Guide to producing malaria subaccounts within the national health accounts framework
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World Health Organization
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Preface

Policy-makers in malaria-endemic countries face difficult decisions regarding 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. In many countries in Africa, these decisions are made in the context of malaria being the leading cause of mortality among children under five years. Depending on the epidemiological situation, policy-makers must determine what level of resources is needed to avert an increase in malaria and if possible reduce its prevalence. A prerequisite for informed policy decisions is reliable information on the organization and financing of malaria services, including spending by donors, public bodies and private entities, such as households.

The malaria subaccount has been designed to provide the financial information needed to inform such decisions. National health accounts (NHA) are an internationally accepted tool that provides a comprehensive estimate of all national health expenditures. Subaccounts report expenditures in accordance with the NHA framework, but with a focus on a particular component of health care, in this case malaria services.

A malaria subaccount can answer specific questions regarding malaria financing, in the same way that the general NHA answer questions on health care financing overall: How much is being spent on malaria? Who is paying? What services and products are purchased and for whom? Policy-makers and programme managers can use the expenditure estimates in various ways, e.g. to project financial requirements for controlling malaria or to monitor how resources are used. In addition, because the subaccounts use the internationally recognized NHA framework, the findings can be compared across countries with similar or different levels of malaria endemicity. If subaccounts are prepared regularly, they 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.

Intended for both NHA country experts and novices, this guide aims to help countries obtain a clearer picture of resource flows in malaria control programmes, through regular estimations that can inform the policy process. This guide has benefited from the participation and contribution of numerous malaria and NHA experts, and from experiences in implementing the methodology in two countries. Although efforts have been made to ensure that it is consistent with existing WHO guidelines on malaria treatment and prevention and on producing national health accounts protocols and standards will evolve in the future and updates will be issued as needed.

1.1 Background

Malaria represents a heavy disease burden, particularly in Africa, where it is the leading cause of mortality among children under five years of age, and policy-makers in endemic countries are increasingly committed to stemming the spread of the disease. In the Abuja Declaration on the Roll Back Malaria (RBM) Partnership in Africa, African leaders committed themselves to reducing malaria mortality by 50% by the year 2010, through the delivery of appropriate curative and preventive interventions. Moreover, the Millennium Development Goals (MDGs), which have been defined by the international community as a framework for measuring overall progress in development, make specific reference to malaria: one of the targets of the MDGs is to halt, and begin to reverse, the spread of the disease by 2015.

However, policy-makers face difficult decisions in their efforts to achieve these 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 human immunodeficiency virus (HIV), acquired immunodeficiency syndrome (AIDS) and tuberculosis. With limited resources, it is imperative that funds are allocated wisely, on the basis of informed policy choices. Baseline information is needed on the current distribution of resources among programme components, as well as an understanding of the organization and financing of malaria care as a whole, including spending by donors, public sector entities, and the private sector, particularly households. With an understanding of what is currently being spent and how, policy-makers will be better equipped to explore alternative ways of allocating and mobilizing resources to prevent the spread of the disease and to treat those infected. Such information also allows policy-makers to determine accurately unit costs and to make realistic assumptions when using budgeting and planning tools.

Recognizing the need for data on expenditure, many stakeholders in countries, as well as donors, are requesting that national malaria spending patterns should be tracked. This guide outlines a methodology for doing just that. The guide adheres to the framework of national health accounts (NHA), which are currently prepared in more than 100 countries to examine

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3 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, the United Nations Children's Fund (UNICEF), the United Nations Development Programme (UNDP), and the World Bank to provide a coordinated international approach to fighting malaria.

general health spending at the national level. Because of its consistency with this globally used tool, the guide provides a standard approach that will allow comparable country estimates and facilitate global resource tracking for malaria programmes. At the same time, the guide is flexible enough to meet the needs of national stakeholders. In summary, this guide offers country NHA teams a globally viable and nationally useful methodological approach for tracking malaria health expenditures within the NHA framework.

1.2 The concept of national health accounts

NHA are an internationally accepted policy tool that provides a comprehensive estimate of national health expenditures for a given year. They examine the use of public, private (including household), and donor health funds in a country, by tracking the flows and amounts of spending:

- from the financiers of health care, 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 the health providers, which deliver health care services, e.g. hospitals, pharmacies; and, finally,
- to the end uses of health funds, namely the health services and products themselves, termed health care functions, e.g. inpatient curative care, public health programmes.

NHA organize these flows in a series of standard tables. It should be noted that NHA are not designed to be an academic study, but rather a tool to inform the policy process; as such, they need to be prepared on a regular basis as part of a government’s ongoing activities.

As mentioned, the NHA methodology is already used in countries throughout the world and has been endorsed by a number of multilateral and bilateral organizations, including WHO, the World Bank, the United States Agency for International Development (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, 2003), informally known as the Producers’ Guide.

1.3 Overview of the malaria subaccount

This guide describes an NHA-compatible approach to tracking expenditures on malaria-related activities, specifically those that are:

- primarily intended to have a positive impact on the health of people with malaria, confirmed or not, within a given year;
- intended to prevent and control the spread of malaria, and which may target the population at large (such as the distribution of insecticide-treated bednets (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. those targeting malaria or HIV/AIDS) or intervention clusters (e.g. based on conditions, such as reproductive health services, or age of beneficiary, such as child health services).

A more complete definition of the scope of expenditures included in a malaria subaccount is given in Chapter 2.
A malaria subaccount generally focuses on a national priority programme area. It is recommended that subaccounts be prepared in tandem with a general NHA (and not as a stand-alone study), and written up as individual chapters within the general NHA report. This is because much information on malaria spending can be obtained from the primary and secondary data collected for a general NHA estimation, and this reduces the cost of preparing the subaccount. Moreover, this approach also helps the subaccount spending patterns to be placed in the context of the country’s overall health spending.

There are thus three advantages to using NHA as the framework for tracking malaria spending: (1) NHA have established standard methods for estimating health expenditures; (2) there is potential for routine estimation of malaria spending within institutionalized NHA systems (this is helpful for generating trend data for monitoring purposes); and (3) expenditure estimates can be compared between countries. More than half of all recipients of malaria grants from the Global Fund to Fight AIDS, Tuberculosis and Malaria have completed, or are planning to prepare, NHA. Thus, in the interests of building on existing capacities to measure health expenditures, the tracking of malaria spending is best done within the NHA framework.

A malaria subaccount allows comprehensive measurement of expenditures between financing sources, financing agents, providers, and functions (at a minimum) involved in malaria financing and delivery. The subaccount includes public, private, and donor components of malaria health services and, like the general NHA, aims to inform key policy issues.

The subaccount presents a systematic summary of malaria-related spending by the malaria programme as well as by other segments of the health system. Malaria programme managers and other decision-makers should be able to identify relevant monitoring data within the malaria subaccount report.

1.4 Policy purpose of the malaria subaccount

In simple terms, the purpose of preparing a malaria subaccount is to inform the policy process, by providing needed data for national stakeholders (both government and nongovernmental players). Subaccounts can promote transparency, accountability, better management of resources, and allocation of funds in closer alignment with national priorities. To aid policymakers 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) spending by income quintile, geographical location, and sex.
- Who manages malaria funds? Who has programmatic control over their allocation?
- Where do these funds go? To which providers (public and private)?
  - How is spending distributed among the various types of facilities? For example, how relevant are retailers, ambulatory centres, hospitals?
What services are financed? For example, how much is spent on prevention and control versus treatment? Is the balance appropriate?

By addressing these questions on a regular basis, institutionalized malaria subaccounts provide critical information to local policy-makers, allowing them to monitor the current uses of malaria funds (are they meeting their intended targets?), and consequently to make informed and evidenced-based policy choices about future resource allocation. The malaria subaccount reports provide a descriptive overview of resources used by the various stakeholders to prevent and treat malaria. This information should permit a coordinated and collaborative effort to ensure a more effective use of resources. In Rwanda, for example, the Ministry of Health used its 2003 malaria subaccount to inform the official government strategy on achieving the Millennium Development Goals, by highlighting the fact that resources seemed to be targeted more for HIV/AIDS and other areas rather than malaria, Rwanda's leading cause of morbidity and mortality. This led the Ministry of Health to openly call for greater donor harmonization and alignment with national priorities.

Most malaria-endemic countries belong to the middle- and low-income categories, and often data on private sector health care spending are scarce, particularly household spending at pharmacies, for traditional healers, and at clinics. Most existing evidence is anecdotal, but it suggests that the bulk of malaria spending occurs in the private sector. Some estimates indicate that household spending accounts for 70% of expenditure on malaria activities, 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, as described in Chapter 5, subaccounts can be prepared in countries with different information system capabilities—including those that have little or no routine data on malaria. By embarking on a subaccount exercise in these countries, the NHA team provides policy-makers with critical data that can also highlight the areas of existing information systems that need to be strengthened to facilitate regular retrieval of malaria expenditure data.

The NHA framework also allows spending to be disaggregated down to a particular malaria service area (disease surveillance, ITNs, distribution of antimalarial drugs, case management, etc.). It can, therefore, allow the efficiency of these various service areas to be assessed. With time, identification of strategies for collecting needed information, together with routine data gathering, will allow the information gaps to be filled. For example, traditional, complementary and alternative medicine (TCAM) healers were previously hardly ever documented. Now, an increasing number of formal programmes are joining efforts with these informal sector healers to expand provision, and some reports are being generated, such as the role of the HIV/AIDS informal sector providers (including TCAM) in handling comorbidity.

The subaccount is also useful for addressing donor concerns and interests. For example, it can track the disbursement of funds from new large financing mechanisms, such as the Global Fund. This translates into increased accountability and transparency of country management of malaria programme funds. Especially in the context of the general NHA estimation, the malaria subaccount is well suited to demonstrate “additionality”, i.e. the principle that assistance provided through the Global Fund should 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. Several mechanisms of donor assistance incorporate the concept of additionality. If carried out before such grants are disbursed, the malaria subaccount can offer valuable baseline information. Subsequent accounts can monitor the flow of funds for malaria in relation to grant disbursement. This can show the impact of the particular donor programme and whether its
funds are indeed additional to government spending on malaria. As NHA become increasingly institutionalized and conducted on a regular basis, the estimations can provide valuable trend data to help assess progress towards national priorities and the goals of various global initiatives.

It is important that expectations for the subaccount are realistic. While the tool has many potential uses, as described above, there are some important policy issues that NHA are not well suited to inform. For example, health accounts deal better with aggregates; thus, unless additional effort is made, it is not likely that the malaria subaccount will be able to track specific details of spending, e.g. for target groups, such as pregnant women and children, and notably, in the private sector. It is also difficult for the subaccount to contribute to assessments of the effectiveness of expenditure, or to provide comprehensive data for long-term projections. The high level of detail needed for these activities is difficult to capture through the health information systems in many low-income countries.

The malaria subaccount may also not be able to shed light on the consumption of artemisinin-based combination therapy (ACT). There is currently debate about whether the donor community should promote ACTs globally. Although they are highly effective and rapid, ACTs are up to 20 times more expensive than other antimalarials. The identification of the burden of financing on 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, like the general NHA framework, does not measure expenditures on “indirect” activities, such as those associated with loss of income due to malaria. Such costs are better tracked through specific malaria costing studies, such as the WHO socioeconomic impact of malaria studies.

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 this list (World Bank, 1993). Given the numerous social determinants of health, it is often difficult to draw a direct link between expenditure and health outcome.

However, studies have shown a strong correlation between funding levels and the burden of disease, particularly measured as disability-adjusted life years (DALYs). Gross and colleagues found that DALYs were strongly predictive of funding by the National Institutes of Health (Gross et al., 1999). Funding levels have also been associated with disease prevalence rates (Lamarre-Cliché et al., 2001). Given the importance of financial investment in health, health expenditure data — when used in combination with data on 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.

There is no direct relationship between the impact of a disease and the amount of resources

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6 This line of work has been developed by WHO and RBM. See, for example: Hanson K et al. The economics of malaria control interventions. In: Helping correct the 10/90 gap. Geneva, Global Forum for Health Research. WHO, 2004.

7 A DALY is defined as one year of healthy life lost because of either disability or death (Murray, 1994).
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required to control it. For example, measures to prevent malaria may have a low cost, but can have a huge impact in reducing morbidity and mortality in highly endemic areas. However, a quantitative approach can facilitate the establishment of such a link, a minimal spending threshold and the appropriate distribution of resources. In particular, standardized and continuous monitoring would facilitate this process.

The indicators in Table 1.1 can be computed using malaria subaccount data. For more details on the recommended indicators, see Annex 1. The rationale for the minimum data set is to identify the level of expenditure on malaria, the distribution of the financial burden, the allocation of resources to the various programme components, and the share of the expenditure on specific interventions, such as preventive services.

Table 1.1 A proposed minimum set of indicators for resource tracking in the malaria programme

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<td>Efficiency</td>
<td>Average expenditure on malaria cases (THEM / Malaria cases treated)</td>
</tr>
</tbody>
</table>

1.6 Outline of methodological approach

The approach recommended here adheres closely to that described in the Producers' Guide (WHO, 2003). Application of the methodology must be tailored to the individual country situation, taking into consideration the level of information available and the nature of the services used by population groups affected by malaria.

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

Once the boundaries of the subaccount have been determined, the team will need to classify expenditures in accordance with the approach recommended in the Producers’ Guide, which
in turn is derived from the System of Health Accounts (SHA) classification scheme (OECD, 2000). Chapter 3 suggests a breakdown of malaria care categories (including 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 can then be entered into the row and column headings of the core NHA tables, which are described in Chapter 4.

Chapter 5 discusses the types of data needed for the subaccount and suggests how such data can be obtained. As for the general NHA, attempts should be made to obtain data for a given estimate from more than one data source. This helps to verify the accuracy of the estimate. Already available data sources should be assessed before any primary data collection efforts are embarked upon (should they be needed). Much can be obtained from “piggybacking” – adding malaria-specific questions to surveys carried out for the general NHA exercise. If household information is not available, a targeted household questionnaire survey may be needed. In countries where most OOP expenditure occurs at pharmacies and health facilities, the same information may be obtained through provider surveys (depending on the level of detail in the facility’s information, specifically the ease with which OOP expenditures can be linked to a malaria diagnosis). Thus, it is important to understand clearly how malaria care is delivered, financed, and obtained by beneficiaries.

Once the data have been collected, the subaccount team begins the 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 arise, with examples from the pilot estimations in the Philippines and Rwanda.

The suggested process, including key steps and timeframes, is summarized in the final chapter. It is suggested that malaria-endemic countries consider institutionalizing data collection efforts for the subaccount. 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.
Definition and scope

This chapter describes the scope of an NHA malaria subaccount in the context of the general NHA. It provides a general definition of malaria expenditures and presents illustrative examples.

2.1 Brief background on malaria and malaria control

This background information on malaria is intended to help identify and understand the range of activities and expenditures to be included in the malaria subaccount. For more information on the malaria-related categories in the International Classification of Diseases (ICD), see Annex 2. Annex 3 describes malaria control activities.

Malaria is a vector-borne disease, transmitted through the bite of an infected female mosquito. If not treated promptly, the infection can progress from the typical chills, fever, and sweating, to more severe complications, including severe anaemia, cerebral complications, rupture of the spleen, and glomerular disorders. Malaria in pregnant women can have adverse effects not only on the woman herself but also on the developing fetus.

Malaria complications can also have secondary long-term consequences. Blood transfusions to treat severe anaemia may transmit other infections, such as HIV and hepatitis. People who recover from cerebral malaria may be left with persistent neurological abnormalities, which can result in psychiatric problems, seizures, and epilepsy. Pregnant women who contract malaria are likely to have infants of low birth weight.

Malaria infections, therefore, may be associated with expenditures, not only for the treatment of current infection (and concurrent complications), but also for long-term effects (e.g. chronic sequelae of acute cerebral infection) that remain after the infection has been treated. The malaria subaccount, however, includes only expenditures associated with current episodes of malaria infection. The cost of treating malaria-related complications in the long term may be estimated, if desired, and included as an addendum to the main malaria subaccount (see Annex 4 for further discussion).

In order to identify systematically what constitutes malaria prevention and control expenditures, it is useful to understand the objectives of control activities. There are three main objectives:

- to reduce the abundance of the malaria vector species;
- to isolate human hosts from vectors;
- to reduce malaria infections in humans.
When all three objectives are accomplished, transmission of malaria in a population will be reduced. Achievement of the first objective results in fewer transmitting agents; the second means that mosquitoes cannot easily transfer infection from one person to another; and the third means that there are fewer sources from which mosquitoes can draw malaria parasites.

2.2 Definition of malaria expenditures

In line with the NHA approach, the subaccount uses health care functions as the 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) implementing activities to prevent malaria; or (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 malaria subaccount

2.3.1 Malaria expenditures 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, the primary purpose of which is the restoration, maintenance, or improvement of the health status of a population. Expenditures in the NHA are grouped as follows.

a) Recurrent or core expenditure on health. In the malaria subaccount, this is expenditure directly channelled to goods and services consumed for the primary purpose of: (1) managing malaria cases (e.g. medical and nursing care, including the acquisition and consumption of medicines); (2) implementing activities to prevent malaria (e.g. distributing insecticide-treated bednets); or (3) providing support to malaria treatment and prevention activities (including general administration).

b) Capital spending related to core health activities, notably capital investment expenditures of health providers. This includes both medical spending, such as for a microscope for sample analysis, and non-medical spending, such as for vehicles used for field work.

c) Total expenditure on health (THE) is the sum of the core or recurrent and capital expenditure.

d) Health-related expenditures refer to expenditures associated with health but outside the boundary of the account. For the malaria subaccount, this includes research and development on malaria, general education and training of physicians and nurses, and cash or in-kind transfers to households associated with malaria losses.

e) The aggregate of THE (c) plus health care related expenditures is referred to as national health expenditure (NHE) (see Figure 2.1). It includes both the expenditure associated with the malaria prevention, control and treatment as well as the health care related activities on malaria.

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8 Within the International Classification of Health Accounts (ICHA) the capital formation refers to a Health Care Related class, code HC.R.1.

9 The Health Care Related classes are associated to health but they are not part of the expenditure on health. The primary purpose criterion can help identify which is health and which is health care related differences: when training is done as part of the activities to increase the quality of the malaria programme the resources involved are considered as part of the expenditure directly used on malaria, but it is used to produce health professionals, they are considered health care related.
Malaria expenditures are confined within the boundaries of the NHA and include both core and health-related expenditures. Core or recurrent expenditures include the cost of malaria treatment and prevention, and of general administration by government, while health-related expenditures include activities such as malaria research and training (HC.R). The THE and NHE aggregates for malaria expenditures should be estimated following the NHA definitions.

2.3.2 Malaria subaccount inclusions and exclusions

Malaria accounts have the same scope as the NHA, so that aggregates are compatible. Many studies have presented more comprehensive cost estimates for the treatment and prevention of malaria for various countries. These studies have generally applied the COI framework (Drummond, 2005). This brief summary is based on a few of these studies (Gallup & Sachs, 2002; Ettling & Shepard, 1991; Cropper, 1999; Wilson, 2002; Jowett & Miller, 2000; KUAWAB Business Consultants, 2002), which identified the following categories of expenditures and costs for malaria:

- private and non-private expenditure for treatment and prevention of malaria;
- loss of income due to illness;
- loss of income 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 effects on the country’s economic growth.

The malaria subaccount includes only the first category of expenditures listed above. Expenditure for treatment and prevention involves actual flows of financial resources, and can be estimated for various types of payers, including government and households. The other categories of costs listed above do not involve resource flows but rather represent forgone opportunities and intangible costs, such as the value of income that would have accrued or of activities that would have been accomplished had the individuals not become ill with malaria.
2.3.3 Malaria and other NHA subaccounts

As mentioned in Chapter 1, subaccounts can be prepared for different health care components, depending on priority policy areas. Thus, subaccounts might be prepared for specific diseases (e.g. malaria), intervention clusters (e.g. reproductive health), or age group of the health care beneficiary (e.g. child health). As can be expected, there may be some overlap between the different subaccounts. For example, reproductive health expenditures may include expenditure for malaria chemoprophylaxis of pregnant women. Similarly, child health accounts will include expenditure for malaria treatment and prevention services rendered to children. (For further discussion of this topic, see section 6.3.1.1.)

2.3.4 Geographical boundaries

As with the general NHA, the geographical boundary for the malaria subaccount is the country of usual residence of 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 the country or abroad. Malaria expenditures for foreigners temporarily within a country's borders should be excluded. However, it may be difficult to exclude non-residents when considering community-wide malaria prevention activities.

Countries in which malaria is widespread will find it useful to develop a national malaria subaccount. However, in countries where malaria is present only in specific areas, it may be more relevant and less costly to develop a regional malaria subaccount, covering only the relevant area.\(^{10}\)

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 as long as consistency is maintained for all expenditures in the subaccount.

Following the accrual method of accounting used in the NHA, the expenditures included refer to obligations incurred for goods and services consumed and provided, and not to actual cash payments. This means that expenditures are recorded at the time when the obligation is made rather than the actual payment.

2.4 Malaria expenditure: 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 range of services and activities that fall within the malaria subaccount. This does not mean that all these items should be covered in a subaccount; each country needs to select those that are relevant. The listing of services and activities is organized in four broad categories: (1) prevention and control, (2) case management (or treatment), (3) general administration and other support to malaria control and treatment, including surveillance, and (4) health-related activities for malaria. Activities or services in italics are the key interventions articulated in the RBM Partnership's Strategic Vision.

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Guide to producing malaria subaccounts within the national health accounts framework

(1) Prevention and control

(a) Reduce abundance of vectors
- Indoor residual spraying (IRS).
- Use of chemical sterilizing agents.
- 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 the environment (i.e. marsh alteration);
  - activities to improve drainage ditches and community water impoundments.
- Information, education, and communication (IEC) for households on basic sanitation measures, particularly maintaining proper drainage for used water and reducing open areas with stagnant water.
- Application of larvicides (oils, organophosphates, insect growth regulators, and microbial insecticides).
- Introduction of natural enemies of mosquitoes, such as larvivorous fish.

(b) Isolate human hosts from vector
- Insecticide-treated nets (ITNs).
- Dry-belting villages in areas where rice is cultivated (i.e. restricting use of land surrounding human communities to the production of dry crops).
- Zooprophylaxis or use of wild or domestic animals as a source of blood meal and as diversion of blood-seeking mosquitoes 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”, to promote the use of nets.

(c) Reduce malaria infection in humans
- IEC to raise public awareness about malaria.
- Integration of malaria control tools in health programmes targeted at pregnant women and newborn babies.
- Intermittent preventive treatment in pregnancy (IPTp).
- Intermittent preventive treatment in infants (IPTi), i.e. administration of an antimalarial three times during the first year of life and at the time of routine immunization, whether or not the infant has malaria.
- Chemoprophylaxis for non-immune groups.
- Mass blood surveys for malaria.

(2) Case management (treatment)

(a) By type of provider of care
- Hospital inpatient stay.
- Outpatient treatment.
- Home-based malaria case management.

(b) By type of input to health care
Consumption of antimalarials including:
- ACT (e.g. artesunate, artemether, dihydroartemisinin, plus other drugs, such as quinoline or antifolate-based drugs);
- quinoline compounds (e.g. quinine, chloroquine, amodiaquine, mefloquine, primaquine);
- antifolate drugs (e.g. sulfonamides, pyrimethamine, proguanil, chlorproguanil);
- artesunate suppositories.

Note: WHO-recommended combination therapies, in order of priority, are:
1. artemether/lumefantrine;
2. artesunate+amodiaquine;
3. artesunate+ sulfadoxine–pyrimethamine;
4. amodiaquine+ sulfonamides–pyrimethamine (in areas where both remain effective); and 
5. artesunate+mefloquine (in areas of low to moderate transmission).

(c) 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 anaemia accompanying malaria.
- Case management of severe malaria (cerebral malaria).
- Case management of malaria accompanied by other infections, such as typhoid and/or salmonella infection.
- Continuing treatment of sequelae to cerebral malaria (e.g. neurological damage, including epilepsy and seizures). As suggested, this type of expenditure can be added as a health care related component.

(3) General administration and other support to malaria control and treatment
(a) Surveillance and monitoring
- Surveillance of incidence of malaria morbidity and mortality, especially for early warning and detection of malaria epidemics, and for monitoring the impact of malaria control activities.
- Monitoring and evaluation of resistance to antimalarial drugs and resistance of vectors to insecticides.
- Monitoring of service delivery and implementation of malaria-related activities.
- Community participation in malaria surveillance and monitoring.
- Surveillance of mosquitoes (e.g. by using insect collectors or remote sensing and climate modelling to map and monitor mosquito populations).

(b) Administration, coordination, and policies
- Preparing country strategies and plans for malaria control.
- Formulating policies and programmes related to malaria.
- Coordinating with programme partners and other institutions that provide support to malaria activities.
Guide to producing malaria subaccounts within the national health accounts framework

- Setting up a system for epidemic preparedness and management.
- General administration.
- Providing consumer protection and quality assurance services.

**(c) Support to programme implementation**

- Production and distribution of IEC materials on malaria (including home-based case management).
- Production of guidelines on malaria case management and distribution to public and health care providers.
- Technical support for implementation of evidence-based malaria control.

**(d) Training**

- Training in curative care: training of health personnel in early detection and diagnosis of malaria; training of laboratory technicians; training in case management, for both simple and severe malaria.
- Training in prevention: training of hygiene technicians and other personnel in vector control and in impregnation of bednets with insecticide; training of community health workers in IEC techniques.
- Training in surveillance: training of health personnel in data management and disease surveillance; training in monitoring antimalarial drug efficacy.
- General training: training in malaria programme management; building capacity for malaria surveillance.
- Training in service delivery in the community: 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.

**(4) Health-related activities for malaria**

**(a) Research**

- Development of new tools to fight malaria (treatment and prevention), e.g. basic research on molecular medicine.
- Basic research on epidemiology and transmission.
- Development of high-quality technology and cost-efficient interventions (including local adaptation of interventions).
- Population-based studies on health-care-seeking behaviour and risk of malaria infection.
- Population-based studies on use of ITNs, use of new therapies, sensitivity of vectors to insecticides.
- Development of malaria-related curriculum and materials for health technical and professional formation.
- Development of tools for forecasting and predicting malaria epidemics.

**(b) Capital formation**

- Upgrading of laboratories in health facilities: equipment e.g. microscopes, vehicles, and facilities (major renovation as well as new generation).
Classification schemes

3.1 Concept

The NHA framework organizes health expenditure data along four principal classifications: financing sources, financing agents, providers, and functions. Each NHA table displays the flow of funds between two of these classifications (e.g. from financing sources to financing agents); the originators of the funds are listed in the column headings and the recipients in the row headings (see Chapter 4 for the target NHA tables). Each classification consists of a series of specific entities or activities, identified by an alphanumeric code. This nomenclature has been adapted from the International Classification of Health Accounts (ICHA) (OECD, 2000) and the recommended scheme for tracking general health expenditures in middle- and low-income countries, as described in the Producers’ Guide (WHO, 2003).

For tracking malaria-specific health expenditures, this guide further disaggregates the NHA classification scheme to encompass specific malaria health care financing and delivery entities (e.g. ITNs). It is important that countries 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 The four principal NHA classifications

The 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, FS.

The principal managers of malaria funds are called financing agents. These entities receive funds from financing sources and use them to pay for or purchase malaria services. As such they act as poolers and distributors of money (see Producers’ Guide (WHO, 2003)). This classification is extremely important as it includes the entities that have programmatic control over how malaria funds are allocated. Examples include the national malaria control programme at the Ministry of Health, insurance schemes, and nongovernmental organizations (NGOs). For classification purposes, financing agents are denoted by the letter code HF.

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

11 Other classifications that may also be measured include (1) resource costs (RC) and (2) beneficiaries, presented as a multi-axial approach (geopolitical location, demographic characteristics, epidemiological/apparent need).
The actual services and goods delivered for malaria control and care are called functions. Policy-makers are likely to be particularly interested in obtaining information for this level. Functions include curative care, medical goods such as ACT and ITNs, preventive services, and administration. Within these classifications, some services are more intimately associated with malaria control. These are called core functions; they are denoted by the code HC and include prevention programmes and curative care. Other – health care-related – functions are denoted by the code HCR and include capital formation for malaria delivery infrastructure, training, and research.

3.3 Approach to assigning classification categories

Each entity in a particular classification has a code, developed in the following manner:

- the letter code for the classification (e.g. HF for financing agents);
- a numerical code, as described in the ICHA;
- the ICHA name.

The NHA approach allows further subcategories to be added to accommodate malaria-specific entities and services. The extra classification codes should respect, to the extent possible, the existing international standards and conventions, but should also be flexible enough to meet the specific policy needs of the country. Equally, if a particular ICHA category is not relevant to a given country, this category need not be used. This approach allows “cross-walking” from the nationally relevant classifications to the international standard classification.

When new subcategories are introduced, the first two numbers of the code should match the ICHA. The numbers that follow designate the new nationally relevant category. If, for example, a country is interested in comparing spending between public and private hospitals, a subcategory must be added to the ICHA classification. ICHA provides only a general classification for hospitals, namely HP.1.1 General hospital. To accommodate a public and private distinction for hospitals, the NHA team can add subcategories:

- HP.1.1.1 Government general hospitals
- HP.1.1.2 Nongovernment general hospitals

The same approach is used to add malaria-specific categories. For example, ICHA offers the coding HC 5.1.2 Over-the-counter medicines. This can be further disaggregated for malaria purposes (data permitting) into:

- HC.5.1.2.1 Artemisinin-based combination therapy
- 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 to the country context.

The subaccount team should develop their malaria classifications in line with the overall country NHA scheme. Thus, if the Ministry of Health is classified as HF.1.1.1.1 in the general NHA exercise, and if it is also featured within the malaria subaccount, it should be given the same code. If the team needs to specify the malaria control programme within the Ministry of Health, this can be designated as HF.1.1.1.1.1, provided the code is not already assigned to another programme in

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12 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 national AIDS control programme. Thus, the malaria control programme will need to be assigned the code HF.1.1.1.2.
the general NHA or in another subaccount. 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 A suggested malaria classification scheme

A possible classification scheme for the malaria subaccount is presented in this section, based on the approach of the ICHA and the Producers’ Guide (WHO, 2003). The integrity and content of the original ICHA classifications have been maintained, i.e. ICHA classifications have not 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 NHA) in the malaria subaccount refers only to malaria-related services. For example, in a malaria subaccount, “HC.1.1 Inpatient care” captures only malaria-related inpatient care. 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 not be feasible or applicable in all countries. Therefore, country teams should adapt the classification scheme to their individual needs and situation.

### 3.4.1 Functions associated with malaria care

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

### 3.4.2 Health providers associated with malaria control and treatment

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

**Table 3.1. Health care functions relevant to 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 (including for severe malaria)</td>
</tr>
<tr>
<td>HC.1.3</td>
<td>Outpatient curative care (including 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</td>
<td>Pharmaceuticals and other medical non-durables</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.5.1.1.1+5.1.2.1</td>
<td>ACTs</td>
</tr>
<tr>
<td>HC.5.1.1.2+5.1.2.2</td>
<td>Chloroquine and quinine</td>
</tr>
<tr>
<td>HC.5.1.1.3+5.1.2.3</td>
<td>Other antimalarials</td>
</tr>
<tr>
<td>HC.5.1.1.43+5.1.2.4</td>
<td>Drugs for malaria-related symptoms (e.g. fever reduction) that are not specifically antimalarials</td>
</tr>
<tr>
<td>HC.5.1.3</td>
<td>Other medical nondurables</td>
</tr>
</tbody>
</table>

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13 The OECD guidelines (OECD, 2000) 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.”
Guide to producing malaria subaccounts within the national health accounts framework

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<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</td>
<td>Therapeutic appliances and other medical durables</td>
</tr>
<tr>
<td>HC.5.2.1</td>
<td>ITNs</td>
</tr>
<tr>
<td>HC.5.2.2</td>
<td>Other insecticide-treated materials</td>
</tr>
<tr>
<td>HC.6.1</td>
<td>Maternal and child health, family planning, and counselling; 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>HC.6.3.2</td>
<td>Insecticide-treated materials/ insecticide-treated net activities</td>
</tr>
<tr>
<td>HC.6.3.3</td>
<td>Indoor residual spraying campaigns</td>
</tr>
<tr>
<td>HC.6.3.4</td>
<td>Integrated vector control (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</td>
</tr>
<tr>
<td>HC.7.1.2</td>
<td>Administration, operation, and support of social security funds (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 expenditure on malaria, not specified by kind</td>
</tr>
<tr>
<td>HC.R.1</td>
<td>Capital formation for health care provider 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>

14 Although in many countries training is a large share of what may be considered prevention and public health programmes, the System of Health Accounts (OECD, 2000) recommends that it be extracted from HC.6. and placed under HC.R.2. This means that training will not be included in the THE estimate, which is used for international comparisons, but only in the National Health Estimate, which is designed for use by local policy-makers. This guide recommends adhering to the System of Health Accounts and the Producers' Guide (WHO, 2003); however, it is recognized that some countries may wish to maintain training expenditure as part of HC.6, so that it can be factored into the THE estimate.

15 Note: clinical research should be classified as a core expenditure.
Table 3.2. Malaria service providers

3.4.3 Financing agents associated with malaria control and treatment

Table 3.3 lists financing agents, or payers, associated with the allocation of health care funds for malaria.

<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- or 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 service centres</td>
</tr>
<tr>
<td>HP.3.4.5.1</td>
<td>Antenatal clinics</td>
</tr>
<tr>
<td>HP.3.4.9</td>
<td>All other outpatient community and other integrated care centres</td>
</tr>
<tr>
<td>HP.3.5</td>
<td>Medical and diagnostic laboratories</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-alleviating drugs</td>
</tr>
<tr>
<td>HP.5</td>
<td>Provision and administration of public health programmes (for malaria)</td>
</tr>
<tr>
<td>HP.6</td>
<td>General health administration 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 kind</td>
</tr>
</tbody>
</table>
Guide to producing malaria subaccounts within the national health accounts framework

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 programme)</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 payments</td>
</tr>
<tr>
<td>HF.2.4.</td>
<td>Non-profit institutions serving households (other than social insurance)</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 nonparastatal 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 services. These financing sources are mostly also 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>
The malaria subaccount tables are used to organize and then to report malaria expenditure data, following the NHA approach. The only differences between the general NHA tables and the malaria subaccount tables are in the subcategories in the rows and columns, and the fact that certain classes in the NHA classifications may not be relevant for malaria.

### 4.1 NHA tables

NHA tables are organized according to the flow of funds within the health system – from financing sources to financing agents to providers and functions. They thus aim to capture the financing, production, and consumption axes of health care. Additional classifications that may be tracked include:

- resource cost (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 classification, 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 and type of intervention.
- geographical division: subnational grouping of consumers or entities involved in the financing or provision 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 indicate the direction of flows of funds.

**Figure 4.1. Resource flows among health sector actors**
An NHA table is in effect a “snapshot” of a specific transaction or flow (i.e. a specific arrow in the diagram). The tables are structured such that the columns show the entities from which a flow started and the rows show the entities, functions, or commodities into which the flow moved. Thus, the table showing the flow from financing sources (FS) to financing agents (HF) would have the different financing sources in the columns and the financing agents in the rows. The table showing the flow from financing agents (HF) to providers (HP) would have the financing agents in the columns and the health care providers in the rows.

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 be the originators of funds in another table (e.g. the financing agents in the HF x HP table); alternatively, 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, which gives an example of the categories of entities that could be involved in the transactions.

### 4.2 Malaria subaccount tables

It is recommended that malaria expenditure data should be compiled according to the NHA format, with the same expenditure aggregates or totals. Following the NHA approach allows comparisons to be made between the NHA and malaria expenditures.

#### 4.2.1 Basic tables

As with the NHA, four basic tables are recommended:

- the flow of malaria funds from financing sources to financing agents;
- the flow of malaria funds from financing agents to providers;
- the flow of malaria funds from financing agents to functions;
- the flow of malaria 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.

Other subaccount tables may be constructed, depending on the needs of policy-makers and other users in the country, and on data availability. One may refer to the Producers’ Guide (WHO, 2003) for descriptions of other tables, which include the following: providers to resource cost; financing agents to resource cost; financing agents to population, grouped by age and sex; financing agents to population, grouped by income; financing agents to disease groups; and financing agents to population, grouped by geographical location.

#### 4.2.2 Aggregates

Aggregates or totals for malaria expenditures should be compiled equivalent to the THE and the NHE. The two totals for malaria expenditure are defined as follows:

- **Total health expenditure (THE) on malaria services (THE$_{M}$):** This is the sum of HC 1–7 plus HC.R.1 (capital formation). This estimate is recommended as a minimum, and represents expenditure on the core of the country’s malaria programmes, consisting mainly of treatment and prevention expenditures. This total will be comparable with other country estimates and with the NHA.
National health expenditure (NHE) on malaria services (NHE\(_M\)) is the total expenditure plus other health-related expenditures (i.e., other than health provider capital formation HC.R.1). These additional components include expenditure for health personnel formation on malaria and research and development on malaria.

- Additional tables for targeted expenditures

The malaria subaccount includes targeted or earmarked funds for malaria as well as non-targeted funds (see section 6.3.2 for more detail). Earmarked funds are those for which the primary purpose is explicitly treatment 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 are staff salaries and maintenance and other operating costs of public health facilities. A portion of non-targeted costs will eventually go to treatment of patients with malaria, but this will not be known until after the funds have been spent. 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 is different from that for incurring targeted expenditures. For this reason, it is recommended that the two types of malaria expenditures be distinguished by preparing: (1) tables reporting specifically on targeted expenditures (see Annex 5.5–5.6); and (2) tables showing both targeted and untargeted spending (the main subaccount tables). The additional tables do not necessarily have to be generated for every main subaccount table. Targeted expenditure tables showing the breakdown from financing agent by health care functions and by providers would be particularly useful to malaria programme managers for planning purposes, complemented with those of total actual expenditure on malaria.

4.2.3 Limited resources

If resources are very limited, the following two tables are recommended as 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 institutions concerned usually have recording or information systems that can provide data on health expenditures. Moreover, the two tables present breakdowns 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 malaria prevalence, where the disease is a priority (such as in sub-Saharan Africa), more comprehensive monitoring of expenditures (including FSxHF, and HPxHC tables) would be required to address policy questions and issues.

4.2.4 Examples of malaria subaccount tables

Examples of malaria subaccount tables are presented in Annex 5 for Rwanda and in Annex 6 for Davao del Norte Province, Philippines. The Rwanda tables were estimated for the entire country and six tables are shown: four for total malaria expenditures and two for targeted malaria expenditures. The tables from the Philippines were estimated for a specific province; two show total malaria expenditures and one shows targeted expenditures.

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16 Non-targeted expenditures can be derived by taking the difference between the totals and targeted expenditure tables.
5.1 Approaching the data collection process

For the malaria subaccount, comprehensive data estimates need to be assembled from public, private, and donor stakeholders in the health care system. Obtaining such estimates is the pivotal step in the NHA process and can be the most time-consuming. The time needed will depend on a number of factors, such as the availability of existing data, the budget available to carry out surveys if needed, the level of cooperation of gatekeepers of data sources or survey respondents, the stability and motivation of the NHA team, and the ability of the team to keep up the momentum of data retrieval by following up regularly with key informants.

As indicated in the Producers’ Guide (WHO, 2003), it is strongly recommended that, for any given estimate, information should be obtained from more than one source, to allow triangulation of the data. For example, in estimating the expenditure incurred by companies contributing to health insurance schemes, the team should obtain the amount that companies report giving to health insurance as well as the amount the health insurance schemes report receiving from companies. More detailed descriptions of triangulation and data retrieval for general health expenditures are given in the Producers’ Guide. This chapter focuses on the specific data collection issues relevant to the malaria subaccount, incorporating experiences and lessons learned from countries with different levels of secondary data.

5.1.1 Understanding what is needed and why

In planning the data collection process, it is important to start from as clear an understanding as possible of the “spider web” of funding flows for malaria health care, i.e. who is providing funding and where those funds are going. The team should list all known entities associated with malaria treatment and prevention and then map the flow of funds between them. This is best visualized in a flowchart of some sort, such as that shown in Figure 5.1, which is the outcome of such an exercise in the Philippines.
In addition to providing a way of organizing initial perceptions of health care delivery for malaria, this “spider web” exercise helps clarify what a malaria subaccount can achieve. Essentially, once the subaccount has been completed, the team should be able to: (1) enter the expenditure estimates next to each funding flow arrow; (2) validate the start and end points of the arrows; and (3) verify and update the list of malaria-associated health care entities.

Once the spider web of funding flows has been prepared, the team will be able to identify the entities from which data are needed. At this stage, the team needs to fully comprehend why the data are needed and how they will inform the NHA matrices. Table 5.1 provides a generic listing of entities involved in health care for malaria and the types of NHA-related questions that can be addressed by data on and from these entities.

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17 Note, in the Philippines, expenditures were not tracked at the financing source level, but rather at the financing agent, provider, and functions level.
Table 5.1. Relationship between needed data estimates and the NHA-related questions they inform

<table>
<thead>
<tr>
<th>Malaria health care entity</th>
<th>When serving as….</th>
<th>NHA-related questions addressed by data estimates on each entity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Households with at least one member who has had malaria in the past year</td>
<td>Financing source only</td>
<td>What proportion of household contribution to insurance is used for malaria-related care? (for the FSxHF table)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>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? (for the FSxHF, HFxHP, HFxHC, and HPxHC tables)</td>
</tr>
<tr>
<td>Providers e.g. hospitals, clinics, pharmacies, and, if applicable, traditional healers</td>
<td>Provider</td>
<td>Which financing agents contribute to providers? How much is received from each financing agent? (for the HFxHP tables)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>How do providers spend their funds across each type of function? (for the HPxHC table)</td>
</tr>
<tr>
<td>Donors</td>
<td>Financing source only</td>
<td>Which financing agents do donors contribute to? How much is contributed? (for the FSxHF table)</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 which functions? (for the HFxHP, HPxHC, and HFxHC tables)</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>From which financing sources do NGOs (as financing agents) receive their malaria funds? And how much is received? (for the FSxHF table).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>How do NGOs allocate their funds across each type of provider and function? (for the HFxHP, HPxHC, and HFxHC tables)</td>
</tr>
<tr>
<td>Relevant government entities e.g. Ministry of Finance, Ministry of Health, and perhaps Ministry of Agriculture</td>
<td>Financing source</td>
<td>What funds does the Ministry of Finance (financing source) give for malaria and to whom? (for the FSxHF table)</td>
</tr>
<tr>
<td></td>
<td>Financing agent</td>
<td>From where do the various ministries (excluding the Ministry of Finance) (as financing agents) receive their malaria funds? And how much is received? (for the FSxHF table)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>How do the various ministries (excluding the Ministry of Finance) allocate their malaria funds across each type of provider and function? (for the HFxHP, HPxHC and HFxHC tables)</td>
</tr>
</tbody>
</table>
### 5.1.2 Types of data needed

The next step is to determine what types of data will be required from each entity. As mentioned already, the objective is to capture what has been spent on malaria. This means that the team should search for information on actual expenditure and not budget or cost estimates. In some cases, however, expenditure data may not be readily available or even retrievable from primary data collection efforts. In this case, alternative data will be needed. For example, as a last resort, unit cost and use indicators may be used. The team should strive to obtain actual costs, not estimates based on an ideal set of services presumed to be regularly delivered. This will be easier if facility records use a cost-accounting system. Malaria expenditure can then be estimated by deriving cost/use weights and applying them to total expenditure levels. This and other uses of cost and use data are described 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

The team then needs to identify all the possible data sources for the targeted entities and types of data (e.g. expenditure data, use rates). This entails taking a census of the available data sources.

<table>
<thead>
<tr>
<th>Malaria health care entity</th>
<th>When serving as…</th>
<th>NHA-related questions addressed by data estimates on each entity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insurance companies/ schemes</td>
<td>Financing agent</td>
<td>From where do insurance programmes (including public and private) receive their funds for malaria coverage? And how much is received? (for the FSxHF table) How do insurance programmes allocate their malaria funds across each type of provider and function? (for the HFxHP, HFxHC, and HPxHC tables)</td>
</tr>
<tr>
<td>Employers</td>
<td>Financing source</td>
<td>How much of the funds paid by employers (financing sources) is ultimately used for malaria? Where do the funds go? (for the FSxHF table)</td>
</tr>
<tr>
<td></td>
<td>Financing agent</td>
<td>How much goes towards on-site health services for employees? For what types of services? (for the FSxHF, HFxHP, HFxHC, and HPxHC tables)</td>
</tr>
</tbody>
</table>

---

18 The Producers’ Guide (WHO, 2003) recommends using estimates 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 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 amount paid for the drugs should be included in the 2003 estimate.

19 For example, costing studies may be developed using an “ingredients approach”, by adding up the elements that should comprise a particular malaria-related service, such as the portion of a doctor’s salary used for the consultation and the drugs that are issued during the visit. However, in practice, a patient may see a nurse rather than a doctor, and the patient may not receive the drugs because they are out of stock. In this case, the estimated cost would be an overestimate. In addition, cost studies may not account for economies of scale, and actual costs may vary according to the size and condition of the provider; the estimates would therefore not necessarily be applicable in all situations.
Essentially, data sources can be organized into four broad categories. To minimize the financial cost of data collection and to avoid unnecessary duplication of efforts, the team should identify sources of information for these four categories, in the following order:

- **Existing information systems**: What types of data are available on a regular basis through health information systems? An example may be OOP expenditure at public facilities.
- **Secondary data (existing studies and reports)**: What types of studies and 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 questions on malaria expenditure can be added? General NHA surveys of donors and NGOs or non-NHA surveys, such as a household income and expenditure survey or a living conditions measurement survey, may be under way.
- **Surveys specific to the malaria subaccount**: As a last option, if there is no other way to estimate expenditures, the team may need to carry out a survey specifically for the malaria subaccount, such as a survey of households in which at least one member has had malaria during the year.

The type of survey needed will depend on:

- the nature of the transaction targeted, i.e. who are the principal financiers and recipients;
- the potential for obtaining accurate responses.

For example, in the case of the Philippines, the malaria programme is largely government-subsidized, and a household survey was therefore not necessary. Also, because of the fairly good detail available in the provider records, which allowed expenditures to be linked to a malaria diagnosis, a provider-based survey was possible. In the more common case where there is significant out-of-pocket spending, health accounting guidelines can be helpful.

The “spider web” funds flow chart (as in Figure 5.1) can be used to help identify the agencies to which the different entities routinely submit a financial report. For example, some entities may need to account for, or report about, the use of borrowed funds or grants to a governing agency. The agencies that serve as budget offices, audit offices, regulatory offices (e.g. for licensing and accreditation), tax authorities, and statistical agencies may then be useful sources of data.

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

Once the data sources have been identified, the team should develop a data collection plan, outlining the types of data needed, for what purposes, and in what timeframe. In addition, specific team members 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 and the quality of data in these systems will differ from country to country. Low-income countries may have weak information...
systems; however, such systems should not be dismissed completely, particularly if malaria is a priority for the government, in which case, it may be mandatory for hospital and health centre administrators to track specific malaria indicators. 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 of chloroquine and quinine consumed. Number of days these drugs have been out of stock.</td>
</tr>
<tr>
<td>Number of laboratory tests positive and negative for <em>Plasmodium</em>.</td>
</tr>
<tr>
<td>Number of home visits for malaria.</td>
</tr>
<tr>
<td>Number of seminars held by the facility on malaria education and number of participants.</td>
</tr>
<tr>
<td>Number of consultations for presumed and confirmed malaria. This can be sorted by age group.</td>
</tr>
<tr>
<td>Number of hospitalizations for “simple confirmed”, “simple presumed”, and “serious” malaria cases. This can be sorted by age group.</td>
</tr>
<tr>
<td>At the hospital level, the HMIS can provide more detail on the number of cases of malaria sequelae (mainly for inpatients), 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 expenditure for all consultations, it is not possible to link each payment to the diagnosis.</td>
</tr>
<tr>
<td>It is also possible to get the total OOP expenditure 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 the country’s health information system is to identify gaps or areas that could be improved if a malaria subaccount were regularly prepared.

Countries with more sophisticated information systems, such as the Philippines, can provide additional useful indicators, as shown in Table 5.3. Close monitoring of both the malaria situation and implementation of the control programme, as well as the routine collection of reliable data, are important activities in the Philippines, particularly since one of the national health objectives is to eliminate malaria as a public health problem. Malaria is still one of the top ten leading causes of morbidity, but the incidence has been low for some time, at around 100 confirmed cases per 100 000 population since the 1990s and 50 confirmed cases per 100 000 population since 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 according to components of the malaria control strategy</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Early diagnosis and prompt treatment</td>
</tr>
<tr>
<td>1.1 Number of smears collected</td>
</tr>
<tr>
<td>a. Clinically diagnosed</td>
</tr>
<tr>
<td>b. Not clinically diagnosed</td>
</tr>
<tr>
<td>1.2 Number of smears examined</td>
</tr>
<tr>
<td>a. Clinically diagnosed</td>
</tr>
<tr>
<td>b. Not clinically diagnosed</td>
</tr>
<tr>
<td>1.3 Number of positive smears</td>
</tr>
<tr>
<td>a. Clinically diagnosed</td>
</tr>
<tr>
<td>- <em>P. falciparum</em></td>
</tr>
<tr>
<td>- <em>P. vivax</em></td>
</tr>
<tr>
<td>- <em>P. malariae</em></td>
</tr>
<tr>
<td>- Mixed infections</td>
</tr>
<tr>
<td>b. Not clinically diagnosed</td>
</tr>
<tr>
<td>- <em>P. falciparum</em></td>
</tr>
<tr>
<td>- <em>P. vivax</em></td>
</tr>
<tr>
<td>- <em>P. malariae</em></td>
</tr>
<tr>
<td>- Mixed infections</td>
</tr>
<tr>
<td>1.4 Number treated</td>
</tr>
<tr>
<td>a. Clinically diagnosed</td>
</tr>
<tr>
<td>- Positive</td>
</tr>
<tr>
<td>- Negative</td>
</tr>
<tr>
<td>b. Not clinically diagnosed</td>
</tr>
<tr>
<td>- Positive</td>
</tr>
<tr>
<td>- Negative</td>
</tr>
<tr>
<td>1.5 Total malaria deaths (Certificates in the Regional Office)</td>
</tr>
<tr>
<td>2. Disease prevention and vector control measures</td>
</tr>
<tr>
<td>2.1 Number of mosquito nets distributed</td>
</tr>
<tr>
<td>2.2 Number of mosquito nets impregnated</td>
</tr>
<tr>
<td>a. Retreatment</td>
</tr>
<tr>
<td>b. New</td>
</tr>
<tr>
<td>2.3 Number of houses sprayed</td>
</tr>
<tr>
<td>2.4 Bio-ponds constructed</td>
</tr>
<tr>
<td>2.5 Streams cleared/exposed to sunlight</td>
</tr>
<tr>
<td>a. New</td>
</tr>
<tr>
<td>b. Maintained</td>
</tr>
<tr>
<td>2.6 Stream seeded with larvivorous fish</td>
</tr>
<tr>
<td>a. New</td>
</tr>
<tr>
<td>Indicators tracked according to components of the malaria control strategy</td>
</tr>
<tr>
<td>---------------------------------------------------------------</td>
</tr>
<tr>
<td>b. Maintained</td>
</tr>
<tr>
<td>3. IEC</td>
</tr>
<tr>
<td>3.1 Number of IEC campaigns conducted</td>
</tr>
<tr>
<td>a. Bench conference</td>
</tr>
<tr>
<td>b. Mothers’ class</td>
</tr>
<tr>
<td>c. Others (specify)</td>
</tr>
<tr>
<td>3.2 Number of IEC materials distributed</td>
</tr>
<tr>
<td>a. Posters</td>
</tr>
<tr>
<td>b. Leaflets</td>
</tr>
<tr>
<td>c. Health counseling</td>
</tr>
<tr>
<td>4. Epidemiological investigations (malaria epidemic-prone areas (MEPA) only)</td>
</tr>
<tr>
<td>4.1 Number of cases investigated</td>
</tr>
<tr>
<td>a. Indigenous cases</td>
</tr>
<tr>
<td>b. Imported cases</td>
</tr>
<tr>
<td>4.2 Number of foci investigations conducted</td>
</tr>
<tr>
<td>5. Entomological activities</td>
</tr>
<tr>
<td>5.1 Bio-assay test</td>
</tr>
<tr>
<td>a. Sprayed walls</td>
</tr>
<tr>
<td>b. Impregnated mosquito nets</td>
</tr>
<tr>
<td>5.2 Susceptibility test</td>
</tr>
<tr>
<td>5.3 Entomological investigation</td>
</tr>
</tbody>
</table>

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

These data are compared with targets to determine the level of performance of public programmes.

5.3 Secondary data

The NHA team should pool their collective knowledge to list all known studies and reports relating to malaria expenditure or to service cost and use rates. For each of the entities in the spider-web diagram, consider whether 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 in the Ministry of Health. In addition to considering routine reports, the team should list recent specific studies on topics potentially useful to the malaria subaccount. For example, in Rwanda, the Situation analysis of malaria report provides valuable information on the time allocation of health personnel who deliver malaria services. This information is 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 given in Table 5.4.
Table 5.4. Secondary data sources (existing studies/reports) identified in Rwanda

<table>
<thead>
<tr>
<th>Malaria health care entity</th>
<th>Secondary data source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Government</td>
<td>Ministry of Health and CAMERWA (Central Medical Stores) annual expenditure reports</td>
</tr>
<tr>
<td></td>
<td>Situation analysis of malaria report</td>
</tr>
<tr>
<td></td>
<td>Commodities listing from the Customs Office</td>
</tr>
<tr>
<td>Providers</td>
<td>2003 In vivo and In vitro testing of drug resistance study</td>
</tr>
<tr>
<td></td>
<td>Treatment of malaria in Rwanda study</td>
</tr>
<tr>
<td></td>
<td>Situation analysis of malaria report (includes time spent on delivering care)</td>
</tr>
<tr>
<td>Households</td>
<td>Evaluation of the malaria situation study (includes data on the use rates of services)</td>
</tr>
<tr>
<td></td>
<td>Quality assurance survey (2002)</td>
</tr>
<tr>
<td>Donors and NGOs</td>
<td>Report submitted to the Programme National de lutte contre le paludisme (PNLP) on Population Services International, Swiss Cooperation Office.</td>
</tr>
<tr>
<td></td>
<td>UNICEF and WHO spending on malaria in the African Malaria Report</td>
</tr>
</tbody>
</table>

The secondary data sources in the Philippines are 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</th>
<th>Secondary data source</th>
</tr>
</thead>
<tbody>
<tr>
<td>National government</td>
<td>Department of Health</td>
</tr>
<tr>
<td></td>
<td>- Annual reports and national objectives for health</td>
</tr>
<tr>
<td></td>
<td>- Knowledge, attitudes and practices (KAP) and malaria prevalence survey in selected indigenous communities in the Philippines</td>
</tr>
<tr>
<td>Local government (for province-level malaria subanalysis)</td>
<td>Provincial government</td>
</tr>
<tr>
<td></td>
<td>- Provincial Health Office statistical reports</td>
</tr>
<tr>
<td></td>
<td>- Financial statements</td>
</tr>
<tr>
<td>Municipal and city governments</td>
<td>- Municipal or city health office statistical reports</td>
</tr>
<tr>
<td></td>
<td>- Financial statements</td>
</tr>
<tr>
<td>Insurance Agencies</td>
<td>PhilHealth reports</td>
</tr>
<tr>
<td>Providers</td>
<td>Hospital records section and billing section databases</td>
</tr>
<tr>
<td></td>
<td>Rural/city health unit logbooks of facility consultation visits, laboratory services, and drugs/supplies received by facility</td>
</tr>
<tr>
<td>Households</td>
<td>DOH KAP and malaria prevalence survey in selected indigenous communities in the Philippines</td>
</tr>
<tr>
<td>Donors and NGOs</td>
<td>Reports of Philippine Rural Reconstruction M branch operating in the study site (implementor of Global Fund monies for malaria)</td>
</tr>
</tbody>
</table>
In addition to consulting locally available studies and records, the team should consider reviewing internationally available data sources. These can be useful for cross-checking estimates. Table 5.6 lists some potentially useful international documents.

### Table 5.6. International data sources

<table>
<thead>
<tr>
<th>Malaria health care entity</th>
<th>Secondary data source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Households</td>
<td>For background statistics, see the annual <em>Africa Malaria Report</em> produced by UNICEF and WHO.</td>
</tr>
<tr>
<td>Epidemiological information</td>
<td>Mapping Malaria Risk in Africa MARA <a href="http://www.mara.org.za/">http://www.mara.org.za</a></td>
</tr>
</tbody>
</table>

For each survey or study listed, the team should discuss how and when the report can be obtained, and who will be responsible for this. Some studies, although theoretically available, may be difficult to obtain. The team should develop a strategy for retrieving such studies. As the 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 Adding questions to ongoing surveys

Another cost-effective method of obtaining data is to identify ongoing surveys that target entities included in the subaccount data collection process. The team leader may be able to negotiate the addition of questions on malaria expenditure to these surveys. This will allow specific malaria data to be obtained at little or no extra cost.

Such “piggybacking” may be particularly valuable in the case of ongoing household surveys. 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 these may not be accurate or reliable) or conduct a new, targeted household survey, which is a costly endeavour. Some routine surveys that address issues relating to malaria among households include the Demographic and Health Surveys (DHS), the Multiple Indicator Cluster Surveys (MICS), and the WHO Regional Office for Africa Socioeconomic Impact of Malaria studies.

- The DHS is a nationally representative household survey, which provides data on a wide range of indicators for monitoring and impact evaluation 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 bednets.²¹
- The MICS is conducted by UNICEF and aims to obtain critical data on children’s health. To date, these surveys have been conducted in over 60 countries and include modules on malaria, which seek information on prevalence, treatment, availability of nets in household, and other related information.²²

²¹ [http://www.measuredhs.com/aboutsurveys/dhs_surveys.cfm](http://www.measuredhs.com/aboutsurveys/dhs_surveys.cfm)
The WHO Regional Office for Africa Socioeconomic Impact of Malaria study has been conducted in Ghana, Mali and Rwanda. In Rwanda, the study was used to obtain information for the malaria subaccount through questions added to a targeted survey of households with at least one malaria episode in the past month.

In addition, if the subaccount is being prepared at the same time as the general NHA, information may be obtained through the general surveys. Simultaneous preparation is recommended, as it allows malaria spending to be analysed in the context of overall health expenditures. Annexes 7 and 8 provide examples of donor and NGO survey instruments used in Rwanda, which include modules on overall health spending and malaria-focused spending.

When determining whether to add malaria questions to ongoing surveys, the following questions should be considered.

- What is the sample size of the survey? Will it be useful for obtaining national and annual estimates of malaria spending by the entity of interest? In the case of Rwanda, the team made sure that all known donors and NGOs who contributed to malaria were included in the sample.

- How many questions need to be added in order to determine who is spending what, and for which malaria services? Particularly with the non-NHA household surveys, there may not be much scope for extensive additional questions; thus, the goal should be to add as few questions as possible, while meeting the data requirements.

- What is the time period for which respondents will be reporting? Some surveys may ask households about expenditures only on their last outpatient visit; however, it is difficult to estimate accurately annual outpatient expenditure from one visit. Therefore, NHA seek information on spending in the past four weeks. In addition, an ongoing survey may ask donors to report on expenditures for a year that does not coincide with the period being used in the NHA (e.g. the fiscal year rather than the calendar year). While, in many cases, the reported amounts can be adjusted to the year of choice by incorporating inflation rates and other factors, this assumes that there is a steady trend in spending practices, which may not be the case, particularly for donors.

- What is the timeline for the workplan for the ongoing survey? Does it allow the team to meet its deadlines for producing malaria subaccount estimates? When can the team expect the data set from this survey? These are critical issues when questions are added to surveys that are not coordinated by the team, as it may be difficult to complete the subaccount tables on time if the survey data are available later than desired.

### 5.5 Developing specific surveys for the malaria subaccount

If data gaps still exist after all available information has been obtained from the health information system, secondary sources, and added questions to ongoing surveys, the team will need to consider separate primary data collection efforts. In deciding whether this is appropriate and feasible, the team will need to do the following.

- Consider whether information on a particular entity can be obtained from data sources on other entities. For example, for a private for-profit clinic whose only source of funds is households, data may be obtained from the household data source (which might be an existing study or an ongoing survey) rather than by conducting a separate survey.

- Assess the resources available to implement a survey and the sample size that the budget can afford.

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23 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.
Consider the time implications of carrying out a separate survey. There are many steps in conducting a survey and each needs to be well coordinated.

The main steps are:

- design the questionnaire;
- pretest the instrument;
- determine the sampling frame;
- administer the questionnaires and ensure that they are properly filled in (if this stage is not carefully monitored, response rates may be low and the data collection process may be drawn out);
- enter data into a statistical software program (e.g. SPSS, Excel, STATA);
- clean the data.

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

In sub-Saharan Africa, household expenditure on malaria is particularly difficult to estimate through sources other than surveys, because spending largely occurs at facilities that do not regularly record household spending information. These may include private-sector shops (not necessarily pharmacies), traditional healers, and street vendors of drugs or ITNs. In such cases, data must be obtained from existing or ongoing malaria household studies. If such studies do not exist, the team will need to consider carrying out its own household survey, which can be a costly, complicated, and lengthy process.

In countries with more advanced record-keeping, and where household utilization patterns are well known and confined to fixed-provider facilities (such as health centres, hospitals, and pharmacies), primary data may be collected in the form of patient exit interviews, and sometimes pharmaceutical sales and consumption 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. In this context, the health facility surveys done in the Philippines for the malaria subaccount did not attempt to collect data from malaria patients leaving facilities (since such patients are rare), but rather focused on collecting data on public facility activities related to malaria. Questionnaires were structured to obtain 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 them. 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 depends critically on the nature of existing information, whether it is possible to “piggyback” on existing surveys, the availability of household data, and the available budget for collecting any needed primary data. Understandably, the more primary
data are required, the greater the cost and time needed to complete the malaria subaccount. Therefore, the team is encouraged to examine all non-primary data collection options before embarking on separate surveys. This will also help facilitate the institutionalization process of the subaccount, such that malaria expenditure estimates can be obtained routinely with little added cost or extra effort. Before embarking on 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.
The analysis stage involves a thorough review of the numerous data sources and the assembly of the information to form a clear picture of malaria funding flows. Inevitably during this process, the team will have to deal with a number of conflicts and gaps in the data that will require further scrutiny and possibly use of alternative estimation techniques. This chapter builds on the recommendations in the Producers’ Guide (WHO, 2003, Chapters 9–13), focusing on malaria-specific issues that may be faced during data analysis.

6.1 Getting organized: what is needed?

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

The analysis stage can be expedited if the template for the tables is created in advance. This template should incorporate: (1) country-adapted classifications in the row and column headings; (2) formulas for summation of columns and rows; (3) links between tables for cross-checking purposes; and (4) links to an “indicator sheet” so that policy indicators and charts can be automatically generated from the estimates in the tables. The template, with minor revisions, can also be used for the following year’s estimation.

It is also useful to link the subaccount tables to the general NHA tables, in order to determine the proportion of overall health expenditure going to malaria-related activities. This can serve as a gauge for assessing the “reasonableness” of the interim malaria estimates produced. For example, is an institution, such as a bilateral donor or NGO, reporting greater expenditures on malaria than on overall health? Is the OOP spending on antimalarial drugs a reasonable proportion of that on all drugs? If subaccount expenditures are larger than general health expenditures, the team will need to look for more evidence and revise the malaria numbers.

6.2 Conducting the analysis

The analysis essentially involves two steps: (1) tallying the amount received and spent nationally by each principal health care entity in accordance with NHA classifications (essentially through T-accounts), and (2) populating the tables. The first step entails a review of primary and secondary expenditure data for the entities concerned. As noted in the Producers’ Guide (WHO, 2003, pp. 146–147), a T-account can be helpful in organizing this process.\textsuperscript{24} In a T-account, expenditures.

\textsuperscript{24} In addition, T-accounts are useful for standardizing and institutionalizing the NHA process, and can be automatically linked to produce the main NHA tables.
#### Table 6.1. Information needed for data analysis in malaria subaccounts

<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 subaccount tables</td>
<td>Clean data sets from NHA surveys. Secondary data (as listed in the data collection plan), such as the Ministry of Health’s financial records for the year of estimation.</td>
</tr>
<tr>
<td>To weight primary datasets to national level</td>
<td>NHA-related surveys may have targeted a sample of the universe for a given entity. To extract national estimates from such data, appropriate weights must be applied. Deriving these weights may require additional information such as: total number of companies likely to provide health coverage and the number of employees at each company (to weight the employer dataset); total number of donors and NGOs (and their relative size) that contribute to health and malaria (to weight 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 for the year). Official exchange rate from donor-reported currencies to local currency. Conversion rate to achieve purchasing power parity (for comparison with other countries).</td>
</tr>
<tr>
<td>To adjust datasets with earlier or later timeframes to year of estimation</td>
<td>Medical inflation rates (or consumer price index). Population growth rates. For current dollar, inflation rates (for time series comparisons).</td>
</tr>
<tr>
<td>To compute key policy indicators</td>
<td>Gross domestic product. Total population (for estimates of per capita expenditure). Total population at risk for malaria. Total government expenditure. Total donor expenditure.</td>
</tr>
<tr>
<td>To inform estimation techniques, particularly when disaggregated expenditure data are not available</td>
<td>Data on utilization, e.g. percentage of inpatient admissions percentage of outpatient visits attributed to malaria. These proportions may be used to estimate the amount of general (non-targeted) revenue (e.g. doctors’ salaries) that is used to deliver malaria services. General breakdown of expenditure at facilities between inpatient and outpatient services. The same ratio may be used to disaggregate expenditures at particular facilities for which functional data are not available. Health commodity or service unit costs.</td>
</tr>
<tr>
<td>To verify expenditure estimates</td>
<td>Existing cost and utilization studies. Cost recovery data. Other studies on national or subnational health expenditures (e.g. public expenditure reviews).</td>
</tr>
</tbody>
</table>
for an entity are listed in the left column and revenues on the right; the sum of the entries on the left and right sides must always be equal. In creating T-accounts, the team should map each type of expenditure to the appropriate NHA classification.

It is of crucial importance that all data sources as well as assumptions, weighting procedures, and estimation techniques are clearly documented. This will facilitate the drafting of the methodology chapter of the report and, more importantly, inform and expedite subsequent NHA exercises.

Once the individual T-account summaries have been completed for each entity, the next step is to populate the malaria subaccount tables. This step involves triangulating data estimates, resolving data conflicts and data gaps, and avoiding double counting. Triangulation is useful for verifying data estimates. For example, if an expenditure transaction involves a transfer of funds between employers and insurance schemes, the team can try to obtain this estimate from at least three data sources: the employers themselves, the insurance schemes, and the employees/households. Inevitably, no two data sources will report exactly the same expenditure estimate; the team will need to make a selection or compute an alternative estimate. The Producers’ Guide, particularly through its “Appia” case study (pp.159-167, 178-195, 203-212), offers guidelines on resolving a variety of data conflicts and data gaps. Some questions to consider during the data reconciliation process are as follows:

- Is one data source more reliable than another? Did one survey have a higher response rate than the others?
- Are all data sources measuring the same data and do they have the same boundaries? For example, one source may include data on spending on sanitation services, while others do not.
- Do all data sources measure data for the same time period?
- How were the data measured, in terms of cash versus accrual accounting?

Because data can be obtained from both the source and the recipient of the funds, 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 the information may be duplicated. For example, households in a survey often report their entire OOP spending, inclusive of the amounts reimbursed by their employers. In this case, care must be taken to avoid counting this reimbursed amount under both employers and households.

In addition to these general strategies, the Producers’ Guide makes a recommendation on the order in which the NHA tables should be filled. It suggests starting with the financing agents to provider table, and then working upstream to the financing source table and downstream to the functions 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.

More information about the general approach to data analysis is given in the Producers’ Guide (WHO, 2003).

6.3 Specific issues that may arise with the malaria subaccount

The issues and suggested strategies described in this section are intended to illustrate the major challenges likely to be faced during the data analysis stage. The discussion is by no means
exhaustive. For additional methodological queries, country NHA teams are invited to consult the international committee of NHA experts at nhaweb@who.int.

### 6.3.1 Boundary-related data analysis issues

Efforts to track resources for specific programmes or diseases face three common challenges:

1. Health resources are often shared and not specifically allocated to a single programme area;
2. Health interventions and programmes may address multiple conditions concurrently; and
3. Most expenditure records do not report expenditures in relation to the 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, i.e. 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 for the malaria subaccount, sizeable overestimates could be anticipated. The approach here is that, in order to ensure policy relevance, the measurement of malaria expenditures should aim to capture, to the extent possible, only the amount actually spent on malaria-related activities. This may mean occasionally breaking down groups of transactions, or estimating the proportion of integrated expenditure going to malaria, particularly when financial records are not sufficiently detailed to allow identification of malaria-specific expenditure. The “separating out” of transactions, while allowable, should be done only when the proportion going to malaria is thought to be significant and when inclusion of the entire transaction would be a gross overestimate. Use of this technique should be kept to a minimum to limit production of “guesstimates”. The allocation ratios and 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 report.

#### 6.3.1.1 Overlaps with other disease subaccounts

In addition to the malaria subaccount, a number of other programme- and disease-specific subaccounts may be prepared using the NHA framework, e.g. for reproductive health or HIV/AIDS. As might be expected, such subaccounts may have overlapping boundaries. Malaria subaccounts may overlap with the reproductive health, child health, and HIV/AIDS subaccounts.

Some overlapping services are listed in Table 6.2. Ideally, expenditure estimates for such activities should not be repeated in different subaccounts; rather they should be placed entirely in one of the subaccounts or divided among the various subaccounts. In this way, the sum of the parts (i.e. the subaccounts) will be equal to the whole (i.e. THE).

#### Antimalarial chemoprophylaxis and IPT

Antimalarial chemoprophylaxis and IPT in pregnant women are important interventions that aim to prevent the development of severe malaria, which may result in serious complications for the developing fetus and the newborn. In the local context, these programmes are generally included as focus areas of national malaria control programmes rather than of reproductive health programmes. For this reason, it is generally recommended that expenditure on such services be included in the malaria subaccount.
Table 6.2. Possible overlapping services in malaria and other subaccounts

<table>
<thead>
<tr>
<th>Overlapping service</th>
<th>Subaccounts that could include overlapping service</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>HIV/AIDS</td>
</tr>
<tr>
<td>Antimalarial chemoprophylaxis in pregnant women:</td>
<td></td>
</tr>
<tr>
<td>other than IPT&lt;sup&gt;a&lt;/sup&gt;</td>
<td></td>
</tr>
<tr>
<td>aimed at maintaining blood drug levels above mean inhibitory concentration for a prolonged period</td>
<td></td>
</tr>
<tr>
<td>IPT&lt;sup&gt;b&lt;/sup&gt;:</td>
<td></td>
</tr>
<tr>
<td>A full therapeutic course of antimalarial treatment administered at specific times, whether or not the woman is infected.</td>
<td></td>
</tr>
<tr>
<td>Yields protective drug levels for short periods, separated by periods when drug levels are too low to inhibit parasite growth.</td>
<td></td>
</tr>
<tr>
<td>Malaria expenditures within infant and child health care, including integrated management of childhood illness (IMCI), and IPT&lt;sup&gt;b&lt;/sup&gt;.</td>
<td></td>
</tr>
<tr>
<td>HIV/AIDS curative care (as a co-infection with malaria)</td>
<td>√</td>
</tr>
</tbody>
</table>

<sup>a</sup> Intermittent preventive treatment in pregnancy.

<sup>b</sup> Intermittent preventive treatment in infants.

Infant and child health care

An area of sizeable overlap, particularly in Africa, is expenditure on malaria prophylaxis and treatment for infants and children. Malaria accounts for 20% of all childhood deaths in Africa, and is responsible for low birth weight, anaemia, epilepsy, and neurological problems (RBM, 2009a). Consequently, from an international standpoint, expenditure on childhood malaria is critical to both the malaria subaccount and the child health subaccount.

In particular, complications can arise with respect to integrated programmes targeted at child health care. For example, many countries use 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 diarrhoeal 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, the question arises as to whether all IMCI expenditures should be included in the malaria subaccount or just the portion relating to malaria. And if the latter, how can this amount be estimated?

Suggested strategy

This issue applies to IMCI programme expenditures only, largely because IMCI does not appear separately in facility records, where it is integrated into overall inpatient and outpatient service delivery. As such, the malaria subaccount will capture these curative care expenses, through the use of some of the techniques outlined in section 6.3.2. The question then becomes, how can IMCI be dealt with at the programme level? Such a line item may be found in the expenditure...
records of donors, NGOs, and the government. Including the entire IMCI programme amount is likely to overestimate malaria expenditure, while apportioning the malaria share of IMCI may not be accurate. This latter option should only be pursued if 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 programme expenses are high when the strategy is being introduced, and funds are needed to develop materials, and provide training and supervision. These expenses are likely to be substantially less as time goes on, because the approach will then be embedded within the facility expenditures.  

IMCI programme expenditure can be apportioned using a number of approaches:

1. asking key informants to estimate the percentage of the programme that focuses on malaria;
2. determining the number of visits for IMCI conditions (e.g. from the DHS) and assuming that the proportion of visits for malaria is equivalent to the proportion of IMCI expenditure going to malaria; and
3. using disease-prevalence data to estimate expenditure. Disease prevalence should be used only as a last resort, since there is often a large gap between the number of people who are sick and the number 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% rule.

Co-infections

Certain conditions have been shown to increase a person's risk of contracting malaria, such as in the case of HIV/AIDS. This may result in co-morbidities, where malaria is one among a number of conditions treated in a patient. How should expenditures for such care be included in the malaria subaccount?

**Suggested strategy**

The cardinal rule of NHA is to determine the primary purpose of the expenditure. If this is malaria, the total amount should be included. If not, and if the total amount is likely to be a sizeable overestimate, then it may be necessary to extract the malaria proportion (provided that this is likely to be significant). This can be done by reviewing the diagnoses in patient records and from billing records for these services (e.g. insurance schemes, OOP spending). If this information is difficult to obtain, it may be necessary to determine the malaria proportion of expenditures on the basis of the estimated percentage of patients with the specific co-infection who also had malaria. Such an estimate may come from a variety of sources, such as key informants, health information records, or disease prevalence studies.

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

26 The 2% rule is an informal accounting rule used to consider whether or not effort should be invested into extracting expenditure amounts. Generally speaking, if the activity in question is thought to account for less than 2% of THE, and is not a significant 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 should be documented in the report.
Vector management targeting multiple diseases

In many countries, vector management activities may help combat not only malaria but also other mosquito-borne diseases, such as dengue, filariasis, yellow fever, and encephalitis. What proportion should be included in the malaria subaccount?

**Suggested strategy**

As mentioned earlier, it is best first to assess the primary purpose of the activities, and whether the malaria proportion is significant enough to warrant inclusion in the subaccount. If there is a high prevalence of malaria – considerably more than other vector-borne diseases – it is suggested that the entire vector control expenditure should be included in the subaccount. However, if this is thought to be a gross overestimate, the country team can explore ways of estimating the malaria proportion.

One possibility may be to use disease prevalence data to identify the proportion of vector control spending attributable to malaria control. This solution is, however, not ideal; for example, in India and some other South-East Asian countries, where there has been a large investment in control programmes and significant success in reducing malaria prevalence, the estimate of malaria expenditures on this basis would be lower than the actual level of investment. Also, from a policy perspective, it is important to convey that – even if levels of malaria are low – the country should not necessarily reduce its investment in prevention. Disease prevalence may be low precisely because an investment is being made in prevention.

An alternative approach can be to use malaria prevalence rates prior to the introduction of vector control programmes. This approach should be used with caution and within a reasonable timeframe. For example, mosquito eradication programmes in the south of Brazil in the 1930s were very effective in eliminating malaria. Similar programmes continue today, but now with the target of eradicating dengue. It is questionable whether these programmes should be included in the malaria subaccount. In this case, the team members who are malaria experts should decide whether such an expenditure is relevant, particularly from the policy and primary purpose perspective.

Finally, another way of deriving the proportion of integrated vector control programmes going to malaria control is to conduct interviews with key informants who can shed light on the primary purpose of the programmes, and their importance in reducing malaria. Again, such estimation techniques should be avoided if at all possible, but are allowable if there is no alternative.

**Surveillance targeting multiple diseases**

While in many endemic countries malaria surveillance programmes may be vertical, some activities may occur as part of general surveillance programmes for communicable and noncommunicable diseases. How should the proportion going to malaria be extracted from these surveillance programmes?

**Suggested strategy**

The team should first determine whether the malaria proportion is likely to be more than 2% of the THEM, or is a significant policy concern. Generally speaking, investments in information...
systems to track key disease statistics are not significant enough to warrant specific inclusion in the subaccount. They may be included – but not explicitly– in the estimation of non-targeted expenditures of the Ministry of Health (see section 6.3.2).

6.3.1.2 Boundary issues with non-health-related activities

Malaria prevention activities may include environmental or biological control of mosquito larval breeding sites, involving draining or filling in of pools, modification of river boundaries or their run-off systems, periodic drying of rice fields, alteration of marshes, and draining of ditches (Arrow et al., 2004). Such measures may be organized as part of public works, mining, or farming activities, or may be integrated in engineering undertakings involving the modification and manipulation of the environment (i.e. agricultural, industrial, and urban development). In short, such activities may serve multiple purposes, with malaria control being one, or even a by-product. Are these activities health-related (to be classified as HCR 5) and should they be included in the subaccount? If so, should the full expenditure be included?

Suggested strategy

The team should first assess the principal purpose of such environment-modifying activities. If preventing malaria transmission is one of the purposes, the expenditures should be captured in the subaccount. There are two options for accounting for such expenditures: (1) the full amount can be included in the tables, with a caveat stating that it may be an overestimate given the multiple purposes of the activity; or (2) an appropriate proportion of the total expenditure could be estimated, with a note stating the assumptions that were used to derive the reported amount. The team may be able to determine the proportion of expenditure going to malaria by interviewing key informants and using data on the incidence of malaria relative to that of other diseases that would be affected by the environmental measure. Whenever possible, to preserve expenditure information, such “guesstimations” should be kept to a minimum.

6.3.2 Dealing with non-targeted expenditures for malaria

The malaria subaccount should be comprehensive, including both targeted or earmarked funds for malaria and non-targeted expenditure. Targeted funds are easily identified from primary and secondary data sources. They are generally programme expenditures incurred by national government (e.g. the malaria control programme at the Ministry of Health), donors, and NGOs. In addition, some household OOP spending may be specifically targeted to malaria care. Non-targeted expenditures refer to indirect spending on malaria, e.g. the proportion of medical staff wages going to public hospital staff who treat patients with malaria. Non-market providers may use their general revenue (contributed by various financing agents for all health services) to pay for malaria-related services. In general, such information cannot readily be 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 constitute a classification system that groups hospital patients according to their medical diagnosis and their use of hospital resources (Kielhorn & Graf von der Schulenburg, 2005). The full cost of intermediate inputs (including salaries, equipment and supplies) at private for-profit providers is embedded in the price charged to patients or insurance schemes. Thus, non-targeted expenditures do not need to be estimated separately for these providers.
2000); this level of detail may not be present in patient records in low-income countries. Rather than undertaking complex and sometimes costly studies to obtain non-targeted expenditure (such as time and motion studies), it is suggested simply to take a particular percentage of overall provider expenditures. This percentage (or allocation factor) can be derived from a number of sources: (1) malaria costing studies at hospitals and health centres; (2) billing records for OOP payments to hospitals; (3) government records of distribution of commodities, including for malaria; and (4) records of admissions and outpatient visits for malaria.

In Rwanda, a combination of cost and use data was used to determine the allocation factor for outpatient care for a given provider, as follows:

\[
\frac{\text{Unit cost of outpatient care for malaria at the given provider} \times \text{Number of outpatient visits for malaria}}{\text{Unit cost of outpatient care overall at the given provider} \times \text{Number of outpatient visits overall}} = Y\% 
\]

This factor \(Y\%\) was then multiplied by the total outpatient expenditure at that provider to determine the amount going to malaria care.

To determine the contributions of financing agents to non-targeted spending for malaria, the same proportion can be applied to their overall health care spending. This is illustrated in Table 6.3 for one provider type. Note that the allocation factor must be derived for each provider type, so a private hospital may have a different allocation factor than a public hospital.

### Table 6.3. Contribution of financing agents to non-targeted malaria spending on outpatient care

<table>
<thead>
<tr>
<th>Public hospitals</th>
<th>Financing agents</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>HF. 1.1.1.1 Ministry of Health</td>
</tr>
<tr>
<td>HC.1.3 General outpatient expenditures (taken from the general HFxHC table)</td>
<td>100</td>
</tr>
<tr>
<td>HC.1.3 Malaria non-targeted outpatient expenditures</td>
<td>(Y% \times 100)</td>
</tr>
</tbody>
</table>

Similarly, to trace the non-targeted spending back to the financing source level, the proportional breakdown found in the general FSxHF table can be applied to the financing agents that contribute to non-earmarked spending.
In the Philippines, several allocation rules were applied to estimate the proportion of non-targeted expenditure going to malaria. One percentage was derived from billing records, by dividing OOP spending by people admitted to a particular public hospital with malaria by total OOP spending by all inpatients at that hospital. It was then assumed that the proportion of OOP spending on malaria reflected the allocation of government subsidies for the disease in public hospitals. The percentage was therefore applied to the government hospital budget to obtain the amount attributable to malaria care. This approach was taken because of a lack of information about how government hospital subsidies were actually allocated among different hospital services.

Another percentage was derived by dividing the number of malaria consultations by the total number of consultations in rural health units (RHUs). The percentage was then applied to spending at the RHUs and provincial health offices to obtain the amount attributable to malaria services. This approach may be viewed as equivalent to applying two of the methods described above, i.e. the unit cost of all consultations is assumed to be the same and is estimated by simply dividing total expenditure at a facility by the number of consultations. Then the estimated unit cost per consultation is multiplied by the number of malaria consultations to derive expenditure on malaria services.

6.3.3 Commodity-related issues

6.3.3.1 OOP expenditures on commodities

A critical component of the malaria subaccount is spending on preventive commodities, such as bednets and mosquito repellants. Targeted household surveys for malaria generally interview only households that have had at least one malaria episode, and are therefore not very useful for estimating total expenditure on prevention.

Suggested strategy

In such cases, it may be prudent to multiply unit cost (to the consumer) and use data to determine expenditure. In the case of pharmaceuticals, the information may be derived by applying the average market price by the reported imported amounts (likely to be distributed during the year of estimation).\(^{29}\) Intermediaries may have records on distribution channels that can be accessed to obtain information on volume. Prices should be determined at the purchaser level. To determine if the derived estimate is reasonable, it may be helpful to compare the estimate with that reported for overall OOP spending on pharmaceuticals, an indicator that is tracked as part of the general NHA. If the malaria estimate is close to or greater than the overall NHA estimate, further investigation is required.

6.3.3.2 Commodities purchased multiple times

Commodities may be bought and sold multiple times as they pass through the health care system, e.g. through social marketing of donated goods. Since the product is essentially purchased twice — for example, once by donors and once by households — should both expenditures be counted? A number of scenarios can be envisaged regarding commodity transfers.

\(^{29}\) An effort should be made to estimate the total amount distributed during the year. The volume of imports in a given year does not necessarily correlate with the volume distributed that year.
a. Donors give US$100 for the purchase of bednets. The Ministry of Health uses the funds in their entirety to purchase and distribute nets free of charge to its providers. The providers in turn dispense them to patients free of charge.

*Suggested strategy*

This is a case of full subsidization of bednets. Essentially, the full US$100 transfer between donors and the Ministry of Health is shown (see Table 6.4).

**Table 6.4. Illustrative FSxHF and HFxHP tables when donated commodities are distributed completely 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 Ministry of Health</td>
<td>$100</td>
<td>$100</td>
</tr>
<tr>
<td>Total</td>
<td>$100</td>
<td></td>
</tr>
</tbody>
</table>

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

b. Donors give US$100 for the purchase of bednets. The Ministry of Health uses the funds to purchase and distribute nets free of charge to its providers. The providers in turn dispense them to patients for a fee of US$10, which is retained at the facility level as part of cost-recovery efforts. Should the full value of donor 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*

While this is a case of partial subsidization at the household level, it is more critical to discern the end use of the household OOP spending. In this case, the funds were used for health care, most likely during the year of estimation. In this sense, the suggested approach is similar to the NHA treatment of user fee retention at the government facility level. The Producers’ Guide (WHO, 2003, paragraph 10.15) states that “if the [user] fees are retained as additional resources by providers, i.e., supplement ministry spending, they do not need to be subtracted from the ministry total”. Therefore, the full donor and household contributions are additive (see Table 6.5).

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

Regardless of the end use of OOP revenue, the full value of the household OOP payments should be recorded in health accounts.

c. Donor funds are transferred to the Ministry of Health, which does not use the funds that year but retains them in the Ministry’s bank account. Should the donor contribution to the Ministry be included in the malaria subaccount matrices?
Table 6.5. Illustrative FSxHF and HFxHP tables when fully donated goods are ultimately dispensed to households for a fee*

<table>
<thead>
<tr>
<th>FSxHF</th>
<th>FS 3. Rest of the world</th>
<th>FS 2.2 Households</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>HF.1.1.1.1 Ministry of Health</td>
<td>$100</td>
<td></td>
<td>$100</td>
</tr>
<tr>
<td>HF.2.3 Household OOP</td>
<td>$10</td>
<td></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>HFxHP</th>
<th>HF.1.1.1.1 Ministry of Health</th>
<th>HF 2.3 Household OOP</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>HP.1.1.1. Public hospitals</td>
<td>$50</td>
<td>$3</td>
<td>$53</td>
</tr>
<tr>
<td>HP.3.4.5.1 Public health centres</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>

*This table shows an arbitrary breakdown between providers for illustration purposes.

**Suggested strategy**

The donor contribution should be excluded from the subaccount for that year, but included in subsequent year(s), provided that the funds are used for malaria-related activities.

d. Donors give US$100 to the Ministry of Health for the purchase of bednets. The Ministry uses these funds to procure nets, then sells them to its providers for US$60. The US$60 is kept in the Ministry’s bank account and used the following year to purchase various malaria-related products and programme needs. Therefore, US$40 is the amount of the subsidy from donors to providers. Households then buy the nets from the providers for US$70, which is retained at the facility. Therefore, the providers make a profit of US $10, which can be used as they see fit (as part of cost-recovery initiatives). Should only the value of US $100 for the nets themselves be counted? Or the full US$170, which includes the total contributions made by both the donors and the households?

**Suggested strategy**

It is critical to assess the end uses of the donor monies that were retained (from the sale to providers), as well as the household OOP revenue (generated from the sale of bednets). The amount retained by the Ministry is channelled back into the health care system the following year. It should therefore 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 Ministry of Health.

Since the household OOP revenue raised by the providers is retained in the facilities for health care use (presumably that year), it should be accounted for in the same way as example (b) (see Table 6.6).

e. Donors give US$100 directly to NGOs. These NGOs then purchase bednets with the full amount and sell them to shopkeepers at a subsidized price of US$60. The funds received from the sale to shopkeepers are then used by the NGO to pack and distribute nets the following. The shops in turn sell the nets to households for US$80. What donor amount should be recorded: the full contribution (US$100), the amount of the subsidy when sold to shops (US$40), or the ultimate subsidy, as reflected at the household purchase level (US$20)?
Table 6.6. Illustrative FSxHF table when donated commodities are sold to public providers who sell the commodities to patients

<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>40</td>
<td>40</td>
</tr>
<tr>
<td>HF. 2.3 Household OOP payment</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 Ministry of Health</th>
<th>HF 2.3 Households OOP</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>HP.3.4.5.1 Public health centres(^a)</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>

\(^a\) For illustration purposes, it is assumed that all government nets are transferred to public health centres.

**Suggested strategy**

Beginning with the household contribution, as recommended by the Producers’ Guide (WHO, 2003), the full amount paid (US$80) should be recorded in the tables. With respect to the donor contribution, the situation is analogous to the returning of public facility user fee revenues to the Ministry of Health. In this case, the NGO is equivalent to the Ministry, and the shops the 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 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 the 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 Non-profit institution serving households</td>
<td>40</td>
<td></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>80</td>
<td>40</td>
<td>120</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>HFxHP</th>
<th>HF 2.4 Non-profit institution serving households</th>
<th>HF 2.3 Households OOP</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>HP4.1 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**

This section draws on the lessons learned in preparing a malaria subaccount in the Davao del Norte Province of the Philippines.

**6.3.4.1 Disaggregating data from central level to the subnational level**

How can the subnational share be teased out of the total expenditure for management of the national malaria programme? The Ministry of Health incurs expenses for staff salaries and other maintenance costs of the national malaria control programme. While the programme office is
based in the central Ministry, 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 other geographical division of interest). Apply this percentage to the expenditure for management of the national malaria programme to obtain the amount attributable to programme management in the specific province. Alternatively, a bottom-up approach can be used, in which independent estimates for each subnational unit are added up to produce the national estimate. This is most practical in countries where health care financing is decentralized.

**6.3.4.2 Disaggregating national expenditure on general administration**

How should national expenditure on general administration for public health programmes (i.e. non-geography-specific and non-targeted expenditures) be treated in a province-level malaria subaccount? General administration costs for the health sector are included in both the NHA and subnational health accounts. These items include the expenditures of Ministry of Health budgeting and accounting offices. Should these expenditures be included in the provincial malaria subaccount? Unlike the non-targeted expenditures in public hospitals and health centres, which are used directly to 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 frequently provided through the national malaria programme management office.

**Suggested strategy:** Exclude general administration expenditures at national level from subnational accounts.

**6.3.4.3 Subnational expenditure on general administration**

How should general administration costs for public health programmes (i.e. non-targeted expenditure) of local governments be treated in a province-level malaria subaccount? General administration costs of health services can be estimated as the proportion of local government expenditure – for budgeting, accounting, procurement, and similar services – going to health (as opposed to other local services). Should these general administration expenditures be included in the provincial malaria subaccount? Unlike the non-targeted expenditures previously mentioned for public hospitals and health centres, these general administration costs have no direct link to provision of malaria services. The state/provincial government’s overall administration and support of malaria prevention, as well as of other health programmes in the province, are frequently provided through the state/provincial health office.

**Suggested strategy**

Exclude general administration expenditure of local government from the provincial subaccount.

**6.3.5 Relying on cost and use data**

In the absence of expenditure data, technical teams may resort to using unit cost and use data as proxy measures of price and volume. This should be done with caution. Unless the costs have been derived from actual expenditures through cost accounting systems, multiplying cost and
use data is not ideal for estimating expenditure on curative care. This is because unit costs are often derived on the basis of an ideal or full set of services. If services are inefficiently provided, the unit costs and the corresponding expenditure differ. Rather than simply multiplying cost and use data, the information can be used to develop ratios of expenditures or weights that can then be applied to the total expenditure at facilities. The greater the detail available in the cost estimates, the greater the ability to generate weights for specific components of malaria programmes.

On the other hand, multiplying cost (price) and use data is appropriate for deriving expenditures on commodities, because there is usually no variability in the services rendered when commodities are purchased. In this case, cost equals price in market goods. This is true not only for commodities but also for market services.

6.4 Summary
At the data analysis stage, the team will need to have access to a variety of data, both directly and indirectly associated with NHA. Such data may range from expenditure information to cost, use, population, and disease prevalence data. Whenever possible, such information should be assembled in advance to avoid delaying the data analysis. Some guiding principles for the analysis itself, particularly for the malaria subaccount, are always to check the primary purpose of the expenditure in question, and to revisit the boundaries of the subaccount. Specific estimation issues include: (1) boundary queries (particularly relating to overlaps with other subaccounts, and distinguishing health-related and non-malaria-related goods and services); (2) commodity transfers; and (3) the extraction of malaria expenditures embedded in integrated activities. This last issue can be one of the most challenging matters to deal with. It is generally best to keep the separating out of integrated activities to a minimum, in order to preserve expenditure data and to limit “guesstimates”. Sometimes, however, it may be necessary to derive malaria proportions from integrated activities; this should be done only if the malaria expenditure is thought to be sizeable and when the full value of the integrated activity is likely to be a significant overestimate of the malaria component. Regardless of the approach used, all assumptions and estimation techniques should be thoroughly documented. Countries will find that, as their information systems improve and as data collection becomes routine, they will rely less on estimation techniques and more on actual expenditure data.
Preparing the malaria subaccount

7.1 Objectives, overall process, and cost considerations

The discussions in this chapter generally assume that the malaria subaccount is being prepared either concurrently with the NHA or in the context of a completed NHA. Section 7.5 considers the special case of a malaria subaccount prepared 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 as a project with some funding. The overall process of preparing the first malaria subaccount will be determined by the following factors:

- the users whose data needs the malaria subaccount is intended to satisfy;
- whether or not it is intended to institutionalize preparation of malaria subaccounts;
- the budget for the project (and long-term cost considerations if estimation activities are to be institutionalized).

It is likely that an expressed need by stakeholders in the health sector for data on malaria expenditures and financing provided the rationale and motivation for the subaccount project. However, to help ensure that the subaccount results are widely used, and to gain widespread support for the project, a broader range of stakeholders will need to be involved. Possible duplication of efforts, conflicting data and waste of resources can also be avoided by informing and involving a wide range of stakeholders. Within the overall NHA steering committee, a special subcommittee for malaria should be formed, to provide guidance on malaria policy issues, to identify useful data, and to facilitate implementation of the project. This is discussed further in section 7.2.

The operational structure of the project phase can be designed to ensure that methods and estimation activities are automatically institutionalized. Some members of the technical team — the group in charge of actual project work, from collection and analysis of data to the production of the malaria subaccount tables and report writing — should be given the responsibility of continuing these tasks after the project phase is over. While the team should be formally trained in the malaria subaccount methodology, they will essentially be learning through their involvement with the work. The possible structures, roles, and composition of the malaria technical team are discussed in section 7.3. A summary of the entire process, specific tasks and activities, and a suggested timeframe are presented in section 7.4.

While the expressed needs of stakeholders are the primary guide to the kinds of data that the subaccount should produce, data availability and the cost of data collection are important factors in determining which subaccount tables are actually feasible. A thorough inventory and assessment can determine the limitations of existing data for 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 budget will be required for data collection if the existing data can fulfil most of the needs of the subaccount.

The decision as to which NHA tables to produce for the subaccount, and the level of detail to pursue for the various classification schemes, needs to take into account the likely cost of data collection. This decision should be made for two scenarios: the project phase and the routine subaccount preparation, given that resources are likely to be very limited after the project ends. The project phase can provide an opportunity to establish the methodologies for generating a range of malaria subaccount tables. After the project, only one or two tables may be produced routinely. As the data system improves, however, more tables can be produced using the methodologies established during the project phase.

**Box 7.1 Choosing the malaria subaccount tables for Davao del Norte, Philippines**

The three main considerations in choosing the subaccount tables to be completed for the Province of Davao del Norte were: (1) practical use, (2) budget, and (3) (lack of) need for data triangulation. Practical use refers to the usefulness of the subanalysis results in addressing policy issues and decision-making by health sector stakeholders. The budget consideration refers to availability of resources, particularly for data collection and filling of data gaps. The need for data triangulation or verification is an important issue in the estimation of private sector expenditure and, specifically, in the estimation of OOP spending, which generally tends to be underestimated. Triangulation is carried out by estimating the same expenditure component using different classifications (i.e. through estimation of different NHA tables).

In the Philippines, health financing issues and critical reforms are articulated in the country’s Health Sector Reform Agenda for 1999–2004 and in the Formula One for Health, 2005–2010. Briefly, the reforms are intended to result in a shift in both the proportions provided by the different financing agents (e.g. by expanding the share of the national health insurance programme PhilHealth and reducing the share of households) and the allocation by type of service for specific financing agents (e.g. so that PhilHealth focuses on inpatient care, local government subsidies are focused on priority public health programmes, and national government deals with regulation and governance).

Given these policy concerns, and the implied data needs for health sector decision-making and monitoring of policy outcomes, the Philippine NHA structure in 2005 included basically two tables: the financing agent (FA) by health provider (HP) table and the FA by health care function (HC) table. The health accounts developed for some provinces followed the NHA structure, since this provided the primary reference against which the provincial health financing situation could be examined. It was decided that the malaria subaccount tables for Davao del Norte should also follow the NHA structure, because the general health financing concerns were also relevant to the malaria programme. Moreover, analysis of the malaria subaccount would be more meaningful if it were comparable to the overall provincial health accounts. While preparation of the Davao del Norte malaria subaccount was a pilot study intended to test concepts and procedures for estimating malaria expenditures, and could in principle have explored more tables, the activity had a limited budget. Finally, malaria expenditure in the Philippines is predominantly for prevention and public health services, which are carried out and paid for by the government. Expenditure for malaria curative care, and thus private spending, is small because of the very low number of cases. (In Davao del Norte, which has roughly double the national malaria morbidity rate, a total of 778 cases were reported in 2004 among an estimated 810,000 population.) Therefore, there was no critical need for data triangulation, and thus no urgent need to estimate additional subaccount tables. Moreover, the data sources for the major share of malaria expenditures are primarily official, audited, public financial documents, which are reliable and comprehensive sources of government expenditure data.
The experiences in Rwanda and the Philippines pointed to another important factor that can influence the approach taken to the malaria subaccount. In Rwanda, malaria is present throughout the country, while in the Philippines, it is significant only in selected provinces and is absent in some. Thus, the financing information generated by the malaria subaccount is of great importance and need at the national level in Rwanda, but only for selected provinces in the Philippines.

Further, in Rwanda a total of nine tables were produced, with considerable detail for some of the classifications. In Davao del Norte province of the Philippines, three tables were produced with less detail (see Box 7.1 for a discussion of the selection of the tables for the malaria subaccount). Some of the tables from the malaria subaccounts for Rwanda and Davao del Norte 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 malaria subaccount tables: the potential users of subaccount findings, and the generators and sources of the data that will be used to produce the subaccount. Some stakeholders may be both subaccount users and sources of input data.

7.2.1 Data users

Potential users of the data can provide insight into their specific areas of interest and help identify policy questions for which the malaria subaccount can help provide answers. In addition, their having immediate access to subaccount results can contribute towards the adoption of policies based on good information and the eventual implementation of such policies.

Potential subaccount users may include the following: (1) policy-makers in charge of general health sector policies (mainly the Ministry of Health); (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 NGOs; and (5) academic and research institutions involved in health policy research.

7.2.2 Data generators

The generators of data can provide insight on the data situation, such as what is available and the quality of data, as well as concepts, definitions, and estimation procedures applied in existing data. Some of these institutions, such as the National Statistics Office, have the expertise to carry out primary data collection. It is possible that data for the malaria subaccount can be collected as part of existing surveys or other data compilation activities carried out by these stakeholders, both in the project phase and as a long-term arrangement.

The following organizations can potentially provide data and technical inputs to the malaria subaccount: (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

If a subnational malaria subaccount is being prepared, it is important to involve stakeholders operating at local level, such as the provincial and municipal health and accounting offices,
regional, provincial and municipal malaria programme managers, and representatives of the Ministry of Health based at the study site.

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

7.2.5 Systematic involvement
The participation of stakeholders in the preparation of the malaria subaccount should be organized systematically.

- Form a malaria subcommittee within the general NHA steering committee. This should be a small group 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 broader group of stakeholders (more details below).

- Form the malaria subaccount technical team. This should be a group of stakeholders who will be actively involved in the malaria subaccount estimation work during the project phase. Some of them will continue these activities as a routine function after the project phase ends.

The level of involvement of the various stakeholders will depend on the operational structure adopted during the project phase (see section 7.3). The technical team should be trained and guided on NHA methods by NHA experts, and be informed about malaria by epidemiologists and other malaria experts. The technical team should have regular consultations with the malaria subcommittee of the NHA steering committee to obtain guidance on policy issues, and to provide information about methodological issues, preliminary estimates, and general progress. The malaria subcommittee should, in turn, organize periodic meetings with the broader group of stakeholders to relay project findings and to solicit feedback concerning the estimates. Regular reporting to stakeholders about progress and findings helps maintain their cooperation.

An example of the relationship between the steering committee and the technical team is illustrated in Figure 7.1, which shows the organizational chart of key players involved in the NHA process in Rwanda.

In general, the NHA steering committee, including the malaria subcommittee, provides guidance about relevant health policy issues and ensures that the subaccount work is focused on the identified policy areas. Thus, it is recommended that the malaria subcommittee should include a representative from the policy development unit of the Ministry of Health, as well as representatives from malaria control programmes, donors, and private provider organizations. The responsibilities of the malaria subcommittee may be summarized as follows:

- Meet regularly with the technical team to provide guidance on relevant policies and priority areas, and to be informed on methodological issues and subaccount results.

- Assist the technical team by facilitating preparation of the subaccount, particularly the primary data collection phase.

- Organize meetings and workshops with the broader group of stakeholders to discuss subaccount findings.

- Recommend new policies or policy changes suggested by the subaccount findings.
Box 7.2. Stakeholders involved with the Rwanda malaria subaccount

- Director of the Malaria Control Programme at the Ministry of Health.
- Coordinator of the Global Fund grant for malaria.
- WHO focal point for Roll Back Malaria activities.
- Representatives of donors involved in malaria-related activities (e.g. Belgian technical cooperation, USAID).
- Department of Planning and Department of Finance of the Ministry of Health.

Box 7.3. Stakeholders involved with the Davao del Norte Province malaria subaccount

- Department of Health (Central Offices): National Centers for Disease Prevention and Control; Infectious Disease Office; Bureau of Local Health Development; Health Policy Development and Planning Bureau.
- Philippine Health Insurance Corporation.
- National Statistical Coordination Board.
- National Statistics Office.
- Department of Health (Regional Offices): Center for Health Development; Davao Region Malaria Unit; Provincial Health Team; Davao Regional Hospital.
- Office of the Provincial Governor.
- Provincial Health Office and Municipal Health Offices.
- Provincial Accounting Office and Municipal Accounting Offices.
- Provincial Planning and Development Office.
- Global Fund Philippine Rural Reconstruction Movement (Davao del Norte Office).
- WHO Regional Office for the Western Pacific and Philippines Country Office.

7.2.5 Systematic involvement

The participation of stakeholders in the preparation of the malaria subaccount should be organized systematically.

- Form a malaria subcommittee within the general NHA steering committee. This should be a small group 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 broader group of stakeholders (more details below).
- Form the malaria subaccount technical team. This should be a group of stakeholders who will be actively involved in the malaria subaccount estimation work during the project phase. Some of them will continue these activities as a routine function after the project phase ends.

The level of involvement of the various stakeholders will depend on the operational structure adopted during the project phase (see section 7.3). The technical team should be trained and guided on NHA methods by NHA experts, and be informed about malaria by epidemiologists and other malaria experts. The technical team should have regular consultations with the malaria subcommittee of the NHA steering committee to obtain guidance on policy issues,
and to provide information about methodological issues, preliminary estimates, and general progress. The malaria subcommittee should, in turn, organize periodic meetings with the broader group of stakeholders to relay project findings and to solicit feedback concerning the estimates. Regular reporting to stakeholders about progress and findings helps maintain their cooperation.

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- Meet regularly with the technical team to provide guidance on relevant policies and priority areas, and to be informed on methodological issues and subaccount results.
- Assist the technical team by facilitating preparation of the subaccount, particularly the primary data collection phase.
- Organize meetings and workshops with the broader group of stakeholders to discuss subaccount findings.
- Recommend new policies or policy changes suggested by the subaccount findings.

**Figure 7.1. Organogram of NHA team, Rwanda, 2003**

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**Director of Rwanda NHA 2003; Secretary General, Ministry of Health- Ben Karenzi**

**NHA Steering Committee (composed of key health care stakeholders)**

**Technical Team Leader - Emmanuel Kabanda**

**Deputy NHA Coordinator - Lazare Ndazaro**

**Coordinator of Malaria subanalysis - Rwagacondo Claude, Head of PNDL, assisted by Francis Nyitegeka**

**Coordinator of Household Survey for Malaria - Dr Maurice Muchago (Beginning March 1) on behalf of School of Public Health (through implementation of Economic Impact Study). From the month of February - Jean Kagubare is prime contact person**

**NHA team members - Lazare Ndazaro (MoH), Charles Waza (MoH), Francis Nyitegeka (PNLP), Nicolas Theopold (MoH) Emmanuel Higiro (School of Finance and Banking), Vincent Nyaume (School of Finance and Banking)**
7.3 Technical team

The technical team prepares the subaccount, writes the report and participates in dissemination workshops. In order to ensure that estimation procedures are consistent and the subaccount results of good quality, the team should be trained in NHA methodologies. In addition to this guide, the Producers’ Guide (WHO, 2003) should be used, both in the project phase and in the long term. Close adherence to the principles and methods recommended can help ensure a consistently high quality of output.

Activities will include designing and implementing the collection and analysis of data. Thus, the technical team should include not only health financing analysts but also experts on data collection, such as personnel from the National Statistics Office. Estimation of malaria expenditure also requires information on the illness itself, treatment courses, and control activities, and the technical team can be strengthened through the inclusion of malaria experts. In addition, the 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 model, the members of the technical team nominated by the stakeholders prepare the subaccount themselves. This structure is ideal, because “learning by doing” is built into the process. The technical team should be closely guided through the various stages by NHA experts (i.e. consultants hired specifically for the project).

Box 7.4. Technical team for the Rwanda malaria subaccount

- The Department of Finance, Ministry of Health
- The Department of Planning, Ministry of Health
- The Malaria Control Program, Ministry of Health
- Development Management Solutions, local research consulting firm

In most cases, however, these members of the technical team would be working on the subaccount in addition to their existing routine functions, and may not be able to commit the time required to do everything themselves. Thus, the second (and more practical) model foresees a technical team for the project phase consisting not only of representatives of stakeholders but also a core project staff that includes consultants and researchers hired for the project. The core project staff may come from a consulting firm. They will carry out the day-to-day activities of the project, including arranging meetings, collecting data, and writing reports, in close consultation with the stakeholder representatives. The entire team should be involved in making important decisions, particularly concerning estimation issues. The composition of the technical teams for the Rwanda and Davao del Norte malaria subaccounts are given in Boxes 7.4 and 7.5, respectively.

Box 7.5. Technical team for the Davao del Norte Province malaria subaccount

- Provincial Health Office (Lead)
- Provincial Accounting Office
- Provincial Planning and Development Office
- WHO Malaria Subaccount Project
If the estimation activities for the malaria subaccount are to be institutionalized, the team should also include at least one member from the agency that will continue the estimation work after the project phase ends. Because the Ministry of Health is likely to have few trained accountants or health financing analysts, routine estimation work (at least in the short term) will need to be done within an existing statistical unit. For example, the agency of government that produces the national income and product accounts has some of the basic skills and training needed to prepare the subaccount. The agency that will continue the subaccount work 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 financing flows: financing sources, financing agents, and health care or service providers.
- Prepare an inventory of existing data for the subaccount, assess their usefulness, and identify gaps and additional primary data needed.
- Collect data.
- Compile, validate, and analyse financial data, and produce subaccount tables.
- Document subaccount methodologies and data sources, and prepare reports on estimates.
- Report regularly to the malaria subcommittee, presenting subaccount estimates as they are completed and reporting on estimation issues encountered.

### 7.4 Workplan

The effort and time required to complete the subaccount will depend on the number of tables to be completed and the availability of data. Collection and analysis of primary data can be time-consuming. If existing data are limited, producing more tables will mean that more primary data have to be collected. Also, the addition of a subaccount to a general NHA lengthens each step of the NHA process. This should be factored into the workplan design.

As mentioned in section 7.1, several tables may be produced during the project phase, but only one or two of them (e.g. the FA x HP and FA x HC) may be produced routinely after the project ends. In this case, more time will be required to complete a subaccount during the project phase than in the succeeding years. The project start-up activities and the testing of estimation methodologies may also require additional time during the project phase, which will not be needed later. Table 7.1 provides a suggested timeframe for subaccount project activities.

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

This guide recommends that the malaria subaccount be prepared in conjunction with, or in the context of, a general NHA. The subaccount estimates will be more useful and comprehensive if they can be examined against other health expenditures, as recorded in the NHA. This comparison is important for policy purposes, because malaria competes with other health needs for limited resources. Specific conveniences to recommend the performance of malaria accounts within the NHA context are exemplified:
Guide to producing malaria subaccounts within the national health accounts framework

When malaria expenditures have been estimated outside the context of NHA, using COI studies, the categories of expenditures or costs included may not be limited to those for the treatment and prevention of malaria, but include additional costs, such as forgone income and intangible costs.

In undertaking or using the results of stand-alone studies of malaria expenditures, two broad issues need to be considered: how well NHA expenditure components are captured; and which non-NHA components have been included in the estimation. Specific questions to raise include the following:

- Which malaria-targeted expenditures (i.e. for treatment and prevention) are included?
- Which 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)?

### Table 7.1. Illustrative timeline for preparation of a malaria subaccount

<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 subcommittee within the NHA steering committee</td>
<td></td>
</tr>
<tr>
<td>Form the technical team for the malaria subaccount</td>
<td></td>
</tr>
<tr>
<td>Conduct training workshop and develop project workplan</td>
<td></td>
</tr>
<tr>
<td>Project implementation</td>
<td></td>
</tr>
<tr>
<td>Identify malaria-relevant entities in financing flows</td>
<td></td>
</tr>
<tr>
<td>Prepare inventory of existing data, assess quality, identify gaps, and develop data collection plan</td>
<td></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></td>
</tr>
<tr>
<td>Collect secondary data</td>
<td></td>
</tr>
<tr>
<td>Collect primary data:</td>
<td></td>
</tr>
<tr>
<td>- design survey instruments</td>
<td></td>
</tr>
<tr>
<td>- develop sampling frames and sample selection schemes</td>
<td></td>
</tr>
<tr>
<td>- pre-test survey questionnaires</td>
<td></td>
</tr>
<tr>
<td>- arrange logistics for implementation of surveys</td>
<td></td>
</tr>
<tr>
<td>- collect data</td>
<td></td>
</tr>
<tr>
<td>Design data entry screens</td>
<td></td>
</tr>
<tr>
<td>Create electronic data file and clean data</td>
<td></td>
</tr>
<tr>
<td>Analyse data and produce subaccount tables</td>
<td></td>
</tr>
<tr>
<td>Write report and submit to steering committee for review</td>
<td></td>
</tr>
<tr>
<td>Dissemination and feedback</td>
<td></td>
</tr>
<tr>
<td>Present subaccount findings to stakeholders and get feedback on estimates and policy implications of findings</td>
<td></td>
</tr>
<tr>
<td>Incorporate use of subaccount findings into the policy process</td>
<td></td>
</tr>
<tr>
<td>Institutionalization</td>
<td></td>
</tr>
<tr>
<td>Document agreed institutional arrangements, timeframe and assignment of tasks for routine production of subaccount</td>
<td></td>
</tr>
</tbody>
</table>

When malaria expenditures have been estimated outside the context of NHA, using COI studies, the categories of expenditures or costs included may not be limited to those for the treatment and prevention of malaria, but include additional costs, such as forgone income and intangible costs.
• Which health-related expenditures (for research and training) are included? How was the boundary between malaria and non-malaria expenditures defined?

Cost components which do not belong to the NHA THE aggregate need to be clearly distinguished.

Malaria expenditures estimated from stand-alone studies should be harmonized after comparing with results from other exercises, especially when the various components were not estimated using the same concepts and methods. Stand-alone studies of malaria expenditure may not be easy to use as monitoring tools, because of the lack of compatible reference levels, such as those contained in NHA estimates. In addition, if conducted outside the Ministry of Health, or with limited coordination with the various stakeholders, there may be less opportunity to use and incorporate the results in the policy process.

7.5 Summary

The project to prepare a malaria subaccount should be initiated by the 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 prepare a subaccount, to ensure that the results are used. Other stakeholders should be involved in the process in various degrees – from being informed and consulted to actively participating in estimation work – to gain widespread support for the project and facilitate its implementation. Members of the general NHA steering committee who are or have been involved in malaria-related activities could form a subcommittee to guide the specific subaccount activities. Stakeholders who can contribute substantively to the estimation work, or facilitate data collection, may be assigned to the technical team.

The technical team will be in charge of the actual project work, from collection and analysis of data to report writing. The technical team may be composed only of stakeholders, or of stakeholders and a core project staff of consultants and researchers. If the subaccount estimation activities are to be institutionalized, the technical team should also include at least one member from the agency that will be responsible for the preparation of subaccounts after the project ends.

Consultations with stakeholders will reveal specific data needs with regard to malaria financing, and this information can be used in deciding which subaccount tables should be prepared for the project. The availability of data and budget constraints will also influence this decision. The effort and time required to complete the subaccount will depend on the number of tables prepared and the level of detail of each expenditure classification.
References


Annex 1
Indicators for monitoring malaria resources

Every resource monitoring exercise is unique. The challenges encountered in computing policy-relevant indicators will depend on the structure of the health system, particularly the information infrastructure, and the design and delivery of malaria-related services. Differences in the content of different malaria programmes mean that any generally acceptable set of indicators has to be flexible enough to be adaptable to country-specific priorities.

This annex proposes a minimum set of indicators based on common policy needs, particularly those stemming from international agreements. In addition, optional indicators are suggested, which may be considered depending on local policy and regional context. An expanded list of indicators is mentioned to illustrate the level of detail that can be obtained with the malaria subaccounts. The proposed lists are not intended to be exhaustive and are designed mainly to present a choice of indicators, including both monetary and non-monetary parameters, linked to the various health accounting classifications and potential policy uses. The selected minimum set of indicators is in line with the United Nations (UN) resolution\(^1\) regarding the 2001–2010 decade to roll back malaria in developing countries, particularly in Africa, and with related international agreements. The health accounts should also be able to contribute to determining whether the priorities articulated in the Millennium Development Goals (notably goal 6: Combat HIV/AIDS, malaria & other diseases\(^2\)) and the plan of action linked to the Abuja Declaration of African Heads of State\(^3\) are being met, namely:

1. an increase in the level and 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 sustainability of domestic resources allocated to malaria control, in coordination with private partnerships;
3. the establishment 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 (ITNs), particularly for young children and pregnant women, insecticides for indoor residual spraying (IRS), and effective antimalarial treatments.

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3 www.rollbackmalaria.org/docs/abuja_declaration.pdf.
Useful supplementary material is available from the Roll Back Malaria (RBM) Partnership, notably the guidelines for core population coverage indicators.  

A1.1 Policy indicators

In most countries, malaria programmes have a long history. While core interventions are common to all programmes, specific operational components will depend on the epidemiological conditions in the country. The availability of resources, and the way these are allocated, will determine the equity, effectiveness and efficiency of interventions.

The main questions to be answered by the malaria subaccount include the following:

- How much is spent on malaria?
- How is the expenditure distributed across the constituent programmes?
- Which interventions are financed?
- Who benefits?

Additional questions regarding policy and the allocation process include the following:

- Is expenditure on malaria changing? How fast? In what sense?
- Is expenditure on malaria enough to cover the population at risk?
- Is the expenditure providing the population with all the services required?

In order to avoid fluctuations in resources and efforts, which can adversely affect programme achievements, it is desirable to measure sustainability and expenditure trends over several years. Health accounts should therefore be prepared regularly, to allow changes over time in levels and sources of expenditure to be tracked. Malaria programmes can only be sustainable if resources are sufficient to provide a basic package of services.

Generally speaking, programmes are monitored and evaluated using indicators of structure, process, output and outcome. Ideally, the indicators should be universally understandable, easily interpreted, and sufficiently sensitive and specific. A basic set of indicators can be generated directly from the health accounts tables; others will require additional information, such as gross domestic product (GDP), currency exchange rates and size of the population.

The quality of the data used to construct each indicator is key to its value and reliability. In some cases, lack of data constitutes the first barrier to generation of an indicator. The basic indicators proposed in this annex can be generated from the malaria subaccount results. In individual countries, the indicators that can be tracked will depend on which tables have been produced for the health accounts. For example, indicators on external funds can be computed only if tables giving the breakdown of financing sources (FS) are available.

The indicators also need to be clearly defined and constructed, using appropriate data sources for both the numerator and the denominator. Indicators constructed from the health accounts should be compatible and consistent; using other approaches, however valid, may lead to biases in the results.

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The generation of indicators and their linkage to policy issues constitute the final stage of the subaccount estimation, but should be kept in mind from the beginning. The selection of indicators should be linked to information needs, availability of information and the specific conditions in the country. For example, expenditure on ITNs as a percentage of THE\(_M\) is proposed as indicator 7 below. However, for countries such as the Philippines, where the package of preventive malaria interventions is a priority (and includes distribution of ITNs and mass blood surveys), and expenditure on prevention is greater than that on treatment, a more useful indicator could be total public health expenditure (HC6) as a percentage of THE\(_M\).

### A1.2 A minimum set of indicators

Table A1.1 lists a minimum set of desirable indicators for monitoring and comparison purposes. Each indicator is further described in the text, with a definition, an explanation of its use, a summary description and a note on challenges in its construction. A complementary list of optional indicators is proposed in section A1.3. Finally, selected examples of an expanded set of indicators are put forward for cases where more information is available. As in other cases, the malaria accounts would require conducting field studies to reach a more detailed and comprehensive coverage.

#### Table A1.1 A proposed minimum set of indicators for tracking malaria resources

<table>
<thead>
<tr>
<th>Domain</th>
<th>Indicator</th>
<th>Subaccount table source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Financing</td>
<td>Total health expenditure on malaria (THE(_M)) as percentage of general total health expenditure (THE)</td>
<td>All tables</td>
</tr>
<tr>
<td></td>
<td>THE(_M) per capita at exchange rate (US$) (population at risk)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>THE(_M) per capita at international dollar rate (int$) (population at risk)</td>
<td></td>
</tr>
<tr>
<td>Financing sources</td>
<td>Externally funded expenditure on malaria as percentage of THE(_M)</td>
<td>Financing source (FS) x Financing agents (HF) table.</td>
</tr>
<tr>
<td>Financing agents</td>
<td>General government health expenditure on malaria (GGHE(_M)) as percentage of general government health expenditure (GGHE)</td>
<td>HF tables</td>
</tr>
<tr>
<td></td>
<td>Household OOP expenditure on malaria as percentage of THE(_M)</td>
<td></td>
</tr>
<tr>
<td>Factor of production</td>
<td>OOP expenditure on pharmaceuticals for prevention or treatment of malaria as percentage of THE(_M)</td>
<td>HF x Resource Cost (RC) table</td>
</tr>
<tr>
<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></td>
<td>Expenditure on malaria diagnosis as percentage of THE(_M)</td>
<td></td>
</tr>
<tr>
<td>Efficiency</td>
<td>Average expenditure on malaria cases (THE(_M)/Malaria cases treated)</td>
<td>All tables</td>
</tr>
<tr>
<td>Monographic interest</td>
<td>Budgeted vs. executed resources for malaria</td>
<td>NHA background documents</td>
</tr>
</tbody>
</table>
1. Total health expenditure on malaria (THE\textsubscript{M}) as percentage of general total health expenditure (THE)

**Definition.** Amount of resources channelled to malaria-specific programmes (THE\textsubscript{M}) as a proportion of THE,\textsuperscript{5} expressed as a percentage, i.e. \[ \frac{\text{THE}_{M}}{\text{THE}} \times 100 \]

**Description.** THE\textsubscript{M} is the sum of resources used by the general government and private entities to prevent malaria, to restore health status lost on account of the disease, and to reduce the prevalence of the vector. Interventions linked to malaria control programmes include curative, preventive and public health services, provision of medical goods, and administration. Investment specifically linked to malaria is also included. An equivalent scope for the whole spectrum of health activities applies to THE.

As noted in Chapter 2, the malaria subaccount includes only expenditure associated with current episodes of malaria. THEM, therefore, does not include interventions to treat indirect and long-term complications of malaria. (These may have been included as an addendum to the subaccount; see Annex 4 for further details).\textsuperscript{6}

**Use.** This indicator assesses the investment in activities aimed at controlling and treating malaria. It is one of the most important indicators, providing a comprehensive measurement of resources specifically used in the malaria control programme and identifying the relative allocative effort in this area. The proportion reflects the relative priority of the roll back malaria effort.

**Sources and methods.** THE\textsubscript{M} and THE are obtained from tables in the malaria subaccount and the NHA, respectively, preferably the financing agents and provider tables.

2. Per capita THE\textsubscript{M}

**Definition.** Total expenditure on malaria (THE\textsubscript{M}) relative to the population at risk, i.e. \[ \frac{\text{THE}_{M}}{\text{population at risk}} \]

The indicator can be expressed in the national currency, or in US dollars or international dollars / purchasing power parity (PPP) to allow cross-country comparisons.

**Description.** THE\textsubscript{M} (the numerator) is the sum of resources used by the general government and private entities to prevent malaria, to restore health status lost on account of the disease, and to reduce the prevalence of the vector. The denominator is the population living in malaria-endemic areas. In the few countries where malaria is widespread, the whole population should be used as denominator.

---

\textsuperscript{5} Health expenditure includes the full set of functions in the health care classification (also known as the functional class), i.e. curative, rehabilitative and long-term care, ancillary services, medical goods, prevention, public health and administration. See: *System of health accounts*, Paris, Organisation for Economic Co-operation and Development, 2000; and *Guide to producing national health accounts*, Geneva, World Health Organization, World Bank, and US Agency for International Development, 2003.

\textsuperscript{6} In some cases, it may be interesting to compute an equivalent indicator that also includes the addendum items, e.g. environmental management and research and development. Social benefits may also be included in an expanded indicator, e.g. expenditure to compensate loss of income. In all cases, it is advisable to indicate the inclusion of the addendum items and refer to the indicator as national health expenditure on malaria (NHE\textsubscript{M}) (see the Producers' Guide, WHO, 2003). It is important to ensure that both the numerator and the denominator correspond to the expanded measure.
Use. This indicator measures the resources spent relative to the population to be covered, and the value of the average basket of goods and services used to combat malaria. It can be useful to assess whether the expenditure allocated is enough to cover the basic services provided in the malaria programme. While it gives no indication of how the funds are allocated, it can contribute to comparisons of the average level of resources needed for a specific basket of interventions as well as estimations of total expenditure in terms of the population to be served. Assuming equal needs, inequities are expressed as differences in per capita resources available.

Sources and methods. $THEm$ (the numerator) is obtained from the financing agents and providers table in the malaria subaccount. The population at risk (the denominator) should preferably be an average annual or a mid-year population. Where malaria risk exists in only part of the country, both numerator and denominator should be adjusted accordingly. Data on population at risk may be available from the malaria programme.

Expenditure in the national currency can be converted to US dollars or PPP. PPPs for many countries are available from the World Bank or WHO.\(^7\)

Challenges. Regional data on the population at risk may not be available, in which case national population should be used. Selecting the appropriate exchange rate may be difficult if there is a difference between the official exchange rate and the parallel or informal exchange rate.

3. Externally funded expenditure on malaria as percentage of $THEm$

Definition. The proportion of total health expenditure on malaria that comes from external sources, expressed as a percentage, i.e. \[ \frac{\text{external expenditure on malaria}}{THEm} \times 100 \]

Description. The numerator includes all external resources allocated to interventions against malaria, and used by any resident entities, whether private or governmental. $THEm$ (the denominator) is the sum of resources used by the general government and private entities to prevent malaria, to restore health status lost on account of the disease, and to reduce the prevalence of the vector.

Use. This indicator reflects the extent to which interventions against malaria are paid for by external funds. It is useful for analysing the sustainability of programmes and the policies for obtaining and distributing external funding.

Sources and methods. Both numerator and denominator can be obtained from the malaria subaccount table of financing sources and financing agents. If a table of financing sources for malaria has not been prepared, some information may be available from the general health accounts, if these contain sufficient detail on financing sources by function, intervention or programme. See Chapter 5 for more details.

Original records may be available from the entities that receive the external resources or from agencies which centralize these records. An increasing number of external funding agencies have specific records of the purposes of the grants awarded.

Challenges. There may be a lack of detailed records, particularly of direct donations to households and private entities. Accounting for resources allocated in one period but spent

\(^7\) PPP are taken from the World Development Indicators; http://publications.worldbank.org/WDI/indicators.
subsequently may be inaccurate. There may be differences in the valuations of resources by donors and recipients. It may also be difficult to assign a value to in-kind goods and services, and to distribute costs, mainly when multiple intermediation channels exist.

4. **General government health expenditure on malaria as percentage of general government health expenditure (GGHE)**

**Definition.** Amount of general government resources channelled to malaria (GGHE$_M$) as a proportion of all government spending on health, expressed as a percentage, i.e. $\frac{GGHE_M}{GGHE} \times 100$

**Description.** GGHE$_M$ (the numerator) is the sum of resources used by general government to prevent malaria, to restore health status lost on account of the disease, and to reduce the prevalence of the vector. The denominator is the total expenditure on health by the general government entities as measured through the health accounting framework. General government is defined as all government entities, i.e. both those with territorial jurisdiction (central, regional and local governments) and all extrabudgetary entities, such as social security services.

**Use.** This indicator measures the relative importance of general government expenditure on malaria in total general health expenditure. It reflects the priority given to malaria by the general government.

**Sources and methods.** GGHE$_M$ and GGHE are obtained from tables in the malaria subaccount and the NHA, respectively. The data can be taken from the table of financing agents and providers. Specific records for all interventions by general government entities may be available from the Ministry of Health, other ministries, social security agencies, and services financed by the territorial governments. The spectrum of interventions to be measured is the same as for THE$_M$; inpatient and outpatient services, provision of medical goods and administration.

**Challenges.** It is important that numerator and denominator are measured consistently. In many countries, reported data for government has a partial coverage. It is important to ensure values net of intergovernmental transfers.

5. **Household OOP expenditure on malaria as percentage of THE$_M$**

**Definition.** The proportion of total health expenditure on malaria that comes from household out-of-pocket spending, expressed as a percentage, i.e. $\frac{OOP \text{ spending on malaria}}{THE_M} \times 100$

**Description.** Out-of-pocket expenditure (the numerator) includes all payments made when a service for the prevention or treatment of malaria is received. Services may be provided by government or by private entities. The payment may cover the total value of the service or a part of it, e.g. where health goods and services are partially subsidized. THE$_M$ (the denominator) is the sum of resources used by the general government and private entities to prevent malaria, to restore health status lost on account of the disease, and to reduce the prevalence of the vector.

**Use.** This indicator measures the relative contribution of households to total expenditure on malaria. In general, OOP spending is a less desirable way of financing health interventions than
prepayments or pooled funding schemes. High OOP expenditure has also been found to be linked to catastrophic expenditure on health.

**Sources and methods.** Both numerator and denominator can be obtained from the table of financing agents and providers of the malaria subaccount. Household surveys can also be a data source if they contain information on type of service or diagnosis. In most cases, business surveys lack the required detail (see Chapter 5 for more detailed discussion).

**Challenges.** Spending by private entities is generally the least accurate component of health accounts and expenditure measurements. It is useful to triangulate the data, by comparing received payments reported by providers with payments reported by households.

### 6. OOP expenditure on pharmaceuticals for prevention or treatment of malaria as percentage of THE

**Definition.** Household out-of-pocket spending on pharmaceuticals for prevention or treatment of malaria as a proportion of total health expenditure on malaria, expressed as a percentage, i.e. \( \frac{\text{OOP spending on pharmaceuticals for malaria}}{\text{THE}_M} \times 100 \)

**Description.** The numerator includes all payments made when pharmaceuticals for the prevention or treatment of malaria are received. These pharmaceuticals may be provided by government or by private entities. The payment may cover the total value of the pharmaceutical or a part of it, e.g. where goods and services are partially subsidized. \( \text{THE}_M \) (the denominator) is the sum of resources used by the general government and private entities to prevent malaria, to restore health status lost on account of the disease, and to reduce the prevalence of the vector.

Pharmaceuticals include medicines, vaccines and other biological products, blood and its derivatives, diagnostic products, and other medical goods used as part of traditional, complementary and alternative medicine (TCAM).

**Use.** This indicator measures the relative importance of household purchases of pharmaceuticals in \( \text{THE}_M \), and helps assess the distribution of purchases by households (financing agents). In general, OOP spending is a less desirable way of financing health interventions than prepayments or pooled funding schemes. High OOP expenditure has also been found to be linked to catastrophic expenditure on health. The greater this indicator, the greater the burden for households. The indicator can also contribute to assessing the coverage of subsidies.

**Sources and methods.** Both numerator and denominator can be obtained from the table of financing agents and resource costs in the malaria subaccount. Household surveys can also be a data source if they contain information on type of service or diagnosis. In most cases, business surveys lack the required detail (see Chapter 5 for more detailed discussion). Records of pharmaceutical sales are usually available and may include the distributional channels. Note that all channels, i.e. hospital as well as outpatient distribution, should be included. It is important that consumer prices are used, not trade or wholesale prices.

**Challenges.** Spending by private entities is generally the least accurate component of health accounts and expenditure measurements. It is useful to triangulate the data, by comparing payments received by providers with purchases made by households.
7. **Expenditure on insecticide-treated nets as percentage of THE**

**Definition.** Expenditure on insecticide-treated bednets as a proportion of total expenditure on malaria, expressed as a percentage, i.e. 

\[
\frac{\text{expenditure on ITNS}}{\text{THE}_M} \times 100
\]

**Description.** The numerator is the amount spent on ITNs, one of the key components of interventions to prevent malaria. \(\text{THE}_M\) (the denominator) is the sum of resources used by the general government and private entities to prevent malaria, to restore health status lost on account of the disease, and to reduce the prevalence of the vector.

**Use.** This indicator measures the relative importance of the amount spent on ITNs in \(\text{THE}_M\). It contributes to an assessment of the distribution of malaria expenditure. The larger the indicator, the broader the coverage of this preventive commodity. Complementary information includes the number of nets distributed.

**Sources and methods.** Both numerator and denominator can be obtained from the table of resource costs and functional classification of the malaria subaccount. Estimates should reflect the price paid by consumers and include subsidies, as exemplified in section 6.3.3. It is useful to triangulate the data, by comparing payments reported as received by providers with those reported as made by households and records of production or imports.

**Challenges.** Records may not be available of expenditure on specific malaria commodities, and a survey may be required.

8. **Expenditure on malaria diagnosis as percentage of THE**

**Definition.** Expenditure on malaria diagnostic services as a proportion of total expenditure on malaria, expressed as a percentage, i.e. 

\[
\frac{\text{expenditure on malaria diagnosis}}{\text{THE}_M} \times 100
\]

**Description.** The numerator is the amount spent on malaria diagnostic services, i.e. laboratory testing of blood for malaria parasites. \(\text{THE}_M\) (the denominator) is the sum of resources used by the general government and private entities to prevent malaria, to restore health status lost on account of the disease, and to reduce the prevalence of the vector.

**Use.** This indicator measures the relative importance of the amount spent on diagnosis of malaria in \(\text{THE}_M\). It contributes to an assessment of the distribution of malaria expenditure. Diagnosis is a key component of every malaria programme, but in many cases treatment is offered on a presumptive basis or may be self-prescribed. The larger the indicator, the better the coverage of this ancillary service. Resistance to pharmaceuticals, effectiveness and efficiency of the programme are linked to this key intervention.

**Sources and methods.** Both numerator and denominator can be obtained from the table of providers and functions of the malaria subaccount. It is important to ensure that records of diagnosis are obtained from all care units.

**Challenges.** There may be no centralized records of laboratory testing for malaria by general government and private providers.
9. **Average expenditure per case of malaria**

**Definition.** Amount spent on malaria relative to number of cases, expressed in the national currency, US dollars or PPP, i.e. \( \frac{\text{THE}_m}{\text{number of malaria diagnosis}} \times 100 \)

**Description.** The numerator is \( \text{THE}_m \), i.e. the sum of resources used by the general government and private entities to prevent malaria, to restore health status lost on account of the disease, and to reduce the prevalence of the vector. The denominator is the total number of cases treated. Results in the national currency can be converted to US dollars or PPP values.

**Use.** This indicator measures the expenditure of the programme relative to each treated case. It can contribute to assessments of the average basket of services provided and their prices, as well as to discussions of equity and efficiency.

**Sources and methods.** The numerator can be obtained from the table of functions in the malaria subaccount. The malaria programme should be able to provide data on number of cases treated during the year.  

**Challenges.** Records of cases may not be complete or consistent with the expenditure reported.

10. **Budgeted vs. executed resources for malaria**

**Definition.** The proportion of the budgeted resources for malaria that are actually spent, expressed as a percentage, i.e. \( \frac{\text{actual \ THE}_m}{\text{budgeted \ THE}_m} \times 100 \)

**Description.** The numerator is the amount actually spent on malaria services, while the denominator is the amount that was budgeted. Resources are recorded as being spent according to the accrual method, i.e. at the time when they are actually used to provide services.

**Use.** This indicator measures the proportion of resources allocated to the malaria programme that are actually used for malaria-related activities. Results can be used to adjust planning strategies and to help identify barriers to execution of services. The indicator should ideally be as close to 100% as possible.

**Sources and methods.** The numerator can be obtained from the malaria subaccount tables results. The denominator should be obtained from authorized budgets of providers or from funders.

**Challenges.** It should be ensured that numerator and denominator are equivalent in coverage.

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8 Country reports to the RBM database can be found at [http://rbm.who.int/merg#morbiditytf](http://rbm.who.int/merg#morbiditytf).
Table A1.2 Optional indicators for tracking malaria resources

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A1.3. Optional indicators

1. Externally funded expenditure on malaria as percentage of total external expenditure on health

**Definition.** Amount of external funds spent on malaria relative to the total amount of external resources spent on health care, expressed as a percentage, i.e.

\[
\left( \frac{\text{external spending on malaria}}{\text{external spending on health}} \right) \times 100
\]

**Description.** The numerator includes all external funds used to prevent malaria, to restore health status lost on account of the disease, and to reduce the prevalence of the vector, whether specifically labelled as such or not. The denominator includes all external funds used for interventions classified as health functions.

**Use.** This indicator measures how much of the external funding is spent on malaria compared with other uses. This information is useful for planning and allocation purposes, as well as for interacting with external funding agencies.
The proportion of external funding going to malaria reflects the level of interest in this field among the external funding agencies, and indicates the level of reliance of the malaria programme on external funding, and the additional external resources that could be channelled to malaria.

**Sources and methods.** The numerator can be obtained from the malaria subaccount (financing sources) and the denominator from the general health accounts (financing sources).

In kind and in cash external resources may be valued differently by recipients and financing agencies. Such discrepancies should be resolved using market values in the recipient country.

**Challenges.** There may not be comprehensive records of disbursements and the use to which they are put. Disbursements may be much lower than commitments. Another challenge is the difference in the valuation of disbursements and in kind donations by the recipient and the external funding agency.

2. **OOP expenditure on malaria as percentage of total OOP expenditure on health**

**Definition:** The proportion of OOP spending on health that goes to malaria, expressed as a percentage, i.e.

\[
\frac{\text{OOP spending on malaria}}{\text{OOP spending on health}} \times 100
\]

**Description:** The numerator includes all payments made when a service for the prevention or treatment of malaria is received. The denominator includes all payments made when health services are received. Services may be provided by government or by private entities. The payment may cover the total value of the service or a part of it, e.g. where health goods and services are partially subsidized.

**Use.** This indicator assesses the burden of malaria on households relative to the total burden of health expenditure. In general, OOP spending is a less desirable way of financing health interventions than prepayments or pooled funding schemes. High OOP expenditure has also been found to be linked to catastrophic expenditure on health.

**Sources and methods.** Data can be taken from the financing agents and providers tables of the malaria subaccount (for the numerator) and the general health account (for the denominator). Household surveys that record type of service or diagnosis can also be a data source. In most cases, business surveys lack the required detail (see Chapter 5 for more detailed discussion).

**Challenges.** Spending by private entities is generally the least accurate component of health accounts and expenditure measurements. It is useful to triangulate the data, by comparing received payments reported by providers with payments reported by households.

3. **Expenditure on malaria by hospitals as percentage of THE\(_M\)**

**Definition.** The proportion of THE\(_M\), spent by hospitals, expressed as a percentage, i.e.

\[
\frac{\text{hospital spending on malaria}}{\text{THE}\(_M\)} \times 100
\]

**Description.** The numerator is expenditure on malaria in hospitals, including both outpatient and inpatient activities. The denominator is the sum of resources used by the general government and private entities to prevent malaria, to restore health status lost on account of the disease, and to reduce the prevalence of the vector.
For accounting purposes, a hospital is a health care unit with facilities for overnight stay by patients, and in which health care services are offered 24 hours per day.\(^9\)

**Use.** This indicator measures the relative importance of hospital interventions for malaria, performed as inpatient or outpatient activities. It is useful for analysing the distribution of resources among health care providers.

The hospital environment is highly heterogeneous between and within countries. Hospitals usually have a higher level of technology than the average outpatient unit. The cost of interventions is frequently higher and they can perform more complex interventions. The efficiency of the health care system is linked to the use of appropriate technology, i.e. using a less complex and less costly environment for less complex health care needs.

Where patients have a free choice of provider, this indicator also reflects the preference of malaria patients for hospital or outpatient treatment.

A large share of expenditure in the hospital environment may reflect complex health care needs or more centralization of malaria treatment within the health system.

**Sources and methods.** Data for this indicator can be obtained from the malaria subaccount. Hospital records are frequently disaggregated by diagnosis, in a way that can be linked to expenditure data (see Chapter 5 for more detailed discussion). Ideally, data should be collected for all hospitals (both government-run and private), which may require a survey. If a study is performed, at least the larger hospitals and the units with highest expenditure on malaria should be included. Information from household surveys (such as the DHS) can also be used if it is disaggregated by cause (malaria) and by provider.

**Challenges.** There may be a lack of specific records of expenditure on malaria in hospital settings and the information may not be collated in a single database, e.g. recorded diagnosis (e.g. severe malaria) are available frequently for inpatients but less frequent for outpatients (e.g. fever). Another problem may be the lack of a standard definition for a hospital, which means that country standards are used and may not be internationally comparable.

**4. Expenditure on malaria by ambulatory care providers as percentage of THE\(_M\)**

**Definition.** The proportion of \(\text{THE}_M\) spent by ambulatory care providers, expressed as a percentage, i.e. \[
\frac{\text{spending on malaria in ambulatory care}}{\text{THE}_M} \times 100
\]

**Description.** The numerator is expenditure on malaria in ambulatory care. The denominator is the sum of resources used by the general government and private entities to prevent malaria, to restore health status lost on account of the disease, and to reduce the prevalence of the vector.

For accounting purposes, ambulatory care involves services which do not include an overnight stay. It may be delivered both in hospitals as well as by outpatient clinics, which are defined

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\(^9\) Other criteria for hospitals are: licensing; primarily engaged in health care of admitted patients (although outpatient care may be provided as a secondary activity); provision of specialized health care. Some countries require a minimum number of beds for classification as a hospital.
as health care units, staffed by medical or other health practitioners and providing ambulatory services.\footnote{Outpatient care providers as described in the HP classification include offices of health practitioners, centres of ambulatory care and ancillary service units.}

**Use.** This indicator measures the relative importance of ambulatory care interventions for malaria. It is useful for analysing the distribution of resources among health care providers.

The efficiency of the health care system is linked to the use of appropriate technology, i.e. using a less complex and less costly environment for less complex health care needs. A large share of expenditure in ambulatory care units may reflect a high proportion of basic health care needs or a decentralization of malaria treatment within the health system.

**Sources and methods.** Data for this indicator can be obtained from the malaria subaccount. Records of ambulatory care providers are not usually disaggregated by diagnosis in a way that can be linked to expenditure data (see Chapters 3 and 5 for more detailed discussion). Ideally, data should be collected for all ambulatory care providers (both government-run and private), which may require a survey. If a study is performed, at least the larger ambulatory care units and those with the highest expenditure on malaria should be included. Information from household surveys (such as the DHS) can also be used if it is disaggregated by cause (malaria) and by provider.

**Challenges.** There may be a lack of appropriate records of expenditure on malaria in ambulatory care units and the information may not be collated in a single database.

**5. Expenditure on inpatient care for malaria as percentage of \( \text{THE}_{\text{m}} \)**

**Definition.** The proportion of \( \text{THE}_{\text{m}} \) spent on inpatient care, expressed as a percentage, i.e.

\[
\frac{\text{spending on inpatient care for malaria}}{\text{THE}_{\text{m}}} \times 100
\]

**Description.** The numerator is malaria spending on inpatient care, defined as medical and paramedical care offered to patients admitted for an overnight stay. The denominator is the sum of resources used by the general government and private entities to prevent malaria, to restore health status lost on account of the disease, and to reduce the prevalence of the vector.

**Use.** This indicator measures the relative importance of inpatient treatment for malaria, reflecting resources channelled to solve potentially 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 both independently and in conjunction with indicator 3 on hospital spending, to assess the need for treatment of complicated or complex malaria cases. If the hospital spending indicator is high because patients choose to seek care in hospital outpatient departments, the indicator of inpatient care should be lower, reflecting treatment of complex cases. Interventions against malaria should give priority to prevention and control activities rather than to handling severe cases, so this indicator should ideally be low.
**Sources and methods.** Data for this indicator can be obtained from the malaria subaccounts. Inpatient care is usually reported by diagnosis and can thus be linked to expenditure (see Chapters 3 and 5 for more details). Ideally, data should be collected for all inpatient services (both government-run and private), which may require a survey. If a study is performed, at least the larger hospitals and the units with the highest expenditure on malaria should be included. Information from household surveys (such as the DHS) can also be used when they are disaggregated by cause (malaria) and by type of care.

**Challenges.** There may be a lack of specific records of expenditure on inpatient care for malaria, and the information may not be collated in a single database.

6. **Expenditure on outpatient care for malaria as percentage of THE<sub>M</sub>**

**Definition.** The proportion of THE<sub>M</sub> spent on outpatient care, expressed as a percentage, i.e.

\[
\frac{\text{spending on outpatient care for malaria}}{\text{THE}_M} \times 100
\]

**Description.** The numerator is malaria spending on outpatient care, defined as all medical and paramedical services delivered in outpatient settings for treatment of malaria. The denominator is the sum of resources used by the general government and private entities to prevent malaria, to restore health status lost on account of the disease, and to reduce the prevalence of the vector.

**Use:** This indicator measures the relative importance of outpatient treatment of malaria. It is useful for analysing the distribution of resources among the health functions.

The efficiency of the health care system is linked to the use of appropriate technology, i.e. using a less complex and less costly environment for less complex health care needs.

**Sources and methods.** Data for this indicator can be obtained from the malaria subaccount tables containing the functional classification. Records on outpatient services are not usually disaggregated by diagnosis in a way that can be linked to expenditure (see Chapters 3 and 5 for more detailed discussion). Ideally, data should be collected for all outpatient services (both government-run and private), which may require a survey. If a study is performed, at least the larger outpatient care providers should be included. Information from household surveys (such as the DHS) can also be used when it is disaggregated by cause and by service.

**Challenges.** There may be a lack of appropriate records on malaria expenditure in outpatient services and the information may not be collated in a single database.

7. **Expenditure on human resources for malaria as percentage of THE<sub>M</sub>**

**Definition.** The proportion of THE<sub>M</sub> spent on human resources, expressed as a percentage, i.e.

\[
\frac{\text{spending on human resources for malaria}}{\text{THE}_M} \times 100
\]

**Description.** The numerator includes all forms of labour costs for interventions against malaria, covering all types of contract and all types of health worker, whether specialized or not. Labour costs include wages of employees (in both government and private units) and payments to self-employed and non-salaried personnel. The denominator is the sum of resources used by
the general government and private entities to prevent malaria, to restore health status lost on account of the disease, and to reduce the prevalence of the vector.

**Use.** This indicator measures the relative importance of human resources in total malaria expenditure. It can contribute to assessments of the distribution of expenditure by type of resource.

**Sources and methods.** Data for this indicator can be obtained from the malaria subaccount tables of financing agent or provider and resource cost. The usual data sources are the executed budgets of the institutions that carry out interventions against malaria. Most business surveys lack the required detail by disease.

**Challenges.** There may be a lack of records on specific resources involved in interventions against malaria, or the share of staff time devoted to these activities. Remuneration of non-salaried workers may be more difficult to identify.

8. **Average expenditure on malaria per pregnant woman**

**Definition.** The average per capita expenditure on interventions against malaria among pregnant women, i.e. :

\[
\frac{\text{spending on malaria intervention among pregnant women}}{\text{number of pregnant women served}} \times 100
\]

**Description.** The numerator includes spending on all interventions against malaria performed on women in all stages of pregnancy. The amount may be given in the national currency or converted into US dollars or international dollars. The denominator is the population of pregnant women served.

**Use.** This indicator measures the resources directed to a priority targeted population group. It can contribute to assessment of the distribution of expenditure by type of beneficiary.

The larger the indicator, the larger the basket of interventions on malaria provided to pregnant women. Expressing the indicator as US or international dollars allows comparisons between countries on the resources directed to this targeted population.

**Sources and methods.** Data for this indicator can be obtained from the malaria subaccount tables of functions and beneficiaries.

**Challenges.** There may be a lack of records on malaria expenditure in specific population groups.

9. **Expenditure on treatment of severe malaria as percentage of THE**

**Definition.** The proportion of \( \text{THE}_m \) spent on treatment of severe malaria, expressed as a percentage, i.e. :

\[
\frac{\text{spending on treatment of severe malaria}}{\text{THE}_m} \times 100
\]
**Description.** The numerator includes all spending on treatment of severe malaria, defined as cases with symptoms and evolution (in the current episode) to coma (cerebral malaria), severe breathing difficulties (respiratory distress), dangerously low blood sugar (hypoglycaemia) and dangerously low blood haemoglobin (severe anaemia). Adults can also develop other major complications such as sudden loss of kidney function (acute renal failure) and severe breathing difficulties different from the respiratory distress of children but equally serious (pulmonary oedema). These cases are counted regardless of the provider, the environment or type of unit in which the service is provided. The denominator is the sum of resources used by the general government and private entities for malaria.

**Use.** This indicator measures the relative importance of resources spent on treatment of severe malaria. Severe malaria cases should occur less frequently when prevention and early treatment are available and effective. This indicator therefore may reflect the quality and availability of appropriate treatment. The larger the indicator, the less available or effective other interventions against malaria are likely to be.

**Sources and methods.** Data for this indicator can be obtained from the malaria subaccount tables of functions and providers. Records and reports on severe malaria cases may be available from both government-run and private hospitals.

**Challenges.** There may be a lack of complete records of severe malaria treatment and the resources used on them.

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

**Definition** The per capita expenditure on malaria at subnational levels, i.e.

\[
\frac{\text{spending on malaria in specific region, district}}{\text{THE}_m} \times 100
\]

**Description.** The numerator is the sum of resources used by the government and private entities in the defined area to prevent malaria, to restore health status lost on account of the disease, and to reduce the prevalence of the vector. The denominator is the population in the area at risk of malaria. The subnational level may be a state, region, district, etc. In setting the boundaries of the area, a choice has to be made between considering the place of residence of the population receiving services or the location of the health services.\(^1\)

The indicator can be expressed in national currency units, US dollars, or international dollars.

**Use.** This indicator measures the amount of resources used in relation to the population at risk in each geopolitical area considered, providing an indication of whether the resources are enough to cover the basket of interventions to be provided, and of the equity of the distribution of resources among the different areas. This indicator can be highly useful in the allocation process in decentralized countries in which malaria risk is widespread.

In interpreting differences in per capita level of expenditure, a key issue is the level of risk. The components of the basket of interventions on malaria, the services and the population coverage should be adjusted to the risk in the area. Thus, equivalent risks should result in

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equivalent expenditure. The larger this indicator, the larger the scope of the components of the malaria treatment. For international comparison purposes, the amounts should be expressed in equivalent currencies.

**Sources and methods.** The sources of information should correspond to the geopolitical level selected for the analysis. The data may be generated via a specific bottom-up consolidation process, or by disaggregating the national-level components through a top-down estimation. Information may be available from the malaria programme. Information from institutional reports and household surveys (such as the DHS) can be used if it is disaggregated by cause (malaria).

**Challenges.** It is important to ensure consistency between the geopolitical boundaries and their coverage. The major difficulty in practice is related to the lack of data at the subnational level for all components of the estimation. The reference values used in performing a top-down disaggregation will define the quality of the approach.

### A1.4 Expanded indicators for tracking malaria resources

<table>
<thead>
<tr>
<th>Level</th>
<th>Domain</th>
<th>Indicator</th>
<th>Potential sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expanded</td>
<td>1</td>
<td>Budgeted vs. executed spending at programme level and by specific programme components</td>
<td>NHA background material</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>Per capita expenditure on malaria by subnational governments</td>
<td>Subnational accounts</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>Per capita expenditure on malaria by age and sex coverage, rural/urban population, insured/uninsured</td>
<td>A survey is needed</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>Expenditure on malaria by type of input, e.g. expenditure on pharmaceuticals, as percentage of THEM</td>
<td>Tables comprising RC (RCxP--HFxRC)</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>Productivity: expenditure on human resources by malaria cases treated</td>
<td>Tables comprising RC (RCxP--HFxRC)</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>Waste ratio: malaria medicines destroyed as percentage of total medicines earmarked for malaria</td>
<td>A survey is needed</td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>Outdated insecticides as percentage of total insecticides for malaria</td>
<td>A survey is needed</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>Expenditure on artemisinin-based combination therapy (ACT) as percentage of THEM</td>
<td>A survey is needed</td>
</tr>
<tr>
<td></td>
<td>9</td>
<td>Share of private expenditure on ACT</td>
<td>A survey is needed</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>Per capita expenditure on malaria (current expenditure, population at risk, measurement of specific interventions)</td>
<td>All tables can provide THEM with relevant level of detail of the intervention under assessment</td>
</tr>
</tbody>
</table>
The tenth revision of the International Classification of Diseases (ICD-10),¹ which came into use in 1994, classifies malaria under “Certain infectious and parasitic diseases” (coded A00–B99) and, more specifically, “Protozoal diseases” (B50–B54.) The ICD-10 subcategories for malaria and its complications are 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*:
  - *falciparum* (B50.-)
  - *vivax* (B51.-)

**B52.0**  *Plasmodium malariae* malaria with nephropathy

**B52.8**  *Plasmodium malariae* malaria with other complications

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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*:
- *falciparum* (B50.-)
- *malariae* (B52.-)
- *vivax* (B51.-)

B53.1 Malaria due to simian plasmodia

Excludes: when mixed with *Plasmodium*:
- *falciparum* (B50.-)
- *malariae* (B52.-)
- *ovale* (B53.0)
- *vivax* (B51.-)

B53.8 Other parasitologically confirmed malaria, not elsewhere classified

Parasitologically confirmed malaria NOS

B54 Unspecified malaria

Clinically diagnosed malaria without parasitological confirmation
Table A3.1 lists the principal malaria control activities according to their main purpose.

**Table A3.1. Malaria control activities by main purpose**

<table>
<thead>
<tr>
<th>Purpose</th>
<th>Malaria control activities and services</th>
</tr>
</thead>
</table>
| Reduce abundance of vector species| Control of mosquito vector at different stages of its life cycle:  
1. Mating.  
   - Genetic manipulation and introduction of exotic species.  
   - Use of chemosterilants.  
2. Eggs.  
   Activities to reduce availability of breeding grounds including:  
   - integration of environmental management for mosquito control into agricultural, industrial and urban development undertakings involving the modification of the environment;  
   - periodic draining of rice paddies;  
   - marsh alteration;  
   - improvement of drainage ditches and community water impoundments.  
   - Information, education, and communication for households on basic sanitation, particularly ensuring proper drainage of wastewater and reducing areas of stagnant water.  
3. Larvae, pupae (pupae are non-feeding).  
   - Clearing operations to promote flow and reduce turbidity of water (turbid water supports flotation of particles, such as pollen, which provide food for larvae).  
   - Application of larvicides (oils, organophosphorus compounds, insect growth regulators and microbial insecticides).  
   - Introduction of natural enemies, such as larvivorous fish.  
4. Adult.  
   - Reduce availability of sources of plant juices.  
   - Indoor residual spraying of insecticides.  
   - Insecticide-treated materials, e.g. bednets, curtains. |
| Isolate human hosts from vectors   | Dry-belting of villages in rice cultivation areas (i.e. restricting use of land surrounding human communities to the production of dry crops).  
Zooprophylaxis, i.e. use of wild or domestic animals as source of blood meal and as diversion of blood-seeking mosquitoes away from humans.  
House-screening or mosquito-proofing of dwellings.  
Bednets.  
Application of repellants to the skin  
Use of other mosquito repellants and domestic insecticides, e.g. insect sprays, mosquito coils, burning of traditional herbs. |
| Reduce malaria infections in humans| Raise public awareness about malaria.  
Provide chemoprophylaxis for non-immune groups.  
Provide intermittent treatment for pregnant women.  
Perform mass blood surveys and provide follow-up treatment. |
Malaria-related long-term health expenditure refers to spending for the continuing treatment or management of diseases and conditions that have developed as secondary complications of malaria, and that persist after the malaria episode. Treatment and management of these secondary complications, as with other health conditions, entail use of health care services (e.g. curative care, drugs) and facilities (e.g. hospitals, ambulatory care). Secondary complications can persist throughout the life of the patient and treatment can be costly. An estimate of these expenditures may, therefore, be useful for policy discussions.

**Accounting for long-term expenditures as addendum items**

This guide recommends that, if long-term malaria-related expenditures are to be estimated, this should be done separately and included as an addendum to the main malaria subaccounts (see Chapter 2). These long-term expenditures may be estimated as part of a full accounting of the economic costs of malaria, or to provide an indication of one cost component that may be averted with effective malaria control and case management. In the planning and management of malaria treatment and control programmes, data on long-term malaria costs are complementary to those provided by the main malaria subaccounts. Table A4.1 outlines the scope of the malaria subaccounts and the types of activities that should be included in an addendum.

**Table A4.1. Types of expenditure to be included in the main malaria subaccount and as addendum items**

<table>
<thead>
<tr>
<th>Expenditures included in the malaria subaccount</th>
<th>Expenditures included as addendum items</th>
</tr>
</thead>
<tbody>
<tr>
<td>Services targeting malaria as defined in ICD-10 (see Annex 2).</td>
<td>Neurological sequelae of cerebral malaria (ataxia, hemiplegia, speech disorders, blindness, gait disturbance, paralysis, cognitive and behavioural 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>Hepatitis contracted from blood transfusion given to treat severe malaria.</td>
</tr>
<tr>
<td>• Cerebral malaria (coma, convulsions, posturing, altered consciousness and respiratory patterns, gaze abnormalities, decreased muscle tone, cranial nerve palsies, retinal abnormalities).</td>
<td></td>
</tr>
<tr>
<td>• Hypoglycaemia, acidosis, severe anaemia, jaundice, kidney damage, acute pulmonary oedema, respiratory distress.</td>
<td></td>
</tr>
</tbody>
</table>
If long-term expenditure on malaria complications is to be estimated, two sets of issues need to be confronted: the definition of the expenditures and the sources of data.

**Defining malaria-related long-term expenditure**

First, there is a need to define which complications should be included as malaria-related and which to exclude. For example, during a training workshop in Rwanda in May 2006, participants agreed that long-term malaria expenditure should include the costs of treating complications of cerebral malaria. On the other hand, participants argued that it should not include the cost of medical care for infections contracted from blood transfusions given to treat malaria-induced anaemia. They argued that the cost is a result of failure in the regulation of the blood supply. Each country will need to decide on its own inclusion and exclusion criteria, reflecting national policy issues and perspectives.

**Data sources**

Identifying data sources for malaria-related long-term expenditures can be particularly challenging in countries with weak health management information systems. Generally, there is little documentation of the causal relationship between malaria and secondary complications. For example, the patient record of a person suffering from blindness may not specify that it is malaria-related. As country information systems evolve, they become more able to capture such policy-relevant data with increasing accuracy. In the interim, information on long-term malaria-related costs will most likely have to be collected through special follow-up surveys of patients who have had 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 formulated. This can be done by determining: (1) the percentage of all malaria cases that have secondary complications (perhaps from key informants and/or disease progression studies); and (2) the approximate annual cost of care 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 supposed to be delivered to patients with secondary complications. Rather, estimates should be based on actual services rendered. This is easier in facilities that have cash-accounting systems for tracking such expenses. Alternatively, price changes in the private sector can be used. A rough approximation of expenditures can be obtained by multiplying the derived estimate of cost per patient by the number of patients with secondary complications. Note that, because the different *Plasmodium* strains are associated with different types of secondary complications, this calculation should be done separately for each strain.
Annex 5
Malaria subaccount tables for Rwanda, 2003

See attached PDF file.
Annex 6

Malaria subaccount tables for Davao del Norte, 2004

See attached PDF file.
Annex 7
Donor survey instrument from Rwanda

See attached PDF file.
Annex 8
NGO survey instrument from Rwanda

See attached PDF file.
Annex 9

Household survey instrument from Rwanda, designed for socioeconomic impact study

See attached PDF file.
Annex 10
Regional health unit survey instrument from Davao del Norte

See attached PDF file.