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END OF ROUND SURVEY FOR SMC CAMPAIGN 2023 - 2024 MOZAMBIQUE

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FINAL REPORT

Comprehense
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ACRONYM LIST

DCs	Community Distributors
CI	Confidence Interval
DOT	Directly Observed Therapy
EAs	Enumeration Areas
EoR	End-of-Round
ICC	Intraclass Correlation Coefficient
MC	Malaria Consortium
MOE	Margin of Error
PPS	Probability Proportional to Size
SMC	Seasonal Malaria Chemoprevention
SP	Sulfadoxine-pyrimethamine
SPAQ	Sulfadoxine-Pyrimethamine and Amodiaquine
SPSS	Statistical Package for Social Sciences
WHO	World Health Organization

EXECUTIVE SUMMARY

BACKGROUND: *Seasonal malaria chemoprevention (SMC) involves administering antimalarial medications monthly during the peak malaria transmission season to children aged 3 to 59 months, as endorsed by the World Health Organization. A complete SMC regimen consists of four monthly doses delivered by trained community distributors (DCs) who provide door-to-door services. On the first day, DCs administer the initial doses of sulfadoxine-pyrimethamine (SP) and amodiaquine (AQ) to the child in person, while caregivers are instructed to give the second and third doses of AQ over the following two days. To maximize impact, high coverage among eligible children is essential.* ***METHODS:*** *This end-of-round (EoR) evaluation survey assessed the coverage and quality of SMC delivery among eligible children in 23 districts of Nampula province. It also assessed the extent to which ineligible children living in targeted areas received SMC medicines, as a measure of implementation quality and efficiency. Conducted between July and August 2024, the study utilized a cross-sectional household survey with multi-stage cluster random sampling. Quantitative data were gathered with a questionnaire to estimate SMC coverage, adherence and other relevant indicators for both eligible and ineligible children.* ***KEY FINDINGS:*** *The results indicated that 74.05% (95% CI: 67.34–79.80) of households with eligible children were visited by DCs in the last monthly cycle (Cycle 4), with coverage varying by district (from 19.88% [95% CI: 4.726–55.4] to 100%). Approximately 70.65% (95% CI: 64.24–76.33) of eligible children received the Day 1 SPAQ treatment in cycle 4. Day 1 SPAQ was administered under directly observed therapy (DOT) in 92.07% (95% CI: 87.31–95.14) of eligible children during Cycle 4. Almost all, 99.03% (95% CI: 98.01 - 99.53) of eligible children who received Day 1 SPAQ went on to receive a full three-day course of SPAQ in cycle 4. Around half, 52.83% (95% CI: 44.59 - 60.93) of the eligible cohort received SPAQ in all four monthly cycles of the round. Among ineligible children, 23.55% (95% CI: 67.34–79.8) received SPAQ in cycle 4.* ***CONCLUSIONS:*** *Overall, this end-of-round survey revealed relatively lower coverage rates, particularly when comparing results for Cycle 4 to the same period in previous rounds. To enhance SMC coverage and adherence, it is vital to implement strategies that improve accessibility, ensure full dosage uptake, and enhance documentation practices to tackle identified challenges. Continued and innovative community campaigns are crucial to raising awareness about SMC and sustaining the effectiveness of SMC.*

INTRODUCTION

Despite the tremendous progress achieved in the recent year in reducing transmission, owing to improvements in access to diagnosis, case management, and preventive interventions, malaria remains one of the most important public health problems globally (WHO, 2022). Mozambique has one of the highest incidence rates and absolute annual number of malaria cases globally (WHO, 2023). Malaria causes 40% of deaths among children under 5 years in Mozambique, rendering it the most significant national public health threat. The NMCP's strategic plan for 2023-2030 focuses on burden reduction in high endemic areas and sustaining gains in low transmission areas towards elimination (PEM 2027-2022).

Seasonal malaria chemoprevention (SMC) is recommended by WHO as a highly effective intervention to prevent malaria infections in areas where the malaria burden is high, and transmission occurs mainly during the rainy season. SMC is a community-based intervention that consists of monthly administration of a combination therapy - Sulfadoxine-pyrimethamine (SP) and amodiaquine (AQ), collectively referred to as SPAQ to children aged 3–59 months during the peak malaria transmission season. A full course of SPAQ consists of one dose of SP and three doses of AQ, which are given over a three-day period. SMC typically involves four monthly cycles of SPAQ administration over the course of the malaria transmission season, which is referred to as a full "round". Trained community distributors (DCs) provide the medication through door-to-door services, typically administering the first doses of SP and AQ to a child in person on day one, when they visit the household. The caregiver then administers a second and third dose of AQ on the next two consecutive days. A full course of SPAQ provides protection for 28 days, after which protection wanes rapidly. SMC is not only safe, affordable, and feasible, but it also has the potential to avert up to 75% of malaria cases in young children. However, the maximum impact is achieved with high coverage of eligible children across each monthly cycle (Cairns et al.,2012). Since 2018, SMC has been implemented in Burkina Faso, Chad, Nigeria, and Togo, reaching over 12 million children in 2020.

In 2020, a mid-term review of Mozambique's Malaria Strategic Plan 2017–2022 recommended the adoption of SMC strategy to accelerate malaria control efforts in high burden locations. To assess SMC effectiveness as malaria prevention strategy in an area where resistance to SP is assumed to be high, Malaria Consortium (MC), in partnership with the national malaria control program (NMCP), conducted a phased SMC implementation study in Nampula province, reaching a total of 120,000 children. The project was designed as a two-year hybrid effectiveness-implementation study, with the first phase focusing on exploring the feasibility and acceptability of SMC outside the Sahel and the second phase focusing on demonstrating impact. Results from this study prove SMC to be feasible, acceptable, and to confer protection from malaria to eligible children, without negatively impacting on overall resistance. Given the positive results, MC and NMCP started implementation of SMC at scale across the 23 districts of Nampula Province, covering around 1.3 million children in 2022.

The end-of-round (EoR) evaluation survey conducted in 2022-2023 to assess SMC coverage based on key performance indicators showed promising rates of SMC coverage and adherence in eligible children, indicating the effectiveness of the distribution system in reaching a substantial portion of the eligible population and commitment of community distributors in delivering SPAQ. The study results also showed that a significant proportion of interviewed caregivers do understand the importance of administering second and third doses and demonstrated confidence on the effectiveness of the SMC intervention for malaria prevention in their communities. Adverse reactions to SMC medicines were reported in a relatively small number of cases. In this report, we present the results of the survey that evaluated the key SMC end-of-round (EoR) indicators of the 2023-2024 SMC implementation cycles in Nampula province.

OBJECTIVES OF THE SURVEY

Below are the key coverage and quality indicators/objectives.

- A proportion of households with eligible children (aged 3–59 months) visited by a community distributor in the last monthly cycle (Cycle 4).
- Proportion of Day 1 SPAQ administered by community distributors to eligible children (in terms of children who received Day 1 SPAQ during cycle 4 and in the three previous monthly cycles).
- The proportion of eligible children who received a full three-day course of SPAQ (including Day 2 and Day 3 AQ) during cycle 4 (that is, among eligible children who received Day 1 SPAQ in that cycle as denominator).
- A proportion of Day 1 SPAQ administered by community distributors by directly observed therapy (DOT) or supervision during cycle 4 (that is, among eligible children who received Day 1 SPAQ in that cycle as denominator).
- The proportion of Day 1 SPAQ received per eligible child over the course of the SMC round (including proportion of children who received Day 1 SPAQ during all four SMC cycles).
- Proportion of ineligible children (age 60-119 months) who received at least one dose of SPAQ during cycle 4.

Additional indicators such as caregivers' awareness, knowledge, and perceptions of SMC, sources of SMC medicines other than from SMC community distributors, caregiver-reported adverse events following administration of SMC medicines and, caregiver report of child's fever were also assessed.

METHODOLOGY

Survey design and Study population

This study is a cross-sectional household survey utilizing multi-stage cluster random sampling. The study population includes SMC-eligible children aged 3–59 months, as well as SMC-ineligible children under 3 months or between 60–119 months. Participants were required to be residents of any of the 23 districts of Nampula province for at least one month during the SMC implementation period. Survey responses were collected by caregivers of children sampled.

Inclusion criteria

- Households with children aged 3-119 months, resident in Nampula (at least one month) during the period of SMC campaign implementation were eligible for survey.
- In addition, a person aged 18 years or more who's primary responsibility is the daily care and feeding of a child aged 3 months to 10 years and resident in the household prior to the start of the SMC campaign was eligible to provide.

Household Exclusion criteria

- Refusal to participate in the survey.
- Absence of children aged 3-119 months (at the time of SMC campaign).
- Absence of caregiver/persons aged 18 years or older in the household, at the time of data collection were excluded.
- Households with refusing participants were replaced by the next eligible household.

SAMPLE SIZE DETERMINATION

The sample size was determined separately for eligible children (aged 3 – 59 months) and ineligible children (aged 60 -119 months). See below the detailed description of sample estimation for both groups.

- Eligible children – A minimum sample size of 1,500 children aged 3 – 59 months was estimated to achieve 75% coverage, 95% confidence level, 5% of margin of error (MOE), 95% response rate, design effect of 4.8 (based on intraclass correlation coefficient (ICC) of 0.2 and cluster size of 20) and precision of 1.98%. This means that a minimum of 1,500 eligible children aged 3 – 59 months across 75 clusters (20 eligible children per cluster) was required.
- Ineligible children – A minimum sample of 1,125 children aged 60 – 119 months was estimated based on expected coverage of 25%, 95% confidence level, 5% MOE, 95% response rate and a design effect of 3.8 (based on ICC of 0.2 and cluster size of 15). This means that a minimum of 1,125 ineligible children aged 60 – 119 months across 75 clusters (15 per cluster) was required.
- Overall survey sample size required (for children aged 3 – 119 months): a minimum of 2,625 children to be sampled across 75 clusters – that is, 20 eligible children and 15 ineligible children in each cluster – a total of 35 children per cluster across 75 clusters.

Sampling procedure

The survey employed multi-stage random sampling of households in Nampula province. The sampling procedure aimed to achieve a representative sample of the targeted population at the provincial level and by urbanicity (rural and urban), to estimate the coverage of SMC at the level of individual eligible children. The sampling protocol aimed to achieve a self-weighted sample with sampling units (clusters/enumeration areas - EAs) selected with a probability proportional to size (PPS). Only at the cluster and household levels a constant number of children (20 eligible and 15 ineligible) were randomly selected with equal probability, with one child sampled per selected household.

The survey was powered to provide estimates of SMC coverage for children aged 3-59 months with a margin of error of 5%, while also providing a representative sample of children aged 60-119 months for assessing the coverage of SMC among older/ineligible children.

The main sampling frame for the selection process was a list of enumeration areas, households target population in Nampula province, from the 2017 National Census, with projections to 2024. First, 75 clusters were randomly selected using probability proportional to size (PPS). This allowed for a self-weighted sample. Clusters were the primary unit of sampling through which households and eligible children were selected randomly. Second, from each selected cluster, a minimum sample of 35 households (20 household, for eligible children, aged 3–59 months, and 15 household, for ineligible children, aged 60–119 months) with at least one child aged 3–119 months, were selected independently. A primary caregiver of the selected child was identified and administered the survey questionnaire. A caregiver in the context of this survey refers to any individual, aged 18 years or over, with the primary responsibility for the feeding and daily care of at least one child under the age of five, in a household where he or she has been resident prior to the start of the SMC campaign or one month before the last cycle of the treatment.

DATA COLLECTION METHODS AND PROCEDURES

Data collection tool

The survey collected a series of essential indicators. Questions and indicators have been adapted specifically to the implemented SMC campaign.

The research team was trained in study procedures including inclusion and exclusion criteria, ethical principals in human research, study procedures and location of households, data collection using electronic application and study consent administration.

The data was collected using a survey questionnaire developed by Malaria Consortium. The questionnaire was uploaded into the SurveyCTO software application, an electronic data collection platform for smartphones, that enables direct, field-based collection of data and remote monitoring of data quality (Annex 1).

Questionnaires were administered by trained research field workers. All surveys were administered using SurveyCTO and data was uploaded to a remote server after each day of data collection. Interviews were conducted in either Portuguese or Emakhua, the local language, with data collectors simultaneously translating from the Portuguese-language questionnaire and assigning responses to pre-defined answer categories. For the age eligibility indicator, survey respondents were asked to present a birth certificate or vaccination card to the data collector to verify the child's date of birth. The duration of the data collection process lasted fifteen days.

Pre-testing of the study tools

The adapted study tools were pretested and piloted with research assistants as part of training to test the validity of the instrument, familiarize the data collectors with the survey tool, and appreciate the time allotted to complete a questionnaire, from the previous End of round evaluation study. Most data collectors were familiar with the questionnaire given their part of the 2023 EoR survey.

Informed consent

As part of the process, the interviewers were trained in the informed consent administration procedure. A written informed consent form was explained to all participants in the local language. These forms, to be read out loud to participants, included a full description of voluntary participation, the right to withdraw from the study at any time, and the right to not answer any question. The forms also addressed the risks, benefits, and purpose of the study and the desired learning output. Interviewees were requested to provide verbal consent to be interviewed.

Data quality assurance

Data collected was verified for quality assurance purposes by the quality assurance officer in the field and uploaded daily to the SurveyCTO platform. The uploaded files underwent additional consistency checks, were cleaned, and exported to Excel and STATA for further quality assurance and checks. Extensive data cleaning was completed at the end of the fieldwork prior to analysis.

Data protection

The electronic data collection using SurveyCTO was kept confidential and anonymous as each study participant was identified by a unique ID in the database and the data was secured and saved on a password-protected encrypted computer for the purposes of analysis. The final data set used for analysis does not contain personal identities and collected data will be only used for the purpose of the present research.

Risk to subjects and protection

This study carried minimal risk to all participants. No biomedical interventions were performed as part of this study component. The survey team adhered to the following actions to mitigate any risk: (a) conducted the interviews in a private location as much as possible within the home, and (b) analyzed and reported only aggregate data and (c) did not release any personally identifiable information.

Data analysis

Data analyses were performed using Stata 15.1 (StataCorp, College Station, TX, 77845 USA). Coverage was calculated using the proportion command, with 95% confidence intervals. Population size weights were applied using the svy: command as appropriate for estimates of coverage indicators. The confidence interval (CI) of 95% was used to provide a range of values around the estimate within which population estimates fall. All reported indicators are adjusted for survey sampling methods and reflect the target population estimates. The general characteristics of the study population were described for each district. We described sociodemographic characteristics of children and caregivers. The analysis of SMC coverage for eligible and ineligible children was carried out independently as well as the Household characterization.

For district level analysis, results are presented in tables. However, it is important to note that some indicators are missing for districts level estimates. This was because the sampling method was designed to provide results that are representative at the provincial level and urbanicity status (rural vs urban regions). Therefore, careful interpretation is needed when interpreting and comparing indicators across districts.

RESULTS

The survey was conducted between July and August 2024 and a total of 3,063 children distributed across all 23 districts of Nampula Province were included, in a total of 75 survey clusters. Of these, 1,789 (58.4%) were eligible children (aged 3–59 months) and 1,274 (41.6%) were ineligible children (aged 60–119 months), resulting on average 23.9 and 16.9 eligible and ineligible children per enumeration area respectively. This represents on average 3.9 eligible and 1.9 ineligible children per enumeration area, over the required sample. Among visited household, 3,063 caregivers/head of the household were interviewed and information on the family livelihood, SMC uptake and child health collected. A comprehensive and detailed exploration of the social demographics and household characteristics of the interviewed children and their caregivers, as well as in-depth SMC uptake indicators among both eligible and ineligible children, are provided in the following sections.

Characteristics of the study population (Eligible children, aged 3–59 months)

Eligible Children and Caregiver Social demographic characteristics

The socio-demographic characteristics of both children and their caregivers are shown in Table 1. There is a balanced distribution of eligible children included in the survey with two-year-olds 21.83% (95% CI: 19.53–24.31), three-year-olds 23.57% (95% CI: 21.37–25.92), and four-year-olds (23.36%, 95% CI: 20.98–25.93), compared to 7.36% (95% CI: 5.74-9.40) between 3 months and one year, and 4.60% (95% CI: 24-6.5) with five years uncompleted, respectively. The results also indicate a balanced distribution of children's gender, with 50.68% females (95% CI: 48.28-53.07) and 49.32% males (95% CI: 46.93-51.72). Most caregivers were aged between 20–29 years old and 30–39 years old with 51.15% (95% CI: 47.43–54.85) and 31.0% (95% IC: 28.55–33.56), respectively. The educational background of caregivers revealed a significant percentage of caregivers with primary school 33.25% (95% CI: 28.04–38.91), however, the majority had no formal education 49.66% (95% CI: 43.14–56.20). Regarding marital status, most of the interviewed caregivers 84.48% (95% IC: 81.59–86.99) referred to be married or in a partnership. In addition, the occupation results stress the economic variability, with the majority 59.46% (95% CI: 51.49-66.96) of caregivers engaged in unpaid agriculture work and 21.35% (95% IC:15.46-28.73) unemployed or not looking for paid work (Table 1).

Table 1: Characteristics of the study population (Eligible children, aged 3 – 59 months and caregivers)

Caracteristics	Proportion	95% CI (lb - ub)
Age, in completed number of years (N=1789)		
0 [only over 3 months]	7.36	5.74 - 9.40
1	19.27	17.17 - 21.55
2	21.83	19.53 - 24.31
3	23.57	21.37 - 25.92
4	23.36	20.98 - 25.93
5 [only less 5 years]	4.60	3.24 - 6.51
Gender (N=1789)		
Female	50.68	48.28 - 53.07
Male	49.32	46.93 - 51.72

Age Caregiver (N=1789)		
Under 20	3.60	2.53 - 5.10
20–29 y	51.15	47.43 - 54.85
30–39 y	31.00	28.55 - 33.56
40–49 y	10.09	8.20 - 12.36
50–59 y	3.29	2.22 - 4.83
60 or more	0.86	0.50 -1.50
Caregiver Gender (N=1789)		
Female	86.58	83.05 - 89.46
Male	13.42	10.54 - 16.95
Marital status (N=1789)		
Married/in a partnership	84.48	81.59 - 86.99
Single/unpartnered	9.16	7.09 - 11.78
Divorced	4.27	3.07 - 5.90
Widowed	2.07	1.28 - 3.33
Caregiver's Education attainment level (N=1789)		
None (or only first-year pre-primary education)	49.66	43.14 - 56.20
Informal or religious education	1.25	0.58 - 2.64
Primary school	33.25	28.04 - 38.91
Secondary school	14.24	11.45 - 17.57
Higher education (post-secondary, vocational college, teacher training)	1.59	0.85 - 2.97
Caregiver's Occupation (N=1789)		
Not employed, not looking for paid work	21.35	15.46 - 28.73
Unemployed (looking for paid work)	3.88	2.38 - 6.27
Agriculture (paid)	7.64	4.05 - 13.95
Agriculture (unpaid)	59.46	51.49 - 66.96
Unskilled manual work (unpaid)	1.65	0.82 - 3.29
Unskilled manual work (paid)	1.58	0.87 - 2.86
Skilled manual work (e.g. builder)	0.62	0.32 - 1.22
Sales and services work (e.g. shopkeeper)	2.34	1.39 - 3.91

Characteristics of Households

Table 2 presents detailed information on household characteristics of the surveyed population. Most surveyed households, 55.95% (95% CI: 46.95–64.58) were headed the child's primary caregiver, while 44.05% (95% CI: 35.42–53.05) did not have the child's primary caregiver as the head of the household. More than three-quarters of heads of the interviewed household were aged between 20–49 years old, with the majority 43.29% (95% CI: 37.75–48.99) being of the age group of 30–39 years old, while 59.62% (95% CI: 49.96–68.59) had some level of formal education attained.

Family size showed a significant variation among study households with the most common family size comprising two and three members with 28.02% (95% CI: 24.61–31.72) and 23.25% (95% CI: 20.76–25.95), respectively (Table 2). When assessing household technology access, it was found that only 26.6% (95% CI: 22.34–31.35) of households have access to television, while mobile phones were accessible to 63.06% (95% CI: 57.67–68.14). The study results also showed that 17.17% (95% CI: 11.27-25.27) of households were not permanent resident at the surveyed community “identified as nomadic” (Table 2), reflecting a distinct lifestyle in study location communities.

Table 2 : Characteristics of Eligible children's Households

If Childs's primary caregiver is the same person as the head of household (N=1789)	Propostion	95% CI (lb - ub)
No	44.05	35.42- 53.05
Yes	55.95	46.95- 64.58
Head of HH Age (N=782)		
Under 20	0.99	0.37- 2.59
20–29 y	24.63	20.74- 28.98
30–39 y	43.29	37.75- 48.99
40–49 y	18.53	14.55- 23.32
50–59 y	8.88	6.65- 11.75
60 or more	3.67	2.05- 6.49
Head of HH Sex (N=782)		
Female	6.75	4.21- 10.65
Male	93.25	89.35- 95.79
Head of HH education (N=782)		
No	40.38	31.41- 50.04
Yes	59.62	49.96- 68.59
Family Size (N=1789)		
1	15.92	12.70- 19.77
2	28.02	24.61- 31.72
3	23.25	20.76- 25.95
4	15.95	13.55- 18.68
5 or more	16.86	13.25- 21.21
Construction material (N=1789)		
Earth	67.39	60.44- 73.66
Improved	32.61	26.34- 39.56
Number of beds (N=1789)		
0 or 1	57.20	49.25- 64.80
2	25.98	20.95- 31.73
3 or more	16.82	12.85- 21.72
Lighting (N=1789)		
Oil	50.83	42.20- 59.41
Electric	49.17	40.59- 57.80
Television (N=1789)		
No	73.40	68.65- 77.66
Yes	26.60	22.34- 31.35
Mobile phone (N=1789)		
No	36.94	31.86- 42.33
Yes	63.06	57.67- 68.14
HH Nomad (N=1789)		
No	82.83	74.73- 88.73
Yes	17.17	11.27- 25.27

SMC Coverage, Main Results - Eligible Children

In this section we present a comprehensive overview of key SMC indicators in Nampula Province and highlight the performance metrics of community distributors and adherence rates within the province and among districts. Table 3 to Table 9 describe the main results in more detail.

Household coverage: the overall proportion of households with eligible children (aged 3 – 59 months) in Nampula province that were visited by a community distributor in the last monthly cycle (Cycle 4) was 74.05% (95% IC: 67.34 - 79.80). The coverage within districts ranged from 19.88% (95% CI: 4.726 - 55.4) in Nacala-Porto to 100% in Rapale district. Cidade de Nampula (28.50% (95% CI: 17.54 - 42.75) and Nacaroa (46.03% (95% CI: 10.86 - 85.66) are districts with the lowest household coverages, lagging below fifty percent (Table 3). In households where children did not receive SMC medicines, reasons for not taking them were explored. The primary reason reported by 70.5% (95% CI: 61.62-78.07) of these households was that they were not visited at all by SMC community distributors. Additionally, 13.96% (95% CI: 9.64-19.79) cited the absence of the caregiver and/or children during the distributor's visit, while 5.04% (95% CI: 2.87-8.72) mentioned that the child had a fever when the distributor arrived. Figure 1.

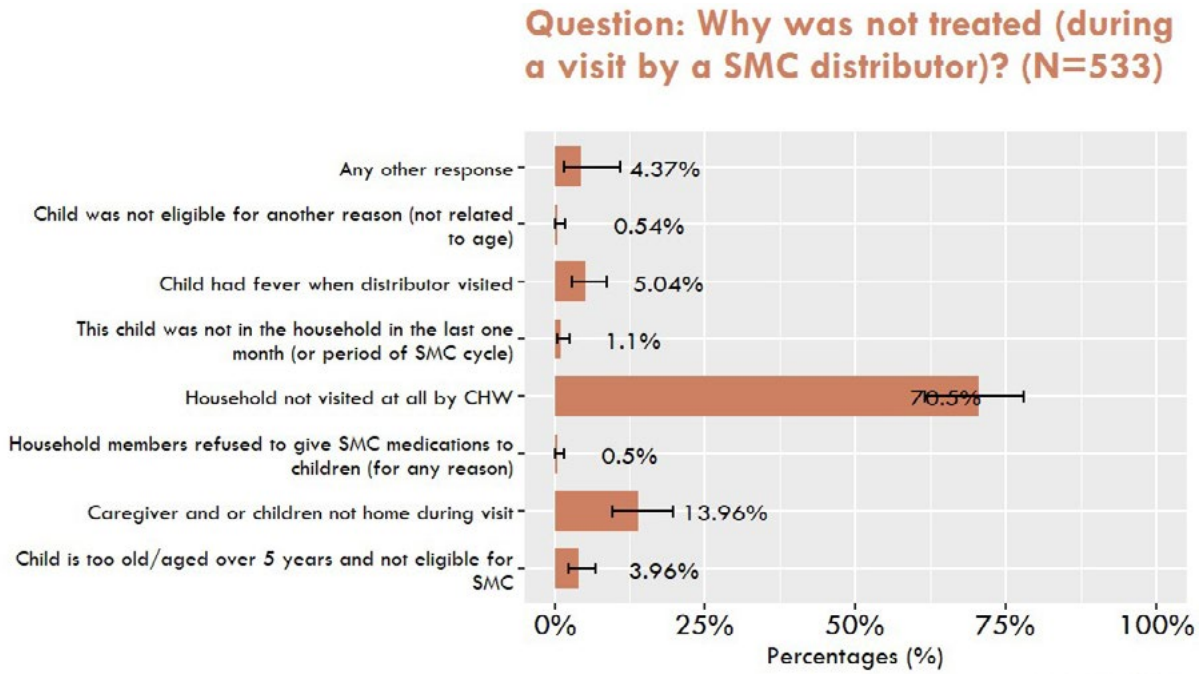

Figure 1 : Administration of SMC by DOT

Eligible child coverage of Day1 SPAQ, all sources: The proportion of eligible children who received Day 1 SPAQ administered across all sources, in the province, was 70.65% (95% IC: 64.24 - 76.33). The proportion of children who received Day 1 SPAQ varied from 16.04% (95% CI: 3.23 - 52.21) in Nacala-Porto to 99.54 (95% CI: 94.55 - 99.96) in Rapale district. Nacala-Porto and Cidade de Nampula's coverage was 16.04% (95% CI: 3.231- 52.21) and 28.31% (95% CI: 18.00-41.52), respectively. These districts presented the lowest household coverages, lagging below fifty percent (Table 3).

SMC received by DOT (The Proportion of Day 1 SPAQ administered by directly observed therapy (DOT) or supervision during cycle 4): The overall proportion of Eligible child who were administered directly observed therapy (DOT) in Day 1 SPAQ among children who received Day 1 SPAQ by a community distributors or supervision during cycle 4 was 92.07% (95% CI: 87.31 - 95.14) in Nampula province. At the district level, the trend of higher proportion of SMC Day 1 SPARQ DOT administration was observed in most districts, with exception of Nacala Porto, Moma, Angoche, and Mongicual districts, which coverage was below 80%. (Table 3 and Figure 2).

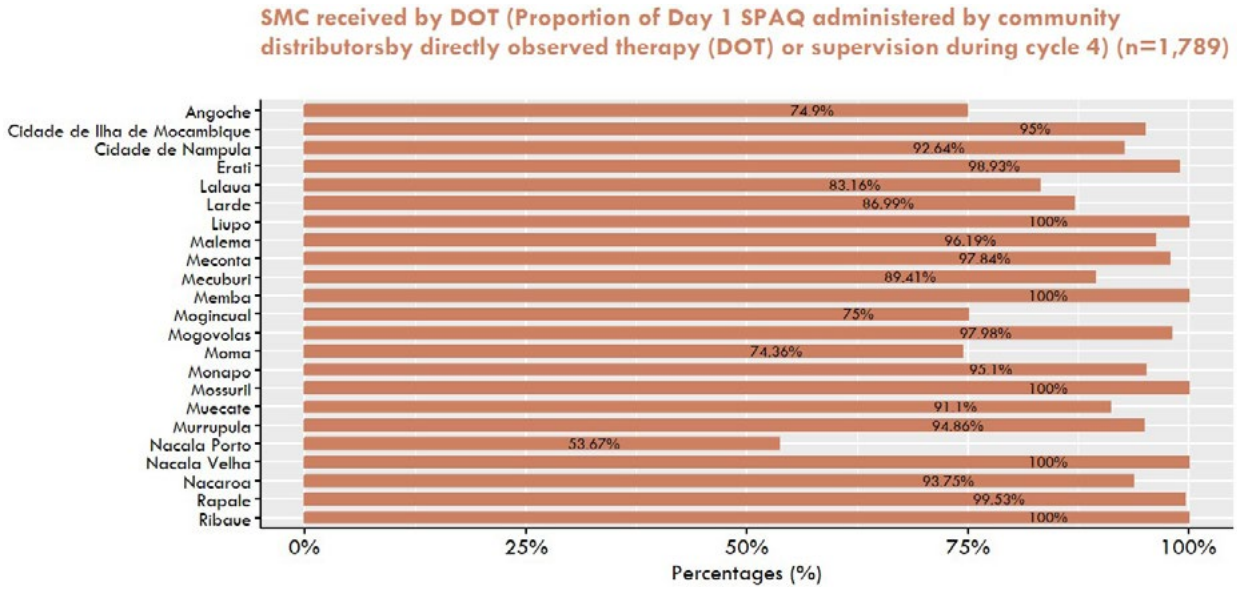

Figure 2: Adherence to SPAQ uptake on Day 2 and 3

Adherence to SPAQ uptake on Day 2 and 3 among children who received Day 1 SPAQ: When analyzing SPAQ uptake on the following days after administration, the results shows that almost hundred percent 99.03% (95% CI: 98.01 - 99.53) eligible children received a full three-day course of SPAQ (including Day 2 and Day 3 SPAQ) among children who received Day 1 during cycle 4 (Table4). This trend was also observed in all districts of Nampula province, with levels of adherence above 92% (Figure 3 and Figure 2.1).

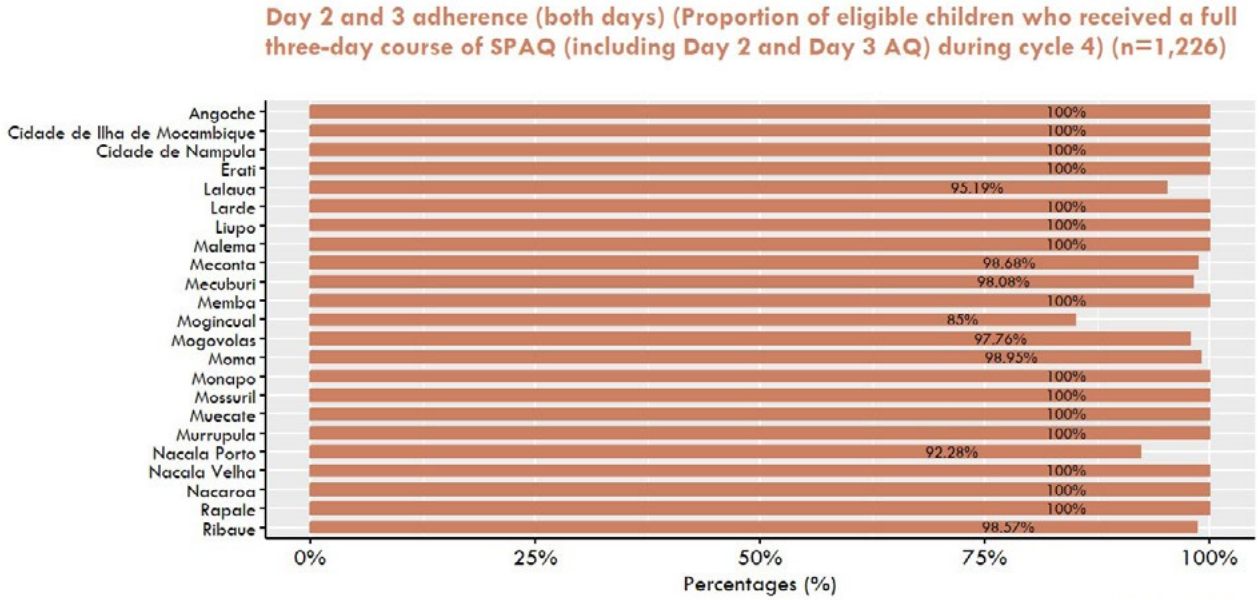

Figure 2.1: Reasons for not receiving SMC medication during a visit by a SMC distributor

Sources of SMC medicines other than from SMC community distributors: When looking to the sources of SMC medicines other than SMC community distributors, results show that Health facility was the most common source of SPAC, accounting for 68.23% (95% CI: 39.48–87.61) of responses. Family/ friends and Fixed-point distribution were mentioned less frequently. However, a considerable number of other sources at 26.22% (95% CI: 10.09–52.95) was cited as having been the means of obtaining SMC medicines (Table 5 and Figure 3).

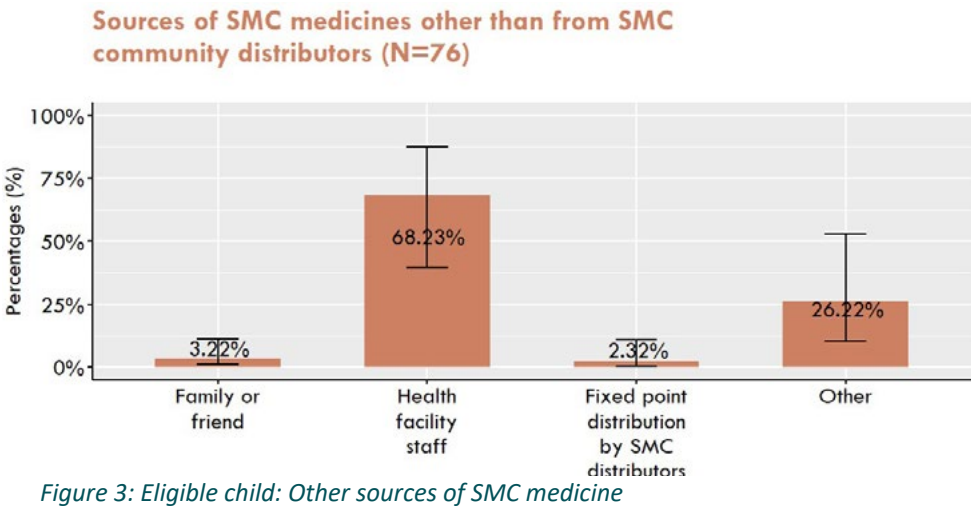

Figure 3: Eligible child: Other sources of SMC medicine

Table 3: SMC Household and child coverage, day 2 and 3 adherence and DOT during cycle 4.

Location	Household coverage Proportion of households with eligible children (aged 3 – 59 months) visited by a community distributor in last monthly cycle (Cycle 4). (n=1,789)		Eligible child coverage of Day1 SPAQ, all sources (Proportion of Day 1 SPAQ administered to eligible children in all cycles) (n =1,788)		Day 2 and 3 adherences (both days) (Proportion of eligible children who received a full three-day course of SPAQ (including Day 2 and Day 3 AQ) during cycle 4) (n=1,178)		SMC received by DOT (Proportion of Day 1 SPAQ administered by directly observed therapy (DOT) or supervision during cycle 4) (n=1,178)	
	Proportion (%)	**95% CI**	**Proportion (%)**	**95% CI**	**Proportion (%)**	**95% CI**	**Proportion (%)**	**95% CI**
Nampula Province	**74.05**	**67.34 - 79.80**	**70.65**	**64.24 - 76.33**	**99.03**	**98.01 - 99.53**	**92.07**	**87.31 - 95.14**
Angoche	92.96	85.79- 96.66	88.99	77.60- 94.96	100	---	74.90	45.22- 91.51
Cidadede Ilha de Mocambique	95.65	95.65- 95.65	86.96	86.96- 86.96	100	---	95.00	95.00 – 95.00
Cidade de Nampula	28.50	17.54- 42.75	28.31	18.00- 41.52	100	---	92.64	75.98- 98.04
Erati	81.14	60.48- 92.37	79.30	57.11- 91.68	100	---	98.93	92.96- 99.84
Lalaua	95.65	95.65- 95.65	93.55	89.66- 96.05	95.19	82.77- 98.79	83.16	49.43- 96.15
Larde	81.03	79.71- 82.27	78.85	73.65- 83.25	100	---	86.99	63.10- 96.32
Liupo	77.27	77.27- 77.27	77.27	77.27- 77.27	100	---	100	---
Malema	89.04	57.36 – 98.00	89.04	57.36- 98.00	100	---	96.19	79.98- 99.38
Meconta	94.42	86.73- 97.77	88.49	82.95- 92.4	98.68	93.67- 99.74	97.84	93.48- 99.31
Mecuburi	96.04	90.15- 98.47	91.43	81.35- 96.31	98.08	92.12- 99.55	89.41	85.68- 92.26
Memba	87.43	76.21- 93.79	80.57	71.11- 87.48	100	---	100	---
Mogincual	86.21	86.21- 86.21	93.10	93.10- 93.10	85.00	85.00 – 85.00	75.00	75.00 – 75.00
Mogovolas	85.56	65.34- 94.90	86.12	73.91- 93.15	97.76	93.85- 99.2	97.98	93.34- 99.41
Moma	88.09	73.40- 95.20	85.28	75.22- 91.70	98.95	94.06- 99.82	74.36	38.57- 93.05
Monapo	74.92	49.41- 90.14	73.55	48.18- 89.27	100	---	95.10	86.02- 98.39
Mossuril	95.49	83.34- 98.90	79.52	74.55- 83.72	100	---	100	---
Muecate	58.88	24.27- 86.48	43.29	18.43- 72.05	100	---	91.10	83.59- 95.36
Murrupula	91.30	91.30- 91.30	84.62	81.27- 87.47	100	---	94.86	94.67- 95.05
Nacala Porto	19.89	4.72- 55.40	16.04	3.231- 52.21	92.28	90.35- 93.85	53.67	43.21- 63.82
Nacala Velha	82.96	64.48- 92.88	82.96	64.48- 92.88	100	---	100	---
Nacaroa	46.03	10.86- 85.66	46.03	10.86- 85.66	100	---	93.75	93.75- 93.75
Rapale	100.00	---	99.54	94.55- 99.96	100	---	99.53	94.47- 99.96
Ribaue	96.72	94.57- 98.04	84.66	66.53- 93.87	98.57	91.81- 99.76	100	---

Table 4: Day 1 SMC coverage by cycle

Location	Eligible child coverage of Day1 SPAQ, all sources, by cycle							
	Cycle 1 (n=1,042)		Cycle 2 (n=1,042)		Cycle 3 (n=1,042)		Cycle 4 (n=1,788)	
	Proportion (%)	95 (%)	Proportion (%)	95 (%)	Proportion (%)	95 (%)	Proportion (%)	95 (%)
Nampula Province	**74.51**	**67.36 - 80.54**	**76.07**	**68.89 - 82.02**	**77.10**	**72.05 - 81.48**	**70.65**	**64.24 - 76.33**
Angoche	79.66	68.38- 87.65	71.22	49.14- 86.38	85.90	77.07- 91.69	88.99	77.60- 94.96
Cidadede Ilha de Mocambique	100	---	100	---	93.33	93.33- 93.33	86.96	86.96- 86.96
Cidade de Nampula	73.69	68.28- 78.47	50.01	35.37- 64.64	45.70	31.82- 60.28	28.31	18.00- 41.52
Erati	95.27	82.00- 98.89	100	---	98.65	91.04- 99.81	79.30	57.11- 91.68
Lalaua	89.73	89.35- 90.10	97.34	89.52- 99.37	100	---	93.55	89.66- 96.05
Larde	100	---	94.22	92.91- 95.30	91.09	83.11- 95.51	78.85	73.65- 83.25
Liupo	68.75	68.75- 68.75	6.25	6.25- 6.25	43.75	43.75- 43.75	77.27	77.27- 77.27
Malema	12.28	11.66- 12.92	24.55	23.32- 25.83	38.62	35.53- 41.80	89.04	57.36- 98.00
Meconta	77.85	62.01- 88.33	83.15	50.93- 95.91	61.27	36.04- 81.62	88.49	82.95- 92.40
Mecuburi	91.82	86.18- 95.28	88.53	77.34- 94.59	85.88	84.85- 86.86	91.43	81.35- 96.31
Memba	55.37	29.51- 78.62	83.35	69.58- 91.63	82.88	70.38- 90.79	80.57	71.11- 87.48
Mogincual	47.62	47.62- 47.62	66.67	66.67- 66.67	76.19	76.19- 76.19	93.10	93.1- 93.1
Mogovolas	61.05	30.85- 84.63	79.23	67.48- 87.52	77.24	70.55- 82.79	86.12	73.91- 93.15
Moma	100	---	87.50	87.50- 87.50	87.50	87.50- 87.50	85.28	75.22- 91.70
Monapo	73.85	57.04- 85.72	70.26	37.36- 90.34	80.41	61.96- 91.18	73.55	48.18- 89.27
Mossuril	70.83	54.05- 83.36	83.09	45.32- 96.68	75.57	68.94- 81.17	79.52	74.55- 83.72
Muecate	72.90	48.79- 88.37	72.90	48.79- 88.37	88.55	73.78- 95.51	43.29	18.43- 72.05
Murrupula	83.69	81.70- 85.49	92.04	88.55- 94.53	86.21	79.78- 90.83	84.62	81.27- 87.47
Nacala Porto	42.88	29.85- 56.99	57.28	48.96- 65.21	44.93	40.89- 49.04	16.04	3.23- 52.21
Nacala Velha	90.41	76.91- 96.39	87.12	84.17- 89.60	83.93	77.37- 88.86	82.96	64.48- 92.88
Nacaroa	66.67	66.67- 66.67	83.33	83.33- 83.33	58.33	58.33- 58.33	46.03	10.86- 85.66
Rapale	96.73	89.76- 99.01	96.73	89.76- 99.01	93.46	80.22- 98.05	99.54	94.55- 99.96
Ribaue	80.87	74.30- 86.08	79.62	59.09- 91.35	87.05	80.76- 91.49	84.66	66.53- 93.87

Table 5: Sources of SMC medicines other than from SMC community distributors

Location	Sources of SMC medicines other than from SMC community distributors (n= 76)							
	Family o		Health f		Fixed po		Other	
	Proportion (%)	95 (%)	Proportion (%)	95 (%)	Proportion (%)	95 (%)	Proportion (%)	95 (%)
Nampula Province	**3.22**	**0.88 - 11.01**	**68.23**	**39.48 - 87.61**	**2.32**	**0.45 - 10.96**	**26.22**	**10.09 52.95**
Angoche	0	---	100	---	---	---	0	---
Cidadede Ilha de Mocambique	---	---	---	---	---	---	---	---
Cidade de Nampula	54.63	28.52 - 78.42	45.37	21.58 - 71.48	0	---	0	---
Erati	0	---	79.74	6.57 - 88.61	20.26	11.39 - 33.43	0	---
Lalaua	0	---	100	---	0	---	0	---
Larde	---	---	---	---	---	---	---	---
Liupo	---	---	---	---	---	---	---	---
Malema	0	---	93.33	93.33 - 93.33	0	---	6.66	6.66 - 6.66
Meconta	---	---	---	---	---	---	---	---
Mecuburi	---	---	---	---	---	---	---	---
Memba	---	---	---	---	---	---	---	---
Mogincual	0	---	94.44	94.44 - 94.44	0	---	5.55	5.55 - 5.55
Mogovolas	3.43	1.00 - 11.15	30.93	18.45 - 46.99	3.44	1.00 - 11.15	62.19	39.99 - 80.24
Moma	0	---	0	---	0	---	100	---
Monapo	---	---	---	---	---	---	---	---
Mossuril	---	---	---	---	---	---	---	---
Muecate	---	---	---	---	---	---	---	---
Murrupula	---	---	---	---	---	---	---	---
Nacala Porto	0	---	17.63	1.49 - 75.14	---	---	82.37	24.86 - 98.51
Nacala Velha	---	---	---	---	---	---	---	---
Nacaroa	---	---	---	---	---	---	---	---
Rapale	---	---	---	---	---	---	---	---
Ribaue	---	---	---	---	---	---	---	---

Receipt of Day 1 SPAQ by number of cycles, all sources: Receipt of SPAQ on Day 1 during SMC delivery cycles varied in the study population. The survey results show that the proportion of participants who received Day 1 SPAQ treatment increased as the number of cycles increased. About 8.92%, (95% CI: 6.006 - 13.05), 18.88% (95% CI: 14.37 - 24.41) and 19.36% (95% CI: 15.14 - 24.43) received SPAQ in one, two- and three-monthly SMC cycles, respectively, while 52.83% (95% CI: 44.59 - 60.93) received SPAQ in all four monthly cycles (Table 6 and Figure 4 and 5).

When looking to the eligible child coverage for Day 1 SPAQ in previous cycles, the results reveal varying levels of coverage both among cycles and across different regions. In Cycle 1, the overall coverage reached 74.51% (95% CI: 67.36–80.54). However, some districts reported significantly lower coverage, with Malema at 12.28% (95% CI: 11.66–12.92), Mongincual at 47.62% (95% CI: 47.62–47.62), and Nacala Porto at 42.88% (95% CI: 29.85–56.99), all falling below 50%. In Cycle 2, the overall coverage improved slightly to 76.02% (95% CI: 68.89–82.02), but the lowest was seen in the Liúpo district, which recorded only 6.25% (95% CI: 6.25–6.25). In Cycle 3, the coverage further increased to 77.10% (95% CI: 72.05–81.48). However, several districts continued registering lower coverage, including Liúpo with 43.75% (95% CI: 43.75–43.75), Malema with 38.62% (95% CI: 35.53–41.80), Nacala Porto with 44.93% (95% CI: 40.89–49.04), and Cidade de Nampula with 45.70% (95% CI: 31.82–60.28), all showing coverage below 50%. (Table 4).

Note: Given that the survey was conducted in July/August 2024, any children with less than 10 months at the time of interview, was not included in the analysis of this indicator as they were less than 3 months old at the start (cycle 1) of the SMC round, thus could not have been eligible for all four monthly cycles between February and May 2024).

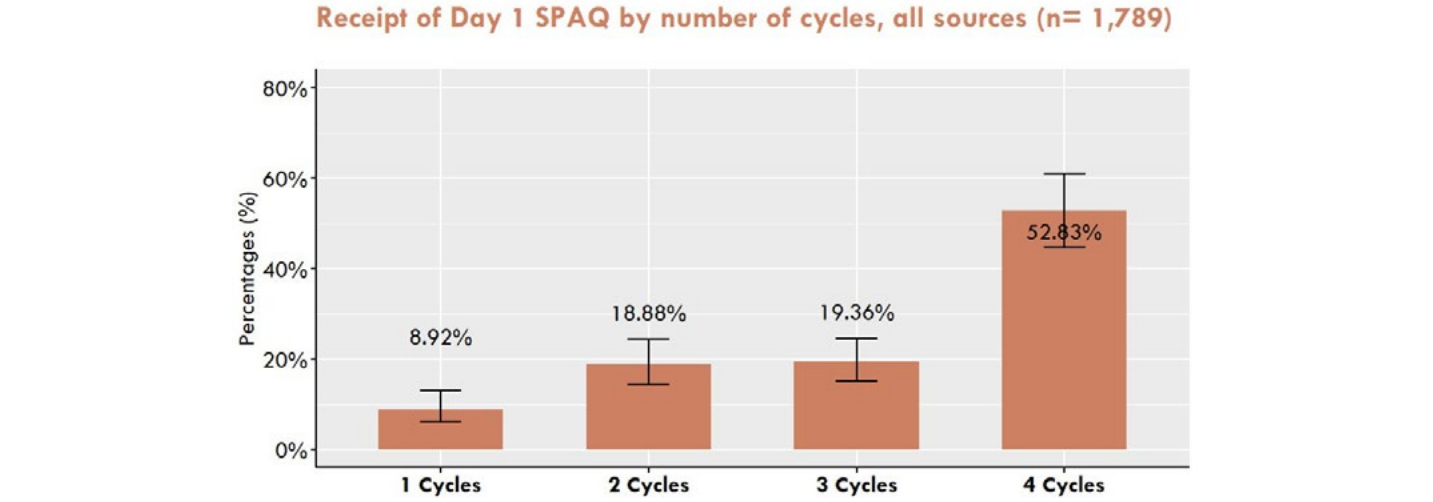

Figure 4: Day 1 SPAQ, all cycles

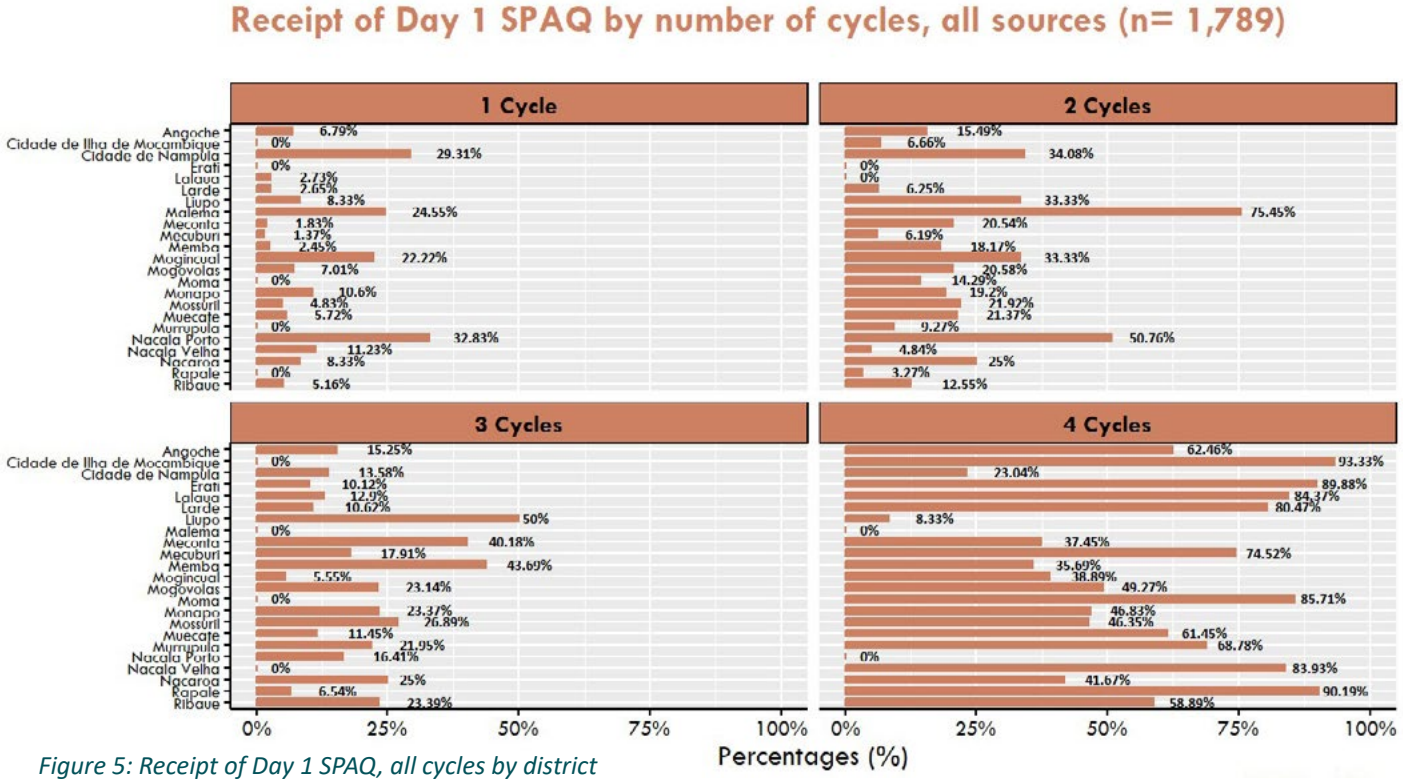

Figure 5: Receipt of Day 1 SPAQ, all cycles by district

Table 6: Receipt of Day 1 SPAQ by number of cycles

Location	Receipt of Day 1 SPAQ by number of cycles, all sources (n= 1,789)									
	0 cycles		1 cycle						2 cycles	
	Proportion (%)	95 (%)	Proportion (%)	95 (%)	Proportion (%)	95 (%)	Proportion (%)	95 (%)	Proportion (%)	95 (%)
Nampula Province	**---**	**---**	**8.92**	**6.06 - 13.05**	**18.88**	**14.37 - 24.41**	**19.36**	**15.14 - 24.43**	**52.83**	**44.59 - 60.93**
Angoche	---	---	6.79	1.44- 26.61	15.49	9.60- 24.04	15.25	6.88- 30.43	62.46	42.94- 78.63
Ilha de Mocambique	---	---	0.00	---	6.66	6.66- 6.66	0.00	---	93.33	93.33- 93.33
Cidade de Nampula	---	---	29.31	15.25- 48.86	34.08	22.94- 47.31	13.58	7.741- 22.73	23.04	13.12- 37.23
Erati	---	---	0.00	---	0.00	---	10.12	2.35- 34.52	89.88	65.48- 97.65
Lalaua	---	---	2.73	0.62- 11.17	0.00	---	12.90	5.57- 27.13	84.37	76.90- 89.74
Larde	---	---	2.65	0.68- 9.80	6.25	1.29- 25.30	10.62	2.57- 34.87	80.47	70.80- 87.50
Liupo	---	---	8.33	8.33- 8.33	33.33	33.33- 33.33	50.00	50.00 – 50.00	8.33	8.33- 8.33
Malema	---	---	24.55	23.32- 25.83	75.45	74.17- 76.68	0.00	---	0.00	---
Meconta	---	---	1.83	0.20- 14.25	20.54	5.66- 52.65	40.18	32.56- 48.31	37.45	13.04-70.51
Mecuburi	---	---	1.37	0.17- 10.27	6.19	3.10- 11.96	17.91	14.65- 21.71	74.52	70.91- 77.82
Memba	---	---	2.45	0.86- 6.77	18.17	12.31- 26.0	43.69	21.60- 68.60	35.69	13.20- 66.94
Mogincual	---	---	22.22	22.22- 22.22	33.33	33.33- 33.33	5.55	5.55- 5.55	38.89	38.89- 38.89
Mogovolas	---	---	7.01	1.76- 24.02	20.58	11.89- 33.23	23.14	14.65- 34.55	49.27	25.08- 73.81
Moma	---	---	0.00	---	14.29	14.29- 14.29	0.00	---	85.71	85.71- 85.71
Monapo	---	---	10.60	2.17- 38.78	19.20	7.85- 39.86	23.37	14.97- 34.56	46.83	19.71- 75.96
Mossuril	---	---	4.83	1.05- 19.43	21.92	17.96- 26.48	26.89	18.45- 37.42	46.35	44.48- 48.23
Muecate	---	---	5.72	2.29- 13.6	21.37	5.56- 55.64	11.45	4.48- 26.27	61.45	50.81- 71.1
Murrupula	---	---	0.00	---	9.27	7.45- 11.48	21.95	20.55- 23.41	68.78	68.20- 69.35
Nacala Porto	---	---	32.83	18.33- 51.55	50.76	26.91- 74.27	16.41	9.51- 26.84	0.00	---
Nacala Velha	---	---	11.23	6.55- 18.58	4.84	4.69- 4.99	0.00	---	83.93	77.35- 88.87
Nacaroa	---	---	8.33	8.33- 8.33	25.00	25.00 – 25.00	25.00	25.00 – 25.00	41.67	41.67- 41.67
Rapale	---	---	0.00	---	3.27	0.98- 10.27	6.54	1.94- 19.83	90.19	71.3- 97.14
Ribaue	---	---	5.16	2.21- 11.56	12.55	6.87- 21.84	23.39	13.92- 36.57	58.89	44.57- 71.85

Awareness, knowledge and perceptions about SMC among caregivers

Table 7 shows the results of the analysis of caregiver knowledge, awareness about SMC intervention, Malaria prevention and symptoms. The overall proportion of caregivers who were aware of Seasonal Malaria Chemoprevention (SMC) before the onset of SMC delivery campaign was 82.49% (95% CI: 76.49-87.21). The proportion of caregivers with knowledge about age illegibility criteria was 71.70% (95% CI: 64.09-78.24). Ownership and use of insecticide-treated nets (RTI) of the households was 71.19% (95% CI: 66.42–75.53), ranging from 35.74% to 91.30% within the districts. The proportion of the interviewed caregivers reporting fever episodes of a child under their care was 30.22% (95% CI: 25.52-35.38%). This figure also showed variation within the district from 2.01% to 72.41%. (Table 7).

Table 7: Awareness and knowledge caregivers about SMC

Location	Caregiver heard of SMC before campaign (n=1,789)		Caregiver knowledge age eligibility (n=1,468)		Household ownership and use of insecticide-treated (n=1,789)		Caregiver reported fever (n=1,789)	
	Proportion (%)	95% CI	Proportion (%)	95% CI	Proportion (%)	95% CI	Proportion (%)	95% CI
Nampula Province	**82.49**	**76.49 - 87.21**	**71.7**	**64.09 - 78.24**	**71.19**	**66.42 - 75.53**	**30.22**	**25.52 - 35.38**
Angoche	65.44	42.23- 83.07	90.3	81.96- 95.02	68.56	47.76- 83.88	42.51	25.66- 61.31
Ilha de Mocambique	100	---	69.57	69.57- 69.57	91.3	91.3- 91.3	21.74	21.74- 21.74
Cidade de Nampula	68.55	53.31- 80.62	26.39	14.47- 43.17	89.83	86.41- 92.47	40.87	33.15- 49.07
Erati	90.36	72.58- 97.08	67.97	30.17- 91.24	35.74	19.39- 56.27	22.2	13.47- 34.34
Lalaua	58.31	42.48- 72.6	69.91	48.89- 84.95	82.46	75.36- 87.84	58.47	48.95- 67.39
Larde	89.74	68.55- 97.23	97.57	89.89- 99.45	89.74	68.55- 97.23	19.36	14.49- 25.38
Liupo	90.91	90.91- 90.91	85	85- 85	63.64	63.64- 63.64	68.18	68.18- 68.18
Malema	89.81	60.41- 98.07	99.14	92.14- 99.91	74.63	28.74- 95.55	40.74	23.75- 60.28
Meconta	97.27	90.12- 99.29	97.71	84.77- 99.7	63.78	60.06- 67.34	58.21	40.00- 74.43
Mecuburi	88	64.75- 96.7	37.2	10.33- 75.28	66.9	53.5- 78.03	33.99	29.10- 39.25
Memba	98.09	94.28- 99.38	66.36	47.71- 81.00	61.33	38.54- 80.05	26.84	17.23- 39.27
Mogincual	79.31	79.31- 79.31	39.13	39.13- 39.13	82.76	82.76- 82.76	72.41	72.41- 72.41
Mogovolas	96.48	89.3- 98.9	73.61	65.34- 80.5	58.92	48.87- 68.28	22.79	14.79- 33.43
Moma	62.38	29.29- 86.9	100	---	66.7	48.15- 81.21	23.93	18.76- 30.00
Monapo	93.73	86.36- 97.24	81.51	65.11- 91.24	75.1	62.03- 84.78	16.69	7.17- 34.15
Mossuril	97.75	91.37- 99.44	100	---	70.3	42.03- 88.54	49.94	40.30- 59.58
Muecate	86.6	84.46- 88.49	45.74	14.62- 80.58	61.83	52.63- 70.26	2.01	0.48- 8.05
Murrupula	100	---	100	---	83.99	62.41- 94.31	6.36	3.88- 10.25
Nacala Porto	36.38	26.51- 47.54	27.93	19.04- 38.98	63.7	55.6 - 71.09	20.78	10.67- 36.55
Nacala Velha	100	---	100	---	87.34	85.53- 88.96	4.30	0.71- 21.93
Nacaroa	80.9	56.71- 93.19	21.34	8.666- 43.68	53.62	35.81- 70.56	0	---
Rapale	100	---	84.96	80.43- 88.59	84.96	80.43- 88.59	15.51	12.82- 18.64
Ribaue	93.98	85.83- 97.58	97.75	87.84- 99.62	85.73	65.58- 94.99	33.21	13.21- 61.89

Table 8: Other cognitive aspects of the caregivers regarding SMC

knowledge of importance of administering second and third doses of SMC (N=1 468)	Proportion	95% CI (lb - ub)
No	27.72	20.72- 36.00
Yes	72.28	64.00- 79.28
knowledge of possible adverse events (N=1 468)		
No	17.33	12.43- 23.65
Yes	82.67	76.35- 87.57
Caregiver confidence/belief in the protective effect of SMC (N=1 468)		
No	7.42	4.79- 11.32
Yes	92.58	88.68- 95.21

In this survey, we also analyzed other cognitive aspects of the caregivers regarding SMC, including the importance of the administering recommended dosage (Dose 2 and 3), adverse reactions and confidence/ belief on SMC effectiveness. Most of caregivers understand the importance and the need of administrating the second and third doses of SMC 72.28% (95% CI: 64.00–79.28), while 82.67% (95% CI: 76.35–87.57) are aware of potential occurrence of adverse events linked to SMC medicine uptake. More than 90% of caregivers reported being confident/belief about the protective effect of SMC (Table 8).

Regarding adverse reactions to SMC medicines, among eligible children, of the total of 1,226 participants interviewed, only 5.17% (95% CI: 3.68-7.23) children reported having observed some adverse reactions after SMC medicine uptake. Fever was the most common adverse events accounting for 1.62% of children, while the rest of observed adverse events such as diarrhea, loss of appetite, etc. were all reported in proportion below 1% (Table 8).

Table 9: Other Caregiver cognitive aspects of the and Adverse Reaction

Did the child have any adverse reactions to the SMC medicines (N=1 226)	Proportion	95% CI (lb - ub)
No	94.82	92.77- 96.32
Yes	5.17	3.68- 7.23
Most common adverse reactions reported (N= 1 789)		
Diarrhea	0.10	0.02- 0.42
Fever	1.62	1.04- 2.50
Loss of appetite	0.24	0.05- 1.08
Severe vomiting	0.50	0.27- 0.94
Severe vomiting and Fever	0.25	0.06- 0.90
Others	97.29	96.02- 98.16

OTHER RELEVANT INDICATORS

The survey also explored other indicators relevant for Malaria prevention. On the number of Received SPAQ Doses and recorded on the SMC card, we noticed a higher proportion of eligible children receiving a complete three-day course of SPAQ (comprising doses 1, 2, and 3) at 84.53% (95% CI: 73.29–91.59). However, some children did not complete the treatment, only 3.22% (95% CI: 0.70-13.54) completed the second doses and only 3.15% (95% CI: 1.896-5.22) completed doses 1 and 2 (Table 9). Regarding the availability of blisters of SMC Medicines, approximately half of the interviewed households had blister packs of SMC medicines available. Among these households, the majority 71.25% (95% CI: 53.53–84.21) had no remaining tablets in the blister. In terms of Household marking for reception of SPAQ, a significant 68.22% (95% CI: 61.64-74.14) proportion of households were marked. Though, illegible markings were observed in 2.37% (95% CI: 1.53-3.67) of households (Table 10). SMC Child Card Retention results showed that only 53.16% (95% CI: 46.63-59.59) of households had the SMC child card during the survey, indicating gaps in monitoring and record-keeping of SMC delivery (Table 10).

Table 10: Other relevant indicators

All SPAQ doses received indicated on SMC card (N=894)	Proportion	95% CI (lb - ub)
1	4.66	2.768- 7.765
1 2	3.15	1.896- 5.22
1 2 3	84.53	73.29- 91.59
1 3	0.50	0.17- 1.42
2	3.22	0.70- 13.54
2 3	0.91	0.37- 2.21
3	3.00	0.98- 8.78
Blister of SMC medicines, whether it is available (N=1 226)		
No	50.78	40.85- 60.65
Yes	49.22	39.35- 59.15
Number of tablets remaining in blister (N=590)		
0_tablet	71.25	53.53- 84.21
1_tablet	1.89	0.39- 8.53
2_tablet	6.03	2.66- 13.07
3_tablet	4.43	1.48- 12.52
4_tablet	16.38	8.24- 29.95
Household marked for receipt of SPAQ (N=1 789)		
illegible	2.37	1.53- 3.67
inc	1.32	0.69- 2.49
no	28.08	22.20- 34.83
yes	68.22	61.64- 74.14
Card retention/ availability of SMC child card (N=1 789)		
No	46.84	40.41- 53.37
Yes	53.16	46.63- 59.59

Characteristics of the study population (Ineligible children (aged 60 – 119 months)

Ineligible Children Social demographic characteristics

Most ineligible children included in the survey were aged six years old, 29.16% (95% CI: 26.23-32.27) and seven-year-old, 23.21% (95% CI: 20.88-25.72).

The results also indicate a balanced distribution of children by sex, with 51.28% of males (95% CI: 47.55-54.99) compared to 48.72% of female children (95% CI: 45.01-52.45) (Table 11). More detailed results on social demographics information and other indicators for ineligible children, are presents in annex 2.

Table 11: Ineligible Child Social Demographic characteristics

Characteristics	Proportion	CI (lb - ub)
Age, in completed number of years (N=1 274)		
0 [less than 3 months]	1.67	0.96- 2.873
5	10.59	8.14- 13.67
6	29.16	26.23- 32.27
7	23.21	20.88- 25.72
8	14.63	12.78- 16.7
9	20.74	18.47- 23.22
Gender (N=1 274)		
Female	48.72	45.01- 52.45
Male	51.28	47.55- 54.99

Main results on SMC Coverage among Ineligible Children

Ineligible child coverage of Day1 SPAQ, all sources, cycle 4 (Proportion of Day 1 SPAQ administered by community distributors to ineligible children in Cycle 4) (n=1,250)

Overall, less than one third of ineligible children received Day1 SPAQ, all sources (Proportion of Day 1 SPAQ administered by community distributors) in all cycles, 23.55% (95% IC: 67.34–79.8) (Table 12). Yet, districts such as Mogincual, 92.86% (95% CI:92.86–92.86), Rapale 88.04% (95% CI: 86.77–89.2) and Malema 67.92% (95% CI: 17.46–95.49) had greater proportion of ineligible children receiving SMC treatment for malaria prevention.

Table 12: Ineligible children: Day 1 coverage

Location	Proportion (%)	95% CI
Nampula Province	23.55	16.28- 32.8
Angoche	13.65	6.464- 26.57
Cidade de Ilha de Mocambique	57.14	57.14- 57.14
Cidade de Nampula	10.39	4.76- 21.19
Erati	52.53	26.74- 77.04
Lalaua	33.11	30.08- 36.28
Larde	17.10	16.61- 17.61
Liupo	17.65	17.65- 17.65
Malema	67.92	17.46- 95.49
Meconta	10.22	6.637 - 15.42
Mecuburi	4.137	1.85 - 8.993
Memba	11.34	2.12 - 42.99
Mogincual	92.86	92.86 - 92.86
Mogovolas	10	4.29 - 21.61
Moma	20.41	8.31 - 42.04
Monapo	38.80	13.39 - 72.23
Mossuril	0.00	----
Muecate	3.69	0.58 - 19.99
Murrupula	2.19	0.43 - 10.38
Nacala Porto	1.35	0.18 - 9.14
Nacala Velha	3.22	0.35 - 23.58
Nacaroa	42.19	10.60 - 81.79
Rapale	88.04	86.77 - 89.2
Ribaue	7.45	2.12 - 23.01

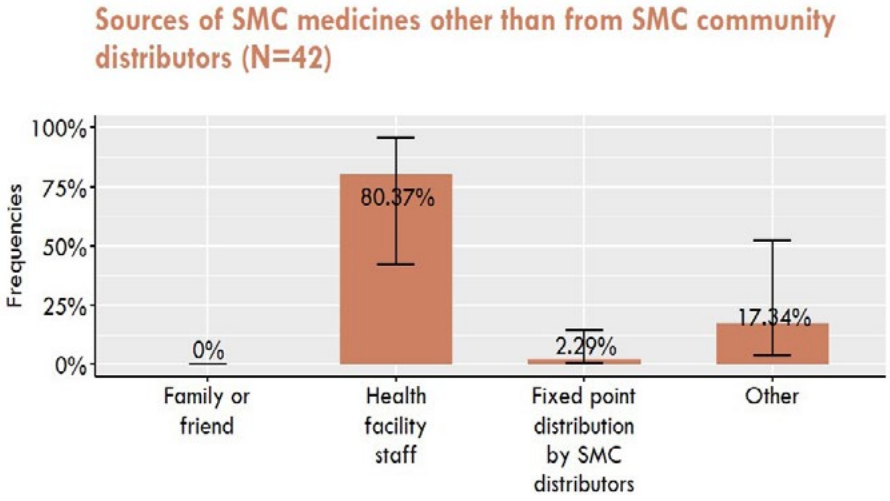

Figure 6: Ineligible children Other sources of SMC medicine

Sources of SMC medicines received by ineligible children other than from SMC community distributors:

Non-ineligible children received SMC medicines from sources other than SMC community distributors mainly from fixed point distribution 2.29% (95% CI: 0.32-14.39) and other sources 17.34% (95% CI: 3.85-52.34) (Table 13 and Figure 6).

Table 13: Sources of SMC medicines other than from SMC community distributors ineligible children

Location	Sources of SMC medicines other than from SMC community distributors (n= 73)							
	Family or friend		Health facility staff		Fixed point distribution by SMC distributors		Other	
	Proportion (%)	**95% CI**	**Proportion (%)**	**95% CI**	**Proportion (%)**	**95% CI**	**Proportion (%)**	**95% CI**
Nampula Province	**---**	**---**	**80.37**	**42.13 - 95.84**	**2.29**	**0.32 - 14.39**	**17.34**	**3.85 - 52.34**
Angoche	---	---	---	---	---	---	---	---
Cidadede Ilha de Mocambique	---	---	---	---	---	---	---	---
Cidade de Nampula	---	---	76.49	20.04 - 97.69	23.51	2.31 - 79.96	0.00	---
Erati	---	---	37.34	15.77 - 65.49	0.00	---	62.66	34.51 - 84.23
Lalaua	---	---	100	---	---	---	---	---
Larde	---	---	---	---	---	---	---	---
Liupo	---	---	---	---	---	---	---	---
Malema	---	---	100	---	0.00	---	0.00	---
Meconta	---	---	---	---	---	---	---	---
Mecuburi	---	---	---	---	---	---	---	---
Memba	---	---	---	---	---	---	---	---
Mogincual	---	---	87.50	87.50 - 87.50	0.00	---	12.50	2.50 - 12.50
Mogovolas	---	---	14.43	9.70 - 20.92	14.43	9.70 - 20.92	71.15	58.93 - 80.91
Moma	---	---	---	---	---	---	---	---
Monapo	---	---	---	---	---	---	---	---
Mossuril	---	---	---	---	---	---	---	---
Muecate	---	---	---	---	---	---	---	---
Murrupula	---	---	---	---	---	---	---	---
Nacala Porto	---	---	100	---	0.00	---	---	---
Nacala Velha	---	---	---	---	---	---	---	---
Nacaroa	---	---	---	---	---	---	---	---
Rapale	---	---	---	---	---	---	---	---
Ribaue	---	---	---	---	---	---	---	---

Caregiver SMC awareness and Adverse Reaction

Table 14: Caregiver SMC awareness

Knowledge of importance of administering second and third doses of SMC N=1 029	Proportion	95% CI
No	28.22	20.85- 36.97
Yes	71.78	63.03- 79.15
Knowledge of possible adverse events N=1 029		
No	15.23	10.60- 21.40
Yes	84.77	78.60- 89.40
Caregiver confidence/belief in the protective effect of SMC N=1 029		
No	5.53	3.28- 9.17
Yes	94.47	90.83- 96.72

The importance of administering second and third doses of SMC was perceived by ; 71.78% (95% CI: 63.03–79.15), while awareness about the potential occurrence of adverse events associated with SMC uptake was reported by more than two thirds 84.77% (95% CI:78.60–89.40) of caregivers of the included ineligible children, while majority 94.47% (95% CI: 90.83–96.72) expressed confidence in the efficacy of SMC (Table 14). More details are presented in annex 2.

Ineligible Children Adverse Reactions

Table 15: Adverse Reactions

Did the child have any adverse reactions to the SMC medicines (N=253)	Proportion	95% CI
No	94.93	91.01- 97.20
Yes	5.07	2.80- 8.98
Most common adverse reactions reported (N=1 274)		
Diarrhea	---	---
Fever	0.34	0.10- 1.12
Loss of appetite	---	---
Severe vomiting	0.16	0.04- 0.65
Severe vomiting and Fever	0.08	0.01- 0.57
Others	99.42	98.54- 99.77

In the analysis of SMC medicines adverse reactions among Ineligible children, the survey results shows that 5.07% (95% CI: 2.80-8.98) reported that had experienced adverse reactions. Among these group, the most common reported adverse events included fever (0.34%) (Table 15).

DISCUSSION AND CONCLUSION

This session provides a comprehensive discussion of the 2023-2024 SMC end-of-round (EoR) survey results in Nampula province.

Findings indicate that a substantial majority of eligible households were reached by community distributors, demonstrating effectiveness of the distribution system in delivering SPAQ reaching 74% of eligible children. Although not statistically different, this coverage is comparable to the previously reported results for cycle 4 during the 2023 EoR survey which reached 79% of households. However, given that one of the key strengths of SMC coverage is the comprehensive protection it offers to eligible children. By ensuring that nearly 80% of the targeted population received SMC; to reduce the risk of malaria infection during the high-transmission season, it is important to strengthen the distribution system in the next rounds to ensure a continued high coverage.

The household coverage of SMC in the 2023-2024 round (74.0%) lags below that observed in the 2022-2023 round (79.2%) by around 5%. This reduction in coverage may probably be due to the following reasons: Lower levels of SPAQ treatment adherence were observed in certain districts, particularly in urban areas such as Cidade de Nampula and Nacala-Porto, which have contributed to draw down provincial coverage. The primary reasons for this lower uptake of SMC medicines included absence of SMC community distributors and the unavailability of caregivers and/or children during the distributor's visit. This is consistent with the literature and other community implemented programs where urban population are hard to reach, given that they leave for work early in the morning and return late in the day.

To address these issues in future campaigns, efforts should focus on increasing SMC announcements, especially through community leaders, who have proven to be the most effective communication channel. Additionally, conducting repeated visits to households with absent caregivers and/or heads of household can help increase the likelihood of reaching caregivers, especially in urban areas. Furthermore, selected supervision of distributors during implementation, as well as reinforced quality of training and real time coverage monitoring during field activities will be important to improve coverage.

The overall eligible child coverage for Day 1 SPAQ in the 2023-2024 round was 70%, highlighting an important gap in universal coverage. There was significant variation across districts, especially in urban areas, showing the challenges in reaching urban populations, similar trends were also observed in previous cycles where urban areas recorded the lowest coverage. These regions, particularly urban centers, tend to face logistical issues such as the unavailability of caregivers during distributor visits and limited community mobilization efforts, which may explain the persistently low coverage.

Moreover, the directly observed therapy (DOT) administration during Cycle 4 showed higher results, with 92% of children receiving Day 1 SPAQ via DOT. This supervised approach seems to be effective in ensuring children complete the initial dose. However, some districts such as Nacala Porto, Moma, and Angoche showed lower DOT coverage, falling below 80%, suggesting that strengthening supervision and reinforcing DOT in these underperforming districts could improve overall SMC adherence and effectiveness.

Results show that nearly all (99%) of the children who received Day 1 SPAQ went on to complete the three-day full course of SPAQ during cycle 4, indicating that the full dose was received by most of the children reached with the first dose and highlighting the high level of adherence to optimal dosing. This is probably a reflection of the high levels of knowledge of the importance of administering a complete course of SPAQ.

On the other hand, only around half (52.83%) of the of the eligible children received SPAQ treatment in all four monthly cycles. Given that the effectiveness of SMC depends on consistent SPAQ coverage throughout the transmission season, it is crucial to strengthen the distribution system, particularly at the start of the campaign, to ensure full coverage from the first to last monthly cycle.

In addition, the survey confirmed an increased awareness among caregivers about SMC, including the timing of the campaign and eligibility criteria by age. Caregiver awareness of SMC interventions, malaria prevention, and symptoms are crucial factors influencing the uptake of SMC medicines, which can drive decisions, improve coverage, and enhance adherence. However, ongoing mobilization campaigns remain essential to sustain and further increase these gains.

The study reveals that around a quarter of ineligible children (aged 60–119 months) received Day 1 SPAQ during cycle 4. This suggests that a substantial number of ineligible children continue to receive SPAQ, with a slight increase from the 22% reported for the same period in the previous round. Administration of SMC medicines to children who do not meet the age-eligibility criteria for SMC has various implications and presents numerous challenges.

As the current SPAQ formulations used in SMC campaigns in Mozambique are intended for children younger than 5 years, there is a risk of underdosing when older children receive those formulations. Exposure of children to sub-optimal doses can contribute to the development of parasite resistance. If not addressed, this can undermine the programmatic effectiveness of SMC and may weaken the level of confidence that communities have in SMC as a malaria preventive intervention. Furthermore, administering SMC medicines to ineligible children presents a challenge in terms of ensuring the availability of sufficient SPAQ stock levels to reach the entire target population of eligible children. This has important implications for reaching and sustaining high target population coverage, while maintaining optimal levels of programmatic impact and effectiveness in SMC delivery settings. It is therefore imperative that efforts are made in future rounds to mitigate the administration of SMC medicines to ineligible children, such as through training of community distributors and bolstering community awareness of SMC age-eligibility.

Most of the eligible children were from households led by young caregivers aged 20–39 years, consistent with findings from the 2023 survey, where most caregivers were between 20–29 years old. This trend highlights the need for tailored interventions and educational programs targeting this age group to enhance health literacy and promote the uptake of SMC. Additionally, the high proportion of female caregivers emphasizes the pivotal role of women in healthcare within the community, underscoring the importance of focusing on women in health-related decision-making processes to maximize the impact of interventions, including SMC.

Family sizes in the eligible households surveyed ranged from single-member households to larger families with five or more members. This highlights the need for flexibility in SMC distribution to accommodate diverse family dynamics. Additionally, as observed in 2023, the widespread ownership of mobile phones among households in Nampula communities presents an opportunity to leverage technology for health communication strategies, which could enhance awareness and adherence to malaria prevention measures. Furthermore, a tailored approach is needed to effectively deliver SMC to nomadic households, addressing their unique challenges in accessing care.

Although a higher proportion of eligible children received SMC medicines, challenges related to dosage completion, monitoring, and proper documentation underscore the need for ongoing community mobilization and improvements in the documentation process to ensure accurate and comprehensive tracking of interventions. The survey results also highlight the importance of targeted interventions and educational campaigns to address adherence issues and encourage the completion of the full treatment course.

In conclusion, while SMC coverage and adherence are below optimal and with decreasing tendency. It is crucial to implement strategies that improve accessibility, increases reach and convey importance of SMC, as well as ensure complete dosage uptake, and improve documentation practices to address the identified challenges. Continued and new innovative strategies aimed at increasing SMC awareness among communities are essential to increase and sustain the coverage, adoption and impact of SMC.

Limitation

The survey has several strengths, including a robust sample size that enhances the precision of the results. It was designed to provide representative data at the provincial level, allowing for comparisons between campaigns. However, there are important limitations to consider. Firstly, the survey was intended for provincial-level and urbanicity representativeness (not district-level representativeness), so caution is needed when interpreting district-level results and making cross-district comparisons.

Secondly, since the interviews relied on respondents' answers, there is potential for recall bias as the survey was conducted several months after the SMC round. Additionally, social desirability bias may have influenced respondents to report that SPAQ was administered as recommended.

To minimize these biases, cross-checks of responses with available documentation were done and emphasizes on honest answers were reinforced at the beginning of the interview.

Finally, the EoR campaign was conducted during a period of insecurity in the northern part of the province, which may have affected the mobility of the population within the province and from neighboring regions with significant security concerns. This population mobility could have affected the underling population profile censured and used for sampling, potentially skewing the sample toward more accessible or safer locations and underrepresenting populations in high-risk zones.

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ANNEX 1

SMC End of Round Survey for 2024 Questionnaire (EOR_2024_phase4_fr_en_pt_moz.3_printable)

ANNEX 2

Other Results for Ineligible children, aged 60 – 119 months

Table 16: Ineligible child and caregiver social demographic characteristics

Caregiver socio-demographics	Proportion	95% CI
Age Caregiver (N=1 274)		
Under 20	1.11	0.54- 2.24
20–29 y	38.46	34.85- 42.21
30–39 y	37.73	34.19- 41.41
40–49 y	15.97	13.48- 18.81
50–59 y	5.49	3.81- 7.85
60 or more	1.22	0.65- 2.28
Caregiver Gender (N=1 274)		
Female	82.23	77.69- 86.01
Male	17.77	13.99- 22.31
Marital status (N=1 274)		
Married/in a partnership	84.13	80.82- 86.96
Single/unpartnered	9.60	7.28- 12.56
Divorced	4.35	3.02- 6.21
Widowed	1.92	1.21- 3.02
Caregiver's Education attainment level (N=1 274)		
None (or only first-year pre-primary education)	50.64	43.74- 57.51
Informal or religious education	1.69	0.69- 4.12
Primary school	32.37	26.96- 38.30
Secondary school	13.67	10.76- 17.21
Higher education (post-secondary, vocational college, teacher training)	1.62	0.94- 2.79
Caregiver's Occupation (N=1 274)		
Not employed, not looking for paid work	18.35	12.03- 26.96
Unemployed (looking for paid work)	4.17	2.61- 6.592
Agriculture (paid)	7.91	3.56- 16.66
Agriculture (unpaid)	61.51	52.87- 69.49
Unskilled manual work (unpaid)	1.67	0.87- 3.20
Unskilled manual work (paid)	1.44	0.73- 2.81
Skilled manual work (e.g. builder)	0.64	0.24- 1.68
Sales and services work (e.g. shopkeeper)	2.16	1.29- 3.59
Clerical, technical, professional	2.12	1.19- 3.75

Table 17: Ineligible children: Household-level characteristics

If childs's primary caregiver is the same person as the head of household (N=1 274)	Proportion	95%CI
No	42.88	33.97 - 52.28
Yes	57.12	47.72 - 66.03
Head of HH Age (N=548)		
Under 20	0.47	0.15 - 1.47
20–29 y	18.80	14.38 - 24.19
30–39 y	41.02	33.35 - 49.14
40–49 y	25.71	20.08 - 32.28
50–59 y	9.77	6.97 - 13.54
60 or more	4.22	2.54 - 6.91
Head of HH Sex (N=548)		
Female	5.80	3.51 - 9.42
Male	94.20	90.58 - 96.48
Head of HH education (N=548)		
No	42.63	33.84 - 51.91
Yes	57.37	48.09 - 66.16
Family Size (N=1 274)		
0	0.06	0.01 - 0.47
1	10.25	6.84 - 15.08
2	25.17	21.31 - 29.47
3	23.22	20.09 - 26.68
4	20.45	17.47 - 23.8
5 or more	20.84	16.44 - 26.05
Construction material (N=1 274)		
Earth	68.47	61.00 - 75.10
Improved	31.53	24.90 - 39.00
Number of beds (N=1 274)		
0 or 1	54.11	45.67 - 62.32
2	25.38	20.37 - 31.14
3 or more	20.51	15.46 - 26.69
Lighting (N=1 274)		
Oil	54.27	45.15 - 63.11
Electric	45.73	36.89 - 54.85
Television (N=1 274)		
No	73.57	68.51 - 78.07
Yes	26.43	21.93 - 31.49
Mobile phone (N=1 274)		
No	35.56	30.47 - 40.99
Yes	64.44	59.01 - 69.53
HH Nomad (N=1 274)		
No	81.84	72.63 - 88.44
Yes	18.16	11.56 - 27.37

Table 18: Ineligible children: Other Indicators

All SPAQ doses received indicated on SMC card (N=198)	Proportion	95% CI
1	6.50	3.03 - 13.41
1 2	2.15	0.86 - 5.22
1 2 3	72.99	38.02 - 92.25
1 3	---	---
2	7.26	1.38 - 30.45
2 3	---	---
3	11.09	1.91 - 44.32
Blister of SMC medicines, whether it is available (N=253)		
No	33.34	20.67 - 48.99
Yes	66.66	51.01 - 79.33
Number of tablets remaining in blister (N=169)		
0_tablet	62.20	34.77 - 83.55
1_tablet	4.29	1.72 - 10.27
2_tablet	8.01	1.37 - 35.30
3_tablet	19.25	7.03 - 42.90
4_tablet	6.25	2.61 - 14.21
Household marked for receipt of SPAQ (N=1 274)		
illegible	3.69	2.11 - 6.36
inc	1.06	0.53 - 2.11
no	35.08	28.70 - 42.04
yes	60.17	53.57 - 66.42
Card retention/ availability of SMC child card (N=1 274)		
No	80.99	72.30 - 87.42
Yes	19.01	12.58 - 27.70

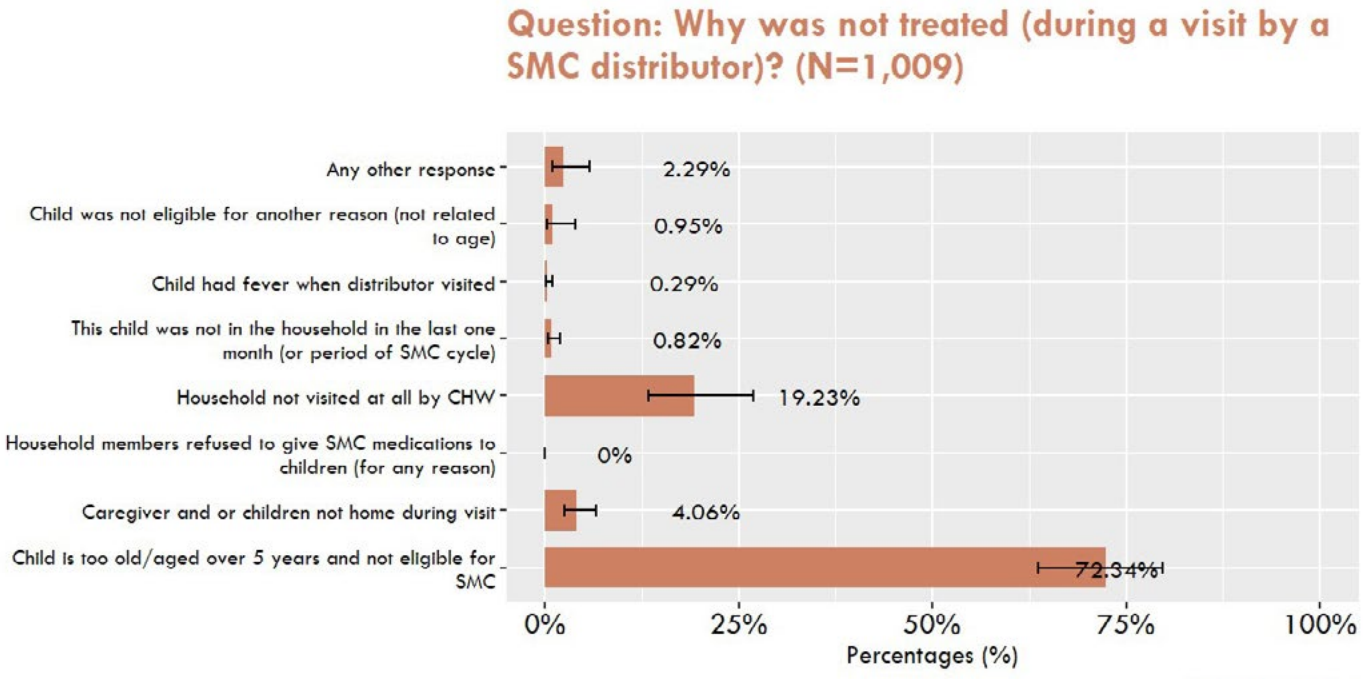

Figure 7: Reasons for not receiving SMC medication during a visit by a SMC distributor in Ineligible children

FINAL REPORT

NOVEMBER 2024

END OF ROUND SURVEY FOR SMC CAMPAIGN IN MOZAMBIQUE

malaria consortium
disease control, better health

Comprehense
The power of Analytics, AI and ML