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Harnessing the power of routine data for decision-making and programme improvement: Lessons from delivering seasonal malaria chemoprevention

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Contents

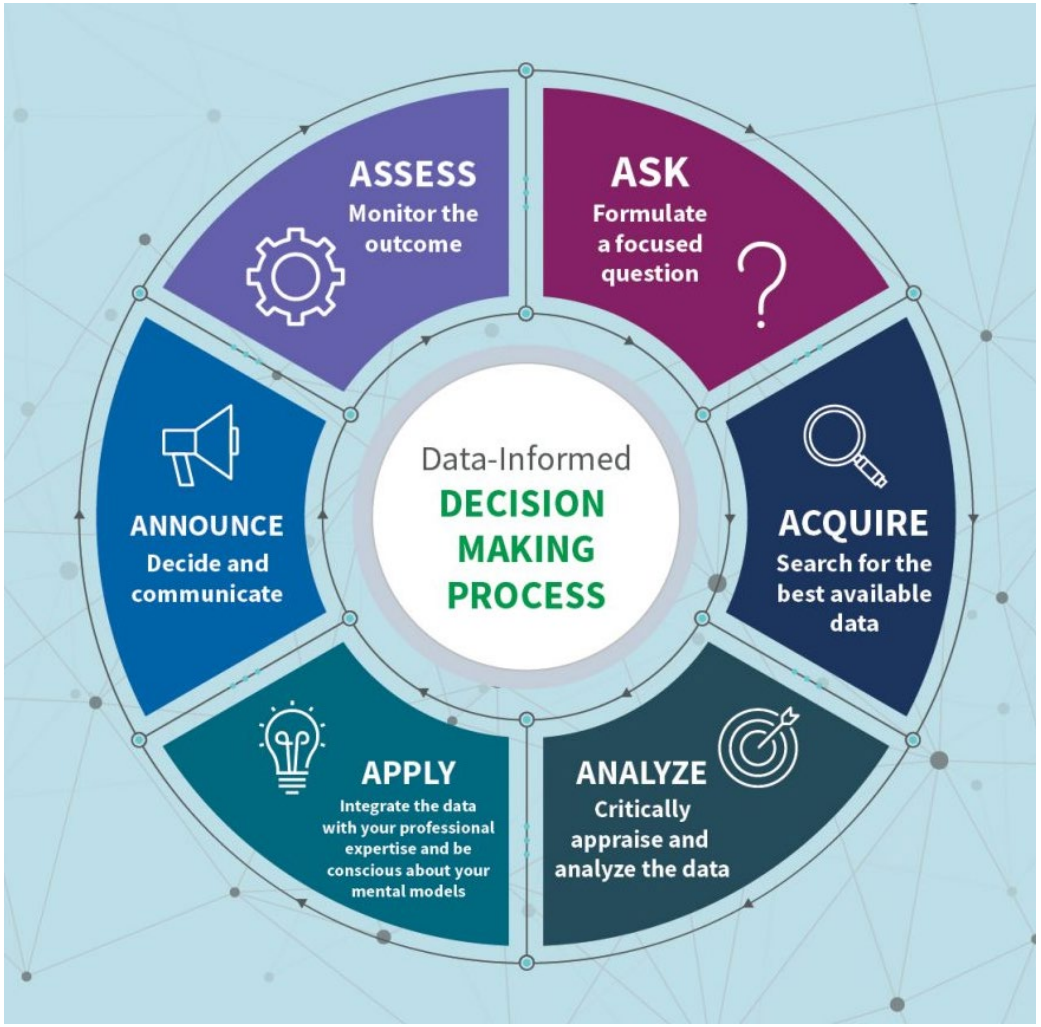
Key message: To ensure efficient and effective use of data for decision-making, it is crucial to bridge the gap between producers of data and users of data

Background

- Seasonal malaria chemoprevention (SMC) is an intervention to protect to at-risk populations from malaria during high transmission periods, which typically coincides with the rainy season.
- Since 2012, the World Health Organization (WHO) recommended SMC as a malaria chemoprevention strategies in eligible areas.
- In 2023, Malaria Consortium supported SMC delivery to approximately 25 million children in seven countries.

Background

- Routine programme data is a valuable resource for tracking progress, identifying performance gaps and informing decisions and actions for improvements.
- In practice, routine data is often under-utilised for planning and decision-making in programmes.[1]
- Data-informed decision-making (DIDM) approaches empower stakeholders at all levels to identify programme delivery gaps and prioritise corrective actions.[2]

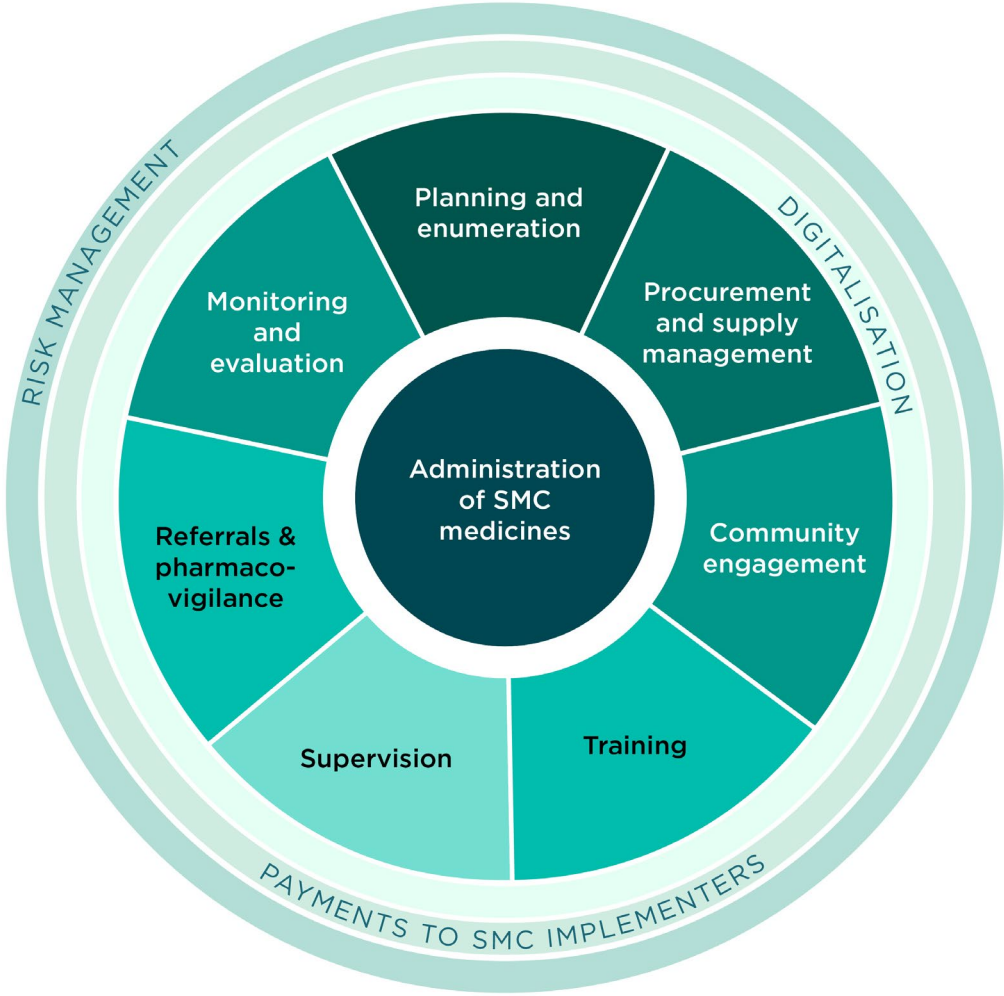


1. Avan BI, et al. District decision-making for health in low-income settings: a feasibility study of a data-informed platform for health in India, Nigeria and Ethiopia. Health Policy Plan. 2016.
2. Lee J, et al. Interventions to improve district-level routine health data in low-income and middle-income countries: a systematic review. BMJ Glob Health. 2021

Current SMC programme monitoring and evaluation approaches

We are committed to the rigorous monitoring and evaluation (M&E) of SMC programmes, in order to:

- Track progress, while identifying successes and areas of improvement
- Inform decision-making and programme improvement
- Increase accountability to partners, stakeholders and communities.



Current M&E approaches for SMC

- An M&E framework was developed to guide M&E approaches for SMC.
- The framework specifies a range of indicators for each of the programme's core objectives, including:
  - supply and demand
  - fidelity
  - acceptability
  - safety
  - coverage
  - quality
  - decision-making.
- Depending on the objective, different M&E methods are employed including quantitative, qualitative and mixed methods designs.

METHODOLOGY Open Access

From efficacy to effectiveness: a comprehensive framework for monitoring, evaluating and optimizing seasonal malaria chemoprevention programmes

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Abstract

Background Seasonal Malaria Chemoprevention (SMC) is a highly effective intervention for preventing malaria, particularly in areas with highly seasonal transmission. Monitoring and evaluating (M&E) SMC programmes are complex due to the scale, time-sensitive delivery of the programme, and influence of external factors. This paper describes the process followed to develop a comprehensive M&E framework tailored specifically for the SMC context.

Methods The Framework was developed through a literature and programme review, and stakeholder dialogues across three implementing countries—Burkina Faso, Chad, and Nigeria. Expert consultation further refined the Framework through an iterative approach drawing upon data collected through the three sources. The Framework was designed using the Logical Framework Approach incorporating external factors and intentionally aligned with global malaria M&E standards.

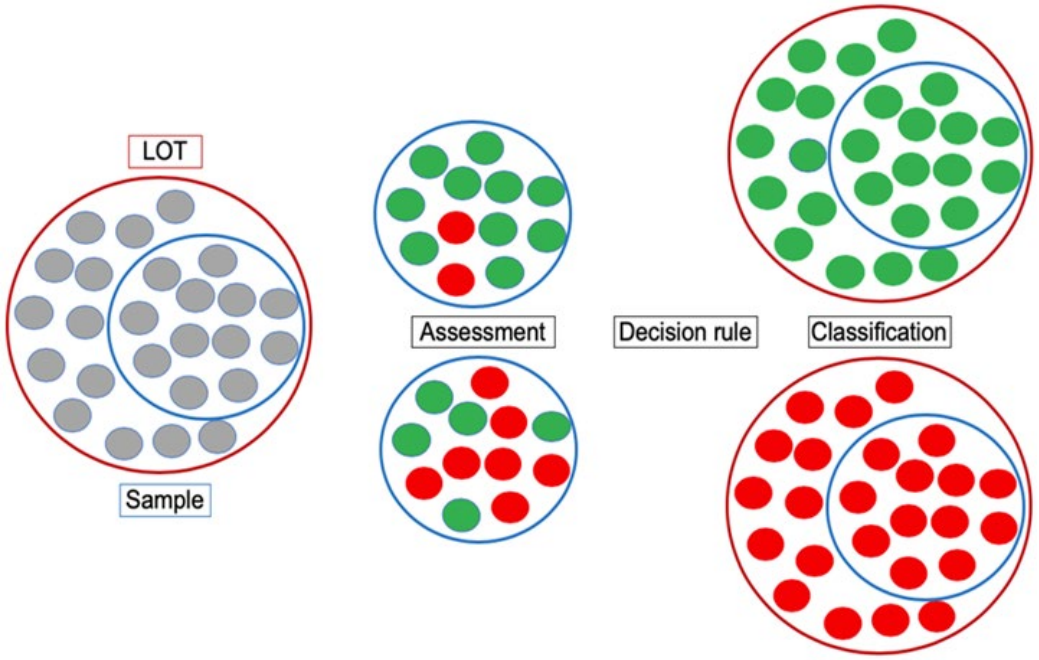
Results An overall aim and seven programme objectives were developed measured by 70 indicators. The indicators also capture the causal links between the implementation and results of the programme. The Framework leverages the use of current data sources and existing mechanisms, ensuring efficient data use without requiring a significant increase in resources for overall programme optimization. It also promotes the use of data triangulation, and stratification for a more nuanced understanding of factors affecting programme performance and timely data informed decision-making.

End-of-cycle household coverage and quality surveys

- A key component of the M&E approach is the use of end-of-cycle household surveys to monitor SMC coverage and the quality of delivery.
- End-of-cycle surveys employ lot quality assurance sampling (LQAS) methods and are typically conducted within one week following each monthly SMC cycle.
- End-of-cycle LQAS surveys enable regular monitoring of programme performance to determine whether acceptable standards for each indicator have been met.
- End-of-cycle surveys enable the timely processing of data to identify areas for programme improvement in subsequent cycles.

About LQAS

- LQAS was first used in the manufacturing industry for quality control in the 1920s.
- LQAS involves taking a small random sample of batch products (called a ‘lot’) to determine whether batches meet the predetermined quality standards.
- LQAS is an efficient tool as it minimises sampling, time and costs.
- LQAS allows results to be obtained and quality control actions to be taken rapidly.



SMC programmatic adaptation and application of LQAS

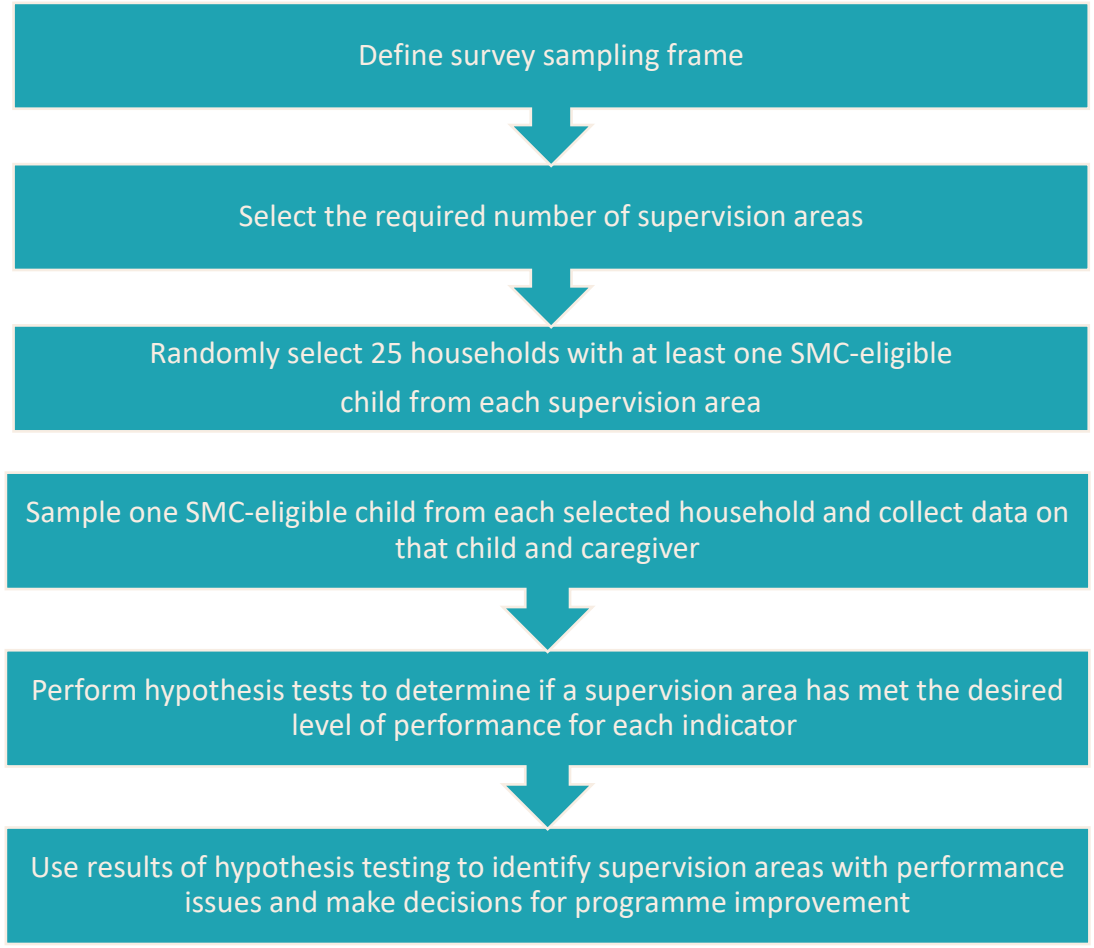
- Based on a review of historical M&E data, targets and decision criteria were defined for each indicator.
- A lot size of 25 was deemed optimal to provide sufficient precision for hypothesis testing at the supervision area level for all indicators with minimal risks of α and β errors (<10 percent)

Indicator with target	Decision criterion percent (%)	Target percent (%)	Selected lot size	Decision rule	α error	β error
Household coverage (household with eligible children visited)	80%	100%	25	23	<0.0001	0.0982
Day 1 SPAQ coverage	80%	100%	25	23	<0.0001	0.0982
Receipt of three-day full course of SPAQ	75%	95%	25	22	0.0341	0.0962
Day 1 SPAQ administration under DOT	75%	95%	25	22	0.0341	0.0962
SMC card retention	80%	100%	25	23	<0.0001	0.0982

- **Target:** A level of coverage (or other indicators) above which no further corrective action is needed.
- **Decision criterion:** A level of coverage (or other indicators) below which corrective action should be taken.
- **Decision rule:** The minimum number of 'good' units within a lot/supervision area required for that lot/ supervision area to reach the desired levels of coverage (or other indicators).
- **Maximum tolerable error:** The maximum allowed probability that the LQAS hypothesis test yields a false positive (α error) or false negative (β error) result.

SMC programmatic adaptation and application of LQAS

- SMC areas are divided into sub-district administrative units called ‘lots’ or supervision areas.
- Supervision areas are typically based on household clusters or communities within a health facility catchment area.
- The required number of supervision areas are included in the sampling frame (depending on scale and capacity).
- To enhance representation, smaller units (such as villages) may be defined within larger supervision areas.



SMC programmatic adaptation and application of LQAS

	LGA ward Hf_name	Households with eligible children visited				SPAQ administered to eligible child (Day 1) Coverage			
2									
3		No	Yes	Total	%	No	Yes	Total	%
49	Keffi_Yara_phcc main market	0	25	25	100	0	25	25	100
50	Kokona_Agwada_Nmphc Agwada	0	25	25	100	0	25	25	100
51	Kokona_Amba_Amba PHC	0	25	25	100	0	25	25	100
52	Kokona_Dari_Arusu PHC	1	24	25	96	0	25	25	100
53	Kokona_Garaku_Garaku phc	2	23	25	92	0	25	25	100
54	Kokona_Hadari_Haderi Phc	0	25	25	100	0	25	25	100
55	Kokona_Ninkoro_Ambasi phc	0	25	25	100	0	25	25	100
56	Kokona_kofar_Gwari__Kofar Gwari Phc	9	16	25	64	9	16	25	64
57	Lafia_Adogi_AGYARAGUN KORO PRIMARY HEALTH CARE CLI	0	26	26	100	3	23	26	88
58	Lafia_Agyaragu_Tofa_Agyaragu Tofa PHC	8	17	25	68	8	17	25	68
59	Lafia_Akurba_AKURBA PRIMARY HEALTH CARE CLINIC	4	21	25	84	4	21	25	84
60	Lafia_Chiroma_Angwa Shalele PHC	1	24	25	96	3	22	25	88
61	Lafia_Gayam_Doma Road PHC	0	25	25	100	0	25	25	100

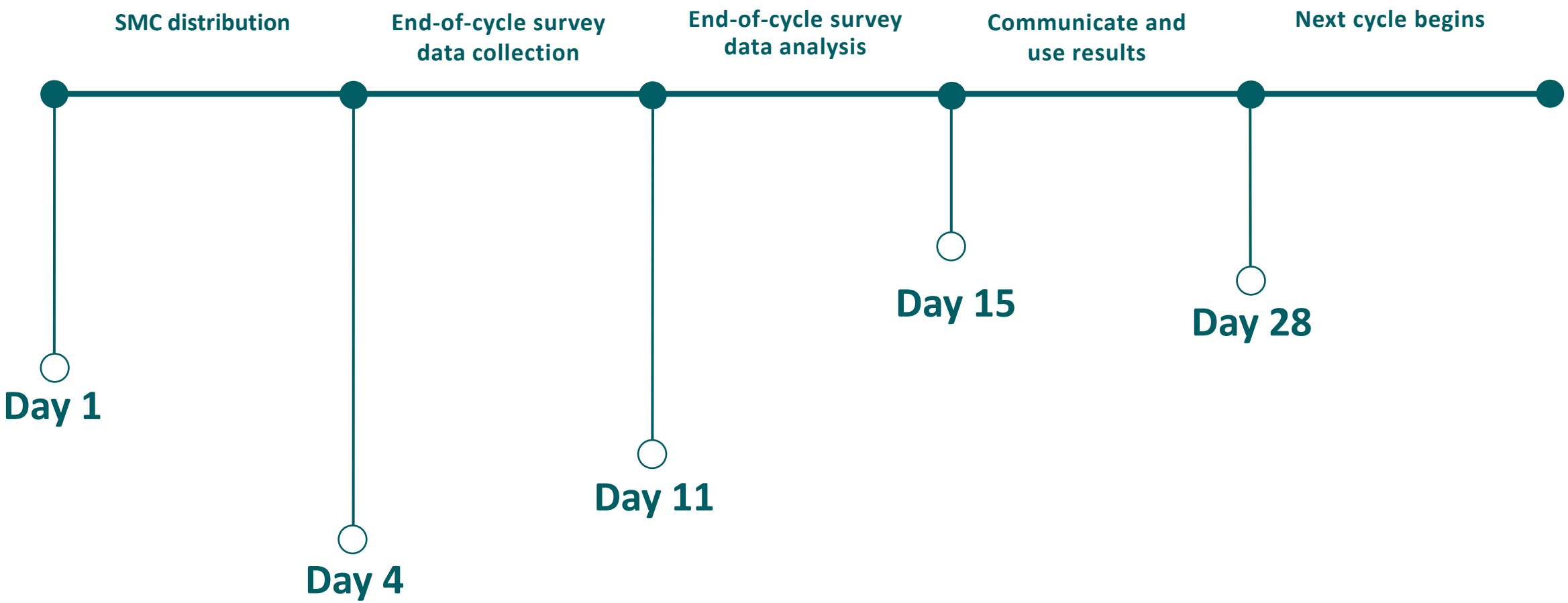
Cycle4 Cycle3 Cycle2 Cycle1 +

In this, LGA-level coverage was >90 percent, obscuring differences in coverage between SAs in the same local governmexampleent area (district-level administrative unit)

Current data-informed decision-making approaches

- Data-informed decision-making (DIDM) is a core objective of Malaria Consortium-supported SMC programmes.
- Monitoring SMC coverage and the quality of delivery using end-of-cycle surveys based on the LQAS methodology advances DIDM across the programme.
- LQAS surveys are typically conducted within one week following each monthly SMC cycle, enabling implementing teams to identify areas of low coverage and other issues in SMC delivery.
- This enables teams to rapidly take corrective actions to improve SMC delivery in subsequent cycles.
- Over the past five years, there have been continued efforts to enhance DIDM within the SMC programme, including recent improvements to data management tools, process adaptations and DIDM capacity strengthening.

Current DIDM processes and expected timelines



Current DIDM processes and expected timelines

Activity	Goal	Person(s) primarily responsible	Expected timeline
LQAS survey data collection **Specific tool:** Sampling frame, SurveyCTO	To collect data on SMC coverage and quality indicators	Country M&E team, data collectors	Within one week following SMC distribution (day 11)
LQAS data analysis **Specific tool:** Hypothesis testing tool (Microsoft Excel)	To generate descriptive data for SMC coverage and quality indicators presented by supervision area and aggregated at higher administrative levels	Country M&E team with support from the global M&E team	Two days following the completion of data collection (day 13)
Perform LQAS hypothesis testing **Specific tool:** Hypothesis testing tool (Microsoft Excel)	To identify supervision areas passing or failing the LQAS hypothesis test (H0: coverage<decision criterion; HA: coverage>decision criterion)	Country M&E team with support from the global M&E team	A day following completion of data analysis (day 14)

LQAS hypothesis testing tool

	hf_name	Households with eligible children visited *(visited_compund)*				SPAQ administered to eligible child (Day 1) *(status_treatment)*				Eligible child received three-day complete course of SPAQ (inc. Day 2 and 3 AQ) *(treated_3d)*				Households with eligible children visited	SPAQ administered to eligible child (Day 1)	Eligible child received three-day complete course of SPAQ (inc. Day 2 and 3 AQ)	Coverage issues	SMC Record Card issues
3		No	Yes	Total	%	No	Yes	Total	%	No	Yes	Total	%					
4	Nampula CS_1_DE_MAIO	0	25	25	100%	5	20	25	80%	2	18	20	90%	O	X	O	Low child coverage	Poor card retention
5	Nampula CS_25_DE_SETEMBRO	0	25	25	100%	2	14	16	88%	1	13	14	93%	O	X	N/A	Low child coverage	Poor card retention
6	Nampula CS_ANCHILO	0	25	25	100%	1	23	24	96%	1	22	23	96%	O	O	O	O	Poor card retention
7	Nampula CS_ANEXO_(PSIQUIATRICO	0	25	25	100%	5	26	31	84%	1	25	26	96%	O	X	O	Low child coverage	Poor card retention
8	Nampula CS_MARATANE	0	25	25	100%	0	26	26	100%	0	26	26	100%	O	O	O	O	O
9	Nampula CS_MUCOVA	0	25	25	100%	1	24	25	96%	1	23	24	96%	O	O	O	O	O
10	Nampula CS_MUCUACHE	0	25	25	100%	2	22	24	92%	0	22	22	100%	O	X	O	Low child coverage	O
11	Nampula CS_MUHALA_EXPANSAO	0	25	25	100%	0	25	25	100%	2	23	25	92%	O	O	O	O	O
12	Nampula CS_MUTAVAREX	0	25	25	100%	9	16	25	64%	0	16	16	100%	O	X	N/A	VERY LOW child coverage	Poor card retention
13	Nampula CS_NAHOLOCO	0	25	25	100%	1	25	26	96%	0	25	25	100%	O	O	O	O	O
14	Nampula CS_NAMACHILO	1	25	26	96%	1	25	26	96%	0	25	25	100%	O	O	O	O	O
15	Nampula CS_NAMICONHA	3	22	25	88%	3	22	25	88%	5	17	22	77%	X	X	X	Low compound coverage	O
16	Nampula CS_NAMICOPO	7	17	24	71%	5	19	24	79%	6	13	19	68%	X	X	N/A	VERY LOW compound coverage	O
17	Nampula CS_NAMIEPE	4	20	24	83%	4	20	24	83%	1	19	20	95%	X	X	O	Low compound coverage	Poor card retention

The tool automates LQAS hypothesis testing and presents results for each key indicator by supervision area, while prioritising issues that need to be addressed in the next cycle.

Current DIDM processes

Activity	Goal	Person(s) primarily responsible	Timeline
Populate DIDM tool Specific tool: DIDM tool (Excel-based)	To propose remedial actions for each supervision area-level, SMC coverage and quality issues identified from the LQAS hypothesis test	Country M&E team with support from the country operational team	Three days following the completion of hypothesis testing (day 17)
Share populated DIDM tool with stakeholders for review and input **Specific tools:** Email, WhatsApp, end-of-cycle review meetings	To foster shared decision-making between Malaria Consortium and implementing partners towards remedying identified SMC delivery issues	Country Malaria Consortium SMC team (M&E and programme) in collaboration with local (supervision area-level), district/LGA, state/regional and national stakeholders	Three days following the population of DIDM tool (day 20)
Take actions based on decisions made Specific tools/processes: training, supervision, community engagement	To translate decisions made into actions aimed at improving SMC delivery in the next cycle	Malaria Consortium SMC team (including M&E and programme management staff) in collaboration with stakeholders at supervision area and above supervision area levels	**Between 20 and day 4 of the next cycle**
Update progress status on DIDM tool **Specific tool:** DIDM tool (Excel-based)	To monitor and track progress with regard to the use of LQAS data to drive SMC DIDM and programme improvements	Country M&E lead	Day 7 of the next cycle

LQAS results dissemination and DIDM tool

- Presents issues identified for each key indicator by supervision area
- Proposes quality improvement action plans for each issue identified
- Specifies person(s) responsible for each action plan and timelines for actioning recommendations.

This form should be completed by State M& E officers 3 days after LQAS activities in readiness for state end of cycle review meeting and for recommended actions to be implemented; Actions taken will be updated 1 week prior to the next cycle

S/NO	State	LGA	ward	Cycle	Health Facility	KEY FINDINGS	RECOMMENDED/ACTION(s) TO BE TAKEN	RESPONSIBLE PERSON(s)	TIMELINE OF ACTIVITY	STATUS OF ACTIONS
298	Bauchi	Ganjuwa	Nassarawa B	2	Dagele HP	Low Child Coverage	Communities were indetified and commnicated to the relevant officers to improve coverage in cycle 3	State supervisor, LGA RBM, MC-Field Officer	1 week prior to cycle 3 MDA	Completed
388	Bauchi	Ganjuwa	Nassarawa B	2	Dagele HP	SMC Record Card issues	CDDs to empasize the importance of Child Record Card during distribution	LGA Team	3 Days prior to Cycle 3	Completed
639	Bauchi	Ganjuwa	Nassarawa B	2	Dagele HP	Low mask use and VERY LOW information provision	Provide adequate Face Mask and conduct refresher training for CDDs	SCO, LGA Team	1 week prior to cycle 3 MDA	Completed

Case studies

Mozambique

- Programme scale: Around 1.5 million children were targeted in each monthly SMC cycle across 23 districts and around 250 supervision areas.
- DIDM process: A multi-level approach was used, including stakeholder engagement at the sub-district, district, provincial and national levels.
- Engagement meetings provided a platform to discuss results, identify successes, challenges and lessons learned from the last SMC cycle.
- Action plans were developed at the end of each meeting to resolve challenges and improve before the next cycle.
- The process helped to identify the reason for sub-district variations in coverage, which enabled the tailoring of community engagement efforts to improve coverage in areas where it was sub-optimal.

Nigeria

- Programme scale: Approximately 19 million children were targeted in each monthly SMC cycle across 273 local government areas (LGA) and over 2,000 supervision areas.
- DIDM process: Pre-cycle meetings were conducted with stakeholders at LGA, state and national levels to review data and findings from the previous cycle.
- In each meeting, stakeholders discussed coverage and developed strategies to respond to any challenges identified.
- Meetings were followed by LGA and sub-LGA adaptations and operationalisation of corrective actions based on agreed timelines.
- The process helped to identify priorities for programme improvement.

Uganda

- Programme scale: Approximately 250,000 children were targeted in each monthly cycle across nine districts, spanning about 100 supervision areas.
- DIDM process: After each cycle, key issues were identified through a survey, and additional M&E data were disseminated to stakeholders at the parish, district and regional levels.
- Survey results were complemented by routine surveillance data collected at the health facility level in supervision areas.
- Reviewing routine data enabled the identification of villages with a high malaria burden but sub-optimal coverage levels during the preceding cycle.
- These findings guided joint decision-making and actions by stakeholders at the parish and district levels, with support from regional and national health ministries.

Challenges and limitations

While substantial progress has been achieved, further advancement has been hindered by factors such as:

- Sampling issues: Actual lot sizes might be fewer or larger than 25 households (LQAS hypothesis testing may not be feasible)
- Missed surveys due to technical or operational capacity issues
- Missed communities due to security risks or inaccessibility
- Time constraints: There is a maximum of two weeks to disseminate results, make shared decisions and take actions
- Other practical and contextual constraints: Engaging local stakeholders for shared decision-making.

Considerations for further improvements

- Further adaptation of DIDM strategies is needed for country and sub-national contexts
- Strengthen capacity for collecting and analysing data in a timely manner
- Bolster synergies between programme M&E teams (the primary producers of data) and implementation teams (primary data users and decision-makers)
- Strengthen communications and engagement with stakeholders for shared decision-making and accountability.
- Track DIDM performance based on defined indicators to increase accountability.

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