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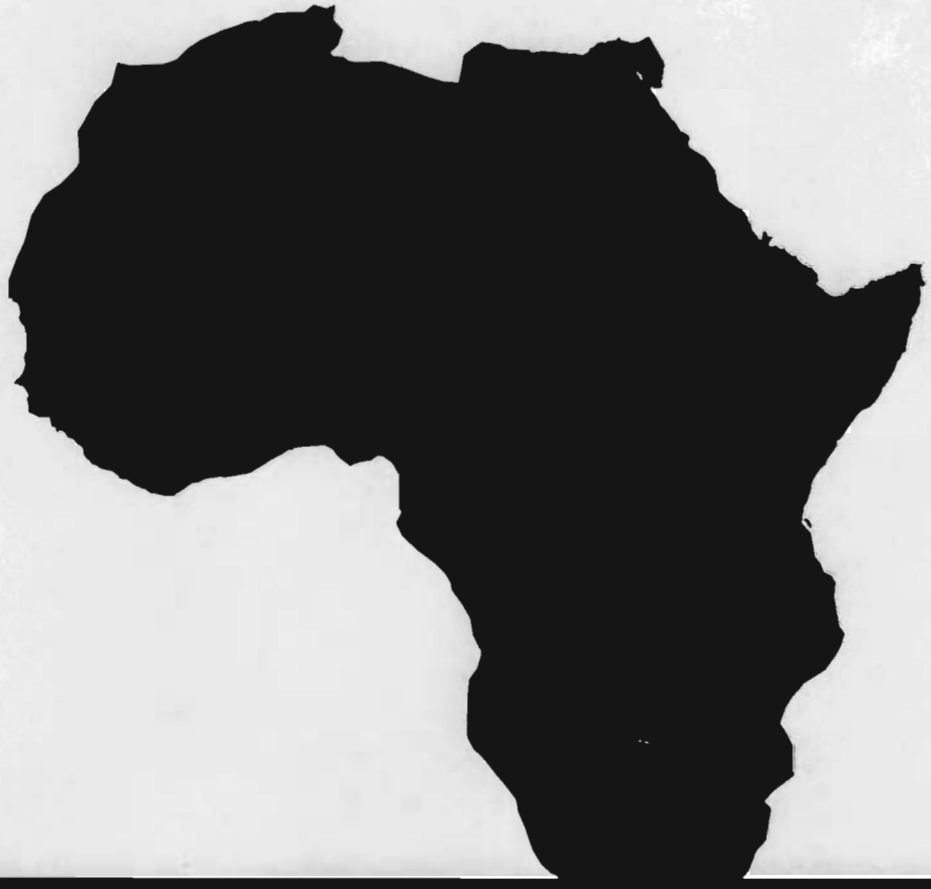
(ACSI-CCCD)

WORKING PAPER:

EVALUATION OF NATIONAL MALARIA CONTROL PROGRAMS IN AFRICA



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U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
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AND PREVENTION

Working Paper:

Evaluation of National Malaria Control Programs in Africa[a]

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ABSTRACT

Evaluation is an essential management tool for the improvement of public health programs or projects. As malaria morbidity and mortality continue to increase in most countries in Africa, international agencies and malaria control program managers have identified the strengthening of program evaluation as an important strategy for improving the efficiency and effectiveness of malaria control programs.

Program evaluation in public health can be defined as **the systematic collection and use of data to improve health programs and guide the allocation of program resources**. Program evaluation's primary purpose is to contribute to the achievement of program objectives. This is accomplished when evaluation activities result in timely information that can be used by managers to make decisions about program design, program operations, and resource allocations.

Managers can develop a program evaluation strategy only after they have defined program objectives and planned specific program activities. Indicators should be directly related to program objectives, and should be selected on the basis of their 1) validity, 2) reliability, 3) ability to detect change within a reasonable time period and as a result of successful program implementation, 4) ability to be interpreted, and 5) usefulness in guiding program change. Only those indicators that can be measured, given available program resources, should be selected. Managers will also need to identify the sources of indicator data and to determine how often each indicator will be measured.

Program managers should develop criteria or indicators for 1) program policies and plans, 2) the process of program implementation, 3) the outcomes of malaria control interventions in disease management and prevention, and 4) program impact in terms of reductions in malaria-related mortality and morbidity. Key issues related to the management of evaluation activities within a national program include the need to begin with available resources and build incrementally; to explore options for administering evaluation activities; to select, train and supervise staff who carry out evaluation activities; to develop quality control strategies; and to ensure that data are managed and communicated in ways that support effective program decision making.

To lead to improvements in malaria control programs, evaluation must be clearly defined as a part of the program management process. Program managers should lead this developmental process, ensuring that evaluation methods produce the information they need to monitor and improve their programs at reasonable cost.

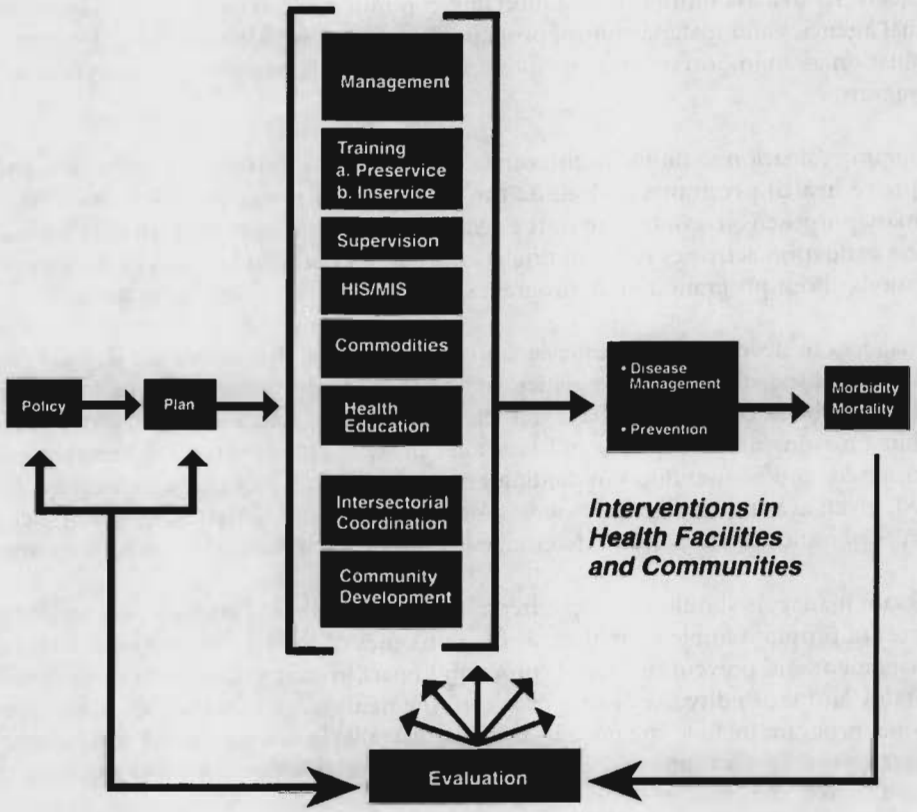
INTRODUCTION AND BACKGROUND

Inadequate implementation of control programs has limited efforts to address an already serious malaria problem in Africa.[1] In response to this problem, a 1992 ministerial Conference on Malaria and issued a global strategy for malaria control.[2] Both this report and the experiences of African malaria control program managers highlight the strengthening of program evaluation as a priority step in improving control programs and reducing malaria-related morbidity and mortality.

Program evaluation in public health can be defined as **the systematic collection and use of data to improve health programs and guide the allocation of program resources**.[3,4] Program managers must evaluate their programs to determine whether they are achieving their objectives and to make decisions about program design, program operations, and resource allocations.[5] Figure 1 shows the components of malaria control programs. A strong malaria policy and program plan, supported by an effective public health infrastructure, provides the basis for the implementation of appropriate disease management and prevention interventions. These interventions then result in measurable program impact on malaria-related mortality and morbidity.[6] Evaluation activities are designed to track

progress in achieving this impact, providing managers with timely information on program operations and outcomes.

FIGURE 1: COMPONENTS OF MALARIA CONTROL PROGRAMS



Responsibility for program evaluation rests with national malaria control program managers,[4] and every effort should be made to strengthen their capacity in this area. Program reviews conducted by external evaluators are often geared toward the requirements of international organizations. Although frequently tied to the provision of resources, these external evaluations may not build managers' skills or promote the frequent and continual evaluation needed for effective management of control programs. Regional and international agencies and organizations need to establish evaluation systems for malaria control as programs begin to flourish within countries. This need can be met by abstracting information from that collected for use at the country level.

The purpose of this paper is to present and discuss issues related to the evaluation of malaria control programs in Africa. We discuss the importance of program planning and the development of program objectives as bases for sound evaluation; we present guidelines and sample indicators for the evaluation of malaria control policies, plans, and programs; we discuss the challenges of measuring the epidemiologic impact of program interventions; and we review key issues in the management of evaluation activities.

EVALUATION AS PART OF PROGRAM PLANNING

Evaluation is a critical element of malaria control programming. Three planning activities essential to sound evaluation practice are 1) defining program objectives, 2) selecting appropriate evaluation criteria and indicators, and 3) identifying appropriate data sources and determining how often indicators will be measured. Each of these activities is discussed below.

Defining Program Objectives. A prerequisite for evaluation is the development of a program plan with measurable process, outcome, and impact objectives that are logically related to one another and to goals and interventions defined in the national malaria control policy. **Impact** objectives target changes in mortality and morbidity expected to result from program activities and should correspond to the priority goal of the program (e.g., mortality reduction) as stated in the national policy. **Outcome** objectives target changes in knowledge, attitudes, behaviors, or availability of needed services or commodities that result from program activities and should be directly related to the priority intervention (e.g., disease management or prevention), The priority target population (e.g., children less than 5 years of age), or those charged with the care of the target population (health care workers, mothers, family members, etc.). **Process** objectives specify the actions needed for program implementation and should correspond to the various activities (training, supervision, commodity supply, surveillance, health education, operational research, etc.) necessary to achieve the intended outcomes and impact.

The selection of program objectives is influenced by

- their direct relationship to national policy;
- their feasibility and practicality given available resources, including the likelihood that they can be achieved within the stated time period; and
- their amenability to measurement and observation,[a] including the availability of baseline information against which to assess progress.

Selecting Criteria and Indicators. Once measurable objectives have been defined, managers can make plans for evaluation on the basis of specific criteria and indicators. Criteria are technical standards that can be used as the basis for making judgments about the quality of a policy, plan, or program component. For example, criteria for a program plan might be whether it includes measurable objectives or whether planned activities are likely to lead to the achievement of stated objectives.

Indicators are quantified measurements that can be repeated over time to track progress toward the achievement of objectives. Selection of indicators should be based on their 1) validity, defined as the extent to which the indicator is a true and accurate measure of the phenomenon under study;[7,8] 2) reliability, defined as the extent to which indicator measurements are consistent and dependable across applications or over time;[7,8] 3) ability to detect change within a reasonable time period and as a result of successful program implementation; 4) ability to produce data that can be easily interpreted; and 5) usefulness in guiding program change. In addition, only those indicators that can be measured with available program resources should be selected.

Identifying Data Sources and Determining How Often Indicators will be Measured. Once program objectives have been defined and criteria and indicators selected, managers must identify the best sources of data and determine how often indicators and criteria will be measured. Reports and records collected as a routine part of service delivery, such as health information systems, reports by supervisors, or stock inventories, can be important sources of evaluation data if they are of sufficient accuracy. Where such data do not exist or are not yet accurate, special surveys or audits may be necessary. Managers should also investigate whether data collected for other purposes or programs may be available and appropriate for use in evaluating malaria control program activities. For example, large-scale surveys conducted for other child survival or family planning programs may provide an opportunity to obtain community-based indicator data.

[a] While desirable, amenability to measurement does not justify indicator selection in the absence of the previous two criteria.

Managers must also determine how often indicators will be measured. Considerations include 1) the resources needed to collect data for that specific indicator (e.g., data from supervisory reports can be collected more frequently than data from a survey of the population), 2) when indicator data will be needed to guide program decision making (e.g., data should be collected, analyzed, and prepared for dissemination before rather than after a program review exercise), and 3) when meaningful changes in indicator levels can be expected given program activities (e.g., there is no need to measure the availability of first-line antimalarial drugs in facilities if none have been available for distribution for the past 6 months).

EVALUATION CRITERIA AND INDICATORS

In program evaluation, there must be a direct relationship between planned program activities (as reflected in process objectives and indicators or criteria) and anticipated results (as reflected in outcome objectives and indicators). Important criteria for evaluating program quality include the extent to which program activities are logical, cohesive, and sufficient to achieve anticipated outcomes and impact.

Program Policies and Plans. The evaluation of program policies and plans may be judged on the basis of a set of predetermined criteria.[4] Criteria that may be useful as a starting point are presented in Table 1.

Table 1: Criteria for Malaria Control Program Policies and Plans

POLICY

- Is there a written malaria control policy?
- Does the malaria control policy reflect the national epidemiologic situation?
- Is the policy realistic given current resources for malaria control?
- Does the policy include specific guidelines for disease management and prevention of malaria in the facility and at home?

PROGRAM PLAN

- Does the program plan include measurable objectives for program processes, outcomes, and impact related to malaria control?
- Do objectives reflect national malaria control policy and resource levels?
- Are indicators included in the plan?
- Does the plan include a description of major program activities (e.g., training, supervision) to be implemented, including a timetable?
- If implemented as planned, are activities likely to lead to the achievement of stated program objectives?
- Is there a program budget? Is it both specific and realistic given planned program activities?

Program Implementation. Program managers are ultimately concerned with the achievement of outcome and impact objectives. Of more immediate concern, however, is tracking the shorter-term process of program implementation, or *monitoring*. The achievement of process objectives, which focus on the routine and continuous operational and management concerns of program managers, is a precursor of medium- and long-term results. Improving program monitoring is an urgent need in Africa and should be the first step in building the evaluation capacity of ministries of health.

For process objectives, managers should select criteria or indicators that will provide evidence that the program is being implemented as planned. Criteria often include evidence that activities have been completed, such as the publication of a training curriculum, the installation of a computer in the statistics unit, or the redesign of a supervisory system. Process indicators that can be monitored to track progress toward successful implementation might address the number of personnel trained, the percentage of needed posters that are printed and distributed, or the number of chloroquine tablets received at the central warehouse. Specific examples of process indicators are presented in Table 2.

Table 2: Indicators for Malaria Control Program Implementation

Training:	Proportion of health facilities with at least one currently practicing health worker who was trained (or retrained) in malaria disease management in the previous 3 years.
	Proportion of health workers trained in the past 3 years who report that training included supervised practice of malaria disease management.
Supervision:	Proportion of personnel who report one or more visits by their supervisor in the previous 3 months.
	Proportion of personnel supervised in the previous 3 months who report that the visit included observation of interactions with patients with fever.
Health Information System:	Proportion of reports (facility to district, district to national) received within the required time period.
	Proportion of district-level managers who report that they receive feedback on their health information system reports within 3 months of report submission.
Drugs:	Proportion of antimalarial drugs ordered by peripheral facilities that were shipped out from the central storehouse.
Health Education:	Proportion of caregivers having visited a health facility in the last 3 months who report that the health worker explained how to administer the antimalarial drug at home.

Program Outcomes. Examples of possible outcome indicators are presented here for both disease management and malaria prevention; specific indicators will vary based on the objectives of individual country programs.

Disease Management. Disease management is a priority intervention in most countries in sub-Saharan Africa because it represents the most direct and feasible approach to reducing malaria morbidity and mortality. Correct disease management is a complex process.[9,10] Health providers must make a correct diagnosis, provide treatment in accordance with national guidelines, educate patients about compliance with treatment regimens, and refer a patient when necessary. To achieve desired performance levels, facilities must have well-defined and understood procedures (diagnostic, treatment, and referral), adequate supplies and equipment, access to a laboratory for microscopic confirmation of malaria if needed, and standard guidelines and drugs for disease management. In addition, health workers must manage their clinics efficiently and carry out needed administrative duties.

Similarly, appropriate disease management in the home requires that patients or caretakers correctly recognize dangerous symptoms, take recommended action in initiating home treatment or seeking health services, and comply with the treatment regimen prescribed. Appropriate home management of disease, therefore, requires access to antimalarial drugs.

Sample indicators for case management are presented in Table 3.

Table 3: Outcome Indicators for the Case Management of Malaria

Provider Performance:

Diagnosis: Proportion of patients seen by the provider, and who meet national diagnostic criteria for malaria, who are diagnosed correctly.

Treatment: Proportion of patients diagnosed with malaria by the provider who are prescribed treatment in accordance with national policy.

Patient education: Proportion of patients diagnosed with malaria by the provider who are given an explanation of the treatment regimen.

Referral: Proportion of patients seen by the provider, and who meet national criteria for referral, who are given an appropriate referral.

Patient/Caretaker Performance:

Recognition: Proportion of caretakers who state that fever in a child requires prompt treatment.

Action: Proportion of children with fever seen in health facilities whose caretakers report that the child was treated at home or taken to a health facility within 24 hours of fever onset.

Compliance: Proportion of caretakers of children seen for fever in a health facility in the past 2 weeks who report that the child completed the nationally-recommended course of treatment.

Facility Resources:

Treatment guidelines: Proportion of facilities in which providers can produce a written copy of the national guidelines for disease management of malaria.

Supplies/ equipment: Proportion of health facilities having needed supplies and equipment (e.g., at least one thermometer in working order).

Referral: Proportion of facilities in which providers can identify the closest referral facility.

Access to laboratory: Proportion of facilities where microscopic confirmation of malaria is possible within 2 hours of request.

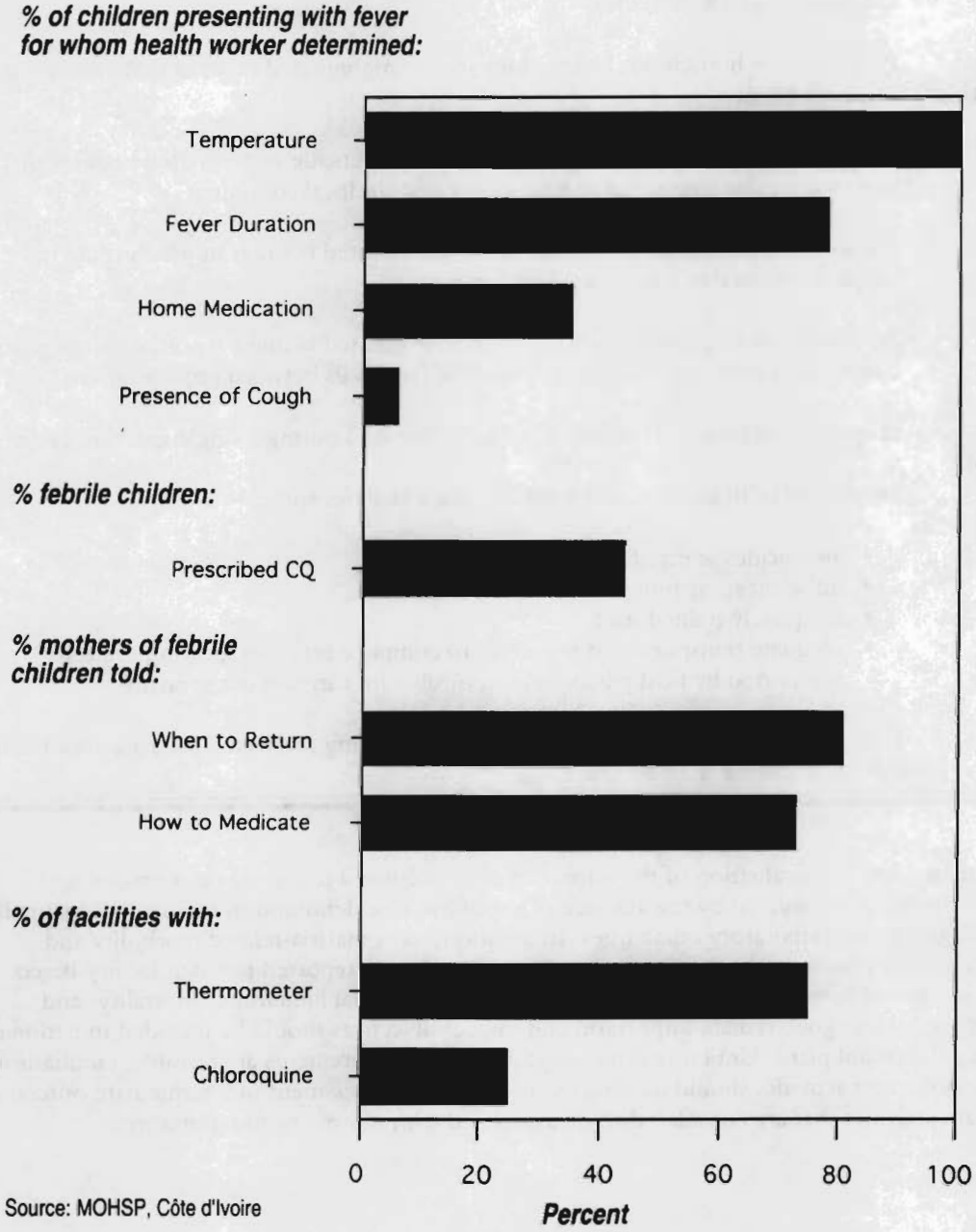
Drugs: Proportion of facilities reporting that stocks of antimalarial drugs present in the clinic during the past 3 months were sufficient to treat all patients appropriately during that time period.

Home/Community Resources:

Drugs: Proportion of patients who were prescribed antimalarial drugs who report that they know where to obtain a full treatment dose at a cost they consider affordable.

In Figure 2, results collected through a 1991 facility-based assessment of malaria disease management in Côte d'Ivoire illustrate how the use of outcome indicators can alert managers to specific operational problems. Here, for example, shortages of chloroquine in health facilities limited health workers' ability to provide on-site treatment with antimalarial drugs; this evaluation allowed Ivoirian authorities to take action and rectify the situation.[11]

FIGURE 2: CASE MANAGEMENT OF CHILDREN WITH FEVER (N = 47) SEEN DURING 1 DAY OF SERVICE IN A RANDOM SAMPLE OF 39 PUBLIC HEALTH FACILITIES IN CÔTE D'IVOIRE, 1991.



Source: MOHSP, Côte d'Ivoire

Prevention. The three major strategies for the prevention of malaria include chemoprophylaxis, personal protection measures, and vector control. Sample outcome indicators for prevention objectives are presented in Table 4.

Table 4: Outcome Indicators for Malaria Prevention

Chemoprophylaxis:	Proportion of targeted women who report at delivery that they have completed a full course of chemoprophylaxis in accordance with the national policy.
	Proportion of antenatal clinics with recommended antimalarial drugs for chemoprophylaxis in stock.
Personal Protection:	Proportion of households targeted for use of impregnated bednets that report ready access to bednets.
	Proportion of households targeted for use of insecticide-impregnated bednets that have at least one impregnated bednet per bed (or local equivalent).
	Proportion of targeted households with impregnated bednets in which there is physical evidence of routine bednet use.
	Proportion of targeted households with impregnated bednets reporting impregnation during the past 6 months (or the prescribed intervals between impregnations).
Vector Control:	Proportion of targeted households that are sprayed during a single spraying cycle.
	Proportion of health/environmental control facilities with: • insecticides selected in the national policy. • sufficient spray pumps in working order. • adequately trained staff. • adequate transportation resources to complete previous spraying cycle, as reported by field personnel responsible for carrying out spraying.
	Proportion of targeted households that report having received a message about source reduction during the past year.

Program Impact. The evaluation of the impact of malaria control programs on mortality and morbidity in Africa is hindered by the absence of a uniform case definition of malaria and by inadequate diagnostic and laboratory capabilities. In addition, most malaria-related morbidity and mortality in Africa occur in the community and are not seen and reported through facility-based sentinel or routine surveillance systems.[12] Despite these operational limitations, mortality- and morbidity-reduction goals remain important, and impact objectives should be included in national program policies and plans. Until more meaningful impact measurements are possible, emphasis in program evaluation activities should be directed to the careful assessment of intermediate outcomes of program activities that are considered to be associated with morbidity and mortality.

Sample indicators of program impact are presented in Table 5, with a particular focus on those indicators that can be collected through routine sources. Program managers will often be more successful in interpreting impact data when multiple indicators are reviewed together. Frequently, available data on outpatient visits or hospital admissions or deaths attributed to malaria are difficult to interpret individually but can be useful when interpreted together. For example, an increasing trend in malaria hospital admissions is more reliable if corroborated by a parallel increase in malaria outpatient visits.[13] A useful strategy for identifying and interpreting fluctuations in such indicator denominators is the use of "tracer diseases," unrelated to malaria, as indicators of the sensitivity of the disease reporting system. If reported levels of the tracer disease remain flat while reported malaria incidence rises, for example, this can suggest that increases in reported malaria reflect a true increase in disease instead of more complete reporting or changes in health services utilization. Chickenpox has been a useful tracer disease in Burundi and Rwanda.[14]

Table 5: Indicators of Malaria Control Program Impact

Morbidity:

Patients with diagnosed malaria in public-sector facilities during one year.*
Proportion of children with diagnosed malaria among patients seen at public-sector clinics.†‡
Proportion of population reporting a febrile episode in the previous 2 weeks.
Patients with microscopically-confirmed severe malaria seen in referral facilities during 1 year.§
Proportion of children with severe anemia among pediatric admissions in health facilities.†
Proportion of babies delivered in health facilities who have low birth weight (<2500 gms).

Mortality:

Deaths following a malaria-like illness‖ occurring in facilities during a 1 year period.
Deaths following a malaria-like illness, confirmed microscopically, occurring in referral facilities during 1 year.
Proportion of all deaths in health facilities that follow a malaria-like illness.†
Proportion of patients hospitalized with a malaria-like illness who die in the hospital.¶
Number of children dying with severe anemia in health facilities during a 1 year period.

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* This and several other indicators in this section are not expressed as proportions, as is desirable. The most useful denominator would be "the population served by the health facilities," but in most malaria-endemic countries population estimates are unavailable or outdated, utilization rates for health facilities may vary over time, and the resulting proportion would be imprecise.

† This indicator can be difficult to interpret because changes may be due mainly to a change in the denominator. These changes may be unrelated to malaria.

‡ More complete reporting is often available from public-sector than from private-sector facilities. This may vary by country, and program managers using this indicator will need to define the types of facilities to sample for indicator measurement.

§ In this example, measurement of the indicator is limited to referral health facilities because they are most likely to have microscopes available and receive a major share of severe malaria cases.

‖ Malaria-like can be defined regionally or at country level but might include fever alone, seizure, coma, or anemia without other apparent cause.

¶ This indicator may reflect community beliefs and attitudes related to health system utilization, health worker performance, or quality of hospital procedures, as well as disease severity or outcome.

MANAGEMENT OF PROGRAM EVALUATION ACTIVITIES

Just as with other components of malaria control programs (e.g., training, supervision, commodities distribution), evaluation must be planned and implemented through the use of sound management principles. Because evaluation may be a relatively new or unfamiliar element in many public health programs, there may be only limited experience among malaria control program staff in administering evaluation-related activities. We highlight key challenges in the management of evaluation. Over time, the experiences of national programs should be documented and shared as the basis for identifying the most effective approaches.

Developing Feasible Evaluation Strategies: Where to Start? Most national malaria control programs do not presently have the personnel or financial resources to design and implement comprehensive evaluations of their programs. A practical approach to this dilemma is to proceed incrementally, beginning with what is possible now and gradually increasing evaluation activities as the program develops. Programs should strive to evaluate a few components well, rather than many poorly or not at all.

Malaria program managers in Africa may want to focus their short-term evaluation efforts on the process and outcomes of malaria disease management in public-sector health facilities, the priority intervention in most countries in Africa. From an evaluation perspective, a focus on the quality of case management in facilities is advantageous because relatively inexpensive and straightforward methods for observation-based assessments of the quality of disease management exist and have been used successfully to evaluate Primary Health Care services, including malaria, by ministries of health in Africa.[15-17]

A limited set of indicators useful to managers at each level of the health system should be identified in an overall plan for evaluation. The plan should specify the data sources and how often indicators will be measured. Priority indicators will vary from country to country, on the basis of their program plans and specific objectives. One illustration of a country-specific plan is presented in Table 6. This plan focuses on cases management and on the use of routine sources of indicator data whenever possible. In some countries, supervisory systems may not provide adequate data on health worker performance; in others, indicators of referral may be more important than those reflecting diagnostic performance. Managers should systematically select the indicators appropriate for their program as a part of the planning process.

Developing an Administrative Structure for Evaluation. There is no single, "correct" administrative structure for program evaluation at the national level. Managers should build on existing organizational resources and the experiences of other countries and disease programs to design a functional system. In Nigeria, with 30 states and 589 semi-autonomous districts, the Federal Ministry of Health has developed a national monitoring and evaluation unit for primary health care. This unit is charged with designing an evaluation plan, testing it in selected geographic areas, and undertaking the development of forms and the training of personnel.[18] This level of investment, decentralization, and integration across programs may not be possible or desirable in other countries. In the Central African Republic, involvement of district-level personnel in the definition of standards for disease management has led to the incorporation of outcome indicators into standard national supervisory checklists. The system is now being strengthened to support use of evaluation data for local-level monitoring before they are forwarded to the district and national levels for use in program evaluation and replanning.

Table 6: Sample Country-Level Evaluation Plan for a Malaria Control Program*

PRIORITY INDICATOR	DATA SOURCE	FREQUENCY
PROCESS:		
Proportion of health facilities with at least one currently-practicing health worker who was trained (or retrained) in malaria disease management in the previous 3 years.	Training Records	Annual
Proportion of personnel who report one or more visits by their supervisor in the previous 3 months.	Facility-Based Assessment	Annual
Proportion of Health Information System (HIS) reports (facility to district, district to national) received within the required time.	Records of Health Information System	Annual
Proportion of health facilities with at least one copy of national malaria policy.	Supervisors' Reports/ Facility-Based Assessment	Annual
OUTCOME:		
Proportion of patients seen by the provider and who meet national diagnostic criteria for malaria whose malaria is diagnosed correctly.	Supervisors' Reports/ Facility-Based Assessment	Annual
Proportion of patients with malaria diagnosed by the provider who are prescribed treatment in accordance with national policy.	Supervisors' Reports/ Facility-Based Assessment	Annual
Proportion of facility directors who report that stocks of antimalarial drugs present in the clinic during the past 3 months were sufficient to treat all patients appropriately.	Supervisors' Reports/ Facility-Based Assessment	Quarterly/ Annual
Proportion of patients with malaria diagnosed by the provider who are given an explanation of the treatment regimen.	Supervisors' Reports/ Facility-Based Assessment	Annual
Proportion of children with fever seen in health facilities whose caretakers report that the child was treated at home or taken to a health facility within 24 hours of fever onset.	Intake Interviews	Annual
IMPACT:		
Patients with diagnosed malaria in public-sector facilities during 1 year.	Health Information System	Annual
Proportion of children with diagnosed malaria among patients seen at public-sector facilities.	Health Information System	Annual
Deaths following a malaria-like illness occurring in facilities during a 1 year period.	Health Information System	Annual

*This plan, and the indicators selected, are for purposes of illustration only. Priority indicators must be selected by program managers on the basis of program objectives, resources available for measurement, and level of program development.

Staff Selection, Training, and Supervision. Program managers will need to select, train, and supervise the staff who will carry out evaluation activities. Staff can be additional personnel dedicated to evaluation or existing personnel whose responsibilities are modified to include evaluation duties. Too often, however, evaluation tasks are added to the responsibilities of already overburdened staff, with little additional training or support.

Concrete actions should be included in the program plan to ensure that evaluation activities are implemented, such as:

- developing or modifying job descriptions to include the evaluation tasks of data collection, management, analysis, use, and feedback.
- training staff to carry out evaluation tasks needed at different levels of the health system.
- developing and implementing a strategy to ensure supervision of evaluation responsibilities including on-the-job observation and feedback.

Data Quality Control Strategies. Program managers must ensure the quality of evaluation results. This can be accomplished by periodic reviews, auditing of records during supervisory visits, or special quality control activities (e.g., re-interviews with random subsamples of survey respondents). Developing quality assurance mechanisms will be a critical challenge in most countries because of shortages of staff trained in research methods and analytic skills.

Data Management and Communication. Evaluation data obtained from different sources must be systematically transformed into accessible and useful information and presented to managers at different program levels. This transformation requires skills in the management of quantitative data, data quality assessment, communication, and planning. Because most programs will draw their evaluation data from a variety of sources, those who collect and analyze the original data may not be able to conduct all the analyses needed for evaluation purposes. To facilitate this integrative process, it may be assigned to a specific individual or organizational unit. To perform effectively, this unit needs managerial authority to request timely submission of data and to work with personnel in other programs in order to coordinate data access and use. The unit should also be an active participant in program review and replanning activities, to ensure that information is correctly interpreted and that additional data needs are incorporated into the evaluation plan.

Evaluation Results in Program Decision Making. Even the best evaluation data are worthless unless the resulting information is used in making program decisions. Sometimes evaluation data are not used because they are made available to decision makers too late or in a form that does not directly address the decision. Even when timely and appropriate data are available, other factors (e.g., political considerations, individual skills and experiences, and administrative and organizational arrangements) may limit their use in decision making. One purpose of evaluation is to improve the decision-making process by assuring that available data are used. This assurance can be obtained in a variety of ways, including participation by the evaluation staff in program review and planning activities, preparation of specific data summaries for review by program planners, and regularly scheduled meetings between managers and evaluation personnel to share information and discuss needs. National malaria control programs should develop both mechanisms and timetables for the review and revision of their evaluation plans.

CONCLUSIONS

Program evaluation is essential to improving the quality and effectiveness of malaria control programs in Africa. The first step in the development of appropriate evaluation activities is to incorporate an evaluation strategy into the program planning process. This strategy should include a limited set of criteria and indicators with which to evaluate the process and outcomes of one or more priority program objectives. For example, the adoption of criteria for the evaluation of malaria control policies and plans and the selection and use of a limited number of indicators of the process and outcomes of malaria disease management in public-sector facilities are within the reach of most African countries.

To lead to improvements in malaria control programs, evaluation must be clearly defined as a part of the program management process. Program managers can increase the yield from their program evaluation activities by working collaboratively with other countries and with regional and international agencies to define appropriate guidelines, indicators, and methods. A coordinated approach will conserve resources and allow comparisons among various approaches. Program managers should lead this developmental process and ensure that evaluation activities produce the information managers need to monitor and improve their programs at reasonable cost.

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