National Malaria Control and Scaling Up for Impact: The Zambia Experience through 2006

Richard W. Steketee,* Naawa Sipilanyambe, John Chimumbwa, James J. Banda, Abdirahman Mohamed, John Miller, Suprotik Basu, Simon K. Miti, and Carlos C. Campbell


Abstract. With its 2006–2011 National Malaria Strategic Plan, Zambia committed to control malaria at a national scale. This scale-up for impact approach was facilitated by sound business planning and financing in 2006 of approximately US$35 million. Compared with surveys in 2001 and 2004, a 2006 national survey of 14,681 persons in 2,999 households at the end of the transmission season showed substantial coverage increases for preventive interventions. Ownership and use rates of insecticide-treated mosquito nets (ITNs) among vulnerable groups doubled, with 44% of households owning ITNs and 23% of children less than five years of age and 24% of pregnant women using them. Roll Back Malaria Abuja targets for intermittent preventive treatment in pregnancy (IPTp) were exceeded, with 62% of pregnant women receiving at least two doses of IPTp. As of 2006, Zambia is demonstrating substantial progress toward the national targets (80% population coverage rates for the interventions) and aspires to show that malaria need not be its leading health problem, and that malaria control is a sound national investment.

INTRODUCTION

The launch of the Roll Back Malaria (RBM) Partnership in late 1998 marked a global commitment to halve the burden of malaria, with a focus on the persisting toll of the disease in Africa. In the intervening years, critical programming elements have been put into place, notably sound global and national policies,1–6 evidence for the efficacy of malaria control interventions7–14 and their cost-effectiveness,15,16 and a dramatic increase in external funding for malaria control in Africa.17 However, although national policies have been strengthened, the lag times with new funding for implementation1 (For example, although Zambia received GFATM malaria grants in Round 1 and Round 4, the first funding disbursements did not occur until late 2003 (Round 1) and late 2005 (Round 4). With long timeframes between initiating, receiving, and distributing prevention (e.g., ITNs) or treatment (e.g., antimalarial drugs) commodities, actual scale-up of intervention coverage has proceeded slowly.) have meant that confidence in the ability of African countries to undertake national-scale malaria control has not increased as rapidly as was anticipated. In the past three years, however, many African countries and their donor and implementing partners have embraced evidence-based national-scale programming to establish the credibility of malaria control and to realize its promise of burden reduction.

Building on the framework of the RBM Strategic Plan,1 a number of partners and malaria-endemic countries have invoked “scale-up for impact” as a rallying call for the rapid national-scale deployment of the full range of existing evidence-based malaria prevention and control strategies through true partnership commitment and intensive country work (Table 1). Scale-up for impact has two critical objectives: to build country-driven malaria control success to establish the feasibility and credibility of national-scope malaria control programming in the Africa region; and to develop a core set of programmatic principles and tools for malaria control to facilitate scale-up for impact across African nations. Scale-up for impact focuses on implementation strategies that attain high population coverage and on measurement and documentation of the reduction in malaria-associated health and economic burden.

Zambia was an early active participant in the RBM partnership. The country embarked on a strategic planning process initially for 2000–2005 and subsequently for the 2006–2011 National Malaria Strategic Plan (NMSP). Zambia received substantial support from donors including the Global Fund to Fight AIDS, Tuberculosis and Malaria (GFATM); the U.S. Agency for International Development (USAID); and support to the health sector from a variety of bilateral and multilateral donors. The World Bank Booster Program and the Bill & Melinda Gates Foundation, which supports the Malaria Control and Evaluation Partnership in Africa (MACEPA) at PATH, began providing additional resources in 2005 to support the scale-up for impact focus of the NMSP. Most recently (2007), the U.S. President’s Malaria Initiative has begun providing support in Zambia. As an example of rapid scale-up for impact, this article documents recent progress in Zambia and identifies key components of successful programming in the areas of planning, resourcing, implementing, and monitoring and evaluating that must be addressed for national program scale-up in Africa.

Zambia and malaria control scale-up for impact. Geography and population. Zambia has a tropical climate with three seasons: a cool, dry winter (May–August), a hot, dry season (September–October), and a hot, rainy season (November–April). The annual rainfall varies from 600 to 1,100 mm across the country. Access to health care sites is often hampered by topographic characteristics including diverse mountainous areas, four large inland lakes, five major rivers, and large areas of swamps and islands that experience seasonal flooding. The population census in 2000 counted 9.8 million people; the 2006 population is estimated to be 11.7 million with an annual growth rate of 3.0%. The total size of Zambia is 752,612 km², with some sparsely populated provinces presenting additional

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During the last 25 years, probably due to a combination of population growth, spread of drug resistance, reduced vector control, decreased access to health care, spread of human immunodeficiency virus infections, and poverty. In 2004, the total number of reported deaths in children less than five years of age decreased to its lowest level in six years, but malaria still accounted for 45% of outpatient visits, 45% of hospital admissions, 47% of overall disease burden among pregnant women, and 50% of disease burden among children less than five years of age. Malaria also has a serious economic impact on Zambia, accounting for 6.8 million disability-adjusted life years lost. This is higher than the figure for acute respiratory infections (5.4 million) or human immunodeficiency virus/acquired immunodeficiency syndrome (3.2 million).

Launching the RBM partnership in Zambia. At the outset of the RBM process in 1999, Zambia participated in global and regional RBM consensus-building activities, organized consultations with internal and external partners, and conducted the necessary steps for a successful introduction of RBM. The Ministry of Health (MOH) signed the RBM Abuja Declaration, and a ministerial task force was established for national policy formulation and to oversee the development of the 2000-2005 NMSP. The MOH set up institutional frameworks to oversee joint action by inter-governmental and intra-governmental agencies and the array of in-country partners, and the National Malaria Control Centre was established in 2002. National, provincial, and district situation analyses were conducted to inform the NMSP and the subsequent annual implementation plans. In the 1990s, the country had undergone decentralization for decision-making and budgeting in the health sector whereby districts controlled their local planning, resources, and implementation. Thus, RBM principles were introduced at sub-national levels and included in the routine district planning cycles, enabling malaria prioritization in local resource allocation. In this way, RBM became embedded within the national health planning format and draws upon common basket resources under the sector-wide approach (SWAp) arrangement.

The Government of Zambia increased its allocations for malaria control from the national budget and, through an act of Parliament, eliminated taxation on malaria-control tools, including mosquito nets and relevant insecticides. Applications to the GFATM were successful in the first (2001) and fourth rounds (2004), for a total of US$83 million over 9 years. The USAID supported the malaria program with US$4–5 million annually, and other bilateral donors contributed either directly or through the SWAp arrangement.

With mounting evidence of reduced treatment efficacy of chloroquine and sulfadoxine-pyrimethamine, Zambia changed its first-line antimalarial-treatment recommendations in 2002 to artemisinin-based combination therapy (ACT). Insecticide-treated mosquito nets (ITNs) were prioritized and introduced through the private sector, social marketing with subsidized sales in antenatal clinics, and a variety of focal efforts in hospitals and select communities. In two mining towns, indoor residual spraying (IRS) was reintroduced in 2001, through an employer-based scheme. Malaria prevention among pregnant women, focusing on intermittent preventive treatment in pregnancy (IPTp) and ITNs, was introduced through the “making pregnancy safer” campaign. Support was provided to improve monitoring and evaluation through the existing HMIS by developing 10 sen-

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<thead>
<tr>
<th>TABLE 1</th>
<th>Scale-up for impact</th>
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<td>Scale-up for impact frames malaria control programming by focusing on national deployment of the full “package” of evidence-based malaria prevention and control strategies through true partnership, commitment, and intensive country work to achieve high coverage and the impact that will come with that high coverage. It has specific implications for the following components:</td>
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<td>• Scope—national scale and the full package of malaria prevention and treatment interventions.</td>
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<td>• Speed and timeliness—rapid.</td>
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<td>• Achieving and documenting impact-reaching high coverage with the interventions, reducing mortality and morbidity, and demonstrating benefits in social, economic, and human terms.</td>
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<td>The scale-up for impact approach has been embraced by the Roll Back Malaria Partnership and is grounded in a commitment to the three ones where in-country and global partners commit to work from the following components:</td>
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<td>• One national plan.</td>
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<td>• One coordination mechanism for implementation of the plan.</td>
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<td>• One monitoring and evaluation system.</td>
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<td>Scale-up for impact embraces the cycle of planning, resourcing (human and financial), implementing, monitoring, and evaluating where scale-up is achieved and sustained in a structured and evidence-based fashion.</td>
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Finally, the documentation of malaria control impact should produce the evidence for advocacy whereby all partners commit to the durable support of malaria control — by country governments and the global donor community.
Transitioning to scale-up for impact. Preparation for the 2006–2011 NMSP began in early 2005 to coincide with the national medium-term expenditure framework planning cycle. The in-country RBM partnership opted to rapidly expand national programming and to fully engage the variety of implementing partners both in the MOH (e.g., child health and the integrated management of childhood illness program, reproductive health, and making pregnancy safer) and a variety of other service-delivery programs (e.g., the Churches Health Association of Zambia and other non-governmental organizations). As the 2005 planning meetings began, new technical and financial resources became available from the World Bank Malaria Booster Program and MACEPA (The World Bank Malaria Booster Program provides US$20 million between 2005–2008 for malaria prevention and control support. The Malaria Control and Evaluation Partnership in Africa (MACEPA), with funding from the Bill & Melinda Gates Foundation, provides approximately US$35 million in malaria control program and technical assistance support from 2005–2013.). Through a systematic review of existing programs, an assessment of gaps between current and target coverage, and the recognition that financial resources were substantial, Zambia and its partners developed strategies to scale up malaria control programming to achieve high coverage and positive health and economic impact.

The national malaria scale-up commitment was detailed in the NMSP 2006–2011, which emphasized accelerated prevention coverage (ITNs, IRS, IPTp), strengthening malaria case management, and setting bold national targets (Table 2). The strategies focused specifically on intervention coverage scale-up to reach or exceed RBM global strategy targets within a setting of increased precision regarding financing and human resource requirements. For the first time, a three-year implementation and business plan was developed to detail the management of the program and a monitoring and evaluation plan using RBM Monitoring and Evaluation Reference Group (RBM MERG) guidance was developed to identify the systems and data collection that would be used to assess progress and identify challenges in the coming years.

Priority actions for the 2005–2006 malaria-transmission season. In the first transmission season linked to the new strategic plan (December 2005 through April 2006), the first steps of the scale-up for impact approach were addressed. Only programming methods that were focused on achieving high coverage were chosen for implementation. The ITNs were distributed in three ways: free of charge to the recipients via mass campaigns (initially providing an average of 3 ITNs per household and covering all households in 17 districts in 2 provinces and to be expanded nationally in 2007 and 2008); at highly subsidized sales to pregnant women through antenatal clinics (initially costing approximately US$0.80 per ITN, but subsequently delivered at no cost after national decree); and through the private sector. The IRS was provided free of charge to homes in urban and peri-urban settings in 15 districts, up from 8 districts during the previous transmission season in 2004–2005. The IPTp was delivered to pregnant women as directly observed therapy in all antenatal clinic programs (where an estimated 94% of all pregnant women in the country attend antenatal clinics once and 92% attend at least twice).

The availability of ACT (artemether plus lumefantrine [Coartem®]; Novartis, Basel, Switzerland) was expanded to reach all provinces and districts, but shortages caused by procurement and supply chain challenges and limitations regarding approval for use of ACT beyond trained staff in health facilities limited this effort. Partner collaborations were expanded (e.g., the Ministry of Defense helped with ITN transport for the mass distribution campaigns in Western and North-Western Provinces), and the management systems were stressed because with the expanded work came more planning requirements and more financial management, accounting, and reporting.

Documenting coverage progress and program performance. The monitoring of malaria-control programming baselines was established with the national-level household DHS 2001–2002 and multi-district RBM household surveys in 2001 and 2004. The MOH and partners conducted a national-level Malaria Indicator Survey (MIS), using tools developed by the RBM MERG, at the end of the 2005–2006 transmission season in May–June 2006 to assess progress and prioritize gaps to inform the coming planning cycle.

Among the sampled population of 14,681 persons in 2,999 households, prevention intervention coverage summary results are shown in Figure 1. By 2006, coverage with IPTp had reached 62% of pregnant women receiving two or more doses (exceeding Abuja Targets, but still short of national targets). Households ITN ownership tripled between 2001 and 2006, with 44% of households owning at least one ITN in 2006. ITN use doubled between 2004 and 2006, achieving use levels of 23% in young children and 24% in pregnant women. Among

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<thead>
<tr>
<th>Guiding principles</th>
<th>RBM principles</th>
<th>RBM principles and scale-up for impact concept</th>
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<tbody>
<tr>
<td>ITN coverage target</td>
<td>60% of HH with ≥ 1 ITN</td>
<td>&gt; 80% of HH with average of 3 ITNs/HH</td>
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<tr>
<td>IRS coverage target</td>
<td>Not defined</td>
<td>&gt; 85% coverage of eligible HH in 15 target districts</td>
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<tr>
<td>IPTp coverage target</td>
<td>90% of pregnant women using IPTp</td>
<td>&gt; 80% of pregnant women receiving ≥ 2 doses IPTp</td>
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<td>Target for ITN use in pregnant women</td>
<td>50% of pregnant women sleeping under ITN</td>
<td>&gt; 80% of pregnant women sleeping under ITN or in a house with IRS</td>
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<tr>
<td>Target for ITN use in children &lt; 5 years of age</td>
<td>60% of children &lt; 5 years of age sleeping under ITN</td>
<td>&gt; 80% of children &lt; 5 years of age sleeping under ITN or in a house with IRS</td>
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<tr>
<td>Target for PECM</td>
<td>60% of sick persons have access to PECM</td>
<td>&gt; 80% of sick persons treated with effective antimalarial within 24 hours of onset</td>
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*RBM = Roll Back Malaria; ITN = insecticide-treated mosquito nets; HH = household; IRS = indoor residual spraying; IPTp = intermittent preventive treatment during pregnancy; PECM = prompt effective case management (defined as treatment with recommended antimalarial drug within 24 hours of illness onset).
Findings from Zambia

Critical to making the “three ones” (all partners working from one national plan, with one coordination mechanism for implementation, and one monitoring and evaluation system) a program reality, the annual planning process has been instrumental in increasing donor partner collaborations leading into the 2007 malaria control action plan. Donors met in advance of the February 2007 action planning process and secured 2.5–3 million long-lasting ITNs for distribution during 2007 (leading into the 2007–2008 transmission season) and sufficient IRS supplies and implementation funds for spraying to achieve coverage targets in all 15 IRS-designated districts prior to the start of the transmission season. Work is ongoing to address the drug needs for prevention in pregnancy and for expanded use of diagnostics and ACTs for case management. Findings from Zambia’s 2007 DHS and the planned biennial MIS in 2008 will track malaria intervention coverage and the disease burden markers noted above.


By 2006 only one-fourth of febrile children receiving any antimalarial treatment (overall and prompt) had been cured 2.5 million long-lasting ITNs for distribution during the February 2007 action planning process and secured 2.5–3 million long-lasting ITNs for distribution during 2007 (leading into the 2007–2008 transmission season) and sufficient IRS supplies and implementation funds for spraying to achieve coverage targets in all 15 IRS-designated districts prior to the start of the transmission season. Work is ongoing to address the drug needs for prevention in pregnancy and for expanded use of diagnostics and ACTs for case management. Findings from Zambia’s 2007 DHS and the planned biennial MIS in 2008 will track malaria intervention coverage and the disease burden markers noted above.


DISCUSSION

With the inception of RBM, expectations ran high that malaria would be controlled rapidly in Africa. At that time, additional financing for malaria control at a national scale was not available either from malaria-endemic countries or external donors. In the absence of well-documented national examples of success, there was hesitancy about serious engagement in malaria control programming. In the initial five years of the RBM partnership, sound control plans were developed, national program capacity was built, the GFATM established substantial funding opportunities for malaria control, and re-
### Table 3

Experience in Zambia in 2005–2006 with scaling up malaria intervention coverage by using the planning → resourcing → implementing → monitoring and evaluating cycle

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<td>LLINs “Catch-up”†</td>
<td>Documented 2004 low national coverage of ITN ownership and use. Reviewed 9 existing methods for ITN distribution, and most strategies had limited ability to increase coverage.</td>
<td>Prioritized one method for “catch-up” delivery = district mass campaigns to deliver an average of 3 LLINs per HH.</td>
<td>NMCC worked with GFATM, MACEPA, World Bank, USAID, and JICA to ensure financing; staffed team to plan distributions.</td>
<td>Procurement support was shared across partners; advance support for local distribution was established.</td>
<td>2006 MIS documented increasing coverage: 44% of HHS with an ITN and 23% of children sleeping under an ITN the previous night.</td>
<td>Early LLIN procurement led to earlier transport for distribution. More than 2.5 million LLINs distributed in 2007. Improving ITN use rates is now prioritized.</td>
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<td>LLINs “Keep-up”‡</td>
<td>System of ITN distribution at a highly-subsidized cost via ANC was supported in several provinces.</td>
<td>National program prioritized “keep-up” ANC distribution; subsidy moved to 100% eliminating the cost to the pregnant woman.</td>
<td>NMCC worked with donors to support expansion of the “keep-up” program via ANC to all districts in all provinces.</td>
<td>Supply systems, training, and implementation support was provided to all ANCs nationwide.</td>
<td>MIS in 2006 showed more than 3-fold increase in pregnant women sleeping under an ITN the previous night.</td>
<td>Current single “keep-up” strategy will not deliver adequate numbers of LLINs nationwide; thus, additional systems are under discussion.</td>
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<td>IRS</td>
<td>Documented incomplete data and highly variable coverage (11–77%) in the existing 8-district program of IRS.</td>
<td>Planned for IRS expansion from 8 to 15 districts. Established calendar for timely procurement, training, and completion of IRS.</td>
<td>NMCC worked with partners to ensure resources for commodities, training, and conduct of spraying.</td>
<td>Procurement delays still occurred and IRS application lasted into the transmission season.</td>
<td>All 15 districts were scheduled for GPS mapping of eligible households. Calendar was reviewed and early procurement prioritized.</td>
<td>Improved timely training and procurement of commodities. Spraying completed prior to transmission season for the first time this decade.</td>
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<tr>
<td>IPTp</td>
<td>Documented 54% of pregnant women received 2 + doses of IPTp. Reproductive Health Unit reported adequate drug supplies and training for nurses and midwives.</td>
<td>No major changes were introduced.</td>
<td>No major changes were introduced.</td>
<td>Continued support for antenatal clinic delivery of IPTp through the Reproductive Health Unit.</td>
<td>2006 MIS showed 75% of women received ≥ 1 dose and 62% received ≥ 2 doses of IPTp in their last pregnancy – highest recorded national coverage in Africa.</td>
<td>Although this 62% coverage level is short of the desired &gt; 80% target, it does demonstrate the feasibility of effective service delivery. Further encouragement is offered to achieve the target.</td>
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<td>Malaria case management in young children</td>
<td>Documented 62% of children with fever got an antimalarial and 38% got it the same day of fever. 2002 policy change to ACT was expanding to reach national coverage.</td>
<td>Planned for full national coverage of ACT; but still limited to trained health workers (facility-based).</td>
<td>Partner support for drugs expanded (GFATM Round 4). Limited resources available for diagnostics.</td>
<td>ACT roll-out and training in all districts completed; stock management remained a concern. Diagnostic training expanded slowly.</td>
<td>2006 MIS showed less recent fever illness requiring treatment, but coverage of fever illness with prompt antimalarial drug was unchanged.</td>
<td>Implementation of prompt case management and the expansion of diagnostics use remains challenging and requires continued attention.</td>
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* ITN = insecticide-treated mosquito net; LLIN = long-lasting insecticide-treated net; HH = household; NMCC = National Malaria Control Centre, which is the coordinating center for the malaria control partnership in Zambia; GFATM = Global Fund to Fight AIDS, Tuberculosis and Malaria; MACEPA = Malaria Control and Evaluation Partnership in Africa; USAID = U.S. Agency for International Development; JICA = Japan International Cooperation Agency; ANC = antenatal clinic; MIS = malaria indicator survey, a national population-based sample survey to assess malaria control intervention coverage (see references 26 and 27); IRS = indoor residual spraying of insecticide; GPS = global positioning system; IPTp = intermittent preventive treatment in pregnancy; ACT = artemisinin-based combination therapy.
† “Catch-up” refers to strategies and procedures designed to achieve high coverage of the LLIN intervention.
‡ “Keep-up” refers to strategies and procedures designed to maintain high coverage of the LLIN intervention over time.
sourcing started to increase as partners joined, including the World Bank Booster Program, the Bill & Melinda Gates Foundation’s support through the MACEPA program at PATH, and, most recently, the U.S. President’s Malaria Initiative.

African ministers made a pivotal commitment in Abuja in 1999 when they moved the target for programming from “halve the malaria burden” to a set of specific coverage targets for each of the core interventions. The RBM Global Strategic Plan for 2005–2015 raised the coverage targets from 60% to 80% on the basis of sound epidemiologic data.1

Programming principles evolving from the Zambia experience with scale-up for impact. Most, if not all, of the critical enabling factors for great progress in controlling malaria at the national scale are in place in many African countries. Donor and national commitment to address malaria control has never been higher, prompted by the sound science base suggesting that considerable health and economic benefit will accrue rapidly if a comprehensive package of control interventions is used by a large proportion of the population. Furthermore, financial resources are available in many countries to make concerted programming progress.

Several critical themes have emerged for the Zambian government and its partners during the initial two years, which form the basis for sustaining progress in Zambia and for initial strategizing as other countries embark on scale-up for impact.

The great challenge is to develop sound management systems for scale-up for impact. The iterative planning, resourcing, implementing, and monitoring and evaluating cycle is the crux of rapid and sustainable progress in national capacity to manage malaria control. Zambia’s investment in developing a detailed plan for its six-year goals and targets, paired with a formal annual plan for assessing progress and a budgeted business plan based on current program data, has been the key to strengthening partner coordination.

The government must coordinate the effort. The Zambia experience this past year reinforced the RBM community’s commitment to support national governments to lead malaria control efforts. Because the government is now a direct recipient of donor support, it has proven increasingly important for the MOH to directly engage contractors and local partners to ensure commitment to the annual planning and progress review processes.

Partners must work within the framework of the three ones. The concept of a single coordinating mechanism and evaluation system for scale-up for impact at the national level is intuitively logical. However, this is not how partners in malaria control have historically operated, and transitioning to a system where partners negotiate with government and one another openly to achieve a consensus plan requires flexibility and shared governance. Zambia has already demonstrated the power of such coordination, and partners have gained greater accountability in the process. A key success factor to date has been the proactive efforts evidenced by many partners to build a functionally single national malaria control program.

Documenting outputs and outcomes is key to effective program management. As noted above, Zambia, with coordinated partner support, is developing multiple innovative approaches to national malaria control. Although the success of the Zambian scale-up for impact effort is pegged to hard health and economic outcomes (e.g., trends in mortality of children less than five years of age and microeconomic conditions at the household level), some of the most transforming outputs in Zambia will be in the development of models for effective and efficient program management and administration.

Scale-up for impact requires sustaining political leadership. Not unexpectedly, the rapid rise of the malaria control profile and funding at the national level triggers political stresses. Leadership is required to manage potential issues around control of finances and personnel. The Zambia partnership has worked proactively to support leadership in mapping these forces, effectively balancing priorities, and having the facts and results to keep a focus on evidence-based decision-making.

What is at stake? Malaria control in Africa historically has existed under a cloud of hesitancy stemming from the per-
ception of unfulfilled promise and reluctance to adopt practical programming principles. Technically, malaria is fully controllable, and prevention approaches promoted to high coverage levels can sustainably alter the health and economic impact of the disease in Africa. Scale-up for impact represents a call for dramatic and coordinated action by national governments and their partners to control malaria in Africa, as well as a commitment to develop a consensus set of methods to support success. Although scale-up for impact builds on and reinforces the fundamental tenets in the RBM strategy, it also accelerates the time frame and emphasizes partnership among African nations and the malaria community. Progress is already occurring in many countries including Zambia,37 and the years through 2010 will be the critical time to establish the credibility of malaria control in Africa. There will be key actions, points of ownership, and areas of compromise and of stepping forward for each of the partners. We will know that scale-up for impact is working when sustaining national and global investment in malaria control is being driven by documented national success.

The fundamental principles of scale-up for impact, paired with strengthening the programming cycle, together can benefit a range of national disease control programs as the strategic investment in health systems and comprehensive monitoring and evaluation ensure that resources are being optimally applied. Recent calls for malaria elimination and eradication,38,39 which build on the extension or introduction of existing and new upstream interventions, will rely on the same programming cycle and principles that are now being deployed for malaria control program scale-up.

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