village health teams on the proper use of data collection tools and on improved, data-guided service delivery. Community-level reporting has also helped the MoH to deploy appropriate medicines and equipment, and to target households with high numbers of malaria episodes for health promotion activities.

An important area of focus for the project is strengthened entomological surveillance aimed at evaluating vector control interventions and decision-making. We have established surveillance sites in various districts to monitor the abundance and composition of *Anopheles* vectors in relation to coverage, use of interventions and disease incidence. We have also supported studies on vector habits and insecticide resistance in different parts of the country and investigated impacts of the core vector control interventions. Lastly, we are supporting the MoH to integrate entomological surveillance into the district health information system for routine and timely monitoring.

Further reading: https://bit.ly/2QKeB40

Supporting data-to-action responses

Through the Support to the National Malaria Programme in Nigeria 2 (SuNMaP 2) project, we are helping Nigeria's National Malaria Elimination Programme (NMEP) to reduce the country's malaria burden by consolidating comprehensive, timely and accurate routine surveillance and health information management systems that integrate malaria where feasible. Additionally, we are improving the capacity of the NMEP and state staff to analyse and interpret routine data results, and to translate them into action.

We actively promote mechanisms that help generate feedback and appropriate responses to malaria, such as the national malaria data repository — which archives malaria information that has not been captured by the routine health information system — and a dynamic dashboard for visibility. Our efforts also aim to strengthen and expand entomological and resistance surveillance sites and systems, which provide the timely evidence needed to respond to vector and parasite resistance.

Further reading: https://bit.ly/33KPALg

Health workers in Nigeria participating in the SuNMaP project

Example of a dashboard, optimised for multiple formats, depicting case characteristics in KaMavota district, Mozambique

4. Fostering collaboration

We cooperate with partners ranging from governments to private-sector actors, enhancing institutional capacity to record, analyse and share data.

We work closely with governments and other organisations to ensure that appropriate reporting and data visualisation tools, as well as quality control measures, are established to improve the overall quality of surveillance. For example, through the USAID Malaria Action Program for Districts project in Uganda, we contribute quarterly data to the Malaria Data Integration and Visualization for Eradication platform — a U.S. President's Malaria Initiative project.

Where possible, we introduce digital strategies for data collection that enable real-time data sharing and prompt responses to surges and outbreaks. We also seek to ensure that centralised, government-owned surveillance systems are in place to collate data from a wide range of sources, thereby enhancing the flow of information to decision makers.

Outside of government structures, we work with key global networks and coalitions involved in surveillance, monitoring and evaluation. As thought leaders in global public health, our expertise is highly sought after. As well as engaging with WHO's High burden to high impact (HBHI) initiative[3] — which fosters a country-led approach for a data-informed targeted malaria response — we have co-chaired WHO's Technical Expert Group on Surveillance, Monitoring and Evaluation, which is tasked with reviewing evidence, providing advice and making draft recommendations in this area of expertise.

We currently co-chair the Roll Back Malaria Partnership to End Malaria's Monitoring and Evaluation Reference Group (RBM MERG), which seeks to align partners based on strategies and best practices for developing effective systems to monitor and evaluate malaria control programmes. Our contribution to MERG's recent guidance on monitoring and evaluating malaria-related routine data during the COVID-19 pandemic[4] — which combined expertise from individuals spanning 10 organisations — is a testament to the collaborative spirit that drives our efforts.

Facilitating cooperation at all levels of Mozambique's health system

In Mozambique, we have brought together stakeholders from government, non-governmental organisations, health facilities and civil society through the development of upSCALE. This digital platform was designed to use real-time data collected by community health workers (CHWs) to improve the management and delivery of health services. The ability to analyse data and local disease-specific trends in near real time allows managers to improve resource allocation, and additionally facilitates quality control by enabling supervisors to manage stock levels and CHW performance.

Improvements to the platform are ongoing, drawing on input from many different users — from CHWs and health officials, to statisticians and community members. Data are also gathered from a wide range of sources, allowing for more up-to-date and accurate information that can assist in the early detection of disease outbreaks. This is invaluable for informing government planning and responses to epidemics. We are currently working with the MoH, Dimagi and the United Nations International Children's Fund to adapt upSCALE — through upgrades to the existing platform, including the integration of a COVID-19 algorithm — to help CHWs to respond more effectively to the pandemic.

Further reading: https://bit.ly/3eXLSCm

Connecting government, health facilities and outreach workers in Cambodia

Through the Regional Artemisinin Initiative 2 Elimination project in northern and southern Cambodia, we have encouraged cooperation across all levels of the health system, connecting CHWs, village malaria workers (VMWs) and mobile malaria workers (MMWs) with the national reporting system in elimination settings. In southern Cambodia, we have assisted operational district staff to train health centre workers and VMWs on real-time electronic reporting. In northern Cambodia, we are training MMWs in the early diagnosis and treatment of malaria among forest goers and mentoring them on data quality.

While health facility workers actively investigate positive malaria cases (and test and treatment supplies come from the health facilities), it is MMWs who operate in the hard-to-reach areas where forest goers work, and where the last malaria cases are found. MMWs are, thus, best placed to reach these groups and collect invaluable data on disease prevalence and antimicrobial resistance. It is critical to connect MMWs with the national surveillance system — and in so doing, with health facilities — to strengthen the local public health system.

Further reading: https://bit.ly/2AWtFWQ

Further reading: https://bit.ly/2zhWWuX
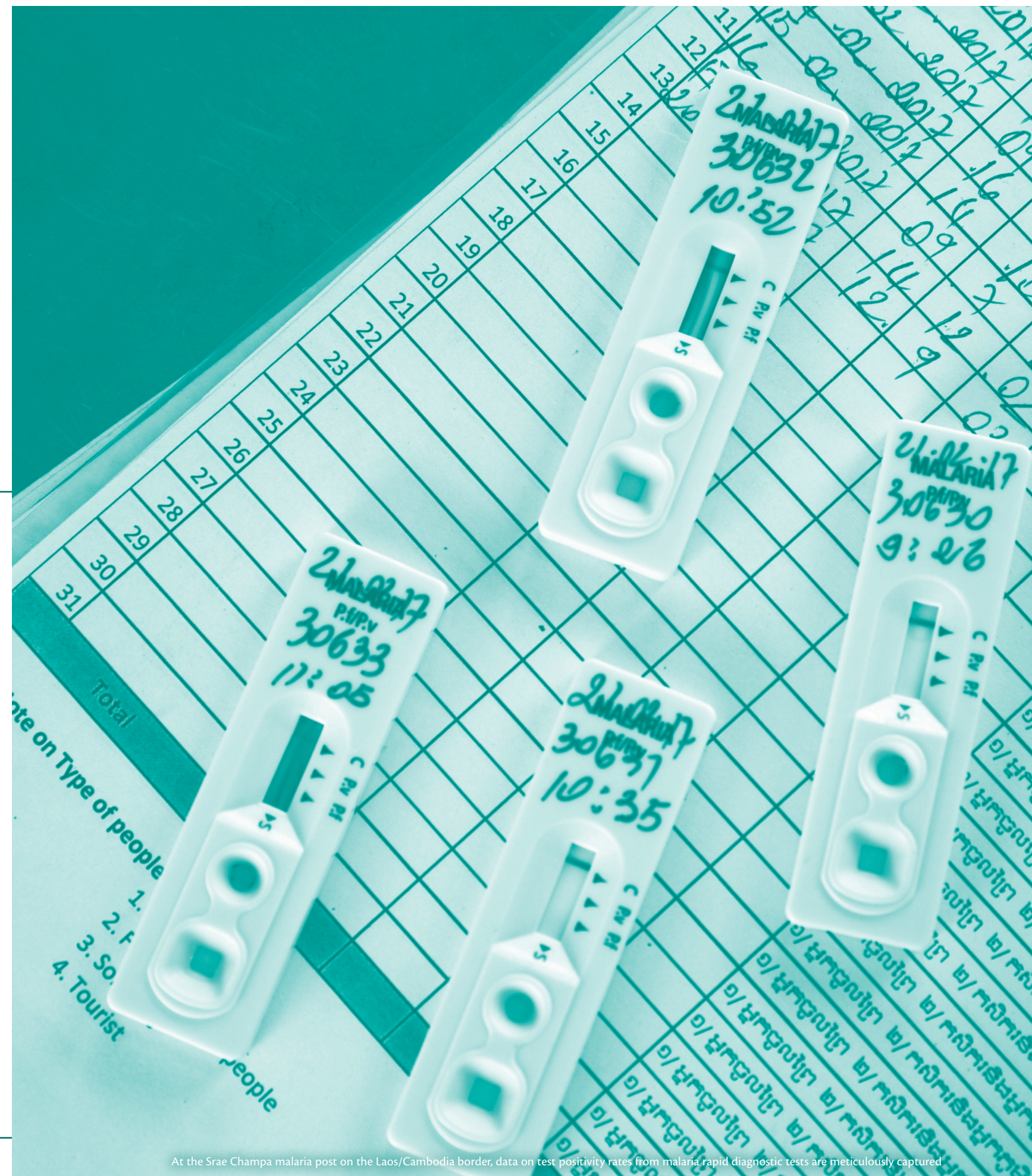
At the Srae Champa malaria post on the Laos/Cambodia border, data on test positivity rates from malaria rapid diagnostic tests are meticulously captured

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Cover image: Tânia Morais and Anifa Latifo conduct data quality analysis at Malapa Health Centre in Cuamba, Mozambique

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