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Call to action: priorities for malaria elimination

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The Lancet's four-part Series on malaria elimination summarises the remarkable progress achieved over the past 100 years and discusses the substantial technical, operational, and financial challenges that confront malaria-eliminating countries.^{1–4} The Series comes at a time when there are increased resources to combat malaria worldwide. A three-part strategy to achieve malaria eradication has been developed and is widely endorsed: aggressive control in high-burden regions; progressive elimination from endemic margins to shrink the malaria map; and research and development, to develop new tools and techniques.⁵ All three components are important and must proceed simultaneously. This Comment focuses on the priorities, requirements, and responsibilities that are associated with the second part of this strategy: shrinking the malaria map.

Progress in shrinking the malaria map (the geographical range of endemic malaria) has been remarkable. Since 1945, 79 countries have eliminated malaria and the proportion of the world's population who live in malaria-endemic regions has decreased from 70% to 50%.⁶ Worldwide, 109 countries are now malaria free, whereas 99 still have malaria transmission. Of these 99 countries, 32 have started to eliminate malaria, with success a prospect for the next decade, provided they are adequately supported. Since the end of the Global Malaria Eradication Program in 1969, the international donor, policy, and research communities have been too cautious in discussing elimination, in recognising malaria-eliminating countries, and in directing financial and technical support to them. Furthermore, the research agenda has been skewed towards *Plasmodium falciparum* malaria and has insufficiently dealt with *Plasmodium vivax* malaria or with the challenges that countries face when eliminating malaria and preventing reintroduction.

Although the 32 malaria-eliminating countries are about as wealthy as previous successful eliminators were, and have similar health-system capacity,¹ they face a formidable array of obstacles, some of which are new. These obstacles include the substantial and increasing movement of people across borders, which creates the constant potential for malaria importation, the inadequate tools for fighting *P vivax*,⁷ the threat of insecticide and drug resistance, and now, the global financial crisis putting pressure on domestic and international resources for malaria.

Many of the operational, technical, and financial challenges faced by malaria-eliminating countries are identical in kind and similar in magnitude to those faced by countries deciding to maintain controlled low-endemic malaria. Comprehensive thinking about these

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For more on the Malaria Elimination Group see <http://www.malariaeliminationgroup.org>

challenges, which unify discussions in Botswana (eliminating) and Zambia (controlling) for example, will be productive. Furthermore, the work of the 32 malaria-eliminating countries in solving these challenges will immediately benefit many other countries that are at, or approaching, controlled low endemicity.

Elimination is a country's decision. When a country reaches the point of transition from controlled low-endemic malaria to elimination,⁸ it then faces the question—now what? This question cannot and should not be answered easily. Policies should be made on the basis of a comprehensive and evidence-based assessment of the risks, benefits, and feasibility of eliminating and maintaining elimination. Strategies that work in one context might not work in another. WHO, supported by the Global Health Group of the University of California, San Francisco (UCSF); the Clinton Health Access Initiative; and others are further developing a feasibility assessment tool, which was trialled in Zanzibar.⁹ Further multidisciplinary work could improve this method to enable programmes to capture the many nuances that must be considered when deciding whether, when, and how to pursue elimination.

During the Global Malaria Eradication Program (1955–69), decisions about what individual countries and regions should do about malaria were made by committees largely comprised of scientists from Europe and the USA. Such days are gone. Bhutan, Botswana, and Brazil will now themselves decide about elimination, and will be guided by collaborative discussions with their neighbours and by the best international evidence and consensus provided by WHO and others. When a country has made an evidence-based decision to pursue elimination, it will already have an effective malaria-control operation in place. An additional component that will be needed for elimination is a surveillance and response system able to detect and eliminate residual reservoirs of symptomatic and asymptomatic infection, and to deal with transmission hotspots.³ Among many other improvements, enhanced laboratory support that embraces more sensitive and sophisticated techniques, particularly PCR, genotyping, and serology, is also required.¹⁰ Current knowledge and guidance on how to best achieve this increased capacity is weak. Commonsense and considerations of efficiency suggest that new surveillance and laboratory capacity for malaria should be built together with the similar capacity that is needed for dengue, influenza, and many other infections. This integrated approach will reap multiple benefits for the health system.

An important consideration for malaria elimination is good management. Poor management is a pervasive and under-recognised cause of failure across health systems worldwide. Many malaria-endemic countries have more doctors than managers, and management talent in the public sector is particularly small. With good management, even the toughest problems can be overcome, as in countries such as Singapore and Taiwan; without it, even the smallest problems might lead to failure.

Continued progress in elimination requires research. Short-term operational and medium-term basic research agendas for elimination have been proposed.^{11–13} These research priorities need adequate funding from the Bill & Melinda Gates Foundation and others, and vigorous implementation with emphasis on research within malaria-eliminating countries. Making friends with neighbours is also important. Porous borders and frequent migration threaten elimination. If multicountry approaches are not formalised and pursued, many countries' efforts will likely fail. Although cross-border and regional collaborations are often spoken and written about, they are rare in practice and the establishment of effective collaborations has proved difficult. Donors have either no way of financing multi country or regional programmes or they have a poor track record of doing so. A group of neighbouring countries with a good collaborative programme to propose to donors might spend years seeking funding with no positive outcome. Donors should agree which of them will take on

cross-border funding for well conceived and designed proposals. In principle, the Global Fund to Fight AIDS, Tuberculosis and Malaria does this, but most multicountry applications are rejected and those that are accepted experience below-average performance.¹⁴ This situation would be improved by issuing clearer guidelines for multi country applications, backed by technical assistance, which can support groups of countries in making their applications and in implementing the required management structures.

Countries that have achieved controlled low-endemic malaria and are questioning whether they can afford elimination are often in the dark about financial implications. Countries must be able to model and predict the costs of achieving elimination and preventing reintroduction, and to compare these costs with the alternative of maintaining controlled low-endemic malaria.⁴ A country must also be able to weigh the cost of eliminating and preventing reintroduction against the value of the overall benefits that will follow. The Malaria Elimination Group, convened by the Global Health Group of UCSF, is addressing this task.¹⁵

A clear benefit from elimination, which this Series does not address, is equity. Malaria is a disease that mainly affects poor people. By definition, an elimination programme must go the last mile and successfully reach the most isolated and marginalised communities and families; however, this rarely happens in public health programmes that set lesser goals than elimination. It is also important to consider benefits to neighbouring countries (regional public goods) and to the world as a whole (global public goods). By improving knowledge on the nature and value of regional and global public goods, we can encourage and enhance contributions to malaria-eliminating countries from their regions and from the world.¹⁶

The thorny question is who pays. Although donor investment for malaria has recently been at a historic high, funds for elimination are under competitive and downward pressure; first, because of the unmet financial needs of the high-priority malaria control programmes in high-burden countries and, second, because of the global financial crisis. There is no guarantee that donors are a sustainable source of financing for elimination or the prevention of reintroduction. Malaria-eliminating countries must therefore explore innovative ways to self-finance elimination, such as earmarked taxes on the tourist industry. The private sector (eg, the extractive industries) can further engage and contribute more.¹⁶ The policies of the Global Fund are also important. The current large imbalance between high-quality demand and available income has led to prioritisation rules for Global Fund applications, which penalise successful countries and jeopardise the maintenance of success.¹⁷ Some malaria-eliminating countries can use their own domestic resources to continue their journey to malaria freedom, but 19 of the 32 malaria-eliminating countries are either low income or lower-middle income and will likely need assistance. With no Global Fund support, these countries will falter with potentially disastrous consequences. This matter requires urgent attention and is best addressed through discussions between WHO and the Global Fund.

An immediate priority is for a clear international consensus and leadership. The Roll Back Malaria Global Malaria Action Plan⁵ is a solid foundation for international consensus for all three parts of the strategy, and should serve as a model for developing consensus on elimination. WHO has an important leadership and convening role, and the Global Malaria Programme must harness the skills and contributions of national malaria control programmes in malaria-eliminating countries and others to develop and regularly revise a clear, global strategic consensus of elimination, which respects and supports legitimate country policies and ambitions.

How many of the blue countries in figure 1 of the introductory paper in the Series¹ will be green by 2020? It could be all of them, but it is probable that it will not be. If most succeed

and we learn from their experience, the unsuccessful minority will be re-equipped and reinvigorated. Even if only half of the blue countries eliminate malaria by 2020, the front line will have shifted considerably and a new generation of red countries will take up the baton of elimination and become blue. At the same time, new drugs, insecticides, diagnostics, and vaccines will have been developed. Malaria elimination is dynamic and ever-changing.

Now is the time to act (panel). We should not ignore the shrinking of the malaria map, which has been successfully unfolding over the past century. Neglect could result in donor and community fatigue, national and international demotivation, and resurgence of malaria disease and death. With scientific ingenuity, political will, coordination, and leadership elimination from the margins inwards will continue, bringing immediate benefit to millions and hope to many more. All players—from community groups to scientists to multilateral donors—must do everything possible to maintain this trend, so that by 2050 we will be fighting malaria on a limited front, and the vision of a malaria-free world will be within our grasp.

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Panel: Global call to action

We urge malaria-endemic countries to

- Undertake comprehensive feasibility assessments of malaria elimination before embarking on a national policy of elimination
- Engage in long-range planning and collaborative activity with neighbouring countries to ensure that necessary cross-border arrangements are progressively put in place
- Develop long-term plans for financing and sustaining malaria elimination, which place minimum reliance on continued funding from external donors
- Ensure excellent programme management for malaria, even when endemicity is low

We urge WHO to

- Strengthen leadership, guidance, and coordination for malaria elimination as a whole
- Use relevant expertise and experience from around the world, including from the national malaria control programmes that are pursuing elimination, whether or not these are currently recognised by WHO as eliminating
- Engage with the Global Fund to Fight AIDS, Tuberculosis and Malaria to modify the prioritisation rules for Global Fund applications so that they do not penalise success or jeopardise progress

We urge the Global Fund to

- Review its malaria-prioritisation rules to ensure that they do not penalise success or jeopardise progress
- Revisit multicountry and regional applications for malaria and rebuild guidelines and technical support to explicitly recognise the needs of malaria-eliminating countries to work closely with their neighbours

We urge the research community and research funders to

- Elaborate and agree on a short-term operational research agenda to support elimination
- Prioritise the development and testing of innovative approaches to building and sustaining surveillance and response systems for malaria and other infections
- Prioritise research on the epidemiology of *Plasmodium vivax*
- Prioritise the development and trial of better drugs that are well suited for *Plasmodium falciparum* and *P vivax* elimination
- Prioritise research that will clarify long-term costs of elimination compared with the alternative—maintaining controlled low-endemic malaria—and comprehensively analyse benefits of malaria elimination

We urge the pharmaceutical industry and Medicines for Malaria Venture to

- Prioritise needs of malaria-eliminating countries, especially for mass drug administration, and drugs that affect transmission, in their drug-development efforts

- Prioritise need for improved drugs to provide safe radical cures for *P vivax* malaria, particularly in elimination settings

We urge the private sector to

- Contribute more to malaria elimination through inputs and services that reflect their core competences
- Lend political advocacy and financial support to malaria-eliminating countries, and to maintenance of elimination in countries that have succeeded
- Strongly support and collaborate with the government's programme to eliminate malaria, for private financiers or providers of health care

figure 1.