

STRENGTHENING LABORATORY CAPACITY FOR MALARIA DIAGNOSIS

TECHNICAL BRIEF

Mozambique Integrated Malaria Program (IMaP)



Lab technician analyzes a sample under a microscope. Photo by Chemonics International, Inc.

In malaria-endemic countries, timely and accurate malaria diagnosis is essential for effective case management. A clinical diagnosis of malaria relies on health workers' knowledge of disease symptoms and access to testing resources. The lack of either can lead to misdiagnosis, which compromises the patient's quality of care. To avoid problems in diagnosis and care, the World Health Organization (WHO) recommends that clinicians test patients who present with fever for malaria, then only treat those who test positive. The Mozambique Integrated Malaria Program (IMaP), a five-year USAID-funded project led by Chemonics International Inc., has been strengthening malaria diagnosis in the northern Mozambique provinces of Cabo Delgado, Zambézia, Nampula, and Tete. In Zambézia and Nampula, the project supported provincial external quality assessments (EQAs) for microscopy.

Strengthening High-Quality Laboratory Services in Mozambique

To strengthen laboratory services and malaria diagnosis, IMaP implemented a variety of capacity building activities in collaboration with technical partner Friends in Global Health, including:

- Training technicians in laboratory diagnosis of malaria, focusing on preparing smears and identifying and quantifying malaria parasites
- Conducting quarterly rounds of external quality assessments using the blind rechecking method of prepared slides for malaria
- Providing technical assistance to laboratories with poor capacity in detecting malaria parasites

Training Laboratory Technicians

IMaP trained 121 laboratory technicians in malaria microscopy. The training included practical sessions on smear quality (preparation of thick and thin blood smears) and staining; parasite detection, quantification, and differentiation of species; and rapid malaria testing, as recommended in the WHO Malaria Microscopy Quality Assurance Manual (2016). IMaP also supported training and certification of 22 provincial laboratory technicians in EQA for microscopy.

Provincial External Quality Assurance

To improve the quality of malaria diagnosis in Zambézia and Nampula provinces, IMaP provided logistical and technical support to the Provincial



A technician analyses malaria samples in a lab in Mozambique. Photo by Chemonics International, Inc.

Mozambique Integrated Malaria Program (IMaP) PROJECT DETAILS

DURATION

November 2017 –
October 2022

LIFE OF PROJECT FUNDING

\$23,797,392

GEOGRAPHIC FOCUS

Zambézia, Nampula, Cabo Delgado, and Tete provinces

PRIME CONTRACTOR

Chemonics International, Inc.

PARTNER ORGANIZATIONS

FHI 360

Vanderbilt University Medical Center (VUMC) / Friends in Global Health

Directorate of Health (known as *Direcção Provincial de Saúde* [DPS]) to implement EQA activities for malaria microscopy through the blind rechecking of malaria blood smears. This activity was aligned with the Mozambique Provincial External Evaluation Programs (Mozambique Ministry of Health [MoH], 2016) and the EQA Decentralization Guideline (MoH, 2018). IMaP conducted a baseline assessment of the infrastructure and technical capacity of each laboratory in collaboration with DPS personnel. After the assessment, IMaP worked with provincial laboratory supervisors to develop comprehensive action plans for laboratories with low performance. Provincial laboratory EQA teams conducted supportive supervision visits and on-the-job-training for laboratory technicians to close knowledge and skill gaps identified during the provincial EQA process.

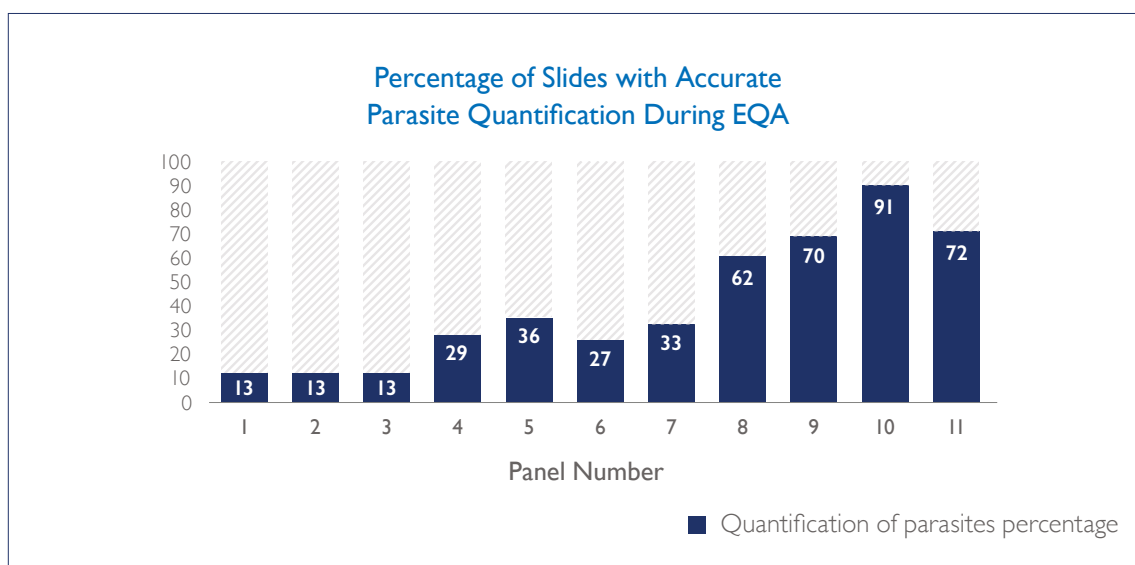
IMaP supported DPS personnel to conduct quarterly EQA rounds on slides from district laboratories. The provincial lab teams re-checked the malaria slides to evaluate smear quality (detection of thick and thin blood smears); concordance of results related to parasite detection, parasite quantification, differentiation of species; and the accuracy of laboratory diagnoses. In Zambézia Province, EQA results showed that the ability of district laboratory personnel to accurately quantify parasites increased

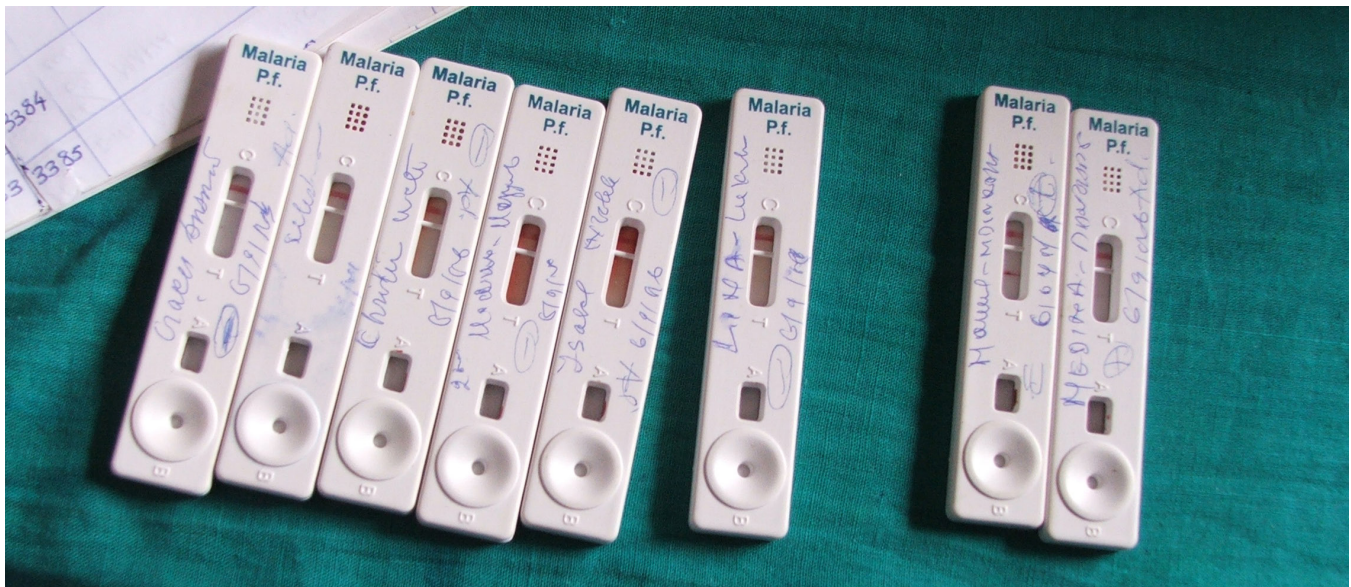


A health worker collects a blood sample for malaria testing. Photo by the USAID Global Health Supply Chain Program—Procurement and Supply Management (GHSC-PSM).

from 13% during the first round in 2019 to 72% during the 11th round in 2021 (see chart below). However, despite this overall improvement, there was a decline in accuracy levels between rounds 10 and 11 due to equipment breakdown and reagent stockouts.

The project provided technical assistance and logistical support to strengthen and standardize laboratory quality assurance systems. Activities included revising laboratory standard operating procedures (SOPs) and bench aids, which were then distributed to each of the participating laboratories. Digital and print SOPs and bench aids in Portuguese and English ensured delivery of high-quality laboratory services.





Results from malaria rapid diagnostics tests. Photo by Angus Spiers, USAID.

Supportive Supervision

IMaP provided quarterly support to provincial EQA teams conducting site-level support and on-the-job training for staff based in laboratories with low performance in each slide panel. The teams trained technicians in the proper smear preparation and staining; parasite detection, quantification, and differentiation of species; data recording; and slide conservation. During supportive supervision, the IMaP and EQA teams observed that malaria microscopy was affected by frequent stockouts of consumables (slides, Giemsa stain), and inadequate number of microscopes or poorly maintained ones. The identified issues were shared with the DPS, the National Malaria Control Program, and relevant technical working group to facilitate re-stocking and re-tooling of the laboratories for sustained delivery of microscopy services.

Conclusion and Recommendation

The IMaP project employed a variety of approaches over the course of the five-year project — training and supportive supervision visits for laboratory technicians, operationalized SOPs and bench aids, and proficiency panels for provincial malaria EQAs. Together, these activities improved the malaria diagnostic capabilities of laboratories in Nampula and Zambézia, the provinces with the highest burden of malaria in Mozambique.

We would like to recommend that laboratories continue using these approaches to sustain and ensure further gains in performance.