# Contents

Foreword....................................................................................................................................................vii

Acknowledgements ....................................................................................................................................ix

Acronyms....................................................................................................................................................xi

1 Introduction ...................................................................................................................................... 1
   1.1 Background.................................................................................................................................. 1
   1.2 Concepts of National Health Accounts .................................................................................... 2
   1.3 Overview of the malaria subaccount........................................................................................ 3
   1.4 Policy purpose of the malaria subaccount................................................................................ 4
   1.5 Indicators informed by a malaria subaccount.......................................................................... 6
   1.6 Outline of methodological approach........................................................................................ 8

2 Definitions and scope...................................................................................................................... 11
   2.1 Brief background on malaria and malaria control.................................................................. 11
   2.2 Definition of malaria expenditures......................................................................................... 12
   2.3 Scope and boundaries of the NHA malaria subaccount......................................................... 12
      2.3.1 Malaria expenditures explained in the context of the NHA..................................... 12
      2.3.2 Malaria subaccount inclusions and exclusions......................................................... 13
      2.3.3 Malaria and other NHA subaccounts ....................................................................... 13
      2.3.4 Geographic boundaries............................................................................................. 14
      2.3.5 Time boundaries....................................................................................................... 14
   2.4 Malaria expenditures: illustrative examples........................................................................... 14

3 Classification scheme...................................................................................................................... 19
   3.1 Concept.................................................................................................................................. 19
   3.2 Four principal health care categories and their letter codes................................................... 19
   3.3 Approach to assigning classification categories for the subaccount...................................... 20
   3.4 Possible malaria classification scheme .................................................................................. 21
      3.4.1 Functions associated with malaria health care ......................................................... 21
      3.4.2 Health providers associated with malaria control and treatment.............................. 23
      3.4.3 Financing agents associated with malaria control and treatment ............................. 23
      3.4.4 Financing sources associated with malaria control and treatment ........................... 24

4 Malaria subaccount tables............................................................................................................. 25
   4.1 NHA tables............................................................................................................................. 25
   4.2 NHA tables as applied to NHA malaria subaccount.............................................................. 26
      4.2.1 Basic tables............................................................................................................... 26
      4.2.2 Aggregates................................................................................................................ 27
      4.2.3 Additional tables for targeted expenditures .................................................................. 27
      4.2.4 Limited resources..................................................................................................... 27
      4.2.5 Examples of malaria subaccount tables ................................................................... 28
Table 6.5: Illustrative $FSxHF$ and $HFxHP$ tables when fully donated goods are ultimately dispensed to the HH for a fee...........................................................................................................................................................................54
Table 6.6: Illustrative $FSxHF$ table when donated commodities are sold to public providers, which in turn sell the commodities to patients for a fee...........................................................................................................................................................55
Table 6.7: Illustrative $FSxHF$ and $HFxHP$ table when donated commodities are sold in private sector ...56
Table 7.1. Illustrative timeline for malaria subaccount activities ........................................................................................................66
Indicators on resource tracking in the Malaria Program: a proposed set.... Error! Bookmark not defined.
Foreword

Policy-makers in malaria-endemic countries face the difficult decision of how much of their limited health care budget they should allocate to malaria treatment and control, and how much to other competing and pressing health needs. For countries in Africa in particular, this decision is made in the context of malaria being the leading cause of mortality among children under five. Policy-makers must determine the level of resources that is needed to avert an increase in malaria prevalence and to eventually reduce prevalence. In countries where prevalence has been reduced, policy-maker concern is on the level of resources needed to sustain the improved situation. Whatever the situation, a prerequisite for informed policy decisions is reliable information on the organization of and financing for malaria services, including spending by donors, public entities, and private entities such as households.

The malaria subaccount has been designed to provide financial information needed to inform such decisions. National Health Accounts (NHA) is an internationally accepted tool that provides a comprehensive estimate of all national health expenditures. The term “subaccount” refers to an additional and more detailed reporting of spending levels and patterns for a particular component of health care, such as malaria services. The subaccount reports expenditures in accordance with the NHA framework. But because of the subaccount’s specificity, NHA expenditure classification schemes are modified where necessary; for example, categories in the malaria subaccount reflect the types of malaria control activities (i.e. distribution of insecticide-treated bed nets or material, vector control, and intermittent treatment for pregnant women).

The subaccount answers specific questions regarding malaria financing in the same manner that the general NHA answers questions on health care financing overall: how much is being spent on malaria, who is paying, and what services and products are purchased (and for whom). A country’s policy-makers and programme managers can use the expenditure estimates in various ways — to project financial requirements for addressing malaria, to monitor how the resources are used, and so forth. In addition, because the subaccounts use the internationally recognized NHA framework, their expenditure findings can be compared across countries with similar or differing levels of malaria endemicity. If subaccount results are available for a number of years, these can be used to track trends in expenditure levels and to monitor patterns of resource use over time and how these patterns relate to achieving malaria programme goals.

Recognizing the need for comparable and comprehensive malaria expenditures data, the Roll Back Malaria Partnership’s Resource and Finance Working Group, the World Health Organization (WHO), and the United States Agency for International Development/Partners for Health Reformplus (USAID/PHRplus) Project and its successor the Health Systems 20/20 (HS 20/20) project worked together to prepare these guidelines for producing the malaria NHA subaccount. The guidelines benefit from the participation and contribution of numerous malaria and NHA experts, and from two country implementations of the methodology. Efforts were made to ensure consistency with the Guide to producing National Health Accounts with special applications for low-income and middle-income countries (WHO, World Bank, and USAID, 2003) in order to similarly serve as a standard for malaria expenditure. Intended for NHA country experts as well as health account novices, these guidelines aim to facilitate the subaccount implementation so that it can be done regularly to better inform the policy process.
Acknowledgements

The malaria subaccount guidelines were produced with support from the Roll Back Malaria (RBM) Partnership Resource and Finance Working Group, World Health Organization (WHO)/Health Systems and Services (HSS) department, as well as the WHO/RBM department, the United States Agency for International Development (USAID)/Partners for Health Reformplus (PHRplus) project, and its follow-on, the Health Systems 20/20 project. This document owes its inception to Patience Kuruneri, formerly of WHO/RBM, who lobbied extensively on its behalf, and initially coordinated the multi-donor sanctioned effort. In addition, Dennis Carrol of USAID and David Evans of WHO/HSS provided substantial and sustained support for the activity.

The guidelines have benefited from the input of numerous malaria and National Health Accounts (NHA) experts as well as from country implementation in Rwanda and the Philippines. The core drafting team consisted of Susna De (USAID/PHRplus and HS 20/20 project), Patricia Hernandez (WHO/HSS), and Rachel Racelis (WHO consultant). Initial drafts received input and valuable feedback from an internal review team consisting of Yann Derriennic (USAID/PHRplus), Tania Dmytraczenko (USAID/PHRplus), Maryse Dugue (WHO/RBM), Tessa Tan Torres (WHO/HSS), and Fatoumata Toure (WHO/RBM). In addition, the authors appreciate the insights and suggestions put forward from consultations with key malaria and health care experts including Charles Delacollette (WHO/RBM), David Evans (WHO/HSS), Piet Kager, Collin Mathers (WHO/HSS), Bernard Nahlen (WHO/RBM), Allan Schapira (WHO/RBM), and T. Teuscher (WHO/RBM).

Following the internal review, the guidelines were submitted to an external review panel, consisting of international researchers, health economists, and donor stakeholders. Sincere thanks go to members of this panel who provided constructive insights. They include Catharina Hjortsberg (International Health Economics Institute), Zine-Eddine El Idrissi M. Driss (WHO/Eastern Mediterranean Regional Office), Valentina Buj (WHO/GMP), Valerie Crowell (WHO/GMP), Charles Delacollette (WHO/GMP), Allan Schapira (WHO/GMP), and Sergio Spinaci (WHO/GMP).

Critical to the development of the malaria subaccount approach was its implementation in the Philippines and Rwanda. The issues, strategies, and lesson learned from these country experiences were integral to defining these international recommendations as well as to determining the feasibility of tracking malaria-specific health expenditures in the developing country context. In this regard, the authors are extremely grateful to the participation of the country teams.

From the Philippines team, we would like to acknowledge the Provincial Government of Davao del Norte, specifically Governor Gelacio Gementiza and Dr. Agapito Hornido, Areonito Lamoste, Glomerlina Abrera, and James Engay of the Provincial Health Office. In addition, thanks are extended to other partners of the Philippines initiative, including the following: National Center for Disease Prevention and Control/Infectious Disease Office, the Center for Health Development Davao Region, the Provincial Health Team for Davao del Norte, and the Health Policy Development and Planning Bureau — all offices of the Department of Health; the National Statistical Coordination Board; and WHO, both the Western Pacific Region Office and Philippine Country Office.
From Rwanda, we thank the following MoH staff: Secretary General Ben Eliphas Karenzi, Claude Rwagacondo (former director of the malaria control programme [Programme National Intégré de Lutte contre le Paludisme, PNILP]), Daniel Ngamije (current director of PNILP), Emmanuel Kabanda (team coordinator), Carpophore Ntagungira, Charles Waza, Nicolas Theopold, Fiacre Kamanzi, François Niyitegeka, Lazare Ndazaro, and Vianney Nizeyimana. In addition, the exercise owes its success to the NHA steering committee composed of high-level representatives from the Kigali Health Institute, the Office of the Prime Minister, Ministry of Economics and Finance, National Bank of Rwanda, National Medical Stores of Rwanda [Centrale d’Achat des Médicaments Essentiels au Rwanda, CAMERWA], and Office of Certified Medical Facilities of Rwanda.
### Acronyms

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACT</td>
<td>Artemisinin-based Combination Therapy</td>
</tr>
<tr>
<td>CAMERWA</td>
<td>National Medical Stores of Rwanda (Centrale D’Achat des Médicaments Essentiels au Rwanda)</td>
</tr>
<tr>
<td>COI</td>
<td>cost of illness</td>
</tr>
<tr>
<td>DALY</td>
<td>disability-adjusted life year</td>
</tr>
<tr>
<td>DHS</td>
<td>Demographic Health Survey</td>
</tr>
<tr>
<td>DOH</td>
<td>Department of Health</td>
</tr>
<tr>
<td>DRG</td>
<td>diagnosis-related group</td>
</tr>
<tr>
<td>FS</td>
<td>Financing Sources</td>
</tr>
<tr>
<td>GGE</td>
<td>General Government Expenditure</td>
</tr>
<tr>
<td>GGHE</td>
<td>General Government Health Expenditures</td>
</tr>
<tr>
<td>HA</td>
<td>Health Accounts</td>
</tr>
<tr>
<td>HC</td>
<td>Health Care (Expenditure on health care - Functional Approach)</td>
</tr>
<tr>
<td>HH</td>
<td>Household</td>
</tr>
<tr>
<td>HMIS</td>
<td>Health Management Information System</td>
</tr>
<tr>
<td>HRH</td>
<td>Human Resources on Health</td>
</tr>
<tr>
<td>HP</td>
<td>Health care providers (delivery of services, including dispensation of medical goods)</td>
</tr>
<tr>
<td>HSS</td>
<td>Health Systems and Services</td>
</tr>
<tr>
<td>ICMA</td>
<td>International Classification of Health Accounts</td>
</tr>
<tr>
<td>IEC</td>
<td>Information, Education, and Communication</td>
</tr>
<tr>
<td>IMCI</td>
<td>Integrated Management of Childhood Illness</td>
</tr>
<tr>
<td>Int $</td>
<td>International dollars (a purchasing power parity measurement approach).</td>
</tr>
<tr>
<td>IP</td>
<td>inpatient</td>
</tr>
<tr>
<td>IPTi</td>
<td>Intermittent preventive treatment in infants</td>
</tr>
<tr>
<td>IPTp</td>
<td>Intermittent preventive treatment in pregnancy</td>
</tr>
<tr>
<td>IRS</td>
<td>Indoor Residual Spraying</td>
</tr>
<tr>
<td>ITN</td>
<td>Insecticide-Treated Net</td>
</tr>
<tr>
<td>MDGs</td>
<td>Millennium Development Goals</td>
</tr>
<tr>
<td>MICS</td>
<td>Multiple Indicator Cluster Survey</td>
</tr>
<tr>
<td>MoH</td>
<td>Ministry of Health</td>
</tr>
<tr>
<td>NCU</td>
<td>National Currency Units</td>
</tr>
<tr>
<td>NHA</td>
<td>National Health Accounts</td>
</tr>
<tr>
<td>NHE</td>
<td>National Health Expenditures</td>
</tr>
<tr>
<td>NHAM</td>
<td>National Malaria Health Account</td>
</tr>
<tr>
<td>NGO</td>
<td>Nongovernmental Organizations</td>
</tr>
<tr>
<td>OECD</td>
<td>Organisation for Economic Co-operation and Development</td>
</tr>
<tr>
<td>OOP</td>
<td>out-of-pocket</td>
</tr>
<tr>
<td>OP</td>
<td>outpatient</td>
</tr>
<tr>
<td>PHRplus</td>
<td>Partners for Health Reformplus project</td>
</tr>
<tr>
<td>PPP</td>
<td>Purchasing Power Parity</td>
</tr>
<tr>
<td>Abbreviation</td>
<td>Full Form</td>
</tr>
<tr>
<td>--------------</td>
<td>-----------</td>
</tr>
<tr>
<td>RBM</td>
<td>Roll Back Malaria</td>
</tr>
<tr>
<td>RC</td>
<td>Resource Cost (production factors)</td>
</tr>
<tr>
<td>RHU</td>
<td>Rural health unit</td>
</tr>
<tr>
<td>SHA</td>
<td>System of Health Accounts</td>
</tr>
<tr>
<td>Sida</td>
<td>Swedish International Development Cooperation Agency</td>
</tr>
<tr>
<td>THE</td>
<td>Total Health Expenditures (the sum of general government and of private expenditures on health)</td>
</tr>
<tr>
<td>THEM</td>
<td>Total Health Expenditures on Malaria (basic approach in this manual)</td>
</tr>
<tr>
<td>UNICEF</td>
<td>United Nations Children Fund</td>
</tr>
<tr>
<td>USAID</td>
<td>United States Agency for International Development</td>
</tr>
<tr>
<td>US $</td>
<td>United States Dollar</td>
</tr>
<tr>
<td>WHO</td>
<td>World Health Organization</td>
</tr>
</tbody>
</table>
1 Introduction

1.1 Background

Given the heavy global burden of malaria, particularly in Africa, where it is the leading cause of mortality among children under five years of age, policy-makers in endemic countries are increasingly committed to stemming the spread of the disease. For example, at the Abuja Declaration on Roll Back Malaria (RBM) Partnership in Africa, leaders declared a commitment to reduce malaria mortality by 50% by the year 2010 through the delivery of appropriate curative and preventive interventions. Moreover, the combating of malaria along with HIV/AIDS and other diseases is one of the principal goals included in the Millennium Development Goals (MDGs), which have been defined by the international community to serve as a framework for measuring overall country development progress. In particular reference to malaria, one of the targets of the MDGs is to halt the spread of the disease by 2015 and begin to reverse its incidence rates.

However, policy-makers face difficult decisions in determining how to achieve such impressive targets. One significant challenge is deciding how much of already limited health budgets should be allocated for malaria control and treatment — particularly in the context of other competing and pressing needs, such as the fight against HIV/AIDS and tuberculosis. With limited resources available for combating malaria, it becomes imperative that these funds be allocated wisely, based on informed policy choices. An important prerequisite for such planning decisions is an understanding of the organization of and financing for malaria health care as a whole, one that includes a review of spending incurred by donors, public sector entities, and the private sector, particularly households. By understanding what is currently being spent, country policy-makers will be better equipped to explore alternative ways of allocating and mobilizing resources to effectively prevent the spread of the disease and to treat those who have its symptoms. Moreover, such information is critical for policy-makers to determine accurate unit costs and make assumptions when using budgeting and planning tools, including the World Bank’s Marginal Budgeting for Bottlenecks and the Malaria Cost Estimation Tool, developed by the RBM Partnership and World Health Organization’s (WHO) Health Systems and Services (HSS).

1 The Roll Back Malaria Partnership is a global initiative – made up of more than 90 partners – whose goal is to halve the burden of malaria by 2010. RBM was launched in 1998 by the World Health Organization, UNICEF, UN Development Programme, and the World Bank to provide a coordinated international approach to fighting malaria.


3 The Marginal Budgeting for Bottlenecks tool is a country-based microeconomic model that estimates the cost of removing health system bottlenecks and the likely impact of such actions on achieving important health policy goals (such as reducing maternal mortality by X%). The tool uses various forms of country data on health interventions (from both the public and private sectors), then identifies the obstacles or bottlenecks that inhibit system performance (generally related to issues of availability, access, utilization, continuity, and quality), followed by a suggestion and costing of how to overcome each obstacle, and finally states how such investment would impact policy goals, similar to those espoused by the MDGs. In short, the tool attempts to link what has been spent to what additionally needs to be spent in particular program areas to achieve a given outcome.

4 Developed by the RBM Partnership secretariats in conjunction with WHO/HSS, the Malaria Cost Estimation Tool is designed to estimate national resource requirements for proven malaria interventions over a period of time. The tool is based on a review of costing studies and extensive consultation with malaria experts. It requires data entry of national health statistics and program documents and then automatically generates summary cost reports for selected interventions. It may be obtained from http://www.rbm.who.int/cgi-bin/rbm/rbmpiportal/custom/rbm/home.do

Guide to Producing Malaria Subaccounts

Introduction
Recognizing this need for expenditure data, many stakeholders at the country and donor levels are now requesting the development of a methodology to track national-level malaria spending patterns. To respond to this urgent request, the Secretariat of the RBM Partnership with support from WHO and the United States Agency for International Development (USAID)/ Partners for Health Reformplus (PHRplus) project and its follow-on, the Health Systems 20/20 project, have worked together to produce a set of guidelines, presented in this document, for examining the financial flows for malaria health care. These guidelines adhere to the framework of National Health Accounts (NHA), which is currently implemented in more than 100 countries and examines general health spending at the national level. By striving for consistency with a globally used tool, these guidelines provide a standard approach that fosters comparable country estimates and facilitates global resource tracking for malaria programmes. Nevertheless, the guidelines also are flexible enough to meet the local needs of national stakeholders. Thus, the objective of this paper is as follows:

- to offer country NHA teams a globally viable and nationally useful methodological approach for tracking malaria health expenditures within the NHA framework.

To be internationally viable, the guidelines have been written such that they consider the issues facing malaria-endemic regions, particularly Asia, Africa, and Latin America. This document has been drafted in consultation with malaria and NHA technical experts from the RBM Partnership, WHO, PHRplus, and the countries themselves. The guidelines received subsequent review and feedback from a panel consisting of stakeholders from key institutions assembled by the RBM Partnership Secretariat. Finally, in proposing a nationally useful and feasible approach, the guidelines incorporate lessons learned from the piloting of the methodology in Rwanda and the Philippines. As more countries track malaria expenditures within the NHA framework, new lessons learned will be incorporated into these guidelines, which until that time are classified as a working paper.

1.2 Concepts of National Health Accounts

NHA is an internationally accepted policy tool that provides a comprehensive estimate of national health expenditures for a given year. It examines a nation’s use of public, private (including households), and donor health funds. This is accomplished by tracking the flows and amounts of spending:

- from the financiers of health care funds, called “financing sources” (e.g. Ministry of Finance, donors);
- to the principal managers of those funds, termed “financing agents” (e.g. Ministry of Health [MoH], insurance schemes);
- to those that deliver health care services, namely health providers (e.g. hospitals, pharmacies); and, finally,
- to the end uses of health funds, namely the health services/products themselves, which are termed health care “functions” (e.g. inpatient curative care, public health programmes).

NHA organizes these flows into a series of standard tables. It should be noted that NHA is not designed to be an academic study but rather a tool to inform the policy process; as such, it needs to be conducted on a regular basis as part of a government’s ongoing activities.

---

5 The Rwanda implementation was led by the Ministry of Health, with technical support from the USAID PHRplus project. The Philippines implementation was led by the Department of Health with technical support from WHO.
In addition to being implemented worldwide, the NHA methodology has been endorsed by many multilateral and bilateral organizations, such as WHO, the World Bank, USAID, and the Swedish International Development Cooperation Agency (Sida). A complete description of the NHA framework is provided in the *Guide to producing National Health Accounts with special applications for low-income and middle-income countries* (WHO, World Bank, and USAID: 2003).

### 1.3 Overview of the malaria subaccount

These guidelines describe an NHA-compatible approach to tracking expenditures on malaria activities, specifically those that are:

- primarily intended to have a positive impact on the health status of people with malaria, confirmed or not, within a given year
- intended to prevent and control the spread of malaria, which may target the population at large (such as the recipients of insecticide-treated bed nets [ITNs]).

This approach is called an NHA malaria subaccount. A “subaccount” is an additional review of expenditures on the delivery of a subset of health care services, such as disease-specific services (e.g. malaria, HIV/AIDS) or intervention clusters (e.g. reproductive health services, child health services). A subaccount generally focuses on a national priority programme area. It is recommended that subaccounts be conducted in tandem with a general NHA (and not done as stand-alone studies) and written up as individual chapters within the general NHA report. The reason for this is that much information on malaria spending can be obtained from the primary and secondary data collected for a general NHA estimation, and this minimizes the cost of implementing the subaccount. Moreover, this approach also helps to place the subaccount spending patterns within the context of the country’s overall health spending (see Figure 1.1).

As alluded to above, there are three advantages to using NHA as the framework for tracking malaria spending: (1) NHA has established standard methods for estimating health expenditures; (2) there is potential for routine estimation of malaria spending within institutionalized NHA systems (helpful for generating trend data for monitoring purposes); and (3) it allows for country comparability of expenditure estimates. Additionally, more than half of all recipients of malaria grants from the Global Fund to Fight AIDS, Tuberculosis and Malaria have completed or will be implementing NHA soon. Thus, in the interests of building upon existing capacities to measure health expenditures, the tracking of malaria spending is best done within the NHA framework.

---

6 Also referred to as the *Producers’ Guide*.  
7 A more complete definition of the scope of expenditures included in a malaria subaccount is described in Chapter 2.
As with the general NHA estimation, a malaria subaccount allows for comprehensive measurement of expenditures between financing sources, financing agents, providers, and functions (at a minimum), specific to those entities involved in malaria financing and delivery. The subaccount also covers public, private, and donor components of malaria health services and, like the general NHA, aims to inform key policy issues pertinent to malaria programme managers and decision makers.

### 1.4 Policy purpose of the malaria subaccount

Why carry out the malaria subaccounts? Simply put— the purpose is to inform the policy process by providing needed data for national stakeholders (both government and nongovernmental players). The Subaccounts are appealing in that they promote transparency, accountability, better management of resources, and allocation of funds in closer alignment with national priorities. To aid policy-makers in understanding the basic financing flows for malaria control and care, the core NHA tables of a malaria subaccount can answer the following policy questions:

- What is the total resource envelope for malaria control and treatment?
- Who finances malaria health care and how much do they spend? Such information can be used to determine potential sources for filling in financing gaps.
  - If a household survey is conducted for the exercise, the subaccount can offer information on out-of-pocket (OOP) expenditures by income quintile, geographic location, and gender.
- Who manages malaria health funds? Who has programmatic control over their allocation?
- Where do these funds go? To which providers (public and private) and services/functions?
  - How much is spent on prevention and control versus treatment? Is there an “appropriate” balance?

By addressing these questions on a regular basis, institutionalized malaria subaccounts provide critical information to local policymakers such that they can monitor the uses of current malaria funds (are they meeting their intended targets?) – and consequently make informed and evidenced-based policy choices about future resource allocation decisions. For example in Rwanda, the Minister of Health used its 2003
Malaria subaccounts to inform the official government strategy on achieving the Millennium Development Goals and highlighted the fact that resources seemed to be targeted for HIV/AIDS and other areas as opposed to Malaria, Rwanda’s leading cause of morbidity and mortality. This has led the Ministry of Health to openly call for greater donor harmonization and alignment with national priorities.

Most malaria-endemic countries are middle- and low-income nations, with scarce data available on private sector health care spending, particularly household spending at pharmacies, for traditional healers, and at clinics. Presently, existing evidence is only anecdotal, suggesting that the bulk of malaria spending occurs in the private sector. Some estimate that households incur 70% of expenditures targeted for malaria activities, thus raising concern about the burden of financing at the household level. The comprehensive nature of the subaccount can help fill in the sizeable knowledge gap on this point. It should be noted that implementation of the subaccounts, as described in chapter 5 on data collection, can occur in countries with varying information system capabilities—including those that offer hardly any to no routine data on malaria. By embarking upon the subaccounts in these countries, the NHA team provides its policymakers with critical data and in the process of doing so can highlight the areas of present-day information systems that need to be strengthened (an assessment so-to-speak) to facilitate regular retrieval of malaria expenditure data.

The NHA framework is also comprehensive in that it allows for a disaggregation of spending down to a particular malaria service area (disease surveillance, ITNs, consumption of antimalarial drugs, case management, and so forth). Therefore, there is potential for assessing the efficiency of these various service areas.

The subaccount is also very pertinent to addressing donor concerns and interests. For example, the tool can track the disbursement of funds from new and large financing mechanisms, such as the Global Fund. This translates into increased accountability and transparency of country management of malaria programme funds. Because disease-specific subaccounts are generally and more easily implemented within the context of the general NHA estimation, the malaria subaccount is well-suited for tracking ‘additionality’ — the concept that assistance made through the Global Fund “not replace or reduce other sources of funding, either those to fight against AIDS, tuberculosis, and malaria or those that support public health more broadly” (www.theglobalfund.org/en/about). Several mechanisms of donor assistance also incorporate the concept of additionality. If implemented before the disbursement of such grants, the malaria subaccount can offer baseline information. Subsequent accounts can monitor the flow of funds for malaria within the context of grant disbursement. This can show the impact of the particular donor programme and determine whether or not its funds are indeed supplemental or additional to government spending on malaria. As NHA becomes increasingly institutionalized or conducted on a regular basis, the estimations can provide valuable trend data to help assess progress made towards other national priorities and goals of various global initiatives.

It is important that a realistic picture of expectations for the subaccount tool be described. Although the tool offers many potential uses, as described above, there are important policy issues that NHA is not well suited to inform. For example, unless additional effort is expended, it is not likely that the malaria subaccount will be able to track malaria spending for target groups such as pregnant women and children. Also, without additional data, it is difficult for the subaccount to contribute to assessments on the effectiveness of the expenditure, or to provide comprehensive data for long-term projections. This high level of detail is difficult to capture from many low-income country health information systems.
Another area on which the malaria subaccount may not be able to shed light is the consumption of artemisinin-based combination therapy (ACT). A debate is ongoing as to whether or not the donor community should globally promote ACTs. Although they are highly effective and rapid, ACTs are also much more expensive (some have reported costing up to 20 times more than existing therapies) than other antimalarials. The question of what is the burden of financing by households for ACT versus other antimalarials would require a significant level of disaggregation not generally afforded by NHA.

Finally, it is worth noting that the malaria subaccount is consistent with the general NHA framework in that it does not measure expenditures on “indirect” activities, such as those associated with loss of income due to illness from malaria. Such costs are better tracked through specific malaria costing studies, such as the “WHO socioeconomic impact of malaria” study.

### 1.5 Indicators informed by a malaria subaccount

Many factors, including income levels, education, empowerment of women, access to nutritious foods, personal choice, quality health care, and equity in health care delivery, are correlated with a population’s health outcomes. Financial investment in health can also be included in a list of such critical factors (World Bank, 1993). Given the numerous social determinants of health, it is often difficult to draw a direct link between expenditures and health outcomes. However, studies have shown strong correlation between funding levels and the burden of disease, particularly with respect to the measure of disability-adjusted life years (DALYs). A DALY is defined as one year of healthy life that has been lost because of either disability or death (Murray, 1994). Gross and colleagues found that DALYs were strongly predictive of funding by the National Institutes of Health (Gross et al., 1999). In addition to DALYs, funding levels also have been associated with prevalence rates (Lamarre-Cliché et al., 2001). Given the importance of financial investment in health, health expenditure data — when used in combination with data addressing the other critical factors related to health outcomes — can help determine how efficient and effective a nation’s health system is in meeting its health goals.

The indicators in Table 1.1 may be computed using NHA malaria subaccount data. For more description and detail on recommended indicators, see Annex 1.

#### Table 1.1. Indicators on resource tracking in the malaria programme – a proposed set

<table>
<thead>
<tr>
<th>Level</th>
<th>Domain</th>
<th>Indicator</th>
<th>Potential feasibility: Subaccount table sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum data set</td>
<td>Financing</td>
<td>Total health expenditures on malaria (THE\textsubscript{M}) as percentage of general THE</td>
<td>All tables provide (THE\textsubscript{M})</td>
</tr>
<tr>
<td></td>
<td></td>
<td>THE\textsubscript{M} per capita at exchange rate (US$) (population at risk)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>THE\textsubscript{M} per capita at international dollar rate (int$) (population at risk)</td>
<td></td>
</tr>
<tr>
<td>Minimum data set</td>
<td>Financing sources</td>
<td>Externally funded expenditure on malaria as percentage of THE\textsubscript{M}</td>
<td>Financing Source (FS) x Financing Agents (HF) table.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Externally funded expenditure on malaria as percentage of THE</td>
<td></td>
</tr>
<tr>
<td>Minimum data set</td>
<td>Financing agents</td>
<td>General Government Health Expenditures (GGHE) on malaria as percentage of GGHE</td>
<td>HF tables</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Household OOP expenditure on malaria as percentage of THE\textsubscript{M}</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>OOP expenditure on malaria as percentage of OOP expenditure on</td>
<td></td>
</tr>
<tr>
<td>Level</td>
<td>Domain</td>
<td>Indicator</td>
<td>Potential feasibility: Subaccount table sources</td>
</tr>
<tr>
<td>-----------------------</td>
<td>-------------------------------</td>
<td>----------------------------------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------</td>
</tr>
<tr>
<td>Minimum data set</td>
<td>Factor of production</td>
<td>OOP expenditure on pharmaceuticals as percentage of THE$_M$</td>
<td>HF x Resource Cost (RC) table</td>
</tr>
<tr>
<td>Minimum data set</td>
<td>Programme level</td>
<td>Expenditure on insecticide-treated nets as percentage of THE$_M$</td>
<td>Tables comprising RC and functions</td>
</tr>
<tr>
<td>Minimum data set</td>
<td>Monographic interest</td>
<td>Budgeted vs. executed resources on malaria</td>
<td>NHA background documents</td>
</tr>
<tr>
<td>Minimum data set</td>
<td>Efficiency</td>
<td>Average expenditure on malaria cases (THE$_M$/Malaria cases treated)</td>
<td>All tables provide THE$_M$</td>
</tr>
<tr>
<td>Optional</td>
<td>Providers</td>
<td>Expenditure on malaria in hospitals as percentage of THE$_M$</td>
<td>Tables comprising HP.4 classification</td>
</tr>
<tr>
<td>Optional</td>
<td></td>
<td>Expenditure on malaria in outpatient centres as percentage of THE$_M$</td>
<td>Informal sales may require a specific survey</td>
</tr>
<tr>
<td>Optional</td>
<td></td>
<td>OOP expenditures on pharmaceuticals incurred in shops and with street vendors percentage of sales in pharmacies</td>
<td>Tables comprising RC</td>
</tr>
<tr>
<td>Optional</td>
<td>Factor of production</td>
<td>Expenditure on human resources on malaria as percentage of THE$_M$</td>
<td>Tables comprising RC</td>
</tr>
<tr>
<td>Optional</td>
<td>Functions</td>
<td>Expenditure on inpatient care as percentage of THE$_M$</td>
<td>Tables comprising functions</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Expenditure on outpatient care as percentage of THE$_M$</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total public health expenditure (HC.6) as percentage of THE$_M$</td>
<td></td>
</tr>
<tr>
<td>Optional</td>
<td>Beneficiaries</td>
<td>Per capita expenditure on malaria at subnational level (population at risk)</td>
<td>Subnational accounts</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Average expenditure by pregnant women served</td>
<td>Tables comprising THE$_M$</td>
</tr>
<tr>
<td>Optional</td>
<td>Effectiveness</td>
<td>Expenditure on treatment of severe malaria as percentage of THEM</td>
<td>All tables provide THE$_M$</td>
</tr>
<tr>
<td>Optional</td>
<td>Additionality</td>
<td>Per capita expenditure on malaria (current expenditure, population at risk) before/after measurement of financing intervention</td>
<td>All tables provide THE$_M$</td>
</tr>
<tr>
<td>Optional</td>
<td>Equity</td>
<td>Per capita expenditure on malaria by rural/urban population</td>
<td>A survey is needed</td>
</tr>
<tr>
<td>Expanded</td>
<td></td>
<td>1. Budgeted vs. executed at programme level and by specific programme components</td>
<td>1. NHA background material</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Per capita expenditure on malaria by subnational governments</td>
<td>2. Subnational accounts</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. Per capita expenditure on malaria by age and sex coverage, rural/urban population, insured / non-insured</td>
<td>3. A survey is needed</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4. Expenditure on malaria by type of input, e.g. expenditure on pharmaceuticals percentage of THE$_M$, expenditure on HRH in the malaria programme, percentage THE$_M$</td>
<td>4. Tables comprising RC (RCxProviders (HP) HPxRC)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5. Expenditure on malaria by type of provider (e.g. inpatient vs. outpatient care)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>6. Productivity: expenditure on human resources by malaria cases treated</td>
<td>5. Tables comprising HP (RCxHP--HPxHP)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>7. Waste ratio: malaria medicines destroyed as percentage of total medicines earmarked for malaria</td>
<td>6. Tables comprising RC (RCxHP--HPxRC)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>8. Outdated insecticides as percentage of total insecticides for</td>
<td>7. Tables comprising RC (RCxHP--HPxRC)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>8. Tables comprising RC (RCxP--HPxRC)</td>
</tr>
</tbody>
</table>
1.6 Outline of methodological approach

These guidelines recommend an implementation approach adhering closely to that described in the Producers’ Guide. Nevertheless, application of the methodology must be tailored to individual country situations, taking into consideration the level of information available and the nature of services used by population groups affected by the disease.

In comparison to general health accounts, the subaccount concept has added complexities in terms of boundaries and definitions. Country financial systems rarely track expenditures by disease and, consequently, the NHA subaccount team is tasked with defining the types of expenditures that should be included and excluded from the subaccount. For example, should the malaria subaccount include expenditures for services targeting the treatment of clinical sequelae of cerebral malaria, such as epilepsy, seizures, and spasticity? Chapter 2 provides a more detailed discussion of these types of boundary issues.

Once the boundaries of the subaccount are determined, the team will need to classify these expenditures in accordance with the classification approach recommended by the Producers’ Guide, which in turn is derived from the System of Health Accounts (SHA) classification scheme. Chapter 3 suggests a breakdown of malaria health care categories (including those specific financing sources, financing agents, providers, and functions) within the NHA classification scheme. This breakdown offers classification names and codes for each entity and service associated with malaria control and treatment. The names and codes are then entered into row and column headings of the core NHA tables, which are detailed in Chapter 4.

Chapter 5 offers a discussion on the types of data needed for the subaccount and suggests how such data can be obtained. Similar to the general NHA, the subaccount attempts to obtain data for a given estimate from more than one data source. This helps to verify the accuracy of the estimate. Another cornerstone of the data collection process is the assessment of already available data sources before embarking upon any primary data collection efforts (should they be needed). Much can be obtained from “piggybacking” or adding malaria-specific rider questions to ongoing surveys implemented for the general NHA exercise. However, in the absence of household information, implementation of a targeted household questionnaire may be needed. In countries where most OOP expenditures occur at pharmacies and health facilities, such information may be obtained from provider-targeted surveys (depending on the level of granularity provided in the facility’s information, specifically the ease with which OOP expenditures can be tracked to a malaria diagnosis). Thus, it is important to clearly understand how malaria care is delivered, financed, and obtained by beneficiaries.
Once the data are collected, the subaccount team begins an involved process of populating the NHA tables. This may entail resolving data conflicts and filling in data gaps using various estimation techniques. Chapter 6 describes some of the malaria-specific analysis issues that can and did arise during the pilot estimation in Rwanda and the Philippines.

The suggested implementation process, including key steps and timeframes, is detailed in the final chapter. As with the general NHA tool, these guidelines suggest that malaria endemic countries consider institutionalizing data collection efforts for the subaccount as well. This may entail altering health information systems so as to capture such data at regular intervals. Since this depends on political commitment and will, it is recommended that a steering committee composed of key stakeholders guide the development and foster ownership of a policy-relevant malaria subaccount.
2 Definitions and scope

This chapter describes the scope of an NHA malaria subaccount within the context of general NHA and against the backdrop of cost-of-illness (COI) studies. It provides a general definition of malaria expenditures and presents illustrative examples.

The writing of this chapter benefited from discussions of various issues related to identifying and estimating malaria expenditures within the NHA framework. Persons involved in the discussions included malaria specialists, malaria policy-makers, programme managers and implementers, persons with experience in estimation of NHA and component expenditures, and disease classification specialists.

2.1 Brief background on malaria and malaria control

This background on malaria constitutes a guide to identifying and understanding the range of activities and expenditures included in the malaria subaccount. This section summarizes material presented in Annexes 2 and 3. Annex 2 describes the clinical courses of malaria and the categories under the International Classification of Diseases – Tenth Revision (ICD-10) for malaria. Annex 3 provides explanations for understanding malaria control activities.

Malaria is a parasitic disease transmitted from person to person through the bite of female mosquitoes at night. If not treated promptly, the infection can progress from simply producing the typical chills, fever, and sweating to further complications that may accompany the episode of infection, including severe anemia, cerebral complications (Plasmodium falciparum), rupture of spleen (P. vivax), and glomerular disorders (nephropathy in P. malariae). Malaria in pregnant women can have adverse effects not only on the mother but also on the developing fetus.

Malaria complications can have secondary long-term consequences. Blood transfusions for severe anemia may lead to contracting of other infections such as HIV and hepatitis. Among survivors of cerebral malaria, persistent neurologic abnormalities can develop, including psychiatric problems, seizures, and epilepsy. Pregnant women with malaria are likely to have infants of low birth weight.

Malaria infections, therefore, may require expenditures not only for the treatment of current episodes of infection (and concurrent complications), but also for continuing complications with long-term effects (e.g. chronic sequela of acute cerebral infection mentioned above) — conditions that remain even after the episode of malaria infection has been treated. The malaria subaccount only includes expenditures associated with current episodes of malaria infection. However, the cost of long-term health expenditures of malaria-related complications may be estimated, if desired, as an addendum to the main malaria subaccount (see Annex 4 for further discussion).

In order to systematically identify what would constitute part of malaria prevention and control expenditures, it is useful to understand the objectives or purposes of control activities. Three main objectives of control activities are the following:
• reduce the abundance of the malaria vector species
• isolate human hosts from vectors
• reduce malaria infections in humans.

When all three objectives are accomplished, transmission of malaria in a population is reduced. In achieving the first objective, fewer mosquitoes mean fewer transmitting agents. By achieving the second objective, mosquitoes cannot easily transfer infection from one person to another person. Achieving the third objective will mean fewer sources exist from which mosquitoes can draw malaria parasites.

2.2 Definition of malaria expenditures

In line with the NHA approach, the subaccount also uses the health care function as a primary reference for defining malaria expenditures. Thus, malaria expenditures are expenditures on goods and services consumed for the primary purpose of (1) managing malaria cases (parasitologically confirmed, clinically diagnosed, or unconfirmed acute febrile cases); (2) providing goods or implementing activities for malaria prevention; and (3) providing support to malaria treatment and prevention activities (including general administration and health-related activities such as research and training).

2.3 Scope and boundaries of the NHA malaria subaccount

2.3.1 Malaria expenditures explained in the context of the NHA

Expenditures included in the NHA are the monetary value of goods and services consumed and of activities carried out whose primary purpose is restoration, maintenance, and improvement of the health status of a population. Expenditures in the NHA are grouped into two main types: core health expenditures (e.g. treatment, disease prevention, and general administration by government) and health-related expenditures (e.g. research and training). Total direct or core expenditures (the first type) plus capital investment expenditures of health providers (HC.R.1) are referred to as total health expenditures (THE). The aggregate of THE plus other health-related expenditures (HC.R) are referred to as national health expenditures (NHE). (See Figure 2.1.)

Figure 2.1. Expenditure boundaries of NHA malaria subaccount
Malaria expenditures, as defined in the previous section, are confined within the boundaries of the NHA and consist of both core and health-related expenditures. Core expenditures include the cost of treatment and prevention and the cost of general administration by government, while health-related expenditures include activities such as malaria research and training (HC.R). The THE and NHE aggregate for malaria expenditures are to be estimated following NHA definitions.

### 2.3.2 Malaria subaccount inclusions and exclusions

Many studies have presented cost estimates for the treatment and prevention of malaria for various countries. These studies have generally applied the COI framework. For this brief summary, a few were reviewed (Gallup and Sachs, 2002; Ettling and Shepard, 1991; Cropper, 1999; Wilson, 2002; Jowett and Miller, 2000; and KUAWAB, 2002), and the following were the categories of expenditures or costs of malaria identified:

- private and non-private expenditures for treatment and prevention of malaria
- income loss due to illness
- income loss due to death
- value of leisure, housework, and other activities not undertaken due to illness
- pain, suffering, and other intangible costs of illness
- overall negative externalities to the country’s economic growth.

Expenditures for treatment and prevention involve actual resource flows or financial resources being expended. These costs were estimated for various types of payers including government, households (OOP), and other nongovernment entities. The additional categories of costs listed above, on the other hand, do not involve any resource flows but rather represent forgone opportunities and intangible costs; for example, the value of income that would have accrued or of activities that would have been accomplished had the individuals not become ill with malaria.

Using the categories of costs identified in COI studies for malaria as reference, inclusions and exclusions of the malaria subaccount or health accounts may be defined. The NHA malaria subaccount only includes the first category of expenditures listed above and excludes the other costs. The subaccount, however, would also cover expenditures for other categories reported in the NHA such as research and training related to malaria — costs not included in COI estimates.

### 2.3.3 Malaria and other NHA subaccounts

As mentioned in Chapter 1, subaccounts can be conducted for different components of health care, generally reflective of policy priority areas. This includes services targeted at various diseases (e.g., malaria), conditions (e.g. reproductive health), and age group of health care beneficiary (e.g. child health). As can be expected, the scope of the subaccounts may overlap. For example, reproductive health expenditures may also include expenditures for malaria chemoprophylaxis of pregnant women. Similarly, child health accounts will include the portion of expenditures for malaria treatment and prevention services rendered to children. (For further discussion on this topic, see section 6.3.1.1.)
2.3.4 Geographic boundaries

As with the general NHA, the geographic boundary of malaria expenditures is the country of usual residence for the beneficiary of the expenditure. In general, the subaccount will include expenditures for malaria treatment or personal prevention that benefit country residents, whether these expenditures are made in-country or abroad. Malaria expenditures for foreigners temporarily within a country’s borders should be excluded. However, it may be difficult to exclude non-resident consumption of communitywide malaria-prevention activities.

2.3.5 Time boundaries

The subaccount should follow the timeframe of the general NHA, spanning a given year, which may be either a fiscal year or a calendar year. Either timeframe is acceptable so long as consistency is maintained for all expenditures in the subaccount.

Following the accrual method of accounting used by the NHA framework, malaria expenditures refer to the obligations incurred (to pay) for goods and services consumed and provided and not to actual cash payments. Expenditures are recorded at the time when the obligations were incurred and not at the time when actual payments are made.

2.4 Malaria expenditures: illustrative examples

Malaria control and malaria-related activities include the treatment of symptomatic cases with antimalarial drugs and the broader set of preventive interventions such as vector control. The list presented below illustrates the possible range of services and activities whose expenditures can fall within the malaria subaccount. The listing, however, does not suggest that all items be covered in a subaccount, but rather only those relevant to a given country. The listing of services and activities is organized according to four main purposes: prevention and control, case management (or treatment), general administration and other support to malaria control and treatment including surveillance, and health-related activities for malaria. Activities or services in italics are the key interventions articulated in the RBM Partnership’s Strategic Vision.

Prevention and Control

Reduce abundance of vectors

- **Indoor Residual Spraying (IRS)**
- use of chemosterilants
- environmental management to eliminate or control breeding sites including
  - integration of environmental management for mosquito control into engineering undertakings involving the modification and manipulation of environment (i.e. environmental changes due to agricultural, industrial, and urban development)
  - marsh alteration
  - activities to correct drainage ditches and water impoundments (community)
- Information, Education, and Communication (IEC) for households to maintain basic sanitation measures particularly maintaining proper drainage for used water and reducing open areas with stagnant water
• application of insecticides for larviciding (oils, organophosphates, insect growth regulators, and microbial insecticides)
• introduction of natural enemies such as larvivorous fish

Isolate human hosts from vector
• Insecticide-Treated Nets (ITNs)
• dry-belting villages in rice-cultivation areas (i.e. restricting use of land surrounding human communities to the production of dry crops)
• zooprophylaxis or use of wild or domestic animals as source of blood meal and as diversion of blood-seeking mosquito vectors away from humans
• house-screening or mosquito-proofing of dwellings
• repellants applied to the skin (e.g. DEET cream, powder, or lotion), use of other repellants and domestic insecticides (e.g. insect sprays, mosquito coils, burning of traditional herbs)
• IEC for a "net culture"

Reduce malaria infection in humans
• IEC to raise public awareness about malaria
• integration of malaria control tools with health programmes targeted to pregnant women and newborns
• intermittent preventive treatment in pregnancy (IPTp)
• intermittent preventive treatment in infants (IPTi) – receive antimalarial three times during first year of life and at time of routine immunization, whether or not they have malaria
• chemoprophylaxis for non-immune groups
• mass blood surveys for malaria

Case Management (Treatment)

By type of provider of care
• hospital inpatient stay
• outpatient treatment
• home-based malaria case management

By type of input to health care
• consumption of antimalarials including
  o ACT (e.g. artesunate, artemether, dihydroartemisinin, plus other drugs such as quinoline or antifolate based)
  o Quinoline compounds (e.g. quinine, Chloroquine, amodiaquine, mefloquine, primaquine)
  o Antifolate drugs (e.g. sulfonamides, pyrimethamine (SP), proguanil, chlorproguanil)
  o Artesunate suppositories
• Note: WHO-recommended combination therapies in prioritized order are (1) artemether/lumefantrine; (2) artesunate+amodiaquine; (3) artesunate+ sulfadoxine-pyrimethamine; (4) amodiaquine+SP (in areas where efficacy of both remains effective); and (5) artesunate+mefloquine (an option in areas of low to moderate transmission)
• diagnosis (e.g. Rapid Diagnostic Test or dipstick, blood smears, qualitative buffycoat, polymerase chain reaction)
By type of treatment

- presumptive treatment for fever (drugs and consultation)
- clinical treatment for malaria (consultation, diagnostic test, and drugs)
- treatment of conditions other than fever such as severe anemia accompanying malaria
- case management of severe malaria – cerebral malaria
- case management of malaria accompanied by other infections such as typhoid and/or salmonella
- continuing treatment required by sequelae to cerebral malaria (e.g. neurological damage including epilepsy and seizures)

General Administration and Other Support to Malaria Control and Treatment

Surveillance and monitoring

- surveillance of incidence of malaria morbidity and mortality – especially for early warning and detection of malaria epidemic, and for monitoring impacts of malaria control activities
- monitoring and evaluation of resistance to antimalarial drugs and resistance of vectors to insecticides
- monitoring of service delivery and/or malaria activity implementation
- participation of community in malaria surveillance and monitoring
- surveillance of mosquitoes (e.g. by using insect collectors or remote sensing and climate modeling to map and monitor mosquito populations)

Administration, coordination, and policies

- preparing malaria control country strategies and plans
- formulating policies and programmes related to malaria
- coordinating with programme partners and other institutions providing support to malaria activities
- setting up system for epidemic preparedness and management
- providing general administration
- providing consumer protection and quality assurance services

Support to programme implementation

- production and distribution of IEC materials on malaria (including material on home-based case management)
- production and distribution of guidelines for malaria case management to public and health care providers
- provision of technical support to implementing evidence-based malaria control

Health-related Activities for Malaria

Training

- curative care training: training of health personnel on early detection and diagnosis of malaria; training of lab technicians; training on management of simple cases and severe malaria
- preventive training: training of hygiene technician and other personnel in vector control and in materials impregnation; training of community health workers on IEC techniques
- surveillance training: training of health personnel on data management and disease surveillance; training capacity to monitor antimalarial drug efficacy
• general training: training on management of malaria programme; build capacity for malaria research
• community service delivery training: training of traditional birth attendants and community-based health workers
• business training: training shopkeepers on the appropriate choice and dose of antimalarial drugs for children, and use of user-friendly packaging of drugs

**Research**
• development of new tools to fight malaria (treatment and preventive)
• studies on epidemiology and transmission
• development of high-quality, cost-efficient interventions (including local adaptation of interventions)
• studies on population health care-seeking behaviour and risk of malaria infection
• operations research — use of ITNs; use of new therapies; sensitivity of vectors to insecticides
• development of malaria-related training curriculum and materials
• development of tools for forecasting and predicting malaria epidemic

**Capital formation**
• upgrading of laboratories (equipment and facilities) in health facilities
3 Classification scheme

3.1 Concept

At a minimum, NHA organizes health expenditures within four broad categories: Financing Sources, Financing Agents, Providers, and Functions. Each NHA table displays the flow of funds between two of these health categories (e.g. from Financing Sources to Financing Agents) — the originators of funds listed in the column headings and the recipients listed in row headings (see Chapter 4 for the target NHA tables). Within each of these health categories, the NHA framework offers a breakdown for specific entities (e.g. “Ministry of Finance,” as part of the financing source category) that begins with a code followed by the classification name. This nomenclature has been adapted from the International Classification of Health Accounts (ICHA) and the recommended scheme for tracking general health expenditures in middle- and low-income countries as described in the Producers’ Guide.

For tracking malaria-specific health expenditures, these guidelines further disaggregate the NHA classification scheme, such that it is compatible with that described in the Producers’ Guide, the national context, and specific malaria health care financing and delivery entities (e.g. ITNs). It is important for countries to ensure that these malaria classification codes fit within the country’s overall scheme used for the general health accounts. This point will be elaborated in subsequent sections.

3.2 Four principal health care categories and their letter codes

The ultimate originators of funds for malaria services are called financing sources. They are the “financiers” of all types of malaria services (including prevention, care, treatment, training, and research). Entities that may fall within this category include the Ministry of Finance, donors, and households. In NHA, all financing source entities are designated with the two-letter code of FS.

The principle managers of malaria health care funds are called financing agents. These entities receive funds from financing sources and use them to pay for/purchase malaria services. As such they act “as poolers and distributors of money” (see Producers’ Guide). This category is extremely important as it describes those entities that have programmatic control over how malaria funds are allocated. Examples include the national malaria control programme at the MoH, insurance schemes, and nongovernmental organizations (NGOs). For classification purposes, all financing agents are denoted by the letter code HF.

The entities that deliver malaria health care are called providers. Examples include private and public hospitals, pharmacies/shops, and health centres. Providers are denoted by the code HP.

The actual services and goods rendered for malaria control and care are called functions. Obtaining information at this level is perhaps most critically sought from policy-makers. Functions can include curative care, medical goods such as ACT and ITNs, preventative services, and administration. Within the function category, there are those services that are more intimately associated with malaria control and

---

8 Other categories that may also be measured include (1) ‘resource costs’ denoted by “RC” and (2) ‘beneficiaries,’ presented as a multi-vectoral approach (geopolitical location, demographic characteristic, epidemiological/apparent need).

9 ICHA is described in Organisation for Economic Co-operation and Development (OECD). System of Health Accounts
care and those that are health care related with respect to malaria-specific services. The more intimately associated health care functions, or “core” functions, are denoted by the code \( HC \) and include prevention programmes and curative care. Health care-related functions are denoted by the code \( HCR \) and include capital formation for malaria delivery infrastructures, training, and research.

### 3.3 Approach to assigning classification categories for the subaccount

To identify each entity within a particular health category, the coding is further developed in the following manner:

- **letter** code for the principal health category (e.g. \( HF \) for Financing Agents)
- **numerical code** (e.g. \( HF.1.2 \), as described in the ICHA)
- ICHA name for this subcategory (e.g. “\( HF.1.2 \) Social Security Funds” is added).

The NHA approach allows for further addition of subcategories to accommodate malaria-specific entities and services. The approach asks that the classification codes “respect, to the extent possible, the existing international standards and conventions but they must also be flexible to meet the specific policy needs required for national analysis” (Producers’ Guide) and disease-specific subaccounts. In short, this criterion states that it is possible to introduce nationally and disease-specific relevant categories, but this must be done within the broader ICHA categories.

If, for example, a country is interested in comparing spending between public and private hospitals,

- ICHA only provides a general classification for hospitals, namely \( H.P.1.1 \) “General Hospitals.” To accommodate a “public” and “private” distinction for hospitals, NHA teams can add further subclassifications:
  \[
  \begin{align*}
  &\text{HP.1.1.1} = \text{GOVERNMENT general hospitals} \\
  &\text{HP.1.1.2} = \text{NON-GOVERNMENT general hospitals}
  \end{align*}
  \]

This NHA approach to classification allows country teams to “cross-walk” from nationally relevant classifications to the international standard for classifications. If a particular ICHA category is not relevant to a given country, this category need not be used. When introducing new subclassifications, the first two numbers of the code should match ICHA. The numbers that follow designate the newer nationally relevant category.

With respect to adding malaria-specific subcategories, the same approach is used. For example, ICHA offers the coding of “\( HC.5.1.2 \) over-the-counter medicines”; this could be further disaggregated for malaria purposes (data permitting) into “\( HC.5.1.2.1 \) Artemisinin-based Combination Therapy” and “\( HC.5.1.2.2 \) Quinine and chloroquine.” A list of possible malaria-specific classifications is included in the next section and can be adapted for each country context.

The subaccount team should develop their malaria classifications within the overall country scheme developed for the general NHA. Thus, if the MoH is classified as \( HF.1.1.1 \) in the general NHA exercise and if it also is featured within the malaria subaccount, it should be given the same code. If the team needs to specify the malaria control programme within the MoH, this can be designated as “\( HF.1.1.1.1 \)”
only if it is not already assigned to another programme highlighted in the general NHA or in another subaccount type. Each subcategory should be designed such that it is mutually exclusive and exhaustive. This ensures that each expenditure transaction can be placed in *one and only one subcategory*.

### 3.4 Possible malaria classification scheme

The possible classification scheme for the malaria subaccount presented in this section is based on the approach proposed by ICHA and the *Producers’ Guide*. The integrity and content of the original ICHA classifications have been maintained, meaning that no classifications have been replaced but rather the subcomponents for malaria control and treatment have been placed into the existing ICHA framework. It should be noted that the listing of two-digit codes (also used in the general NHAs) in the malaria subaccount refers to those services associated with malaria care only. For example, in a malaria subaccount, “HC.1.1 inpatient care” captures only malaria-related inpatient care (as can occur in cases of severe malaria). In the general NHA exercise, this category embraces all types of inpatient care, regardless of the diagnosis.

The classification scheme presented in Table 3.1 is an illustrative listing of line items. The presented level of detail may or may not be feasible and applicable to all countries. Therefore, individual country NHA teams are encouraged to adapt the classification scheme to individual country needs and situations.

#### 3.4.1 Functions associated with malaria health care

Table 3.1 lists the functional categories that are relevant for the malaria subaccount.

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>HC.1.1</td>
<td>Inpatient curative care (incl. for severe malaria)</td>
</tr>
<tr>
<td>HC.1.3</td>
<td>Outpatient curative care (incl. consultation and prescription of drugs)</td>
</tr>
<tr>
<td>HC.1.4</td>
<td>Services of curative home care for malaria</td>
</tr>
<tr>
<td>HC.4.1</td>
<td>Clinical laboratory services (for malaria diagnosis)</td>
</tr>
<tr>
<td>HC.4.3</td>
<td>Patient transport and emergency rescue (for malaria cases)</td>
</tr>
<tr>
<td>HC.5.1.1+5.1.2</td>
<td>Prescribed and over-the-counter medicines (for malaria)</td>
</tr>
<tr>
<td>HC.5.1.2.1</td>
<td>ACTs</td>
</tr>
<tr>
<td>HC.5.1.2.2</td>
<td>Chloroquine and quinine</td>
</tr>
<tr>
<td>HC.5.1.2.3</td>
<td>Other antimalarials</td>
</tr>
<tr>
<td>HC.5.1.2.4</td>
<td>Drugs for malaria-related symptoms (e.g. fever reduction) that are not specifically antimalarials</td>
</tr>
</tbody>
</table>

10 For example, if an HIV/AIDS subaccount has been completed, the code *HF.1.1.1.1.1* may have already been assigned to the MoH national AIDS control programme. Thus, the malaria control programme will need to be assigned the code of *HF.1.1.1.1.2*.

11 Note that the highest level ICHA classification (first two numbers of the code) cannot be replaced or changed; rather, classifications can be modified or added in the subcategories of the classifications.

12 The OECD guidelines state “this item comprises transportation in a specially-equipped surface vehicle or in a designated air ambulance to and from facilities... It also includes transportation in conventional vehicles, such as taxi, when the latter is authorized and the costs are reimbursed to the patient.”
<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>HC.5.1.3</td>
<td>Other medical non-durables</td>
</tr>
<tr>
<td>HC.5.1.3.1</td>
<td>Rapid diagnostic tests (dipsticks)</td>
</tr>
<tr>
<td>HC.5.1.3.2</td>
<td>Mosquito repellants applied to skin (DEET powder, lotion, sprays)</td>
</tr>
<tr>
<td>HC.5.1.3.3</td>
<td>Mosquito repellants applied to nets</td>
</tr>
<tr>
<td>HC.5.1.3.4</td>
<td>Domestic insecticides and mosquito coils</td>
</tr>
<tr>
<td>HC.5.2.5</td>
<td>Therapeutic appliances and other medical durables</td>
</tr>
<tr>
<td>HC.5.2.5.1</td>
<td>ITNs</td>
</tr>
<tr>
<td>HC.5.2.5.2</td>
<td>Other insecticide-treated materials</td>
</tr>
<tr>
<td>HC.6.1</td>
<td>Maternal and child health, family planning, and counseling; malaria control in integrated health programmes (e.g. IMCI)</td>
</tr>
<tr>
<td>HC.6.2</td>
<td>School health services that include malaria awareness programmes</td>
</tr>
<tr>
<td>HC.6.3</td>
<td>Prevention of communicable disease (malaria)</td>
</tr>
<tr>
<td>HC.6.3.1</td>
<td>Intermittent preventive treatment in pregnant women and infants</td>
</tr>
<tr>
<td>HC6.3.2</td>
<td>Insecticide-treated materials/ insecticide-treated net activities</td>
</tr>
<tr>
<td>HC.6.3.3</td>
<td>IRS campaigns</td>
</tr>
<tr>
<td>HC.6.3.4</td>
<td>Integrated vector management (including environmental management, community spraying, larviciding, drainage and river clearing, and activities of the Department of Agriculture and Public Works in the malaria programme)</td>
</tr>
<tr>
<td>HC.6.3.5</td>
<td>IEC (malaria awareness)</td>
</tr>
<tr>
<td>HC.6.3.6</td>
<td>Other malaria prevention and control activities including support to programme implementation (e.g. zooprophylaxis, mosquito proofing of houses).</td>
</tr>
<tr>
<td>HC.6.3.7</td>
<td>Surveillance and monitoring</td>
</tr>
<tr>
<td>HC.7.1.1</td>
<td>General government administration of malaria programme and implementation</td>
</tr>
<tr>
<td>HC.7.1.2</td>
<td>Administration, operation, and support of social security (as payer of malaria treatment)</td>
</tr>
<tr>
<td>HC.7.2.1</td>
<td>Health administration and health insurance: private social insurance (as payer of malaria treatment)</td>
</tr>
<tr>
<td>HC.7.2.2</td>
<td>Health administration and health insurance: other private insurance (as payer of malaria treatment)</td>
</tr>
<tr>
<td>HC.nsk</td>
<td>Health care expenditures on malaria that are not specified by any other kind</td>
</tr>
<tr>
<td>HC.R.1</td>
<td>Capital formation for health care-provided institutions (associated with malaria prevention and care services)</td>
</tr>
<tr>
<td>HC.R.2</td>
<td>Education and training of health personnel (for malaria)</td>
</tr>
<tr>
<td>HC.R.3</td>
<td>Research and development in health (for malaria)</td>
</tr>
</tbody>
</table>

13 Though in many countries, training is a large share of what may be considered prevention and public health programs, the *System of Health Accounts* recommends that this portion be extracted from HC. 6. and placed under HCR.2. Note: this means that the training portion will not be included in the THE estimate, which is used for international comparison purposes (but only in the National Health Estimate, which is designed for local policy-makers and not for international comparisons). These guidelines recommend consistency with the *System of Health Accounts* and Producers’ Guide; however, it is recognized that some countries may wish to maintain training expenditures as part of HC. 6 so that they can be factored into the THE estimate.

14 Note: clinical research should be classified as a core expenditure.
3.4.2 Health providers associated with malaria control and treatment

Table 3.2 presents a list of those health care providers involved in delivering malaria health care services.

**Table 3.2. Malaria health care providers**

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>HP.1.1</td>
<td>General hospitals</td>
</tr>
<tr>
<td>HP.1.1.1</td>
<td>Public hospitals</td>
</tr>
<tr>
<td>HP.1.1.2</td>
<td>Private hospitals</td>
</tr>
<tr>
<td>HP.1.1.2.1</td>
<td>Private for-profit hospitals</td>
</tr>
<tr>
<td>HP.1.1.2.2</td>
<td>Private not-for-profit hospitals (NGO/church-owned hospitals)</td>
</tr>
<tr>
<td>HP.1.3</td>
<td>Specialty (other than mental health and substance abuse) hospitals</td>
</tr>
<tr>
<td>HP.1.3.1</td>
<td>University hospitals</td>
</tr>
<tr>
<td>HP.1.3.2</td>
<td>Teaching hospitals</td>
</tr>
<tr>
<td>HP.1.3.3</td>
<td>Maternity hospitals</td>
</tr>
<tr>
<td>HP.3.1</td>
<td>Offices of physicians</td>
</tr>
<tr>
<td>HP.3.4</td>
<td>Outpatient care centres</td>
</tr>
<tr>
<td>HP.3.4.5</td>
<td>All other outpatient multi-specialty and cooperative services (health centres)</td>
</tr>
<tr>
<td>HP.3.4.5.1</td>
<td>Antenatal clinics</td>
</tr>
<tr>
<td>HP.3.5</td>
<td>Medical and diagnostic labs</td>
</tr>
<tr>
<td>HP.3.6</td>
<td>Providers of home health care services</td>
</tr>
<tr>
<td>HP.3.9.3</td>
<td>Alternative or traditional practitioners</td>
</tr>
<tr>
<td>HP.3.9.4</td>
<td>Volunteer community health worker/ animator</td>
</tr>
<tr>
<td>HP.4.1</td>
<td>Dispensing chemists</td>
</tr>
<tr>
<td>HP.4.1.1</td>
<td>Pharmacies</td>
</tr>
<tr>
<td>HP.4.1.2</td>
<td>Shops/ street vendors of antimalarials and other symptom alleviation drugs</td>
</tr>
<tr>
<td>HP.5</td>
<td>Provision and administration of public health programmes (for malaria specifically)</td>
</tr>
<tr>
<td>HP.6</td>
<td>General health admin and insurance (associated with malaria)</td>
</tr>
<tr>
<td>HP.8</td>
<td>Institutions providing health-related services</td>
</tr>
<tr>
<td>HP.nsk</td>
<td>Providers not specified by any other kind</td>
</tr>
</tbody>
</table>

3.4.3 Financing agents associated with malaria control and treatment

Table 3.3 lists those financing agents, or payers, associated with having programmatic control over the allocation of malaria health care funds.
### Table 3.3. Malaria financing agents

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>HF.1.1.1</td>
<td>Central government</td>
</tr>
<tr>
<td>HF.1.1.1.1</td>
<td>Ministry of Health (including national malaria control programmes)</td>
</tr>
<tr>
<td>HF.1.1.1.2</td>
<td>Ministry of Agriculture</td>
</tr>
<tr>
<td>HF.1.1.1.3</td>
<td>Other Ministries</td>
</tr>
<tr>
<td>HF.1.1.2</td>
<td>State/provincial government</td>
</tr>
<tr>
<td>HF.1.1.3</td>
<td>Local/municipal government</td>
</tr>
<tr>
<td>HF.1.2</td>
<td>Social security funds</td>
</tr>
<tr>
<td>HF.2.1.1</td>
<td>Government employee insurance programmes (covering malaria health care)</td>
</tr>
<tr>
<td>HF.2.1.2</td>
<td>Private employer insurance programmes</td>
</tr>
<tr>
<td>HF.2.2</td>
<td>Private insurance enterprises (other than social insurance)</td>
</tr>
<tr>
<td>HF.2.3</td>
<td>Private household OOP expenditures</td>
</tr>
<tr>
<td>HF.2.4</td>
<td>Non-profit institutions serving households</td>
</tr>
<tr>
<td>HF.2.5.1</td>
<td>Parastatal companies (other than health insurance)</td>
</tr>
<tr>
<td>HF.2.5.2</td>
<td>Private non-parastatal firms and corporations (other than health insurance)</td>
</tr>
<tr>
<td>HF.3</td>
<td>Rest of the world</td>
</tr>
</tbody>
</table>

### 3.4.4 Financing sources associated with malaria control and treatment

Table 3.4 lists the ultimate financiers of malaria health care. These financing sources are for the most part the same as those found in the general NHA.

### Table 3.4. Malaria financing sources

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>FS.1.1.1</td>
<td>Central government revenue</td>
</tr>
<tr>
<td>FS.1.1.2</td>
<td>Regional and municipal government revenue</td>
</tr>
<tr>
<td>FS.1.2</td>
<td>Other public funds</td>
</tr>
<tr>
<td>FS.2.1</td>
<td>Employer funds</td>
</tr>
<tr>
<td>FS.2.1.1</td>
<td>Parastatal employers</td>
</tr>
<tr>
<td>FS.2.1.2</td>
<td>Private employers</td>
</tr>
<tr>
<td>FS.2.2</td>
<td>Household funds</td>
</tr>
<tr>
<td>FS.2.3</td>
<td>Non-profit institutions serving individuals</td>
</tr>
<tr>
<td>FS.2.4</td>
<td>Other private funds</td>
</tr>
<tr>
<td>FS.3</td>
<td>Rest of the world funds</td>
</tr>
</tbody>
</table>
4 Malaria subaccount tables

This chapter describes the structure of malaria subaccount tables. Tables represent the manner in which malaria expenditure data will be organized and reported. In general, the NHA approach will be followed. The differences between the general NHA tables and the malaria subaccount tables will be in the subcategories adopted in the rows and columns of the tables. Certain classifications applicable to the NHA may not be relevant for malaria expenditures and vice-versa.

4.1 NHA tables

A feature of the NHA is that the tabular presentations of health expenditure data are organized according to the flow of funds within the health sector. These tables aim to capture the financing, production, and consumption dimensions of health care spending by revealing the flow of funds from financing sources to financing agents to providers and functions. Additional categories that may be tracked are the following:

- resource inputs (RC): the factors of production or inputs used by providers to produce goods and services consumed or the activities conducted within the health sector. This category, particularly when computed for the public sector, is useful for economic efficiency analyses.
- demographic and socioeconomic characteristics (of beneficiaries): policy-relevant groupings along the lines of age, sex, income, educational attainment, and occupation
- health status: policy-relevant groupings typically including condition or disease state and type of intervention received
- geographic division: subnational grouping of entities involved in the financing or consumption of goods and services transacted within the health accounts boundaries.

The relationship among these categories in terms of resource flows is represented in Figure 4.1, where the arrows are indicative of the direction of flows of funds.

**Figure 4.1. Resource rows among health sector actors**

```
Figure 4.1 Resource Flows Among Health Sector Actors

Financing Sources (FS) ↓

Financing Agents (HF) ↓

Providers (HP)

  ↓

Beneficiary Population

  ↓

by sex and age group

by socio-economic group

by health status

by geographic division
```

by resource input (RC)

by service or function (HC)
An NHA table is in effect a snapshot of a specific transaction or flow (i.e. a specific arrow in the diagram) in the health sector flow of funds. An NHA table is structured such that the table columns show the categories of entities from which a flow started or originates (tail of the arrow), and the table rows show the categories of entities, health functions, or commodities into which the fund flows moved to or the “receivers” (point of the arrow). Thus, the table showing the flow from financing sources (FS) to financing agents (HF) would have the categories of financing sources along the columns and the categories of financing agents along the rows. The table showing the flow from financing agents (HF) to providers (HP) would have the categories of financing agents along the columns and the categories of health care providers along the rows.

Several NHA tables are constructed to have a complete picture of the series of flows. The basic tables recommended are (1) financing source to financing agents, (2) financing agents to providers, (3) financing agents to health care function, and (4) providers to health care functions. Other tables are constructed if policy-makers have specific needs and if data are available. Refer to the NHA Producers’ Guide for descriptions of other tables, which include the following: providers to resource inputs; financing agents to resource inputs; financing agents to population grouped by age and sex; financing agent to population grouped by income; financing agent to disease groups; and financing agent to population grouped by geographic location.

The NHA tables are linked to each other through the entities that make up the rows and columns of each table. The recipients in one table (e.g. the financing agents in the FS x HF table) may make up the originators of funds in another table (e.g. the financing agents in the HF x HP table), or tables can have the same originators (e.g. financing agents in HF x HP and HF x HC tables).

A more detailed picture of flows between financing agents, providers, and health care functions is shown in Figure 5.1 in Chapter 5, Data Collection. It shows the categories of entities involved in the transactions.

4.2 NHA tables as applied to NHA malaria subaccount

These guidelines recommend that countries compile their malaria expenditure data according to the traditional NHA format. In addition, the same distinction made in the NHA between different types of expenditure aggregates or totals should be followed. Following the NHA approach would allow for all types of comparison to be made between the NHA and malaria expenditures.

4.2.1 Basic tables

As with the NHA, four basic tables are recommended:

- table showing the flow of malaria funds from financing sources to financing agents
- table showing the flow of malaria funds from financing agents to providers
- table showing the flow of malaria funds from financing agents to functions
- table showing the flow of health funds from providers to functions.

Examples of these tables from Rwanda and the Davao del Norte Province of the Philippines are shown in Annexes 5 and 6. As described in the previous chapter, the relevant classifications and their alphanumerical codes are shown in the row and column headings of the tables.
In addition to the basic four, other subaccount tables may be constructed. The decision to do so depends upon expressed need by policy-makers and other users in the country and, of course, on data availability.

### 4.2.2 Aggregates

Among the types of aggregates or totals generated for NHAs, equivalents for malaria expenditures will be compiled for two types of NHA totals: the THE and the NHE. The two types of totals for malaria expenditures are as follows:

- **total health expenditures (THE) on malaria services** – This estimate is recommended as a minimum, as this represents expenditures on the core of malaria country programmes, consisting mainly of treatment and prevention expenditures. It equates to the sum of $HC_{1-7}$ plus $HCR.1$ (capital formation). This total will be comparable with other country estimates and with the core NHA, which is also referred to as $THE_M$.

- **national health expenditures (NHE) on malaria services** – This total includes the THE plus other expenditures described in the NHA as health-related expenditures (i.e. other than health provider capital formation $HC.R.1$ already included in the THE). These additional components include expenditures for health personnel training on malaria and research on malaria.

### 4.2.3 Additional tables for targeted expenditures

The malaria subaccount includes targeted or earmarked funds for malaria as well as non-targeted expenditures (see section 6.3.2 for more detail.). Earmarked funds are those for which the primary purposes are explicitly declared as treatment and/or control of malaria. Non-targeted expenditures, on the other hand, are incurred to provide health services in general and are not specific to the treatment of any particular disease or health condition. Examples of these latter expenditures are staff salaries and maintenance and other operating costs of public health facilities. A portion of non-targeted costs will eventually go into paying for treatment of patients with malaria, but this will not be known until after the funds are spent. Furthermore, it should be noted that non-targeted expenditures would be incurred whether or not malaria cases exist. Thus, the rationale for incurring the non-targeted expenditures and that for incurring malaria-targeted expenditures would be different. For this reason, it is recommended that the two types of malaria expenditures be distinguished: (1) tables reporting specifically on malaria-targeted expenditures (see Annex 5.5-5.6), and (2) tables showing targeted and untargeted spending (the main subaccount tables. These additional tables do not necessarily have to be generated for or correspond to every main subaccount table. Targeted expenditure tables showing the breakdown from financing agent by health care function and by providers would be particularly useful to malaria programme managers.

### 4.2.4 Limited resources

Given limited resources, the following two tables are recommended at a minimum: the financing agent by health provider table and the financing agent by health function table. From a practical point of view, data for the two tables are much more readily available (and, thus, less costly to collect) since the rows (health providers) and columns (financing agents) are entities that generally correspond to institutions that

---

15 Non-targeted expenditures can be derived by taking the difference between the totals and targeted expenditure tables.
have recording or information systems. Data on health expenditures can be retrieved from these data systems. Moreover, the two tables present a breakdown of health expenditures that are most useful for routine operations of malaria programmes. More specifically, programming and allocation of malaria resources are generally carried out by type of provider institution and by type of activity or function. In countries with high prevalence, where malaria is a major priority (such as in sub-Saharan Africa), more comprehensive monitoring of expenditures (to include $FSxHF$, and $HPxHC$ tables) would be required to address policy questions and issues.

### 4.2.5 Examples of malaria subaccount tables

As mentioned earlier, examples of malaria subanalysis tables are presented for Rwanda and Davao del Norte Province, Philippines. The Rwanda tables were estimated for the entire country and six tables are shown (Annex 5) — four showing total malaria expenditures and two showing targeted malaria expenditures. The examples from the Philippines were estimated for a specific province and consist of three tables (Annex 6) — two showing total malaria expenditures and one showing targeted expenditures.
5 Data collection

5.1 Approaching the data collection process

The malaria subaccount calls for an assembly of comprehensive data estimates from public, private, and donor stakeholders in the health care system. Obtaining data for such estimates is considered the pivotal step of the NHA process and can certainly become the most time-consuming step. The length of time entailed depends on a number of factors, such as the availability of existing data within a country, the financial budget to implement surveys if need be, the level of cooperation given by gatekeepers of data sources and/or survey respondents, NHA team stability and motivation, and team efforts to keep up the momentum of data retrieval by regular follow-ups with key informants.

In addition to requiring data estimates from all aspects of the health care system, the NHA approach, as mentioned in the Producers’ Guide, strongly recommends obtaining more than one information source for any given estimate. This is done in an effort to “triangulate” the data. For example, if estimating the expenditure incurred by companies contributing to health insurance schemes, the NHA team should examine the amount that companies report giving to health insurance and the amount health insurance schemes report receiving from companies. Further descriptions on triangulation and data retrieval for general health expenditures are provided in detail in the Producers’ Guide. This chapter will focus on the specific data collection issues relevant to the malaria subaccount. Moreover, it will incorporate experiences and lessons learned from countries with varying levels of secondary data.

5.1.1 Understanding what is needed and why

Keeping in mind the need for comprehensive data, the first order of business when planning the data collection process is to understand as much as possible about the “spider web” of funding flows for malaria health care. This means, to the best of the team’s knowledge, understanding who is funding whom and where those funds are going. This process involves listing all known entities associated with malaria health care and then mapping the flow of funds between them. This is best visualized in a flow chart of some sort. Figure 5.1 shows the outcome of such an exercise from the Philippines.

---

16 Based on team member knowledge, particularly the input of members from the malaria control program. This should not require much additional effort.
In addition to organizing the team’s initial perceptions of malaria health care delivery, this “spider web” exercise is useful for comprehending what will be achieved with a malaria subaccount. Essentially, upon completion of a subaccount, the team should be able to (1) enter the expenditure estimates next to each funding flow arrow, (2) validate the starting and ending points of the arrows themselves, and (3) verify and update the listing of malaria-associated health care entities.

After conceptualizing the spider web of funding flows, the NHA team will then be able to identify the entities from which data estimates are needed. At this stage, the team will be best served if it fully comprehends why such estimates are needed and how they will specifically inform the NHA matrices. Table 5.1 provides a generic listing of entities involved in malaria health care and the types of NHA-related questions that can be addressed upon retrieval of estimates for these entities.

17 Note, in the Philippines, expenditures were not tracked at the financing source level but rather at the financing agent, provider, and functional level.
<table>
<thead>
<tr>
<th>Malaria health care entities</th>
<th>When serving as...</th>
<th>NHA-related questions addressed by data estimates on each entity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Households</td>
<td>Financing source only</td>
<td>What proportion of household contribution to insurance ultimately gets used for malaria-related care? <em>(for the FSxHF table)</em> How much and for which insurance schemes?</td>
</tr>
<tr>
<td></td>
<td>Financing source and agent</td>
<td>How much do households pay OOP for inpatient and outpatient services at various providers? <em>(for the FSxHF, HFxHP, HFxHC, and HPxHC tables)</em></td>
</tr>
<tr>
<td>Providers</td>
<td>Provider</td>
<td>Which financing agents (the principal managers of malaria funds) contribute to providers? How much is received from each financing agent? <em>(for the HFxHP tables)</em> How do providers spend their funds across each type of function? <em>(for the HPxHC table)</em></td>
</tr>
<tr>
<td>Donors</td>
<td>Financing source only</td>
<td>What financing agents do donors contribute to? How much is contributed? <em>(for the FSxHF table)</em></td>
</tr>
<tr>
<td></td>
<td>Financing source and agent</td>
<td>Do donors transfer their funds directly to providers? If so, to which ones, how much, and for what functions? <em>(for the HFxHP, HPxHC, and HFxHC tables)</em></td>
</tr>
<tr>
<td>NGOs</td>
<td>Financing source</td>
<td>Do NGOs serve as financing sources by generating their own revenue from local philanthropy (e.g., church groups)? If so, how much is generated by this mechanism?</td>
</tr>
<tr>
<td></td>
<td>Financing agent</td>
<td>Where do NGOs (as financing agents) receive their malaria funds? From what financing sources? And how much is received? <em>(for the FSxHF table)</em> How do NGOs allocate their funds across each type of provider and function? <em>(for the HFxHP, HPxHC, and HFxHC tables)</em></td>
</tr>
<tr>
<td>Relevant government entities</td>
<td>Financing source</td>
<td>How much and to whom does the Ministry of Finance (financing source) give malaria funds? <em>(for the FSxHF table)</em></td>
</tr>
<tr>
<td>e.g. Ministry of Finance, Ministry of Health, and perhaps Ministry of Agriculture</td>
<td>Financing agent</td>
<td>Where do the various ministries (excluding the Ministry of Finance) (as financing agents) receive their malaria funds? From what financing sources? And how much is received? <em>(for the FSxHF table)</em> How do the various ministries (excluding the Ministry of Finance) allocate their malaria funds across each type of provider and function? <em>(for the HFxHP, HPxHC and HFxHC tables)</em></td>
</tr>
<tr>
<td>Insurance companies/ schemes</td>
<td>Financing agent</td>
<td>Where do insurance programmes (including public and private) receive their funds for malaria coverage? From what financing sources? And how much is received? <em>(for the FSxHF table)</em> How do insurance programmes allocate their malaria funds across each type of provider and function? <em>(for the HFxHP, HPxHC, and HPxHC tables)</em></td>
</tr>
<tr>
<td>Malaria health care entities</td>
<td>When serving as....</td>
<td>NHA-related questions addressed by data estimates on each entity</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>---------------------</td>
<td>---------------------------------------------------------------</td>
</tr>
<tr>
<td>Employers</td>
<td>Financing source</td>
<td>How much and to whom do employers (financing sources) give funds ultimately used for malaria health care? (for the $FSxHF$ table)</td>
</tr>
<tr>
<td></td>
<td>Financing agent</td>
<td>How much goes towards on-site health services for employees? And for what types of services? (for the $FSxHF$, $HFxHP$, $HFxHC$, and $HPxHC$ tables)</td>
</tr>
</tbody>
</table>

5.1.2 Types of data needed

Now that the team has sketched a financial picture of the services targeting malaria and understands what will be accomplished through a malaria subaccount, the next step is to determine what types of data will be required from each entity.

As mentioned from the onset of these guidelines, the objective of NHA is to capture “what has been spent on malaria,” namely, malaria expenditures\(^\text{18}\). This means that the NHA team should first and foremost search for information on expenditure amounts and not budget or cost estimates.

In some cases, however, such expenditure data may not be readily available or even retrievable from primary data collection efforts, and, therefore, alternative data will be needed. For example, unit cost and utilization indicators may be required (but this should be a last resort). In these cases, the team should strive to obtain “actual” costs, not those based on an ideal set of services presumed to be regularly delivered.\(^\text{19}\) This is facilitated from facility records that use cost-accounting systems. Malaria expenditure estimates can then be inferred deriving cost/use weights and applying them to total expenditure levels. This and other uses of cost and use data are described further in Chapter 6. Thus, the types of data to be collected will need to anticipate the different expenditure estimation techniques that may be employed during the analysis phase.

5.1.3 Identifying data sources

After understanding all the necessary needs of data collection, the next step is to brainstorm on data sources for the team’s targeted entities and types of data (e.g. expenditure data, utilization rates). This entails taking a census of the type of available data sources.

\(^{18}\) Also, the *Producers’ Guide* recommends using estimates calculated based on an accrual methodology and not a cash-based accounting system. Thus, in addition to actual cash disbursements made during the year of estimation, the NHA team should include obligated amounts in their annual expenditure estimate. For example, if drugs were obtained in December 2003 but the actual cash transfer did not take place until February 2004, the value of the drugs should still be included in the NHA 2003 estimate.

\(^{19}\) For example, costing studies may be developed using an “ingredients approach,” namely, adding up those elements that should comprise a particular malaria-related service, such as the portion of a doctor’s salary used for that consultation and the drugs that are issued within the visit. However, in actuality, a patient may see a nurse rather than a doctor, and the patient may not get needed drugs possibly due to stock-outs at the facility. Thus, in this case, the estimated cost derived earlier would be an overestimation of reality. In addition, cost studies may not account for some economies of scale, and the costs may vary according to the size and condition of the provider; therefore, they would not be easily expandable for use in all environments.
Essentially, data sources can be organized into four broad categories. To minimize financial costs for the data collection phase and to avoid unnecessary duplication of efforts, the NHA team should identify sources of information from these four areas in the following order:

- **Existing information systems**: What types of data are provided on a regular basis through health information systems? Perhaps OOP expenditures at public facilities?
- **Secondary data (existing studies/reports)**: What types of studies/reports have already been produced? Perhaps there are useful costing studies or focused expenditure review studies in existence?
- **Ongoing surveys**: Are there any ongoing surveys to which rider questions can be added on malaria expenditures? General NHA surveys targeting donors and NGOs could be ongoing. Alternatively, non-NHA surveys may be underway, such as a household income and expenditure survey or a living conditions measurement survey.
- **Malaria subaccount-specific surveys**: As a last option, if there is no other way to estimate expenditures, the NHA team may need to implement a malaria subaccount-specific survey, such as one targeting households who have had at least one member undergoing a malaria episode.

The type of survey needed will depend on:
- the nature of the transaction targeted, namely, who are the principal financiers and recipients
- the potential for accurate responses from respondents.

For example, in the case of the Philippines, malaria is principally a government-subsidized programme and therefore a household survey was not necessary. Also, because of the fairly good detail available in the provider records, which allowed for a linking of expenditures to a malaria diagnosis, a provider-based survey was able to be issued.

In listing potential data sources, it is useful to first sketch a “spider web” funds flow chart (as in Figure 5.1) by identifying the agencies to which each entity routinely submits some form of a financial report. For example, some entities may need to account or report about the use of borrowed funds or grants to a governing agency. Data sources could include agencies that may serve as budget offices, audit offices, regulatory offices (e.g. for licensing and accreditation), tax authorities, and statistical agencies.

For each source identified, the *Producers' Guide* recommends evaluating the level of detail, quality (scope, level of detail, reliability), appropriateness, and sufficiency of the data provided. This will help the NHA team to determine whether additional data sources are needed.

Once this is done, the team should develop a data collection plan. This plan should outline the types of data sources needed, for what purposes, and by what timeframe. In addition, each team member should be assigned responsibility for accessing a given data source or, in the case of primary data collection, for coordinating a survey.
5.2 Existing information systems

Health information systems may be the most accessible data source that can be evaluated for their utility to the malaria subaccount. The level of detail provided and the quality of data in these systems will differ from country to country. Low-income countries may have weak information systems; however, these systems should not be dismissed completely, particularly if malaria is a priority for the government, in which case, there may be specific malaria indicators that are mandatory for hospital and health centre administrators to track. For example, in Rwanda, the health management information system was able to produce fairly good data on expenditure and use indicators, as shown in Table 5.2.

**Table 5.2. Indicators tracked by Rwanda’s Health Management Information System (HMIS)**

<table>
<thead>
<tr>
<th>Indicators Tracked</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amount spent to purchase mosquito nets by facility.</td>
</tr>
<tr>
<td>Amount received for selling of mosquito nets to patients.</td>
</tr>
<tr>
<td>Number of units consumed of chloroquine and quinine. Number of days these drugs have been out of stock.</td>
</tr>
<tr>
<td>Number of lab tests that are positive and negative for plasmodium.</td>
</tr>
<tr>
<td>Number of home visits for malaria.</td>
</tr>
<tr>
<td>Number of seminars and participants held by the facility on malaria educations.</td>
</tr>
<tr>
<td>Number of presumed and confirmed malaria consultations. This can be sorted by age group.</td>
</tr>
<tr>
<td>Number of hospitalizations due to “simple confirmed,” “simple presumed,” and “serious malaria” cases. This also can be sorted by age group.</td>
</tr>
<tr>
<td>At the hospital level, the HMIS can provide more detail as to the number of malaria sequelae cases they received (mainly for inpatient), such as anaemia related to malaria and co-infections.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Indicators NOT tracked</th>
</tr>
</thead>
<tbody>
<tr>
<td>Although it is possible to get the total OOP expenditures for all consultations, it is not possible to link each payment to the diagnosis.</td>
</tr>
<tr>
<td>Again, it is possible to get the total OOP expenditures for all hospitalizations; however, it is not possible to link each payment to the diagnosis.</td>
</tr>
</tbody>
</table>

Another reason to review the data provided by a country’s health information system is to identify its data gaps or areas that could be improved upon if an NHA malaria subaccount were to become a regular occurrence.

Countries with more sophisticated information systems, such as the Philippines, can provide additional useful indicators, as shown in Table 5.3. Close monitoring of the malaria situation and control programme implementation and the routine compiling of good data are very important activities in the Philippines, given that one of its national health objectives is to “eliminate” malaria as a public health problem in the country. Malaria is still one of the top 10 leading causes of morbidity, but the rate of occurrence has been low, at around 100 confirmed cases per 100,000 population since the 1990s and at 50 confirmed cases per 100,000 populations as of 2002. The monitoring system of the Department of Health’s (DOH’s) Regional Centres for Health Development gathers (on a quarterly basis), compiles, and maintains province-level data on the indicators listed in Table 5.3.
Table 5.3. Indicators tracked by the Philippine DOH Information System for Malaria

<table>
<thead>
<tr>
<th>Indicators tracked by major malaria control strategy</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. Early Diagnosis and Prompt Treatment</strong></td>
<td></td>
</tr>
<tr>
<td>1.1 Number of Smears Collected</td>
<td></td>
</tr>
<tr>
<td>a.) Clinically diagnosed</td>
<td></td>
</tr>
<tr>
<td>b.) Not clinically diagnosed</td>
<td></td>
</tr>
<tr>
<td>1.2 Number of Smears Examined</td>
<td></td>
</tr>
<tr>
<td>a.) Clinically diagnosed</td>
<td></td>
</tr>
<tr>
<td>b.) Not clinically diagnosed</td>
<td></td>
</tr>
<tr>
<td>1.3 Number of Positive</td>
<td></td>
</tr>
<tr>
<td>a.) Clinically diagnosed</td>
<td></td>
</tr>
<tr>
<td>- P. falciparum</td>
<td></td>
</tr>
<tr>
<td>- P. vivax</td>
<td></td>
</tr>
<tr>
<td>- P. malariae</td>
<td></td>
</tr>
<tr>
<td>- Mixed infections</td>
<td></td>
</tr>
<tr>
<td>b.) Not clinically diagnosed</td>
<td></td>
</tr>
<tr>
<td>- P. falciparum</td>
<td></td>
</tr>
<tr>
<td>- P. vivax</td>
<td></td>
</tr>
<tr>
<td>- P. malariae</td>
<td></td>
</tr>
<tr>
<td>- Mixed infections</td>
<td></td>
</tr>
<tr>
<td>1.4 Number Treated</td>
<td></td>
</tr>
<tr>
<td>a.) Clinically diagnosed</td>
<td></td>
</tr>
<tr>
<td>- Positive</td>
<td></td>
</tr>
<tr>
<td>- Negative</td>
<td></td>
</tr>
<tr>
<td>b.) Not clinically diagnosed</td>
<td></td>
</tr>
<tr>
<td>- Positive</td>
<td></td>
</tr>
<tr>
<td>- Negative</td>
<td></td>
</tr>
<tr>
<td>1.5 Total Malaria Deaths (Cert. Reg. Office)</td>
<td></td>
</tr>
<tr>
<td><strong>2. Disease Prevention and Vector Control Measures</strong></td>
<td></td>
</tr>
<tr>
<td>2.1 Number of Mosquito Nets Distributed</td>
<td></td>
</tr>
<tr>
<td>2.2 Number of Mosquito Nets Impregnated</td>
<td></td>
</tr>
<tr>
<td>a.) Retreatment</td>
<td></td>
</tr>
<tr>
<td>b.) New</td>
<td></td>
</tr>
<tr>
<td>2.3 Number of Houses Sprayed</td>
<td></td>
</tr>
<tr>
<td>2.4 Bio-ponds Constructed</td>
<td></td>
</tr>
<tr>
<td>Indicators tracked by major malaria control strategy</td>
<td></td>
</tr>
<tr>
<td>---------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>2.5 Stream Cleared/Exposed to Sunlight</td>
<td></td>
</tr>
<tr>
<td>a.) New</td>
<td></td>
</tr>
<tr>
<td>b.) Maintained</td>
<td></td>
</tr>
<tr>
<td>2.6 Stream Seeded w/ Larvivorous Fish</td>
<td></td>
</tr>
<tr>
<td>a.) New</td>
<td></td>
</tr>
<tr>
<td>b.) Maintained</td>
<td></td>
</tr>
<tr>
<td>3. IEC</td>
<td></td>
</tr>
<tr>
<td>3.1 Number IEC Campaign Conducted</td>
<td></td>
</tr>
<tr>
<td>a.) Bench conference</td>
<td></td>
</tr>
<tr>
<td>b.) Mothers Class</td>
<td></td>
</tr>
<tr>
<td>c.) Others (Specify)</td>
<td></td>
</tr>
<tr>
<td>3.2 Number IEC Materials Distributed</td>
<td></td>
</tr>
<tr>
<td>a.) Posters</td>
<td></td>
</tr>
<tr>
<td>b.) Leaflets</td>
<td></td>
</tr>
<tr>
<td>c.) Health Advisory</td>
<td></td>
</tr>
<tr>
<td>4. Epidemiological Investigation (malaria epidemic-prone areas [MEPA] only)</td>
<td></td>
</tr>
<tr>
<td>4.1 Number Cases Investigated</td>
<td></td>
</tr>
<tr>
<td>a.) Indigenous cases</td>
<td></td>
</tr>
<tr>
<td>b.) Imported cases</td>
<td></td>
</tr>
<tr>
<td>4.2 Number Foci Investigation Conducted</td>
<td></td>
</tr>
<tr>
<td>5. Entomological Activities</td>
<td></td>
</tr>
<tr>
<td>5.1 Bio-Assay Test</td>
<td></td>
</tr>
<tr>
<td>a. Sprayed walls</td>
<td></td>
</tr>
<tr>
<td>b. Impregnated mosquito nets</td>
<td></td>
</tr>
<tr>
<td>5.2 Susceptibility Test</td>
<td></td>
</tr>
<tr>
<td>5.3 Entomological Investigation</td>
<td></td>
</tr>
</tbody>
</table>

Source: DOH, Center for Health Development Davao Region (Malaria Control Unit)

These data are put alongside targets to indicate level of performance of public programmes.

### 5.3 Secondary data (studies/reports already in existence)

Pooling their collective knowledge, the NHA team should list all known studies/reports relating to malaria expenditures as well as cost and use rates. Again, this may best be accomplished by revisiting the “spider web” funding flow diagram that was initially outlined. Consider each of the listed entities and whether or not they may routinely submit a financial statement to another agency. For example, in Rwanda, the main donor agencies supporting malaria programmes submit a report of their expenditures to
the malaria control programme at the MoH. In addition to considering routine reports, the team should list recent specific studies that have been conducted on topics potentially useful to the malaria subaccount. For example, in Rwanda, the *Situation Analysis of Malaria* report provides valuable information on time allocation of health personnel to deliver malaria services. This information would be helpful in determining the proportion of medical staff salaries that should be included in the malaria subaccount.

A thorough assessment of secondary data sources in Rwanda resulted in the list outlined in Table 5.4.

**Table 5.4. Secondary data sources (existing studies/reports) identified in Rwanda**

<table>
<thead>
<tr>
<th>Malaria health care entity targeted by data source</th>
<th>Name of secondary data source (existing studies/reports)</th>
</tr>
</thead>
</table>
| Government                                       | - Ministry of Health and CAMERWA (Central Medical Stores) annual expenditure reports  
- Situation analysis of malaria report  
- Commodities listing from the Customs Office |
| Providers                                         | - 2003 In vivo and In vitro testing of drug resistance study  
- Treatment of malaria in Rwanda study  
- Situation analysis of malaria report (includes time spent on delivering care) |
| Households                                       | - Evaluation of the malaria situation study (includes data on the use rates of services)  
- Quality assurance survey (2002) |
| Donors and NGOs                                  | - Report submitted to PNLP on Population Services International, Swiss Corp.UNICEF, WHO spending on malaria |

In the Philippines, secondary data included those sources listed in Table 5.5.

**Table 5.5. Secondary data sources (existing studies/reports) identified in the Philippines**

<table>
<thead>
<tr>
<th>Malaria health care entity targeted by data source</th>
<th>Name of secondary data source (existing studies/reports)</th>
</tr>
</thead>
</table>
| National government                              | Department of Health  
- Annual reports and national objectives for health  
- KAP and Malaria Prevalence Survey in selected indigenous communities in the Philippines  
- Malaria Situation Report  
- National Expenditure Programme (by programme/project/activity) |
| Local government (for province-level malaria sub-analysis) | Provincial government  
- Provincial Health Office statistical reports  
- Financial statements |
| Municipal and city governments                  | - Municipal/city Health Office statistical reports  
- Financial statements |
| Insurance Agencies                               | - PhilHealth reports |
| Providers                                        | - Hospital records section and billing section databases |
In addition to consulting locally available studies and records, the NHA team should consider reviewing internationally available data sources. Such data sources are useful to cross-check estimates. Table 5.6 lists some potentially useful international documents.

<table>
<thead>
<tr>
<th>Malaria health care entity targeted by data source</th>
<th>Name of secondary data source (existing studies/reports)</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Rural/city health unit logbooks of facility consultation visits, laboratory services, and drugs/supplies received by facility</td>
<td></td>
</tr>
<tr>
<td>Households - DOH’s KAP and Malaria Prevalence Survey in selected indigenous communities in the Philippines</td>
<td></td>
</tr>
<tr>
<td>Donors and NGOs - Reports of Philippine Rural Reconstruction M branch operating in the study site (implementor of Global Fund monies for malaria)</td>
<td></td>
</tr>
</tbody>
</table>

For each survey/study listed, the team should discuss how to obtain the report, who would be responsible for this, and when the report will be obtained. Some studies, although theoretically available for dissemination, may be difficult to obtain (as they may be sitting on someone’s office shelf or computer). The team should develop a careful strategy for retrieving these studies during the data collection process. As the remaining NHA data gaps are identified, the team should also consider the strengths and weaknesses of each secondary data source: Is the study methodologically sound? Does it offer data on the year targeted by the NHA exercise? What are the study’s limitations?

### 5.4 Ongoing surveys (adding rider questions)

Another cost-effective method of obtaining data is to identify ongoing surveys that target the same entities targeted by the NHA data collection process. Through negotiation and facilitation, the NHA team leader may be able to secure approval for the addition of questions on malaria expenditures within these ongoing surveys. This would allow for the retrieval of specific NHA malaria data at little to no extra cost.

Such an opportunity is an added advantage in the case of piggybacking onto an ongoing household survey. Households are traditionally the most difficult health care actor from which to obtain data. Often countries rely on old household reports to produce needed estimates (but this may not produce accurate or reliable estimates) or conduct new, targeted surveys of households, which is a costly endeavor. Some routinely conducted surveys that address issues relating to malaria among households include the Demographic Health Survey (DHS), the Multiple Indicator Cluster Survey (MICS), and the WHO/Afro Socioeconomic Impact of Malaria study.
• The DHS is a nationally representative household survey that provides data for a wide range of monitoring and impact evaluation indicators in the areas of population health and nutrition. These surveys are conducted every five years and include questions related to malaria, such as the use of bed nets.\(^{20}\)

• The MICS is conducted by UNICEF and aims to get critical data for monitoring children’s health. To date, these surveys have been conducted in over 60 countries and include modules on malaria that target information on prevalence, type of treatment, availability of nets in household, and other related information.\(^{21}\) A new round is planned for 2004–2005.

• The \textit{WHO/Afro Socioeconomic Impact} study has been conducted in Mali, Ghana, Rwanda. In Rwanda, researchers also used the study to obtain NHA information by adding rider questions to a targeted malaria household survey (households with at least one malaria episode in the past month).

In addition to the abovementioned surveys, general NHA surveys may be ongoing if the subaccount is being implemented simultaneously with the general NHA exercise. These guidelines recommend such an approach as it allows for analysis of malaria spending within the context of overall health expenditures. Annexes 7 and 8 provide examples of donor and NGO survey instruments used in Rwanda that include modules on overall health spending and malaria-focused spending.

When determining whether or not to add malaria questions to ongoing surveys, the team should address the following questions:

• \textit{What is the sampling size of the ongoing survey? Will it be useful for obtaining \textit{national and annual estimates of malaria spending by the entity of interest}?} In the case of Rwanda, the NHA team made sure that all known donors and NGOs who contribute to malaria were included in the broader sampling size.

• \textit{How many questions need to be added in order to determine who spends, how much, and for what malaria services?} Particularly with the non-NHA household surveys, there may not be much room for extensive additions of malaria questions; thus, the goal is to add as few questions as possible in order to meet the team’s data requirements.

• \textit{What is the time period that respondents will be reporting within?} Some surveys may ask households about expenditures only on their last outpatient visit; however, for NHA purposes, it is difficult to estimate accurately an annual outpatient expenditure amount from one visit. Therefore, NHA generally asks households to report on spending in the past four weeks. Another issue that may arise is that an ongoing survey may ask donors to report on expenditures for a year that does not coincide with the time period being used in the NHA (these are sometimes done for the fiscal rather than calendar year). While in many cases the reported amounts may be adjusted to the year of choice by incorporating inflation rates and other factors, this assumes that the entity in question follows a steady trend in its spending practices, which may not be the case, particularly with donors.

• \textit{What is the workplan time line for the ongoing survey? Does it coincide with the team’s deadlines for producing malaria subaccount estimates? When can the NHA team expect the data set from this survey?} These are critical questions when adding rider questions to surveys that are not coordinated

---

\(^{20}\) http://www.measuredhs.com/aboutsurveys/dhs_surveys.cfm

\(^{21}\) http://www.childinfo.org/
by the NHA team. For example, if the timeframe of the ongoing survey is later than that anticipated for the subaccount, it may be difficult to complete the subaccount tables on time.

5.5 Developing specific surveys for the malaria subaccount

If the team finds data gaps still exist after reviewing information provided from the health information system, secondary sources, and rider questions to ongoing surveys, then investigators will need to determine whether or not they should embark upon separate primary data collection efforts. To make this decision, the team will need to do the following:

- consider possibility of obtaining information on a particular entity from data sources on other entities. For example, for a private for-profit clinic that has only one source of funds, namely households, data may be obtained from the household data source (which could be an existing study or an ongoing survey; see Annex 9 for an example of a survey instrument used for the socioeconomic impact study of malaria which was also used for NHA purposes) rather than by conducting a separate survey for providers.
- assess its financial budget to implement a survey and the sample size that the budget can afford.
- consider the time implications of implementing a separate survey. There are many steps entailed in conducting a survey and each needs to be well coordinated.

The steps principally involve
- designing the questionnaire
- pretesting the instrument
- determining the sampling frame
- administering the questionnaires and ensuring that they are properly filled in — if this stage is not carefully monitored, response rates may be quite low and will draw out the data collection process
- entering data into a statistical software program (e.g. SPSS, Excel, STATA)
- cleaning data.

If the subaccount is done as a stand-alone study (not in conjunction with a general NHA estimation), primary data collection efforts may involve surveys for those entities that do not regularly report or publish their financial health care contributions, such as donors, NGOs, pharmacies, and employers. Households are one of the more difficult, yet important, entities from which to capture malaria expenditure information.

In sub-Saharan Africa, estimates on household expenditures are particularly difficult to capture through sources other than surveys, because they largely occur at facilities that do not regularly provide or record household spending information. Such facilities may include private sector shops (not necessarily pharmacies), traditional healers, and mobile street vendors (which householders use to purchase drugs and ITNs). In such cases, it is difficult to obtain household spending data from the providers. Rather, data collection necessitates the retrieval of existing or ongoing malaria household studies. Failing these options, the team will need to consider implementation of its own household survey, which can be a costly, complicated, and lengthy process.

Alternatively, in countries with more advanced recordkeeping practices and where household utilization patterns are well known and confined to fixed-provider facilities (such as health centres, hospitals, and...
primary data collection may be pursued in the form of patient exit interviews, and, records permitting, from pharmaceutical drug surveys. While detection and treatment of malaria cases are carried out as part of the malaria control programme in the Philippines, the relatively low number of cases (only about 40,000 in 2002 for a population of about 75 million) and the country’s goal of complete elimination of malaria have led to much heavier emphasis being placed on prevention activities. In this context, the health facility surveys done in the Philippines for malaria subaccount purposes did not attempt to collect data from malaria patients exiting facilities (since these will be rare), but rather focused on collecting data on public facility activities related to malaria. Questionnaires were structured to acquire data on malaria-related activities (including IEC, vector control, research, and training), the estimated cost of these activities, and the party responsible for paying for these activities. Because the facilities (i.e. public hospitals and rural health units) were also the main providers of health care and sources of free antimalarial drugs, the data needed for estimating the cost of treatment of malaria cases could also be collected from health facilities. Annex 9 shows the questionnaire used for the rural health unit (RHU).

5.6 Summary

The data collection process critically depends on the nature of existing information, whether or not it is possible to “piggyback” onto existing surveys, the availability of household data, and the available budget for conducting any needed primary data collection. Understandably, the more primary data required, the greater the cost and time it will take to complete the malaria subaccount. Therefore, the NHA team is encouraged to examine all non-primary data collection options before embarking upon separate surveys. This will also help facilitate the institutionalization process of the subaccount, such that malaria expenditure estimates can be obtained routinely without much added cost or extra effort. Before embarking upon data collection, it is highly recommended that a detailed data collection plan be developed to outline the strategy for accessing secondary and primary data sources.
6 Data analysis

The analysis stage involves a thorough review of numerous data sources and their assembly into a clear picture of malaria funding flows. Inevitably during this process, the NHA team faces a number of data conflicts and gaps that necessitate further scrutiny and possible use of alternative estimation techniques.

This chapter builds on the recommendations described in the *Producers’ Guide* (Chapters 9–13). In particular, the chapter focuses on malaria-specific issues that may be faced during data analysis. The suggested strategies for dealing with these issues have grown out of discussions with malaria and NHA experts as well as from country experience in Rwanda and the Philippines.

6.1 Getting organized: What is needed?

Data analysis can be a long, drawn-out process if the right types of data are not available. To avoid analysis bottlenecks, it is useful to first assemble all needed data, including financial and non-financial information that may or may not be directly related to the NHA tables. The key types of information are listed in Table 6.1.

<table>
<thead>
<tr>
<th>Purpose of needed information</th>
<th>Examples of the types of data needed</th>
</tr>
</thead>
<tbody>
<tr>
<td>To populate the NHA matrices</td>
<td>• Clean data sets from NHA surveys</td>
</tr>
<tr>
<td></td>
<td>• Secondary data (as listed in the NHA data plan), such as the Ministry of Health’s financial records for the year of estimation.</td>
</tr>
<tr>
<td>To weigh primary datasets to national level</td>
<td>NHA-related surveys may target a sample of the ‘universe’ for a given entity. To extract national estimates from such datasets, appropriate weights must be applied. Deriving these weights may require additional information such as —</td>
</tr>
<tr>
<td></td>
<td>• Total number of companies likely to provide health coverage and the number of employees at each company (to weigh the employer dataset)</td>
</tr>
<tr>
<td></td>
<td>• Total number of donors &amp; NGOs (and their relative size) that contribute to health and malaria (to weigh donor and NGO datasets)</td>
</tr>
<tr>
<td>To convert currencies</td>
<td>• Official exchange rate from local currency to US $ for year of estimation (take average of the year)</td>
</tr>
<tr>
<td></td>
<td>• Official exchange rate from donor reported currencies to local currency</td>
</tr>
<tr>
<td></td>
<td>• Conversion rate to achieve purchasing power of parity (for comparison with other countries)</td>
</tr>
<tr>
<td>To adjust those datasets with earlier/later timeframes to NHA year of estimation</td>
<td>• Medical inflation rates (or consumer price index)</td>
</tr>
<tr>
<td></td>
<td>• Population growth rates</td>
</tr>
<tr>
<td></td>
<td>• For current dollar, inflation rates (for time series comparisons)</td>
</tr>
</tbody>
</table>
### Purpose of needed information

<table>
<thead>
<tr>
<th>Purpose of needed information</th>
<th>Examples of the types of data needed</th>
</tr>
</thead>
</table>
| To compute key policy indicators | • Gross domestic product  
• Total population (for expenditure per capita estimates)  
• Total population at risk for malaria  
• Total government expenditure  
• Total donor expenditure |
| To inform estimation techniques, particularly when disaggregated expenditure data are not available | • Utilization data (e.g. percentage of inpatient admissions attributed to malaria, percentage of outpatient visits attributed to malaria.) These proportions may be used to estimate the amount of general revenues (not targeted) that is indirectly used to deliver malaria services (e.g. the salary of the doctor delivering malaria health care).  
• General expenditure breakdown at facilities between inpatient and outpatient. The same ratio may be used to disaggregate expenditures at a given facility if functional data are not available.  
• Health commodity or service unit costs |
| To verify expenditure estimates | • Existing cost and utilization studies  
• Cost recovery data  
• Other studies on national or subnational health expenditures (e.g. public expenditure reviews) |

In addition to obtaining a variety of data, the analysis stage can be expedited if the template for the target NHA tables is already created. This template should incorporate (1) country-adapted classifications in the row and table headings, (2) formulas for summation of columns and rows, (3) links between the tables for cross-checking purposes, and (4) links to an “indicator” sheet so that once the estimate is entered in the NHA table, policy indicators and charts can be automatically generated.

With respect to the malaria subaccount, it is also useful to link the subaccount tables to the general NHA tables in order to determine the proportion of overall health expenditures consumed by malaria-related spending. This serves as a gauge for assessing the “reasonableness” of the interim malaria estimates produced during the analysis. Some examples of what to look for include the following: (1) Is an institution, such as a bilateral donor or NGO, reporting greater expenditures on malaria in comparison to its reported contribution for overall health? (2) Is the OOP pharmaceutical expenditure for malaria reasonably less than that found for general health? Red flags will be raised if subaccount expenditures are larger than general health expenditures. In such cases, the NHA team will then need to revise the malaria numbers. This template, with minor revisions, can then be used for the following year’s NHA estimation.

### 6.2 Conducting the analysis

The analysis process essentially involves two steps: (1) tallying up the national amount received and spent by each principal health care entity in accordance with NHA classifications, and (2) populating the matrices. The first step entails a review of primary and secondary expenditure data for a given entity. As recommended by the *Producers’ Guide*, the T-account is quite helpful for organizing this process (see...
In T-accounts, national expenditures for an entity are listed in the left column and revenues on the right side. The guiding principle of T-accounts is that the left and right sides must always be equal. In the process of creating T-accounts, the team should map each type of expenditure to the appropriate NHA classification. More importantly, this should be clearly documented.

Expanding upon the issue of documentation, all assumptions, weighting procedures, and estimation techniques used must be clearly noted. Such notation facilitates the drafting of the methodology chapter of the report and, more importantly, informs and expedites subsequent country NHA efforts.

Upon completion of the individual T-account summaries for each entity, the next step is to populate the NHA matrices. This step involves triangulating data estimates, resolving data conflicts and data gaps, and avoiding double counting. Triangulation is a very useful approach for verifying data estimates. For example, if the expenditure transaction in question involves the fund transfer between employers and insurance schemes, the NHA team can try to obtain this estimate from at least three different data sources: the employers themselves, insurance schemes, and employees/households. Obtaining multiple estimates for the same NHA cell provides a range of possible expenditure amounts. Inevitably, no two data sources will report the same expenditure estimate; thus, the team will need to make a selection or compute an alternate estimate. The *Producers’ Guide*, particularly through its ‘Appia’ case study, offers guidelines on resolving a variety of data conflicts and data gaps. Some questions to consider during the data reconciliation process are the following:

- Is one data source more reliable than the other? Perhaps one survey had a higher response rate than the other?
- Do both data sources measure the same data and conform to the same boundaries? For example, one entity’s definition of health expenditures may include spending on sanitation services whereas other data sources may exclude such expenditures.
- Do both data sources measure the same time period?
- How was the data measured in terms of cash versus accrual accounting?

Because data can be obtained from the originator and recipient of the fund transfer, the team must be careful to avoid double counting. This occurs when the same piece of information is captured in more than one data source. When both data sources are used in the NHA tables, it is possible that this information may be duplicated. For example, households in a survey generally report their entire OOP expenditure amounts, inclusive of the amount that may have been reimbursed by their employers. In this case, care must be taken to avoid counting this amount under both employers and households in the NHA tables.

In addition to these general strategies, the *Producers’ Guide* makes recommendation on the order in which the NHA tables should be filled. The *Producers’ Guide* suggests starting in the middle — with the financing agents to provider table — and then working back upstream to the financing source table and downstream to the functional tables. Financing agents are a good place to start, because funds at this level are generally targeted at health care and thus are more clearly identifiable.

---

22 In addition, T-accounts are useful for standardization and institutionalization of the NHA process, and can be automatically linked to produce the main NHA tables.
6.3 Specific issues that may arise with the malaria subaccount

The issues and suggested strategies described in the following paragraphs have grown out of numerous discussions with malaria and NHA experts. They also include lessons learned from the implementation of the subaccount at the national level in Rwanda and at the subnational level in the Philippines. The issues discussed in this section are intended to be illustrative of the major challenges faced during the data analysis stage for malaria. The discussion is by no means exhaustive. For additional methodological queries, country NHA teams are welcome to consult with the international committee of NHA experts at nhaweb@who.int.

6.3.1 Boundary-related data analysis issues

Efforts to track resources on specific programmes or diseases face three common challenges: (1) health resources are shared and not specifically allocated to a single programme area; (2) health interventions and programmes address multiple conditions concurrently; and (3) most expenditure records are not prepared to report expenditures on specific diagnosis. Thus, reported expenditures often encompass broad categories or integrated areas rather than a specific, disease-focused service. Traditional accounting methods suggest that each transaction should be reported only once. That is to say that the total amount of a transaction, which may extend beyond the targeted boundaries, should be allocated to its principal purpose. However, if this approach were strictly adhered to with respect to the malaria subaccount, then sizeable overestimates could be anticipated. The approach of these guidelines is that, in order to maintain policy relevance, the measurement of malaria expenditures should aim to capture, to the extent possible, only the amount spent on malaria-related activities. This may mean occasionally breaking groups of transactions or estimating malaria proportions of integrated expenditures, particularly when financial records are not sufficiently detailed to allow for malaria-specific expenditures. The “separating out” of transactions, while allowable, should be used only when the malaria share is thought to be significant and inclusion of the entire transaction would be a gross estimate. Use of this technique should be kept to a minimum to limit production of expenditure “guesstimates.” The allocation ratios/decisions used in estimating such malaria shares will differ from country to country, depending on available data and the country context. Allocation factors are generally based on key reference values such as the share of human resources, utilization rates, costs, and other factors devoted to malaria-related services. Regardless of the reference value used, the approach taken should be well documented in the NHA report.

6.3.1.1 Overlaps with other disease subaccounts

How should overlaps with other subaccounts be handled? In addition to the malaria subaccount, a number of programme/disease-specific subaccounts use the NHA framework, such as the reproductive health or HIV/AIDS subaccounts. As can be expected, such subaccounts may have overlapping boundaries. With respect to malaria, possible overlaps exist with the reproductive health, child health care, and HIV/AIDS subaccounts.

Suggested strategy: Overlapping services may include those listed in Table 6.2. Ideally, expenditure estimates on such activities should not be repeated in two or more subaccount types, particularly when
conducted simultaneously; rather they should be placed entirely in one of the subaccounts or divided among the various subaccounts. This allows for the sum of the parts (i.e. subaccounts) to add up to the whole (i.e. THE).

### Table 6.2. Overlapping services among malaria and other subaccount types

<table>
<thead>
<tr>
<th>Overlapping Malaria Service</th>
<th>Subanalyses whose scope can include overlapping service</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antimalarial chemoprophylaxis in pregnant women</td>
<td>HIV/AIDS</td>
</tr>
<tr>
<td>• different than IPT&lt;sub&gt;p&lt;/sub&gt;</td>
<td>✓</td>
</tr>
<tr>
<td>• chemoprophylaxis aims to sustain blood levels above mean inhibitory concentration for a prolonged period</td>
<td></td>
</tr>
<tr>
<td>IPT&lt;sub&gt;p&lt;/sub&gt;</td>
<td>HIV/AIDS</td>
</tr>
<tr>
<td>• Is a full therapeutic course of antimalarial treatment administered at specific times whether or not a recipient is infected</td>
<td>✓</td>
</tr>
<tr>
<td>• Yields shorter bursts of protective drug levels separated by periods when drug levels are too low to inhibit parasite growth</td>
<td></td>
</tr>
<tr>
<td>Infant and child health care malaria expenditures</td>
<td></td>
</tr>
<tr>
<td>• Incl. integrated management of childhood illnesses programmes (IMCI), IPT&lt;sub&gt;i&lt;/sub&gt;</td>
<td></td>
</tr>
<tr>
<td>HIV/AIDS curative care (as a co-infection)</td>
<td>✓</td>
</tr>
</tbody>
</table>

**Antimalarial chemoprophylaxis and IPT**

Antimalarial chemoprophylaxis and IPT in pregnant women is an important malaria intervention that aims to prevent the susceptibility of pregnant women to develop severe malaria that may result in serious complications for the developing fetus and newborn. Moreover, from the local perspective, these programmes generally tend to be included as focus areas of national malaria control programmes rather than reproductive health programmes. For this reason, it is generally recommended that expenditures on such services be included within the scope of the malaria subaccount.

**Infant and child health care**

An area of sizeable overlap, particularly in the African context, is that of expenditures on malaria prophylaxis and treatment for infant and children. Malaria accounts for 20 percent of all childhood deaths in Africa and is responsible for low birth weights, anemia, epilepsy, and neurological problems (see RBM fact sheet, *Children and Malaria*). Consequently, from an international standpoint, childhood malaria expenditure is critical to both the malaria subaccount and the child health subaccount.

*How should one deal with integrated child health care programmes?* From the malaria subaccount perspective, estimation complications can arise with respect to integrated programmes targeted at child health care. For example, many countries subscribe to the WHO- and UNICEF-recommended strategy of Integrated Management of Childhood Illness (IMCI) to improve child health. This strategy focuses on actively addressing the major causes of childhood morbidity and mortality, including five preventable conditions: diarrheal disease, acute respiratory infection, measles, malaria, and malnutrition. Particularly in Africa, malaria is a major component of IMCI. However, since it is only one component of IMCI,
should all IMCI expenditures be included in the malaria subaccount or just the portion relating to malaria? If it is the latter, how can this amount be estimated?

**Suggested strategy:** First, this issue applies to IMCI programmatic expenditures only — largely because IMCI does not appear separately in facility-level records where it is integrated into overall inpatient and outpatient service delivery. As such, the malaria subaccount would already capture these curative care expenses using some of the techniques outlined in section 6.3.2 that deals with non-targeted expenditures at the facility level. The question then becomes, “how can IMCI be dealt with at the programmatic level?” In this regard, such a line item may be observed in the expenditure records of donors, NGOs, and the government. Including the entire IMCI programme amount may overestimate malaria expenditures, while apportioning out the malaria share of IMCI may not necessarily be any more accurate. This latter option should only be pursued when the malaria expenditure is thought to be sizeable and when the full value of the integrated activity is likely to be a significant overestimate. Generally speaking, IMCI programmatic expenses are sizeable when the strategy is being introduced. During this time, spending may be for the development of materials, training, and supervision. Such programmatic expenses are likely to be substantially reduced or non-existent, because the approach and any associated expenses will then be embedded within the facility-level expenditures.  

Apportioning IMCI programmatic expenditures can be done through a number of approaches: (1) asking key informants about their estimation of the share of the programme that focuses on malaria, (2) determining the number of visits incurred for the IMCI targeted conditions (e.g. from the DHS) and assuming that the malaria portion of visits is equivalent to the malaria share of IMCI expenditures, and (3) using disease-prevalence data to estimate expenditure share. Regarding the latter strategy, disease prevalence use should be a last resort since a large gap often exists between those who are sick and those who seek care. Again, separating out integrated programmes should be kept to a minimum and is only worth exploring if the malaria share is thought to be significant and if the full value of the integrated programme is likely to be a significant overestimate. Consider the 2 percent rule.

**Co-infections**

*How should one account for expenditures for the treatment of malaria and its co-infections, such as typhoid and salmonella?* Certain conditions have been shown to increase the susceptibility of contracting malaria. This may result in co-morbidities, where malaria is one among other conditions treated in a patient. How should expenditures for such care be included in the malaria subaccount?

**Suggested strategy:** Revisiting the cardinal rule of NHA, the NHA investigator should ask what the primary purpose of the expenditure was. If it is for malaria, then the total expenditure amount should be included. If it is not for malaria, and if the total amount is likely to be a sizeable overestimate, then it may be necessary to extract the malaria share (provided that the malaria amount is likely to be significant).

---

23 This was the experience seen in Rwanda. While in previous NHAs NGO surveys had reported small IMCI expenditures, no estimate was reported from NGO surveys conducted as part of the NHA 2003 malaria subaccount exercise (perhaps reflecting that IMCI as a strategy was not being funded programatically as it was up and running within facilities).

24 The 2 percent rule is an informal accounting rule used to consider whether or not effort should be invested into extracting expenditure amounts that are less than the 2 percent of the THE. Generally speaking, if the activity in question is not a policy concern and if the estimate is not readily accessible (or requires significant effort for computation), then it may be considered not significant enough to warrant specific inclusion in the subaccounts. This decision must be documented in the NHA report.
This can be done by reviewing diagnoses listed in patient records and from billing records for these services (e.g. insurance schemes, OOP expenditures). Should such information be difficult to obtain, it may be necessary to determine the malaria proportion of expenditures based on the estimated percentage of typhoid patients (for example) who have had malaria. Such an estimate may come from a variety of sources such as key informants, health information records, or disease prevalence studies.

**Vector management targeting multiple diseases**

*How should one account for vector management control targeting multiple diseases?* In many countries, vector management activities may serve not only malaria but also other mosquito-borne diseases, such as dengue, filariasis, yellow fever, and encephalitis. What proportion is malaria related and should be included in the malaria subaccount?

*Suggested strategy:* As mentioned earlier, it is best to first assess the primary purpose of such activities and whether the malaria proportion of these activities is significant enough to warrant inclusion in the subaccount. If the country in question has a high prevalence of malaria, more sizeable than other vector-borne diseases, then these guidelines suggest documenting the entire vector control expenditure in the subaccount. However, if this is thought to be a gross overestimate, the country team can explore ways of estimating the malaria proportion of such expenses.

One possibility may be to use disease prevalence data to identify the proportion of vector control spending attributed to malaria control. This solution is not ideal, however, because in India and some Southeast Asian countries where there has been a large investment in control programmes and, consequently, significant success in reducing malaria prevalence, the estimate of malaria expenditures would be low and would not reflect the actual level of investment. Also, from a policy perspective, it is important to convey that even if levels of malaria are low, it does not mean that the country should lessen its investment in prevention. Disease prevalence may be low precisely because of an investment in prevention. Thus, an alternative approach can be to use malaria prevalence rates prior to the introduction of vector control programmes as the weight for estimating current malaria expenditure proportions of these programmes. This approach should be used cautiously and within a reasonable timeframe. For example, mosquito eradication programmes conducted in the south of Brazil in the 1930s were very effective in eliminating malaria. These programmes continue today, but now target the eradication of dengue. It is questionable whether these programmes should be captured in the malaria subaccount. In this case, the local NHA team should consult with their malaria team members to identify if such an expenditure is relevant to the exercise, particularly from the policy and primary purpose perspective.

Finally, another way of deriving the “malaria share” of integrated vector control programmes is to conduct interviews with key informants who can shed light on the importance of vector programmes (or their primary purpose) in reducing malaria expenditures. Again, where possible, it is best to avoid extracting shares based on such estimation techniques, but if deemed necessary, it is allowable.
Surveillance targeting multiple diseases

How should one account for surveillance activities that target multiple diseases? Although in many endemic countries malaria surveillance may be vertical in nature, some surveillance activities may occur as part of general surveillance programmes for communicable and non-communicable diseases. In such cases, should a malaria expenditure share be extracted from these surveillance programmes?

Suggested strategy: The team should first determine whether extracting the malaria share is of strategic value (a policy concern) and is also “worth the effort” (i.e. is the expenditure amount likely to be significant, more than 2 percent of the THEM). Generally speaking, investments in information system tracking of key disease statistics are not significant enough to warrant specific inclusion into the subaccount. However, such expenditures may be included, but not explicitly, when MoH non-targeted expenditures are estimated (see section 6.3.2).

6.3.1.2 Boundary issues between health-related and non-malaria-related activities

How does one account for vector control measures in environment-modifying activities? Malaria prevention activities may include environmental or biological control of mosquito larval breeding sites. This may involve draining or filling in of pools, modifying river boundaries or their run-off systems, periodic drying of rice fields, alteration of marshes, and draining of ditches (Institute of Medicine, 2004). Such measures can fall within the jurisdiction of public works, mining, and farming activities. Moreover, they may be integrated into engineering undertakings involving the modification and manipulation of the environment (i.e. changes due to agricultural, industrial, and urban development). In short, such activities may serve multiple purposes, with malaria control being one purpose or a byproduct. Are these activities health related (to be classified as HCR 5) and should they be included in the subaccounts? If so, should the full expenditure be included?

Suggested strategy: The team should first assess the principal purpose of such environment-modifying activities. If the prevention of malaria transmission is one of the purposes of the activities, then these expenditures should be captured within the health-related scope of the subaccount. There are two options for accounting such expenditures: (1) the full amount can be included in the tables with a documented caveat stating that it may be an overestimate given the multiple purposes of the activity; or (2) a portion of the total environmental expenditure could be estimated with a documentation stating what assumptions were used to derive the reported amount. The team may be able to determine the share of malaria expenditures by considering the opinions of key informants and by using morbidity data, estimating the malaria incidence relative to that of other diseases that would be lowered with the environmental measure. Whenever possible, and to preserve expenditure information rather than rely on “guesstimates,” computations of shares of integrated spending should be kept to a minimum.

6.3.2 Dealing with non-targeted expenditures for malaria

How can non-targeted expenditures for malaria be estimated? The malaria subaccount aims to be comprehensive; as such, it includes targeted or earmarked funds for malaria as well as non-targeted

---

25 Vertical malaria surveillance programs may include monitoring and evaluation of resistance to antimalarial drugs and resistance of vectors to insecticides, mosquito surveillance (e.g. insect collectors), or use of remote sensing and climate modeling to map and monitor mosquito populations.
expenditures. Targeted funds are easily identified from primary and secondary data sources. These funds may include programmatic expenditures incurred by national governments (e.g. the malaria control programme at the MoH), donors (e.g. donated bed nets), and NGOs (e.g. behaviour change communication campaigns on malaria prevention). In addition, household OOP expenditures may be specifically targeted to a malaria health care service. Non-targeted expenditures refer to indirect spending on malaria (e.g. the proportion of medical staff wages for public hospital staff that treat patients with malaria). For these types of expenditures, non-market providers may use their general revenue (contributed by various financing agents for all health services rendered by the provider) to pay for malaria-related services. In general, such information is not readily disaggregated in the information systems of middle- and low-income countries.

**Suggested strategy:** Non-targeted spending can be more easily determined in countries where providers are reimbursed according to diagnosis-related groups (DRGs) (Australian Institute of Health and Welfare, 2005). DRGs comprise a classification system used to group hospital patients according to their medical diagnosis and their use of hospital resources (Kielhorn and Graf von der Schulenburg, 2000). Such level of detail may not be present in the patient records of low-income countries, and in lieu of complex and sometimes costly studies (such as those that track time motion), these guidelines suggest applying a specified percentage to overall provider expenditures. The percentage used can be derived from a number of sources: (1) malaria costing studies at hospitals and health centres, (2) billing records for OOP expenditures of hospital discharges, (3) records of commodity distribution by government, including malaria commodities, and (4) utilization records of the number of admissions and outpatient visits attributed to malaria.

In Rwanda, a combination of cost and use data was used in the following manner (illustrative for outpatient care) for a given provider:

\[
\text{Unit cost to deliver outpatient care for malaria at a given provider} \times \text{Number of outpatient visits for malaria at a given provider} = \frac{\text{Unit cost to deliver outpatient care overall at a given provider} \times \text{Number of outpatient visits overall at a given provider}}{\text{Y % of overall outpatient expenditures that are used for malaria}}
\]

The derived percentage (Y %) is then applied to that provider expenditure for outpatient care. To determine which financing agents contribute to non-targeted spending for malaria, the same ratios of contributors for overall health care at the provider can be used for the malaria subaccount. This is illustrated in Table 6.3 for one provider type. Note that the percentage is derived for each provider type so

---

26 It should be noted that the full cost of intermediate inputs (including salaries, equipment, supplies) at private-for-profit providers is embedded within the price charged to patients or insurance schemes. Thus, non-targeted expenditures do not need to be estimated separately in these cases.
that a private hospital may have a different share of its overall outpatient expenditures attributed to malaria compared to that of a public hospital.

### Table 6.3. Financing agents contribution to non-targeted malaria spending on outpatient care

<table>
<thead>
<tr>
<th>Financing Agents</th>
<th>Public Hospitals</th>
</tr>
</thead>
<tbody>
<tr>
<td>HF. 1.1.1.1 Ministry of Health</td>
<td>100</td>
</tr>
<tr>
<td>HF. 2.3 Household OOP expenditures</td>
<td>=Y% x 100</td>
</tr>
<tr>
<td>HF. 2.4 NPISH (NGOs)</td>
<td></td>
</tr>
</tbody>
</table>

Similarly, to trace the non-targeted spending back to the financing source level, the same proportional breakdown found in the general $FSxHF$ table can be applied to those financing agents that contribute to non-earmarked spending.

In the Philippines, several allocation rules were applied to estimate the share of malaria included in non-targeted expenditures. One percentage used was derived from billing records by dividing total OOP expenditures incurred on malaria hospital discharges by total OOP expenditures for all hospital discharges at a given public hospital. It is then assumed that OOP expenditure share for malaria parallels the allocation of government subsidy in public hospitals for the disease. The percentage is applied to the government hospital budget to obtain the amount attributable to malaria care. This approach was taken because of lack of information about how government hospital subsidies are actually utilized among different hospital services. Another percentage was derived by dividing the number of malaria consultations by the total number of consultations in RHUs. The percentage is then applied to the RHU and provincial health office expenditures to obtain the amount attributable to the provision of malaria services. This approach may be viewed as equivalent to applying two of the methods described above. That is, the unit cost of all consultations is assumed to be the same and is estimated by applying the method in reverse (i.e. by simply dividing total expenditures at a facility by the total number of consultations). Then the estimated unit cost per consultations is multiplied with the number of malaria consultations to derive total expenditures of malaria service provision.

### 6.3.3 Commodity-related issues

#### 6.3.3.1 OOP expenditures on commodities

*How does one estimate OOP expenditures on malaria-related commodities?* Critical to the malaria subaccount is the measurement of spending on preventative commodities, such as ITNs and mosquito repellants. Since targeted household surveys for malaria generally interview households that have had at least one malaria episode, these surveys are not as useful for estimating total expenditures on prevention.

*Suggested strategy:* In such cases, it may be prudent to multiply unit cost (to the consumer) and utilization data to determine expenditure. In the case of pharmaceuticals, such information may be derived from applying the market average price by the reported imported amounts (that are likely to be distributed
during the year of estimation). Intermediaries may have records on the distribution channels that can be accessed to obtain information on volume. Prices, however, should be considered at the purchaser level so that both distributional channels and purchaser price levels can facilitate an expenditure estimate. To determine if the derived estimate is reasonable, it is helpful to compare the estimate against that reported for overall OOP expenditures on pharmaceuticals, which is an indicator that would be tracked as part of the general NHA exercise. If the malaria estimate is close to or greater than the general NHA estimate, then the malaria amount requires further investigation.

6.3.3.2 Commodities purchased multiple times

How can one account for commodities that may be purchased more than once? Commodities may be bought and sold multiple times as they pass through the health care system. This can occur through social marketing of donated goods. Since the product is essentially purchased twice — most likely, once by donors and once by households — should both sets of expenditures be counted? A number of scenarios can be envisaged regarding commodity transfers.

a) Donors give US $100 for the purchase of bed nets. The MoH uses those funds in their entirety to purchase and distribute the nets (valued at US $100) free of charge to its providers. The providers in turn dispense them to patients free of charge. How would this information be captured in the NHA tables?

Suggested strategy: This is a case of full subsidization of bed nets. Essentially, the full US $100 transfer between donors and the MoH is shown in Table 6.4.

Table 6.4. Illustrative $FSxHF$ and $HFxHP$ tables when full value of donated commodities are distributed free of charge

<table>
<thead>
<tr>
<th>$FSxHF$</th>
<th>$FS 3. Rest of the world$</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>$HF.1.1.1.1$</td>
<td>Ministry of Health</td>
<td>$100</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>$100</td>
</tr>
<tr>
<td>$HFxHP$</td>
<td>$HF.1.1.1.1$ Ministry of Health</td>
<td>$50</td>
</tr>
<tr>
<td>$HF.1.1.1.$</td>
<td>Public hospitals</td>
<td>$50</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>$100</td>
</tr>
<tr>
<td>$HF.3.4.5.1$</td>
<td>Public health centres</td>
<td>$50</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>$100</td>
</tr>
</tbody>
</table>

b) This second example is the same as the scenario in “a” above with the exception of one twist. Donors give US $100 for the purchase of bed nets. The MoH uses those funds to purchase and distribute the nets free of charge to its providers. The providers in turn dispense them to patients for a fee of US $10, which is then retained at the facility level as part of cost-recovery efforts. How would this information be captured in the NHA tables? Should the full value of donor

---

27 Effort should be made to estimate the total amount distributed that year. Often the volume of imports in a given year does not necessarily correlate with the volume distributed that year.
expenditure be included (US $100) or just the portion subsidized (US $90) to the household in addition to the amount paid by the household (US $10)?

Suggested strategy: Although this is a case of partial subsidization at the household level, what is more critical to discern is the end use of household OOP revenue. In this case, the funds were used for health care and most likely during the year of estimation, which makes this suggested approach similar to the NHA treatment of user fee retention at the government facility level. In such cases, the *Providers’ Guide* states that “if the (user) fees are retained as additional resources by providers, i.e., supplement MoH spending, they do not need to be subtracted from the Ministry total.” (p.142, paragraph 10.15) Therefore, the *full* donor and household contributions are additive, as shown in Table 6.5.

### Table 6.5. Illustrative *FSxHF* and *HFxHP* tables when fully donated goods are ultimately dispensed to household for a fee

<table>
<thead>
<tr>
<th><em>FSxHF</em></th>
<th><em>FS 3. Rest of the world</em></th>
<th><em>FS 2.2 Households</em></th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>HF.1.1.1.1 Ministry of Health</em></td>
<td>$100</td>
<td></td>
<td>$100</td>
</tr>
<tr>
<td><em>HF.2.3 HH OOP</em></td>
<td></td>
<td>$10</td>
<td>$10</td>
</tr>
<tr>
<td>Total</td>
<td>$100</td>
<td>$10</td>
<td>$110</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><em>HFxHP</em></th>
<th><em>HF.1.1.1.1 Ministry of Health</em></th>
<th><em>HF 2.3 HH OOP</em></th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>HP.1.1.1. Public hospitals</em></td>
<td>$50</td>
<td>$3</td>
<td>$53</td>
</tr>
<tr>
<td><em>HP.3.4.5.1 Public health centres</em></td>
<td>$50</td>
<td>$7</td>
<td>$57</td>
</tr>
<tr>
<td>Total</td>
<td>$100</td>
<td>$10</td>
<td>$110</td>
</tr>
</tbody>
</table>

Breakdown across providers in Table 6.5 is intended as an illustrative assumption.

If household user fees were returned to the MoH, then the recorded MoH expenditure will be a net of those fees (e.g. US $100 – $10 = $90). As stated in the *Providers’ Guide*, “it is essential that they not be included in the ministry’s outlays in order to avoid double counting those expenditures.” (p.142, paragraph 10.15) Consequently, tracing the expenditure back to the financing source level, donors would be recorded as giving US $90 to the MoH.

Regardless of the end use of OOP revenue, the full value of the household OOP expenditures should be recorded in health accounts (p.142, paragraph 10.15).

c) The donor funds are transferred to the MoH, which does not use the funds that year and retains the funds in the Ministry’s bank account. Should the donor contribution to the MoH be included in the NHA matrices?

Suggested strategy: The donor contribution should be excluded from the subaccount that year, but included in subsequent year(s), provided that those funds are used and spent on malaria-related activities.
d) Donors give the MoH US $100 for the purchase of bed nets. The MoH uses these funds in their entirety and procures nets for US $100, then sells them to its providers for US $60. The US $60 amount is stored in the MoH’s bank account and used for the following year’s purchase of various malaria-related products and programme needs. Therefore, US $40 is the amount actually subsidized by donors to facilities. Households then buy the nets from the health centres for US $70 (which is retained at the facility level). Therefore, the provider makes a profit of US $10 and is entitled to use the profit as he sees fit (as part of cost-recovery initiatives). Should only the value of US $100 for the nets themselves be counted? Or perhaps the full US $170 amount that includes the total contributions made by both the donors and the households?

Suggested strategy: Critical to the approach taken is an assessment of the end uses of donor monies that were not used for ITNs that year as well as the household OOP revenue (generated from the sale of bed nets). Regarding the amount retained in the Ministry’s bank account, Rwanda faced this same issue. Since this amount is channeled back into the health care system the following year, it should be excluded from this year’s accounts and included in the following year’s accounts. Therefore, donors will be described as giving US $40 to the MoH. With respect to the household OOP revenue raised by the hospital, because these funds are retained at the facility level for health care use, presumably that year, they should be accounted for in a similar manner as done in example “b.” Table 6.6 illustrates the cost to patients who purchase donated commodities that are sold by public providers.

Table 6.6. Illustrative FSxHF table when donated commodities are sold to public providers who sell the commodities to patients for a fee

<table>
<thead>
<tr>
<th>FSxHF</th>
<th>FS.2.2 Households</th>
<th>FS.3 Rest of the World (donors)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>HF. 1.1.1.1 MoH</td>
<td>40</td>
<td></td>
<td>40</td>
</tr>
<tr>
<td>HF. 2.3 Households OOP</td>
<td>70</td>
<td></td>
<td>70</td>
</tr>
<tr>
<td>Total</td>
<td>70</td>
<td>40</td>
<td>110</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>HFxHP</th>
<th>HF. 1.1.1.1 MoH</th>
<th>HF. 2.3 Households OOP</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>HP. 3.4.5.1 Public health centres*</td>
<td>40</td>
<td>70</td>
<td>110</td>
</tr>
<tr>
<td>Total</td>
<td>40</td>
<td>70</td>
<td>110</td>
</tr>
</tbody>
</table>

*Just for illustration purposes, this matrix assumes all government nets are transferred to only public health centres.

e) Rather than give funds to the MoH, US $100 of donor funds is transferred directly to NGOs. These NGOs then purchase bed nets with the full amount and sell the commodities to shopkeepers at a subsidized price of US $60. The funds received from the sale to shopkeepers are then used by the NGO for next year’s packaging and distribution of nets. The shops in turn sell all of their nets to households for US $80. What is the donor amount that should be recorded: the full contribution of donors (US $100), the amount subsidized when sold to shops (US $40), or the ultimate subsidy reflected at the household purchase level (US $20)?

Suggested strategy: Beginning with household contribution, as per the Producers’ Guide recommendations, the full amount (US $80) given should be recorded in the tables. With respect to the donor contribution, consider the situation as being analogous to the returning of public facility user fee
revenue to the MoH. In this case the NGO is like the MoH, and the shops, like public providers. Shops send part of their “user-fee” revenue back to the NGO, thus the amount actually contributed by the NGO should be recorded as the net of those fees in order to avoid double counting. See Table 6.7.

Table 6.7. Illustrative \( FSxHF \) and \( HFxHP \) tables when donated commodities are sold in private sector

<table>
<thead>
<tr>
<th>( FSxHF )</th>
<th>( FS.2.2 ) Households</th>
<th>( FS.3 ) Rest of the World (donors)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>( HF.2.4 ) NPISH</td>
<td></td>
<td>40</td>
<td>40</td>
</tr>
<tr>
<td>( HF.2.3 ) Households OOP</td>
<td>80</td>
<td></td>
<td>80</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>80</td>
<td>120</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>( HFxHP )</th>
<th>( HF.2.4 ) NPISH</th>
<th>( HF.2.3 ) Households OOP</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>( HP.4.1 ) Dispensing chemists</td>
<td>40</td>
<td>80</td>
<td>120</td>
</tr>
<tr>
<td>Total</td>
<td>40</td>
<td>80</td>
<td>120</td>
</tr>
</tbody>
</table>

6.3.4 Subnational level issues

The issues discussed in this section draw from the lessons learned in implementing the subaccount in the Davao del Norte Province of the Philippines.

6.3.4.1 Disaggregating central level data to the subnational level

*How can the subnational share be teased out of the total expenditure for the national malaria programme management?* The DOH incurs expenses for staff salaries and other maintenance costs of the national malaria control programme. While the programme office is based in central DOH, it serves the provinces by coordinating and providing support to provincial malaria-related activities.

*Suggested strategy:* Compute the percentage of malaria cases treated in the country that are found in the province or any geographic division of interest. Apply the percentage to the national malaria programme management expenditures to obtain the amount attributable to programme management in the specific province. Alternatively, a bottom-up approach could be used, where independent estimates for each subnational unit can be totaled to produce the national estimate. This is most practical in countries where health care financing is decentralized.

6.3.4.2 Disaggregating national general administration expenditures

*How should national general administration spending for public health programmes (i.e. non-geographic specific and non-targeted expenditures) be treated in a province-level malaria subaccount?* In the NHA and subnational-level health accounts, the general administration cost for the health sector is included. These items include the expenditures of DOH budgeting and accounting offices. Should these expenditures be allocated and included in the provincial malaria subaccount? Unlike the non-targeted expenditures in public hospitals and health centres, which are used to directly provide malaria curative
care, national general administration costs have no such direct link to the provision of malaria services and commodities. The overall supervision, coordination, and administration of all malaria-related programmes and activities in the country are provided through the national malaria programme management office located in the DOH.

**Suggested strategy:** Exclude national general administration expenditures.

### 6.3.4.3 Treating subnational general administration expenditures

*How should general administration cost for public health programmes (i.e. non-targeted expenditure) of local governments be treated in a province-level malaria subaccount?* In the local health account, general administration costs of health services are estimated as the health share (versus other local services share) out of local government expenditures for budgeting, accounting, procurement, and similar services. Should these general administration expenditures also be allocated and included in the provincial malaria subaccount? Unlike the non-targeted expenditures previously mentioned for public hospitals and health centres, these estimated local general administration costs have no direct link to malaria services provision. The provincial government’s overall administration and support of malaria prevention, as well as other health programmes within the province, are provided through the provincial health office.

**Suggested strategy:** Exclude general administration costs of local governments.

### 6.3.5 Other data analysis issues

**Relying on cost and use data.** In the absence of expenditure data, NHA teams may resort to using unit cost and use data as proxy measures of price and volume. This should be done with caution and with the following considerations. Unless the costs are derived from actual expenditures through cost accounting systems, multiplying cost and use data is not ideal for estimating expenditures on curative care, because unit cost derivation is often based on the “ideal,” or full set of services rendered. To the extent that services are inefficiently provided, unit cost estimates will be higher. As an alternative to a simple multiplication of cost and use data, such information can be used to develop ratios of expenditures or weights that can then be applied to the total expenditure incurred at facilities. The greater the detail available in the cost estimates, the greater the ability to generate weights for specific components of malaria programmes.

Although the practice of multiplying cost (price) and use data is not ideal for curative care expenditures, it is not a limitation for deriving commodity expenditures, because usually there is no variability in the services rendered when commodities are purchased or obtained. Cost equals price in market goods. This is true not only of commodities but also of market services.

### 6.4 Summary

The data analysis stage requires access to a variety of data, both directly and indirectly associated with NHA. Such data may range from expenditure information to data on cost, use, population, and prevalence of the disease. Because of the extent of this information, it would be best if it could be assembled in advance to avoid data analysis bottlenecks. Some guiding principles for the analysis itself, particularly for the malaria estimation, are to always check the “primary purpose” of the reported
expenditure in question and to revisit the boundaries of the subaccount. Specific estimation issues include boundary queries (particularly relating to overlaps with other subaccounts, health related and non-malaria related), commodity transfers, and the extraction or addressing of malaria expenditures embedded within integrated activities. The latter issue can be one of the trickier matters to address. While not negated altogether, it is best to keep the “separating out” of integrated activities to a minimum in order to preserve expenditure data and to curtail “guesstimates.” Sometimes it may be necessary to derive malaria proportions from integrated activities; in these cases, it should be done when the malaria expenditure is thought to be sizeable and when the full value of the integrated activity is likely to be significantly overestimated. Regardless of what approach is used, it is critical that all assumptions and estimation techniques be thoroughly documented. Countries will find that as their information systems improve and NHA data collection becomes routine, they will rely less on estimation techniques and more on actual detailed expenditure data.
7 Implementation process for malaria subaccount

7.1 Objectives, overall process, and cost considerations

The discussions in this section and in sections 7.2–7.4 assume that the malaria subaccount will be done either concurrently with general NHA activities or within the context of an NHA that has been previously completed. Section 7.5 covers a special case where the malaria subaccount is to be developed as a stand-alone study and the resulting issues that would need to be addressed. It is further assumed that in most cases the malaria subaccount activities will start up as a project with some funding. The overall process to conduct a malaria subaccount project will be determined by the following considerations:

- objective with respect to whose data needs the malaria subaccount results are intended to satisfy
- objective with respect to institutionalizing malaria subaccount estimation activities
- budget for the project phase (and long-term cost considerations if estimation activities are to be institutionalized).

Presumably, health sector stakeholders expressed a need for data on malaria expenditures and financing, which then provided the rationale and motivation to initiate the subaccount project. In order to optimize the usefulness and utilization of subaccount results, however, as well as gain widespread support for the project, more stakeholders (other than the initiators) have to be involved. Possible duplication of efforts (eventually conflicting data and wasteful use of resources) can also be avoided by informing and involving a wider range of stakeholders. A special committee for malaria within the NHA steering committee will have to be formed to provide guidance about relevant malaria policy issues, to identify data useful for policy-making, and to facilitate project implementation. The need to involve stakeholders and examples of stakeholders are discussed in section 7.2.

The operational structure of the project phase can be designed such that institutionalization of methodologies and estimation activities are automatically taking place even as the project is ongoing. The technical team — the group in charge of actual project work (from data collection to data analysis and report writing) and the production of the malaria subaccount tables — should include members who are expected to continue these tasks after the project phase is over. Although the team members should be formally trained in the malaria subaccount methodology (i.e. during an NHA training workshop at the onset of the project), they essentially will be “learning” the subaccount methodologies by their involvement. The possible structures, roles, and composition of the NHA/malaria technical team are discussed in section 7.3. A summary of the entire process, specific tasks/activities, and suggested timeframe are presented in section 7.4.

While expressed needs of stakeholders are the primary guide or indicator of the kinds of malaria financing data that the subaccount should produce, data availability and cost of data collection are other important factors that determine which NHA subaccount tables are feasible for the country. A thorough inventory and assessment can establish limitations in existing data for NHA or subaccount purposes. Having a substantial budget for data collection can compensate for severe limitations or gaps in data. On the other hand, only a small data collection budget would be required if the existing data can fulfill most of the data needs of NHA or the subaccount.
The decision as to which NHA tables to produce for the subaccount (and, also important, the level of
detail to pursue for the various classification schemes) must be made, bearing in mind the implied data
collection cost, which as explained above depends on the state data availability in the country. This
decision should be made on two levels: first, the target tables produced and financed during the project
phase; and, second, the NHA tables eventually produced routinely (and the frequency) given the context
of very limited resources after the project ends. The project phase can provide the opportunity to establish
the methodologies for generating a wider array of NHA malaria tables. Following the ending of the
project, only one or two NHA malaria tables may be routinely produced. As the data system improves,
however, potentially more tables can be produced using the methodologies already demonstrated during
the project phase.

The pilot activities in Rwanda and the Philippines pointed to another important factor that would
determine the approach taken in malaria subaccount work. In Rwanda, malaria is present throughout the
country while in the Philippines, it is significant in only selected provinces and, in fact, is absent in some
provinces. Thus, the importance of the kinds of financing information generated by the malaria
subaccount would be of great importance and need at the national level for Rwanda and only for selected
provinces in the Philippines. Hence, the subaccount was carried out nationally in Rwanda and for a
selected province, Davao del Norte, in the Philippines.

In terms of the extent of malaria subaccount work (tables and detail) carried out, the Rwanda
implementation produced a total of nine tables with considerable detail for some of the classifications.
The Davao del Norte province implementation produced three tables with less detail compared to the
Rwanda tables (See Box 7.1 for a discussion on the selection of the Davao del Norte malaria subaccounts
tables). Some of the Rwanda and Davao del Norte tables are presented in Annexes 6 and 7.
7.2 Involving stakeholders

Two sets of stakeholders, grouped in terms of their primary function, need to be involved in the process of producing NHA malaria subaccount tables: potential users of subaccount findings, and input data generators/data sources and institution(s) that will produce the NHA subaccount (i.e. during project phase and potentially after the project ends.) Note that some stakeholders may be both subaccount users and input data sources.

7.2.1 Data users

The first set of stakeholders can provide insight into their specific areas of interest and help identify policy questions for which the NHA subaccount can help provide answers. In addition, their having immediate access to subaccount results can contribute towards the adoption of policies made based on good information and the eventual implementation of such policies.

Potential NHA subaccount users may include the following: (1) policy-makers in charge of general health sector policies (mainly the MoH); (2) malaria programme managers; (3) financing sources and financing agents for malaria including health insurance and donors; (4) providers of malaria goods and services such as hospitals, health centres, drug companies, and community and other NGOs involved in malaria-related activities; and (5) academic and research institutions involved in health policy research.

7.2.2 Data generators

The second set of stakeholders can provide insight on the data situation (e.g. what is available, quality of data) and concepts/definitions/estimation procedures applied in existing data. Some of these institutions have the expertise to carry out primary data collection (e.g. National Statistics Office and routine national...
surveys). The collection of data for the NHA subaccount could piggyback on existing surveys and other data compilation activities carried out by these stakeholders, with possibilities that these arrangements could be made permanent.

Entities that can potentially provide data and technical inputs to NHA subaccount estimation include the following: (1) statistical agencies that carry out routine surveys and compile various kinds of data; (2) statistical units of government health offices; (3) government budget, accounting, and finance offices; (4) health insurance agencies and other malaria-financing sources or agents; and (5) providers of malaria goods and services.

### 7.2.3 Local stakeholders

The involvement of stakeholders operating at local levels (such as the provincial health office and regional/provincial malaria programme managers) is necessary if a subnational NHA subaccount is being implemented. Local stakeholders include the following: MoH representatives based in the study site; regional, provincial, and municipal malaria programme managers; provincial and municipal health and accounting offices; and others.

### 7.2.4 Examples of stakeholders

Examples of stakeholders involved in the malaria subaccount pilot activities in Rwanda and Davao del Norte, Philippines, are listed in Boxes 7.2 and 7.3.

#### Box 7.2. Stakeholders involved with the Rwanda malaria subaccount

1. Director of the PNLP (Malaria Control Programme at the MoH)
2. Coordinator of the Global Fund grant for malaria
3. WHO focal person for Roll Back Malaria activities
4. Malaria donor representatives (e.g. the Belgian technical cooperation, USAID)
5. Department of Planning and Department of Finance, MoH
6. Ministry of Economics and Finance

#### Box 7.3. Stakeholders for the Davao del Norte Province malaria subaccount

2. Philippine Health Insurance Corporation
3. National Statistical Coordination Board
4. National Statistics Office
5. Department of Health (Regional Offices) – Center for Health Development – Davao Region/Malaria Unit – Provincial Health Team – Davao del Norte – Davao Regional Hospital
6. Office of the Provincial Governor – Davao del Norte
7. Provincial Health Office and Municipal Health Offices – Davao del Norte
8. Provincial Accounting Office and Municipal Accounting Offices – Davao del Norte
10. Global Fund/Philippine Rural Reconstruction Movement (Davao del Norte Office)
11. WHO-Western Pacific Region Office and Philippine Country Office
7.2.5 Systematic involvement

The participation of stakeholders in the NHA subaccount process may be organized systematically:

- form a subcommittee for malaria within the general NHA steering committee, a small group consisting of key malaria stakeholders whose functions are mainly to provide guidance, facilitate data retrieval, generally support the process, and act as a link between the malaria subaccount project and the bigger group of stakeholders (more detail below)
- form the NHA subaccount technical team, a group consisting of stakeholders who will be actively involved in the NHA subaccount estimation work during the project phase and some of whom will continue estimation activities as a routine function after the project ends.

The level of involvement of stakeholders depends on the operational structure adopted during the project phase (more detail can be found in section 7.3). The technical team will be trained and guided on NHA methodologies by NHA experts, and be informed about malaria by epidemiologists and malaria experts. The technical team will have regular consultations with the NHA steering committee/malaria group to obtain guidance on policy issues, and to inform the latter about methodological issues, preliminary estimates, and general work progress. The NHA steering committee/malaria group in turn will organize periodic meetings with the bigger group of stakeholders to relay project findings and to solicit feedback concerning the estimates. Regular reporting to stakeholders about subaccount work progress and findings is one way to maintain their cooperation.

An example of the relationship between the steering committee and the technical team is illustrated in Figure 7.1 in Rwanda’s organogram of the key players involved in the NHA process.

In general, the NHA steering committee (including the malaria group) provides guidance about relevant health policy issues and ensures that the NHA and subaccount work are focused on the identified policy areas. Thus, it is recommended that the malaria group in the NHA steering committee include a representative from the policy development unit of the MoH and representatives from malaria interest groups such as malaria control programmes, donors, and private provider organizations. The responsibilities of the NHA steering committee, which are also applicable to the malaria group, may be summarized as follows:

- meet regularly with the technical team to guide the latter on relevant policies and priority areas, and to be informed by the latter on methodological issues and subaccount results;
- assist the technical team by facilitating the NHA/subaccount process (particularly, the primary data collection phase);
- organize meetings and workshops with the bigger body of stakeholders to discuss subaccount findings;
- recommend new policies and/or policy changes identified using NHA/subaccount findings.
7.3 Technical team

The technical team carries out actual subaccount (in addition to general NHA) estimation activities and report writing and participates in dissemination workshops. In order to ensure consistency in the estimation procedures implemented and the quality of the subaccount results, the team should be trained in NHA methodologies. A resource (in addition to these guidelines) that should be utilized from the start of the project and which can continue to guide post-project subaccount work is the NHA Producers’ Guide. Close adherence to the principles and methods recommended in the guidelines can ensure consistent quality of output in the future.

Estimation activities include designing and implementing data collection and data analysis. Thus, the technical team must include not only health financing analysts but also experts on data collection such as National Statistics Office personnel. Because malaria expenditure estimation also requires being informed about malaria as an illness, malaria treatment courses, and malaria control activities, the technical team
can be strengthened by including malaria experts as members. In addition, the NHA technical team may wish to involve or consult with other experts such as epidemiologists, demographers, and clinicians.

The operational structure of the project phase can follow either of two possible models. In the first (and ideal) model, the stakeholders identified as members of the technical team directly carry out the subaccount activities themselves. This structure is ideal because “learning by doing” the NHA subaccount is built into the process. The technical team would be closely guided by NHA experts (i.e. consultants hired by the project) in the various stages of estimation work. In most cases, however, the representatives sent by the stakeholder entities to participate in technical committee work would generally be doing this work in addition to their regular or existing routine functions. In general, the representatives may not be in any position to commit the time the subaccount project requires.

Thus, in the second (and more practical) model, during the project phase the technical team will not only consist of stakeholders but also a core project staff that will include technical consultants and researchers hired by the project. The core project staff may in fact come from a consulting firm. The core project staff will carry out the day-to-day activities of the project (including arranging meetings, collecting data, and writing reports) in close consultation with stakeholder members. The entire team will be involved in making important decisions, particularly concerning estimation issues. Examples of technical team composition are provided in Boxes 7.4 and 7.5 for the Rwanda and Davao del Norte, Philippine malaria subaccounts, respectively.

If the NHA subaccount estimation activities are to be institutionalized, the team must also include at least one member from the agency that will continue the estimation work after the project phase ends. Because the MoH has few trained accountants and health financing analysts, routine estimation work (at least in the short term) will need to be conducted outside the MoH and within an existing statistical unit. For example, the unit or agency of government that produces the national income and product accounts has some of the basic skills and training needed to implement the NHA subaccount. The unit or agency that is likely to continue NHA subaccount work in the future should take the lead role in the technical team.

The tasks of the technical team may be summarized as follows:

- Describe how malaria goods and services are provided and accessed through the existing health system and market structure.
- Identify malaria stakeholders at each level of the NHA flows: financing sources, financing agents, and health care/services providers.
- Undertake inventory and assessment (of usefulness) of existing data for NHA subaccount, and identify gaps and needed additional primary data collection.
- Implement data collection.
• Compile, validate, and analyse financial data, and produce NHA subaccount tables.
• Document subaccount methodologies and data sources, and prepare reports on estimates.
• Report regularly to the NHA steering committee/malaria group to present subaccount estimates as they are completed and estimation issues encountered.

7.4 Workplan

The amount of effort and time required to complete subaccount work depends on the number of NHA tables to be completed and the country’s data situation. Primary data collection and processing can be time consuming. Given limited existing data, producing more tables means more primary data will need to be collected. Also, if conducting a general NHA, the addition of a subaccount lengthens each step of the NHA process. This should be factored into the workplan design.

As mentioned in section 7.1, however, several tables may be produced during the project phase and their number be reduced to only one or two tables (e.g. the FA x HP and/or FA x HC), for routine production after the project ends. Thus, more time will be required to complete NHA subaccount activities during the project phase compared to the succeeding years. The project start-up activities and the testing of estimation methodologies may also explain the additional time needed during the project phase, both of which will not have to be repeated later. Table 7.1 summarizes NHA subaccount project activities with the suggested timeframe.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Month</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Start-Up</td>
<td></td>
</tr>
<tr>
<td>Form the malaria group within the NHA steering committee</td>
<td>1</td>
</tr>
<tr>
<td>Form the NHA malaria subaccount technical team</td>
<td>2</td>
</tr>
<tr>
<td>Conduct training workshop and develop project workplan</td>
<td>3</td>
</tr>
<tr>
<td>Project Implementation</td>
<td></td>
</tr>
<tr>
<td>Identify malaria-relevant entities in NHA flows</td>
<td>4</td>
</tr>
<tr>
<td>Undertake inventory and assessment of existing data, identify gaps, and develop data collection plan</td>
<td>5</td>
</tr>
<tr>
<td>Set up and finalize formats (i.e. row and column categories) of subaccount tables to be produced during the project phase</td>
<td>6</td>
</tr>
<tr>
<td>Collect secondary data</td>
<td></td>
</tr>
<tr>
<td>Undertake primary data collection</td>
<td></td>
</tr>
<tr>
<td>- design survey instruments</td>
<td>7</td>
</tr>
<tr>
<td>- develop sampling frames and sample selection schemes</td>
<td>8</td>
</tr>
<tr>
<td>- pre-test survey questionnaires</td>
<td>9</td>
</tr>
<tr>
<td>- arrange logistics for implementation of surveys</td>
<td></td>
</tr>
<tr>
<td>- implement data collection</td>
<td>10</td>
</tr>
<tr>
<td>Design data entry screens</td>
<td></td>
</tr>
</tbody>
</table>
Create electronic data file and clean data

Analyse data and produce NHA subaccount tables

Write report and submit to steering committee for review

• **Dissemination and Feedback**
  
  Present subaccount findings to stakeholders and get feedback both on estimates and policy implications of findings

Incorporate use of NHA subaccount findings into the policy process

• **Institutionalization**

Document agreed upon institutional arrangements and assignment of tasks for routine production of NHA subaccount and new timeframe

### 7.5 Estimating malaria expenditures as a stand-alone study

To estimate malaria expenditures, these guidelines recommend that the malaria subaccount be conducted in conjunction with the estimation of a general NHA or within the context of an already existing NHA. The usefulness and comprehensiveness of the subaccount estimates are enhanced if the NHA is available as a reference, because the significance of malaria expenditures can then be examined against other health expenditures. This comparison is important for policy purposes because malaria competes with other health needs for a limited pool of resources, which is measured by the NHA. Estimating malaria expenditures can be done comprehensively using the NHA boundaries and scope as a guide.

When malaria expenditures have been estimated without NHA but through using COI studies, as described in Chapter 2, the categories of expenditures or costs included in the COI estimates have not been limited to those for the treatment and prevention of malaria (i.e. NHA categories). Rather, these expenditures have included costs that do not involve resource transfers such as forgone income and intangible costs.

To undertake or to use results of stand-alone studies of malaria expenditures, two sets of issues need to be taken into account: how well NHA expenditure components are captured, and how non-NHA components have been included in the estimation. NHA-related issues would include the following:

- What malaria targeted expenditures (i.e. treatment and prevention) are included?
- What non-targeted health expenditures are included? How were these expenditures allocated between malaria and other health activities (e.g. integrated vector control, surveillance, capital outlays)?
- What health-related expenditures (research and training) are included? How was the boundary between malaria and non-malaria expenditures defined?

If not bound by the NHA framework, the stand-alone estimates of malaria costs are likely to include components not included in the NHA such as those estimated in COI. These items need to be clearly distinguished from expenditure items that are within the scope of the NHA.
Bearing in mind the above-mentioned issues, the team needs to be careful when comparing malaria expenditures estimated as stand-alone with results of other similar exercises, especially if the various components being compared were not estimated using uniform concepts and methodology. Moreover, as a stand-alone study, the malaria expenditure estimates may not be an effective monitoring tool because of the lack of a reference such as the NHA. In addition, if conducted outside the MoH, there may be less opportunity for use and incorporation of the results in the policy process.

While not recommended, the team may estimate malaria expenditures without the NHA. This may be more efficient, but only in the sense that it will not be necessary to coordinate the study with the general NHA process or involve multiple stakeholders.

7.6 Summary

A malaria subaccount project should be initiated by potential users of the information that will be generated. The need for data, particularly to address health policy issues, should be the prime motivation to undertake a subaccount project to ensure the eventual utilization of project output. In addition to the initiators, more stakeholders should be involved in the process, although in various degrees (i.e. from being informed and consulted to actively participating in estimation work), to gain widespread support for the project and facilitate its implementation. Stakeholder roles can be assigned and organized. Some stakeholders who are already part of the general NHA steering committee and who are or have been involved in malaria-related activities could form a subcommittee to “steer” specific subaccount activities. Stakeholders who can contribute substantively to subaccount estimation work as well as facilitate data collection may be assigned to the technical committee.

The technical committee will be in charge of actual project work (from data collection to data analysis and report writing). The technical committee could be composed purely of stakeholders or of stakeholders and a core project staff (i.e. consultants and researchers). If the NHA subaccount estimation activities are to be institutionalized, the technical team must also include at least one member from the agency that will continue subaccount estimation after the project ends.

Consultations with stakeholders will reveal specific data needs with regard to malaria financing, and this information can be used as input to make decisions about target NHA subaccount tables for the project. The data situation in the country and budget constraints are two other factors that will influence this decision. The amount of effort and time required to complete subaccount work will depend on the number of target NHA tables and the level of detail pursued for each expenditure classification.
Bibliography


RBM. Children and Malaria. RBM fact sheet. RBM, Geneva. www.rbm.who.int


Annex 1: Indicators on malaria resource monitoring

Background

Every resource monitoring effort is a unique exercise. Methodological challenges for computing policy-relevant indicators come from the structure of a health system: its information infrastructure, and the design and delivery of malaria-targeted services. Differences in the content of regional malaria programmes argue for flexibility in devising a generally agreeable set of indicators. Ultimately, these indicators should be constructed according to country-specific priorities. For comparative purposes, a minimum set of indicators is described here. These indicators are developed based on policy needs, particularly those stemming from international agreements. In addition, this annex suggests optional indicators that may be considered depending on local policy characteristics and on regional context.

The proposal below is not exhaustive and is mainly designed to present choices of indicators linked to the various health accounting classifications and to potential policy uses. The measurement involves data in monetary units and in physical (non-monetary) units. The selected indicators are in-line with the United Nation’s (UN) most recent resolution (19/12/2005) regarding the 2001-2010 decade to extirpate malaria from developing countries, particularly in Africa, and with related international agreements. Specific interventions with respect to health accounting must include, at the minimum, the priorities highlighted by the UN in the Millennium Development Goals and the Abuja Declaration of African Heads of State (UN A60/L.44, www.rbm.who.int/cgi-bin/rbm/rbmportal/custom/rbm/home.do and):

1. an increase in the level and the sustainability of funding for malaria interventions, and for research and development on prevention and control tools by the international community
2. an increase in the level and the sustainability of the allocation of domestic resources for malaria control, in coordination with private partnerships
3. the establishment and/or strengthening of major preventive and curative interventions in order to achieve at least a 50% reduction in the burden of malaria by 2010
4. the promotion of the use of insecticide-treated mosquito nets (ITN), insecticides for indoor residual spraying (IRS) for malaria control, effective antimalarial treatments, with specific protection of young children and pregnant women, particularly through ITN.

In addition to guidelines in this manual, the use of complementary material is encouraged, such as Roll Back Malaria Partnership (RBM) materials, including notably the guidelines for core population coverage indicators for RBM published in conjunction with MEASURE Evaluation, UNICEF and WHO.28

Purpose of policy indicators

Malaria programmes have a long history in most countries. Though core intervention components are clearly identified, specific epidemiological conditions define operational components in each country and in each region. Availability of resources adjusted to requirements and allocation processes have equity, effectiveness, efficiency and empowerment implications.

As in all resource-tracking exercises, the main questions to be answered through the estimation results include:

- how much is spent on malaria?
- how is the burden of expenditure distributed across the constituent programmes?
- which interventions are financed?
- who benefits?

Additional questions regarding the policy and the allocation process include:

- is the expenditure on malaria changing? how fast? in what sense?
- is the expenditure on malaria enough to cover the population at risk?
- is this expenditure providing the population with all the services they require?

In terms of malaria resource monitoring, the relevant learning process has led to fluctuations in resources and in efforts, which adversely affect programme achievements. It is thus desirable to measure sustainability and expenditure trends. Fluctuation of resources can only be measured by trends in expenditure over several years. Health accounting as a monitoring and analytical tool should therefore be conducted repeatedly so as to construct a database allowing the analysis of changes over time in levels and in sources of expenditure. Sustainability in terms of malaria programmes implies a volume of resources sufficient to generate a package of basic services. Generally speaking, programme monitoring and evaluation (M&E) plans use structure, process, output and outcome indicators. Ideally, all may be linked to the malaria programmes with priority given to the internationally agreed commitments.

Indicators are summary measures that synthesize complex conditions. Developing indicators that meet both sensitivity and specificity requirements is a major challenge, and the goal is to generate indicators that are universally understandable and easily interpreted. A basic set of indicators can be directly generated from the Health Accounts (HA) tables, and others may use additional information, including other indicators. A set of widely used indicators, such as Gross Domestic Product (GDP), the relative value of a currency and per capita income, are frequently linked to the resource measurement process.

The quality of data input is key to define the value and reliability of each indicator. In some cases, data availability constitutes the first barrier in the generation of an indicator. Indicators proposed in this annex basically use malaria accounts results. In some countries the set of tables is generated progressively. Thus, the indicators that can be implemented in a country depend on which HA tables have been initially produced for the accounts. For example, indicators on external funds cannot be computed when tables with the Financing Sources (FS) breakdown are not available. For countries with a limited set of data, decisions on the expected indicators should be linked to decisions on which tables to construct.

Furthermore, inadequate definitions and construction procedures constitute obstacles. The data sources should be appropriate for the selected indicator under construction regarding both the numerator and the denominator. When numerator and denominator are constructed through a HA methodology they should generate a compatible and consistent measurement. Using other than HA approaches, however valid, may lead to biases in the results.
The final stage of an accounting estimation involves the generation of indicators and their linkage to policy issues. An effort to generate indicators may be required, in some cases involving a consequent investment in cost and in time. A clear planning process of data records and its format are necessary for the construction of adequate indicators.

The selection of indicators is linked to information needs, availability of information and particular conditions to each country. For example, ITN has been proposed as a targeted component indicator. However, for countries such as the Philippines, where the prevention of malaria activities are varied (e.g. ITNs and mass blood surveys) and significant relative to curative care, a more useful indicator would be total public health expenditure (HC6) as % of THEM.

The following listing describes a **minimal** set of desirable indicators for monitoring and for comparative purposes. Each indicator is described in terms of its definition, its use, a summary description and a note on challenges regarding its construction. A complementary list of **optional** indicators is proposed with greater detail in the section on programme components. Finally, selected examples of an **expanded** set of indicators are put forward for cases where more information is available. Components of each case are basically linked to potential data availability in countries. Accessibility to data on a recurrent basis constitutes a necessary feasibility and sustainability criterion.

### Indicators on resource tracking in the Malaria Programme: a proposed set

<table>
<thead>
<tr>
<th>Level</th>
<th>Domain</th>
<th>Indicator</th>
<th>Potential NHAM table sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum data set</td>
<td>Financing</td>
<td>THEu as % of general THE</td>
<td>All tables provide THEu</td>
</tr>
<tr>
<td></td>
<td></td>
<td>THEu per capita at exchange rate (US$) (population at risk)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>THEu per capita at international dollar rate (int$) (population at risk)</td>
<td></td>
</tr>
<tr>
<td>Minimum data set</td>
<td>Financing</td>
<td>Externally funded expenditure on malaria as % of THEu</td>
<td>FS x FA</td>
</tr>
<tr>
<td></td>
<td>Sources</td>
<td>Externally funded expenditure on malaria as % of total external</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>expenditure on health</td>
<td></td>
</tr>
<tr>
<td>Minimum data set</td>
<td>Financing</td>
<td>GGHE on malaria as % of GGHE</td>
<td>FA</td>
</tr>
<tr>
<td></td>
<td>Agents</td>
<td>OOP expenditure on malaria as % of THEu</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>OOP expenditure on malaria as % of THEu</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>OOP expenditure on malaria as % of OOP expenditure on general</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>NHA</td>
<td></td>
</tr>
<tr>
<td>Minimum data set</td>
<td>Factor of Production</td>
<td>Expenditure on pharmaceuticals as % of THEu</td>
<td>FA x RC</td>
</tr>
<tr>
<td>Minimum data set</td>
<td>Programme level</td>
<td>Expenditure on insecticide-treated nets as % of THEu</td>
<td>Tables comprising RC</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Expenditure on malaria diagnosis as % of THEu</td>
<td>HC</td>
</tr>
<tr>
<td>Minimum data set</td>
<td>Monographic interest</td>
<td>Budgeted vs. executed resources on malaria</td>
<td>NHA background documents</td>
</tr>
<tr>
<td>Minimum data set</td>
<td>Efficiency</td>
<td>Average expenditure on malaria cases (%THEu/Malaria cases treated)</td>
<td>All tables provide THEu</td>
</tr>
<tr>
<td>Optional</td>
<td>Providers</td>
<td>Expenditure on malaria in hospitals as % of THEu</td>
<td>Tables comprising HP.4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Expenditure on malaria in outpatient centres as % of THEu</td>
<td>Informal sales may require a specific survey</td>
</tr>
<tr>
<td></td>
<td></td>
<td>OOP expenditure on pharmaceuticals incurred in shops and with street vendors % sales in pharmacies</td>
<td></td>
</tr>
<tr>
<td>Optional</td>
<td>Factor of Production</td>
<td>Expenditure on HRH on malaria as % of THEu</td>
<td>Tables comprising RC</td>
</tr>
<tr>
<td>Optional</td>
<td>Functions</td>
<td>Expenditure on inpatient care as % of THEu</td>
<td>Tables comprising HC</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Expenditure on outpatient care as % of THEu</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total public health expenditure (HC6) as % of THEu</td>
<td></td>
</tr>
<tr>
<td>Optional</td>
<td>Beneficiaries</td>
<td>Per capita expenditure on malaria at subnational level (population at risk)</td>
<td>Subnational accounts</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Average expenditure by pregnant woman served</td>
<td>Tables comprising THEu</td>
</tr>
<tr>
<td>Optional</td>
<td>Effectiveness</td>
<td>Expenditure on treatment of severe malaria as % of THEu</td>
<td>All tables provide THEu</td>
</tr>
</tbody>
</table>
A conceptual effort has been made to identify malaria health accounts that are achievable/constructable. Experience has shown, however, that construction of all types of accounts, requires conducting field studies to arrive at a more comprehensive approach. Such studies work synergistically with conceptual efforts to construct health accounts.

I. Minimum set of indicators

1. Total Expenditure on Health on Malaria (THE\textsubscript{M}) as \% of Total Expenditure on Health (THE)

**Definition:** amount of resources channelled towards malaria-specific programmes (THE\textsubscript{M}) as a share of THE\textsuperscript{29}, expressed as a percentage.

**Description:** the sum of resources used by the general government and private entities to prevent malaria and to restore a health status lost on account of the disease and to gradually reduce, and hopefully, eradicate the vector (THE$_M$).

Interventions linked to malaria control programmes involve curative, preventive and public health services, provision of medical goods and administration. Investment resources specifically linked to interventions on malaria are also recorded. An equivalent measurement scope covering the whole spectrum of health activities applies to THE.

Because the spectrum of the malaria impact on health and the required interventions can be direct, as well as comprise long term and indirect effects, this manual targets, for comparative purposes, the interventions to prevent, treat and rehabilitate, with the administrative and investment costs associated to the direct effects of malaria (THE$_M$). The indicator is associated with the direct and basic components of the malaria programme. It does not include interventions of the indirect and long term impact of malaria, nor the memorandum items linked to the malaria condition.$^{30}$

This indicator includes THE$_M$ as a numerator and the equivalent or total expenditure on health (all health activities, not exclusively focused in malaria) as a denominator, multiplied by 100.$^{31}$

---

$^{30}$ An expanded composition is obtained through the measurement of the memorandum items, not included in Total Expenditure on Health: environmental, training and research and development, are considered as highly relevant components of the malaria programme, though they are not added as part of the total neither for health nor for malaria interventions. Though kept as memorandum items, they are relevant to measurement and susceptible to be compared independently of the equivalent components on total health activity.

Besides the basic coverage of the health components of Total Expenditure on Health and the expanded composition reached through the memorandum items, additional measurement of social benefits is sometimes desirable. Specific components include the expenditure in cash or in kind benefits to compensate income loses and other economic items. As in the previous cases, these components should be clearly labelled and kept as memorandum items, independent, not included as part of the total expenditure on health.

$^{31}$ A less consistent scenario can be found, where health accounts exist and no malaria health accounts have been estimated. In such cases, the basic principles of the methodology can be pursued in a preliminary way, as in a “concurrent -malaria health accounts” procedure, in order to approach the measurement feasible to be reached. The general principles to that aim have been described along this guide and can be roughly summarized as follows:

a) a double entry to track origin and use of resources and to avoid double or partial counting

b) a systematic measurement of all components, including government and private ones

c) measurement of at least 2 out of the 3 dimensions (financing, production, consumption) to ensure comprehensiveness. A priority given to financing and provider is suggested in case a shortage of resources make the light exercise be necessary
d) equivalent amounts should be reached in all 3 dimensions as well as in their vectors expressing the mean and the actor involved (for the financing dimension: vectors of sources and of agents; for the production dimension, vectors of cost of factors and of providers; and for the consumption dimension vectors of functions and of beneficiaries)
e) evaluation should preferably be made on an accrual instead of cash basis (valuation of resources used at the time they were consumed instead of the time when they were paid)
f) if resources to perform measurement are scarce, a priority may be given to measure those items with a larger amount of resources used unless some strategic view is linked to those with a known lesser amount (e.g. preventive costs are frequently lower than curative and their total amount as expenditure is also lower however strategic)
g) a detailed record of data sources and procedures followed to perform the estimation has to be made so that a reproduction of the estimate can be reached by anyone if required. All departures of the methodology statements in the guide should be made explicit
Use: an assessment of the investment in activities aimed at controlling, and treating malaria. It is one of the most important indicators, being a comprehensive measurement of resources specifically used in the malaria control programme and identifying the relative allocative effort of a nation in this area.

The percentage weights the specifically effort made to fight malaria in a health system. The share should vary accordingly with the relevance of a roll back malaria as a health need.

Sources and methods: Totals of malaria health accounts taken from tables by financing agent and provider. THE\textsubscript{M} is expected to be the numerator and the denominator the THE of health accounts in general. Both totals are obtained from health accounts tables using preferably financing sources and provider tables.\textsuperscript{32}

2. Per capita \( \text{THE}_{\text{M}} \) (NCU, X rate and international dollars)

Definition: total expenditure on health channelled towards interventions on malaria relative to the population at risk. The absolute amount can be expressed in units of national currency, in US$ and /or international dollars or PPP (purchasing power parities).

Description: \( \text{THE}_{\text{M}} \) is equivalent to the total amount that government and private units channel to prevent, maintain and increase health of individuals and population regarding malaria.

The total amount is measured in relative terms to the population at risk to be covered. The coverage of the basket of services received for this programme should be in-line with the risk level of the population, usually linked to geographical areas. This indicator refers thus to the population in risk areas. In the few countries where malaria areas spread widely, the whole population should be used as denominator.

Estimates expressed in national currency units and to make comparisons easier, at exchange rate in USD and in international dollars or PPP (purchasing power parities).

Use: measures the average amount of resources relative to the population to be covered and the value of the average basket of goods and services used up during interventions on malaria. The indicator is useful to verify if the expenditure allocated is enough to cover the basic basket of services to be provided in the malaria programme, the minimum required.

Per capita values allow an assessment of the average quantity of resources used in the interventions on malaria in total values. Though allocation is not defined, this can contribute to compare the average

\textsuperscript{32} When a major effort has been placed on the memorandum items, a complementary measurement of the ratio involving them could be used as a more comprehensive interpretation of the use of resources. But, in all cases, it is advisable to indicate the inclusion of the memorandum items and mention it as national health expenditure on malaria (\( \text{NHE}_{\text{M}} \)) on malaria, see the \textit{Producers’ Guide}. It is relevant also to ensure that the numerator and the denominator correspond to the expanded measure.
resources needed for a specific basket of interventions as well as estimating a total expenditure in terms of the population to be served. Thresholds can change in some cases but allow interpreting the total amounts. Assuming equal needs, inequities are expressed as differences in per capita resources available this is why the denominator should be the population at risk.

When expressed as USD and/or PPP comparisons are feasible among cross country programmes.

**Sources and methods**: malaria health accounts results and the health accounts when a specific breakdown is given for malaria expenditure. Totals from tables including financing agents and providers generate the $\text{THE}_M$ and in case the breakdown is included from NHA in general, from tables with the function classification and the breakdown for malaria interventions.\(^{33}\)

An average annual or a mid-year population level is preferable. In countries where the population at risk covers only a part of the country, both numerator and denominator should be adjusted accordingly. The malaria programme may have data on population and their reports to the RBM database can be found in http://rbm.who.int/merg#morbiditytf.

The NCU used are expressed in current terms. Conversion to USD is done through exchange rates expressing the average annual parities (USD and PPP). Parities to USD calculated by the central bank reports are also reported in International Financing Statistics. The World Bank PPP covers between 140-160 countries. An additional source can be taken from the www.who/nha database which covers 192 Member States.

**Challenges**: lack on data of the population at risk at sub national level in which case estimates rely on the better national estimates. Difficulties with parities can be relevant when there are differences between the official exchange rate and the parallel or informal exchange rates in which the values of the official exchange rates can be irrelevant to reflect currencies. When inappropriate USD exchange rates are used to get PPP/international dollars rates, the values can be greatly distorted.

3. Externally funded $\text{THE}_M$ as % of $\text{THE}_M$

**Definition**: the share of external resources used on the measured expenditure on health on malaria, as percentage of $\text{THE}_M$.

**Description**: All external resources are to be accounted, labelled or no labelled to be allocated in the interventions on malaria, used by all resident entities either private and/or general government on health interventions on malaria.

**Use**: measures the origin of resources used in the interventions on malaria and their weight in the total. It is useful while analysing sustainability and the policies to obtain and distribute external funding.

Indicates the relevance of the use of external resources in the whole basket of interventions on malaria.

\(^{33}\) When data is taken from general health accounts, the total amount should correspond in the content to $\text{THE}_1$, both to preventive and public health components as well as curative and administration.
Sources and methods: malaria health accounts results and HA reports. Data is taken from the table with the financing sources computation. When a recurrent reporting in financing sources is not yet established, some information in the general health accounts report with detailed sources of resources used in health interventions on malaria may be supplied in case the financing sources data by function displays the components of interventions on malaria. Ministries of Finance, Central Statistical Offices and Central Banks may have relevant pieces of desirable information. See methodological details for estimation in section 5 of this manual.

Original records to be found in the recipient entities: in case of centralized records no questionnaire may be needed. Experience shows that an increasing number of external funding agencies have a specific record of the purposes of the grants accessible though this may not be the general situation.

The numerator of the indicator includes the total amount of external resources used in the health interventions on malaria the denominator total expenditure on the health interventions on malaria in NCU, times 100.

Challenges: lack of detailed records; lack of records for direct donations to households and private entities; the accuracy of accounting for resources appropriated in one moment but spent subsequently; differences in the valuation of resources given and resources received; the valuation of in-kind goods and services (to reflect their local market value) and additional distribution of costs, mainly when multiple intermediation channels co-exist.

4. Externally funded expenditure on malaria as % of total external expenditure on health

Definition: the relative amount of external funds used in the interventions on malaria regarding the total amount of external resources channelled to health care, as percentage.

Description: The external funds include both labelled and not labelled to malaria. The scope of the interventions on malaria is the one has been indicated for THE₅₅. The total expenditure on health through external funds involves all interventions classified as health functions.

The external funding channelled to malaria is the numerator and the denominator the total external funding used in health care interventions, times 100.

Use: it measures how much of the total external funding is used in the interventions on malaria compared to other uses of external resources. This information is useful for planning and allocation purposes as well to interact with external funding agencies.

The share devoted to malaria out of the total external funding contributes to inform the level of interest in this field among the external funding agencies, the level of reliance of the malaria programme on external funding and the additional external resources that can be channelled to malaria.

Sources and methods: to estimate this indicator two measurement levels are required: external resources used in the interventions on malaria and the total amount of external resources used in the health system, as part of the total expenditure on health. The malaria health accounts results and the health accounts report when present a breakdown on the malaria programme. In both sets of accounts, the specific on
malaria and the general on health, data is taken from the table with the financing sources computations. Including data with records from recipient and external funding agencies.

The valuation of in kind and in cash external funded resources can be different when made by the recipient or by the financing agency. Such discrepancies are solved giving priority to market values in the recipient country.

**Challenges**: lack of comprehensive records of disbursements and their specific use. Disbursements can be much lower than the commitments made. Another challenge is the difference in the valuation of disbursements and in kind donations by the recipient and by the external funding agency.

5. **GGHE on malaria as % of GGHE**

**Definition**: a display of the expenditure on malaria as percentage of the THE by the general government entities.

**Description**: Expenditure on malaria through the general government entities (THE\textsubscript{M} components). General government is defined as all governmental entities, either with territorial jurisdiction (federal/central, state/region, local/municipal governments), as well as all extrabudgetary entities, such as social security, and other boards.

The expenditure on health through interventions on malaria by the general government entities is the numerator and the total expenditure on health by the general government entities as measured through the health accounting framework the denominator, times 100.

**Use**: measures the weight of the expenditure on malaria by the general government entities in their total expenditure on health. It allows identifying the priority given to interventions on malaria by the general government.

**Sources and methods**: malaria health accounts results and health accounts reports when they present a breakdown in malaria. Data can be taken from the financing agents and providers tables. There may be specific records for all interventions performed by the general government entities, basically the Ministry of Health, other Ministries, (including records in the Ministry of Finance Central Statistical Office and/or Central Bank), the social security and the services financed by the territorial governments such as the local and state governments. The spectrum of interventions to be measured is the same in THE\textsubscript{M}: inpatient, outpatient, provision of medical goods and administration performed by the general government entities.

**Challenges**: measurement consistency in numerator and denominator are required. Comprehensiveness on the measurement may be limited in many countries, basically because the partial measurement of expenditure on health, on malaria and on overall interventions on health through other ministries than the ministry of health and because of the lack of enough records of territorial governments other than central ones in highly decentralized countries.

6. **OOP expenditure on malaria as % of THE\textsubscript{M}**
**Definition**: Share of OOP spending on malaria in THE\textsubscript{M}.

**Description**: all interventions on malaria provided by government and private entities, and paid through OOP expenditure. Out-of-pocket is a payment made when the service is received. It can refer either to the total value of the service or a part of it, as in the case of partially subsidized health goods and services, which are covered through partial household payments. OOP expenditure may be contrasted to prepayments in which planning is done to allow better uses of available funds.

The amount paid for all interventions on malaria through OOP spending is the numerator and the total amount on expenditures on interventions on malaria is the denominator, times 100.

**Use**: measures the effort made by households relative to total expenditure on malaria. It allows assessing the distribution of resources by purchaser (financing agent). As OOP expenditure has been found to be linked to catastrophic expenditure on health, this is a less desirable way of financing health interventions. This indicators aims to measure how relevant is OOP expenditure in the THE\textsubscript{M}.

The larger the share of OOP expenditure in the THE\textsubscript{M} is thus, less desirable than prepayment and pooled schemes.

**Sources and methods**: malaria health accounts results and health accounts reports when they have a display to analyze expenditure on interventions on malaria. Data can be taken from the financing agents and providers tables. Household surveys can be a third data source when they contain the type of service and/or diagnosis. In most cases business surveys lack the required detail unless a specific survey is performed on this subject. See methodological proposals in section 5 of this manual.

**Challenges**: Private are the weaker components of the health accounting and most expenditure measurements. Household surveys can hardly estimate the total expenditure on health, though they are useful to estimate their distribution. The challenge is an ability to triangulate the provider receiving the payments and the payments made by households to reach a better estimate (see sections 5 and 6 in this guide).

7. **OOP expenditure on malaria as % of OOP expenditure on health**

**Definition**: Share of OOP spending on malaria out of total OOP expenditure on health.

**Description**: all interventions on malaria provided by government and private entities and paid through OOP spending out of the OOP expenditure on THE. Out-of-pocket is a payment made when the service is received. It can refer either to the total value of the service or a part of it, as in the case of partially subsidized health goods and services, which are covered through partial household payments. OOP spending contrasts as a payment mode with the prepayments in which a planning may be made and allow better uses of available funds.

The OOP amount paid for all interventions on malaria is the numerator and the total amount of OOP expenditure on health is the denominator, times 100.
Use: As OOP expenditure has been found to be linked to catastrophic expenditure on health, it is the less desirable way of financing health interventions. This indicators aims to assess how relevant is the burden of malaria out of the total burden on expenditure on health for households.

The larger the share of OOP expenditure on malaria, the larger burden is attributed to malaria for households among other health problems.

Sources and methods: malaria health accounts results and health accounts reports when they display expenditure on interventions on malaria. Data can be taken from the financing agents and providers tables. Household surveys when they contain type of service and/or diagnosis can be a third data sources. In most cases business surveys lack the required detail unless a specific survey is performed on this subject. See methodological proposals in sections 5 and 6 of this manual.

Challenges: Private are the weaker components of the health accounting and most expenditure measurements. Household surveys are hardly enough to estimate the total expenditure on health, though they are useful to estimate their distribution. The challenge is thus being able to triangulate the provider receiving the payments and the payments made by households to reach a better estimate (see sections 5 and 6 in this guide).

8. OOP expenditure on malaria pharmaceuticals as % of THE_M

Definition: share of OOP spending on pharmaceuticals linked to malaria out of the THE_M.

Description: all malaria pharmaceuticals provided by government and private entities and paid through OOP spending out of the THE_M. OOP expenditure is a payment made when the service is received. It can refer either to the total value of the service or a part of it, as in the case of partially subsidized health goods and services, which are covered through partial household payments. OOP spending is the opposite to prepayment, in which a planning may be made and allow better uses of available funds.

Pharmaceuticals\textsuperscript{34} include medicines and vaccines and other biological products, blood and its derivatives and diagnostic products. Includes medical goods used as part of the traditional, complementary and alternative medicines (TCAM).

The amount of OOP expenditure on malaria pharmaceuticals is used as numerator and the THE_M is the denominator, times 100.

Use: measures the effort channelled by households on malaria pharmaceuticals relative to the THE_M. Contributes to assess the distribution of resources by households as purchasers (financing agent) and specifically how large is the burden of malaria pharmaceuticals out of the total burden on expenditure on health on malaria.

\textsuperscript{34} A medicine is any substance (or combination) to be administered to human beings in order to diagnose or to restore, correct or modify physiological functions. A proprietary medicinal product includes any ready-prepared medicinal product placed on the market under a special name and a special pack. WHO. The world medicines situation pp 3. (WHO/EDM/PAR/2004.5) WHO. Geneva. 2004.
As OOP expenditure has been found to be linked to catastrophic expenditure on health, it is the less desirable way of financing health interventions. Expenditure on pharmaceuticals is frequently paid by households not only on malaria but in most health interventions. The larger the share, the larger is the burden for households among the malaria pharmaceuticals out of the total expenditure on malaria.

Sources and methods: malaria health accounts results and health accounts reports when they have a display to analyze expenditure on interventions on malaria. Data can be taken from the financing agents and resource cost tables. Household surveys when they contain type of health good or service and/or diagnosis are an alternative data sources. In most cases business surveys lack the required detail by disease unless a specific survey is performed on this subject. However, records on pharmaceuticals sales are usually available and sometimes they include the distributional channels. The only caution to face is that measurement should be made through consumption prices. Expenditure on pharmaceuticals to be measure involve all delivery channels which includes not only outpatient distribution but in hospitals, paid by households.

Challenges: Private are the weaker components of the health accounting and most expenditure measurements. Household surveys are hardly enough to estimate the total expenditure on pharmaceuticals by type. The challenge is thus being able to triangulate data from the provider receiving the payments and data regarding the payments made by households to reach a better estimate (see sections 5 and 6 in this guide).

9. Expenditure on ITNs as % of THEM

Definition: share of expenditure on malaria nets on the THEM.

Description: ITNs are one of the key goods in the preventive interventions on malaria. Payments made on malaria nets are the numerator and all components of interventions on malaria the denominator, times 100.

Use: measures the weight of resources paid on ITNs on the THEM. Contributes to assess the distribution of expenditure by type of resources.

The larger the share, the larger coverage of this preventive good.

Sources and methods: malaria health accounts results and health accounts reports when they have a display on interventions on malaria. Data is to be taken from tables by resource cost and by functional classifications. Measurement required purchaser values. As mentioned for other indicators, ideal estimation involves a triangulation of provider (including informal) and beneficiary records and triangulation on production/imports.

Challenges: lack of records for specific expenditure by type of malaria goods, which may require specific surveys. See additionally technical proposals in sections 5 and 6.

---

35 This intervention has been targeted. However, for some countries such as Philippines, were the prevention of malaria activities are more varied (ITNs and mass blood surveys, for example) and more significant relative to curative care, the more useful indicator would be the total public health expenditure (HC6 or HP5) as % of THEM.
10. Expenditure on malaria diagnosis as % of THE\textsubscript{M}

**Definition:** share of expenditure on diagnostic services on the THE\textsubscript{M}.

**Description:** Malaria diagnosis refers to laboratory blood testing with the malaria programme standards. Payments made on malaria diagnosis services as numerator and THE\textsubscript{M} as denominator, times 100.

**Use:** measures the weight of resources paid on diagnosis on malaria on the THE\textsubscript{M}. Contributes to assess the distribution of expenditure by type of service involved. Diagnosis is a key component of the malaria programme because a wrong diagnosis has been associated with around half of treated cases.

The larger the share, the larger coverage of this ancillary service. Resistance to pharmaceuticals, effectiveness and efficiency of the programme are linked to this key intervention.

**Sources and methods:** main sources are the malaria health accounts and the health accounts when they display expenditure on interventions on malaria. Data are to be taken from tables by function and provider classifications. Records on diagnostic cases through all care units are required.

**Challenges:** Lack of centralized records for specific laboratory testing in malaria by general government and private providers.

11. Expenditure on malaria by prevalent cases

**Definition:** average expenditure on malaria treatment in NCU, USD and/or PPP.

**Description:** average of curative treatment on malaria cases. The amount paid on treatment on malaria is the numerator and the total cases treated the denominator. The results in NCU can be changed into USD and PPP values.

**Use:** measures the average amount for malaria treatment. Contributes to assess the average basket of services provided and their prices, as well as to discuss equity and efficiency issues.

The larger the share, the larger coverage of basket of services provided.

**Sources and methods:** malaria health accounts results and health accounts reports when they display expenditure on interventions on malaria. Data is to be taken from tables by function and records on prevalence and treatment provided available in the malaria programme.

**Challenges:** lack of comprehensiveness of records of cases and of expenditure.

12. Budgeted vs. executed resources at programme level

**Definition:** share of expenditure on health on malaria on the budgeted resources in the malaria programme.
**Description:** executed resources correspond to accrual measurement, which means they are recorded at the time when resources are used to provide health services on malaria (including the provision of health goods). Budgeted resources correspond to planned executions, authorised by the corresponding authorities. Executed resources on malaria are the numerator and planned/budgeted resources on malaria are the denominator, times 100.

**Use:** measure the difference on execution of planned resources on the malaria programme. Results are useful to adjust planning strategies and to solve execution barriers.

Smaller shares are desirable to show correspondence between planning and execution processes.

**Sources and methods:** malaria health accounts results and health accounts reports when they display expenditure on interventions on malaria. Authorised budgets and authorised execution budgets of provider entities.

**Challenges:** lack of access to authorised versions of planned and executed budgets.

**Current and constant values**

Ideally, expenditure tracking should be performed on a continued basis. The cost of an exercise can be reduced when it is included in the information health system and the results can provide a series to understand and verify fluctuations as well as stability periods.

Though for a wide audience the results are easily understandable when expressed as NCU in current terms, comparisons over time may also be expressed in constant prices. Estimation of constant values can be done for NCU, USD and PPP values, preferably using the most recent year as base year.

**II. Complementary set of indicators**

13. **Per capita expenditure on malaria by subnational level**

**Definition:** the per capita expenditure on health on malaria but among the subnational level relevant entities, expressed as NCU and/or USD and/or PPP.

**Description:** This indicator displays the same content of the previous one, all direct interventions linked to the prevention and control of malaria in individuals and society, described in this guide as THEM. Per capita values are obtained considering the population under risk of malaria. The subnational levels under measurement refer to the flexible selected level of aggregation either state or local level of geopolitical government. There is a choice between considering the place of residence of the population or the location of the health services to define the way sublevel is approached. See notably www.who.int/nha/ the methodological guide on regional accounts by Dan Waldo also under pilot testing stage.

Computation of this indicator can be achieved through a similar process: THEM divided by the population at risk for each of the geopolitical entities under study. When the amount is to be expressed in foreign currency, the per capita values will be divided by the selected exchange rate (such as USD, the exchange rate USD and/or international dollars).
Use: measures the average amount of resources used by the covered population at risk in each of the geopolitical areas under measurement. It provides an overview not only on the total amount of resources allocated on the control of malaria in relation to the population to be served and if they are enough to cover the basket of interventions on malaria to be provided, but also the equity in the distribution of such resources among the various geopolitical residents under risk of malaria. This indicator can be highly useful in the allocation process within decentralized countries in which risk of malaria is spread.

A key issue to interpret properly differences in the per capita level of expenditure refers to the risk level. The basket components of the interventions on malaria should be adjusted to the risk by geopolitical area and services and population coverage should correspond. Thus, equivalent risks should correspond to equivalent expenditure. The larger the amount the larger the coverage of the basket components of the malaria treatment. For international comparison purposes the amounts should be expressed in equivalent currencies.

Sources and methods of data collection: The sources of information should correspond to the level of geopolitical disaggregation selected for the analysis. A specific bottom-up and consolidation process should have been performed to generate the data or alternatively a conscious process to disaggregate the components through a top down estimation for the components of the indicator. Information from the malaria programme may have this information. An alternative source is the report offered to RBM available at http://rbm.who.int/merg#morbiditytf. Information from institutional reports and household surveys can be used (e.g. the DHS) when they have a disaggregation by cause.

Exchange rates are found in central banks and in their reports to international specialized agencies such as IMF (International Financial Statistics, with monthly updates). International dollars (close to PPP concept estimated by WHO) the larger coverage of countries is available in the www.who.int/nha.

Challenges: A consistency between the geopolitical boundaries and their coverage is required. The major difficulty found in practice regards the lack of data disaggregated at the geopolitical level for all components of the estimation. The reference values to perform a top down disaggregation will define the quality of the approach used.

14. Expenditure on malaria by hospitals as % of THE$_{M}$

Definition: The hospital share of measured expenditure on malaria in measured THE$_{M}$.

Description: measured expenditure on health on malaria in total and selectively measured in the hospital environments. Hospitals for accounting purposes are health care units with an overnight stay by patients with health care demands, in which health care services are offered round the clock 24/24. The expenditure on malaria in hospitals is measured including outpatient and inpatient activities and used as numerator. The denominator is the overall expenditure on health on malaria measured, times 100.

Criteria to name a health unit as "hospital" are: licensing, primarily engaged in health care offered to admit patients though can provide outpatient care as a secondary activity, provision of specialized health care. Some countries require a minimum size (number of beds) to be classified as hospital.
Use: Measures the weight on expenditure on interventions in malaria performed in hospitals, both as inpatient and as outpatient activities.

It is useful to analyze distribution of resources among health providers and specifically by hospitals.

The hospital environment is highly heterogeneous across and within countries. Hospital establishments usually have a higher technology than any average outpatient unit. The cost of interventions is frequently higher and they can perform more complex interventions than in the outpatient environment. Efficiency of the models of health care is linked to the use of appropriate technology complexity according to the health care. Thus, a less complex and less costly environments are expected to be used for the less complex health care needs. In countries with a free choice, it also expresses the preferences of malaria patients to attend directly to hospitals instead of outpatient units.

The larger the share of expenditure on health in an hospital environment the larger the expected complexities on health care needs, alternatively, the less decentralized interventions on malaria within the health system units.

Sources and methods: malaria health accounts results and health accounts reports when present the breakdown of malaria activities. Records on hospitals are frequently available with a disaggregation by diagnosis in a way that can be linked to expenditure data when such a display is not already available. See for methodological proposals in sections 5 and 6. Ideally, a collection of data for all hospitals is required (both run by general government and by private entities) which may imply a survey by the programme or in case a deterministic study is performed, the larger hospitals and the units with the larger expenditure on health on malaria should be taken on board in all cases. Information from the household surveys (such as the DHS and the like) when they have a disaggregation by cause and by provider can also be used.

Challenges: lack of appropriate records to measure the expenditure on malaria in hospital settings and the lack of collation of such information in a single database. When health accounting reports are available, the task can be easier. Another underlying problem is the lack of a standard definition for a hospital which means that standards at country level are to be used and may not be really comparable, which can bias the shares according to the larger hospitals providing information.

15. Expenditure on malaria on inpatient care as % of THE<sub>m</sub>

Definition: Share of resources used on inpatient care out of total measured expenditure on health on malaria.

Description: Inpatient care is defined as the medical and paramedical care offered in an admitted patient including overnight stays due to malaria. Although an expanded expenditure on health on malaria would include a more comprehensive set of conditions linked to malaria, this indicators should be limited to the direct and restricted approach on malaria boundary (THE<sub>m</sub>).

The expenditure on malaria in inpatient care is the numerator and the denominator is the overall expenditure on health on malaria, times 100.
Use: measure of the distribution of expenditure by health functions. It allows identifying how relevant is the amount channelled to solve potentially more complex malaria cases.

This indicator refers to the type of service provided and not to the environment in which the service is delivered. The indicator can be used independently and as a complement to the one constructed for hospitals, so as to assess the need of treatment in complicated or complex cases on malaria. When the choice of the patient can lead to a larger attendance to get care on hospitals, the ratio on the inpatient care should be lower, because malaria should be primarily treated as outpatient care. Interventions on malaria should preferably give priority to preventive and control activities more than to handling severe cases so this share ideally should be small.

Sources and methods: malaria health accounts report and the health accounts report when display a breakdown to analyse the malaria interventions. Inpatient care is reported usually by diagnosis thus can be linked to expenditure data when there is not already a report on the subject. See for methodological proposals in sections 3 and 5. Ideally, a collection of data for all inpatient services is required (both provided by general government and by private entities) which implies a survey by the programme or when a deterministic study is performed, the larger hospitals and the units with the larger expenditure on health on malaria should be taken on board in all cases. Information from the household surveys can be available in some cases as the DHS and the like when they have a disaggregation by cause and by type of care.

Challenges: lack of appropriate records to measure selectively the expenditure on malaria on inpatient care and the lack of collation of such information in a single database. Where comprehensive health accounting reports are available the task tends to be much easier.

16. Expenditure on malaria by ambulatory providers as % of THE\textsubscript{M}

Definition: share of expenditure on health on malaria used in ambulatory care providers in expenditure on health on malaria.

Description: The content of the measurement corresponds to the expenditure on health on malaria as expressed in previous indicators but selectively measured in the ambulatory care providers. Ambulatory care providers for accounting purposes are defined as health care units covering ambulatory services by medical and other health practitioners.\textsuperscript{37}

The expenditure on malaria in ambulatory care providers is the numerator. The denominator is the overall measured expenditure on health on malaria, times 100.

Use: measures the weight of expenditure on the interventions against malaria performed by ambulatory care providers.

The indicator is useful to identify the distribution of resources among health care providers, specifically in ambulatory care environments.

\textsuperscript{37} Outpatient care providers as described in the HP classification, include offices of health practitioners, centres of ambulatory care, ancillary service units.
Efficiency of the models of health care is linked to the use of appropriate technology complexity according to the health care. Thus, a less complex and less costly environment is expected to be used for the less complex health care needs.

The larger the share of expenditure on health in an outpatient unit, the larger the health care of basic needs served; complementary, the more decentralized interventions on malaria within the health system units.

Sources and methods: malaria health accounts results and health accounts report when they present the breakdown to analyze the malaria activities. Records of ambulatory care providers usually lack a disaggregation by diagnosis in a way that can be linked to expenditure data in case a display is not available as needed. For methodological proposals see sections 3 and 5. Ideally a collection of data for all ambulatory care providers is required (both run by general government and by private entities) which implies a survey by the programme or when a deterministic study is performed, the larger outpatient units and those units with the larger expenditure on health on malaria should be taken on board in all cases. Information from the household surveys can be available (DHS and the like) when they have a disaggregation by cause and by provider.

Challenges: lack of appropriate records to measure the expenditure on malaria in outpatient units and the lack of collation of such information in a single database.

17. Expenditure on malaria on outpatient care as % of THE_M

Definition: share of outpatient care expenditure in THE_M.

Use: measures the weight on expenditure of the outpatient in total interventions on malaria.

The indicator is useful to identify the distribution of resources among the health functions and specifically in outpatient care.

Efficiency of the models of health care is linked to the use of appropriate technology complexity according to the health care. Thus, a less complex and less costly care is expected to be provided to the less complex health care needs.

The larger share is linked to interventions directed to basic needs on malaria.

Description: resources channelled to outpatient care on malaria. Outpatient care comprises all medical and paramedical services delivered in outpatient episodes of curative care regarding malaria. The THE_M as expressed in previous indicators comprises all resources used in the interventions on malaria.

The expenditure on outpatient care is used as numerator and the THE_M is the denominator, times 100.

Sources and methods: malaria health account results and health accounts reports when they present the breakdown to analyze the interventions on malaria. Data is taken from tables with the functional classification. Records on outpatient services usually lack a disaggregation by diagnosis in a way that can be linked to expenditure data in case a display is not available as needed. See for methodological
proposals in sections 3 and 5. Ideally, a collection of data for all outpatient services is required (both provided by general government and by private entities) which may imply a survey by the programme or in case a deterministic study is performed, the larger outpatient care provision should be taken on board in all cases. Information from the household surveys can be available (DHS and the like) when they have a disaggregation by cause and by service.

**Challenges:** lack of appropriate records to measure the expenditure on outpatient care on malaria and the lack of collation of such information in a single database.

18. **OOP** expenditure on pharmaceuticals incurred at shops and street vendors versus sales on pharmacies

**Definition:** share of OOP spending on pharmaceuticals linked to malaria incurred in non specialised retail units out of the out-of-pocket spending on pharmaceuticals linked to malaria incurred in pharmacies.

**Description:** It refers to OOP spending on pharmaceuticals linked to malaria treatment either provided by informal and specialized retail units (run by government and/or private entities). Pharmaceuticals include medicines and vaccines and other biological products, blood and its derivatives and diagnostic products. It includes medical goods used as part of the traditional, complementary and alternative medicines (TCAM). The amount that should be accounted for refers to final consumption prices and not only ex-factory pricing.

Informal retail units are those without a full compliance of the regulatory norms established to license the sale of medicines and pharmaceuticals (more frequently found as street vending but not exclusively).

The amount paid for sales on informal units on pharmaceuticals linked to malaria is the numerator and the total amount paid for sales on pharmacies linked to malaria is the denominator, times 100.

**Use:** measures the effort made by households on purchases on pharmaceuticals linked to malaria on informal and formal specialized retail units. Contributes to assess the distribution of resources by households as purchaser (financing agent) and by provider of pharmaceuticals on malaria.

As licensing implies a quality control of the medical goods under sale there may be a safety, price control and record difference between informal and specialized retail units, making preferably a distribution through specialised units. Policies may require information on all sale profiles and in some cases to rely on informal sale units to increase coverage of populations, as in the case of rural areas and poor urban groups.

**Sources and methods:** malaria health accounts results and health accounts reports when they display expenditure on interventions on malaria. Data is to be extracted from tables with financing agent and provider classifications. Records of pharmaceutical wholesales can provide information on amount of sales and distribution channels. Surveys on informal units and pharmacies may contain complementary

---

A medicine is any substance (or combination) to be administered to human beings in order to diagnose or to restore, correct or modify physiological functions. A proprietary medicinal product includes any ready-prepared medicinal product placed on the market under a special name and a special pack. WHO. The world medicines situation pp 3. WHO/EDM/PAR/2004.5 WHO. Geneva. 2004.
information about amount of sales by type of product and provider. Information regarding sales by type of pharmaceuticals in most business surveys lacks the required detail by disease or type of product unless a specific survey is performed on this subject. Household surveys are alternative data sources when they contain type of provider and/or type of medicament.

Challenges: Surveys on informal sales may be inaccurate due to sampling and representativeness difficulties. Pharmaceuticals should be valued on consumption prices. The challenge of triangulation data from the provider receiving the payments and data regarding the payments made by households to reach a better estimate is discussed on section 6 in this manual.

19. Expenditure on HRH on malaria as % of THE\textsubscript{M}

**Definition:** share of expenditure on HRH on THE\textsubscript{M}.

**Description:** refers to all forms of labour costs on interventions on malaria. Involves all types of contract and all types of health worker, either specialized or not specialised. Labour costs include compensation to employees (government and private units) and payments to self employed and non salaried personnel. Personnel included refer to all workers involved in interventions on malaria linked to all health functions.

The amount paid for HRH performing all interventions on malaria is the numerator and the total amount on expenditures on health on malaria the denominator, times 100.

**Use:** measures the weight of HRH on the THE\textsubscript{M}. Contributes to assess the distribution of expenditure by type of resource.

**Sources and methods:** malaria health accounts results and health accounts reports when they display expenditure on interventions on malaria. Data can be extracted from tables by financing agent or provider by resource cost. Executed budgets from the institutions performing interventions on malaria described as health functions are the usual data source. Most business surveys lack the required detail by disease unless a specific survey is performed on this subject.

**Challenges:** lack of records for specific resources involved in interventions on malaria, or the share of their time devoted to these activities. Remuneration of non salaried workers may be more difficult to identify as records when business surveys do not include small provider units.

20. Expenditure on treatment of severe malaria as % of THE\textsubscript{M}

**Definition:** share of expenditure on treatment of severe malaria on the THE\textsubscript{M}.

**Description:** Severe malaria includes cases with symptoms and evolution in the current malaria episode that require more care to the average, regardless the provider, environment or type of unit in which the service is given. Payments made on treatment of severe malaria are the numerator and all expenditure on health on malaria the denominator, times 100.

**Use:** measures the weight of resources paid on severe malaria treatment on the THE\textsubscript{M}. Contributes to assess the distribution of expenditure by type of service involved. Severe malaria cases should be less
frequent when prevention and early treatment are provided. It reflects a quality and availability of appropriate treatment.

The larger the share, the less timely interventions on malaria may be available.

**Sources and methods**: malaria health accounts results and health accounts reports when they display expenditure on interventions on malaria. Data is to be taken from tables by function and provider. Malaria programme records and reports on severe malaria cases reported both for general government and private entities.

**Challenges**: lack of full records of severe malaria treatment and their payments.

21. **Average expenditure by pregnant woman covered**

**Definition**: average amount of expenditure on interventions on malaria among pregnant woman.

**Description**: refers to all components of interventions on malaria performed on women in all stages of pregnancy. Amount is described in NCU and can be presented as USD and/or international dollars.

Expenditure on health on interventions on malaria among pregnant women is the numerator and the population of pregnant women served is the denominator, times 100.

**Use**: measures the weight of resources on the total expenditure on malaria directed to one priority targeted population group. Contributes to assess the distribution of expenditure by type of beneficiary.

The larger the share, the larger the coverage of basket of interventions on malaria provided to pregnant women. Measurement as USD and/or international dollars allows international comparisons and standardise prices of basket of services for these targeted population.

**Sources and methods**: malaria health accounts results and health accounts reports when they display expenditure on interventions on malaria. Data is to be taken from the tables by function and beneficiary. Records on services provided by population group and/or services received by population groups linkable to expenditure records are less frequently found options, unless a specific study is developed.

**Challenges**: lack of records on expenditure on specific population groups and interventions on malaria.

III. Expanded proposal of indicators

22. **Budgeted vs. executed at programme level and by specific programme components**

23. **Per capita expenditure on malaria by subnational governments**

24. **Per capita expenditure on malaria by age and sex coverage, rural/urban population, insured / uninsured**
25. Expenditure on malaria by type of input, e.g. expenditure on pharmaceuticals % \( \text{THE}_M \), expenditure on HRH in the malaria programme % \( \text{THE}_M \)

26. Expenditure on malaria by type of provider e.g. inpatient vs. outpatient care

27. Productivity: expenditure on human resources vs. malaria cases treated.

28. Expenditure wasted: malaria medicines destroyed as % of total medicines earmarked for malaria, outdated insecticides % total insecticides for malaria.

29. Share of private expenditure on specific goods: expenditure on ACT as % of \( \text{THE}_M \)
Annex 2: Clinical Course of Malaria and Associated Categories in ICD-10

Discussion in this annex drew heavily from Wilson 2002 and the Roll Back Malaria fact sheet on “what is malaria?” Also presented is information on the International Classification of Diseases – Tenth Revision (ICD-10) classification of malaria available on the WHO website.

Table A.2: Clinical courses of malaria: A summary

<table>
<thead>
<tr>
<th>1. current episode of infection</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1 uncomplicated (fevers and chills)</td>
</tr>
<tr>
<td>1.2 severe (including severe anemia)</td>
</tr>
<tr>
<td>1.2.a non-cerebral</td>
</tr>
<tr>
<td>1.2.b cerebral</td>
</tr>
<tr>
<td>1.2.b.i chronic sequela of acute cerebral infection including neurologic abnormalities such as behavioral disorders, epilepsy and seizures, and partial paralysis</td>
</tr>
<tr>
<td>1.3 co-infections (e.g. malaria concurrent with typhoid or salmonella, HIV/AIDS)</td>
</tr>
<tr>
<td>2. malaria infection during pregnancy</td>
</tr>
<tr>
<td>2.1 maternal anemia</td>
</tr>
<tr>
<td>2.2 placental malaria</td>
</tr>
<tr>
<td>2.2.a premature delivery</td>
</tr>
<tr>
<td>2.2.b low birth-weight</td>
</tr>
</tbody>
</table>

Malaria is a life-threatening disease caused by protozoa of the genus Plasmodium. Four species of malaria parasites are known to infect humans: Plasmodium malariae, P. ovale, P. vivax, and P. falciparum. The last two are the most common, and falciparum is the most deadly type of infection. Malaria infections are generally diagnosed using bloodsmears.

The ICD-10, the latest in a series which came into use in WHO Member States as of 1994, classifies malaria under the category “Certain infectious and parasitic diseases” (coded A00-B99), and more specifically subcategories it under “Protozoal diseases” (coded B50-B54.) The ICD-10 subcategories for malaria are by type of parasite and type of complications, as shown below:

B50  Plasmodium falciparum malaria
     Includes mixed infections of Plasmodium falciparum with any other Plasmodium species
B50.0 Plasmodium falciparum malaria with cerebral complications
     Cerebral malaria NOS
B50.8 Other severe and complicated Plasmodium falciparum malaria
     Severe or complicated Plasmodium falciparum malaria NOS
B50.9 Plasmodium falciparum malaria, unspecified
B51  Plasmodium vivax malaria
     Includes mixed infections of Plasmodium vivax with other Plasmodium species, except Plasmodium falciparum
     Excludes when mixed with Plasmodium falciparum ( B50.- )
B51.0 Plasmodium vivax malaria with rupture of spleen
B51.8 Plasmodium vivax malaria with other complications
B51.9 Plasmodium vivax malaria without complication
   Plasmodium vivax malaria NOS
B52 Plasmodium malariae malaria
   Includes mixed infections of Plasmodium malariae with other Plasmodium species, except
   Plasmodium falciparum and Plasmodium vivax
   Excludes when mixed with Plasmodium:
   o falciparum (B50.-)
   o vivax (B51.-)

B52.0 Plasmodium malariae malaria with nephropathy
B52.8 Plasmodium malariae malaria with other complications
B52.9 Plasmodium malariae malaria without complication
   Plasmodium malariae malaria NOS

B53 Other parasitologically confirmed malaria
B53.0 Plasmodium ovale malaria
   Excludes: when mixed with Plasmodium:
   o falciparum (B50.-)
   o malariae (B52.-)
   o vivax (B51.-)

B53.1 Malaria due to simian plasmodia
   Excludes: when mixed with Plasmodium:
   o falciparum (B50.-)
   o malariae (B52.-)
   o ovale (B53.0)
   o vivax (B51.-)

B53.8 Other parasitologically confirmed malaria, not elsewhere classified
   Parasitologically confirmed malaria NOS

B54 Unspecified malaria
   Clinically diagnosed malaria without parasitological confirmation

The disease is transmitted to humans by inoculation of the infective sporozoites through the bite of a female Anopheles mosquito at night. The sporozoites are carried in the blood circulation into the liver where they develop into merozoites. The merozoites invade the red blood cells. The periodic destruction of the red blood cells and release of more parasites into circulation, which invade more red blood cells, cause typical intermittent chills, fever, and sweating associated with malaria. Some merozoites further develop into male and female gametocytes that are sucked in by the female Anopheles mosquito during a blood meal. In the mosquito, the gametocytes undergo sexual development, giving rise to sporozoites, and the cycle is repeated.

The clinical presentation of malaria is influenced by the epidemiological context. In highly endemic regions, residents are repeatedly exposed to infection and the majority of residents may be asymptomatic.
though infants and young children are likely to suffer severe illness and death. Immunity to non-cerebral severe malaria is acquired after a few infections (cited in Wilson 2002.)

Malaria symptoms appear about 9 to 14 days after the infectious mosquito bite. Typically, malaria produces fever, headache, vomiting, and other flu-like symptoms. If not treated promptly with an antimalarial drug, the infection can kill by infecting and destroying red blood cells (severe anemia) and by clogging the capillaries that carry blood to the brain (cerebral malaria) or other vital organs. Because malaria resembles many other acute infections and differentiating them can be difficult, especially in areas where diagnostic facilities are limited or non-existent, the majority of acute febrile illness in malaria endemic areas are treated with an antimalarial drug. This means that many persons without malaria are receiving antimalarials unnecessarily and, importantly, may not be treated for other treatable infections.

Transfusions are the most effective treatment of severe anemia. Transfusions are lifesaving, but these can also be the source of infections, especially in developing countries where donors and donated blood undergo limited screening. In addition to HIV, infections transmitted by transfusions include hepatitis B and C, Epstein-Barr virus (EBV), parvovirus, syphilis, and trypanosomiasis, among others.

Bacterial infections can complicate the course of malaria. This appears to occur most often in patients with severe, acute falciparum. In a 1997-1998 study in Cameroon of a sample of cases diagnosed with positive smears, overall 17% had concurrent malaria and typhoid fever and 33% had concurrent malaria and salmonella (Wilson, 2002).

Cerebral malaria is fatal in 15% to 29% of cases. Cerebral malaria primarily affects children in areas with year-round transmission. Among those that survive, persistent neurologic abnormalities can develop including partial paralysis, speech disorders, behavioral and psychiatric problems, cognitive sequelae, blindness, hearing impairment, seizures, and epilepsy. Percentage with permanent sequelae is estimated to range widely depending on where and how the studies were conducted. Recent studies found that 16% of children with cerebral malaria died and 9% to 23% had neurologic sequelae at the time of discharge (Wilson 2002). Among children followed up at least 6 months after discharge, the rate of persisting neurologic abnormalities was about 6%.

In most malaria endemic areas, pregnant women are the main adult risk group for malaria. The burden of infection during pregnancy is caused chiefly by P. falciparum. The symptoms and complication of malaria during pregnancy differ with the intensity of malaria transmission and thus with the level of immunity the pregnant woman has acquired. Malaria has adverse effects on the pregnant woman, the developing fetus, and the newborn infant. The sequestration of the parasites in the placenta can lead to changes in nutrient transport across the placenta. Pregnant women with malaria are likely to have fetal deaths, intra-uterine birth retardation, premature delivery, and low birth weight of infants than are uninfected women.
### Annex 3: Understanding Interventions/Activities for Malaria Control, by General Purpose of Activities

#### Table A.3. Purpose of malaria control activities

<table>
<thead>
<tr>
<th>Purpose of Activities</th>
<th>Malaria Control Activities/Services</th>
</tr>
</thead>
</table>
| Reduce abundance of dangerous vector species.              | 1. male and female mosquitoes mate  
- genetic manipulation and introduction of exotic species  
- use of chemosterilants  
2. eggs laid by female in breeding grounds  
- activities to reduce availability of breeding grounds including:  
- integrating environmental management for mosquito control into engineering undertakings involving the modification and manipulation of environment, i.e. environmental changes due to agricultural, industrial and urban development  
- periodic draining of rice paddies  
- marsh alteration  
- activities to correct drainage ditches and water impoundments (community)  
- Information, education, and communication for households to maintain basic sanitation measures particularly maintaining proper drainage for used water and reducing open areas with stagnant water  
3. larva, pupa (pupa is non-feeding)  
- clearing operations to promote flow and reduce turbidity of water (turbid water supports flotation of particles, e.g. pollens, enhancing feeding efficiency)  
- application of insecticides for larviciding (oils, organophosphates, insect growth regulators and microbial insecticides)  
- introduction of natural enemies such as larvivorous fish  
4. adult  
- reduce availability of source of plant juices (adult males and females)  
- indoor residual spraying of insecticides  
- insecticide treated materials, e.g. bed nets, curtains  |
| Isolate human hosts from vectors                            | - Dry-belting villages in rice-cultivation areas (i.e. restricting use of land surrounding human communities to the production of dry crops)  
- Zooprophylaxis or use of wild or domestic animals as source of blood meal and as diversion of blood-seeking mosquito vectors away from human  
- House-screening or mosquito-proofing of dwellings  
- Bed nets  
- Repellants applied to the skin  
- Other repellants and domestic insecticides, e.g. insect sprays, mosquito coils, burning of traditional herbs  |
| Reduce malaria infections in humans                         | - Raise public awareness about malaria  
- Chemoprophylaxis for non-immune groups  
- Intermittent treatment of pregnant women  
- Mass blood surveys and follow-up treatments |
Annex 4: Accounting for Malaria-Related Long-Term Health Expenditures

Malaria long-term health expenditures refers to spending for the continuing treatments/health care of diseases and conditions medically established to have developed as secondary complications of malaria, having persisted after the episode of malaria infection was treated. Treatment and management of these secondary complications, as with other health conditions, entail use of health care services (e.g. curative care and consumption of drugs) and use of health care facilities (e.g. hospitals and ambulatory care facilities.) Treating secondary complications can be costly and lifelong. As such, an estimate of these expenditures may be useful to policy discussions concerning the relationship between investments and the malaria burden.

Accounting for long-term expenditures as addendum items

These guidelines recommend that long-term malaria-related expenditures be estimated separately as an addendum to the main malaria subaccounts, which target principally those services that address malaria as defined by ICD-10. These long-term expenditures may be estimated as part of a full accounting of the economic costs of malaria. Alternatively, these estimations may be carried out simply to provide an indication of one component of cost that may be averted with strong malaria control and case management programmes. But for purposes of planning and managing malaria treatment and control programmes, data on long-term malaria costs are complementary to that provided by the main malaria subaccounts. Table A.4 describes the scope of the malaria subaccounts and the types of activities that should be included in an addendum.

Table A.4. Type of expenditures included and excluded from the malaria subaccount THE estimate

<table>
<thead>
<tr>
<th>Expenditures included in the Malaria THE</th>
<th>Expenditures included as addendum items</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Those services targeting malaria as defined by ICD-10</td>
<td>△ Neurological sequelae following CM incl. ataxia, hemiplegia, speech disorders, blindness, gait disturbance, paralysis, cognitive and behavioral deficits, epilepsy, spasticity</td>
</tr>
<tr>
<td>Simple/uncomplicated malaria e.g. fevers, chills, sweats</td>
<td>Complications to fetus</td>
</tr>
<tr>
<td>Severe Malaria</td>
<td>Hepatits contracted from blood transfusion needed for treating severe malaria.</td>
</tr>
<tr>
<td>△ Cerebral Malaria (CM)</td>
<td></td>
</tr>
<tr>
<td>△ Coma, convulsions, posturing, altered consciousness and respiratory patterns, gaze abnormalities, decreased muscle tone, cranial nerve palsies, retinal abnormalities.</td>
<td></td>
</tr>
<tr>
<td>△ Hypoglycemia, Acidosis, Severe Anemia, Jaundice, kidney damage, Acute pulmonary edema, Respiratory distress</td>
<td></td>
</tr>
</tbody>
</table>
If estimation of long-term expenditures of malaria complications is to be pursued, two sets of issues need to be confronted.

**Defining a malaria long-term expenditure**

First, there is a need to define which complications to include as malaria related and which ones to exclude. For example, feedback from participants of the malaria subaccounts training in Rwanda (in May 2006) showed a consensus about including as a “long-term malaria expenditure” those continuing medical costs of complications of cerebral malaria as long-term malaria-related expenditures. On the contrary, training participants also argued that the cost of medical care for infections contracted from blood transfusions (i.e. transfusions required as a result of malaria-induced anemia) should be excluded from long-term malaria-related costs. The argument presented is that the cost is a result of failure in the regulation of the blood supply. The scope of inclusions would necessarily be country-specific because of differences in relevant policy issues and policy perspectives.

**Data sources**

Second, there is a need to identify data sources for malaria-related long-term expenditures. This is particularly challenging in countries with weak health management information systems. Generally, there is a lack of documentation of the causal relationship between secondary complications and malaria. For example, the patient record of a person suffering from blindness may not include the cause of his/her condition as being malaria-related. However, as country information systems evolve, the potential exists for such policy-relevant data to be captured and (and this should be encouraged) with increasing accuracy. In the interim, the required information on long-term malaria-related costs would most likely have to be collected through special follow-up surveys of previously treated cases of malaria.

**Estimation of long-term malaria expenditures.**

If causal documentation is not available from patient records, at best only a very rough estimate of expenditures can be approximated. This can be done by determining (perhaps from key informants and/or disease progression studies) (1) the percentage of all malaria cases that have secondary complications and (2) an estimated annual cost of health-related expenses for such individuals (perhaps from a small costing exercise). Care should be taken to avoid estimating cost on the basis of an ideal set of services that are delivered (or thought to be delivered) to patients with secondary complications. Rather, the estimates should be based on actual services and expenditures rendered. This is facilitated if facilities have cash-accounting systems for tracking such expenses. In lieu of this, price ratios in the private sector can be used. Then, a rough approximation of expenditures can be obtained by multiplying the derived cost/patient estimate with the number of patients with secondary complications. Note that because of differences in the types of secondary complications (most severe are those due to P falciparum) associated with the various Plasmodium strains, this computation has to be done by type of infection.
Annex 5: Rwanda 2003 NHA Malaria Subaccount Tables

See attached PDF file.
Annex 6: Davao del Norte 2004 NHA Malaria Subaccount tables

See attached PDF file.
Annex 7: Example of Donor Survey Instrument from Rwanda

See attached PDF file.
Annex 8: Example of NGO Survey Instrument from Rwanda

See attached PDF file.

See attached PDF file.
Annex 10: Example of Regional Health Unit Survey Instrument from Davao del Norte

Rachel, please insert.