Company Management Guide
Implementing an Integrated Malaria Control Program

Ensuring Sustainability in:
• Vector Control
• Awareness and Public Education
• Diagnosis and Treatment
• Procurement, Management and Distribution
• Monitoring and Evaluation

In Partnership with
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# Abbreviations and Acronyms

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<tr>
<td>ABCD</td>
<td>Awareness and public education, bite control, chemoprophylaxis, and early diagnosis and treatment</td>
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<tr>
<td>ACT</td>
<td>Artemisinin Combination Therapy</td>
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<tr>
<td>AFRO</td>
<td>World Health Organization/Africa Regional Office</td>
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<tr>
<td>BCC</td>
<td>Behavior change communication</td>
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<td>CAMA</td>
<td>Corporate Alliance on Malaria in Africa</td>
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<td>CBO</td>
<td>Community-based organization</td>
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<td>CDC</td>
<td>U.S. Centers for Disease Control and Prevention</td>
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<td>CI</td>
<td>Continuous improvement</td>
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<tr>
<td>CSM</td>
<td>Communication and Social Mobilization</td>
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<td>CSR</td>
<td>Corporate social responsibility</td>
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<tr>
<td>DALYs</td>
<td>Disability Adjusted Life Years</td>
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<tr>
<td>DOI</td>
<td>Days of inventory</td>
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<tr>
<td>GBC</td>
<td>Global Business Coalition on HIV/AIDS, Tuberculosis and Malaria</td>
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<td>GFATM</td>
<td>Global Fund to fight AIDS, Tuberculosis and Malaria</td>
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<td>HIA</td>
<td>Health impact assessment</td>
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<tr>
<td>HIV/AIDS</td>
<td>Human Immunodeficiency Virus/Acquired Immunodeficiency Syndrome</td>
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<td>HMIS</td>
<td>Health management information systems</td>
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<td>HR</td>
<td>Human resources</td>
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<td>HQ</td>
<td>Headquarters</td>
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<tr>
<td>IEC</td>
<td>Information, education, and communication</td>
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<td>IMCI</td>
<td>Integrated Management of Childhood Illness</td>
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<tr>
<td>IPIECA</td>
<td>The International Petroleum Industry Environmental Conservation Association</td>
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<tr>
<td>IPT</td>
<td>Intermittent preventive therapy</td>
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<tr>
<td>IPTi</td>
<td>Intermittent preventive therapy for infants</td>
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<tr>
<td>IRS</td>
<td>Indoor residual spraying</td>
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<tr>
<td>ITN</td>
<td>Insecticide-treated net</td>
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<tr>
<td>KPI</td>
<td>Key performance indicators</td>
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<tr>
<td>LLINs</td>
<td>Long-lasting insecticidal nets</td>
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<td>LSDI</td>
<td>Lubombo Spatial Development Initiative</td>
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<tr>
<td>M&amp;E</td>
<td>Monitoring and evaluation</td>
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<tr>
<td>MIM</td>
<td>Multilateral Initiative on Malaria</td>
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<td>MFI</td>
<td>Malaria Foundation International</td>
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<td>NGO</td>
<td>Nongovernmental organization</td>
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<td>NMCP</td>
<td>National Malaria Control Program</td>
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<td>PEPFAR</td>
<td>U.S. President’s Emergency Plan for AIDS Relief</td>
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<td>PMI</td>
<td>U.S. President’s Malaria Initiative</td>
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<td>QC</td>
<td>Quality control</td>
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<td>RBM</td>
<td>Roll Back Malaria</td>
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<td>RCM</td>
<td>Regional Coordinating Mechanism</td>
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<td>R&amp;D</td>
<td>Research and Development</td>
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<td>RDT</td>
<td>Rapid diagnostic test</td>
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<td>RFP</td>
<td>Request for proposal</td>
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<td>RMCC</td>
<td>Regional Malaria Control Commission</td>
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<td>TB</td>
<td>Tuberculosis</td>
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<td>UNICEF</td>
<td>United Nations Children’s Fund</td>
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<td>UNDP</td>
<td>United Nations Development Programme</td>
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<tr>
<td>USAID</td>
<td>United States Agency for International Development</td>
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<td>WB</td>
<td>World Bank</td>
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<td>WHO</td>
<td>World Health Organization</td>
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Glossary of Terms

Artemisinin: A drug used against malaria, derived from the Qinghao plant, Artemisia annua L.

Disability Adjusted Life Years (DALYs): The sum of years of potential life lost due to premature mortality and the years of productive life lost due to disability.

Chemoprophylaxis: Taking antimalarial drugs to prevent the disease.

DEET: N,N-diethylmetatoluamide, an ingredient of insect repellents.

Efficacy: The power or capacity to produce a desired effect.

Endemic: Where disease occurs on a consistent basis.

Endophagic: An endophagic mosquito is a mosquito that feeds indoors.

Endophilic: An endophilic mosquito is a mosquito that tends to inhabit/rest indoors. Endophilism facilitates the blocking of malaria transmission through application of residual insecticides to walls.

Epidemic: The occurrence of more cases of disease than expected in a given area or among a specific group of people over a particular period of time.

Epidemiology: The study of the distribution and determinants of disease or health status in a population; the study of the occurrence and causes of health effects in humans.

Host: A plant or animal harboring another organism.

Incidence: The number of new cases of disease in a defined population over a specific time period.

Indoor Residual Spraying: Treatment of houses where people spend night-time hours, by spraying insecticides that have residual efficacy [i.e., that continue to affect mosquitoes for several months]. Residual insecticide spraying aims to kills mosquitoes when they come to rest on the walls, usually after a blood meal.

Immune system: The complex system (network of specialized cells and organs) in the body responsible for fighting disease. Its primary function is to identify foreign substances in the body (bacteria, viruses, fungi, or parasites) and develop a defense against them. This defense is known as the immune response. It involves production of protein molecules called antibodies to eliminate foreign organisms that invade the body.

Immunity: Natural or acquired resistance provided by the immune system to a specific disease. Immunity may be partial or complete, specific or nonspecific, long lasting or temporary. Immunity is indicated by the presence of antibodies in the blood and can usually be determined with a laboratory test.

Longevity: The longevity, or length of lifespan of the mosquito is of considerable importance in malaria control. There are two reasons for this. The first is that the reproductive cycle of malaria in the mosquito takes 10-11 days, and the second is that if the mosquito lives a long time, it will be able to take several blood meals, and will have a higher chance of biting a human who has malaria parasites.

Parasite: Any organism that lives in or on another organism without benefiting the host organism; commonly refers to pathogens, most commonly in reference to protozoans and helminths.

Parasitemia: The presence of parasites in the blood. The term can also be used to express the quantity of parasites in the blood.

Plasmodium: The genus of the parasite that causes malaria. The genus includes four species that infect humans: Plasmodium falciparum, Plasmodium vivax, Plasmodium ovale, and Plasmodium malariae.

Presumptive treatment: Treatment of clinically suspected cases without, or prior to, results from confirmatory laboratory tests.

Prevalence: The number of existing disease cases in a defined population during a specific time period.

Prophylaxis: Prevention of disease.

Resistance: The ability of an organism to develop strains that are impervious to specific threats to their existence. The malaria parasite has developed strains that are resistant to drugs such as chloroquine. The Anopheles mosquito has developed strains that are resistant to DDT and other insecticides.

Species: Organisms in the same genus that have similar characteristics.

Vaccine: A preparation that stimulates an immune response that can prevent an infection or create resistance to an infection.

Vector: The organism, typically an insect, that transmits an infectious agent to its alternate host, typically a vertebrate; in human malaria, the vectors of the parasite are mosquitoes, the “carriers” or “hosts” are humans.

Primary sources for this glossary are the US Centers for Disease Control and Prevention, the World Health Organization, National Institute for Allergy and Infectious Diseases, and Malaria Foundation International.
In recognition of the human and continuing socio-economic impact of endemic malaria, the global health community has called for massive scale-up of malaria control interventions. The objective of this effort is to reduce the incidence of disease and achieve near-zero malaria deaths. This call to action has already resulted in intensive social mobilization efforts and an influx of substantial, additional financial resources to a large number of malaria endemic countries, especially in Africa. Malaria is recognized as a threat to business in endemic countries. Bringing this threat under control is as much of interest to private companies as it is to the public sector.

In response, the Corporate Alliance on Malaria in Africa (CAMA) was formed in 2006 by 12 multinational companies with operations in Africa. CAMA serves as a forum for companies to work together with governments and civil society in malaria-endemic countries to reduce the impact of malaria by saving lives and facilitating economic development. To achieve this end, CAMA will:

- Share malaria control experiences and achievements among interested parties;
- Scale up malaria activities of CAMA-member companies in targeted countries, in partnership with key private and public sector stakeholders;
- Diversify CAMA membership to leverage the strength of the partnership represented in the Alliance; and
- Encourage government involvement and support to ensure sustainability.

In order to encourage increased investment in malaria programs, add value, increase effectiveness and promote sustainable impact, CAMA has developed an evidence-based management guide for interested companies and their partners to reduce the impact of malaria as a major public health threat in Africa. The intention of the guide is not to duplicate other available technical manuals, but to provide experiences-based guidance on key program elements and processes that when utilized in unison by interested parties could produce a deeper and more sustainable impact. The information is intended to be a high-level overview with links to documents that provide more in-depth and specific information about various technical aspects of malaria control. This document serves as a tool for private and public sector managers.

This guide identifies critical requirements for managing an integrated malaria control program. It is based on analysis of current best practices and lessons learned by successful malaria control programs coordinated by both public and private sectors. It evolved through a consultative series of brainstorming sessions among technical advisors, the scientific community, and corporate stakeholders. This group’s diverse experience and expertise, combined in a spirit of coordination and partnership is reflected in this guide. CAMA strongly believes this spirit is necessary to achieve sustainability in malaria control programming. The management guide stresses the need for tailored, context-specific, and long-term sustainable approaches to malaria control that require coordinated efforts. The guide encourages companies to work in partnership, with key stakeholders (particularly government) from the onset to ensure the integrated malaria program is aligned with the national malaria control plan.

While details of designing and planning an integrated malaria program are largely dependent on the size and scale of the program, this guide is intended to serve as a technical and programmatic tool for managers within the private and public sectors. It outlines key program elements required to implement an effective and sustainable program. The guide utilizes business management tools that are applicable in public health settings, creates linkages to other sectors, and seeks to provide mechanisms in which key stakeholders can address positive and negative spill-over effects.
Introduction

Malaria continues to afflict the population of Africa, especially sub-Saharan Africa, where nearly a million children a year lose their lives to the disease. Children under five, pregnant women, those with weakened immune systems, and any individual moving into a malaria-endemic area from a non-endemic area are particularly susceptible. However, no one is without risk, and the African workforce suffers from malaria either directly or indirectly through family members. Economic losses due to malaria deaths and the disabling, chronic recurrence of severe disease amount to $12 billion a year across Africa.1 Most countries suffer stunted economic and infrastructure growth due to malaria’s far-reaching effects.

CAMA has produced this management guide to help any company or organization operating in malaria-endemic regions of Africa develop an effective malaria control program. The guide makes it clear that to reduce the impact of malaria, it is necessary to develop a systematic, multi-pronged approach to interventions, using a framework that incorporates the biology, pathophysiology and epidemiology of malaria infection with environmental, economic and sociopolitical factors. The guide will take management through the process of developing efficient sustainable programming, from determining the project scope and assessing program capacity in infrastructure, support, resource availability, and the like; to defining the project and developing strategies for procurement, training, gap closure, and other issues; to finally developing and implementing the program itself, including effective monitoring and evaluation and strategies for continuous quality improvement.

- Every 30 seconds a child dies from malaria
- 300-500 million malaria cases per year
- Malaria accounts for more than 1 million deaths annually
- 90 percent of malaria deaths occur in sub-saharan Africa.

The research and collaboration that went into the development of this management guide incorporate the latest in proven science and effective implementation in recommended actions and program elements. Assessments of successful efforts suggest that any effective malaria control program should be informed by the established primary, secondary, and tertiary interventions for malaria control and what’s known as the ABCD model of basic programming: Awareness and public education; Bite control; Chemoprophylaxis; and early Diagnosis and treatment.

Primary interventions are designed to prevent infection and focus for the most part on vector control, with additional efforts at personal protection and eventual vaccines.

Secondary interventions will reduce the severity of disease and prevent its recurrence once contracted. Secondary interventions will also decrease the length of any occurrence, and include, for example, efforts at prompt diagnosis and intermittent preventive treatment for pregnant women.

Tertiary interventions are designed to prevent death from severe malaria and primarily involve emergency medical interventions.

The following chapters of the guide incorporate these principles and other evidence-based best practices that have proven effective in reducing malaria transmission. The guide includes suggested key program elements and key program indicators to assess effectiveness. Incorporating these elements into a malaria control program should provide significant reduction in disease burden in the local area of implementation. While any malaria control program must prove responsive to the particulars of its own target environment, this guide provides the generic, necessary elements for success anywhere malaria is endemic.

CAMA hopes to promote the understanding among all interests in Africa that the long-term benefit on industry and the community far outweighs the cost of designing, planning, and implementing these programs for malaria control. In addition, establishing programs based on this management guide provides ample opportunities for the private sector to increase corporate engagement through innovative partnerships with the public sector. These partners will create indirect benefits by building in-country capacity through training and quality assurance for services and commodities, transportation, and education, among other sectors. These programs also directly stimulate economic growth—an obvious benefit to all involved. To CAMA, supporting effective and sustainable malaria control in Africa is a matter of corporate responsibility.

The Purpose of This Guide:

• Targets business managers engaged in malaria control and/or other public health programs. It assumes that these individuals have a basic knowledge of malaria control.

• Provides guidance on key interventions and program elements required to develop and implement an integrated malaria control program.

• Does not provide comprehensive information on the epidemiology of the disease and ecology.

• Provides a broader overview of malaria control and available interventions and leads the reader to more substantive publications and resources for in-depth information.

• Outlines programmatic activities that can be linked with public sector initiatives to strengthen systems and support large scaled impact of interventions.

The female *Anopheles* mosquito carrying the *Plasmodium* parasite is responsible for malaria transmission in most cases when it (1) bites a human who is infected with the malaria parasite, (2) then becomes infected with the parasite in about 10 days, and (3) bites another human and infects that human with the parasite. Almost all malaria control programs will involve some intervention in this infection cycle that is dependent on the biological and behavioral traits of the *Anopheles* vector.


Linkages/References:

• Roll Back Malaria Partnership: Malaria Information Sheets [http://www.rbm.who.int/cmc_upload/0/000/015/372/RBMInfosheet_1.htm](http://www.rbm.who.int/cmc_upload/0/000/015/372/RBMInfosheet_1.htm)

• World Health Organization: Global Malaria Program [http://www.who.int/malaria/](http://www.who.int/malaria/)

• U.S. Centers for Disease Control: Malaria [http://www.cdc.gov/malaria/biology/index.htm](http://www.cdc.gov/malaria/biology/index.htm)

• Malaria Atlas Project: malaria geography and maps [http://www.map.ox.ac.uk/](http://www.map.ox.ac.uk/)

OBJECTIVES:

- This chapter provides guidance to companies operating in malaria endemic countries, where the disease’s impact on existing human resources and infrastructure is a barrier to success.
- The assessment, planning, implementation and monitoring of an integrated and sustainable malaria control program constitutes the focus of the document. The fundamental program elements presented here are based upon the principles of primary, secondary, and tertiary prevention; sustainability; and key infrastructure development. They are designed to reduce malaria’s impact.

Outline of Action Steps for Project Planning and Implementation

I. Project Scope and Assessment
   A. Identify the project lead, key internal and external stakeholders
   B. Assemble planning team
   C. Establish key program elements
      1. Primary prevention
         • Awareness and public education
         • Vector control
      2. Secondary and tertiary prevention
         • Awareness and public education
         • Early diagnosis and prompt and effective treatment including intermittent preventive treatment for pregnant women (IPT) and infants (IPTi) as well as routine treatment for children under age five.

   D. Situation Analysis/Obtain Data for Project Planning
      1. Community Health Impact Assessment
      2. Infrastructure Sustainability Assessment
      3. Procurement, Management, and Distribution of Materials and Supplies, Information Technology, Security, Regulation, and Transportation Infrastructure
      4. Resource Availability Assessment
         • Funding, Human Resources/Professionals, and Supplies

II. Project Definition and Planning
   A. Confirm strategic alliances with stakeholders
   B. Conduct gap analysis
III. Project Development and Implementation

A. Establish M&E system
B. Institute continuous improvement process
C. Implement, monitor and evaluate program

Key Performance Indicators:
• All program elements are effectively implemented.
• Continuous improvement reviews occur at least yearly.

MALARIA MANAGEMENT GUIDE

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<tr>
<th>Project Scoping and Assessment</th>
<th>Project Definition and Planning</th>
<th>Project Development and Implementation</th>
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<tr>
<td>• Conduct preliminary background research</td>
<td>• Conduct resource capacity assessment</td>
<td>• Mobilize human, financial and institutional resources</td>
</tr>
<tr>
<td>• Review National Health Plans including Malaria Control Plan</td>
<td>• Identify management team and location</td>
<td>• Communicate expectations, progress and challenges to project team</td>
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<tr>
<td>• Seek internal approval</td>
<td>• Mobilize and train team</td>
<td>• Develop Information, Education and Communication Plan</td>
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<tr>
<td>• Assemble project planning team</td>
<td>• Define potential barriers</td>
<td>(See Section IV)</td>
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<tr>
<td>• Establish key interventions</td>
<td>• Develop mitigation plan</td>
<td>• Develop training plan for partners</td>
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<tr>
<td>• Define project scope</td>
<td>• Define critical success factors</td>
<td>• Develop deliverables</td>
</tr>
<tr>
<td>• Conduct field visit</td>
<td>• Develop implementation plan, timeline and resource expectations</td>
<td>• Finalize implementation plan</td>
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<tr>
<td>• Meet with key stakeholders to discuss health needs</td>
<td>• Develop strategy for procurement and distribution of resources and supplies</td>
<td>• Implement monitoring and evaluation system</td>
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<td>• Conduct community health impact assessment (See Section VII)</td>
<td>• Develop monitoring and evaluation system (See Section XI)</td>
<td>(See Section X)</td>
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<tr>
<td>• Conduct infrastructure sustainability assessment (See Section VIII)</td>
<td>• Refine implementation plan and budget</td>
<td>• Establish continuous improvement system</td>
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<td>• Conduct procurement and supplies assessment (See Section VIII)</td>
<td>• Share implementation plan</td>
<td>(See Section XII)</td>
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<td>• Conduct resource availability assessment (See Section IX)</td>
<td>• Seek endorsement of plan</td>
<td>• Monitor critical success factors, control risks and manage change</td>
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<tr>
<td>• Identify sources of funding</td>
<td>• Seek approval of plan</td>
<td>• Identify improvement opportunities</td>
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<tr>
<td>• Confirm strategic alignments with internal and external stakeholders</td>
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<td>• Define priorities for improvement</td>
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<tr>
<td>• Redefine project scope based on assessments</td>
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<td>• Integrate continuous improvement into program</td>
</tr>
<tr>
<td>• Seek stakeholder endorsement</td>
<td></td>
<td>• Obtain stakeholders (internal and external) feedback</td>
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</table>

Identify opportunity

Submit project scope and budget to internal stakeholder for approval

No approval, develop alternative

Upon approval, proceed with execution and approved funding

Execute Project

• Reduction in workplace absenteeism, total days related to malaria (i.e., reduction in company operating costs).
• A reduction in malaria incidence and health care costs.

Linkages/References:
• Roll Back Malaria website http://www.rollbackmalaria.org/
• WHO website http://www.who.int/malaria/
Vector Control

OBJECTIVE:

- To inform companies of the current, basic ideas of vector control for use in planning when engaging in or assisting with malaria control programs in developing countries.

Due to the complexity of vector control programs, it is essential that the project lead identify the right skill set needed to design, plan, and implement the program. Expertise and staffing as well as suitable funding are vital elements.

Vector control is considered the primary prevention strategy for the control of the malaria parasite, that is, from the vector (mosquito) to humans. It therefore targets reducing the longevity of the vectors as well as reducing human-vector contact. The main vector control methods are:

- Use of insecticide treated nets (ITNs) which include long-lasting insecticidal nets (LLINs) and insecticide re-treatment kits
- Use of indoor residual spraying (IRS)
- Larval source management (larviciding and environmental management, including management of breeding sites)
- Other consumer market, personal protection, insect control methods (repellents for skin, mosquito coils, aerosols, etc.)

International standards established by WHO (WHO Malaria Control Policy, 2008) focus on scale-up in use of LLINs and/or IRS as the most cost-effective strategies to fight malaria transmission. Other methods mentioned previously can also prove effective in the context of an integrated vector management program that aims at maximizing the use of resources for vector borne disease control. This may include a combination of interventions determined to be appropriate to control mosquito populations.

The concept of integrated vector management: Each location will require guidance on specific procedures and decisions, based on local ecology, entomological knowledge such as the behavior and susceptibility of the Anopheles species in the area, as well as the epidemiology of disease transmission. Depending on the Anopheles species, a specific intervention will need to be created. For example, neither IRS or ITNs/LLINs will be particularly effective against Anopheles species that do not enter the house for blood meals but prefer to bite outdoors. IRS will not be effective against mosquitoes that bite indoors and seek to rest outdoors after a blood meal. ITNs/LLINs will not be effective if species bite indoors when few people are sleeping. Conversely, neither larval source reduction for breeding site management will be particularly effective when ecological and environmental factors result in a multiplicity of hard-to-access or transient breeding sites over time.
A well-tailored, integrated vector control program, possibly in partnership with national or local government, should aim at:

- Reducing transmission through high-level coverage of LLINs or a comprehensive IRS program. At least 80% LLIN coverage in the target community can confer community-level protection, beyond just the individual sleeping under the treated net. Similarly, at least 80% IRS coverage among households in the target community confers community-level protections to households that have not been sprayed. Furthermore, complementing with larvicide treatments and environmental modification/manipulation (e.g., source reduction such as elimination of mosquito breeding pools) if assessed to be cost effective within the local setting.

- Reducing the life-span of *Anopheles* mosquitoes: Mosquitoes only become potentially infective as adults and infective some 10 days after feeding on an infected human, so insecticide-based interventions that aim to prevent mosquito maturation can substantially reduce the likelihood of transmission.

- Reducing contact between humans and mosquito vectors. Items for personal protection such as clothing, repellents, mosquito coils, LLINs, screens, insecticide-treated materials to cover windows, doors, and eaves reduce human-mosquito contact and the number of opportunities for infection.

**Key Program Elements:**

1. Understand epidemiology of malaria, transmission cycle, local ecology, environment, and vector susceptibility to determine the best-suited vector control approach(es) for the targeted area.

2. Conduct a needs assessment (institutional capacity, human resources, logistics, environmental, and baseline parasitological and entomological assessment in target area).

3. Assess in-country entomology capabilities¹ and identify areas to strengthen these.

4. Build local (in-country) capacity, education, and ownership through consensus building, joint program planning, design, and implementation at national, district/region, and community level.

5. Collect baseline data on the ecology, environment and human settlement patterns of target areas, as well as on the incidence, the force and characteristics of transmission (to include biting behavior), as well as knowledge, attitudes, practices, and beliefs related to malaria.

6. Conduct a geographical reconnaissance and develop a logistics management plan (identify facilities for operations, transportation, storage, malaria commodities required, procurement and distribution plan).

7. Select vector control intervention based on environmental and entomological assessment (include national malaria program, entomologists and national environmental agency in selection process).

8. Confirm in-country registration status for WHO-recommended insecticide for IRS and bed nets.

9. Develop project implementation plan for the best suited vector control approach(es).


   a. Focus on creating awareness within a sociocultural context through community mobilization and direct in-person communication.

   b. Finalize and disseminate the IEC/BCC plan to all stakeholders.

11. Develop a training plan and execute training activities (community mobilization and communication, spray operators/application techniques, entomological surveillance, operations management, environmental management, drivers in safe transport of insecticide for IRS).

12. Mobilize human resources for IRS: program managers, logisticians, entomologists, IEC workers, finance specialists, mechanics, spray operators, M&E specialists, drivers.

13. Mobilize human resources for LLINs program managers, logisticians, communications specialists, health workers, community-based distributors, finance specialists, M&E specialists, drivers.

14. Develop plans for IRS spray, an LLIN distribution and keep-up plan, a breeding site identification and control plan, and/or a plan for procurement and marketing of personal prevention products.

15. Develop a security plan for safely transporting insecticide and LLINs to storage facilities and mobilizing of beneficiaries to a central point for mass distribution.

¹ See Table 1 (page 10) for a list of examples of African institutions with entomology capabilities.
16. Establish a robust M&E system
   • Entomological surveillance and resistance management in partnership with academic institutions where possible.
   • Operational oversight (development of data tracking system and program management).
   • Logistics management (LLIN and IRS commodities, storage).
   • IRS environmental monitoring and compliance (storage, safe transport of insecticide, waste disposal management, minimizing pilferage).
   • Parasitological surveillance.
   • Demographic surveys.
   • IEC/BCC.

17. Implement quality control measures.

18. Procure and distribute malaria commodities: LLINs, IRS equipment (insecticide for IRS, spray equipment, vehicles, gloves, boots, respiratory protection masks, helmets, and face shields).

19. Post operations (demobilization, post evaluation, post entomological surveillance for IRS).

**Key Performance Indicators:**
   • Coverage of the vector control intervention (at least 80% coverage for IRS and LLINs).
   • Reduction in mosquito bites linked to IRS and LLINs, entomological inoculation rates and sporozoites rates.
   • Reduction in the incidence of malaria as measured through active detection of parasitemia rates (can be costly) and passive reports of admissions and outpatient cases diagnosed and treated.
   • Reduction in all-cause mortality (particularly among target groups) and malaria-attributable case fatality among hospital inpatients.
   • Reduction in low birth weights.
   • Reduction in anemia.
   • Increased school attendance.
   • Reduced absenteeism at the work place, schools, etc. due to malaria.

**TABLE 1: EXAMPLES OF AFRICAN INSTITUTIONS WITH ENTOMOLOGY CAPABILITIES**

<table>
<thead>
<tr>
<th>COUNTRY</th>
<th>INSTITUTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benin</td>
<td>Centre de Recherche Entomologique de Cotonou/Centre for Entomological Research/Cotonou</td>
</tr>
<tr>
<td>Cameroon</td>
<td>The Biotechnology Centre, University of Yaoundé</td>
</tr>
<tr>
<td>Ghana</td>
<td>Noguchi Memorial Institute for Medical Research</td>
</tr>
<tr>
<td>Kenya</td>
<td>Kenya Medical Research Institute (KEMRI)</td>
</tr>
<tr>
<td></td>
<td>University of Nairobi – School of Biological Sciences</td>
</tr>
<tr>
<td></td>
<td>International Centre of Insect Physiology and Ecology (ICIPE)</td>
</tr>
<tr>
<td>Madagascar</td>
<td>National Malaria Control Program</td>
</tr>
<tr>
<td></td>
<td>Institute Pasteur</td>
</tr>
<tr>
<td>Mali</td>
<td>Malaria Research and Training Centre (MRTC)</td>
</tr>
<tr>
<td>Senegal</td>
<td>Laboratoire d’Ecologie Vectorielle et Parasitaire (LEVIP)</td>
</tr>
<tr>
<td></td>
<td>University of Dakar</td>
</tr>
<tr>
<td>South Africa</td>
<td>Medical Research Council (MRC)</td>
</tr>
<tr>
<td></td>
<td>National Institute for Communicable Diseases (NICD) – Vector Control Reference Unit</td>
</tr>
<tr>
<td>Sudan</td>
<td>University of Gezira</td>
</tr>
<tr>
<td>Tanzania</td>
<td>National Institute for Medical Research (NIMR)</td>
</tr>
<tr>
<td></td>
<td>Ifakara Health Institute (IHI)</td>
</tr>
<tr>
<td>Uganda</td>
<td>Vector Control Division, Ministry of Health</td>
</tr>
<tr>
<td></td>
<td>School of Entomology and Parasitology: Affiliated to Vector Control Division</td>
</tr>
<tr>
<td></td>
<td>Uganda Virus Research Institute</td>
</tr>
<tr>
<td>Zambia</td>
<td>Zambia National Malaria Control Centre (NMCC)</td>
</tr>
<tr>
<td></td>
<td>Macha Malaria Research Institute</td>
</tr>
<tr>
<td></td>
<td>Tropical Disease Research Centre</td>
</tr>
<tr>
<td></td>
<td>University of Zambia</td>
</tr>
</tbody>
</table>

CASE STUDY—VECTOR CONTROL:
ANGLOGOLD ASHANTI, GHANA

Business Case:
In 2004, malaria was seen as the most significant public health threat to AngloGold Ashanti (AGA) operations in Ghana, Mali, Guinea, and Tanzania. For the AGA Obuasi Mine in 2005, between 6,000 and 7,000 cases of malaria were diagnosed monthly among employees, contractors, and employee dependents, with a monthly case incidence rate of 24% for employees and contractors. Treatment costs for malaria at the AGA Edwin Cade Hospital were some US$55,000 per month. The impact on productivity at the Obuasi Mine was significant, with an average of 7,400 shifts per month in 2005 lost due to malaria.

AGA feels very strongly about corporate social responsibility (CSR) and believes that local community involvement and development is key to sustainable operations. AGA sees a malaria control program encompassing the whole community as an ideal CSR project.

Company Action:
Vector control was a key component of AGA’s response: a comprehensive integrated malaria control program. Prior to program implementation, baseline entomological studies were conducted in the Obuasi district during 2004 and 2005 to identify resident mosquito species and their behavior and determine insecticide resistance patterns. As a result of the outcome of these studies, it was decided that the main thrust of the vector control component of the program would be IRS of approximately 134,000 structures (mine housing and infrastructure, Obuasi town, community housing, and surrounding villages) combined with insecticide resistance management. This would be supplemented by the distribution of LLINs to vulnerable groups, and environmental management initiatives such as larvicide of open water bodies, screening houses, and cleaning/removing of refuse dumps.

Further, AGA recognized the importance of linking their vector control program with an effective IEC campaign (see “Awareness & Public Education”). As such, an intensive national and local multimedia marketing campaign preceded the spray program to sensitize the community about the program and provide health information on malaria. Spray operators also disseminated information during their rounds. The success of this initiative was demonstrated by the high spray coverage of 96% achieved during the first round of spraying: without community buy-in and support of the initiative, such coverage in vector control would not have been possible. In 2006, AGA conducted a widespread knowledge, attitudes, and perception study in the community, and used information gained to inform and improve health education initiatives moving forward.

Key Partnership Outcomes:
- By December 2007 malaria cases had decreased by 74%.
- The “Obuasi model” is internationally accepted as a gold standard program.
- The Obuasi program has been replicated at AGA operations in Guinea and Mali.
- Other mining companies (Newmont, Redback) have been assisted with implementing malaria control programs. Shell Africa has visited Obuasi and will implement a similar program in Gabon.

![Malaria Total Cases 2005 - 2008](Edwin Cade Hospital)
OBJECTIVES:

- To reduce the risk and burden of malaria at the individual and community levels through Information, Education and Communication (IEC) on malaria transmission, prevention, and treatment.
- To develop programs to motivate individuals to develop appropriate attitudes, beliefs, perceptions, and behavior regarding malaria prevention and control, and to work together in communities to sustain these education programs.

Increasing public awareness and understanding of the full range of malaria’s impact should be a goal of IEC/Behavior Change and Communication (BCC) programming. Companies and public-private partnerships should strive to help local citizens in malaria-endemic regions understand prevention tools and treatment required to mitigate the impact of the disease. Malaria contributes to poverty, consuming scarce resources at the household and state level that could otherwise be invested in improved health, education and development. Educational programming that explains the widespread deleterious effects of malaria will help counter local resistance to intervention programs.

IEC/BCC programming should be community based, appropriate to the local culture, and current, reflecting the state of the art in malaria-control prevention and treatment. Outreach partnerships with governmental, local leaders and locally operating non-governmental organizations (NGOs) will prove key to disseminating information and promoting of local buy-in.

Key Program Elements:

1. Conduct baseline study of beliefs and perceptions regarding malaria awareness among potential program beneficiaries within the targeted area/community.

2. Evaluate existing malaria prevention and treatment strategies and programs to determine best practices and additional needs in the following areas:
   - A - Awareness of malaria cycle risks and controls
   - B - Effective bite prevention and personal protective measures
   - C - Compliance with effective chemoprophylaxis for non-immunes in particular expatriate staff
   - D - Early diagnosis and effective treatment
3. Develop a plan for rolling out education and motivational messages based on the local context:
   - Identify channels of communication that are culturally appropriate and effective.
     - Interpersonal communication through direct personal communication within the targeted community is key to building acceptability and willingness of beneficiaries to participate in vector control and treatment programs.
     - Conduct community sensitization meetings with target beneficiaries to promote malaria awareness and prevention.
     - Community-based media and advertising, e.g., public service announcements, social events, health fairs, etc.
     - Private-sector communications, e.g., employer/employee communications and training.
     - Widely accessible, interactive educational tools for use by schools, employers, government agencies, and NGOs.
   - Identify bodies/groups to disseminate and reinforce the educational messages/materials.
     - Employers through outreach programs
     - Public health/community health organizations
     - Health care facilities and providers
     - NGOs
   - Ensure that the providers of educational materials and communication campaigns have the following competencies:
     - Knowledge of malaria transmission, prevention, and treatment
     - Skills in effective communication strategies and messaging
     - Awareness of local cultures, language, and ability to implement effective prevention measures (e.g., distribute bednets, implement and maintain other effective vector controls, and diagnose accurately and treat promptly and effectively any malaria cases)

Key Performance Indicators:
1. Knowledge of malaria transmission and prevention (at least 80% of individuals interviewed know the signs, symptoms, and methods of preventing malaria).
2. Awareness of availability of malaria control measures to include IRS, LLINs, breeding site control and personal prevention as appropriate (at least 80% of people interviewed know how to access available malaria control measures).
3. Compliance with vector control measures to include IRS, LLINs, breeding site management, personal protection as appropriate (at least 80% utilization of relevant control measures).
4. Prompt and effective care seeking (at least 80% of suspected cases are diagnosed and treated as appropriate within 24 hours of the onset of fever).
5. Evidence of sustained educational programs.

Linkages/References:
- Global Business Coalition on HIV/AIDS, Tuberculosis and Malaria (GBC) member company malaria control public education tools: [www.gbcimpact.org](http://www.gbcimpact.org)
CASE STUDY—AWAWARENESS: CHEVRON CORPORATION

Business Case:
In order to spread public awareness about malaria and support the company’s vector control efforts, Chevron began a comprehensive malaria prevention campaign. In November 2005, Chevron developed a campaign based on the ABCD principle: awareness, bite prevention, chemoprophylaxis, and diagnosis.

Company Action:
Chevron conducted waiting room and town hall presentations for community members, held Malaria Roll-Out Day celebrations and distributed materials such as brochures, posters, t-shirts, and laminated “Emergency Cards” with basic, vital information. The company produced a widely distributed video on malaria, offering it in both Portuguese and English in Angola in order to maximize reach.

Key Outcomes:
• In Nigeria, Chevron launched anti-malaria initiatives in Rivers and Kaduna states. Both initiatives targeted children under five years of age and pregnant women. Chevron introduced an awareness campaign to be delivered from the River Boat Clinic project, which serves as a mobile hospital along the Benin and Escravos rivers in Delta State.
• In Angola, Chevron distributed LLINs to Angolan employees, their families, and local communities; established a 24-hour malaria hotline, trained local health care practitioners in diagnoses, and supplied Artemisinin Combination Therapy (ACT) medication. As a result of these and other steps, the incident rate of malaria cases was substantially reduced by 40% at Chevron’s clinic in Luanda and facilities in Cabinda and Malongo provinces.
• In 2006, Chevron worked with the Global Business Coalition on HIV/AIDS, Tuberculosis, and Malaria, CAMA, the Global Fund Private Sector Delegation, and others to drive awareness of the theme of sustainability in mitigating epidemics.
Diagnosis and Treatment

**OBJECTIVE:**

- To establish a process that facilitates prompt diagnosis and early treatment of suspected malaria.

For businesses operating in malaria-endemic countries, it is critical to recognize that malaria affects the population from which the industry workforce is selected as well as expatriate workers. Early diagnosis and treatment can reduce the impact on the workforce and improve productivity. Malaria can be diagnosed on a clinical basis through symptom recognition during patient examination. Symptoms can include fever, chills, sweats, vomiting, headaches, nausea and muscle pains. Additional diagnostic approaches include microscopic diagnosis and rapid diagnostic tests.

Microscopic diagnosis, usually termed as the “gold standard,” is an established method of laboratory confirmation of malaria. This method, conducted by a laboratory technician, is an examination of the patient’s blood smear under a microscope for the presence of malaria parasites.

The use of rapid diagnostic tests (RDTs) involves identification of the antigen derived from the malaria parasites using immunologic tests such as a dipstick or test strip, yielding results within 15 minutes.

Once diagnosed with malaria, it is critical that the individual is treated early with antimalarial medication per WHO recommended treatment guidelines within 24 hours of the onset of symptoms. Establishing partnerships with government agencies and NGOs and working within country initiatives can optimize the community’s health and wellbeing, which can, in turn, have a beneficial effect on corporate profits and capital investments.

**Key Program Elements:**

1. Develop workplace malaria policies and programs and/or integrate them into existing workplace HIV/AIDS, TB, antenatal or child care, and other health programs.

2. Review and adhere to national and WHO-recommended malaria treatment policies and guidelines to ensure availability of effective diagnosis and treatment for adults, pregnant women, and children per national policy.¹

3. Review WHO and RBM recommendations and guidelines on effective case management including appropriate drug choice, drug quality assurance, distribution, regulation, rational use, diagnostics, capacity development and monitoring and evaluation.

¹ WHO has recommended as first line treatment, the use of artemisinin-based combination therapies (ACTs) for falciparum malaria in countries experiencing resistance to conventional monotherapies, (e.g. chloroquine, amodiaquine or sulfadoxine-pyrimethamine).
4. Conduct a knowledge, attitude, and perception survey to understand health seeking behaviors linked to care such as access, affordability, acceptability, improving diagnosis and treatment within health care facilities.

5. Identify and/or educate healthcare providers and allied health professionals (laboratory technicians) to use RDTs and/or microscopic diagnosis and to follow internationally recognized treatment protocols.

6. Set up company diagnosis and treatment protocols.

7. Ensure malaria diagnosis and treatment protocols are in line with national primary healthcare strategy and antenatal care package.

8. Ensure that quality assurance for microscopy and RDTs are in place, including proficiency testing and training of laboratory personnel and care providers, and testing of the reliability of microscopy and RDTs.

9. Work with healthcare facilities in targeted areas to strengthen clinical management of malaria, and seek to extend training from the company’s health facility to include health professionals in the larger surrounding areas who provide care and treatment to the community.

10. Work with health care facilities in targeted areas to establish process for managing and tracking malaria cases.

11. Support development of a training and supervision plan to build health workforce development within the health facility in disease management.

12. Educate employees and their families about when to seek prompt medical attention if they experience symptoms of malaria (e.g., fever, chills, headaches, muscle aches).

13. For community-based programs, educate population to encourage acceptability of national treatment policy, regarding when and where to seek prompt medical attention based on early symptom recognition.

14. Evaluate the supply availability of WHO pre-qualified diagnostic supplies and drugs for the treatment of uncomplicated and severe malaria and assess the extent to which the target population can afford to purchase these supplies.

15. Identify WHO pre-qualified vendors of malaria diagnostic supplies and drugs for the treatment of uncomplicated and severe malaria, and procure commodities as required.

16. For workplace programs, establish referral systems to ensure procedures are in place and medical care is available within 24 hours from the onset of symptoms.

17. Establish procedures for when symptoms are present and individual is in a remote endemic area and medical care is unavailable (rapid diagnostic kits, immediate transport, and stand-by treatment based on WHO recommended malaria treatment guidelines).

18. Determine plan for the education and distribution of emergency treatment procedures.

**Key Performance Indicators:**

- Increased case detection/case management capacity increased
  - Number and percent of confirmed malaria cases, using microscopy, rapid diagnostic test, etc., stratified by total population (gender, age, children under five, pregnant women)
  - Proficiency testing metrics
  - Dispensaries per population or per area
  - Number of drug therapy doses distributed
  - Percentage of health personnel adhering to quality assurance procedures
  - Distribution by treatment regimen and delivery mode, if more than one
  - Percentage of probable and confirmed malaria deaths among patients with severe malaria admitted to health facility
  - Number of cases of severe malaria (probable and confirmed) among target group
  - Number of uncomplicated malaria (probable and confirmed) among target group
  - Percentage of pregnant women who have taken intermittent preventive treatment
  - Percentage of clinic staff trained in intermittent preventive treatment for pregnant women and infants
INTrODUCTION

- Percentage of health personnel involved in patient care trained in malaria case management and Integrated Management of Childhood Illness (IMCI)
- Percentage of patients with uncomplicated malaria getting correct treatment at health facility and community levels in accordance with international and national guidelines within 24 hours of onset of symptoms
- Percentage of patients hospitalized with diagnosis of severe malaria and receiving correct antimalarial and supportive treatment in accordance with international and national guidelines.

Linkages/References:
- Centers for Disease Control and Prevention Diagnostic Procedures: (http://www.dpd.cdc.gov/dpdx/HTML/DiagnosticProcedures.htm)
- Malaria and Health Riamet/Coartem: (http://www.malariaandhealth.com/professional/riamet_coartem/01_riametcoartem.htm)
- WHO Management of Severe Malaria: (http://www.who.int/malaria/docs/hbsm.pdf)
- WHO Stand-by Treatment: (http://www.who.int/malaria/cmc_upload/0/000/014/923/am_3.htm)
- WHO: Prevention of Malaria in Pregnancy Recommendations: http://www.who.int/malaria/docs/ecr20_8.htm#p8.2.2
- WHO: Rapid Diagnostic Test http://www.wpro.who.int/sites/rdt

GLOBAL DISTRIBUTION OF MALARIA TRANSMISSION RISK


MALARIA ENDEMICITY

- Very high
- High
- Moderate
- Low
- No malaria
Community Health Impact Assessment

OBJECTIVE:

- To identify sources of baseline data on health and identify potential obstacles to achieving success. Data on additional factors such as economic and social characteristics may influence project planning and should be included to the extent possible.

Establishing a malaria control program requires cross-sector efforts and solid project management frameworks. Epidemiological and entomological malaria risk assessments should be conducted in the early project planning phase in order to determine the need and the level of the program. Engaging partners such as Ministry of Health/National Malaria Control Program and vector control experts, and implementing partners from the central, regional, and/or district level remains critical to the success of the program. It enables consensus building, allows for stakeholder buy-in, and assures a level of ownership needed to implement and sustain the program.

A community health impact assessment is conducted to estimate the current disease burden in the targeted area and to help in estimating the project’s size and complexity. Data sources can include public and NGO agencies, commercial sources, medical/scientific literature, and sponsoring companies’ internal data. The process of data collection often identifies potential collaborators or subject matter experts.

Key Program Elements:

1. Data on a variety of indicators are usually assembled from existing sources. If unavailable, set data collection system to collect and collate data.
2. Data must be interpreted in light of known deficiencies, such as the data’s age or sparseness.
3. For smaller projects, it may be feasible to collect primary data for segments of the health impact assessment.
4. Geographic scope, populations measured, and timing of data collection should match the proposed study parameters as much as possible.
5. Data from the community health impact assessment should lead to development of an action plan that includes key stakeholders, roles, health needs, and impacts.
6. Types of data necessary:
   a. Demographic data
      - Total population
      - Age and gender distributions
      - Geographic distribution
b. Malaria control related data
   - Endemic malaria types
   - Drug regime(s) are in use
   - Vector control interventions in use, with level of coverage
   - Vector/parasite resistance

c. General population health data
   - Life expectancy
   - Birth rates, fertility rates, infant mortality rates, birth weight

d. Morbidity/mortality data
   - All-cause, under five, under two, and infant
   - Malaria incidence, prevalence, and mortality
   - Other diseases, anemia

e. Additional data that are highly useful
   - Economic data
     - Income per capita
     - Principal occupations and employment rates
     - Total individual or household out of pocket expenditure on health care
     - Total individual and/or household out of pocket expenditure on malaria
   - Sociological data
     - Literacy rates
     - Family, tribal, and community organizational structures
     - Knowledge level on malaria
   - Infrastructure data
     - Government structure
     - Health system capacity
     - Hospital/health center distribution and capacity per 1,000 population or per area
     - Health workers per 1,000 population or per area

- Community health infrastructure, community health volunteers, etc.
- Level of health worker education
- Transportation, power, water, and sanitation

Key Performance Indicators:
- All significant existing data are identified
- Data limitations are recognized and incorporated into project planning

Linkages/References:
- The PMI Country Profiles: [http://www.fighting-malaria.gov/countries/country_profiles.html](http://www.fighting-malaria.gov/countries/country_profiles.html)
OBJECTIVE:
- To assist companies in determining whether a suitable infrastructure is in place, identifying potential infrastructure gaps, and developing gap-closure strategies to ensure program sustainability.

Companies operating in malaria-endemic countries will want to determine whether a suitable infrastructure is in place to support a malaria control program or to determine what changes are necessary to manage the program and drive sustainability. It will be critical for companies to identify stakeholders and potential partners and determine their capacity to assist in program development, implementation, and maintenance.

The following areas should be assessed:
- Socioeconomic infrastructure
- Political infrastructure
- Education infrastructure
- Health care infrastructure
- Public health infrastructure
- Funding sources
- Procurement infrastructure
- Distribution/transportation infrastructure
- Power, water, and sanitation infrastructure

Key Program Elements:
1. Identify key stakeholders in civil society, public, and private sectors to better understand the potential collaborators/partners
   - National key stakeholders should include ministries of health, education, environment, agriculture, finance; the National Malaria Control program; national business coalitions, NGOs/CBOs; research institutions; etc.
   - Regional networks in east Africa, west Africa, southern Africa, and central Africa
   - International stakeholders such as Roll Back Malaria Partnership (RBM), WHO, The Global Fund, USAID/PMI, Gates Foundation, Clinton Foundation, UNICEF, World Bank, and United Nations Development Programme (UNDP)
   - Identify mix of national stakeholders and gaps to maximize efficiency and sustainability are they cooperating, competing, complementary, etc.
   - Understand expectations for economic growth
2. Evaluate current local, regional, and national infrastructure in the key areas via desk reviews and interviews
   - Community and regional clinics, health care centers, hospitals, private sector health facilities, pharmacies, and patent medicine vendors—assess health care management; provision of quality and affordable services; work force; availability of equipment, drugs, and medical supplies
   - Capacity of national agencies to drive malaria efforts in country and provide partnership opportunities for national agencies and other key stakeholders
   - National agency competence in monitoring changes in disease incidence, prevalence, mortality
   - Drug supply management, in-country procurement, and distribution from central to district/community-level capacity and ability to make malaria commodities available in targeted areas (supply chain requirements and what is available)
   - Environmental management including contaminated waste disposal, hospital waste management, and disposal of malaria control commodities, e.g., empty insecticide packs, rinse water, used protective gear, etc.
   - Assessment of the current infrastructure and private-sector development in-country, including local production of malaria commodities like bed nets; employment opportunities in the private and public sector, strengthening economic, educational, and health systems
   - Evaluate water, sanitation, and hygiene program(s) in targeted areas and determine gaps and innovative opportunities for private sector development and/or public-private partnerships
3. Identify gaps that may undermine long-term program sustainability
   - Lack of effective drugs, diagnostic tools, vector control commodities, and supply management systems in country
   - Lack of robust/inadequate procurement and distribution management systems in country
   - Inequitable distribution of health workers to meet current demands at community, district, and national level
   - Insufficient monitoring and evaluation (M&E) capacity to ensure effective implementation and impact measurement
   - Governance and/or varying political will to support efforts
   - Management of health care waste
4. Develop gap-closure implementation strategies and plan in the areas of key infrastructure elements. Gap-closure plan should aim to accomplish the following through contracting with internal or external experts:
   - Participate in partnership meetings with key stakeholders to identify opportunities for collaboration and alignment of malaria activities with national plan
   - Strengthen health information management system in collaboration with government and/or private sector health facilities
   - Strengthen drug, diagnostic tool, and vector control commodity supply management systems in collaboration with government and/or private-sector counterparts
   - Evaluate possibilities for local supply and production plus capabilities of malaria control commodities with international standard quality, e.g., bed nets
   - Strengthen in-country procurement and distribution systems in collaboration with government counterparts, key NGOs, and private sector players involved in malaria programs
   - Support the provision of training, re-training opportunities, remuneration, and relocation incentives to health and allied health professionals to strengthen care and treatment in urban and rural areas.
   - Increase supply of health professionals in rural areas, and staff effective on-going disease surveillance activities
   - Strengthen health care waste disposal system
   - Develop in-country ownership and foster dialogue and consensus with the host government and target community
• Provide or develop targeted and strategic assistance to support innovative economic, water, and sanitation programs

5. Assess alignment of all stakeholders/business partners in malaria

• Review key global, country, and national stakeholders in malaria; programmatic activities; funding allocation by intervention; focus countries, identification of gaps to assess alignment with business partners’ core expertise, available resources, and initiatives in malaria

• Assess continuous improvement opportunities¹

• Solicit feedback from beneficiaries, government counterparts, and other major players

• Evaluate programmatic process and outcomes in alignment with continuous improvement initiatives

• Harmonize stakeholder activities if necessary

**Key Performance Indicators:**

• National stakeholder community working together in a coordinated and constructive manner through planning, M&E, dissemination of information challenges, and best practices

• A strategy/program addressing specific infrastructure gaps as perceived by the host country government and key stakeholders

• Successful implementation of a program that strengthens one or more components of the health system (e.g., workforce development; improvement in disease prevention; diagnosis, treatment, and surveillance systems; malaria commodity supply management system, including compliant procurement and effective distribution systems)

**Linkages/References:**

• World Economic Forum: Guideline for Employer-Based Malaria Control Program: [http://www.weforum.org/pdf/Malaria.pdf](http://www.weforum.org/pdf/Malaria.pdf)


¹ See Section XII: Continuous Improvement.
OBJECTIVE:

- Once identification and specification of supplies (malaria commodities and operational items) and services (subcontractors) have been completed, a company may develop a procurement supply strategy, as outlined in this chapter. The purpose of a procurement strategy is to:
  - fairly identify, evaluate, and contract with vendors and contractors that can provide supplies and services at the lowest price and/or cost-benefit ratio possible based on previously identified standards.
  - Increase access to supplies and services that meet globally acceptable standards of quality, safety, and effectiveness.
  - Build, utilize, and expand in-region and in-country capacity for local African supply chain.

Assessing the country’s infrastructure is a critical step in procurement and distribution. Essential functions include:

- Forecasting and timely ordering of commodities,
- On-schedule delivery to the port of entry, and
- Prompt distribution to the final destination of project office, hospital, or clinic.

Successful strategies may vary by the nature of the commodity, such as pharmaceuticals and diagnostics, vector control supplies, and durable equipment. Separate distribution planning is needed for supplies that require continuous re-supply (e.g., drugs and diagnostics) vs. periodic re-supply (e.g., vector control supplies). An essential factor to consider when developing a procurement strategy is to encourage sustainability through the qualification and selection of vendors and contractors that are actively involved in growing the African supply chain.

Bottlenecks in international transportation and customs clearance can create impediments during the implementation phase. Distribution plans have to overcome ongoing, critical deficiencies in national infrastructure such as lack of good roads, lack of transport capacity, lack of adequate storage capacity, electricity, and potable water. Ensuring adequate storage and transport capacity for large quantities of bulky items (e.g., bed nets, insecticide) or perishables poses ongoing problems. Potential threats to the physical security of supplies and the integrity of distribution practices are key operational considerations.
However, making the necessary supplies available solves only half the problem; supplies must be secured, acceptable to targeted beneficiaries, and easily accessible as well. Once medications and supplies are obtained, arrangements need to be made to safely secure and reliably disseminate to the target population. Distribution must take into account varying delivery end-points, from large-area warehouses to individual villages or health facilities.

**Key Program Elements:**

1. Establish contracting protocols involving fair and transparent bidding (tendering) processes, contract management, and payment

2. Obtain the estimated needs (supplies and services) with technical specifications and timelines
   - Provide written technical specifications and identified standards (e.g., WHO Pesticide Evaluation Scheme, etc.) for supplies
   - Identify existing networks (nationally and internationally) for supplies
   - Provide written scope of work for services
   - Identify national distribution systems for medication
   - Identify special warehousing and transportation requirements such as cold storage, moisture protection, etc.
   - Include manufacturing lead time, buffer stock, days of inventory (DOIs), shelf life, and storage-capacity requirements where applicable

3. Identify country-specific regulatory restrictions for:
   - Importation restrictions
   - Sale/manufacture of medicines
   - Patent status of selected medicines
   - Pesticide registrations
   - Import tariffs

4. Develop in-country receipt procedures
   - Pre- and post-customs clearance procedures
   - In-country final destination definition
   - Warehousing availability
   - Correct storage conditions (e.g., temperature and humidity for perishables)
   - Security

5. Plan transport and delivery to final destinations
   - Availability and reliability of transportation
   - Correct storage conditions in transit
   - Security in transit
   - Correct storage at final destination
   - Security at final destination

6. Develop perishables management plan
   - Expiration date monitoring
   - Stock rotation
   - Safe and legal destruction or removal of expired materials

7. Define inventory management process

8. Evaluate existing vendor and contractor pool
   - Identify vendor qualification process including in-region and in-country resources

9. Identify gaps in vendor pool and develop potential gap-closure strategies
   - Work with vendors and contractors to develop or grow in-region and in-country resources
   - Bidding (tendering) process development
     - Developing Request for Proposal (RFP)
     - Communication of RFP and bid-submittal deadline to potential suppliers
     - Answering questions and communicating responses to all suppliers bidding (tendering)
     - Receiving bid responses (sealed bids)
     - Adhering to deadline and opening bids
     - Comparison and evaluation of bids (technical and cost)
     - Negation of contract terms, scope of work, deliverables, schedule, and payment terms
     - Issuing work release or purchase order to commence work
   - Provide written procedures for bidding process and selection
   - Provide ongoing contract management during contract period
   - Identify and execute payment methods

10. Obtain services of a procurement agent should the management team decide to outsource the procurement process
11. Identify or create a system to track and monitor supplies and services from contract award to delivery.

12. Perform quality control (QC) assessments and inspections throughout contracting period
   - Develop QC standards
   - Provide resources to perform QC assessments
   - Monitor procurement period/on-time delivery history of suppliers

**Procurement Needed for the Following Malaria Commodities:**

- Antimalaria medicines
- LLINs
- Insecticides
  - IRS
  - Insecticide kits for treatment of bed nets *(where there are no LLINs and conventional nets need retreatment)*
- Spray equipment (for IRS)
- Diagnostics
  - Microscopes and parts, slides, stains, and reagents
  - Rapid diagnostic test (RDT) kits

**Services and Logistics Required**

- Shipping/freight handling
- Transportation (people and equipment)
- Warehousing
  - Non-climate controlled
  - Climate controlled
- Labor (for IRS, clinic, etc.)
  - Technical/specialty
  - Non-technical
- Immunology

**Key Performance Indicators:**

- Amount of expired supplies not able to be used reduced
- Percentage stockouts reduced (indicator of timeliness and adequacy of supply/distribution efforts)
- Increased percentage of supplies obtained in country increased
- Increased level of contract compliance
- Continuous improvement review is completed at least yearly
- Reduced frequency and duration of stockouts

**Linkages/References:**

- RBM Procurement and Supply Chain Management Lists: [http://www.rbm.who.int/mmss/procurementandtraining.html](http://www.rbm.who.int/mmss/procurementandtraining.html)
  - List of Malaria Pharmaceutical Products (The Global Fund)
  - List of Antimalaria Medicines (World Health Organization)
  - List of Mosquito Net Suppliers (RBM)
  - List of Insecticide Suppliers (RBM)
  - List of IRS Suppliers (RBM)
  - List of RDT Manufacturers and Suppliers (RBM)
  - List of Set Pack Suppliers (RBM)
  - List of Resistance Kit Suppliers (RBM)
OBJECTIVE:

- To determine the financial, human, and material resources capability and availability that will support a sustainable malaria control program.

A lack of affordability and inaccessibility of resources can severely hamper efforts to manage an effective malaria control program. The remoteness of some operations and depressed economies of some malaria-endemic countries make availability and accessibility of supplies and services an ongoing challenge. A strategy for procuring and disseminating reliable resources and supplies must be established. Leveraging the internal structure and network of the company can facilitate easier resource management. Government agencies can also serve as data sources. Public and private partners can support the implementation and management of logistics systems.

Key Program Elements:

1. Identify and secure financial resources:
   - Estimate program cost based on current resource availability and cost of the intervention. Each intervention is dependent on a needs assessment within the targeted area. Interventions can be based on cost per household, cost per person for each intervention, and/or costs of the intervention per number of people protected over time.
   - Identify sources of program element funding and timeline for soliciting funding. Potential sources of funding:
     - National budgets
     - Locally generated funds
     - Out-of-pocket payments by households
     - Multilateral and bilateral donors
     - Global Fund to Fight HIV/AIDS, TB, & Malaria
     - Private foundations: Bill & Melinda Gates, Clinton Foundation, etc.
     - Company resources
     - Leveraging resources from other global initiatives such as PMI, PEPFAR (U.S. President’s Emergency Plan for AIDS Relief), MIM (Multilateral Initiative on Malaria), MFI (Malaria Foundation International), etc.
2. Identify and secure human resources:
   - An assessment of qualified health care providers and allied health professionals in a targeted area will include examining the number of health care workers per given population. The review will also focus on access to health care, equity, and patient satisfaction.
   - Training needs assessment of qualified health care providers and allied health professionals in case management, disease surveillance, medication and insecticide protocols and symptom recognition, diagnosis, treatment, and patient education.
   - Determine availability of entomologist and infrastructure at country/regional and sub-regional level for baseline entomology assessment and surveillance.
   - Determine in-country entomological capability and training needs.
   - Assess the number of community support personnel available to support key program elements including IEC and community mobilization resources. Community support available to support interventions is country/region specific. Development of a sense of ownership of the program by the community, dissemination of information and education based on local context, and a clear understanding of added benefits of the interventions will drive acceptance within the community.

3. Identify training needs
   - Identify training and retraining programs for health care providers and other personnel.
   - Training in procurement, logistics management, and drug management system.
   - Training in disease surveillance and Health Management Information System (HMIS).
   - Training in malaria diagnosis and treatment.
   - Training in hospital/health care management.
   - Training in management (client management, HR management, financial management, and business development).
     - Training in M&E.
     - Training in vector control program management.
   - Training in communications, BCC, and community mobilization.

4. Accessibility
   - Determine accessibility to health care providers.
   - Examine barriers to health care services: distances, finances, human resources, availability of drugs and supplies.

5. Materials
   - Identify reliable vector control vendors for:
     - Manufacturers of IRS spraying equipment and gear.
     - WHO-evaluated and -specified insecticide formulations for IRS, ITNs, and LLINs.
     - Evaluate distribution system from headquarters (HQ) to local distributor/agent.
   - Identify suppliers of reliable:
     - Chemoprophylaxis medicines.
     - Treatment medication, e.g., ACT.
     - Rapid diagnostic tests.
   - Identify technical support mechanisms (e.g., information, communication, and supply systems to support trained personnel, supervision, training, etc):
     - Technical support for IEC can be gleaned from local and international NGOs.
     - Procurement and drug management.
     - Vector control.
     - Systems strengthening.
     - M&E and disease surveillance.

6. Identify gaps that may undermine long-term sustainability
   - Lack of human capital.
   - Health work force to provide care and treatment.
   - Lack of innovative ideas for business development and wealth creation.
   - High unemployment and need for job creation within the private sector.
   - Access to schools, roads, and hospitals.
   - Lack of referral and emergency transport.
7. Develop gap-closure implementation strategies and plan
   • Conduct needs assessment: country specific
   • Review national malaria strategic plan and policy, including malaria operational plans by RBM, PMI, and other stakeholders
   • Design integrated malaria control program that is country specific and addresses needs
   • Develop M&E Plan
   • Ensure sustainability of malaria control program by ensuring local community/country ownership, building in-country capacity, and cross-sectoral linkages (education, private sector development, infrastructure development, etc.)

Key Performance Indicators:
   • Harmonization of malaria control objectives and activities among key stakeholders
   • Number of health workers trained in malaria diagnosis and treatment; people trained in disease surveillance; people trained for vector control interventions, e.g., spray operators; people trained in IEC and community mobilization; and people trained in procurement, logistics, and drug management
   • Increased human capital through improved health (e.g., decline in mortality and morbidity rates, reduced Disability Adjusted Life Years/DALYs, increased productivity, increased school attendance, etc.)
   • Increased frequency of supervision
   • Increased quality of services provided (possibly assessed from community surveys or health facility exit interviews of patients)

Linkages/References:
   • WHO website http://www.who.int/malaria/
OBJECTIVE:
• To facilitate a consistent, efficient, and sustainable approach to the assessment, development, and implementation of a malaria control program.

Once it is determined that the proposed malaria control program is feasible, companies can proceed with developing a detailed plan for program operations. It will prove important to plan for gap-control, M&E, and continuous quality improvement throughout the life of the program.

Key Program Elements:
1. Project assessment: identify and assess opportunity
   • Conduct a community health impact assessment
     - Review epidemiological and entomological parameters
     - Malaria risk assessment (review of transmission cycles and risk to the business, i.e. mining, oil and gas, clothing and apparel, etc.)
   • Identify key internal and external stakeholders and partners
   • Determine what level of malaria control program is needed
   • Define project scope
   • Examine implementation research needs

2. Project definition and planning: generate and select alternatives
   • Conduct an infrastructure sustainability assessment
   • Develop a budget
   • Identify funding sources for the duration of the plan
   • Evaluate data and determine if program has a high probability of sustainability
   • Obtain approval for funding

   CRITICAL DECISION POINT

   CRITICAL DECISION POINT
3. Project development: develop preferred alternative
   - Define program elements that are critical to success
   - Conduct gap analysis amongst best practices and program deliverables/goals
   - Review gap analysis and determine gap-closure strategies
   - Develop financial management system
   - Develop key performance indicators
   - Develop program deliverables, e.g., training, documentation, etc.
   - Define a strategy for procurement of resources and supplies
   - Develop implementation plan to include:
     - Roles and responsibilities (responsibility, accountability, consultant, information)
     - M&E system
     - Continuous improvement process
     - Ongoing staffing levels
     - Roll-out plan
     - Communication plan
   - Obtain endorsement for implementation

4. Project implementation: execution
   - Monitor critical success factors
   - Monitor and control risks
   - Manage change
   - Communicate expectations to stakeholders
   - Facilitate training of program owner and other key staff and/or stakeholders regarding roles and responsibilities and system elements
   - Identify additional sources of funding for expansion or continuation of the project
   - Provide final deliverable package to program owner

5. Operate and evaluate: project post-implementation evaluation
   - Obtain feedback from stakeholders on development and implementation
   - Obtain user feedback
   - Collect key performance indicators
   - Identify continuous improvement opportunities
   - Provide evaluation findings to key stakeholders
   - Determine priority for implementing continuous improvement opportunities
   - Integrate continuous improvement opportunities into program using continuous improvement process

**Key Performance Indicators:**
- Resources in place or plan in place to secure them
- Project proceeds on time and within budget
- Evaluation plan in place with indicators/results clearly delineated
- Malaria activities align with national initiatives

**Linkages/References:**
- IPIECA: A Guide to Malaria Management Programs in the Oil and Gas Industry
- World Economic Forum: A Guideline for Employer Based Malaria Programs
XI Monitoring and Evaluation

OBJECTIVE:

- To suggest M&E indicators designed to help companies track malaria control program performance through measurement of processes, outcomes, and impacts.

Depending on resources available, the sophistication, rigor, and reporting frequency of project monitoring may vary. M&E are necessary for:

- Accountability to project sponsors
- Promoting efficient use of project resources
- Timely monitoring of project activities
- Identifying and correcting performance deficiencies
- Analyzing costs and benefits of project components
- Determining how successful the program has been in meeting its objectives

Key Program Elements:

1. Identify lead M&E specialist
2. Review existing M&E systems set up in the target area by private sector companies and other implementing agencies
3. Review and ensure harmonization with government and internationally recognized malaria indicators
4. Ensure M&E is incorporated into the program design and planning stages
5. Develop or refine a pre-existing data-collection system
6. Develop communication policy and system for reporting indicators
7. Develop and conduct training in data collection, reporting, and analysis for personnel leading each intervention and program area

Seven Simple Steps to Performance Measurement

1. Define program goals and objectives.
2. Match objectives to relevant indicators.
3. Identify sources and methods of data collection.
4. Collect data.
5. Interpret and revise, if needed, the data collected.
6. Ensure data are used to optimize and improve the intervention.
7. Share results.
8. Sample process metrics by service delivery segment are as follows:

- **Vector control**
  - Percentage of houses sprayed based on total number of houses targeted for spray operations
  - Number of bed nets distributed; coverage in percent
  - Current condition and percent of bed nets in use after time; e.g., percent used last night, one week, six months, etc., after distribution

- **Disease prevention**
  - Number of Intermittent Preventive Treatment (IPT) doses distributed to pregnant women
  - Number of educational materials distributed

- **Case detection/case management**
  - Number and percent of cases confirmed, by confirmation method (e.g., microscopy, rapid diagnostic test, etc.)
  - Dispensaries per population or per area
  - Number of drug therapy doses distributed
  - Distribution by treatment regimen and delivery mode, if more than one
  - Percentage of probable and confirmed malaria deaths among patients with severe malaria admitted to health facility.
  - Number of cases of severe malaria (probable and confirmed) among target group
  - Number of cases of uncomplicated malaria (probable and confirmed) among target group
  - Percentage of pregnant women who have taken intermittent preventive treatment
  - Percentage of clinic staff trained in intermittent preventive treatment for pregnant women and infants
  - Percentage of health personnel involved in patient care trained in malaria case management and IMCI
  - Percentage of patients with uncomplicated malaria getting correct treatment at health facility and community levels in accordance with international and national guidelines within 24 hours of onset of symptoms
  - Percentage of patients hospitalized with diagnosis for severe malaria and receiving correct antimalarial and supportive treatment in accordance with international and national guidelines

- **Advocacy and partnership development**
  - Number of supporting commitments formulated and implemented for service delivery

- **Health system strengthening**
  - Number of people trained in entomology, M&E, statistics, and project management
  - Number of households participating in community-based vector monitoring
  - Number of health facilities with quality assurance procedures in place and strengthened supervision of practices at all levels

- **Outcome indicators by segment, e.g.**
  - Number of health facilities with quality assurance procedures in place and strengthened supervision of practices at all levels

- **In vector control intervention areas**
  - Percentage of correct net usage, e.g., persons having slept last night under bed net, etc.
  - Percentage of bed nets returned, by reason (e.g., insecticide worn out, torn)
  - Percentage of pregnant women receiving timely IPT
  - Percentage of people with access to first-line drugs
  - Percentage of children under five admitted with severe malaria
  - Percentage of health facilities producing complete/timely patient malaria register records per period
  - Percentage of facilities reporting no stock outs of malaria drugs
MONITORING AND EVALUATION

• Intermediate impact indicators, e.g.:
  - Entomological parameters before and after vector control intervention (vector density, parous rate, infection rate, biting rates, etc.)
  - Species and sporozoite analysis of trapped mosquitoes
  - Parasitemia/anemia prevalence in pregnant women and children
  - Malaria incidence rate

• Final impact indicators, e.g.:
  - Infant and under-five all-cause and malaria-attributed mortality
  - Malaria case-fatality rate by population segment
    • Total population
    • Children under age five
    • Pregnant women

Key Performance Indicators:

• M&E package includes a set of key metrics and additional indicators used for monitoring different levels of project activity

• Indicators are clearly defined and comparable over time

• Metrics are comparable across similar projects regionally or worldwide

• Metrics demonstrate direct impact of malaria control interventions

• Levels of reporting detail and reporting transparency are agreed upon by project partners in advance

Linkages/References:

• RBM M&E Reference Group (MERG) http://www.rbm.who.int/merg.html


• UNICEF malaria technical and policy documents: http://www.unicef.org/health/index_documents.html

• GBC Case Studies: Marathon Oil Company: http://www.gbcimpact.org/live/cases/cases.php?id=32

• BP Indonesia: http://www.gbcimpact.org/live/cases/cases.php?id=24

• Chevron (Angola): http://www.gbcimpact.org/live/cases/cases.php?id=57

• WHO: Malaria in Pregnancy: Guidelines for Measuring Key Monitoring and Evaluation Indicators: http://www.who.int/malaria/docs/mip/mip_guidelines.pdf
CASE STUDY: MARATHON OIL, EQUATORIAL GUINEA

Business Case:
When Marathon Oil entered Equatorial Guinea in 2002, it identified malaria as the most significant health threat to its employees and the local communities of Bioko Island. Malaria was endemic on Bioko Island and accounted for approximately 40% of all deaths among children under the age of five and a comparable high percentage of all illnesses. To address this threat, Marathon and its business partners consulted global public health experts, who concluded that a dramatic reduction in malaria transmission would significantly improve the health status of the population and reduce the heavy economic burden associated with the disease, thus contributing to economic development in the country. Marathon and its partners teamed up with the Government of Equatorial Guinea and health experts to design and implement a comprehensive malaria control project for Bioko Island. To ensure success, this collaborative partnership rolled out a program focusing on five key components: vector control, case management, monitoring and surveillance, information, education and communication, and capacity building.

Company Action:
Surveillance and evaluation comprise a vital piece of Marathon’s malaria control programs. Designed to monitor the effectiveness of the program [reduction in mosquito numbers and their level of infectivity], this component checks ongoing project results and facilitates necessary operational adjustments.

A series of household surveys are undertaken prior to initiating IRS, and case management is monitored at the mid-point and end of each project cycle. Surveys evaluate the impact of the project on under-five mortality, incidence of malaria and demand for treatment, and the welfare of the Bioko Island population as reflected in economic burden from malaria treatment costs. Annual surveys of the presence of malaria-causing parasites among children and pregnant women enable the company to monitor effectiveness in the target population. Window traps located in representative sites around the island provide opportunities to monitor reduction in mosquito numbers and their level of infectivity. These same surveillance sites provide the basis for a crucial early warning system to help avoid a future resurgence of malaria. This protocol has become the model for the national malaria control program.

Key Program Outcomes:
- Two years into the program, evaluations showed a 95% reduction in malaria-transmitting mosquitoes (based on average number of infected mosquitoes caught in the home per 100 nights from pre-spray baseline research), and a 44% reduction in the presence of malaria parasites in children (based on blood smear testing).
- Marathon’s comprehensive monitoring and evaluation program demonstrated tremendous economic benefits to the community. The island population (a quarter million people) had previously been averaging one episode of malaria per person per year. According to M&E studies of the first year of program implementation, Marathon was able to avert an estimated 150,000 cases.
- In the same period, due to reduction of necessary spending on malaria treatment, the bottom 40% of earners in the population experienced an estimated net savings of 6% of personal revenues. For every dollar invested by the project, the return to the community (in terms of averted cases, improved productivity and reduced absenteeism) was $4 – an impressive cost-benefit ratio of 4:1.
- Data collection and analysis demonstrated the program’s worth and cost-effectiveness both to the community at large and internally with the company, ensuring continued program support and sustainability.
OBJECTIVE:

- To identify areas of the program lacking significant operational and public health impact in order to adjust for and enhance efficiency and effectiveness.

Continuous improvement looks to identify and then eliminate activities that add cost but no value to the program. It continuously seeks to improve various methods of operation, thereby driving efficiency and effectiveness. Continuous improvement in malaria control specifically identifies scientific advancements and research, especially in the area of vaccine research and development, where advances in new biotechnologies have enhanced the viability of a malaria vaccine.

The first and most important focus of continuous improvement planning is on the people who deploy the malaria control program. The workers (people on the ground) should be the focus of management decisions. Workers should contribute regularly to identifying opportunities to make improvements, including increasing productivity, safety, security, efficiency, and public health impact. Workers should be actively contributing (via support group or regular meetings) towards making the work day more pleasant and rewarding.

Aspects to improve:

a. Teamwork
b. Personal discipline/accountability
c. Improving morale
d. Quality
e. Suggestions for improvement

Key Program Elements:

1. Focus on the team of employees
2. Focus on materials and equipment, or attend to assessments of equipment, tools, and other resource needs, maintenance, and repairs, scrutinizing the largest cost centers carefully
3. Identify and measure improvement: measures of improvement will change over time, but some obvious fundamentals are likely to stay static
4. Obtain feedback from key stakeholders
   - Solicit input on identifying key performance indicators
7. Identify scientific advancements with organizations that are supporting/developing research related to malaria management
   - At news of any advancement, consider a change request if applicable
   - Review known advancements at meeting/maintenance intervals to let every member consider solutions
   - Stimulate scientific/technology advancements with bottom-up feedback to R&D organizations

8. Rank and prioritize implementation of continuous improvement opportunities
   - Align suggestions and ideas for improvement with mission, vision, objectives, and goals
   - Consider dissolving ineffective efforts currently in place
   - Established/approved management will rank and approve the change opportunities

9. If program improvements are recommended, identify management of change

10. New scope: New tasks added to the scope that were not included in original baseline
    - Problem reports identify implementation constraints to be addressed
    - System enhancement requests from workers
    - Changes in underlying structure and or standards
    - Demands from senior management

11. Amended scope: Tasks (staff-hours) that were included in the original approved project baseline, but have changed or have expanded past the original intent
    - Events in the development of other systems

12. Schedule: Significant changes in the project schedule, as compared to the approved schedule baseline, that will require additional overhead to manage and support the project scope throughout the extended duration

13. Establish a management of change plan (actions, timelines, funding, communications, new performance indicators, etc.); each group/subgroup must prepare and submit a change request to program management for approval; internal to this group the following steps should be followed:

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1 See Section XI: Monitoring and Evaluation.
• **Prepare the change request**
  - Identify (and rank if multiple) change requests
  - Identify scope and deliverables
  - Estimate staff-hours required to complete task
  - Estimate costs including additional material resources and additional services needed
  - Quantify the cost impact to the approved budget
  - Quantify the schedule impact and critical path of adding the task to the approved project scope
  - Justify the change, including compiling any pertinent data or client requests for the change

• **Issuing and approval/rejection of the change request**
  - Respective manager or approved technical decision maker will discuss and approve, recommend clarifications, propose a modification of the change request, or decline the change request with reason
  - Contingencies may exist; transparency of internal obstacles promotes good faith and understanding

14. If management approval teams approves revision, then the approval is documented and implemented. Changes to operating procedures are to be implemented quickly. If management declines revisions, then it is documented with no changes.

**Key Performance Indicators:**

- All program elements are effectively implemented
- Continuous improvement reviews occur at least yearly
  - Management-level reviews
  - Employee-level reviews

**Resources:**

- Various member company management system processes
CONTRIBUTING AUTHORS

SECTION
Management Guidance
Vector Control

Awareness and Public Education
Diagnosis and Treatment
Community Health Impact Assessment
Infrastructure Sustainability Assessment
Procurement, Management, and Distribution
Resource Availability Assessment
Project Plan
Monitoring and Evaluation
Continuous Improvement

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GLOBAL BUSINESS COALITION ON HIV/AIDS, TUBERCULOSIS AND MALARIA

- Marathon
- Halliburton
- Bayer
- Wood Group
- Global Industries, Ltd.
- WorleyParsons
- Cameron
- Noble Energy