

2 Director's Message

Malaria remains a major public health challenge for many countries around the world. While evidence of an encouraging decline of malaria in some countries is well established, the disease remains highly prevalent in many areas, particularly in Sub-Saharan Africa, requiring a sustained commitment to effective control strategies. Members of the Malaria Centre have helped to show that investment in malaria control can produce tangible benefits at many different levels. These efforts to develop and properly deliver effective malaria control require a broad, cross-disciplinary approach, such as that applied by the Malaria Centre.

Members of the London School of Hygiene and Tropical Medicine (LSHTM) continue to work across a whole range of scientific disciplines and this report demonstrates the

scope of cross-cutting research undertaken in 2008 & 2009. This integrated approach facilitates a better understanding of how research outputs can translate into control efforts with the aim of achieving the Millennium Development Goal 6 which includes targets related to malaria. Scientists within the Centre have been involved in several high profile evaluations of new interventions, paving the way for their inclusion in control policies. Members have also made significant contributions to defining the research agenda surrounding recently established elimination initiatives.

The contributions of LSHTM Malaria Centre staff are recognised not only in academia but also as part of the broad policy-making process of the World Health Organisation and major national and international malaria bodies. Despite the uncertain financial future, donors and governments in the United Kingdom and abroad, have continued to pledge considerable funds for malaria control. The LSHTM and its Malaria Centre are committed to making important contributions to decisions about where best to target funding as well as to the evaluation of malaria control interventions.



A handwritten signature in black ink that reads "Andy Haines". The signature is written in a cursive style and is positioned above a horizontal line.

Professor Sir Andrew Haines

Director of LSHTM

Malaria research and control continues to develop apace. In the time since the last report (2006/7) further reductions in malaria prevalence have been recorded in a number of African, Asian and South American countries. However, these recent successes are tempered by high malaria incidence in several countries in the African heartland, including Nigeria and Uganda, and the absence of reliable information in others. Furthermore, there are now very worrying reports from South East Asia of potential resistance to artemisinins which form the basis of first line anti-malarial treatment in many countries. These developments present a variety of important challenges to those working on malaria research and control.

In recognition of the complexity of the situation, several think tanks and organisations have been established to direct research and policy agendas. Focus remains on malaria control but has been extended to include the possibility of elimination. Consequently, there has been an increased emphasis in a number of areas: the relatively under researched *Plasmodium vivax*, which makes an important contribution to the total global burden of malaria; the containment of drug resistance; the spread of resistance to pyrethroid insecticides and its threat to effective net use; and the development and implementation of optimal control strategies. Intent has been matched with funding commitments from major donors including the Bill & Melinda Gates Foundation, the National Institutes of Health, the United Kingdom (UK) Department for International Development, UK research councils and other charitable organisations.

Progress depends on an integrated, multi-disciplinary approach and the London School of Hygiene and Tropical Medicine (LSHTM) Malaria Centre plays an important part in this. Approximately half of staff are lab-based, working to develop new or improved interventions. Other members work on intervention studies, evaluating how well new approaches to malaria control work or are engaged in social or economic studies to understand how to get the most out of malaria control tools. This breadth and depth of expertise is the Malaria Centre's main strength.

The research presented in this report demonstrates the importance of interdisciplinary collaborations both within LSHTM and with a large number of collaborators outside the School. The report covers work done on basic biology and the identification of new potential targets for drugs, vaccines and insecticides; the testing of these products in field settings; the social and economic evaluation of interventions; and their relevance to policy. The endpoint is translational research that can be implemented by governments and those involved in malaria control programmes wherever the disease exists.



Chris Drakeley

Director, Malaria Centre

4 Global Relevance

The Malaria Centre comprises more than 200 staff & students whose research focus is malaria. This research encompasses the broad spectrum of disciplines from basic biology of the parasite, vector and human through to implementation and policy related studies. Not surprisingly therefore Malaria Centre members are spread across all the faculties and departments within the London School of Hygiene and Tropical Medicine (LSHTM) providing a catalyst for cross-disciplinary collaboration.

Capacity strengthening has long been at the core of the Malaria Centre. This was initiated by the Bill & Melinda Gates Foundation funded Gates Malaria Partnership which has now been superseded by the Wellcome Trust funded Malaria Capacity Development Consortium. Additional Wellcome Trust funded African Institution Initiatives such as THRIVE (Training Health Researchers into Vocational Excellence in East Africa) as well as others supported by the European Union and United Kingdom (UK) Research Councils further contribute to this aim. Members have continued to provide teaching and training on malaria at centres all over the world as well as through in-house courses and Distance Learning.

Successful and influential research is dependent on strong collaborations. Much of the work presented here would not be possible without partner institutions in the UK, Europe, the USA and malaria endemic countries.



Map illustrating countries in which Malaria Centre members work.

This report demonstrates the geographical and scientific breadth of the research conducted by the Malaria Centre and its partners. The principal aim is to provide the tools for malaria control through translational research.

Examples of research with global relevance include:

- Continued studies into the biochemistry of the transmissible stages of malaria parasites with the aim of developing drugs that prevent infection of mosquitoes and thus stop malaria transmission
- Vaccine studies on the evaluation of the RTS,S malaria vaccine which has shown to provide up to 50% protection from disease in vaccine recipients. This work is supported by more fundamental immunological studies on the longevity of both the cellular and humoral arms of the immune response

- Studies on the threat of drug resistance to Artemisinin-based Combination Therapy (ACT). Clinical and laboratory studies address identification of potential targets whilst social and economic studies aim to define optimal delivery methods for good quality ACTs and the influence of change in drug policy on the development of resistance
- Vector control research that builds on the long standing relationship with the World Health Organisation in evaluating new brands of Long Lasting Insecticidal Nets (LLINs) and the development of alternative insecticides to pyrethroids. With the introduction of Indoor Residual Insecticide Spraying (IRS) in many African countries, under the President's Malaria Initiative, studies are also described on integrated vector management where LLINs are combined with IRS and other approaches including larviciding and repellents
- A large number of clinical studies which have evaluated drugs, vaccines and insecticides as well as different sites of drug delivery (home or hospital). Studies on Intermittent Preventative Treatment (IPT) in children, pregnant women and in infants are also described - the latter having been extensively evaluated including safety and policy implications
- Research that describes the development of tools (including molecular) for the monitoring and surveillance of malaria and malaria species. Studies include those to develop serological tools used to estimate the foci of exposure which may be particularly relevant at low transmission intensities. Studies on better systems and methodologies to collect data such as verbal autopsy information, drug use at home and drug quality are also presented
- Social and economic studies that fall into two main areas: work that improves our understanding of the acceptability and cost-effectiveness of interventions such as IPT for malaria in infants and children; and work that supports the development of methods for delivering malaria prevention, diagnosis and treatment interventions with a view to scaling up their effective coverage

In addition to the scientific research described in this report, Malaria Centre members continue to play an active role in providing support to policy makers in the UK and abroad. In particular, members have provided advice to the World Health Organisation and national control programmes in malaria endemic countries. In addition, members have authored or contributed to reports produced by the UK Department for International Development and the All-Party Group on Malaria and Neglected Diseases of the Tropics.

The Centre continues to engage with the public and other interested parties by hosting a wide range of seminars and events including those to mark World Malaria Day and World Mosquito Day. Furthermore, the renovated web site allows users across the world to stay up-to-date with news and events from the Centre as well as our latest research findings.