MODULE 6:

INDICATORS FOR MALARIA PROGRAMS

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This module describes how to identify and develop good indicators for malaria programs. Specifically, it will cover the criteria for selecting good indicators, how to critique indicators, how indicators are linked to frameworks, and different sources for the main indicators for malaria programs.

Module Objectives

By the end of this module, you will be able to:

- Identify the strengths and weaknesses of indicators for malaria programs
- Identify criteria for the selection of sound indicators
- State how indicators are linked to the frameworks (logic models, conceptual frameworks, results frameworks, and logical frameworks)
- Identify sources for predefined malaria-related indicators that are in line with global standards

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What Is an Indicator?

An **indicator** is a variable that measures one aspect of a program, project, or health outcome. It serves to measure the value of change over time in meaningful units, allowing comparison between a baseline value and a future value. Indicators are most commonly expressed in a quantitative form, as either a percentage or number.

Because indicators measure only one aspect of a program, project, or health outcome, an appropriate set of indicators will include at least one indicator for each significant aspect of the program or project. In many cases, there will be two or three indicators for each aspect of the program or project to obtain the necessary information for decision making.

Common Indicator Metrics
Counts *Examples:* number of providers trained, number of insecticide-treated nets distributed
Calculations Percentages, rates, and ratios *Example:* proportion of children under five who slept under a bed net the previous night
Index Composite measures *Example:* wealth index
Threshold Presence or absence, a cutoff point, a predetermined level or standard *Example:* epidemic threshold for early detection

Function of Indicators

Indicators are central to surveillance, monitoring, and evaluation (SME) efforts because they allow you to reduce a large amount of data down to their simplest form. They provide vital information for a program or project, by signaling the need for corrective management action, evaluating the effectiveness of various management actions, and providing evidence as to whether the objectives of the program or project are being achieved.

Clinic logbook for monitoring patient care

Characteristics of a Good Indicator

A good indicator includes the following characteristics:

- **Valid:** A valid indicator is an accurate measure of a behavior, practice, or task. In other words, it measures what it is intended to measure.
- **Reliable:** The indicator can be consistently measured in the same way by different observers.
- **Measurable:** The indicator is quantifiable using available tools and methods.
- **Precise:** A precise indicator is operationally defined in clear, well-specified terms.
- **Timely:** The indicator provides a measurement at time intervals that are relevant and appropriate in terms of program goals and activities.
- **Programmatically important:** The indicator is linked to a public health impact or to achieving the objectives that are needed for impact.

Examples of Indicators

It is important to check that the indicators that you have selected for your program or project meet each of these criteria. Using these characteristics as your guide and considering the objective trying to be met, identify the potential strengths and weaknesses of the indicators listed in this section. Can you think of any other potential limitations of these indicators?

Example 1:

Objective: To reduce malaria-related morbidity in Community Z

Indicator: Prevalence rate of parasitemia in Community Z

Limitations: This indicator is not necessarily a valid measure of malaria-related morbidity in a community. It is possible that you could test positive for malaria parasites but have no symptoms in an area that has stable malaria transmission. It is important to take into account these nuances, because malaria is a complex disease, making monitoring and evaluation of malaria prevention and control programs challenging.

Example 2:

Objective: To increase the knowledge of prevention and treatment of malaria among adults ages 15 and older in Community X

Indicator: Number of people reached by behavior change communication campaigns

Limitations: In this example, measuring the proportion of adults ages 15 and older exposed to malaria prevention and treatment-related messages (target population) would be a more valid and precise measure of this objective. The indicator is not measuring the outlined objective, making it an invalid measure. It is measuring how many people were reached by the campaign, not the knowledge of malaria prevention and treatment in the community. Furthermore, the indicator is not precise. The objective is to increase knowledge among adults ages 15 and above. The indicator only states "number of people" and is not specific to the age group targeted.

Example 3:

Objective: To increase insecticide-treated net (ITN) ownership in Community Y

Indicator: Number of ITNs that were distributed by the health clinic in community Y

Limitations: In this example, measuring the proportion of households with at least one ITN would be a more valid and precise measure of this objective. The indicator is not valid or precise. First, the indicator does not measure what it is intended to measure, which is actual household ownership of ITNs. Second, the indicator is vague and not precise, in that it is determining how many ITNs were distributed by the health clinic only and does not take into account whether there were other programs distributing ITNs that could have also increased ITN ownership in the community.

Example 4:

Objective: At least 80 percent of pregnant women who have an antenatal care visit at clinic Y each month receive intermittent preventive treatment

Indicator: Number of pregnant women who received intermittent preventive treatment at their last antenatal care visit

Limitations: In this example, measuring the proportion of pregnant women who received intermittent preventive treatment at their last antenatal care visit during the last month would be a better way to measure this objective. The indicator does not state how frequently the measurement is to take place, thus the timing of data collection might not allow the indicator to capture whether the program is achieving its objective.

Selecting Indicators for Your Malaria Program

There are a number of factors that are important to consider when you are selecting indicators for your malaria program:

- Is the indicator linked to your program or project framework?
- Does it match your programmatic needs and provide valuable information for decision making?
- Do you have the resources necessary to be able to collect the data? Be sure to consider whether you have the necessary human resources.
- What are the external requirements of the program or project? For example, does the government or donor have other specific reporting requirements?
- Are the data available and accessible?
- Are there standardized indicators that you could use that would facilitate sharing and comparing data across other programs?

Common Pitfalls in Selecting Indicators

- Indicators are not linked to the program activities.
- Indicators selected do not currently exist and cannot be realistically collected.
- Process indicators are used to measure outcomes or impact of a program.
- Indicator is not very sensitive to change.
- Too many indicators selected.
- Indicator does not accurately represent the program's desired outcome.
- Indicator is difficult to interpret or too vague and poorly defined.
- The data needed for the indicator are not available.

Levels of Indicators

Figure 16. Levels of malaria program indicators

There are a number of different levels of indicators. The main levels of indicators for malaria programs are global, national, subnational, district, and health facility levels. Indicators at different levels are used for distinct purposes. Most often, the number and type of indicators at each level varies because stakeholders at each of these levels have different information needs. For example, at the national and global levels, typically the indicators focus on measuring program outputs, outcomes, and impact. Overall, fewer indicators are reported at these levels. At the district and facility levels, more indicators are typically collected to capture the necessary information for program management purposes.

In most cases, indicators at the high levels are linked to those at the lower levels. In many cases, data will be collected at lower levels (district or facility) and then passed up to the national level and then up to the global level.

Global

The global level refers to international agencies, such as the World Health Organization (WHO) or the Global Fund to Fight AIDS, Tuberculosis and Malaria (Global Fund). These agencies typically collect

information on coverage and impact of malaria prevention and control interventions to assess the progress of countries and regions over time as well as to be able to compare progress across countries. They also collect information to be able to assess their investments in malaria programs.

National or Subnational

The national or subnational level refers to agencies or organizations that are responsible for supporting malaria efforts at the national or regional and provincial levels in a country. An example of a national-level agency would be a national malaria control program housed in the Ministry of Health. At this level, an agency might require information regarding assessments of coverage to justify further investments in its program and to assess which areas in the country have the greatest need for specific malaria interventions.

District or Health Facility

At the district and health facility levels, the information requirements are much greater than at the higher levels. At this level, more information is typically collected on inputs into programs (e.g., human resources, drugs and supplies), different program processes (e.g., trainings for staff), and outputs of programs (e.g., number of staff trained in malaria diagnostics). This information is useful for programmatic decision making as well as for informing managers on how they can improve their programs. For example, hospital managers may collect information to assess the quality and costs of their services to decide what needs to be done to improve those services. District managers may need information on provision and use of health services in their district for future planning and budgeting of services.

Operationalizing Indicators

After selecting the indicators for your program, the next step is to establish exactly how each indicator will be measured. In other words, once you have selected your indicators, you must operationalize them. This is done by first defining each indicator in precise terms and establishing the metric that will be used for calculating the indicator. The second step is to define specifically how the indicator will be calculated. For proportions or percentages, this means that you will need to define both the numerator and the denominator. For example, if our indicator was the proportion of the population that slept under an ITN the previous night, the numerator and denominator would be defined as follows:

Numerator: Number of individuals who slept under an ITN the previous night

Denominator: Total number of individuals who spent the previous night in surveyed households

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For more information on ITN indicators see this video. Defining an indicator and how to calculate it as precisely as possible will help ensure that anyone using the same data will arrive at the same indicator value. After you have defined the indicator and how it should be calculated, the next step is to clearly write out detailed instructions for how to collect, analyze, and report on your indicators. Often programs develop an indicator reference sheet for each indicator they are responsible for measuring. Indicator reference sheets provide detailed information on the indicator definition; how the indicator will be

measured; plans for data collection; plans for data analysis, reporting, and review; and potential data quality issues to consider. They also include a performance data table with the baseline and program targets for that specific indicator. An example is available in Module 5.

Linking Indicators to Frameworks

The indicators that you select should be linked directly to the framework that you use for designing your program, project, or intervention. If the indicators are not linked to the framework, then it will not be possible to assess the progress of your program or intervention or whether it met its stated objectives.

Example 1: Logic model

In the example logic model that follows, you would want to select at least one indicator for each of the elements of the framework. In some cases, you may need multiple indicators per element if you are unable to measure the element completely with only one indicator. The number of indicators per program will vary and will be based on what is needed, the resources available, and what is feasible.

This table shows which indicators are linked to the different elements in the logic model.

Table 5. Linkages between a malaria logic model and program indicators

Logic Model →	Indicators
Input	
Human resources	Number of community health workers (CHWs) in program catchment area
Financial resources	Annual program funding
ITNs	Number of ITNs purchased for distribution
Process	
Training for CHWs on ITN delivery	Number of trainings for CHWs
Establish distribution points for selling ITNs	Number of distribution points of ITNs established
Develop educational communication campaigns on proper use of ITNs	Number of educational communication campaigns developed
Output	
Trained CHWs on ITN delivery	Number of CHWs trained on ITN delivery
ITNs sold at distribution sites	Number of ITNs sold at distribution sites
ITNs delivered by CHWs	Number of ITNs delivered by CHWs
Educational communication campaigns implemented	Number of educational communication campaigns implemented
Outcome	
Household ownership of ITNs	Proportion of households with at least one ITN
Household use of ITNs	Proportion of children under five who slept under an ITN the previous night
Impact	
Malaria mortality	Reported annual number of malaria cases
Malaria morbidity	Reported annual number of malaria deaths

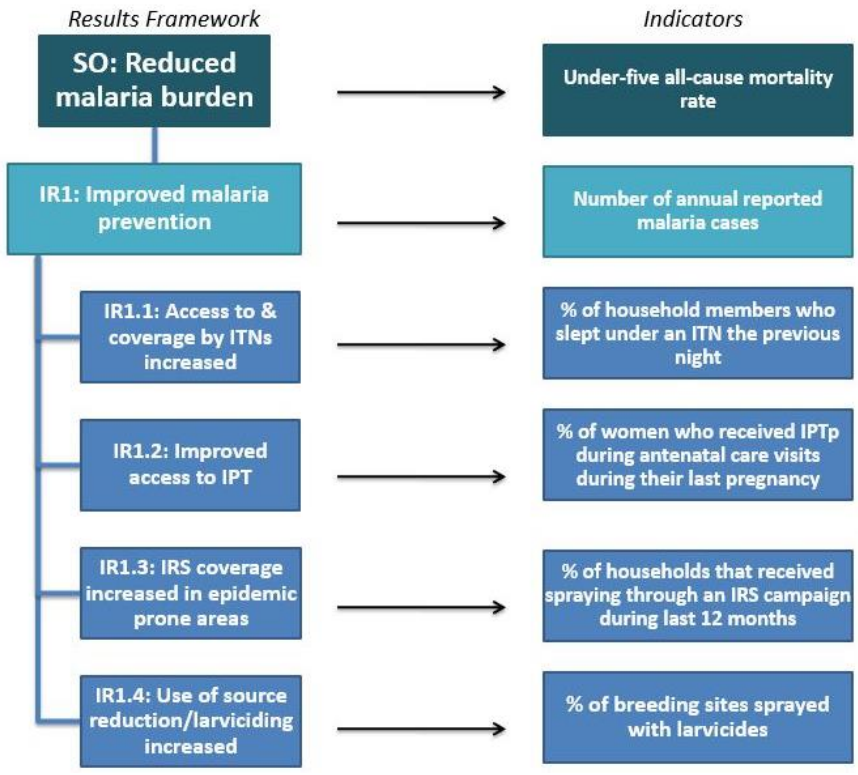
Table 6. Another way to show linkages between a logic model and indicators

Elements of the Logic Model	Indicators
Input	1. Number of CHWs in program catchment area 2. Annual program funding 3. Number of ITNs purchased for distribution
Process	1. Number of trainings for CHWs 2. Number of distribution points of ITNs established 3. Number of educational communication campaigns developed
Output	1. Number of CHWs trained on ITN delivery 2. Number of ITNs sold at distribution sites 3. Number of ITNs delivered by CHWs 4. Number of educational campaigns implemented
Outcome	1. Proportion of households with at least one ITN 2. Proportion of children under five who slept under an ITN the previous night
Impact	1. Reported annual number of malaria cases 2. Reported annual number of malaria deaths

Example 2: Results framework

Here is another example of how indicators are linked with a results framework. In this example, you can see that an indicator is developed for the intermediate result (IR) as well as for each of the intermediate results that are linked to reach the final result.

Figure 17. Linking a results framework with indicators



Tips to Link Indicators to Frameworks

As a general rule of thumb for selecting indicators for your program:

- Select at least one to two indicators per key activity or result area within your framework. Ideally, the data for your selected indicators will come from different data sources and not from just one source.
- Select at least one indicator for every core activity of your program.
- There should be no more than 8–10 indicators per area of significant program focus.
- When possible, use a mix of data collection strategies and sources to strengthen data quality.

Selecting too many indicators to monitor your program can be a huge burden and will likely result in the data not being used.

It is important to remember not to select too many indicators for your program, but be sure to select enough to be able to monitor and evaluate the key activities and results areas as defined in your program's framework. If you have too many indicators, collecting data to monitor them can be a burden on time and program resources. If you select indicators that follow your program's framework, then they will provide the necessary information for program improvement and programmatic decision making.

Sources for Malaria-Related Indicators

Indicators do not need to be newly developed for every new program or project. If possible, it is helpful to use indicators that have already been predefined. A few good sources to keep in mind when you are in the process of selecting indicators are as follows:

- Indicators that were used during previous years of the program. Using the same indicators over time allows data to be compared over many years.
- Indicators from related or similar programs. This allows for comparison between programs that provide similar services or conduct similar activities.
- Global or other recommended indicators from the Roll Back Malaria Monitoring and Evaluation Reference Group, WHO, Global Fund, the U.S. President's Malaria Initiative (PMI), and other key partners. The following links provide resources on these indicators:
  - Household Survey Indicators for Malaria Control
  - Global Fund Indicator Guide
  - Malaria Behavior Change Communication Indicator Reference Guide

Indicator Strengths and Limitations

Although some indicators are more useful and appropriate than others, it is important to remember that all indicators have limitations. Even the indicators that we commonly use in malaria programs have their own limitations. Being aware of and understanding those limitations is essential.

For example, the commonly used indicator for measuring coverage of indoor residual spraying is subject to recall bias that can end up resulting in what is referred to as "heaping" of dates. This occurs when subjects are not able to recall exactly the correct date when something happened in the past and they round up to a more common date. For example, instead of stating that their house was sprayed 11 months ago, they round up and say one year ago.

Another example is for the indicator used to measure ITN/LLIN use among children under five and pregnant women. This indicator is subject to two main types of bias. Because the indicator is based on self-reported data, it can be subject to social desirability bias, which can happen, for example, when the subject being interviewed reports what he or she feels the interviewer would like to hear, rather than reporting accurately. The second is the bias that occurs due to the timing of survey implementation relative to the malaria transmission season. Malaria transmission is higher during the rainy season than during the dry season, and therefore this may affect ITN/long-lasting insecticide-treated net usage levels. Thus, the season during which the survey is implemented must be taken into account when analyzing your data.

It is important to note that the following two issues can affect the results obtained from household surveys.

Malaria Endemicity

The first issue that may affect the interpretation of indicator values involves the definition of the target population. As stated previously, the Roll Back Malaria targets stipulate that coverage indicators are intended to be measured among the target population defined as those at risk for malaria. For countries in which malaria is endemic or are epidemic-prone throughout, this issue should not be of particular concern as long as stratification by urban and rural residence is undertaken, which is typically the case with the Demographic and Health Surveys (DHS), Multiple Indicator Cluster Surveys (MICS), and Malaria Indicator Surveys (MIS). In countries with large populations in areas absent of malaria, such as those with mountainous areas or deserts, national-level estimates, such as those obtained from the DHS and MICS surveys, will likely result in an underestimate of coverage for those at risk for malaria. In such a situation, it may be advisable to collect additional information that can establish whether an enumeration area is within or outside a malaria risk area; then during data analysis, the analysis can be limited to survey domains that are deemed to be malarious.

Seasonality

A second consideration that affects the interpretation of the survey findings is the timing of survey implementation relative to the high malaria transmission season (rainy and early post-rainy seasons). MIS surveys are typically conducted during and immediately after the rainy season and should conclude no later than four to six weeks after the rains end, because this timeframe is associated with peak transmission. For operational reasons, however, both DHS and MICS surveys may be conducted during the dry season and therefore outside the peak malaria transmission period. Intervention coverage or usage levels may differ significantly between seasons, and malaria morbidity and mortality will differ by season, so interpretation of the data obtained must take into account the seasonality of the survey period. It is also important to note that parasite prevalence data from surveys conducted outside peak transmission periods are not a reliable indicator of peak transmission; therefore, biomarker measurement is recommended during the malaria transmission season only. Further analysis of these data is needed to better understand the extent of the relationship between survey timing and intervention coverage.

Module 6 Assessment

Questions

Correct answers are provided on the next page.

1. If an indicator measures exactly what it was intended to measure, which of the following characteristics would it represent?

    a. Reliable—You did not select the correct response. An indicator that is reliable means that the indicator can be consistently measured in the same way by different observers. If an indicator measures exactly what it is intended measure, then it would be **valid.**
    b. Precise—You did not select the correct response. An indicator that is precise means that the indicator is operationally defined in clear and well-specified terms. If an indicator measures exactly what it is intended measure, then it would be **valid.**
    c. Programmatically important—You did not select the correct response. An indicator that is programmatically important refers to an indicator being linked to a public health impact or to achieving the objectives that are needed for impact. If an indicator measures exactly what it is intended measure, then it would be **valid.**
    d. If an indicator measures exactly what it is intended to measure, then it is **valid**.

2. *True or False:* It is important to have at least one indicator for each significant aspect, component, or activity of your program.

    a. True
    b. False

3. Which of the following actions is not involved in operationalizing indicators?

    a. Establishing how a given concept or behavior will be measured
    b. Developing a precise definition and metric for the indicator
    c. Defining how the value will be reliably calculated
    d. Training SME staff to collect the indicators

4. *True or False:* It is not necessary to link your indicators to the framework that you designed for your program or project.

    a. True
    b. False

Correct Answers

Correct answers are noted in bold.

1. If an indicator measures exactly what it was intended to measure, which of the following characteristics would it represent?

   d. If an indicator measures exactly what it is intended to measure, then it is valid.

2. *True or False:* It is important to have at least one indicator for each significant aspect, component, or activity of your program.

   a. True

   An appropriate set of indicators for a program will include at least one indicator for each significant aspect of the program. In many cases, there will be two to three indicators for each aspect of the program to obtain the necessary information for decision making.

3. Which of the following actions is not involved in operationalizing indicators?

   d. Training SME staff to collect the indicators

   Operationalizing indicators refers to establishing exactly how a given concept or behavior will be measured, then developing a precise definition and metric for the indicator and defining how the value will be reliably calculated.

4. *True or False:* It is not necessary to link your indicators to the framework that you designed for your program or project.

   b. False

   The indicators that are chosen to monitor and evaluate your program should be directly linked to your program's framework. Because your framework lays out the program's logic and how and what will be achieved, it is essential that the indicators you choose link directly to your program's framework.