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Coverage and quality of seasonal malaria chemoprevention supported by Malaria Consortium with philanthropic funding or co-funding in 2024:

Results from Burkina Faso, Chad, Mozambique, Nigeria, South Sudan, Togo and Uganda

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Report compiled by: Chuks Nnaji, with support from Ebenezer Ikechukwu

Reviewers and contributors: Norman Aweno, Fantche Awokou, Honore Banang, Jennifer Chukwumerije, Louise Cook, Simon Cordery, Paulino Da Costa, Monica Anna de Cola, Becki Davies, Freddy Doumde, Aristide Doumtoudjimbaye, Hannah Edwards, Sonia Enosse, Anna Fallon, Tom Heslop, Jamshed Khan, Maxwell Kolawole, Maurice Kwizera, Tonny Kyagulanyi, Emma Manning, Crispim Munda, Anthony Nuwa, Calvin Ochen, Oluwafunmilayo Ogundeko-Olugbami, Olabisi Ogunmola, Olusola Oresanya, Christian Rassi, Samantha Rothbart, Benoit Sawadogo, James Tibenderana and Celia Yeung.

Established in 2003, Malaria Consortium is one of the world's leading non-profit organisations specialising in the prevention, control and treatment of malaria and other communicable diseases among vulnerable populations. Our mission is to improve lives in Africa and Asia through evidence-based programmes that combat targeted diseases and promote universal health coverage.

Malaria Consortium

The Green House, 244–254 Cambridge Heath Road, London E2 9DA

www.malariaconsortium.org

info@malariaconsortium.org

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Acronyms and abbreviations

ACCESS-SMC	Achieving Catalytic Expansion of Seasonal Malaria Chemoprevention in the Sahel
AQ	amodiaquine
CI	confidence interval
DHS	Demographic and Health Surveys
DIDM	data-informed decision-making
DOT	directly observed therapy
EoC	end-of-cycle
EoR	end-of-round
FCT	Federal Capital Territory
GF	Global Fund to Fight AIDS, Tuberculosis and Malaria
IDP	internally displaced person
IPC	infection prevention and control
IHfRA	Innovative Hub for Research in Africa
KOICA	Korea International Cooperation Agency
LGA	local government area
LQAS	lot quality assurance sampling
M&E	monitoring and evaluation
PPS	probability proportional to size
SA	supervision area
SMC	seasonal malaria chemoprevention
SP	sulfadoxine-pyrimethamine
SPAQ	sulfadoxine-pyrimethamine and amodiaquine
SRS	systematic random sampling
WHO	World Health Organization
UNICEF	United Nations International Children's Emergency Fund

Executive summary

Background

Malaria transmission typically peaks during the rainy season in sub-Saharan Africa, where it is the leading cause of illness and death among children. Since 2012, the World Health Organization (WHO) has recommended seasonal malaria chemoprevention (SMC) as an intervention intended to provide protection against malaria to at-risk populations during the period of peak transmission in areas where transmission is highly seasonal. As a malaria chemoprevention strategy, SMC involves the administration of a single dose of sulfadoxine-pyrimethamine (SP) in combination with three daily doses of amodiaquine (AQ) — together known as SPAQ — to eligible children at 28-day intervals throughout the high transmission season. Evidence from research and large-scale implementation have demonstrated that SMC is safe, feasible, effective and cost-effective across a range of epidemiological and geographical settings.

Malaria Consortium's SMC programme in 2024

Malaria Consortium, through full or partial philanthropic funding, supported SMC delivery as an implementing partner in seven countries in 2024. Based on country-specific microplanning data, 17,074,746 children aged 3–59 months were targeted. The seven countries and their target population estimates were Burkina Faso (2,148,425), Chad (1,437,037), Mozambique (1,482,649), Nigeria (11,579,662), South Sudan (76,457), Togo (186,611) and Uganda (163,905). The total size of the target population in 2024 was about the same as the 17,070,262 children targeted during the 2023 round.

Malaria Consortium remains committed to rigorously monitoring and evaluating its SMC programme, enabling timely tracking of coverage and other programmatic indicators against targets, and generation of critical data to inform decision-making and drive programme improvements. This report details the methods used to measure and monitor the performance of country-level SMC programmes delivered with support from philanthropic funding, and provides 2024 estimates of key programme coverage and quality indicators. It also highlights the methodological, contextual and programmatic implications of findings, while offering recommendations for refining monitoring and evaluation (M&E) methods and SMC programmatic approaches in 2025 and future rounds.

Methods

Administrative coverage was estimated using numerators and denominators derived from appropriate data sources. Numerators were determined using data derived from routine monitoring forms referred to as SMC tally sheets or digitalised SMC delivery tools, while denominators were defined based on target population estimates derived from 2024 microplanning data.

In addition to administrative coverage, more precise and reliable estimates of SMC coverage and quality were obtained from data collected using two types of household coverage monitoring surveys, described below:

- End-of-cycle (EoC) surveys employing the lot quality assurance sampling (LQAS) methodology were conducted typically within one week of each SMC cycle, except for the final cycle. They enabled the identification of areas of lower coverage and quality, and the implementation of rapid corrective actions to improve SMC delivery in subsequent cycles.
- Comprehensive end-of-round (EoR) surveys took place typically within one month of the final cycle. Designed to provide estimates of coverage and quality that were representative at the country level, — in addition, being representative at the state level in Nigeria — EoR surveys enabled comprehensive assessment of programme performance across all cycles of the yearly round.

As a result of continued investments in bolstering M&E capacity across country teams, 2024 saw the conduct of household surveys following every cycle in every supported country, with one exception due to catastrophic flooding. This was a notable improvement from previous years in which surveys were missed in a few cycles or areas due to a combination of factors.

Main findings

Administrative coverage

Malaria Consortium supported the delivery of SMC across seven countries in 2024, reaching 17,208,260 children on average per cycle. Considering the estimated 17,074,746 target population, this represents an overall administrative coverage of 100.8 percent, ranging from 92.3 percent in Mozambique to 115.3 percent in Burkina Faso. While overall coverage appears high, notable variations were observed across countries, which may reflect differences in implementation contexts, target population estimation accuracy and potential programmatic challenges. This will be explored in detail later in the report.

Coverage estimates from end-of-cycle and end-of-round surveys

Findings from household surveys showed that the programme sustained the high levels of coverage and quality achieved in the previous years. Day 1 SPAQ coverage was above 90 percent in most cases, as were other coverage and quality indicators. Results, expressed as percentages with 95 percent confidence intervals (95% CIs) for key indicators by cycle and country are highlighted in the Table 0 below, and presented, interpreted and discussed in greater detail in the main report:

Table 0. Summary of 2024 SMC coverage results from EoC and EoR surveys by country and cycle

Country	Cycle no.	Target population	Day 1 SPAQ coverage (95%CI)	Adherence to day 2 and 3 AQ (95% CI)	Day 1 SPAQ DOT (95%CI)	Receipt of SPAQ in all cycles (95% CI)	
Burkina Faso	cycle 1	2,148,425	97.4(94.4–98.8)	96.5(91.0–98.7)	95.9(91.7–98.0)	*73.6(70.8–76.2)	#71.2 (67.1–75.0)
	cycle 2		97.9(96.3–98.8)	96.0(93.8–97.4)	86.6(74.8–93.4)		
	cycle 3		97.8(96.0–98.8)	97.0(94.0–98.5)	90.4(78.8–96.0)		
	cycle 4		96.3(92.3–98.3)	98.4(95.6–99.4)	94.6(83.7–98.4)		
	cycle 5		96.5(95.4–97.3)	98.7(98.0–99.2)	93.4(92.0–94.6)		
Chad	cycle 1	1,437,037	97.3(96.2–98.0)	90.2(87.0–92.7)	96.5(94.9–97.5)	74.5(72.2–76.6)	
	cycle 2		96.9(95.6–97.9)	95.0(92.9–96.6)	96.8(95.7–97.7)		
	cycle 3		98.2(97.5–98.7)	95.6(93.8–96.9)	97.1(95.8–97.9)		
	cycle 4		90.5 (88.8–91.8)	94.8(93.5–95.9)	87.7(85.8–89.4)		
Mozambique	cycle 1	1,482,649	89.4(85.9–92.1)	96.9(95.8–97.7)	96.7(95.5–97.6)	52.8(44.6–60.9)	
	cycle 2		88.5(84.6–91.5)	98.4(97.7–98.9)	97.6(96.5–98.4)		
	cycle 3		95.0(92.6–96.7)	99.2(98.7–99.4)	98.4(97.5–99.0)		
	cycle 4		70.7 (64.2–76.3)	99.0 (98.0–99.5)	92.1 (87.3–95.1)		
Nigeria	cycle 1	11,579,662	88.1(85.2–90.5)	93.7(92.1–95.0)	78.3(75.1–81.3)	*78.6 (77.3–79.9)	#81.9 (81.1–82.8)
	cycle 2		91.4(89.9–92.7)	95.6(94.8–96.3)	83.3(81.7–84.9)		
	cycle 3		96.7(95.8–97.4)	98.1(97.5–98.6)	88.8(83.3–92.6)		
	cycle 4		96.9(96.2–97.4)	98.9(98.6–99.2)	94.8(93.8–95.7)		
	cycle 5		93.1(92.6–93.5)	98.8(98.7–99.0)	95.8(95.4–96.1)		
South Sudan	cycle 1	76,457	78.5(63.8–88.3)	96.0(90.3–98.4)	96.5(92.1–98.5)	67.2(64.8–69.6)	
	cycle 2		79.0(60.2–90.4)	97.7(95.3–98.9)	98.3(96.7–99.2)		
	cycle 3		77.6(58.4–89.6)	97.1(94.4–98.5)	95.3(88.8–98.1)		
	cycle 4		84.3(71.7–91.9)	97.7(95.6–98.7)	91.8(81.1–96.7)		
	cycle 5		79.9(77.8–81.9)	99.8(99.3–99.9)	95.0(93.6–96.1)		
Togo	cycle 1	186,611	94.9(92.7–96.4)	90.9(87.8–93.3)	86.8(82.8–89.9)	87.1(85.4–88.8)	
	cycle 2		96.3(94.6–97.4)	94.4(92.0–96.0)	89.5(85.9–92.3)		
	cycle 3		97.5(96.1–98.4)	95.5(93.7–96.8)	89.9(85.6–93.0)		
	cycle 4		96.3(93.8–97.9)	97.8(96.5–98.7)	91.1(86.5–94.2)		
	cycle 5		94.6(93.0–96.0)	99.3(98.7–99.6)	87.7(86.0–89.0)		
Uganda	cycle 1	163,905	98.8(87.0–99.9)	99.4(99.0–99.7)	92.2(66.8–98.6)	92.0(88.5–94.5)	
	cycle 2		98.4(96.5–99.3)	97.2(91.8–99.1)	94.1(76.6–98.8)		
	cycle 3		98.7(97.0–99.5)	98.4(95.2–99.5)	97.6(86.7–99.6)		
	cycle 4		98.9(97.9–99.4)	96.7(84.2–99.4)	96.1(84.8–99.1)		
	cycle 5		97.2(96.3–97.9)	96.8(95.1–97.9)	99.0(97.4–99.6)		

*Areas that received four SMC cycles; #areas that received five SMC cycles; DOT: directly observed therapy.

Conclusion

Estimates indicate that SMC coverage and quality remained high throughout most cycles across the seven supported countries in 2024. There were however notable gaps in the level of coverage and quality achieved in some cycles and locations, which may be attributable to specific programmatic and contextual challenges. These gaps highlight opportunities for programme improvements and adaptations to further optimise SMC delivery. Additionally, current methodological limitations in coverage estimation and assessment of adherence to quality standards highlight opportunities for further refinement of M&E methods in 2025 and future campaigns.

1. Introduction

Malaria transmission typically peaks during the rainy season in sub-Saharan Africa, where it remains the leading cause of morbidity and mortality particularly among young children and pregnant women.[1,2] Seasonal malaria chemoprevention (SMC) is an intervention intended to protect children against *Plasmodium falciparum* malaria during the period of high transmission through intermittent administration of courses of sulfadoxine-pyrimethamine (SP) and amodiaquine (AQ), together know as 'SPAQ.' [1, 2] The objective is to maintain therapeutic antimalarial drug concentrations in the blood throughout the period of highest risk of malaria incidence, morbidity and death. Since 2012, the World Health Organization (WHO) has recommended SMC using SPAQ as a chemoprevention strategy in areas where transmission is highly seasonal.[3] A growing body of evidence from research, including randomised controlled trials, non-randomised studies and programmatic data, has shown SMC to be safe, feasible, effective and cost-effective in protecting children across a range of epidemiological and geographical settings.[1,4,5,6]

Programmatically, SMC is delivered in yearly rounds of four or five cycles during periods of peak malaria transmission, typically coinciding with the rainy seasons — approximately July to October in the Sahel and December/January to March/April in countries in the southern hemisphere such as Mozambique — with distribution periods 28 days apart. SPAQ is distributed through door-to-door campaigns by trained community distributors who, in most settings, receive stipends. Distribution occurs over a period of three to four days per cycle. In each cycle, a full course of SPAQ comprises one single dispersible tablet of SP and three daily dispersible tablets of AQ. On the first day, a dose of SP and the first dose of AQ ('day 1 SPAQ') is administered by or under the supervision of community distributors to ensure that the tablets are correctly dispersed in water and that the child fully ingests all of the dispersed tablets without spitting them out or vomiting. This is referred to as directly observed therapy (DOT). Community distributors leave a blister pack with the two remaining tablets with caregivers and provide instructions on how to administer the remaining two doses of AQ once per day — every 24 hours — over the following two days ('day 2 AQ' and 'day 3 AQ').[7] For further details of the programmatic delivery model, refer to our 2024 SMC Philanthropy Report.[8]

1.1 Malaria Consortium's philanthropic SMC programme in 2024

In 2024, Malaria Consortium supported SMC delivery as an implementing partner with philanthropic funding in seven countries: Burkina Faso, Chad, Mozambique, Nigeria, South Sudan, Togo and Uganda (Figure 1). Based on microplanning estimates, a total of 17,074,746 children were targeted. Malaria Consortium also used philanthropic funding to support selected activities or commodities for other areas in Burkina Faso and Togo, where we did not act as implementing partner. Target population numbers for those areas are not reported here. As a result, the number of districts and target population figures reported for both countries in 2024 may differ from those in the 2023

report.[9] For a detailed account of how Malaria Consortium used philanthropic funding for SMC in 2024, refer to our 2024 SMC Philanthropy Report.[8]

Another remarkable difference between the 2024 round and prior years was the number of cycles delivered in Togo. Following the outcome of a sub-national tailoring exercise, it was decided that the length of the transmission period warranted the addition of a fifth cycle in all SMC eligible districts. As such, all supported areas received five cycles in 2024, compared to four cycles delivered in previous rounds in Togo.

Of the total target population, 2,148,425 eligible children were targeted in 27 health districts across six regions in Burkina Faso; 1,437,037 in 30 health districts across six provinces in Chad; 1,482,649 in 23 districts in one province in Mozambique; 11,579,662 in 154 local government areas (LGAs) across eight states and the Federal Capital Territory (FCT) in Nigeria; 76,457 in two counties in one state in South Sudan; 186,611 in seven districts in one region in Togo; and 163,905 in five districts in one region of Uganda.

Figure 1. Countries where Malaria Consortium supported SMC as implementing partner in 2024

Countries and sub-national units where Malaria Consortium supported SMC as an implementing partner using philanthropic funding in 2024, dates of SMC rounds and estimated target populations are shown in Table 1. Most areas were supported wholly by philanthropic funding, while the remaining areas were supported through co-funding with philanthropic and other funding sources.

Table 1. Malaria Consortium's SMC programme supported by full or partial philanthropic funding in 2024 by number of children targeted for SMC delivery and funding source

Country	Dates of SMC round	Areas covered	Number of children targeted (mean per cycle)
Burkina Faso	June – October 2024	27 health districts in six regions: Cascades, Centre, Centre Nord, Centre Sud, Hauts Bassins and Plateau Central	2,148,425
Chad	July – October 2024	30 health districts in six provinces: Barh el Gazel, Batha, Chari Baguirmi, Hadjer Lamis, Mayo Kebbi Est and N'Djamena	1,437,037
Mozambique*	February – May 2024	23 districts in one province: Nampula	1,482,649
Nigeria	June – November 2024	154 local government areas (LGAs) in eight states (Bauchi, Borno, Kebbi, Kogi, Nasarawa, Oyo, Plateau, and Sokoto) and the FCT	11,579,662, of which 309,282 were co-funded by KOICA in two LGAs in Bauchi state
South Sudan	June – October 2024	Two counties in one state: Northern Bahr El Ghazal	76,457 which were jointly supported by philanthropic funding and UNICEF
Togo	May – September 2024	Seven districts in one region: Savanes	186,611 which were jointly supported by philanthropic funding, the Global Fund and UNICEF
Uganda	May – September 2024	Five districts in one sub-region: Karamoja	163,905 which were jointly supported by philanthropic funding and the Global Fund
		Programme total	**17,074,746**

KOICA: Korea International Cooperation Agency; UNICEF: United Nations International Children's Emergency Fund.

*This report includes target population figures for Mozambique for the season for which coverage figures are available at the time of writing, i.e. the 2023/24 season. By contrast, the 2024 philanthropy report[8] includes target population figures for the calendar year in which the peak transmission season started, i.e. the 2024/25 season.

Four cycles of SMC were delivered in all supported districts in Chad and Mozambique, while five cycles were delivered in all supported areas in South Sudan, Togo and Uganda. In Burkina Faso and Nigeria, five cycles were delivered in areas with relatively longer transmission seasons, while four cycles were delivered in the remaining areas. In Burkina Faso, a fifth cycle was delivered in the southern districts in the Cascades and Hauts Bassins regions, and in the Pô district of the Centre-Sud region. In Nigeria, the states of Bauchi, Kogi, Nasarawa, Oyo and Plateau and the FCT received five cycles, while the states of Borno, Kebbi and Sokoto received four cycles. In practice, in countries where there is sub-national variation in the number of cycles, as is the case in Burkina Faso and Nigeria, areas receiving five cycles tend to start the SMC round earlier than areas implementing four cycles. Therefore, for the purposes of this report, this cycle is referred to as 'cycle 1,' while 'cycle 2' refers to the second cycle in those districts and the first cycle in areas where four cycles were delivered. As such, the final cycle is referred to as 'cycle 5' in all supported areas in Burkina Faso and Nigeria, irrespective of the number of cycles delivered.

1.2 Objectives of this report

This report summarises estimates of coverage and quality of SMC implementation in areas supported by Malaria Consortium through philanthropic funding in 2024. Its objectives are as follows:

- Outline methods employed by Malaria Consortium for monitoring coverage and quality in areas where Malaria Consortium supported SMC as implementing partner with philanthropic funding in 2024.[1]
- Provide a summary of estimates of programme coverage and quality in each cycle delivered across supported countries in the period under review.
- Examine the methodological, contextual and programmatic implications of the findings and provide recommendations for refining M&E methods and programmatic approaches in 2025 and future SMC rounds.

[1] For Togo, where philanthropic funding is used to conduct end-of-cycle and end-of-round surveys in all 23 SMC-implementing districts, we report survey results for all districts, including 16 districts where Malaria Consortium does not support SMC delivery as implementing partner.

2. Methods

Malaria Consortium remains committed to rigorously monitoring and evaluating the performance of its SMC programme. This enables the tracking of progress against intended reach, coverage, quality and impact, while identifying successes and areas where improvements can be made. It also enables accountability to partners and stakeholders. A framework was developed to guide the programme's current M&E approaches, allowing the programme to strengthen and harmonise M&E methods, tools and processes across countries and implementation settings.[10] The framework specifies a range of indicators for each of the programme's seven core performance objectives: supply and demand, fidelity, acceptability, safety, coverage, quality and decision making. Depending on indicators, different M&E methods are employed including quantitative, qualitative and mixed methods designs. In line with the objectives outlined earlier, this report focuses on M&E aspects pertaining to programme coverage and quality.

2.1 Administrative coverage

Administrative coverage was estimated using numerators and denominators derived from appropriate data sources. Numerators were determined based on data derived from routine monitoring forms, referred to as SMC tally sheets, which were used to estimate the quantity of SPAQ courses distributed as a proxy indicator for the number of eligible children reached after discounting SPAQ redosing and wastages. Tally sheet methods and processes within the SMC programme have been described in detail in previous reports.[8] In brief, tally sheets were completed and submitted by SMC community distributors and aggregated at the district and higher administrative levels during SMC distribution periods. We continue to support campaign digitalisation efforts with the aim of refining our estimates of the number of children reached in each cycle. In 2024, administrative data collection was digitised to varying degrees in Burkina Faso, Chad, Mozambique, Nigeria and Togo. Denominators were defined using target population estimates derived from microplanning data for the 2024 round. As part of target population estimation methods during microplanning, efforts are made to account for projected population growth, migration and the expected population of newly eligible three-month-olds joining the cohort of eligible children in the later cycles of the round. Limitations in current methods are acknowledged in the next paragraph and later in the discussion section.

Administrative coverage was calculated by dividing the total number of SPAQ courses distributed in a given cycle by the estimated target population of children 3–59 months. It is thus expressed as a percentage of the target population, both overall (3–59 months) and disaggregated by age group, i.e. 3–<12 months and 12–59 months, reflecting the two age-based formulations of SPAQ.

It is important to note that administrative coverage estimated using this method may exceed 100 percent in some cycles. This may be due to several factors, including inaccuracies in the denominator (target population estimates) during microplanning, a higher-than-expected number of newly eligible

three-month-olds joining the cohort of eligible children in the latter cycles of the round and unforeseen population movements such as in nomadic populations or internally displaced populations. Other reasons why administrative coverage may exceed 100 percent include the administration of SMC medicines to ineligible children, or the non-exclusion of SPAQ redosing or wastages when tallying and aggregating data reported by community distributors, all of which could inflate the numerator (number of children reached in each cycle).

2.2 Household coverage and quality monitoring surveys

To facilitate more reliable measures of programme coverage and quality, Malaria Consortium conducts two types of post-cycle household surveys: end-of-cycle (EoC) surveys following all but the final monthly cycles, as well as independent and more comprehensive end-of-round (EoR) surveys conducted following the final cycle. Both survey types enable collection of data for monitoring coverage and quality of SMC implementation.

In line with the programme's M&E framework, SMC survey coverage can be defined in various ways. Bearing in mind that receiving the first dose of SP and AQ alone is insufficient to provide full protection for the duration of the high transmission season, it is therefore necessary that SMC coverage indicators consider adherence to all relevant components of SPAQ administration. These include proportions of households visited by distributors, administration of day 2 and day 3 AQ by caregivers, and whether children received SPAQ in all monthly cycles. We must also consider the proportions of ineligible children (60–119 months) who received day 1 SPAQ by cycle and the proportions of eligible children who received SPAQ by means other than its distribution by SMC community distributors during home visits. Alternative means of acquisition include both legitimate sources of SPAQ, such as distribution at health facilities and distribution at fixed distribution points, and illegitimate sources of SPAQ, such as through private purchase. Both EoC and EoR surveys also enable the monitoring of SMC quality, including adherence to DOT when administering day 1 SPAQ; availability and use of SMC cards; caregiver SMC awareness, knowledge and perceptions; and safety indicators.

2.2.1 End-of-cycle surveys

These surveys are routinely conducted after all but the last SMC cycle so that data from each can be collected and processed before the next cycle to identify issues within smaller discrete local areas, and to inform changes or improvements to SMC delivery.

In 2024, EoC surveys were conducted and supervised by Malaria Consortium staff in all countries. Data collectors were employed directly by Malaria Consortium as independent contractors. They were typically selected through an open process based on criteria such as data collection competences and being able to speak the local language. Individuals involved in SMC delivery, including community distributors and district-level supervisors were considered ineligible to work as data collectors.

Rationale and design

End-of-cycle surveys continued to employ lot quality assurance sampling (LQAS) methods, which has been recommended for monitoring health interventions as it provides a simple, rapid method to assess performance at the local level.[11] As an efficient sampling method, LQAS enables rapid monitoring of a programme against pre-determined targets, while facilitating timely generation of local evidence to aid decision-making for programme improvement. In the context of public health programmes such as SMC, LQAS entails the subdivision of programme implementation areas into smaller functional areas typically at the sub-district level — such as health facility catchment areas — referred to as 'supervision areas' (SAs).[12] In that sense, SAs are defined as the lowest administrative levels at which programmatic decision-making capacity exists. The method requires a relatively small sample per SA to allow for hypothesis testing of whether a predetermined standard for a particular indicator, e.g. percentage coverage, has been met in a given SA. Although with limited precision, the smaller sample size per SA allows for surveys to be rapidly completed and for hypothesis testing to be performed with reasonable levels of accuracy and margins of error to inform programmatic decisions and improvements from cycle to cycle.[12]

Malaria Consortium's SMC M&E framework defines decision criteria and targets for 16 priority indicators (Table 2). The framework was developed following a consultative process involving Malaria Consortium staff at global and country offices.[10] Decision criteria are defined as proportions of units, i.e. compounds, per SA below which action is considered necessary to improve programme delivery. Targets, on the other hand, are defined as proportions of units per SA in which a standard is met such that no further improvement is considered necessary.

Based on results from previous surveys, programme requirements and maximum alpha and beta errors of 10 percent, a 'lot size' of 25 compounds per SA was found to be the minimum such that the sample was sufficient to run hypothesis tests for each of the indicators to determine whether required standards had been met.[13] Finally, decision rules were calculated based on the lot size, decision criteria and targets. These decision rules defined a threshold number of compounds, out of a lot size of 25, which were required to have met a standard for each SA. Hence, if the number of compounds meeting a standard fell below the decision rule for an indicator in a given SA, this indicated that actions were necessary to improve programme performance related to that indicator in that particular SA before the next SMC cycle. For example, given a decision rule of 22, if fewer than 22 out of 25 caregivers in a SA reported administering day 2 and day 3 AQ to their eligible children, this issue was flagged and reported for further actions to be considered to increase adherence to the full three-day course of SMC. Such remedial actions could include improved distributor training or community sensitisation on the importance of day 2 and day 3 AQ doses before the next SMC cycle.

Through aggregation of results across multiple SAs, LQAS can also provide a representative summary of coverage at higher administrative levels, such as state or national level. As such, the interpretation of these findings is similar to that of conventional cluster surveys on the assumption that SAs are

selected through random sampling and that they are of approximately equal population size to ensure a representative sample. This report presents the EoC results aggregated across SAs to give country-level — or state-level, in the case of Nigeria — summaries of key SMC indicators.

Since 2019, methodological improvements have been made to the LQAS methodology and survey implementation, including improvements to sampling, data quality assurance measures and data analysis as described in previous reports.[8] In 2024, further efforts were made to standardise and harmonise the conduct of surveys across countries, including further standardisation of data collection tools and sampling approaches. There were improvements in the timeliness of EoC surveys in 2024, with EoC surveys being conducted within one week of the preceding cycle in most instances. Further progress was achieved in strengthening the use of data to drive decision-making and programmatic improvements. Following a programme-wide data-informed decision-making (DIDM) workshop held prior to the 2024 round, programme implementing teams demonstrated a greater commitment to using data from LQAS hypothesis testing to identify coverage and quality gaps at the SA level in each cycle, and to guide the implementation of corrective actions to address such gaps. As part of improved DIDM, timely conduct of surveys following each cycle's SPAQ distribution facilitated the completion of data collection and analysis, and provided ample time — up to two weeks before the subsequent cycle — to communicate results to stakeholders at the SA level and engage with them to take actions to improve SMC delivery before and during the succeeding cycle.

EoC survey objectives and indicators

As in previous years, EoC surveys using LQAS methods had two main goals, the first of which was to determine whether SAs had met each of the priority indicator targets. The second goal was to provide summaries of key indicators at above-SA levels, including district/LGA, state/regional and country levels. Table 2 outlines the priority coverage and quality indicators assessed in EoC surveys, with their LQAS specifications.

Table 2. List of key indicators assessed by EoC surveys, by unit of analysis, denominator and LQAS specifications: Decision criteria, targets, errors, lot size and decision rules

Indicator with targets	Unit of analysis	Denominator	Decision criterion	Target	α error	β error	Selected lot size	Decision rule (below is failure)
Households with eligible children visited	Household	Households with eligible children	80%	100%	<0.0001	0.0982	25	23
SPAQ administered to eligible child (day 1)	Child	Households with eligible children	80%	100%	<0.0001	0.0982	25	23
Eligible child received three-day complete course of SPAQ (inc. day 2 and day 3 AQ)	Child	Eligible children provided SPAQ (day 1)	75%	95%	0.0341	0.0962	25	22
SPAQ administration observed by a community distributor (day 1)	Child	Eligible children provided SPAQ (day 1)	75%	95%	0.0341	0.0962	25	22
SMC child record card retention	Child	Eligible children provided SPAQ (day 1)	80%	100%	<0.0001	0.0982	25	23
All SPAQ doses received marked on card	Child	Eligible children provided SPAQ (day 1)	80%	100%	<0.0001	0.0982	25	23
Caregiver accepted SMC administration (not refused)	Child	Compounds reached	90%	100%	<0.0001	0.0718	25	25
SMC awareness (heard of SMC)	Caregiver	Households with eligible children	80%	100%	<0.0001	0.0982	25	23
SMC knowledge (purpose of SMC)	Caregiver	Households with eligible children	80%	100%	<0.0001	0.0982	25	23
SMC knowledge (age eligibility for SMC)	Caregiver	Households with eligible children	70%	90%	0.098	0.0905	25	21
SMC knowledge (importance of age eligibility for SMC)	Caregiver	Households with eligible children	70%	90%	0.098	0.0905	25	21
SMC knowledge (importance of administering AQ on day 2 and day 3)	Caregiver	Households with eligible children	70%	90%	0.098	0.0905	25	21
SMC knowledge (what to do in case of an adverse event)	Caregiver	Households with eligible children	70%	90%	0.098	0.0905	25	21
Confidence in SPAQ efficacy	Caregiver	Households with eligible children	75%	95%	0.0341	0.0962	25	22

2.2.2 EoC LQAS survey sampling and data collection methods

EoC surveys followed a multi-stage sampling approach. The first stage involved the selection of lots or SAs with probability proportional to population size (PPS) in places where all eligible SAs cannot be sampled due to logistical or capacity reasons. Health facility catchment areas were defined as SAs for sampling and DIDM purposes using LQAS methods in the EoC surveys in all areas, except for Borno state in Nigeria and Uganda, where administrative wards were used instead. The second stage involved the selection of 25 eligible households within selected SAs — in line with pre-determined optimal LQAS lot sample size as illustrated in Table 2 — using systematic random sampling. In practice, two types of systematic random sampling techniques were used, depending on whether SA-level household listing was feasible. In places where SA-level household listing was feasible, the starting household was selected from the list using a random number generator, typically Microsoft Excel-based or another statistics package. Subsequently, 24 additional households were selected from the list by applying a sampling interval, which was determined by dividing the total number of households in each SA by 25. In total, 25 households were selected per SA. In places where it was not feasible to list households, an alternative approach, the 'spin-the-pen' method, was used.[14] This involved spinning a pen in a central location in each selected SA to determine the starting household. Subsequently, 24 additional households were selected by walking in the direction indicated by the pen and applying a sampling interval or sequence which was dependant on the geographical size of the SA. Ineligible households — those without at least one SMC-eligible child — encountered in the sampling sequence were skipped. As up-to-date lists of households in each SA were rarely available and it was not feasible to conduct household listing in most places, the 'spin-the-pen' method was the more commonly used sampling method to systematically select eligible households within participating SAs.

In each selected household, after obtaining consent from residents for participation in the survey, a roster of all children 3–119 months was made in SurveyCTO, and their first name, age and sex were recorded. One child, aged 3–59 months, was then automatically selected at random from the roster using a randomisation algorithm in SurveyCTO, an electronic data collection platform. Only one eligible child was sampled per household to avoid overrepresentation of households with multiple eligible children. In all surveys, an ineligible child, aged 60–119 months, was opportunistically sampled, if such an older child was present in the household, to allow for estimation of summary statistics for the proportion of overage non-eligible children who received day 1 SPAQ. Households in which residents refused or were unable to participate, or without a child aged under five years, were resampled.

Similar sampling approaches — including the sampling of 25 households per supervision area — were followed in all countries, with context-specific adaptations as outlined for each country below. All eligible sub-national administrative units covered were included in survey sampling frames except otherwise stated. Where administrative units were excluded for any reason, such as insecurity and

inaccessibility as a result of severe flooding, they were noted under each country's sampling section. For each cycle and survey, supervision areas were randomly sampled from sampling frames containing all eligible areas in each country, with the exception of Mozambique and Uganda where there was capacity to sample all supervision areas in supported districts. As such, the representativeness of survey samples may not be similar in absolute terms from cycle to cycle in countries where not all supervision areas were sampled. Areas deemed inaccessible due to insecurity, flooding or other reasons were also excluded from sampling frames.

All survey questionnaires were administered using data forms in SurveyCTO (version 2.81), an electronic data collection platform for smartphones, and data were uploaded to a remote server after each day of data collection. Generic questionnaires were initially developed in English for Nigeria then were adapted for use in Uganda and South Sudan. These were translated into French for use in Burkina Faso, Chad and Togo, and into Portuguese for use in Mozambique. Survey questionnaires used in 2024 were based on those used in previous rounds, with adaptations to suit each country's specific context; for example, by changing terminology used to reflect differences in local administrative units or country-specific programmatic terminology. In some cases, survey questionnaires were also adapted to capture additional variables to answer specific research questions or obtain additional contextual information on SMC campaigns, such as the addition of questions relating to routine immunisation, zero-dose children and integrated community case management in Togo surveys. Interviews were typically conducted in the country's official language using questionnaires provided by Malaria Consortium. Where it was necessary to interview respondents in local languages, data collectors provided on-the-spot translation from the English, French or Portuguese questionnaire. Informed consent was received from all survey participants in accordance with Malaria Consortium's policy on ethical research, and caregivers and heads of household were read a description of the survey, its purpose and the nature of questions it contained.

Burkina Faso (cycles 1, 2, 3 and 4)

A multi-stage sampling approach was followed as described earlier under Section 2.2.2. In the first stage, 80 SAs were randomly sampled using PPS methods from the total number of SAs — represented by health facility catchment areas — in the health districts supported by Malaria Consortium in 2024. To enhance representation of sub-SA sampling units, stratification was applied by selecting three settlements at random from the catchment area of each of each selected SA, followed by the sampling of eight or nine compounds from each within-SA stratum (settlement) to give a total of 25 compounds sampled per SA. In each SA selected, 25 households were sampled, giving a total sample size of 2,000 households in each EoC survey (Table 3).

As up-to-date lists of households in each SA were unavailable and it was not feasible to conduct household comprehensive listings as part of the survey, the spin-the-pen method was used to systematically select eligible households within participating SAs. As described earlier, this stage

involved spinning a pen or bottle in a central location in each sampling unit to determine the starting household. Subsequent households were selected by walking in the direction the pen pointed to and applying a pre-determined sampling sequence, as deemed appropriate by the enumeration team, until the target number of eligible households (25) for each SA was reached. In each selected household, after obtaining consent from residents for participation in the survey, one child aged 3–59 months was sampled following the methods described earlier.

An ineligible child, aged 60–119 months, was opportunistically sampled, if such an older child was present in eligible households, to allow for estimation of summary statistics for the proportion of overage non-eligible children who received SPAQ. It is pertinent to note that SMC eligibility in the context of LQAS surveys in Burkina Faso aligned with the age group (3–59 months) targeted by SMC programmes supported by Malaria Consortium. As such, children aged 5–9 years were considered ineligible even in the districts where SMC age eligibility was expanded to include such older children through a programme supported by another funding source.

It is important to note that in cycle 1, SAs were selected only from among the 296 health facility catchment areas in 12 health districts where five cycles of SMC were delivered. In subsequent cycles, SAs were randomly selected from a list of 803 health facility catchment areas in the 27 districts supported by Malaria Consortium as an implementing partner. For this reason, the sampling frame and coverage estimates from the cycle 1 EoC survey were not comparable with those of the subsequent cycles. Districts determined to be inaccessible due to insecurity or other operational constraints during survey periods were excluded from survey sampling frames, as was the case for the districts of Barsalogho, Kongoussi, Mangodara and N'dorolla in all cycles. Due to the PPS sampling tool used, health districts with smaller population sizes were not sampled in all cycles, such as Lena and Sapone during cycle 4. Where districts were partially accessible due to insecurity or other reasons, accessible SAs within such districts were sampled in surveys.

Table 3. Sampling frame for 2024 end-of-cycle surveys, Burkina Faso (e.g. cycle 4)

Region	Health district	Number of supervision areas	Target number of households sampled
Cascades	Banfora	4	100
	Sindou	4	100
Centre	Sig-Nonghin	6	125
	Bogodogo	12	300
	Boulmiougou	8	200
	Nongremassom	4	100
	Baskuy	3	75
Centre Nord	Kaya	3	75
	Boussouma	6	150
Centre Sud	Kombissiri	2	50

	Po	2	50
	Manga	3	75
Hauts-Bassins	Karangasso Vigue	1	25
	Dande	3	75
	Dafra	3	75
	Do	1	25
	Hounde	5	125
	Orodara	2	50
Plateau Central	Zorgho	4	100
	Bousse	1	25
	Ziniare	3	75
Total	n= 21	80	2,000

Chad (cycles 1, 2 and 3)

Survey sampling frames were representative of the 30 health districts across the six regions where Malaria Consortium supported SMC, namely: Barh El Gazal, Batha, Chari Baguirmi, Hadjer Lamis, Mayo Kebbi East and N'Djamena. In the third cycle, health districts such as Amdjamena Bilala, Biliam Oursi and Moito that were inaccessible due to flooding were excluded from sampling frames. All health districts were divided into SAs of approximately equal population size, each covering the catchment areas of an average of three health centres. Each health district was classified as either urban or rural and sampling was carried out independently within those two strata. Within each SA, nine settlements — e.g. villages or urban wards in the case of N'Djamena — were randomly selected, from which three to four compounds were randomly sampled. This process covered all health facility catchment areas in which SMC was delivered and resulted in a target sample size of 3,775 compounds across 151 SAs (Table 4). Due to unavailability of up-to-date lists of households in each SA, systematic sampling of households within each selected SA followed the spin-the-pen method described earlier. Selection of eligible children and opportunistic sampling of ineligible children at the household level followed the methods described in Section 2.2.2 above.

Table 4. Sampling frame for 2024 end-of-cycle surveys, Chad (e.g. cycle 3)

Region	Health district	Number of health facilities	Number of supervision areas	Target number of households sampled
Chari Baguirmi	Ba-Illi	13	4	100
	Bousso	12	4	100
	Dourbali	18	6	150
	Mandelia	22	7	175
	Massenya	17	6	150

	Kouno	4	1	25
Hadjer Lamis	Bokoro	26	9	225
	Gama	10	3	75
	Karal	13	4	100
	Mani	14	5	125
	Massaguet	21	7	175
	Massakory	18	6	150
Mayo Kebbi Est	Bongor	25	8	200
	Guelendeng	10	3	75
	Moulkou	9	3	75
	Gam	11	4	100
	Katoa	4	1	25
N'Djamena	N'Djamena Centre	19	6	150
	N'Djamena Est	24	8	200
	N'Djamena Nord	20	7	175
	N'Djamena Sud	30	10	250
	Toukra	18	6	150
Barh El Ghazal	Chaddra	19	6	150
	Michemire	14	5	125
	Moussoro	32	11	275
	Salal	14	5	125
Batha	Yao	19	6	150
Total	n=27	456	151	3,775

Mozambique (cycles 1, 2 and 3)

Surveys sampled from 242 SAs across the 23 districts in which SMC was delivered during the 2023–2024 round. Within each SA, represented by a health facility catchment area, three *comunidades* — communities within a health facility catchment area — were selected at random and eight or nine households were surveyed in each, giving a total sample of 25 households per SA (Table 5). As comprehensive lists of households in each comunidade were rarely available, the spin-the-pen method was used to systematically select eligible households within participating SAs. In each selected household, the sampling of eligible children and opportunistic enrolment of ineligible children followed the methods described previously in Section 2.2.2.

Table 5. Sampling frame for 2024 end-of-cycle surveys, Mozambique (e.g. cycle 3)

Province	District	Number of supervision areas	Target number of households sampled
Nampula	Nampula district	22	625
	Murrupula	8	200
	Rapale	8	200
	Mecubúri	13	325
	Ribaue	10	250
	Lalaua	8	200
	Malema	11	275
	Mogovolas	8	200
	Moma	11	275
	Larde	9	225
	Angoche	20	500
	Liupo	3	75
	Mogincual	6	150
	Muecate	11	275
	Meconta	8	200
	Nacaroa	7	175
	Memba	14	350
	Erati	11	275
	Monapo	17	425
	Mossuril	12	300
	Ilha de Moçambique	5	125
	Nacala Porto	13	325
	Nacala-á-Velha	6	150
Total	**n=23**	**242**	**6,050**

Nigeria (cycles 1, 2, 3 and 4)

EoC surveys were conducted in all but the final cycles in Nigeria during 2024. Between 10 and 20 health facilities were randomly selected from each LGA in proportion to the LGA's population size. The catchment areas of these facilities were considered SAs for the purposes of the EoC surveys. Three settlements were randomly selected from the catchment area of each of these three health facilities and eight or nine compounds were sampled from each to give a total of 25 compounds sampled per health facility catchment area (Table 6). Due to the limited availability up-to-date and comprehensive lists of households at the SA-level, the spin-the-pen method was used to systematically select 25 eligible households in each participating SA as described previously in [23]

Section 2.2.2. The selection of eligible children and the opportunistic inclusion of ineligible children at the household level also followed the methods described in Section 2.2.2.

Sampling units in areas determined to be high risk due to insecurity were excluded from surveys, such as some supervision areas during the first three cycles in Sokoto state. Surveys were not conducted in Borno state following the first cycle due to inaccessibility as a result of severe flooding.

Table 6. End-of-cycle survey sampling frame for a typical cycle in 2024, Nigeria (e.g. cycle 3)

State	Number of health facility catchment areas/wards sampled	Target number of households sampled
Bauchi	322	8,050
Borno	344	8,600
FCT	274	6,850
Kebbi	225	5,625
Kogi	239	5,975
Nasarawa	147	3,675
Oyo	60	1,500
Plateau	325	8,125
Sokoto	241	6,025
Total	**2,177**	**54,425**

South Sudan (cycles 1, 2, 3 and 4)

EoC surveys were conducted three days after the end of every SMC distribution cycle in Aweil South and West counties. From the total 53 bomas which constituted the supervision areas — 23 in Aweil South and 30 in Aweil west counties — 40 bomas were randomly selected every cycle, 20 in each county. In each selected boma, 25 eligible households were sampled (Table 7). Since up-to-date household lists were not available for each SA in South Sudan, households within the selected SAs were systematically sampled using the spin-the-pen technique, as described earlier. The process for sampling eligible children and opportunistically sampling ineligible children at the household level adhered to the sampling approach outlined in Section 2.2.2.

Due to inaccessibility as a result of severe flooding, SAs representing the bomas of Achana, Ajok, Amutho, Anyuopjang, Chelkou, Majokadim, Malek Mayar, Marial Baai, Mayomakuakrel and Wundgir were not sampled during cycle 4. Where there was an influx of populations, including SMC eligible children, displaced by the humanitarian situation in neighbouring Sudan, internally displaced person (IDP) camps in such areas were included in the survey sampling frame. This was achieved by purposively selecting IDP camps as independent supervision areas or lots during LQAS surveys, as was the case in Wedwil Primary Healthcare Unit (PHCU) (Table 7).

Table 7. Sampling frame for 2024 end-of-cycle surveys, South Sudan (e.g. cycle 1)

County	Health facility	Number of supervision areas	Target number of households sampled
Aweil South	Panthou PHCC	2	50
	Nyieth PHCU	2	50
	Makueialel PHCU	1	25
	Tiaraliet PHCU	2	50
	Malekalel PHCC	2	50
	Wathmouk PHCU	2	50
	Wuncum PHCU	2	50
	Akach PHCU	1	25
	Mabior PHCU	1	25
	Alueth PHCU	1	25
	Aluel PHCU	1	25
	Macharkou PHCU	1	25
	Ayai PHCU	2	50
Aweil West	Nyamlel PHCC	2	50
	Marail Baai PHCC	2	50
	Aguat PHCU	1	25
	Amatngang PHCU	1	25
	Maker PHCU	1	25
	Goungnou PHCU	1	25
	Chelkou PHCC	1	25
	Nyinboulic PHCC	2	50
	MajokDengdit PHCU	1	25
	Mayomakuakrel PHCU	1	25
	Wungiir PHCU	1	25
	Udhum PHCC	1	25
	Anyoupjang PHCU	1	25
	Wedwil PHCU	2	50
	Maduany PHCU	2	50
Total	**n=28**	**40**	**1000**

PHCC: primary health care centre; PHCU: primary health care unit

Togo (cycles 1, 2, 3 and 4)

In Togo, Malaria Consortium used philanthropic funding to support EoC surveys in all SMC-implementing districts, including seven where we supported SMC as implementing partner and 16 where other partners were responsible for SMC delivery. Results from all districts are reported here.[25]

Survey SAs were represented by health facility catchment areas. The sampling frame included health facility catchment areas in all 23 districts (Table 8). Notably, certain localities in the Savanes region were excluded from the sampling frame due to insecurity. Three villages were randomly selected from each locality and eight or nine compounds were sampled from each to give a total of 25 compounds sampled per locality. As up-to-date lists of households in each SA were unavailable and it was not feasible to conduct household comprehensive listings as part of the survey, the spin-the-pen method was used to systematically select eligible households within participating villages and localities. In each selected household, after obtaining consent from residents for participation in the survey, one child aged 3–59 months was sampled following the methods described previously in Section 2.2.2. An ineligible child, aged 60–119 months, was also randomly selected, if such an older child was present in eligible households, to allow for estimation of summary statistics for the proportion of overage non-eligible children who received SPAQ.

Table 8. Sampling frame for 2024 end-of-cycle surveys, Togo (e.g. cycle 1)

Region	Health district	Number of health facilities	Number of supervision areas	Target number of households sampled
Savanes	Cinkasse	7	15	137
	Kpendjal-ouest	3	9	75
	Oti	6	14	129
	Oti-sud	2	6	55
	Tandjoare	3	9	76
	Tone	7	15	126
	Kpendjal	0	0	0
Kara	Assoli	1	3	25
	Bassar	4	8	75
	Binah	3	9	76
	Dankpen	2	6	50
	Doufelgou	4	11	101
	Keran	2	6	52
	Kozah	5	14	127
Centrale	Blitta	6	18	150
	Mô	3	9	83
	Sotouboua	6	18	151
	Tchamba	8	24	210
	Tchaoudjo	6	17	153

Plateaux	Amou	3	9	79
	Anie	2	6	50
	Est mono	4	12	109
	Ogou	2	6	50
Total	**n=23**	**89**	**244**	**2139**

Uganda (cycles 1, 2, 3 and 4)

EoC surveys were conducted in the five districts where Malaria Consortium supported SMC as an implementing partner with philanthropic funding: Amudat, Nakapiripirit, Moroto, Kotido and Nabilatuk. As in previous years, SAs were defined at the level of wards. Three villages were randomly selected from each ward and eight or nine compounds sampled from each to give a total of 25 compounds sampled per SA (Table 9). As up-to-date lists of households in each SA were unavailable and it was not feasible to conduct household comprehensive listings as part of the survey, the spin-the-pen method was used to systematically select eligible households within participating wards. The selection of eligible children, along with the opportunistic sampling of ineligible children at the household level, was based on the methods described in Section 2.2.2.

Table 9. Sampling frame for 2024 end-of-cycle surveys, Uganda (e.g. cycle 1)

Region	Health district	Number of supervision areas	Target number of households sampled
Karamoja	Amudat	10	250
	Kotido	16	400
	Moroto	12	300
	Nabilatuk	6	150
	Nakapiripirit	12	300
Total	**n=5**	**56**	**1,400**

2.2.3 End-of-round surveys

EoR surveys were conducted following the last cycle in all countries where Malaria Consortium supported SMC implementation during 2024. The surveys were conducted independently by local research firms selected by Malaria Consortium through a competitive open bidding process. The research firms were as follows:

- Burkina Faso: Innovative Hub for Research in Africa (IHfRA)
- Chad : Bureau d'Analyse et de Conseil en Intelligence Economique
- Nigeria: Sydani Group
- Mozambique: Comprehense Tech Limited
- South Sudan: Dev-com Consult Limited

- Togo: Africa Synergy Group Plus Sarl

Uganda: Afrotech Management Consult Limited.

EoR survey objectives and indicators

As in previous years, the EoR surveys aimed to assess SPAQ coverage defined as the proportion of eligible children that received SPAQ during the four or five monthly cycles of the 2024 SMC campaign. The surveys were designed to meet the following objectives:

- To assess programme coverage in terms of compounds/households visited
- To assess coverage of eligible children in terms of day 1 SPAQ administered, and full three-day course of SPAQ received during cycle 4
- To assess adherence to programme protocols, in terms of the proportion of day 1 SPAQ doses administered by community distributors adhering to DOT
- To assess SPAQ coverage in terms of children who received day 1 SPAQ during all four or five planned monthly cycles.

The key indicators were similar to those assessed in EoC survey, as outlined earlier in Table 2. In addition to those, EoR surveys enabled the estimation of the proportion of eligible children who received SPAQ in all monthly cycles of the round. Only key coverage indicators are presented for the purposes of this report. Unless otherwise specified, estimates of coverage indicators were based on self-reported information provided by caregivers.

EoR survey design

As with previous years, EoR surveys followed standard methodological designs similar to those employed in large scale population-based surveys such as national malaria indicator surveys and demographic and health surveys.

To ensure precise estimation of coverage and other indicators at the country level with a maximum of ±5% margin of error, surveys required a sample of 75 clusters per country — 66 per state in Nigeria — each comprising 20 households. That resulted in a total of 1,500 households with eligible children for each country, except for Nigeria where there were 1,320 households per state resulting in a total of 11,880 households across the nine supported states. The sample size was determined based on the following parameters and assumptions:

- Estimated coverage rate: 75–80%
- Confidence level: 95%
- Margin of error: ±5%
- Number of households in each cluster: 20
- Inter-cluster correlation: 0.2
- Design effect: 4.8
- Non-response rate: 5%

2.2.4 End-of-round survey sampling and data collection methods

Like the EoC surveys, EoR surveys employed multi-stage random sampling of households in areas covered by Malaria Consortium's philanthropic SMC programme. They were intended to achieve a representative sample of the target population at country level, or all administrative units within countries supported by Malaria Consortium's philanthropic SMC programme, and at state level in Nigeria.

The first stage of sampling involved the selection of survey clusters with PPS methods. Clusters were typically defined at the level of health facility catchment areas, or census enumeration areas such as in Nigeria. Where administrative units and their constituent clusters were excluded for any reason, such as insecurity or inaccessibility as a result of severe flooding, it was noted under each country's sampling section. The second stage involved the selection of 20 eligible households within the selected cluster using systematic random sampling methods similar to those described earlier for EoC LQAS surveys. In places where comprehensive cluster-level household lists were available or where household listing was feasible as part of surveys, as was the case in Nigeria and Uganda, the starting household was selected from the list using a random number generator. Subsequently, 19 additional households were selected from the list by applying a sampling interval determined by dividing the total number of households in each cluster by 20.

Alternatively, the spin-the-pen method was used in places where it was not feasible to list households, as was the case in Burkina Faso, Chad, Mozambique, South Sudan and Togo. This involved spinning a pen in a central location in each selected SA to determine the starting household. Subsequently, 19 additional households were selected by walking in the direction indicated by the pen and applying a sampling interval determined in several ways depending on geographical the size of the cluster.

In each selected household, an eligible child was selected using methods similar to those described earlier for EoC LQAS surveys. Only one eligible child was sampled per household to avoid overrepresentation of households with multiple eligible children. In all surveys, except those in Mozambique and Uganda, an ineligible child aged 60–119 months was sampled opportunistically, when such an older child was present in the household, to allow for estimation of summary statistics for the proportion of overage non-eligible children who received day 1 SPAQ. In Mozambique and Uganda, older ineligible children were sampled independently to enable a more representative sample of older children. Households in which residents refused, were unable to participate or lacked a child under five years were resampled. Ineligible households encountered in the sampling sequence were skipped.

Sampling protocols aimed to achieve a self-weighted sample with clusters selected using the PPS methods. All district-level administrative units were represented in the EoR sampling frames, from which 75 survey clusters were selected in each country — with the exception of Nigeria where 66 clusters were selected per state — using PPS sampling methods. Replacements were made for

selected clusters that were within areas deemed inaccessible due to insecurity or other reasons, such as in Burkina Faso and Togo. Similar sampling approaches — including the sampling of 20 households per survey cluster — were followed in all countries, with context-specific adaptations as outlined for each country below.

Unlike EoC surveys which are conducted usually one week following the cycle, EoR surveys are typically conducted one month following the final cycle. This is to enable the collection of data on fever and malaria occurrences in the 28 days following the final cycle. However, the interval between the final cycle and EoR survey was considerably longer than one month in Mozambique, Togo and Borno state in Nigeria, mostly due to delays in completing contractual agreements and field deployment arrangements with independent evaluators. EoR survey data collectors were generally selected through an open process, managed by the external contractor and overseen by Malaria Consortium. Contractors conducted interviews with the data collectors. During these interviews, the contractor ascertained whether the data collectors met key criteria such as being able to speak the local language and verified whether they were involved in SMC delivery in any capacity. Individuals involved in SMC delivery were considered ineligible to work as survey data collectors.

Survey questionnaire and data collection methods are similar to those described for EoC surveys in Section 2.2.2. As in previous rounds, additional variables were included in the EoR surveys to facilitate further analyses to better understand how Malaria Consortium's SMC programme works and to answer specific research questions as also described for EoC surveys in Section 2.2.2. Interviews were typically conducted in the country's official language using questionnaires provided by Malaria Consortium. Where it was necessary to interview respondents in local languages, data collectors provided on-the-spot translation from the English, French or Portuguese questionnaire. Similar sampling approaches — including the sampling of 20 households per survey cluster — were followed in all countries, with context-specific adaptations as outlined below for each country.

Burkina Faso

The EoR survey sampled from districts supported by Malaria Consortium as implementing partner in 2024, distributed across six regions. To ensure that the sample was representative at the country level, 75 clusters represented by health facility catchment areas were selected with probability proportional to population size from a list of all health facility catchment areas in all 27 health districts where SMC was delivered in 2024, except Barsalogho health district which was excluded due to insecurity (Table 10). To ensure representativeness in terms of the number of four- and five-cycle districts and type of residence — urban and rural — the cluster selection was stratified accordingly. Four strata were thus formed: health facilities in four-cycle health districts located in rural areas, health facilities in four-cycle health districts located in urban areas, health facilities in five-cycle health districts located in rural areas and health facilities in five-cycle health districts located in urban areas. For health facilities covering more than three villages or smaller communities, three of those were randomly selected with equal probability.

Within each selected cluster, 20 households with at least one child aged 3–59 months were sampled. The spin-the-pen method was used to systematically select eligible households within participating survey clusters as described elsewhere in Section 2.2.4. In each selected household, eligible children were sampled using similar methods as illustrated in Section 2.2.4. Ineligible child, aged 60–119 months, were opportunistically sampled for the estimation of summary statistics for the proportion of overage non-eligible children who received SPAQ.

Table 10. Sampling frame for 2024 end-of-round surveys, Burkina Faso

Region	Health district	Number of clusters	Target number of compounds surveyed
Cascades	Banfora	4	80
	Mangodara	2	40
	Sindou	2	40
Centre	Baskuy	1	20
	Bogodogo	4	80
	Boumiougou	4	80
	Nongre-massom	1	20
	Sig-Nonghin	2	40
Centre Nord	Boussouma	2	40
	Kaya	5	100
	Kongoussi	4	80
Centre Sud	Kombissiri	3	60
	Manga	4	80
	Po	3	60
	Sapone	2	40
Hauts-Bassins	Dafra	1	20
	Dande	3	60
	Do	3	60
	Hounde	3	60
	Karangasso Vigue	1	20
	Lena	1	20
	NDorola	2	40
	Orodara	3	60
Plateau Central	Bousse	3	60
	Ziniaré	6	120
	Zorgho	6	120
Total	**n=26**	**75**	**1,500**

Chad

In Chad, the survey was conducted in the 30 supported health districts across six regions. To ensure representativeness, a sample of 1,500 children from 1500 households — one child per household — were sampled from 75 clusters; 20 households per survey cluster in accordance with the pre-determined cluster size. Clusters were selected from a comprehensive list of all cluster across the 30 supported health districts. Within each selected cluster, 20 households with at least one child aged 3–59 months were sampled. The spin-the-pen method was used to systematically select eligible households within participating survey clusters. Since up-to-date within-cluster household lists were unavailable, households within the selected SAs were systematically sampled using the spin-the-pen technique, as described earlier. The process for identifying eligible children and opportunistically sampling ineligible children at the household level adhered to the approach outlined in Section 2.2.4**.** Overall, this approach allowed us to obtain 20 households in each cluster and to reach a total sample size of 1500 households (Table 11).

Table 11. Sampling frame for 2024 end-round surveys, Chad

Region	Health district	Target number of compounds surveyed
Chari Baguirmi	Ba-Illi	60
	Bousso	40
	Dourbali	80
	Kouno	40
	Mandelia	40
	Massenya	20
Hadjer Lamis	Bokoro	40
	Gama	40
	Karal	40
	Mani	40
	Massaguet	40
	Massakory	40
Kebbi Mayo Est	Biliam Oursi	40
	Bongor	60
	Gam	40
	Guelendeng	40
	Katoa	40
	Moulkou	60
N'Djamena	N'Djamena Centre	100
	N'Djamena Est	100
	N'Djamena Nord	100
	N'Djamena Sud	140
	Toukra	120

Barh El Ghazal	Chaddra	40
	Michemire	40
	Moussoro	40
	Salal	40
Batha	Amdjamena Bilala	40
	Moito	40
	Yao	40
Total	**n=30**	**1500**

Mozambique

In Mozambique, survey samples were self-weighted within districts, with clusters selected with probability proportional to sample size. The main sampling frame for the selection process was a list of enumeration areas in all 23 SMC districts. First, 75 enumeration areas were randomly selected from the list using PPS methods. This allowed for a self-weighted sample. Clusters were the primary unit of sampling within which households and eligible children were selected randomly. Second, from each selected cluster, age-stratification was done to enable the sampling of 20 households with age-eligible children, aged 3–59 months (Table 12). 15 households with ineligible children, aged 60–119 months, were selected independently. Note that the sampling strategy here was such that older ineligible children, aged 60–119 months, were sampled irrespective of whether they resided in the same households as eligible children, unlike in other countries, except Uganda, where older ineligible children were sampled opportunistically in the same households as eligible children. The survey was thus more representative of older ineligible children than those based on opportunistic sampling. Within-cluster sampling followed the spin-the-pen systematic randomly sampling approach described in Section 2.2.4.

Table 12. Sampling frame for 2024 end-of-round surveys, Mozambique

Province	District	Number of clusters	Target number of compounds
Nampula	Angoche	5	100
	Cidade de Ilha de Mocambique	1	20
	Cidade de Nampula	11	220
	Erati	5	100
	Lalaua	2	40
	Larde	2	40
	Liupo	1	20
	Malema	3	60
	Meconta	3	60
	Mecubúri	3	60
	Memba	4	80
	Mogincual	1	20

	Mogovolas	5	100
	Moma	4	80
	Monapo	5	100
	Mossuril	2	40
	Muecate	2	40
	Murrupula	2	40
	Nacala Porto	4	80
	Nacala Velha	2	20
	Nacaroa	2	40
	Rapale	2	40
	Ribaue	4	80
Total	**n=23**	**75**	**1,500**

Nigeria

EoR surveys were designed to be representative at the state level. Target sample sizes were specified in advance for each state, with 1,320 compounds from 66 clusters — 20 compounds per cluster — considered appropriate for estimating coverage at state level to within an accuracy of five percent (Table 13). A total of 66 enumeration areas, cluster units, were selected in each of the eight states and the FCT, with probability proportional to population size. Due to insecurity, clusters in the LGAs of Goronyo, Isa, Rabah, Sabon Birni and Tureta in Sokoto state were excluded from the state's sampling frame. At the second stage, 20 eligible households were be selected from each selected cluster using a systematic random sampling method. This was preceded by preparation of a household listing to generate a household sampling frame. Where applicable, a mapping update of the clusters was also conducted to ensure that new changes to the existing map were reflected since the last population census was held. These sampling methods are explained in greater detail by the national protocol, based on the 2020 protocol, produced by Malaria Consortium in partnership with the Nigerian National Malaria Elimination Programme.[15]

With each cluster, the starting household was selected from the list of households using a random number generator. Subsequently, 19 additional households were selected from the list by applying a sampling interval determined by dividing the total number of households in each cluster by 20 until the target cluster size of 20 was achieved. The sampling of ineligible children followed the opportunistic process described in Section 2.2.4 to allow for estimation of summary statistics for the proportion of overage non-eligible children who received SPAQ.

Table 13. Sampling frame for 2024 end-of-round surveys, Nigeria

State	Number of clusters sampled	Target number of compounds surveyed
Bauchi	66	1,320
Borno	66	1,320

FCT	66	1,320
Kebbi	66	1,320
Kogi	66	1,320
Nasarawa	66	1,320
Oyo	66	1,320
Plateau	66	1,320
Sokoto	66	1,320
Total	**594**	**11,880**

South Sudan

The survey employed a multi-stage random sampling method in areas covered by Malaria Consortium's SMC programme, aiming for a representative sample of the target population in Aweil South and West, Northern Bahr el Ghazal state. Clusters — 75 in total — were selected with PPS from a spreadsheet of all eligible bomas, cluster units, in the two supported counties (Table 14). Within each selected cluster, 20 households with at least one child aged 3–59 months were sampled. In the absence of complete household lists for each cluster, systematic sampling of households was conducted using the spin-the-pen method, as previously outlined. The approach for selecting eligible children and the opportunistic sampling of ineligible children at the household level, to allow for estimation of summary statistics for the proportion of overage non-eligible children who received SPAQ, followed the procedures detailed in Section 2.2.2.

On average, each cluster was located 7.9 km from its health centre. In areas with an influx of displaced populations including SMC eligible children such as from neighbouring Sudan, IDP camps in such areas were included in the survey sampling frame by purposively selecting them as a separate survey cluster, as was the case in Guomjuer East (Table 14).

Table 14. Sampling frame for 2024 end-of-round surveys, South Sudan

County	Payam	Number of supervision areas/clusters	Target number of compounds surveyed
Aweil South	Tarweng	2	96
	Tiaraliet	2	227
	Panthou	2	217
	Gakrol	3	173
	Nyoc- Awany	3	344
	Nyieth	3	302
	Wathmuok	4	350
	Ayat Centre	4	828

	Ayai	5	660
Aweil West	Gumjuer Centre	1	278
	Guomjuer East	1	126
	Achana	1	28
	Ayat East	2	213
	Ayat West	3	371
	Mariem West	3	525
	Mariem East	3	171
	Guomjuer West	16	2179
	Achana	17	1831
Total	**n=18**	**75**	**1,500**

Togo

As with EoC surveys, Malaria Consortium used philanthropic funding to support the EoR survey in all 23 SMC-implementing districts, including 16 where we did not act as implementing partner. Results from all districts are reported here. A random sampling procedure was performed to select clusters from a sampling frame of all clusters across the 23 districts. Kpendjal district was however subsequently excluded from the sampling frame due to insecurity. This was done using a random selection tool designed by Malaria Consortium. Data on localities and their populations, provided by the country's National Malaria Control Programme, were entered into the tool which selected 75 clusters for 2024 EoR survey with PPS (Table 15). Within each selected cluster, 20 households with at least one child aged 3–59 months were sampled following the spin-the-pen methods described in Section 2.2.4. Sampling of eligible children and opportunistic sampling of ineligible children at the household level also followed the approaches described in Section 2.2.4.

Table 15. Sampling frame for 2024 end-of-round surveys, Togo

Region	Health district	Number of clusters (health facilities) sampled	Target number of compounds surveyed
Centrale	Blitta	3	60
	Mô	2	40
	Sotouboua	3	60
	Tchamba	4	80
	Tchaoudjo	5	100
Kara	Assoli	1	20
	Bassar	3	60
	Binah	2	40
	Dankpen	4	80
	Doufelgou	2	40
	Keran	3	60
	Kozah	6	120

Plateaux	Amou	2	40
	Anie	4	80
	Est Mono	3	60
	Ogou	5	100
Savanes	Cinkasse	3	60
	Kpendjal-Ouest	3	60
	Oti	3	60
	Oti-Sud	3	60
	Tandjoare	3	60
	Tone	8	160
Total	**n=22**	**75**	**1,500**

Uganda

A total of 75 clusters, represented by sub-district wards, were selected with PPS from all districts where SMC was delivered with philanthropic support in 2024, with 47 clusters in the five districts (Table 16). Age-stratification of sampling within clusters followed the methods described earlier for Mozambique to enable the sampling of a total of 35 households per cluster: 20 for children aged 3–59 months and 15 for those aged 60–119 months. Using comprehensive cluster-level household lists, the starting household was selected from the list using a random number generator. Subsequently, 19 additional households for eligible children aged 3–59 months — 14 additional households for those aged 60–119 months — were selected from the list by applying a sampling interval. This interval was determined by dividing the total number of households in each cluster by 20. Ultimately, a total 20 households were selected per cluster.

Note that sampling strategy here was such that older ineligible children were sampled irrespective of whether they resided in the same households as eligible children, unlike in other countries, except Mozambique, where older ineligible children were sampled opportunistically in the same households as eligible children. The survey was thus more representative of older ineligible children 60–119 months than those based on opportunistic sampling of older children. Table 16 shows the sampling frame for the five districts supported with philanthropic funding.

Table 16. Sampling frame for 2024 end-of-round surveys, Uganda

Region	Health district	Number of sub-counties	Number of clusters	Target number of compound surveyed
Karamoja	Amudat	8	9	297
	Nakapiripirit	8	9	297
	Moroto	8	9	297
	Kotido	10	14	490
	Nabilatuk	6	6	198
Total	**n=5**	**47**	**47**	**1,579**

2.3 Data quality assurance

Efforts continued to be made to enhance the quality of M&E data across the programme. Ensuring high-quality survey data is essential for accurately monitoring programme coverage and performance. Having reliable data not only enables accurate estimates of programme performance but also facilitates DIDM by helping to identify real gaps and areas for improvement in intervention delivery. To enhance the validity, accuracy and consistency of survey data, several quality assurance measures were implemented throughout the data life cycle. As with previous rounds, data quality assurance efforts made in 2024 included regular training of survey data collectors, real-time survey data auditing and global positioning system (GPS) tracking to verify interview locations and duration. We continued use of data validation checks on the electronic data collection forms to flag the entry of implausible data values such as age, while prompting the data collector to validate or correct such entries before proceeding. Hidden variables have also been used to monitor interviews for the duration of sensitive survey segments, particularly for probing caregiver recall on children's medication doses. Other data quality assurance measures included re-visiting potentially eligible households where caregivers were unavailable on the first attempt. This minimises any bias associated with excluding such households. Although we are yet to fully understand the extent to which campaign digitalisation enhances data quality, the recent use of digitalised tools for administrative data collection does offer opportunities for improving the quality of data captured and reported by community distributors for more accurate estimation of administrative coverage.

Minimising risks of recall and social desirability bias in survey data

Several measures were taken to minimise recall bias, including shortening the recall periods by conducting surveys within one week of SPAQ distribution and the use of anchoring techniques to assist respondents' recall by linking the last SPAQ distribution to specific timeframes, local events or holidays. Other measures included the use visual aids, such as by showing caregivers pictures of SMC blister packs or SPAQ administration to prompt better recall and minimise any confusion of SPAQ with other interventions administered orally like vitamin A supplements, and the use of cross-validation, asking the same question in different ways to check for consistency in responses.

All survey data were collected primarily based on caregiver reports. This poses a risk of social desirability bias. Efforts made to minimise the potential for social desirability bias included training of enumerators to be neutral and non-judgemental during surveys, assuring respondents of their anonymity and confidentiality, and reassuring them that whatever answers they gave will not have any punitive consequences. While a child's SMC coverage status can be determined or validated using home-based SMC child record cards that are given to caregivers by community distributors the first time they administer SPAQ to a child each season, the retention and use of these cards by caregivers remain variable across supported areas. Moreover, information recorded by caregivers on day 2 and day 3 AQ doses administered to children at home after distributor visits may be inconsistent. As in the previous reporting periods, SMC child record cards were not employed to

measure programme coverage for the purposes of this report given the limited availability and reliability of the cards as data sources. However, efforts were made to quality assure coverage data obtained from caregiver reports, such as the use of anchoring techniques and cross-validation, asking the same question in different ways to check for consistency in responses

2.4 Data analysis

Data from both EoC and EoR household surveys were collected using SurveyCTO software (version 2.80). Once data collection was completed, data were exported, processed and analysed using Stata (version 16). To generate estimates that are representative at the country level for each cycle, post hoc weighting was applied. This approach ensures unbiased, representative estimates by accounting for the complex and hierarchical sampling design of surveys: sampling of children within clusters, which were nested within lower subnational administrative units which were themselves nested within higher-level subnational administrative units. Population sizes at the cluster, district — LGA in Nigeria or county in South Sudan — and regional levels — state in Nigeria and provincial in Mozambique — were used to compute selection probabilities and sampling weights at each level. The data was set up in Stata using the svyset command, specifying primary sampling units (clusters), stratification (region, state or province) and finite population correction based on cluster size. Weighted country-level estimates of coverage and other indicators, in addition to state-level estimates in the case of Nigeria, with their 95% CIs were then computed using the svy: proportion command and logit transformation functions in Stata.

3. Results

3.1 Administrative coverage

Estimates of administrative coverage by cycle using data from SMC tally sheets and mean coverage across all cycles delivered, disaggregated by age group based on data from SMC tally sheets, are shown in Table 17 for Burkina Faso, Chad, Mozambique, South Sudan, Togo and Uganda and in Table 18 for Nigeria.

In 2024, Malaria Consortium supported the delivery of SMC across seven countries, reaching a total of 17,208,260 children per cycle on average. Considering an estimated 17,074,746 target population, this represents an overall administrative coverage of 100.8 percent, ranging from 92.3 percent in Mozambique to 115.3 percent in Burkina Faso. While the total coverage appears high, variations in administrative coverage were observed across countries.

Burkina Faso recorded the highest administrative coverage at 115.3 percent, indicating that the number of children reported as reached (2,477,164) remarkably exceeded the target population of 2,148,425. Chad also exceeded 100 percent administrative coverage (104.0 percent). In South Sudan nearly all (99.8 percent) of the 76,457 eligible targeted were reached in 2024. This was also the case in Togo where 99.1 percent of the 1,864,611 children in the target population were reached.

Relatively lower, but still high, levels of administrative coverage were reported in Nigeria (98.9 percent) ranging from 93.3 percent in Sokoto to 103.1 percent in Plateau, with most states achieving coverage above 95 percent, and in Uganda (96.3 percent). Mozambique had the lowest administrative coverage, reaching 92.3 percent of the 1,482,649 children targeted in 2024.

Overall, despite some notable variations, the programme successfully reached most of the target population of eligible children across all covered countries and Nigerian states according to administrative data.

Table 17. Administrative coverage by country, cycle and age group in 2024

Country		Age group (months)	Target population	cycle 1		cycle 2		cycle 3		cycle 4		cycle 5		Mean	
				Doses	Coverage	Doses	Coverage	Doses	Coverage	Doses	Coverage	Doses	Coverage	Doses	Coverage
Burkina Faso	Districts with four cycles	3–<12	270,600	253,526	93.7	264,881	97.9	268,206	99.1	279,093	103.1	-	-	266,427	98.5
		12–59	1,132,149	1,344,585	118.8	1,378,104	121.7	1,392,725	123.0	1,424,683	125.8	-	-	1,385,024	122.3
		3–59	1,402,749	1,598,111	113.9	1,642,985	117.1	1,660,931	118.4	1,703,776	121.5	-	-	1,651,451	117.7
	Districts with five cycles	3–<12	140,760	126,801	90.1	129,489	92.0	138,627	98.5	142,263	101.1	148,922	105.8	137,220	97.5
		12–59	604,916	659,704	109.1	670,764	110.9	697,095	115.2	701,840	116.0	713,060	117.9	688,493	113.8
		3–59	745,677	786,505	105.5	800,253	107.3	835,722	112.1	844,103	113.2	861,982	115.6	825,713	110.7
	All districts	3–<12	411,360	380,327	92.5	394,370	95.9	406,833	98.9	421,356	102.4	148,922	105.8	403,647	98.1
		12–59	1,737,065	2,004,289	115.4	2,048,868	117.9	2,089,820	120.3	2,126,523	122.4	713,060	117.9	2,073,517	119.4
		3–59	2,148,425	2,384,616	111.0	2,443,238	113.7	2,496,653	116.2	2,547,879	118.6	861,982	115.6	2,477,164	115.3
Chad		3–<12	287,407	289,484	100.7	283,285	98.6	295,725	102.9	294,669	102.5	-	-	290,791	101.2
		12–59	1,149,630	1,193,742	103.8	1,198,653	104.3	1,207,633	105.0	1,212,638	105.5		-	1,203,167	104.7
		3–59	1,437,037	1,483,226	103.2	1,481,938	103.1	1,503,358	104.6	1,507,307	104.9		-	1,493,958	104.0
Mozambique		3–<12	437,301	226,909	51.9	239,979	54.9	329,838	75.4	297,499	68.0		-	273,556	62.6
		12–59	1,045,348	889,996	85.1	964,649	92.3	1,295,469	123.9	1,230,223	117.7		-	1,095,084	104.8
		3–59	1,482,649	1,116,905	75.3	1,204,628	81.2	1,625,307	109.6	1,527,722	103.0	-	-	1,368,640	92.3
South Sudan		3–<12	14,527	11,774	81.0	13,244	91.2	11,346	78.1	13,159	90.6	13,638	93.9	12,632	87.0
		12–59	61,930	56,653	91.5	63,921	103.2	63,548	102.6	66,613	107.6	67,481	109.0	63,643	102.8
		3–59	76,457	68,427	89.5	77,165	100.9	74,894	98.0	79,772	104.3	81,119	106.1	76,275	99.8
Togo		3–<12	30,032	27,421	91.3	28,178	93.8	28,232	94.0	26,522	88.3	23,624	78.7	26,795	89.2
		12–59	156,579	149,830	95.7	156,695	100.1	157,527	100.6	161,706	103.3	164,592	105.1	158,070	101.0
		3–59	186,611	177,251	95.0	184,873	99.1	185,759	99.5	188,228	100.9	188,216	100.9	184,865	99.1
Uganda		3–<12	40,158	33,031	82.3	35,252	87.8	37,147	92.5	36,457	90.8	44,556	111.0	37,289	92.9
		12–59	123,747	113,780	91.9	117,055	94.6	123,610	99.9	126,213	102.0	122,118	98.7	120,555	97.4
		3–59	163,905	146,811	89.6	152,307	92.9	160,757	98.1	162,670	99.2	166,674	101.7	157,844	96.3

Table 18. Administrative coverage by Nigerian state, cycle and age group (tally sheet method) in 2024

Country and state		Age group (months)	Target population	cycle 1		cycle 2		cycle 3		cycle 4		cycle 5		Mean	
				Doses	Coverage	Doses	Coverage	Doses	Coverage	Doses	Coverage	Doses	Coverage	Doses	Coverage
Nigeria	Bauchi	3–<12	397,200	412,867	103.9	415,480	104.6	386,909	97.4	386872	97.4	367,577	92.5	393,941	99.2
		12–59	1,697,425	1,720,651	101.4	1,718,678	101.3	1,598,557	94.2	1598594	94.2	1,543,689	90.9	1,636,034	96.4
		3–59	2,094,625	2,133,518	101.9	2,134,158	101.9	1,969,612	94.0	1,985,466	94.8	1,911,266	91.2	2,026,804	96.8
	Borno	3–<12	447,980	454,589	101.5	450,533	100.6	452,756	101.1	454,613	101.5	-	-	453,123	101.1
		12–59	1,915,804	1,922,336	100.3	1,921,841	100.3	1,922,175	100.3	1,922,468	100.3	-	-	1,922,205	100.3
		3–59	2,363,784	2,376,925	100.6	2,372,374	100.4	2,374,931	100.5	2,377,081	100.6	-	-	2,375,328	100.5
	FCT	3–<12	182,227	173,421	95.2	172,553	94.7	171,614	94.2	170,702	93.7	166,674	91.5	170,993	93.8
		12–59	779,035	772,358	99.1	774,431	99.4	766,492	98.4	766,851	98.4	763,415	98.0	768,709	98.7
		3–59	961,262	945,779	98.4	946,984	98.5	938,106	97.6	937,553	97.5	930,089	96.8	939,702	97.8
	Kebbi	3–<12	255,454	272,299	106.6	271,273	106.2	274,228	107.3	203,257	79.6	-	-	255,264	99.9
		12–59	1,091,326	1,106,648	101.4	1,107,517	101.5	1,116,133	102.3	1,023,590	93.8	-	-	1,088,472	99.7
		3–59	1,346,780	1,378,947	102.4	1,378,790	102.4	1,390,361	103.2	1,226,847	91.1	-	-	1,343,736	99.8
	Kogi	3–<12	224,689	240,891	107.2	241,686	107.6	220,381	98.1	240,768	107.2	237,066	105.5	236,158	105.1
		12–59	959,963	975,550	101.6	973,780	101.4	877,371	91.4	970,889	101.1	959,391	99.9	951,396	99.1
		3–59	1,184,652	1,216,441	102.7	1,215,466	102.6	1,097,752	92.7	1,211,657	102.3	1,196,457	101.0	1,187,555	100.2
	Nasarawa	3–<12	186,957	194,012	103.8	194,796	104.2	193,906	103.7	196,798	105.3	193,387	103.4	194,580	104.1
		12–59	798,831	807,715	101.1	808,997	101.3	809,040	101.3	814,785	102.0	807,661	101.1	809,640	101.4
		3–59	985,788	1,001,727	101.6	1,003,793	101.8	1,002,946	101.7	1,011,583	102.6	1,001,048	101.5	1,004,219	101.9
	Oyo	3–<12	49,480	50,378	101.8	50,150	101.4	50,139	101.3	49,202	99.4	48,976	99.0	49,769	100.6
		12–59	211,479	210,515	99.5	210,054	99.3	210,239	99.4	207,064	97.9	206,017	97.4	208,778	98.7
		3–59	260,959	260,893	100.0	260,204	99.7	260,378	99.8	256,266	98.2	254,993	97.7	258,547	99.1
	Plateau	3–<12	177,478	182,185	102.7	194,540	109.6	182,005	102.6	183,582	103.4	189,608	106.8	186,384	105.0
		12–59	757,947	768,102	101.3	778,162	102.7	791,407	104.4	771,912	101.8	779,418	102.8	777,800	102.6
		3–59	935,425	950,287	101.6	972,702	104.0	973,412	104.1	955,494	102.1	969,026	103.6	964,184	103.1
	Sokoto	3–<12	274,256	270,278	98.5	267,337	97.5	272,187	99.2	266,851	97.3	-	-	269,163	98.1
		12–59	1,172,131	1,086,950	92.7	1,061,683	90.6	1,069,244	91.2	1,103,227	94.1	-	-	1,080,276	92.2
		3–59	1,446,387	1,357,228	93.8	1,329,020	91.9	1,341,431	92.7	1,370,078	94.7	-	-	1,349,439	93.3

	3–<12	2,195,721	2,250,920	102.5	2,258,348	102.9	2,204,125	100.4	2,152,645	98.0	1,203,288	98.8	2,209,375	100.6
Total	12–59	9,383,941	9,370,825	99.9	9,355,143	99.7	9,160,658	97.6	9,179,380	97.8	5,059,591	97.2	9,243,310	98.5
	3–59	11,579,662	11,621,745	100.4	11,613,491	100.3	11,348,929	98.0	11,332,025	97.9	6,262,879	97.5	11,449,514	98.9

3.2 Coverage surveys

This section presents the results of EoC and EoR surveys in Burkina Faso, Chad, Mozambique, Nigeria, South Sudan, Togo and Uganda.

3.2.1 Households with eligible children visited by a community distributor

Tables 19–21 show proportions of households visited by a community distributor in each cycle for which a survey was conducted, with 95% CIs and sample sizes.

Generally, high coverage in terms of the proportion of households visited by a community distributor was observed across locations and cycles, with some countries maintaining steady coverage while others experienced variations between cycles (Tables 19–21).

Burkina Faso recorded consistently high household coverage across all cycles, with proportions ranging from 98.2 to 99.0 percent. Chad demonstrated a somewhat progressive increase in the proportion of households visited: from 91.9 percent in cycle 1 to 97.0 percent in cycle 3. However, coverage slightly dropped to 93.6 percent in cycle 4. Similarly, Mozambique began with lower coverage at 86.5 percent in cycle 1 and improved to 95.7 percent by cycle 3. However, a marked decrease to 74.0 percent was observed in cycle 4.

South Sudan maintained relatively lower household coverage in some cycles, with only cycle 2 and cycle 3 reaching higher than 90 percent coverage. Togo recorded high coverage, ranging from 97.4 to 98.4 percent between cycle 1 and cycle 4, followed by relatively lower but still high coverage of 95.9 percent in cycle 5. Uganda reported very high levels of household coverage; above 98 percent in all cycles.

In Nigeria, the proportions ranged from 91.0 percent to 97.4 percent across cycles. At the state-level, coverage was above 90 percent in most cycles across the eight states while being lower than 90 percent in all cycles in the FCT.

Table 19. Proportions of households with eligible children visited by a community distributor by country and survey

Data source	Number of households sampled	Proportion of households covered	95% CI
Burkina Faso (districts receiving five cycles)			
EoC: cycle 1	2,000	98.2	95.2–99.3
Burkina Faso (all districts)			
EoC: cycle 2	1,999	99.0	98.1–99.5
EoC: cycle 3	1,999	98.9	98.1–99.4
EoC: cycle 4	2,000	98.6	97.6–99.2
EoR: cycle 5	1,500	98.5	97.7–99.0
Chad			
EoC: cycle 1	5,908	91.9	88.6–94.2
EoC: cycle 2	5,985	94.7	92.9–96.1
EoC: cycle 3	5,769	97.0	96.0–97.8

EoR: cycle 4	1,491	93.6	92.2–94.8
Mozambique			
EoC: cycle 1	6,329	86.5	83.1–89.4
EoC: cycle 2	6,556	88.4	84.7–91.3
EoC: cycle 3	6,610	95.7	93.4–97.3
EoR: cycle 4	1,789	74.0	67.3–79.8
Nigeria (states with five cycles)			
EoC: cycle 1	28,367	91.0	88.6–93.0
Nigeria (All states)			
EoC: cycle 2	39,378	92.8	91.4–94.0
EoC: cycle 3	42,569	96.8	95.9–97.5
EoC: cycle 4	43,072	97.4	96.8–97.9
EoR: cycle 5	11,879	94.1	93.7–94.6
South Sudan			
EoC: cycle 1	1,024	86.0	72.9–93.3
EoC: cycle 2	1,022	91.2	82.4–95.8
EoC: cycle 3	1,024	90.1	83.3–94.3
EoC: cycle 4	746	87.1	75.0–93.8
EoR: cycle 5	1,500	79.9	77.8–81.9
Togo			
EoC: cycle 1	1,725	97.4	96.2–98.3
EoC: cycle 2	2,139	97.7	96.3–98.5
EoC: cycle 3	2,129	98.4	97.2–99.1
EoC: cycle 4	1,670	98.0	95.8–99.0
EoR: cycle 5	1,500	95.9	95.0–97.0
Uganda			
EoC: cycle 1	1,398	98.9	96.3–99.7
EoC: cycle 2	1,400	98.8	92.8–99.8
EoC: cycle 3	1,400	99.3	98.0–99.7
EoC: cycle 4	1,400	99.3	96.8–99.9
EoR: cycle 5	1,575	98.3	97.3–99.0

Table 20. Proportions of households with eligible children visited by a community distributor by Nigerian state and survey (states with four cycles)

Data source	Number of households sampled	Proportion of households covered	95% CI
Borno			
EoC: cycle 1*	n/a	n/a	n/a
EoC: cycle 2	3,544	98.4	96.9–99.2
EoC: cycle 3	3,340	99.6	99.2–99.8
EoR: cycle 4	1,319	98.3	97.3–98.8
Kebbi			

EoC: cycle 1	5,597	93.4	91.7–94.8
EoC: cycle 2	5,600	96.9	95.3–97.9
EoC: cycle 3	5,629	98.7	98.0–99.1
EoR: cycle 4	1,320	93.8	92.4–95.0
Sokoto			
EoC: cycle 1	5,632	90.8	88.4–92.7
EoC: cycle 2	5,635	94.9	93.4–96.1
EoC: cycle 3	5,865	92.9	90.5–94.8
EoR: cycle 4	1,320	88.1	86.2–89.7

*Due to operational constraints as a result of heavy flooding, no EoC survey was conducted following cycle 1 in Borno state.

Table 21. Proportions of households with eligible children visited by a community distributor by Nigerian state and survey (states with five cycles)

Data source	Number of households sampled	Proportion of households covered	95% CI
Bauchi			
EoC: cycle 1	8,046	95.6	94.2–96.7
EoC: cycle 2	7,839	95.3	94.1–96.2
EoC: cycle 3	7,580	92.4	90.4–94.1
EoC: cycle 4	8,004	92.5	90.4–94.1
EoR: cycle 5	1,320	90.9	89.2–92.3
FCT			
EoC: cycle 1	1,549	82.3	75.8–87.3
EoC: cycle 2	1,550	86.6	79.9–91.3
EoC: cycle 3	1,550	87.1	82.9–90.4
EoC: cycle 4	1,550	86.6	80.3–91.1
EoR: cycle 5	1,320	87.2	85.2–88.8
Kogi			
EoC: cycle 1	5,702	97.9	97.1–98.5
EoC: cycle 2	5,702	97.9	97.1–98.5
EoC: cycle 3	5,678	97.1	95.5–98.2
EoC: cycle 4	5,620	97.5	96.5–98.2
EoR: cycle 5	1,320	97.1	96.0–97.8
Nasarawa			
EoC: cycle 1	3,599	92.1	89.5–94.1
EoC: cycle 2	3,626	97.5	96.1–98.5
EoC: cycle 3	3,625	96.0	93.5–97.6
EoC: cycle 4	3,622	97.6	96.1–98.6
EoR: cycle 5	1,320	98.6	97.8–99.1

Oyo			
EoC: cycle 1	1,500	98.5	96.6–99.3
EoC: cycle 2	1,500	98.6	96.7–99.4
EoC: cycle 3	1,500	99.9	99.6–100.0
EoC: cycle 4	1,501	99.6	98.2–99.9
EoR: cycle 5	1,320	95.1	93.8–96.1
Plateau			
EoC: cycle 1	7,971	92.7	90.6–94.4
EoC: cycle 2	7,932	95.2	93.4–96.6
EoC: cycle 3	7,857	95.5	94.1–96.6
EoC: cycle 4	7,941	94.0	92.2–95.4
EoR: cycle 5	1,320	98.3	97.3–98.8

3.2.2 Day 1 SPAQ provided to eligible children aged three to 59 months

Results from EoC and EoR survey showing coverage in terms of day 1 SPAQ provided by community distributors across cycles and countries are presented in Tables 22–24. In general, coverage tended to be high across most cycles and countries, often improving with successive cycles. However, coverage in the final cycle was notably lower than those in the earlier cycles in some cases.

Burkina Faso shows consistently high day 1 child coverage across all cycles, ranging from 96.3 to 97.9 percent. Chad maintained similarly high coverage, ranging from 96.9 to 98.2 percent. However, there was a noticeable decrease to 90.5 percent in cycle 4. Mozambique began with lower coverage in the first two cycles (89.4 and 88.5 percent), then improved to 95.0 percent in cycle 3, followed by a drop to 70.7 percent in the final cycle.

South Sudan recorded relatively low coverage between 77.6 and 84.3 percent, with a further decline to 67.2 percent in cycle 5. Togo displayed consistently high coverage throughout all cycles, ranging from 94.6 to 97.5 percent. Uganda had the highest coverage across all countries and cycles, with coverage between 97.2 and 98.9 percent.

Nigeria showed a clear upward trend across cycles, rising from 88.1 percent in cycle 1 to 96.9 percent in cycle 4 and 93.1 percent in cycle 5. At the state-level, coverage estimates were above 90 percent in most cycles across the eight states, while the FCT achieved lower than 90 percent in all cycles.

Table 22. Proportions of eligible children (3–59 months) who received day 1 SPAQ by country and survey in 2024

Data source	Number of children sampled	Proportion of children covered	95% CI
Burkina Faso (districts receiving five cycles)			
EoC: cycle 1	2,000	97.4	94.4–98.8
Burkina Faso (all districts)			

EoC: cycle 2	1,999	97.9	96.3–98.8
EoC: cycle 3	1,999	97.8	96.0–98.8
EoC: cycle 4	2,000	96.3	92.3–98.3
EoR: cycle 5	1,500	96.5	95.4–97.3
Chad			
EoC: cycle 1	5,908	97.3	96.2–98.0
EoC: cycle 2	5,985	96.9	95.6–97.9
EoC: cycle 3	5,769	98.2	97.5–98.7
EoR: cycle 4	1,491	90.5	88.8–91.9
Mozambique			
EoC: cycle 1	6,329	89.4	85.9–92.1
EoC: cycle 2	6,556	88.5	84.6–91.5
EoC: cycle 3	6,610	95.0	92.6–96.7
EoR: cycle 4	3,063	70.7	64.2–76.3
Nigeria (states with five cycles)			
EoC: cycle 1	28,367	88.1	85.2–90.5
Nigeria (All states)			
EoC: cycle 2	39,378	91.4	89.9–92.7
EoC: cycle 3	42,569	96.7	95.8–97.4
EoC: cycle 4	43,072	96.9	96.2–97.4
EoR: cycle 5	11,879	93.1	92.6–93.5
South Sudan			
EoC: cycle 1	1,024	78.5	63.8–88.3
EoC: cycle 2	1,022	79.0	60.2–90.4
EoC: cycle 3	1,024	77.6	58.4–89.6
EoC: cycle 4	746	84.3	71.7–91.9
EoR: cycle 5	1,500	67.2	64.8–69.6
Togo			
EoC: cycle 1	1,725	94.9	92.7–96.4
EoC: cycle 2	2,139	96.3	94.6–97.4
EoC: cycle 3	2,129	97.5	96.1–98.4
EoC: cycle 4	1,670	96.3	93.8–97.9
EoR: cycle 5	1,500	94.6	93.6–96.7
Uganda			
EoC: cycle 1	1,398	98.9	87.0–99.9
EoC: cycle 2	1,400	98.4	96.5–99.3
EoC: cycle 3	1,400	98.7	97.0–99.5
EoC: cycle 4	1,400	98.9	97.9–99.4
EoR: cycle 5	1,576	97.2	96.3–97.9

Table 23. Proportions of eligible children who received day 1 SPAQ, by Nigerian state and survey (states with four cycles)

Data source	Number of households sampled	Proportion of children covered	95% CI
Borno			
EoC: cycle 1*	n/a	n/a	n/a
EoC: cycle 2	3,544	99.0	97.6–99.6
EoC: cycle 3	3,340	99.6	99.1–99.8
EoR: cycle 4	1,319	98.0	97.1–98.6
Kebbi			
EoC: cycle 1	5,597	93.3	91.5–94.7
EoC: cycle 2	5,600	96.1	94.5–97.3
EoC: cycle 3	5,629	98.1	97.3–98.7
EoR: cycle 4	1,320	92.7	91.1–94.0
Sokoto			
EoC: cycle 1	5,632	90.2	87.8–92.2
EoC: cycle 2	5,635	94.6	93.1–95.8
EoC: cycle 3	5,865	92.5	90.1–94.4
EoR: cycle 4	1,320	88.1	86.2–89.7

*Due to operational constraints, no EoC survey was conducted following cycle 1 in Borno state.

Table 24. Proportions of eligible children who received day 1 SPAQ, by Nigerian state and survey (states with five cycles)

Data source	Number of households sampled	Proportion of children covered	95% CI
Bauchi			
EoC: cycle 1	8,046	93.9	92.4–95.1
EoC: cycle 2	7,839	93.3	91.9–94.4
EoC: cycle 3	7,580	90.7	88.5–92.4
EoC: cycle 4	8,004	90.6	88.6–92.4
EoR: cycle 5	1,320	89.7	88.0–91.3
FCT			
EoC: cycle 1	1,549	77.6	70.1–83.6
EoC: cycle 2	1,550	84.1	77.3–89.1
EoC: cycle 3	1,550	84.7	80.1–88.4
EoC: cycle 4	1,550	83.8	77.8–88.4
EoR: cycle 5	1,320	84.7	82.7–86.6
Kogi			
EoC: cycle 1	5,702	96.0	94.9–96.9
EoC: cycle 2	5,702	96.0	94.9–96.9
EoC: cycle 3	5,678	94.9	93.1–96.3

EoC: cycle 4	5,620	94.5	92.8–95.8
EoR: cycle 5	1,320	95.3	94.1–96.3
Nasarawa			
EoC: cycle 1	3,599	88.4	85.3–91.0
EoC: cycle 2	3,626	96.0	94.2–97.2
EoC: cycle 3	3,625	94.9	92.4–96.6
EoC: cycle 4	3,622	96.2	94.3–97.5
EoR: cycle 5	1,320	97.6	96.5–98.2
Oyo			
EoC: cycle 1	1,500	97.1	94.8–98.4
EoC: cycle 2	1,500	95.3	92.0–97.3
EoC: cycle 3	1,500	98.2	96.7–99.1
EoC: cycle 4	1,501	97.7	95.6–98.8
EoR: cycle 5	1,320	94.3	92.9–95.4
Plateau			
EoC: cycle 1	7,971	92.4	90.6–93.9
EoC: cycle 2	7,932	94.9	93.5–96.0
EoC: cycle 3	7,857	94.1	92.6–95.3
EoC: cycle 4	7,941	93.3	91.6–94.7
EoR: cycle 5	1,320	97.7	96.7–98.4

Table 25 shows day 1 SPAQ coverage of eligible children by cycle based on retrospective reporting by caregivers during EoR surveys following the last cycle of SMC delivery.

Results from EoR surveys (Table 25) can be assessed against those obtained from EoC surveys (Table 22). In all countries, results of EoR surveys show notably lower day 1 SPAQ coverage estimates in earlier cycles compared with those reported in EoC surveys. Given the retrospective nature of these EoR estimates and the potential for recall bias, their corresponding EoC estimates should be considered more reliable.

Table 25. Proportions of eligible children (3–59 months) who received day 1 SPAQ by country, EoR survey

Number of cycles	Number of children sampled	Proportion of children covered	95% CI
Burkina Faso			
EoR: cycle 1	540	92.4	89.8–94.4
EoR: cycle 2	1,500	91.5	89.9–92.8
EoR: cycle 3		92,3	90.0–93.6
EoR: cycle 4		84.5	82.5–86.2
EoR: cycle 5		96.5	95.4–97.3
Chad			

EoR: cycle 1	1,491	86.7	84.9–88.4
EoR: cycle 2		86.5	84.6–88.1
EoR: cycle 3		82.9	80.9–84.8
EoR: cycle 4		90.5	88.8–91.9
Mozambique			
EoR: cycle 1	1042	74.5	67.4–80.5
EoR: cycle 2	1042	76.1	68.9–82.0
EoR: cycle 3	1042	77.1	72.0–81.5
EoR: cycle 4	1,789	70.7	64.2–76.3
Nigeria (all states; total, weighted proportion)			
EoR: cycle 1	11,879	89.7	89.2–90.3
EoR: cycle 2		90.6	90.0–91.1
EoR: cycle 3		89.8	89.2–90.3
Nigeria (areas with four cycles)			
EoR: cycle 4	2,960	89.5	88.9–90.0
Nigeria (areas with five cycles)			
EoR: cycle 5	7,920	89.1	88.4–89.8
South Sudan			
EoR: cycle 1	1,500	85.0	83.1–86.7
EoR: cycle 2		82.4	80.4–84.3
EoR: cycle 3		79.1	76.9–81.1
EoR: cycle 4		75.8	73.6–77.9
EoR: cycle 5		79.9	77.8–81.9
Togo			
EoR: cycle 1	1,500	93.9	93.3–95.5
EoR: cycle 2		91.5	90.9–93.3
EoR: cycle 3		90.3	89.8–92.2
EoR: cycle 4		89.7	88.7–91.1
EoR: cycle 5		94.6	93.6–96.7
Uganda			
EoR: cycle 1	1,576	94.7	93.5–95.7
EoR: cycle 2		95.4	94.2–96.3
EoR: cycle 3		96.1	95.1–97.0
EoR: cycle 4		96.9	95.9–97.6
EoR: cycle 5		97.2	96.3–97.9

3.2.3 Proportion of eligible children who received a full three-day course of SPAQ

Both EoC and EoR surveys found that very high proportions of children who received day 1 SPAQ also received AQ doses on both day 2 and day 3 from their caregivers (Tables 26–28).

In Burkina Faso, the proportion remained consistently above 96 percent across all cycles, including the final cycle, which reached 98.7 percent. In Chad, the proportion improved from 90.2 percent in cycle 1 to over 95 percent in subsequent cycles, with the EoR survey showing 94.8 percent in cycle 4. Mozambique showed a clear upward trend across the cycles, from 96.9 percent in cycle 1 to over 99 percent in cycles 3 and 4, followed by 99.0 percent in cycle 4. In South Sudan, estimates were consistently high, beginning at 96.0 percent and increasing slightly through each cycle, reaching 99.8 percent in the final cycle. Togo also showed an upward trend from 90.9 percent in the first cycle to 99.3 percent in the final cycle. Uganda started with very a high proportion at 99.4 percent in the first cycle. While there was some fluctuation in later cycles, estimates remained high throughout, with the end-of-round figure being 96.7 percent.

Nigeria followed a similar pattern, with coverage rising from 93.7 percent in cycle 1 to 98.9 percent in cycle 4, and 98.8 percent in the final cycle. Across states, coverage estimates were above 90 percent in most cycles across the eight states, while the FCT achieved lower than 90 percent in two of the five cycles.

Table 26: Proportions of eligible children (3–59 months) who received a full three-day course of SPAQ among those who received day 1 SPAQ, by country and survey

Data source	Number of children sampled	Proportion of children received full course	95% CI
Burkina Faso (districts receiving five cycles)			
EoC: cycle 1	1,936	96.5	91.0–98.7
Burkina Faso (all districts)			
EoC: cycle 2	1,947	96.0	93.8–97.4
EoC: cycle 3	1,947	97.0	94.0–98.5
EoC: cycle 4	1.942	98.4	95.6–99.4
EoR: cycle 5	1,447	98.7	98.0–99.2
Chad			
EoC: cycle 1	5,628	90.2	87.0–92.7
EoC: cycle 2	5,694	95.0	92.9–96.6
EoC: cycle 3	5,595	95.6	93.8–96.9
EoR: cycle 4	1,360	94.8	93.5–95.9
Mozambique			
EoC: cycle 1	5,475	96.9	95.8–97.7
EoC: cycle 2	6,042	98.4	97.7–98.9
EoC: cycle 3	6,387	99.2	98.7–99.4

EoR: cycle 4	1,178	99.0	98.0–99.5
Nigeria (states with five cycles)			
EoC: cycle 1	26,510	93.7	92.1–95.0
Nigeria (All states)			
EoC: cycle 2	36,982	95.6	94.8–96.3
EoC: cycle 3	40,370	98.1	97.5–98.6
EoC: cycle 4	40,726	98.9	98.6–99.2
EoR: cycle 5	11,066	98.8	98.6–99.0
South Sudan			
EoC: cycle 1	822	96.0	90.3–98.4
EoC: cycle 2	853	97.7	95.3–98.9
EoC: cycle 3	808	97.1	94.4–98.5
EoC: cycle 4	611	97.7	95.6–98.7
EoR: cycle 5	1,196	99.8	99.3–99.9
Togo			
EoC: cycle 1	1,642	90.9	87.8–93.3
EoC: cycle 2	2,064	94.4	92.0–96.0
EoC: cycle 3	2,077	95.5	93.7–96.8
EoC: cycle 4	1,621	97.8	96.5–98.7
EoR: cycle 5	1,419	99.3	98.7–99.6
Uganda			
EoC: cycle 1	1,375	99.4	99.0–99.7
EoC: cycle 2	1,377	97.2	91.8–99.1
EoC: cycle 3	1,380	98.4	95.2–99.5
EoC: cycle 4	1,383	96.7	84.2–99.4
EoR: cycle 5	1,575	96.7	95.5–97.6

Table 27. Proportions of eligible children (3–59 months) who received a full three-day course of SPAQ among those who received day 1 SPAQ, by Nigerian state and survey (states with four cycles)

Data source	Number of households sampled	Proportion of children received full course	95% CI
Borno			
EoC: cycle 1*	n/a	n/a	n/a
EoC: cycle 2	3,518	98.9	97.8–99.5
EoC: cycle 3	3,329	99.7	99.0–99.9
EoR: cycle 4	1,293	98.6	97.8–99.1
Kebbi			
EoC: cycle 1	5,224	97.2	96.4–97.8

EoC: cycle 2	5,378	98.1	97.5–98.5
EoC: cycle 3	5,524	99.0	98.5–99.3
EoR: cycle 4	1,224	98.4	97.4–98.9
Sokoto			
EoC: cycle 1	5,111	96.3	95.5–97.0
EoC: cycle 2	5,326	97.6	96.9–98.1
EoC: cycle 3	5,436	98.0	97.3–98.5
EoR: cycle 4	1,163	97.7	96.6–98.4

*Due to operational constraints, no EoC survey was conducted following cycle 1 in Borno state.

Table 28. Proportions of eligible children (3–59 months) who received a full three-day course of SPAQ among those who received day 1 SPAQ, by Nigerian state and survey (states with five cycles)

Data source	Number of households sampled	Proportion of children received full course	95% CI
Bauchi			
EoC: cycle 1	7,534	97.2	96.5–97.7
EoC: cycle 2	7,260	97.1	96.3–97.6
EoC: cycle 3	6,885	98.2	97.7–98.5
EoC: cycle 4	7,245	98.1	97.6–98.4
EoR: cycle 5	1,185	99.1	98.4–99.5
FCT			
EoC: cycle 1	1,337	85.8	80.9–89.6
EoC: cycle 2	1,374	89.5	85.6–92.4
EoC: cycle 3	1,404	91.1	88.2–93.4
EoC: cycle 4	1,361	94.5	92.3–96.2
EoR: cycle 5	1,119	98.0	97.0–98.7
Kogi			
EoC: cycle 1	5,487	97.3	96.5–97.9
EoC: cycle 2	5,487	97.3	96.5–97.9
EoC: cycle 3	5,430	97.2	96.5–97.8
EoC: cycle 4	5,354	97.9	97.2–98.4
EoR cycle 5	1,259	98.8	98.1–99.3
Nasarawa			
EoC: cycle 1	3,262	95.4	94.0–96.5
EoC: cycle 2	3,507	97.4	96.4–98.1
EoC: cycle 3	3,506	97.6	96.6–98.3
EoC: cycle 4	3,514	97.7	96.5–98.4
EoR: cycle 5	1,288	98.8	98.1–99.3
Oyo			
EoC: cycle 1	1,455	97.3	95.4–98.5
EoC: cycle 2	1,425	98.1	96.2–99.1

EoC: cycle 3	1,474	98.5	97.4–99.2
EoC: cycle 4	1,467	98.7	97.4–99.3
EoR: cycle 5	1,245	99.0	98.3–99.5
Plateau			
EoC: cycle 1	7,435	96.9	96.3–97.4
EoC: cycle 2	7,594	96.6	95.8–97.2
EoC: cycle 3	7,449	97.1	96.5–97.7
EoC: cycle 4	7,496	97.1	96.2–97.8
EoR: cycle 5	1,290	99.5	98.8–99.7

3.2.4 SPAQ administration directly supervised by community distributors adhering to DOT

Overall, most countries and Nigerian states demonstrated increasing or consistently high levels of adherence to DOT among eligible children who received day 1 SPAQ throughout the cycles. However, there were a number of instances where adherence was below 90 percent (Table 29).

In Burkina Faso, DOT adherence fluctuated slightly across the cycles, starting at 95.9 percent in cycle 1, dipping to 86.6 percent in cycle 2 and recovering to 93.4 percent in cycle 5. Chad recorded consistently high adherence in the early cycles, increasing from 96.5 percent in cycle 1 to 97.1 percent in cycle 3, before decreasing to 87.7 percent in cycle 4.

Mozambique reported high and increasing coverage between cycles 1 and 3, from 96.7 percent to 98.4 percent, followed by a decrease to 92.1 percent in cycle 4. South Sudan maintained high adherence throughout, ranging from 91.8 percent to 98.3 percent across the cycles, and reaching 95.0 percent in the final cycle.

Togo showed gradual improvement from 86.8 percent in cycle 1 to 91.1 percent in cycle 4, followed by a slight decline to 87.7 percent in cycle 5. Uganda reported consistently high household coverage across all cycles, increasing from 92.2 percent in cycle 1 to 97.6 percent in cycle 5.

In Nigeria, coverage improved steadily over time, from 78.3 percent in cycle 1 to 94.8 percent in cycle 4, ending with 95.8 percent in cycle 5. Observed levels of DOT adherence varied widely across states, with relatively lower estimates in Bauchi and the FCT where adherence was below 80 percent in the majority of the cycles.

Table 29. Proportions of eligible children (3–59 months) who received day 1 SPAQ by community distributors adhering to DOT among those who received day 1 SPAQ by community distributors during home visits, by country and survey

Data source	Number of children sampled	Proportion administered SMC by DOT	95% CI
Burkina Faso (districts receiving five cycles)			
EoC: cycle 1	1,936	95.9	91.7–98.0
Burkina Faso (alls districts)			

EoC: cycle 2	1,947	86.6	74.8–93.4
EoC: cycle 3	1,947	90.4	78.8–96.0
EoC: cycle 4	1,942	94.6	83.7–98.4
EoR: cycle 5	1,447	93.4	92.0–94.6
Chad			
EoC: cycle 1	5,346	96.5	94.9–97.5
EoC: cycle 2	5,495	96.8	95.7–97.7
EoC: cycle 3	5,511	97.1	95.8–97.9
EoR: cycle 4	1,360	87.7	85.8–89.4
Mozambique			
EoC: cycle 1	5,745	96.7	95.5–97.6
EoC: cycle 2	6,042	97.6	96.5–98.4
EoC: cycle 3	6,387	98.4	97.5–99.0
EoR: cycle 4	1,178	92.1	87.3–95.1
Nigeria (states with five cycles)			
EoC: cycle 1	26,486	78.3	75.1–81.3
Nigeria (All states)			
EoC: cycle 2	36,952	83.3	81.7–84.9
EoC: cycle 3	40,351	88.8	83.3–92.6
EoC: cycle 4	40,705	94.8	93.8–95.7
EoR: cycle 5	11,066	95.8	95.4–96.1
South Sudan			
EoC: cycle 1	821	96.5	92.1–98.5
EoC: cycle 2	852	98.3	96.7–99.2
EoC: cycle 3	808	95.3	88.8–98.1
EoC: cycle 4	611	91.8	81.1–96.7
EoR: cycle 5	1139	95.0	93.6–96.1
Togo			
EoC: cycle 1	1,629	86.8	82.8–89.9
EoC: cycle 2	2,043	89.5	85.9–92.3
EoC: cycle 3	2,068	89.9	85.6–93.0
EoC: cycle 4	1,609	91.1	86.5–94.2
EoR: cycle 5	1,500	87.7	86.7–89.9
Uganda			
EoC: cycle 1	1,374	92.2	66.8–98.6
EoC: cycle 2	1,377	94.1	76.6–98.8
EoC: cycle 3	1,380	97.6	86.7–99.6
EoC: cycle 4	1,382	96.1	84.8–99.1
EoR: cycle 5	1,575	97.6	95.8–98.7

Table 30. Proportions of eligible children (3–59 months) who received day 1 SPAQ by community distributors adhering to DOT among those who received day 1 SPAQ by community distributors during home visits, by Nigerian state and survey (states with four cycles)

Data source	Number of households sampled	Proportion administered SMC by DOT	95% CI
Borno			
EoC: cycle 1*	n/a	n/a	n/a
EoC: cycle 2	3,518	90.4	81.0–95.4
EoC: cycle 3	3,328	98.9	97.6–99.5
EoR: cycle 4	1,293	94.6	93.3–95.7
Kebbi			
EoC: cycle 1	5,218	88.5	85.5–91.0
EoC: cycle 2	5,378	92.0	89.2–94.1
EoC: cycle 3	5,524	95.1	92.9–96.6
EoR: cycle 4	1,224	94.2	92.8–95.4
Sokoto			
EoC: cycle 1	5,105	82.8	79.2–86.0
EoC: cycle 2	5,320	86.9	83.3–89.9
EoC: cycle 3	5,428	93.0	90.8–94.8
EoR: cycle 4	1,163	96.3	95.0–97.2

*Due to operational constraints, no EoC survey was conducted following cycle 1 in Borno state.

Table 31. Proportions of eligible children (3–59 months) who received day 1 SPAQ by community distributors adhering to DOT among those who received day 1 SPAQ by community distributors during home visits, by Nigerian state and survey (states with five cycles)

Data source	Number of households sampled	Proportion administered SMC by DOT	95% CI
Bauchi			
EoC: cycle 1	7,526	73.4	70.3–76.2
EoC: cycle 2	7,250	75.0	71.7–78.0
EoC: cycle 3	6,878	73.3	69.9–76.5
EoC: cycle 4	7,239	76.3	72.7–79.5
EoR: cycle 5	1,185	90.4	88.7–92.0
FCT			
EoC: cycle 1	1,336	69.7	59.2–78.6
EoC: cycle 2	1,373	79.1	72.0–84.9
EoC: cycle 3	1,404	81.6	75.6–86.3
EoC: cycle 4	1,358	75.0	65.3–82.7
EoR: cycle 5	1,119	95.5	94.2–96.6
Kogi			

EoC: cycle 1	5,486	95.4	93.9–96.5
EoC: cycle 2	5,486	95.4	93.9–96.5
EoC: cycle 3	5,429	95.5	94.3–96.5
EoC: cycle 4	5,353	96.8	95.8–97.6
EoR: cycle 5	1,259	95.7	94.4–96.7
Nasarawa			
EoC: cycle 1	3,254	84.4	98.0–88.0
EoC: cycle 2	3,507	85.7	81.0–89.4
EoC: cycle 3	3,506	85.6	80.5–89.6
EoC: cycle 4	3,514	89.4	85.2–92.6
EoR: cycle 5	1,288	97.0	95.9–97.8
Oyo			
EoC: cycle 1	1,455	90.5	83.8–94.6
EoC: cycle 2	1,425	97.3	94.1–98.8
EoC: cycle 3	1,474	99.5	97.5–99.9
EoC: cycle 4	1,467	99.1	98.2–99.6
EoR: cycle 5	1,245	98.8	98.1–99.3
Plateau			
EoC: cycle 1	7,429	86.2	83.6–88.5
EoC: cycle 2	7,588	88.1	85.7–90.1
EoC: cycle 3	7,444	89.9	87.6–91.8
EoC: cycle 4	7,494	90.8	88.6–92.6
EoR: cycle 5	1,290	98.9	98.3–99.4

3.2.5 Receipt of SPAQ by eligible children outside of home visits by community distributors

Results based on EoR survey data show rare occurrences of receipt of day 1 SPAQ by eligible children outside of home visits by community distributors during the final cycle, with estimates lower than 2 percent in all countries except South Sudan where it was 2.5 percent. Notably, in Uganda all sampled children received SPAQ exclusively through home visits by community distributors during the final cycle (Table 32).

The majority of instances of receipt of SPAQ outside of home visits were via personnel at local health facilities and from community distributors handing out SPAQ at fixed distribution points. These sources may be considered legitimate sources of SPAQ. Outside of these sources, the most common alternative source of SMC medicines were family or friends.

Table 32. Receipt of SPAQ by eligible children outside of home visits by community distributors by country

Data source	Number of eligible children sampled	Proportion of eligible children covered	95% CI
Burkina Faso			
EoR: cycle 5	1,447	0.4	0.2–0.9

Chad			
EoR: cycle 4	1,681	0.1	0.0–0.4
Mozambique (Nampula region; weighted proportion estimated)			
EoR: cycle 4	1,789	1.7	1.2–2.3
Nigeria (all states; total, weighted proportion)			
EoR: cycle4/ cycle5	11,879	0.9	0.7–1.1
South Sudan (Aweil South and West counties; weighted proportion)			
EoR: cycle 5	1,500	2.5	1.7–3.3
Togo			
EoR: cycle 5	1,500	1.3	0.9–1.8
Uganda (Amudat, Nakapiripirit, Moroto, Kotido and Nabilatuk districts; Karamoja region)			
EoR: cycle 5	1,532	0.0	-

3.2.6 Day 1 SPAQ received per child over the course of the SMC round and children who received day 1 SPAQ during all monthly SMC cycles

Tables 33–38 show the proportions of eligible children by country and state by number of day 1 SPAQ received across all planned cycles during the 2024 SMC campaign. The proportions varied widely among the countries.

The proportion of children who received SPAQ in all cycles varied considerably across countries, with some maintaining high coverage throughout, while others showed notable drop-off rates. Uganda had the highest proportion of children receiving SPAQ in all cycles, reaching 92.0 percent, indicating strong retention of children in the programme across all rounds. Togo also demonstrated strong retention, with 87.1 percent of children completing all cycles. These results suggest that most children targeted in these countries remained in the programme throughout the entire round.

Burkina Faso had approximately 73.6 percent and 71.2 percent of children receiving SPAQ in all cycles in areas covered by four and five cycles, respectively. Chad showed a similar trend, with 74.5 percent of children completing all cycles.

South Sudan showed 67.2 percent retention across all planned five cycles, while Mozambique had the lowest proportion of children completing all planned cycles, with only 52.8 percent of the target population receiving SPAQ in all rounds.

Nigeria recorded a relatively high overall proportion of children receiving SPAQ in all cycles, achieving 78.6 percent and 81.9 percent in states that received four and five cycles, respectively. Across Nigerian states, the extent to which eligible children received day 1 SPAQ in all cycles of the round exceeded 80.0 percent in most states, with a notable exception in the FCT where estimates were lowest at 61.1 percent.

The proportion of eligible children receiving no cycles was less than five percent in most countries and Nigerian states, with the notable exceptions being Chad (7.0 percent), South Sudan (8.5 percent) and Sokoto state in Nigeria (5.4 percent).

Table 33. Proportions of eligible children (3–59 months) who received day 1 SPAQ by community distributors by number of cycles during 2024 (EoR survey), by country

Number of cycles	Number of children sampled	Proportion of eligible children covered	95% CI
Burkina Faso (districts with four cycles)			
None	1,000	0.6	0.3–1.3
One		3.8	2.8–5.2
Two		4.5	3.4–6.0
Three		17.5	15.3–20.0
Four		73.6	70.8–76.2
Burkina Faso (districts with five cycles)			
None	500	1.6	0.8–3.2
One		1.6	0.8–3.2
Two		3.0	1.8–4.9
Three		5.6	3.9–8.0
Four		17.0	14.0–20.6
Five		71.2	67.1–75.0
Chad			
None	1,491	7.0	5.8–8.4
One		3.5	2.6–4.6
Two		4.2	3.3–5.4
Three		10.9	9.4–12.6
Four		74.5	72.2–76.6
Mozambique			
None	1,789	0.0	0.0
One		8.9	6.1–13.1
Two		18.9	14.4–24.4
Three		19.4	15.1–24.4
Four		52.8	44.6–60.9
Nigeria: (areas with four cycles; total, weighted proportion)			
None	3,959	4.0	3.5–4.7
One		5.4	4.8–6.2
Two		3.9	3.4–4.6
Three		8.0	7.2–8.9
Four		78.6	77.3–79.9

Nigeria: (areas with five cycles; total, weighted proportion)			
None	7,920	0.0	-
One		3.3	3.0–3.8
Two		3.3	2.9–3.7
Three		3.5	7.4–8.6
Four		8.0	7.4–8.6
Five		81.9	81.1–82.8
South Sudan (Aweil South and West, weighted proportions)			
None	1,1,465	8.5	7.2–10.1
One		3.9	3.0–5.0
Two		4.8	3.7–6.0
Three		7.5	6.2–9.0
Four		8.1	6.7–9.6
Five		67.2	64.8–69.6
Togo			
None	1,500	1.9	1.2–2.6
One		5.5	4.3–6.7
Two		0.9	0.4–1.4
Three		1.2	0.6–1.8
Four		3.4	2.5–4.3
Five		87.1	85.4–88.8
Uganda			
None	999	1.2	0.6–1.9
One		0.9	0.5–1.6
Two		1.4	0.7–3.0
Three		1.6	0.7–3.5
Four		2.8	1.7–4.5
Five		92.0	88.5–94.5

Table 34. Proportions of eligible children (3–59 months) who received day 1 SPAQ by community distributors by number of cycles during 2024 (EoR survey), by Nigerian state (states with five cycles)

Number of cycles	Number of children sampled	Proportion of eligible children covered	95% CI
Bauchi			
None	1,320	4.2	3.2–5.4
One		2.3	1.5–3.2
Two		3.5	2.6–4.7
Three		5.1	4.1–6.4

Four		5.9	4.8–7.4
Five		78.8	76.5–80.9
FCT			
None	1,320	1.1	0.5–1.7
One		4.9	3.8–6.2
Two		7.1	5.8–8.6
Three		7.8	6.5–9.4
Four		8.1	6.8–9.7
Five		61.1	58.3–63.6
Kogi			
None	1,320	1.8	1.2–2.6
One		1.5	1.0–2.4
Two		1.8	1.2–2.6
Three		2.8	2.1–3.9
Four		4.1	3.2–5.3
Five		87.7	85.8–89.4
Nasarawa			
None	1,320	0.6	0.3–1.3
One		0.6	0.3–1.3
Two		1.2	0.7–1.9
Three		0.7	0.4–1.4
Four		3.1	2.2–4.1
Five		93.5	92.1–94.7
Oyo			
None	1,320	0.3	0.1–0.8
One		2.5	1.7–3.4
Two		3.4	2.5–4.5
Three		5.8	4.6–7.2
Four		13.1	11.3–15.0
Five		74.8	72.4–77.1
Plateau			
None	1,320	0.6	0.3–1.2
One		0.8	0.4–1.4
Two		1.7	1.1–2.6
Three		3.7	2.8–4.9
Four		5.1	4.0–6.4
Five		87.8	86.0–89.5

Table 35. Proportions of eligible children (3–59 months) who received day 1 SPAQ by community distributors by number of cycles during 2024 (EoR survey), by Nigerian state (states with four cycles)

Number of cycles	Number of children sampled	Proportion of eligible children covered	95% CI
Borno			
None	1,319	1.5	0.9–2.3
One		1.5	0.1–2.4
Two		3.0	2.2–4.1
Three		9.8	8.3–11.5
Four		84.0	81.9–85.8
Kebbi			
None	1,320	3.5	2.6–4.7
One		4.0	3.0–5.2
Two		4.6	3.6–5.9
Three		5.3	4.2–6.6
Four		82.4	80.2–84.4
Sokoto			
None	1,320	5.4	4.3–6.8
One		8.2	6.8–9.8
Two		6.6	5.4–8.1
Three		7.8	6.5–9.4
Four		71.7	69.2–74.1

3.2.7 SPAQ provided to ineligible children aged five years and above

Table 36 and Table 37 show the proportions of ineligible children aged 60–119 months who received SPAQ, based on data from EoR surveys.

Coverage of ineligible children varied substantially across countries. Chad and Burkina Faso reported the highest proportions, with 36.9 percent and 33.6 percent of ineligible children receiving SPAQ, respectively. South Sudan also recorded a relatively high proportion of over-age treatment at 28.1 percent, followed by Mozambique at 23.6 percent and Uganda at 17.6 percent, respectively.

Nigeria and Togo had the lowest proportions, with only 8.0 percent and 7.3 percent of ineligible children receiving SPAQ, respectively. Across Nigerian states, estimates ranged from 3.0 percent in Oyo to 22.0 percent in Borno.

Table 36. Proportions of ineligible children (60 –119 months) who received day 1 SPAQ (EoR survey) by country

Data source	Number of ineligible children sampled	Proportion of ineligible children covered	95% CI
Burkina Faso			
EoR: cycle 5	919	33.6	30.6–36.8
Chad			
EoR: cycle 4	377	36.9	32.1–41.9
Mozambique			
EoR: cycle 4	1,250	23.6	16.3–32.8
Nigeria			
EoR: cycle 5	8,276	8.0	7.4–8.6
South Sudan			
EoR: cycle 5	335	28.1	23.3–33.2
Togo			
EoR: cycle 5	537	7.3	5.3–9.8
Uganda			
EoR: cycle 5	1069	17.6	13.8–22.3

Table 37. Proportions of ineligible children (60 –119 months) who received day 1 SPAQ (EoR survey), by Nigerian state

Data source	Number of ineligible children sampled	Proportion of ineligible children covered	95% CI
State: Bauchi			
EoR: cycle 5	863	15.3	13.0–17.9
FCT			
EoR: cycle 5	963	4.8	3.5–6.3
Kogi			
EoR: cycle 5	965	3.3	2.4–4.7
Nasarawa			
EoR: cycle 5	773	5.8	4.3–7.7
Oyo			
EoR: cycle 5	986	3.0	2.1–4.3
Plateau			
EoR: cycle 5	1033	7.5	6.0–9.3
Borno			
EoR: cycle 4	845	22.0	19.3–24.9
Kebbi			
EoR: cycle 4	932	6.3	4.9–8.0
Sokoto			
EoR: cycle 4	916	5.8	4.5–7.6

4. Discussion

Target populations across the SMC programme in 2024

The 17,074,746 children targeted for SMC delivery across the seven countries supported in 2024 is about the same as the 17,070,262 children targeted in 2023.[9] However, while in previous years we tended to report the target population figures for all areas where philanthropic funding was used, in this report we have only included target population figures for areas where Malaria Consortium acted as SMC implementing partner with philanthropic funding. These are the areas where we directly coordinate the delivery of SMC medicines and where we take responsibility for coverage achieved. This difference in how we report target population figures affects the total numbers reported for Burkina Faso and Togo. In 2023, we reported target population figures for 29 health districts in Burkina Faso, including two where Malaria Consortium only procures SMC medicines. By contrast, in 2024 we have only reported target population figures for the remaining 27 health districts, where Malaria Consortium acts as implementing partner. For Togo, we reported target population figures for 19 SMC-implementing districts as philanthropic funding was used to support activities in all of those. In 2024, we have only reported target population figures for seven districts where Malaria Consortium is the implementing partner.

Administrative programme coverage

High levels of administrative coverage were maintained in 2024; overall coverage was 100.8 percent, ranging from 92.3 percent in Mozambique to 115.3 percent in Burkina Faso. Administrative coverage estimates represent the proportion of SPAQ treatment courses distributed by community health workers relative to the target population of eligible children aged 3–59 months. Similar to prior years, administrative coverage estimates exceeded 100 percent in some instances. However, there were fewer such instances in 2024; only Burkina Faso and Chad, and four out of the nine states in Nigeria (Borno, Kogi, Nasarawa and Plateau) exceeded 100 percent in 2024.

Current estimates exceeding 100 percent might have been due to persistent numerator issues, such as the challenges faced in tallying administrative data across levels and administration of SMC medicines to ineligible children. This was evident in the relatively higher proportions of children over five years who received SPAQ in Chad and Burkina Faso; both countries had the highest occurrences — over 30 percent — of overage treatment. Denominator factors could also have contributed to this, including potential underestimation of the target population size. Target population estimates may not fully account for population movements, particularly among nomadic and internally displaced populations. This was evident in South Sudan where administrative coverage exceeded 100 percent in most cycles, probably due to the two supported counties experiencing an influx of displaced populations from neighbouring Sudan who may not have been accounted for in target population estimates determined during pre-round

microplanning. Another contributing factor is the administration of SMC medicines to ineligible children, particularly considering the prevalence of stunting and undernutrition within South Sudan's humanitarian context,[18] coupled with challenges related to the availability of home-based official birth and health records in such settings.[19] These could make it challenging for community distributors to accurately exclude older children when distributing SPAQ, which could ultimately inflate the numerator — number of children reached — and lead to overestimated administrative coverage.

As in previous years, within-country variations in administrative coverage persisted, particularly in Nigeria, where estimates ranged from 93.3 percent in Sokoto to 103.1 percent in Plateau state. These variations may be attributed to several factors, such as differences in the accuracy of target population estimates and population dynamics, administrative data collection tools, the extent to which eligible children were accessible across different settings and variability in community distributors' ability to correctly determine a child's age and SMC eligibility during campaigns.

To more accurately and precisely determine the number of children reached in each cycle, we have taken several measures to digitalise administrative and tally sheet data collection to varying degrees in Burkina Faso, Chad, Mozambique, Nigeria and Togo. We have also made efforts to use the most accurate population figures obtainable for estimating SMC target population during microplanning and adjusting for anticipated population changes during the round as much as feasible.

Looking ahead, we will maintain our commitment to continuing to refine our administrative coverage estimation methods, tools and processes via digitalisation, data triangulation and comprehensive household mapping where these are feasible. For example, as house lists are rarely available in supported districts, we are considering further efforts to conduct pre-round household listing in supported areas. This is however likely to be resource-intensive and logistically demanding. We will continue to consult with in-country partners and stakeholders to identify practical, cost-efficient and sustainable use cases.

SMC programme coverage among eligible children based on household survey data

Estimates from EoC and EoR household surveys indicate that SMC programmes supported by Malaria Consortium, for the most part, maintained high programme coverage and adherence to SMC quality standards in 2024. Across cycles, day 1 SPAQ coverage exceeded 90 percent in most countries and Nigerian states. There were, however, notable instances where major gaps in coverage and quality were identified as highlighted below.

Coverage was lower than 90 percent in most cycles in Mozambique in 2024, particularly so in the fourth cycle where coverage fell below 80 percent; a level that is relatively lower, though statistically insignificantly, than that seen in the same cycle during the 2023 round (77.2 percent). The trend is consistent with the relatively lower administrative coverage in Mozambique in 2024

(92.3 percent) than in 2023 (100.4 percent), which may reflect the unique programmatic challenges experienced during the 2023–2024 round. Of note is the likely impact of delays in processing payments to community distributors throughout the campaigns, which may have led to demotivation of distributors, particularly in the final cycle of the round.

Similarly, South Sudan recorded day 1 SPAQ coverage below 90 percent in all cycles, despite administrative data showing nearly 100 percent coverage. The trends somewhat mirror those of 2023, where survey coverage estimates were below 90 percent in most cycles, yet administrative coverage exceeded 100 percent. As estimates from surveys are more reliable than those from administrative data, we think the relatively lower coverage levels seen in South Sudan reflect the continued impact of factors such as flooding which limited accessibility to some communities during most of the cycles and broader operational challenges in the country's humanitarian setting. Several factors may have contributed to the discrepancy between survey and administrative coverage data, including gaps in the accuracy of numerators and denominators used in the estimation of administrative coverage as highlighted previously. It is important to emphasise that survey estimates are less prone to the misclassification of children's age, which sometimes happen when community distributors experience difficulty in accurately determining the age eligibility of children. This can inflate the numerator — the number of children reported as reached in each cycle — leading to overestimated administrative coverage. In surveys, however, data collectors tend to be more literate and numerate than community distributors. In addition, survey data collectors receive training, such as in the use of anchoring techniques to help caregivers recall children's birth months and years by linking them to specific timeframes, local events or holidays. Moreover, the electronic data collection forms used in surveys have built-in features for validating a child's age and eligibility.

High levels of day 1 SPAQ coverage, as seen in previous years, were maintained in Burkina Faso in 2024. It is important to interpret this within the context of the various adaptions made to the standard SMC delivery model in 2024, including the use of community distributor visits for identification and destruction of larval breeding sites, screening of children's malaria vaccination status and the expansion of SMC target population to children aged five to ten years in some districts. These programmatic adaptations are described in greater detail in the 2024 philanthropy report.[8] When comparing day 1 coverage across cycles between 2024 and previous years, those programmatic adaptations did not appear to have negatively impacted SMC coverage and delivery in Burkina Faso in 2024. We are conducting additional secondary analyses of programmatic data to more comprehensively understand and document learnings on the interaction and impact of each of those initiatives, particularly the introduction of the malaria vaccine on SMC coverage, quality and caregiver perceptions in 2024.

In Nigeria, coverage variations across states persisted as seen in previous years. Remarkably, the FCT recorded relatively lower coverage — below 90 percent — across individual cycles compared

with the eight states, consistent with the trends in administrative coverage. Current survey coverage estimates are however the same as seen in 2023, reflecting the continued influence of geographical and programmatic factors constraining coverage when delivering SMC in complex urban settings such as Nigeria's FCT.[16] Looking forward, it is imperative that further efforts are made to refine programmatic strategies and context-specific adaptations implemented in 2024 to improve SMC uptake in 2025 and future rounds.

In general, coverage tended to be high across most cycles and countries, often improving with successive cycles. However, coverage in the final cycle was notably lower than those in the earlier cycles in some cases, with remarkably declines reported in the final cycles in Chad, Mozambique and South Sudan. The observed drop might have been due to a combination of programmatic, contextual and methodological factors. As was the case in Mozambique, programmatic factors such as delays in the processing of payment of community distributors may lead to demotivation of community distributors, which could lead to reduced household visits and overall coverage in latter cycles. The final cycle may coincide with the end of the rainy season or agricultural harvests, when households are more mobile or harder to reach due to competing priorities, as might have been the case in Chad and South Sudan. Methodologically, differences in survey timing between EoC surveys, which are typically conducted shortly after each cycle when recall is fresh, and EoR surveys, which have longer intervals between them and the final cycle, might have contributed to the observed trend. However, we are of the view that recall bias likely has a less significant role to play in this regard than programmatic and contextual factors.

Similar to 2023 and other years, the proportion of day 1 SPAQ doses administered under DOT remained above 90 percent in most cycles, and exceeded 80 percent in all cycles across all countries. However, at the state level in Nigeria, there were cycles in which DOT adherence was below 80 percent such as in most cycles in Bauchi and three of the five cycles in the FCT. These may have resulted from a combination of programmatic and contextual factors, such as civil protests in Bauchi during cycle 2, which may have that limited the time community distributors spent in households and interacted with caregivers to ensure the administration of day 1 SPAQ under DOT in accordance with delivery standards. The gaps therefore underscore the need for programmatic quality improvement efforts and adaptations in 2025.

Ensuring optimal adherence to day 2 and day 3 AQ doses is crucial for maximising SMC's protective effectiveness.[4] Consistent with the trends in previous years, over 90 percent of children who received the first dose of SPAQ went on to receive the full three-day SPAQ course in all cycles and across all supported countries and Nigerian states in 2024. This suggests that once children are reached, their likelihood of completing the full course of SMC medicines in each cycle is very high; an indication of the effectiveness of current strategies aiming to improve caregivers' knowledge of the importance of, and their capability to administer, the second and third doses of AQ. As previously noted, these estimates are based on caregiver reports and may be subject to social desirability bias. However, the potential for such bias is likely minimal given the reasons outlined

earlier. A study was conducted to evaluate the lead-mother initiative involving the training and deployment of lead-mothers and role models as community-level peer-support systems in Kano state, Nigeria, during the 2022 round. The study demonstrated the initiative's effectiveness in improving adherence to the second and third doses of AQ. A manuscript has been developed to report findings from the evaluation and is expected to be published later in 2025.

The retention of the cohort of eligible children throughout the round, measured by the proportion of those who received SPAQ in each of the four or five planned cycles of the annual SMC round, is also essential for maximising protection of the target population through the high transmission period. The proportions varied widely by country, ranging from 53 percent in Mozambique to 92 percent in Uganda. In Nigeria, they ranged from 61 percent in the FCT to 94 percent in Nasarawa state. These trends are consistent with those seen in cycle-specific coverage indicators, with relatively lower performance in Mozambique, South Sudan and Nigeria's FCT. These could be attributed to the challenges of delivering SMC in both settings as outlined previously. We have conducted secondary analyses to explore and further understand factors associated with cohort retention during the 2024 round. We aim to publish findings from those analyses later in 2025.

It is important to clarify the representativeness of coverage and quality data from both EoC and EoR surveys in Togo, where survey sampling frames included districts supported by Malaria Consortium as an implementing partner and additional districts where other partners were responsible for SMC delivery. Results from all districts are reported here. Data from these additional districts were retained in the analytical sample to preserve the overall sample size and enhance the statistical precision of the estimates. Consequently, any estimates presented for Togo in this report should be interpreted as representative not only of districts supported by Malaria Consortium, but of all districts sampled.

Overall, these results indicate that SMC programmes supported by Malaria Consortium in 2024 were mostly successful in providing SMC medicines and its chemoprevention benefits to large proportions of the target populations of eligible children during the high transmission seasons. There were, however, notable gaps in coverage and quality, particularly in Mozambique, South Sudan and the FCT in Nigeria. These observed gaps highlight opportunities for programme improvements to further optimise SMC delivery, coverage, quality and impact. The operational challenges posed — particularly those related to difficulties in accessibility of communities due to insecurity and flooding in Chad, Nigeria and South Sudan; the humanitarian setting in South Sudan; the urban complexities in the FCT, Nigeria; and delays in processing payments to community distributors in Mozambique — underscore the need for adaptive strategies to enhance the capability of SMC programmes in reaching communities and children in complex operational settings.

Receipt of SMC outside of home visits by community distributors

Consistent with previous years, the proportion of eligible children receiving SPAQ through means other than home visits by community distributors or legitimate sources such as health facilities

remained low across all seven supported countries in 2024. As in prior years, the majority of SPAQ doses administered outside home visits were provided by health facility personnel or by community distributors at fixed distribution points, serving caregivers who were not home during household visits, both of which are considered legitimate distribution channels. Beyond these official sources, the most common alternative providers of SMC medicines were family members or friends. However, the proportion of children who did not receive SPAQ through door-to-door distribution or legitimate sources was below two percent in all supported areas during the final cycle of 2024, except for South Sudan where it was 2.5 percent (Table 32). Notably, in Uganda, all sampled children received SPAQ exclusively through home visits by community distributors during the final cycle.

Receipt of SMC by ineligible children aged five years and older

According to the results of the EoR surveys, the proportion of ineligible older children receiving day 1 SPAQ showed wide variation across countries, ranging from 7.3 percent in Togo to 36.9 percent in Chad. The proportions of ineligible children who received day 1 SPAQ in the last cycle were comparable to those observed in previous years in some countries, with notable contrasts in others. In Burkina Faso, the proportion increased from 7.9 percent in 2023 to 33.6 percent in 2024. This is unsurprising, considering the expansion of age eligibility and delivery of SMC to children up to 10 years in six health districts, all supported by Malaria Consortium, in 2024. Hence, this does not necessarily reflect gaps in the appropriate exclusion of ineligible children. It rather reflects that our sampling methods in Burkina Faso did not take into account the expansion of SMC age eligibility in 2024, which we will make efforts to address in future rounds. Another notable difference in the estimates of the proportion of ineligible children receiving SMC between 2024 and the previous round is in South Sudan, where there was a marked decrease from nearly 50 percent in 2023 to 28 percent in 2024. Similarly, there was remarkable decrease in the proportion in Nigeria in 2024; 8 percent, compared with 37 percent in 2023. These are likely due to further efforts made to minimise over-age treatment in both countries in 2024.

Nonetheless, these results indicate that receipt of SMC medicines by ineligible children remains a common occurrence with notable between-country variations. As shown by findings of a previous study by conducted by Malaria Consortium, the majority of ineligible children who received SMC medicines tend to be aged five to six years.[17] While that may suggest that the risks of underdosing and contributions to the development of drug resistance may be lower compared to if the children were predominantly much older than five years, it is crucial to minimise exposure of ineligible children to SMC medicine and any risk of underdosing or drug resistance that might pose.

It is important to note that estimates of SMC coverage among ineligible children may not reflect the true extent to which older ineligible children receive SMC due to sampling limitations. Owing to the opportunistic sampling of older children from households with eligible children, estimates of receipt of SMC by older children are likely to have been overestimated in all countries except Mozambique and Uganda. In both countries, older children were sampled independently, rather

than opportunistically as in other countries. Their samples may therefore be considered more representative of the general population of older children in supported areas, with estimates from both countries consistently indicating around 20 percent of older children received SPAQ in 2022, 2023 and 2024. While the exact extent of the receipt of SMC by ineligible children remains uncertain, findings from these surveys and those of the previous years have consistently shown that the administration of SMC medicines to older children is a common issue across countries. This, in addition to inaccurate denominators and population movement, may be key factors contributing to the higher-than-expected administrative coverage estimates reported, more than 100 percent in some cases.

Comparability of survey results between locations and over time

To a large extent, results of surveys are comparable across cycles in the same country, between different countries in the same year and across years, particularly in terms of the general sampling and analysis methods. It is, however, essential to recognise that comparability is challenged by various factors. First, survey results may not be comparable across multiple years in the same country in some cases due to differences in SMC scale and survey sampling frames used in each year. For instance, unlike in 2023 when surveys were representative of the 19 districts and four cycles delivered in Togo that year, surveys were representative of 23 districts — including four additional districts and the addition of a fifth cycle in all cycles — where SMC was delivered in Togo during 2024. As such, sampling frames for both EoC and EoR surveys in 2023 may not necessarily have the same level of representativeness as those for 2024 surveys.

Comparisons of survey results are also constrained by between-cycle differences in EoC sampling frames, as was the case in where districts were excluded from the sampling frame due to insecurity or other inaccessibility issues. A case in point was the Kpendjal district in Togo which was not sampled in EoC surveys following cycles 1 and 2. Between-cycle comparisons are complicated further by the delivery of a fifth cycle of SMC in specific areas in Burkina Faso and Nigeria with longer high transmission seasons. In such cases, areas requiring five cycles begin the SMC round earlier than those requiring four cycles. Hence, coverage results from cycle 1 EoC survey in Burkina Faso and Nigeria as presented in this report are representative only for areas where five cycles were delivered. On the other hand, coverage estimates for the four subsequent cycles are representative of all areas irrespective of the number of SMC cycles delivered. Moreover, the proportion of children who received SMC in all four or five monthly cycles of the annual round may not be comparable between areas with four and five cycles in the same country, as this tends to be lower in the latter areas.

Time between delivery of day 1 SPAQ and coverage surveys may have influenced our results through recall bias and may explain differences in coverage estimates between EoC and EoR surveys. This is particularly the case when comparing EoC results of earlier cycles with coverage results based on retrospective self-reports by caregivers for the same cycles, i.e. when comparing results shown in Table 22 and Table 25. In all countries, coverage estimates for earlier cycles from

EoR survey data tended to be lower than those obtained from EoC survey for the corresponding cycles. Given the retrospective nature of EoR estimates for those earlier cycles and the higher potential for recall bias, their corresponding EoC survey estimates should be considered more reliable. On the other hand, it is important to note that there are often no substantial differences in coverage and quality estimates for current cycles, when measured using data from EoC surveys for earlier cycles and EoR surveys for the final cycle, as can be seen in Table 0.

Use of survey results to inform decision-making and programme improvements

Malaria Consortium places great value on the utilisation of programme data to guide decision-making and tailoring programme improvements. In this regard, data-informed decision-making (DIDM) is one of the core objectives of Malaria Consortium's SMC programme. To foster DIDM within the SMC delivery model, the programme's M&E framework defines measurable indicators for tracking the use of data for decision-making.[10]

Monitoring SMC coverage and quality using EoC household surveys employing the LQAS methodology plays a crucial role in supporting DIDM within the programme. EoC surveys are typically conducted following all but the final monthly SMC cycle, enabling implementing teams to identify areas of low coverage and other issues in SMC delivery, and to rapidly take corrective actions to improve SMC delivery in subsequent cycles. In 2024, we made progress in enhancing the culture of data-driven decision-making across the programme. In most cases, surveys were conducted within a week following SMC distribution in each cycle. That made it possible for country teams to complete data analyses and obtain LQAS hypothesis test results at least one week before the start of the next cycle. Results and recommendations for programme improvement actions were communicated with health authorities at district, state/regional and national levels, and malaria control programmes.

A case study of the EoC LQAS survey data to drive decision making and improvements in SMC delivery in Nigeria has been published.[20] More recent country-specific case studies of DIDM experiences in Togo and Uganda during the 2024 round are presented in the 2024 philanthropy report.[8]

A presentation describing the adaptation of the LQAS methodology to Malaria Consortium's SMC programme was presented at the 8th Multilateral Initiative on Malaria Society Conference in 2024.[21] Analyses of LQAS hypothesis testing data across all seven supported countries are ongoing to evaluate the extent to which DIDM efforts might have contributed to the correction of coverage and quality issues identified in previous cycles. We intend to develop and publish findings in a peer-reviewed article within the coming months.

4.1 Methodological improvements, strengths and limitations

Malaria Consortium's SMC M&E methods have several notable strengths. As alluded to earlier, modifications have been made to the LQAS methodology and survey implementation to improve the EoC surveys since 2019. In 2024, further efforts were made to strengthen M&E capacity at all

levels and standardise methods across countries. As a result of continued investments in bolstering M&E capacity across country teams, 2024 saw the conduct of household surveys following every cycle in every supported country, a notable improvement from previous years in which surveys were missed in a few cycles or areas due to a combination of factors. Efforts were made to further standardise survey data collection tools — such as by harmonising variable naming — and sampling approaches, particularly the systematic sampling of households within survey clusters. There were further improvements in the timeliness of EoC surveys in 2024, with EoC surveys being conducted within one week of the preceding cycle in nearly all instances.

As already highlighted in Section 2.3, several quality assurance measures were implemented throughout the data life cycle to enhance the validity, accuracy and consistency of survey data in 2024. These included improvements to sampling technique to enhance representativeness, the continued use of data validation checks on the electronic data collection forms, and real-time survey data auditing using GPS tracking to verify interview locations and durations. Hidden variables have also been used to monitor interviews for the duration of sensitive survey segments, particularly for probing caregiver recall on children's medication doses. The use of campaign digitalisation tools for administrative data collection also facilitated more accurate estimation of programme reach and administrative coverage.

Efforts were also made to conduct EoC surveys in a timelier manner during 2024, with EoC surveys being completed within two weeks of the preceding cycle in virtually all cases in 2024. This provided a two-week window before the subsequent cycle for processing and analyse EoC survey data and enabled programme improvement needs to be identified, communicated and addressed in partnership with stakeholders at all levels. In addition, the timely implementation of EoC surveys helped to minimise the risk of recall bias in the estimation of programme coverage for indicators relying on caregivers' recall.

The use of independent partners to conduct comprehensive EoR coverage surveys in all countries where surveys were carried out during 2024 helped to promote objectivity and transparency of our M&E approaches. Another strength of the EoR surveys was their self-weighting multi-stage sampling designs were employed with clusters selected with probability proportional to the size. This ensured that estimates of programme coverage were representative of the populations targeted for SMC administration at country level and at state level in Nigeria, as appropriate to the country setting. Furthermore, as in previous years, instances of missing responses for key indicators in EoR datasets were consistently low in 2024, generally less than two percent across indicators, surveys and countries.

Further progress was achieved in the use of data to drive decision-making and programmatic improvements in 2024. Following a programme-wide DIDM workshop held prior to the round, programme implementing teams reinvigorated commitment to using data from LQAS hypothesis testing to identify coverage and quality gaps at the SA level in each cycle, and to guide the implementation of corrective actions to address such gaps. As part of improved DIDM, timely

conduct of surveys following each cycle's SPAQ distribution facilitated the completion of data collection and analysis and provided ample time — up to two weeks before the subsequent cycle — to communicate results to stakeholders at the SA level, and engage with them to take actions to improve SMC delivery before and during the succeeding cycle

Our methods are nonetheless not without limitations. First, while efforts have been made to digitalise administrative data collection, target populations used for calculation of administrative coverage continue to rely on official population estimates which may not be accurate. Estimates of population sizes may not adequately reflect population growths or dynamics such as migration. While results of surveys are mostly comparable due to recent standardisation efforts, the extent to which they are comparable is constrained by several factors as acknowledged earlier, including between- and within-country differences in sampling frames, scale and number of cycles. Another notable limitation of our surveys is their reliance on self-reporting. The use of SMC child record cards for estimation of coverage is not feasible due to limited retention and completion of cards by caregivers, limiting the reliability of the cards as a source of data for determining SMC coverage or validating caregiver responses. Consequently, survey findings may be prone to social desirability. We are of the view however that the role of social desirability bias is minimal, considering that coverage as determined by SMC cards tends to be comparable to the high levels seen in caregiver-reported survey data.

Lastly, while there are often no substantial differences in coverage and quality estimates between earlier cycles, as measured in EoC surveys, and the final monthly cycles, as measured in EoR surveys, there may be a higher potential for recall bias occurring in EoR surveys. This is because EoR surveys are typically conducted one month following the final cycles to enable the collection of data on fever and malaria occurrences in the 28 days following the final cycle, unlike EoC surveys which are usually conducted within a week following each of the earlier cycles. This may, in part, explain the relatively lower levels of day 1 SPAQ coverage seen in the final cycles based on EoR survey data compared to estimates seen in earlier cycles' EoC survey data, such as in Chad and Mozambique (Table 0). Ongoing and planned efforts to mitigate many of these methodological limitations are outlined in the next section.

4.2 Conclusions, recommendations and future directions

Our estimates show that high levels of administrative coverage were maintained across all countries where Malaria Consortium supported SMC delivery with philanthropic funding in 2024. Data from EoC and EoR household surveys also show that SMC supported by Malaria Consortium as implementing partner generally achieved high levels of programme coverage and adherence to SMC quality standards, with coverage in terms of receipt of day 1 SPAQ and adherence to the full three-day course of SMC medicines exceeding 90 percent in most places and cycles during 2024. Results also demonstrate the sustainability of high coverage and quality standards in newer SMC geographies in East and southern Africa. Coverage gaps remain, however, especially for indicators such as receipt of SMC medicines in all cycles by each eligible child targeted. While results indicate

that the SMC programme has continued to be delivered to a high standard, with notable improvements in key coverage indicator estimates, there were notable instances of coverage decline owing to several factors like insecurity, and challenges with implementing SMC in new and complex urban contexts. These gaps and challenges therefore provide opportunities for programme improvement and adaptations for optimising SMC delivery, coverage and quality in 2025.

While there have been improvements to administrative coverage estimation methods, including the use of SMC tally sheets in all locations and recent efforts at digitalising enumeration and recording of SMC medicines distributed, further consideration will be given to expanding campaign digitalisation with the aim of improving data accuracy process, process efficiency and timeliness of reporting. Going forward, we aim to strengthen household survey data quality assurance by operationalising it more routinely and systematically. We expect to use additional data validation features on SurveyCTO and more widely implement real-time use of GPS tracking to ensure interviews are conducted within assigned communities as per the sampling plans across countries. We remain committed to enhancing the capacity of data collectors and M&E staff at all levels through regular training, improved supervision and cross-country learning to consolidate progress in terms of standardising and operationalising M&E methods across locations. To enhance the use of routine programme data to inform decision making, there are also plans to strengthen synergies between M&E and programme management teams both internally and externally with in-country stakeholders through strategic consultations and DIDM goal sharing.

Finally, as in the past years, household surveys will continue to be utilised to collect data on important variables to enable secondary analyses of data for evaluation and answering operational research questions. This is particularly important given the recent and likely further use of SMC as a platform for integration and co-delivery of other public health interventions, such as vitamin A supplementation and identification of under-immunised children to improve malaria vaccination and routine immunisation uptake.

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