

Improving the quality of malaria diagnosis and laboratory services in resource-poor countries



A Namibian nurse uses microscopy to confirm malaria diagnosis in her health centre

Improving laboratory services and promoting accurate diagnosis of malaria at community level will save lives and prevent wastage of valuable resources. Increasing levels of resistance to cheap, first-line antimalarials means that many poor countries must promote new, more expensive treatment in the form of Artemisinin-based Combination Therapies (ACTs). Due to the resultant rising costs, it is no longer feasible to treat all fevers as malaria; the current high levels of misdiagnosis are unsustainable. The need, therefore, for improved diagnostic tools that can be used at community level has never been greater.

One million deaths per year are caused by malaria alone. In Sub-Saharan Africa more than 80 per cent of individuals self-treat fevers with antimalarial drugs without seeking health care in the formal sector. Self-treatment results in high levels of over-diagnosis of malaria, treating all fevers as malaria masks other underlying and potentially fatal conditions, and doing so is a significant waste of public and private resources.

The importance of accurate diagnosis of all the major diseases cannot be underestimated, and efficient laboratory testing is vital to identifying and treating life-threatening illnesses. Laboratory services in many low-income countries are often run down and yet they are critical for public health, disease control and surveillance as well as guiding patient diagnosis and care.

Poor quality laboratory services have the greatest negative impact on poor and vulnerable people because these people carry the largest burden of ill health. The effective diagnosis of malaria and other life-threatening illnesses at both community and laboratory level will help reduce this burden. There is indirect evidence to suggest that the mismanagement of malaria and other fevers contributes to a vicious cycle of deepening poverty and increasing ill health.

Since 1999 the Malaria Knowledge Programme has been working in Ghana and Malawi to increase the effectiveness of laboratory systems and diagnostics tools. The following recommendations have emerged from this research. Overleaf are two examples of MKP's work that have been implemented at national levels and are replicable in other low-income countries.

Recommendations

Laboratory services in resource-poor settings

- Recognition is needed at national and international level that clinical laboratory services are essential components of health systems. Adequate representation of laboratories in decision-making processes must occur.
- It must be acknowledged that sub-standard laboratory services waste public and individuals' resources and result in clinical mismanagement and inaccurate health information. To revitalise laboratory services, support must be given to education, supervision and technical improvements and quality assurance networks to ensure reliable test results.
- Resources should be used equitably to ensure there is access to quality-assured essential laboratory services. This will ensure effective haemoglobin



The Laboratory Technologist of the Namibian Malaria Control Programme teaches nurses how to make good malaria blood slides

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“We are dedicated to providing quality work to support health delivery.”

Laboratory staff in Ghana

“Training others makes work more interesting and training subsidiary trainers also reduces the workload.”

MKP workshop participant

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www.healthlink.org.uk

Contact:
Dr Imelda Bates
Tel: +44 (0)151 705 3115
Email: ibates@liv.ac.uk
Dr Guy Barnish
Tel: +44 (0)151 705 3153
Email: gbarnish@liv.ac.uk

measurement, safe blood transfusion practices and diagnosis and management of the major health problems such as TB, malaria and HIV/AIDS.

- Laboratory professionals and clinicians need to work in partnership to ensure that laboratory services are effective in guiding patient management.
- A safe working environment is needed, to minimise the risk of infection through occupational exposure.
- Laboratory equipment should be appropriate for the workload and technical skills of staff, and the budget must cover servicing and repair, spare parts, and training in maintenance.

Accurate malaria diagnosis

- Commitments should be made at international level to improve the availability of accurate and inexpensive diagnostic tools for malaria, and support given to ensure that supervisory mechanisms are used effectively.
- There are differing cost benefits for different combinations of diagnostic tools and treatment regimes. Therefore, there needs to be cost benefit analysis in any given context as solutions will differ, depending on the prevalence of malaria, patterns of resistance, technical and clinical skills and the availability of resources.
- Practical, feasible and affordable mechanisms for monitoring the efficacy of malaria interventions when they are scaled up need to be identified. This relies on the appropriate use of good quality diagnostic tools.

Malaria Knowledge Programme work in action

Improving the accuracy of malaria-related laboratory tests in Ghana

MKP has demonstrated that it is feasible to establish a nationwide system for improving the accuracy laboratory tests, including those for malaria, in Ghana. Inaccurate malaria results can lead to patient mismanagement, misperceptions about malaria resistance patterns and public health misinformation.

The study involved almost 700 staff in all government health laboratories in Ghana and improved the accuracy of test results. An effective and practical model was developed, based on a national network of senior technicians who implemented and supervised a continuous cycle of test monitoring and targeted training for all laboratory staff in their regions. This model is replicable in other low-income countries.

Haemoglobin testing in Malawi

MKP has developed and tested a practical model for gathering evidence about haemoglobin test efficiency that could be adapted for use in other resource-poor settings.

Haemoglobin is the most commonly performed test worldwide, and is an essential part of any health system. However, the process for choosing an appropriate method for haemoglobin testing is complex, and there is little guidance available for health managers in poorer countries. MKP developed a model evaluation process in Malawi to choose and validate a simple, accurate and fast method that met their needs. The Ministry of Health in the country has now adopted a standardised method in all peripheral laboratories, thereby facilitating training and provision of supplies.