malaria consortium
disease control, better health

TECHNICAL BRIEF

Monitoring and evaluating seasonal malaria chemoprevention using a logical framework approach

Background

The World Health Organization (WHO) recommends using seasonal malaria chemoprevention (SMC) as a preventive intervention for the control of malaria in children under five.[1] The intervention involves monthly administration of the antimalarial drugs sulfadoxine-pyrimethamine and amodiaquine (SPAQ) to children 3–59 months to maintain therapeutic drug concentrations in the blood during the highest malaria risk period.[1]

One dose of SP and three doses of AQ are administered over a three-day period, which is referred to as a course. Trained community distributors deliver SMC door-to-door, typically administering the first doses of SP and AQ to a child in person on day one, when they visit the household. The caregiver then administers a second and third dose of AQ on the next two consecutive days. A full course of SPAQ provides protection for 28 days, after which protection wanes rapidly. The three-day course and protective period are collectively referred to as a cycle. Depending on the pattern of rainfall in the target implementation area, a course is repeated for every month of the high transmission season each year.[1] This is referred to as a round.

Controlled trials have shown that, when administered to quality standards, SMC is 75 percent effective in protecting against uncomplicated and severe malaria cases.[2] To maximise impact, programmes should aim to achieve high coverage in eligible children across each monthly cycle, on a timely schedule starting at the beginning of the peak transmission season.[3,4]

Malaria Consortium has led the rapid roll out of SMC across the Sahel region of west Africa since 2013. Currently, we support SMC implementation in Burkina Faso, Chad, Mozambique, Nigeria, Togo and Uganda, reaching around 20 million children in 2021.

Purpose

We undertake monitoring and evaluation (M&E) activities to ensure that SMC is implemented to quality standards. To date, Malaria Consortium has collected data on delivery, coverage, efficacy, safety, drug resistance, impact and cost. Data are collected through a variety of methods, including routine programme data, regular end-of-cycle and end-of-round household surveys, case-control studies and administrative databases, such as the national health management information system (HMIS).

We are committed to refining M&E methods that are operationally feasible for countries, use robust methodology, recognise the dependencies between the different parts of the programme, and generate estimates of indicators to an appropriate degree of accuracy. We also aim to assess the outcomes of our programmes and the effectiveness of our processes to inform decision-making and priority-setting. Therefore, Malaria Consortium has developed an SMC M&E Framework using a logical framework (or 'logframe') approach to link the inputs to programme outcomes and impacts, to better understand why the programme has, or has not, achieved its intended goal.[5,6]

Methods

Malaria Consortium conducted extensive reviews of the operational aspects of the SMC programme, data sources and collection methods, as well as a review of the conceptual frameworks of the impact of health programmes. Using this information, we developed a comprehensive framework for monitoring and evaluating SMC programmes that could be applied across all countries in which we support SMC. This process involved SMC programme staff, both at headquarters and country offices.

To inform the design of the M&E framework, we defined an overarching aim that was reflective of the SMC programme's intended purpose and anticipated impacts. This aim was *"to safely[a] prevent malaria cases[b] in eligible children[c] living in areas targeted[d] by the seasonal malaria chemoprevention (SMC) programme[e] supported by Malaria Consortium[f] within the intended period of protection.[g]"*

Next, we identified programme objectives relating to this aim to specify the results and changes expected through the fulfilment of different elements of SMC — ranging from procurement and delivery of key commodities to training of SMC distributors, sensitisation of targeted communities and administration of SPAQ. We designed each of these objectives and their associated indicators to be SMART: specific, measurable, achievable, realistic and timely.

Based on these objectives, the SMC M&E Framework is intended to assess the relationship between different aspects of programme implementation (inputs, processes and outputs) and the expected results (outcomes and impacts) of the programme, while accounting for external factors, where feasible and appropriate, such as those affecting programme implementation, results, and collection and interpretation of programme data. Quality appraisal, meanwhile, assesses the level of excellence of programme delivery in all aspects.

We identified SMC programme indicators covering all components of the SMC programme, grouped by objective. Subsequently, we defined specifications for each indicator, in alignment with the SMART criteria, to allow Malaria Consortium to specify what is being measured; how, where, by whom, by when and at what unit of analysis it is measured; and how data will be utilised.

A long list of indicators and their specifications was compiled based on current practices, future programme needs and areas identified for improvement. Malaria Consortium country office teams in the relevant departments reviewed this list, refining the indicators to ensure their relevance and practicality. Although we have designed the M&E Framework to encourage a standardised approach to M&E across countries, in some cases, we have adapted or added indicators to reflect the situation in individual countries. These could include differences in administrative units, numbers of cycles per year etc.

a without severe adverse events resulting from SMC administration
b severe and uncomplicated
c defined as meeting the current eligibility criteria for eligibility for SMC as recommended by the WHO, including being within the specified age range (3–59 months), absence of allergy, confimed malaria or other acute illness, and other criteria
d encompassing the geographic area or administrative unit(s) designated for coverage by the campaign, irrespective of actual geographic coverage
e in this instance, defined as intermittent prophylactic administration of sulfadoxine–pyrimethamine plus amodiaquine within a defined high-transmission season
f including programmes to which Malaria Consortium provides technical support
g in the case of SMC with sulfadoxine–pyrimethamine plus amodiaquine, each course confers protection for 28 days; assuming monthly intervals between SMC cycles are maintained, the intended period of protection therefore includes the time from administration of the first course of SMC until one month after administration of the last monthly cycle in an annual SMC round

Figure 1. Framework for monitoring and evaluating seasonal malaria chemoprevention programmes[6]

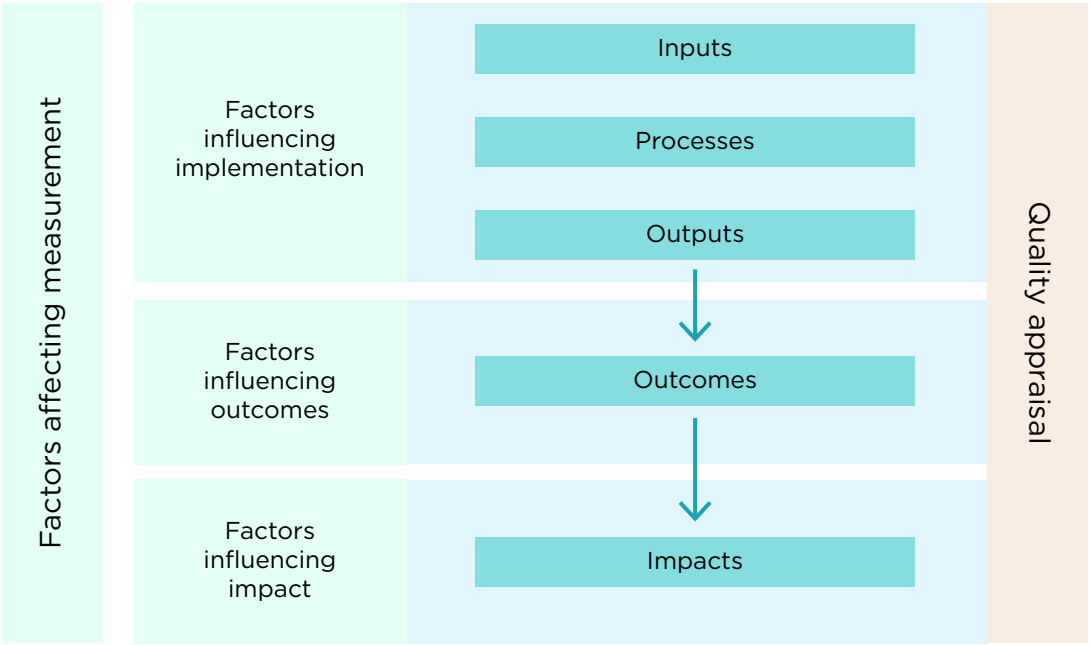

Table 1. Malaria Consortium seasonal malaria chemoprevention monitoring and evaluation objectives

	Description	Short name
Objective 1	Maximise programme coverage among eligible children in targeted areas	Coverage
Objective 2	Achieve the highest-possible fidelity of programme delivery	Fidelity
Objective 3	Ensure the highest-possible quality of all programme aspects	Quality
Objective 4	Secure the highest-possible degree of acceptability among caregivers of eligible children	Knowledge, attitudes and perceptions (KAP)
Objective 5	Ensure provision of appropriate inputs to meet programme demands in relation to the place, time and person	Supply and demand
Objective 6	Gather, and make effective use of, information obtained from monitoring and evaluation activities to inform decision-making, and promote short- and long-term programme improvements	Decision-making
Objective 7	Ensure complete reporting of, and minimise occurrence of, adverse events following drug administration, and monitoring contraindications and other reactions to treatment to ensure safe use of SPAQ	Safety

In total, we have identified seven programme objectives. These cover SMC programme coverage; fidelity and quality of SMC delivery; knowledge, attitudes and perceptions of caregivers of eligible children; supply and demand of key programme commodities; use of programme and survey data for decision-making; and safety (Table 1).

Table 2 shows a simplified SMC indicator grid, with examples of indicators relating to programme inputs, processes, outputs, outcomes and impacts across the seven objectives. Specifications of each variable are shown, where applicable. These include units of measurement, numerators and denominators, geographic units of analysis, stratification variables and data sources.

Other indicator specifications include:

- baseline years
- required degree of accuracy (with units)
- frequency and schedule of reporting of indicators
- responsible person(s) for providing data, analysis and reporting
- country restrictions (e.g. for country-specific indicators)
- feedback and decision-making mechanisms
- indicator assumptions.

To date, we have identified a total of 60 indicators and included these in the refined indicator grid, grouped by level of programme implementation and by objective.

Value and impact

The SMC M&E Framework facilitates assessment of the implementation aspects of the programme through a process evaluation, which focuses on whether or not the programme is delivered as intended to the target population. It involves the tracking of inputs, processes and outputs. Considering the time-sensitive nature of SMC, the tracking of process indicators should be systematic and timely — with some tracking occurring after each monthly cycle to allow for timely response and improvements to programme implementation.

The results of the programme are assessed through outcome and impact evaluations. The outcome evaluation assesses coverage of the programme — and knowledge, attitudes and behaviours of caregivers over time — using data from end-of-round surveys. Meanwhile, impact evaluations assess the degree to which the programme prevents malaria among eligible children. Contextual factors from the process and outcome evaluations assist in understanding variable results in coverage and impact.

Bringing the process, outcome and impact evaluations from the SMC M&E Framework together will guide users in assessing whether the programme has reached its defined objectives and overall aim.

Putting the framework into practice

Implementation of the SMC M&E Framework as part of Malaria Consortium's SMC programme started in 2020, despite the challenges posed by the global coronavirus disease pandemic. We assessed the feasibility of data collection using data from 10 states in Nigeria with a target population of 6.4 million children. Based on the format and timeliness of the data sources, we made adaptations to data collection and management and, subsequently, rolled out data entry in the other Malaria Consortium-supported states of Nigeria — as well as in Chad, Burkina Faso, Togo and Uganda. Data are entered by variable into one centralised database and then formatted into an overall indicator framework and dashboards for data visualisation. Dissemination of the results of implementing the framework and this assessment is planned for 2022.

The SMC M&E Framework will constitute a living document that will be adapted continually to match the needs of the programme. This framework was used to inform the content of the Performance Framework in the Seasonal Malaria Chemoprevention Monitoring & Evaluation toolkit, developed by the SMC Alliance's M&E sub-group.[7] The SMC Alliance is a group of global stakeholders involved in SMC campaigns, from National Malaria Control Programmes to international technical partners, donors, research and implementing agencies.

Table 2. Malaria Consortium seasonal malaria chemoprevention monitoring and evaluation indicator grid with example indicators (non-exhaustive list)

Framework	Objective	Indicator name	Unit of measurement	Numerator (N) and denominator (D)	Aggregation level	Data source
Inputs	Supply and demand	Courses procured	Number (#)	Number of doses (N)	Programme, country/state	Operations tracker
	Quality	Gender balance of SMC distributors	Ratio (n:n)	Number of female distributors: Number of male distributors	Health district/ LGA*	Programme recruitment reports
	Acceptability	Broadcasts	Number (#)	Number of broadcasts (N)	Health district/ LGA	Micro-plan
Processes	Fidelity	Proportion of health centres received supervised visit	Proportion (%)	Number of health centres received a visit (N) Total number of health centres (D)	Country/State	In-process monitoring checklist
	Quality	Proportion of SMC distributors passed training exam	Proportion (%)	Total distributors passed exam (N) Total distributors trained (D)	Health district/ LGA	Training reports
	Decision-making	End-of-cycle LQAS survey started on time	Binary outcome (1/0)	Yes/No	Country/state	End-of-cycle survey
Outputs	Quality	Number of courses administered per distributor pair per day	Proportion (%)	Number of courses delivered (N) Number of distributor pairs (D)	Health district/ LGA	End-of-cycle reports Micro-plan
	Coverage	Administrative coverage	Proportion (%)	Number of target children that have received all planned SMC cycles. (N) Total number of target children (D)	Health district/ LGA	End-of-cycle reports
Outcomes	Coverage	Percentage of target children that have received all planned SMC cycles (by survey)	Proportion (%)	Weighted total number of eligible children who received SMC in all planned cycles (N) Weighted total number of children eligible for the full number of cycles (D)	Health district/ LGA	End-of-round survey
	Decision-making	Decision criterion action met	Proportion (%)	Health units action taken (N) Health units decision criterion issue identified (D)	Health district/ LGA	End-of-cycle survey
	Safety	Reported adverse events attributable to SMC within 48 hours at a health facility	Number (#)	Number of Events (N)	Health district/ LGA	End-of-cycle Reports
Primary impacts	Malaria prevention	Confirmed malaria cases (incidence)	Confirmed cases/1000 eligible population/ month	Total suspected cases (N) Eligible population (D)	Health district/ LGA	health management information systems (HMIS) data
Contextual factors	Environmental	Rainfall	Cumulative monthly rainfall (mm)	N/A	Health district/ LGA	National meteorological agency data
	Health system and population health	Mosquito net coverage	Proportion (%)	Total households with nets (N) Eligible households (D)	Health district/ LGA	End-of-round survey
	Social and economic	Urbanisation	Binary outcome (1/0)	Yes/No	Health district/ LGA	MIS surveys, DHS surveys, other national surveys

*Local government areas (LGA) are geographic units specific to Nigeria

Because SMC is delivered during the rainy season, caregivers are also often tending their crops. SMC distributors visit them here so that they don't miss out on their work and their children can receive SMC, Uganda

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