Malaria Consortium's seasonal malaria chemoprevention program annual narrative report

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Acronyms and abbreviations

ACCESS-SMC	Achieving Catalytic Expansion of Seasonal Malaria Chemoprevention in the Sahel
AIDS	acquired immune deficiency syndrome
AQ	amodiaquine
CAMEG	Centrale d'Achat des Médicaments Essentiels Génériques et des Consommables Médicaux
CHW	community health worker
CPA	Centrale Pharmaceutique D'achats
DFID	Department for International Development
DOT	directly observed treatment
Global Fund	Global Fund to Fight AIDS, Tuberculosis and Malaria
HBHI	high burden to high impact
HMIS	health information system
LGA	local government area
LQAS	lot quality assurance sampling
MSF	Médecins Sans Frontières
M&E	monitoring and evaluation
NMS	national medical store
PMI	President's Malaria Initiative
RBM	Roll Back Malaria
SMC	seasonal malaria chemoprevention
SMS	state medical store
SP	sulfadoxine-pyrimethamine
SuNMaP 2	Support to National Malaria Programme Phase 2
UK	United Kingdom
UNICEF	United Nations Children's Fund
USA	United States of America
WHO	World Health Organization

Background

Across the Sahel, most malaria illness and deaths occur during the rainy season. Seasonal malaria chemoprevention (SMC) is a highly effective intervention to prevent malaria infection during this peak transmission period among those most at risk: children under five.

SMC is defined as the intermittent administration of full treatment courses of an antimalarial medicine during the malaria season. The World Health Organization (WHO) recommends administering four monthly[i] courses of two antimalarial drugs to children aged between three and 59 months: sulfadoxine-pyrimethamine (SP) and amodiaquine (AQ)[ii]. SMC is a safe, cost-effective and feasible intervention, which can prevent up to 75% of malaria cases in children under five **[1]**. In 2018, SMC was implemented in 12 countries of the Sahel, reaching around 19 million children. It was also estimated, however, that around 12 million children who live in areas that could benefit from SMC were not covered **[2]**.

Malaria Consortium has been a leading implementer of SMC since WHO issued its recommendation to scale up the intervention in 2012. Starting with an early implementation pilot in Nigeria in 2013, we then led the rapid scale-up of SMC through the Achieving Catalytic Expansion of Seasonal Malaria Chemoprevention in the Sahel (ACCESS-SMC) project in 2015–2017, reaching close to seven million children in Burkina Faso, Chad, Guinea, Mali, Niger, Nigeria and The Gambia. Since 2018, Malaria Consortium has continued to implement SMC in Burkina Faso, Chad and Nigeria, mainly using philanthropic funding received as a result of being awarded Top Charity status by GiveWell.

[i] The recommended interval between SMC cycles is 28 days.

[ii] There are two SPAQ dosing regimens used in SMC: a lower dose of SPAQ for children 3<12 months and a higher dose for children 12-59 months. SPAQ for use in SMC is packaged in co-blister packs containing one full course.

Malaria Consortium works with governments and implementation partners to deliver the following SMC intervention components:

a) Planning and enumeration

Macro-level planning typically starts four to five months before the campaign at the national and state level. This involves agreeing campaign dates and modalities, as well as discussing adaptations to the SMC intervention tools and guidelines. Based on the macro-plan, micro-planning is conducted around three months before the start of the campaign at the regional and district level. This involves estimating the target population of children aged three to 59 months and recruiting the required number of community distributors and supervisors. In many contexts, accurately estimating the target population is challenging and often relies on outdated census data. Malaria Consortium's country teams are closely involved at the central-level macro-planning and, through our field staff, also support micro-planning.

b) Procurement and supply management

SPAQ for use in Malaria Consortium's SMC campaign is procured by our global operations team. Because as yet there is only one manufacturer capable of manufacturing quality-assured SPAQ in the required formulation and packaging for use in SMC, global production capacity is limited and orders must be placed around one year in advance. It is usually possible to order smaller quantities a few months before the campaign to accommodate increased targets. Malaria Consortium's global operations team manages the shipment of SPAQ for its SMC program from the manufacturer in Guilin, China, to ports in Africa, preferably by sea owing to the lower freight cost, or by air at a higher cost if the consignment is more urgent. The global operations team is also responsible for organizing transport of consignments of SPAQ from seaports and airports to central warehouses in-country. Arrangements for transporting the medicines from central warehouses to district-level warehouses and health facilities differ by country. This intervention component also comprises procurement and supply management of other commodities used in SMC, such as T-shirts, bags and pens for SMC implementers, which are generally managed by Malaria Consortium's country teams.

c) Community engagement

To ensure maximum uptake, mass campaigns such as SMC need to be well accepted by beneficiaries. Ensuring communities understand the rationale for SMC and support its implementation is therefore essential. Typically, this includes sensitization meetings with local leaders, airing of radio spots, and town announcers disseminating relevant information during the campaign. Malaria Consortium supports the development of health communication messages and social and behavior change materials at the central level. Through our field staff, we also support sensitization meetings and orientation of town announcers.

d) Training

SMC implementers are typically trained through a cascade model starting at the national level about one month before the campaign, with each cadre of trainers subsequently training the next lower level of trainers and learners. All community distributors and supervisors attend a one- or two-day classroom training before the start of the campaign. Malaria Consortium has played a key role in developing the training materials used in the countries where we implement SMC. We are closely involved in providing trainings at the higher levels of the cascade and, through our field staff, support trainings at the lower levels. In addition to providing technical support, we also support training logistics and printing of training materials.

e) SMC administration

SMC is delivered to eligible children door-to-door by volunteer community distributors, who typically work in pairs. Many of the community distributors are community health workers (CHWs), a recognized cadre of community-based primary health care workers who receive a small stipend from the government. Others are recruited specifically for the SMC campaign, but all distributors should be from the communities they serve. Each SMC course involves one dose of SP and three daily doses of AQ, with SP and the first dose of AQ given under the supervision of the community distributor as directly observed treatment (DOT), and the remaining two doses of AQ given by the caregiver over the following two days. Each monthly SMC cycle is typically delivered over a period of four days. Field teams are coordinated by salaried, facility-based health workers. SMC campaigns typically also include a fixed-point distribution element: children who are ill should not receive SMC from community distributors, but should be referred to the nearest health facility, where they will be tested for malaria. If tested positive, they should be treated with appropriate antimalarials; if tested negative, they should receive SMC at the health facility. Malaria Consortium has played a key role in developing guidance for SMC implementers, as well as tools to ensure high-quality implementation, for example job aids for community distributors.

f) Supervision, monitoring and evaluation

During the SMC campaign, supervision is provided by salaried, facility-based health workers, with support from district, regional and central-level supervisors, as well as Malaria Consortium staff. Administrative monitoring data, including SPAQ doses provided and adverse events, are collected by community distributors on tally sheets, which are compiled by health workers and reported to the district level. In addition to carrying out supervision visits, Malaria Consortium supports supervision and monitoring of the SMC campaign by contributing to the development and printing of tools such as the tally sheets used by community distributors to record doses provided, as well as the interpretation of results.

To draw robust conclusions on program coverage, Malaria Consortium routinely conducts household surveys using lot quality assurance sampling (LQAS) methodology following SMC cycles 1 to 3. The surveys are designed to rapidly assess whether areas have reached a coverage threshold of 80% and determine urgent actions for improvement during subsequent cycles, while also providing an estimate of country- or state-level coverage. To evaluate coverage at the end of the annual campaign, we conduct a representative end-of-round household survey following completion of SMC cycle 4, which encompasses a wider range of variables, including quality of program implementation. All surveys are conducted by independent research firms to reduce bias. Stock consumption and management data collected at health facilities and at district and national warehouses are further sources of monitoring and evaluation (M&E) data.

This report summarizes achievements and challenges of SMC implementation in areas where Malaria Consortium used philanthropic funding in 2019, either exclusively or in combination with other funding sources. It also discusses program management activities, such as planning for the scale of the program in 2020, communications and advocacy, research, strategic priorities, program risks and budget. The report only contains brief summaries of our work relating to coverage, impact and research, as well as budget management. More detailed information can be found in the following annexes:

- Annex 1: 2019 coverage report
- Annex 2: Research and impact progress report
- Annex 3: 2019 financial report

SMC implementation 2019

Burkina Faso

a) Background

In 2018, Burkina Faso's total population was estimated at 19.8 million **[3]**. Malaria is highly endemic in all of the country's 13 regions, with an estimated 7.9 million cases and 13,000 deaths from malaria in 2018 **[2]**. Burkina Faso has been included in the "high burden to high impact" (HBHI) initiative **[4]** launched by WHO and the Roll Back Malaria (RBM) Partnership to End Malaria in 2018, with the aim to bring the world's 11 highest-burden countries back on track to achieve the milestones set out in WHO's Global Technical Strategy for Malaria by 2025 **[5]**. Malaria transmission is seasonal throughout the country, with the rainy season typically lasting longest in the south.

SMC was first implemented in seven health districts in 2014. In 2019, Burkina Faso achieved 100% geographical coverage of SMC, reaching all 70 health districts, including, for the first time, five urban districts in and around the capital city, Ouagadougou. Overall, the 2019 campaign in Burkina Faso targeted around 3.57 million children. Funding was provided by the World Bank, the Global Fund to Fight AIDS, Tuberculosis and Malaria (Global Fund), the President's Malaria Initiative (PMI), the United Nations Children's Fund (UNICEF), and Malaria Consortium (**Table 1**).

Table 1. 2019 SMC campaign funding in Burkina Faso.

Funding source	Number of health districts	Approximate number of children targeted
Malaria Consortium (philanthropic funding)	23	1,320,000
World Bank	20	1,290,000
Global Fund	13	460,000
PMI	12	410,000
Global Fund & UNICEF	2	90,000
TOTAL	**70**	**3,570,000**

b) Planning and enumeration

Initially, Malaria Consortium had planned to implement SMC in the same 18 health districts as in 2018. However, the national malaria program approached Malaria Consortium in early 2019 with a request to implement SMC in the capital city of Ouagadougou too. Following feedback from the manufacturer of SPAQ that they had additional production capacity, as well as discussions with the government and GiveWell, we decided that expanding the program to Ouagadougou was feasible. The number of health districts supported in 2019 was therefore 23 across nine regions (**Figure 1**), with a total of 780 health facilities and an estimated target population of 1.32 million children (**Table 2**). Anticipating that census-based data for Ouagadougou were likely to be inaccurate due to rapid, unplanned and undocumented urbanization, target population numbers were agreed with the government, taking into account data from recent mosquito net and vitamin A distribution campaigns.

Figure 1. Malaria Consortium's SMC program in Burkina Faso, 2019.

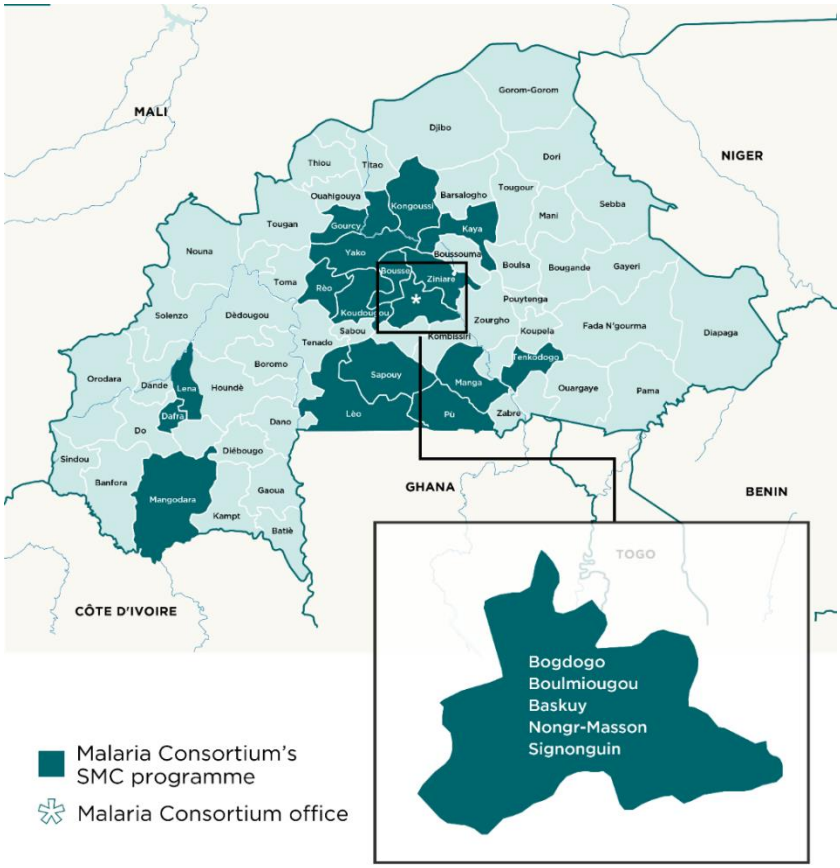


Table 2. Estimated target population for Malaria Consortium's SMC campaign in Burkina Faso, 2019.

Region	Health district	Health facilities	Target population
Cascades	Mangodara	26	45,195
Centre	Bogodogo[a]	36	124,278
	Boulmiougou[a]	40	145,565
	Baskuy[a]	17	38,894
	Nongr-Masson[a]	10	50,813
	Signonguin[a]	29	52,972
Centre-Est	Tenkodogo	28	45,206
Centre-Ouest	Nanoro	26	33,516
	Sapouy	33	47,875
	Koudougou	58	69,274
	Léo	44	54,436
	Réo	20	37,497
Centre Nord	Kaya	42	74,541
	Kongoussi	40	73,039

Region	Health district	Health facilities	Target population
Centre Sud	Manga	45	60,808
	Po	28	39,816
Hauts Bassins	Dafra	17	51,950
	Léna	16	14,735
Nord	Séguénéga	31	43,732
	Yako	62	81,577
	Gourcy	37	44,030
Plateau Central	Ziniaré	65	59,956
	Boussé	30	34,142
TOTAL		**780**	**1,323,847**

[a] Health districts not previously covered by Malaria Consortium's SMC campaign.

With the exception of one health district in the Cascades region[iii], the SMC campaign was scheduled to start on 22 July and comprised of four monthly cycles.

c) Procurement and supply management

A total of 5.81 million blister packs of SPAQ were procured for Malaria Consortium's SMC program in Burkina Faso (**Table 3**). Though a top-up order from the manufacturer was necessary in early 2019 to accommodate the need for additional SPAQ to cover Ouagadougou, it was possible to ship the required quantities by sea and to transport them through our global freight forwarder from the sea port in Abidjan, Côte d'Ivoire, to the national medical store (NMS) in Ouagadougou, which is operated by the *Centrale d'Achat des Médicaments Essentiels Génériques et des Consommables Médicaux* (CAMEG).

Table 3. Procurement and shipment of SPAQ for SMC in Burkina Faso, 2019.

Consignment	Quantity	Arrival at port	Arrival at NMS	Mode of shipment
Consignment 1	3,912,850	15 May	19 June	Sea
Consignment 2	1,897,600	6 June	19 June	Sea
TOTAL	**5,810,450**			

[iii] In this health district, Mangodara, Malaria Consortium conducted an implementation research study exploring the feasibility and acceptability of implementing a fifth monthly SMC cycle to accommodate the longer rainy season in the south of the country. The additional cycle was implemented 25 - 27 June.

In Burkina Faso, all SMC partners deliver the SPAQ they procure into a common stock ("*panier commun*"), which is owned by the government and managed by CAMEG in terms of distribution to the health district level. In 2019, no challenges were experienced, and all medicines were delivered on time and in sufficient quantities.

d) Community engagement

In Ouagadougou, where SMC was implemented for the first time in 2019, sensitization meetings were held with relevant leaders at regional and health district level. In all areas where Malaria Consortium implemented SMC, sensitization meetings with local leaders and health workers were conducted at each health facility involved in the SMC campaign.

The 2019 SMC campaign involved 4,604 town announcers. Based on experience from implementing cycle 1, it became evident that in Ouagadougou, town announcers were a less effective channel for information sharing than in rural areas. Communication plans were therefore modified to include radio broadcasts, social media, banners and posters ahead of the second cycle.

e) Training

Malaria Consortium's 2019 SMC campaign supported 846 training events involving 17,258 individuals (**Table 4**). All trainings were completed before the scheduled start of the campaign.

Table 4. SMC implementers trained in Burkina Faso, 2019.

Cadre	Training events	Trainees	Duration of training
National-level trainers and supervisors	2	102	2 days
Regional-level trainers and supervisors	9	92	2 days in Ouagadougou 1 day elsewhere
District and health-facility-level trainers and supervisors	55	1,762	2 days in Ouagadougou 1 day elsewhere
Community distributors	780	15,302	2 days in Ouagadougou 1 day elsewhere
TOTAL	**846**	**17,258**	

During implementation of SMC cycle 1 in Ouagadougou, it became evident that the target population had been underestimated by around 160,000 children, despite the use of data from other mass campaigns. Owing to the higher than anticipated target numbers, we recruited and trained an additional 658 additional community distributors in the five urban districts ahead of cycle 2, resulting in a total of 18,186 individuals being trained for the 2019 SMC campaign.

f) SMC administration

All monthly SMC cycles were implemented as scheduled in all health districts, despite a country-wide strike of salaried, facility-based health workers for most of 2019. The strike was the consequence of a labor dispute between the union representing health workers' interests and the government of Burkina Faso. During the strike, health workers refused to take payments for services from patients –

depriving the government of a vital source of income – and they did not report health data into the national health information system (HMIS). Recognizing the life-saving nature of interventions like SMC, the labor union supported health workers' involvement in campaigns. Spot checks by Malaria Consortium and other implementation partners confirmed that health workers did indeed serve as supervisors and coordinators for the SMC campaign, and the campaign was implemented as planned. This is corroborated by information from supervision reports and coverage surveys. CHWs, the cadre most SMC community distributors are recruited from, were not involved in the strike.

Despite the higher than anticipated target numbers in Ouagadougou, stock-outs could, for the most part, be avoided by re-distributing stock from rural to urban areas and by having access to the *panier commun*. Recruiting additional community distributors ahead of cycle 2 not only supported the administration of SPAQ to more children than anticipated, it was also necessary because distribution in Ouagadougou was found to be slower due to the lower number of children per household compared with rural areas, which meant more households had to be visited to serve equal numbers of children. In addition, caregivers in urban areas were often not present to give consent to their children receiving SMC, which meant it was more common for community distributors to revisit households to obtain consent. Another challenge was that supervisors found it more difficult to plan the movement of community distributors to ensure all children were reached, given that urban settlements are often unplanned and unmapped. To adapt to the differences between implementing SMC in urban and rural contexts, we set up more fixed-distribution sites in health centres and markets in Ouagadougou to provide an alternative way of accessing SMC. A learning brief summarizing Malaria Consortium's lessons learnt from implementing SMC in Ouagadougou has recently been published, including recommendations for implementing SMC in urban areas **[6]**.

Security concerns continue to pose challenges for SMC implementation in Burkina Faso. Two of the health districts where Malaria Consortium implements SMC are now considered high risk. Across the country, the situation is highly volatile, and attacks and violence are on the rise.

g) Supervision, monitoring and evaluation

In preparation for the 2019 SMC campaign, Malaria Consortium worked with the national malaria program and other stakeholders to develop guidelines for supportive supervision. However, the ability of district, regional and central-level supervisors to have effective exchanges with health workers was compromised by the health worker strike, as many health workers were reluctant to engage with the higher levels of the health system. Malaria Consortium staff were also affected, though the degree to which health workers distrusted implementation partners during the strike varied from health centre to health centre.

For the most part, it appears that administrative data from SMC tally sheets was collected and compiled, but not reported to the district level. Since the strike has now been suspended, it is possible that the data will be shared with the government and made accessible to implementing partners in the future, but at the time of writing this report, administrative data from the 2019 SMC campaign is not available.

Coverage surveys based on LQAS methodology were conducted after SMC cycles 1, 2 and 3. A representative end-of-round household survey was conducted after cycle 4. All surveys were conducted by an independent research firm. It was noted by the national malaria program that having LQAS survey data from Malaria Consortium's SMC program was essential during the health worker strike, as it was the most reliable evidence available country-wide that the campaign was being implemented as planned.

Owing to security concerns, Malaria Consortium restricted travel of our own staff to two high-risk health districts during the campaign, restricting our ability to supervise, monitor or evaluate the program in those areas.

Chad

a) Background

Chad's population was estimated at 15.5 million in 2018 **[3]**. Malaria is endemic across the southern half of the country, where the majority of the population lives. In 2018, there were an estimated 2.5 million cases and 8,700 deaths from malaria **[2]**. Based on the seasonality of malaria transmission, 13 out of the country's 23 regions are considered eligible for SMC.

SMC implementation in Chad started in 2015 under ACCESS-SMC, targeting 14 health districts. The intervention has since been scaled up to a total of 41 health districts[iv] in nine regions (Bahr el Gazel, Batha, Chari Baguirmi, Guéra, Hadjer Lamis, Kanem, Lac, Mayo Kebbi Est, N'Djamena). In 2019, the SMC campaign targeted around 1.61 million children with funding from the Global Fund, UNICEF and Malaria Consortium (**Table 5**). Twenty health districts in six regions were eligible for SMC but not covered in 2019, most of them in four regions in the eastern part of the country (Ouaddaï, Salamat, Sila, Wadi Fira). It is estimated that around 590,000 children were not reached by the SMC campaign in 2019.

Table 5. 2019 SMC campaign funding in Chad.

Funding source	Number of health districts	Approximate number of children targeted
Malaria Consortium (philanthropic funding)	20	980,000
Global Fund	17	440,000
UNICEF	4	190,000
TOTAL	**41**	**1,610,000**

b) Planning and enumeration

Four new health districts not covered in 2018 were added to Malaria Consortium's SMC program in 2019. Another district covered in 2018 was split into two administrative units, bringing the total of health districts supported in 2019 to 20 (**Figure 2**)[v]. The target population was estimated at 980,000 children, served by 287 health facilities (**Table 6**).

[iv] Some of the increase in targeted health districts is due to new administrative units being created in 2018.
[v] Before the start of the 2019 campaign, the Global Fund requested financial support of around USD 65,000 from Malaria Consortium to address a funding gap in two health districts in Batha region. However, all health districts supported by the Global Fund in 2019 experienced severe delays, which resulted in only two SMC cycles being implemented. The available Global Fund support was sufficient to cover the reduced number of SMC cycles in Batha region and Malaria Consortium's offer of financial support was not taken up. Consequently, results from those two districts are not included in this report.

Figure 2. Malaria Consortium's SMC program in Chad, 2019.

Table 6. Estimated target population for Malaria Consortium's SMC campaign in Chad, 2019.

Region	Health district	Health facilities	Target population
Chari Baguirmi	Ba-Illi	9	32,747
	Bousso	11	29,700
	Dourbali	15	50,819
	Mandelia	20	55,499
	Massenya	16	44,524
	Kouno	4	10,791
Hadjer Lamis	Bokoro[a]	21	60,645
	Gama[a]	5	23,304
	Karal	10	22,754

Region	Health district	Health facilities	Target population
	Mani	11	27,878
	Massaguet	16	36,050
	Massakory	17	32,614
Mayo Kebbi Est	Bongor	30	64,104
	Guelendeng[a]	10	28,349
	Moulkou[a]	10	31,165
N'Djamena	N'Djamena Centre	17	104,058
	N'Djamena Est	19	101,697
	N'Djamena Nord	15	45,567
	N'Djamena Sud	20	148,745
	Toukra[b]	11	31,606
TOTAL		**287**	**982,616**

[a] Health districts not previously covered by Malaria Consortium's SMC campaign.
[b] Health district previously covered by SMC, but newly created as an administrative unit.

All health districts were scheduled to implement four monthly SMC cycles, starting on 4 July. The start of the campaign was scheduled about three weeks earlier than in previous years, in anticipation of an earlier start to the rainy season.

c) Procurement and supply management

A total of 4.61 million SPAQ blister packs for use in Malaria Consortium's SMC campaign were procured and shipped to Chad in 2019 (**Table 7**). Shipments by sea arrived at the port in Douala, Cameroon, while air shipments arrived at the airport in N'Djamena. A local courier was used to transport consignments by land to the NMS in N'Djamena, which is operated by the *Centrale Pharmaceutique d'Achats* (CPA). Given the limited production capacity of the manufacturer, it was not possible to send the required quantity of SPAQ for four SMC cycles by sea freight in time for the start of cycle 1. In addition, Chad requires batch testing of each consignment to be conducted by a laboratory in France before imported medicines are cleared for distribution, which typically takes between one and two months. To minimize the risk of delays to SMC cycles 1 and 2, we decided to send sufficient quantities by air freight for two cycles.

Table 7. Procurement and shipment of SPAQ for SMC in Chad, 2019.

Consignment	Quantity	Arrival at port	Arrival at NMS	Clearance for distribution	Mode of shipment
Consignment 1	2,967,550	30 June	8 July	17 August	Sea
Consignment 2	1,643,800	30 May	2 June	12 July	Air
TOTAL	**4,611,350**				

In Chad, Malaria Consortium sub-contracts distribution of SPAQ from the NMS to the health district level to a local courier ahead of each SMC cycle. In cycle 2, there was a two-day delay in delivering medicines to 11 out of the 20 health districts where Malaria Consortium implements SMC owing to a lack of capacity on the part of CPA to hand over medicines from the warehouse to the courier. In three remote districts, an additional two-day delay was caused by heavy rains, which rendered roads impassable.

d) Community engagement

Before the start of the SMC campaign, 311 sensitization meetings were held with stakeholders and leaders at regional, health district and health facility level. A national flag-off ceremony was held, accompanied by a TV and radio spot campaign. During the campaign, 940 town announcers disseminated relevant information among the population.

e) Training

Malaria Consortium's 2019 SMC campaign involved 13,988 individuals who were trained in 597 training events using a cascade approach (**Table 8**). All trainings were completed before the scheduled start of the campaign.

Table 8. SMC implementers trained in Chad, 2019.

Cadre	Training events	Trainees	Duration of training
National-level trainers and supervisors	3	4	2 days
Regional and district-level trainers and supervisors	20	66	1 day
Health-facility-level trainers and supervisors	287	1,764	1 day
Community distributors	287	12,154	1 day
TOTAL	**597**	**13,988**	

f) SMC administration

In mid-June, the national malaria program became aware of national campaigns for polio and immunization scheduled for early July, which clashed with the planned start of the SMC campaign. A decision was therefore made to re-schedule the start of the campaign for 25 July, in line with the start date in previous years. In areas where Malaria Consortium implemented SMC in Chad, the first cycle was implemented in all health districts according to the revised schedule. The above-mentioned stock distribution challenges resulted in SMC cycle 2 being delayed by two days in eight health districts and by four days in three remote districts. The recommended 28-day interval between cycles was maintained in all health districts for cycles 3 and 4. No further delays were experienced.

Heavy rain and flooding were frequently reported as challenges restricting the movement of community distributors. However, this does not appear to have resulted in delays or lower coverage. Another challenge reported was the presence of mobile populations such as nomads in the SMC implementation area. There is currently no strategy in place for including mobile populations in SMC campaign planning or delivery. Finally, security remains a concern for SMC implementation in Chad. While the health districts where Malaria Consortium implements SMC are considered relatively safe, the situation remains volatile. In particular, there are concerns about the deteriorating security in the Lac region, which is close to the capital city, N'Djamena.

g) Supervision, monitoring and evaluation

M&E tools had been harmonized before the start of the SMC campaign and were used by all implementing partners. Despite negative experiences with a similar tool under ACCESS-SMC, Chad introduced a register to record eligible children's details in addition to tally sheets. Overall, stakeholders concluded that the register was helpful as it allowed tracking of doses provided to specific children.

The quality of the LQAS survey conducted after SMC cycle 1 was not satisfactory and the contract with the local research firm was cancelled as a result. At that point, it was not possible to recruit an alternative for the LQAS survey following cycle 2 and this survey was not conducted. Another local research firm was commissioned to conduct the LQAS survey after cycle 3, with acceptable results. To ensure high-quality end-of-round coverage data, we decided to commission the same research outlet that had conducted the coverage surveys in Burkina Faso with good results for a number of years. While this meant that the survey could only be conducted in early 2020, once the end-of-round survey in Burkina Faso had been completed, we believe that the superior quality of the survey outweighs the potential bias introduced by the delay between the end of the campaign and the survey.

Nigeria

a) Background

Nigeria is Africa's most populous country, with an estimated total population of 195.9 million in 2018 **[3]**. Malaria is a major public health problem throughout the country. According to WHO, Nigeria accounts for 25% of global malaria cases. In 2018, there were an estimated 57.2 million cases and 95,800 deaths from malaria **[2]**. Consequently, Nigeria is one of the countries targeted by the HBHI initiative **[4]**. Using standard WHO eligibility criteria for SMC, malaria transmission is considered seasonal across the nine Sahelian states in the north of the country.

SMC implementation in Nigeria started in 2013 with a pilot implemented by Malaria Consortium in five local government areas (LGAs) in Katsina and Jigawa. By 2019, the intervention had been scaled up to 81 LGAs in five states (Borno, Katsina, Jigawa, Sokoto, Yobe, Zamfara), targeting around 4.21 million children. Funding or in-kind contributions were provided by PMI, the Global Fund, Médecins Sans Frontières (MSF), the United Kingdom's (UK) Department for International Development (DFID), and Malaria Consortium (**Table 9**). The SMC coverage gap remained substantial in 2019: three (Bauchi, Kano, Kebbi) out of the nine eligible states were not covered at all, and another three (Borno, Katsina, Yobe) only achieved partial geographical coverage, leaving between eight and nine million children in 151 LGAs unprotected during the peak transmission season.

Table 9. 2019 SMC campaign funding in Nigeria.

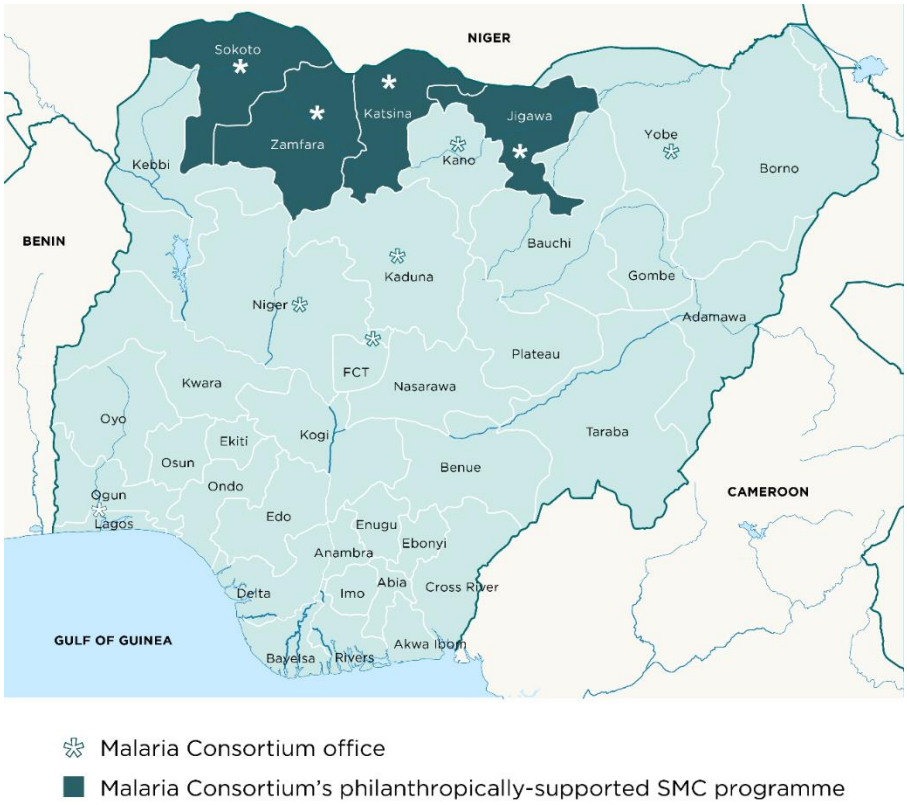
Funding source	States	Number of LGAs	Approximate number of children targeted
Malaria Consortium (philanthropic funding)	Katsina, Jigawa, Sokoto	49	2,260,000
Malaria Consortium (philanthropic funding) & PMI	Zamfara	14	1,070,000
Global Fund	Katsina, Yobe	8	340,000
MSF	Borno	5	340,000
Malaria Consortium (philanthropic funding) & DFID	Jigawa	5	200,000
TOTAL		**81**	**4,210,000**

b) Planning and enumeration

The original plan for the philanthropically-funded part of Malaria Consortium's SMC campaign in Nigeria was to continue to support the 46 LGAs where SMC had been implemented in 2018. However, taking into account feedback from the manufacturer of SPAQ that they had additional production capacity, as well as discussions with the government, implementation partners and GiveWell, there was an opportunity to expand the program to cover all 27 LGAs in Jigawa, bringing the total of supported LGAs to 68 across four states (**Figure 3**)[vi]. Out of those, 47 were supported exclusively using philanthropic funding (22 in Jigawa, four in Katsina, 21 in Sokoto). A further 14 LGAs in Zamfara received an in-kind contribution of SPAQ from PMI, but were otherwise supported using philanthropic funding. In Jigawa, DFID funded operational costs in five LGAs through Malaria Consortium's Support to National Malaria Programme Phase 2 (SuNMaP 2) project. Philanthropic funding was used to procure SPAQ for those five LGAs.

[vi] Malaria Consortium implemented SMC with funding from the Global Fund in four LGAs in Katsina and four LGAs in Yobe. No philanthropic funding was used in those areas. Results from those LGAs are not included in this report.

Figure 3. Malaria Consortium's philanthropically-supported SMC program in Nigeria, 2019.



In addition to census data, Malaria Consortium used three additional data sources to estimate the target population in 2019:

- Health facility catchment area population figures
- Data from mosquito net distribution and immunization campaigns
- Information compiled through a community-led, bottom-up enumeration exercise

It was noticeable that target population estimates differed substantially between data sources, most notably in Zamfara, where both the health facility catchment area data and the community-led enumeration exercise suggested that the actual target numbers were around 80% higher than those suggested by the census data. In other states, the discrepancies were less pronounced (between -15% and +4%). Taking the different data sources into account, the total target population in the 68 philanthropically supported LGAs was estimated at 3.53 million, served by 2,133 health facilities (**Table 10**).

Table 10. Estimated target population for Malaria Consortium's philanthropically-supported SMC campaign in Nigeria, 2019.

State	LGAs	Health facilities	Target population
Jigawa	27	697	1,248,011
Katsina	4	199	192,083
Sokoto	23	630	1,026,555
Zamfara	14	607	1,067,315
TOTAL	**68**	**2,133**	**3,533,964**

All states scheduled four monthly SMC cycles, starting on 25 July.

c) Procurement and supply management

Two factors complicated the procurement and distribution of commodities to the LGA level in Nigeria in 2019:

- The decision to expand to all LGAs in Jigawa was only made in early 2019, which significantly increased the target population;
- The above-mentioned discrepancies between census data and other data sources to estimate the target population implied a need to increase our buffer stock to minimize the risk of stock-outs.

In total, Malaria Consortium procured 14.15 million blister packs of SPAQ, which were shipped through local couriers to state medical stores (SMS) and LGAs[vii], spread over five consignments (**Table 11**). Note that this does not include an in-kind contribution of 1.69 million blister packs of SPAQ from PMI for use in Zamfara.

Table 11. Procurement and shipment of SPAQ for SMC in Nigeria, 2019.

Consignment	Quantity	Arrival at port	Arrival at NMS	Mode of shipment
Consignment 1	8,316,000	16 May	5 June	Sea
Consignment 2	500,000	11 June	2 September	Sea
Consignment 3	1,600,000	20 August	30 August	Air
Consignment 4	1,796,000	19 September	12 November	Sea
Consignment 5	1,940,000	7 October	30 October	Air
TOTAL	**14,152,000**			

Consignments 2 and 3 were necessary due to the decision to expand to all LGAs in Jigawa. There was sufficient time to ship consignment 2 by sea. However, consignment 3, which consisted of SPAQ from PMI's global stock that they had procured, but could not use before expiry[viii], needed to be shipped by air freight to ensure timely availability for the SMC campaign, as discussions with PMI over shipment and payment modalities took longer than expected. Once a consignment arrives either at the seaport in Lagos or the airport in Abuja, two documents need to be obtained before imported medicines can be transported to the SMS: an import duty waiver from the Ministry of Finance and customs clearance from the Nigeria Customs Service, with different customs offices responsible in Lagos and Abuja. While this is normally a formality, it accounts for the longer interval between arrival at ports and arrival at the warehouse than in the other countries where Malaria Consortium implements SMC. Expecting only one consignment from Malaria Consortium, the Ministry of Finance issued the waiver comparatively quickly for consignment 1, but took much longer to provide the waiver for consignments 2 and 3. Owing to the higher target numbers obtained through the analysis of health facility catchment area data and the community-led enumeration

[vii] In most states, Malaria Consortium's country team is responsible for organizing the transport of SPAQ from NMS to the LGA level. In some states, this falls within the responsibility of state governments.

[viii] This involved a commercial transaction between Malaria Consortium and PMI and was separate from the in-kind contribution of SPAQ that PMI donated for use in Zamfara in 2019.

exercise, we decided to increase our buffer stock to avoid stock-outs, which made another top-up order of SPAQ necessary. Anticipating delays in obtaining the import waiver, around half of this top-up order was shipped by air freight with the other half shipped by sea. However, both the import waiver and the customs clearance for consignments 4 and 5 were only obtained with substantial delay, which resulted in delayed implementation of SMC cycle 4 in a majority of LGAs, ranging from five days in Zamfara to six weeks in Sokoto.

To improve the quality of supply management and stock consumption data, dedicated trainings were conducted for Malaria Consortium's LGA-level logistics officers, as well as 224 LGA-level health authority staff with responsibility for stock management. Meetings were held at state level following each monthly SMC cycle to review lessons learned and discuss improvements for the following cycles. An external consultant was commissioned to carry out a commodity audit after the end of the 2019 SMC round to identify gaps and areas for improvement. The audit concluded that, overall, inventory management across the SMC program was good. Improvements were recommended with regard to reverse logistics, reporting wastage and end-of-cycle reporting at health facility level. Some documentation issues at SMS level were also noted.

d) Community engagement

Around 1,000 sensitization meetings with community leaders were conducted in the run-up to the SMC campaign. In addition to ensuring support from communities in selecting suitable community distributors who had the trust of the communities they served, the meetings were also used to discuss safeguarding issues. In areas where philanthropic funding was used, 2,706 town announcers supported the SMC campaign. 2019 also saw the introduction of a new cadre of SMC implementers in Nigeria, referred to as "lead mothers". This involved 2,746 women from the communities where SMC was implemented receiving a short orientation and tasking them with visiting households over the two days following SMC administration by community distributors, mainly to remind caregivers to administer the second and third dose of AQ. Dissemination of key messages and information about the campaign was further supported by radio spots broadcast before and during SMC cycles.

e) Training

In areas where philanthropic funding was used in 2019, 1,829 training events were conducted to train 29,930 individuals involved in the campaign (**Table 12**). Malaria Consortium introduced a new flipbook to support the training of community distributors. Health-facility-level trainees were asked to complete a knowledge assessment at the end of the training, with those achieving a score of less than 80% receiving a one-day refresher training. All trainings, including refresher trainings, were concluded before the scheduled start of the campaign.

Table 12. SMC implementers trained in Nigeria (philanthropically supported), 2019.

Cadre	Training events	Trainees	Duration of training
National-level trainers and supervisors	1	26	2 days
State-level trainers and supervisors	10	472	2 days
Health-facility-level trainers and supervisors	156	4,945	2 days
Community distributors	1,662	24,487	1 day

Cadre	Training events	Trainees	Duration of training
TOTAL	**1,829**	**29,930**	

f) SMC administration

SMC cycle 1 was implemented as scheduled in all LGAs in Jigawa, Katsina and Sokoto. In Zamfara, there was a misunderstanding with the state malaria program about how last-mile distribution of SPAQ from LGAs to health facilities would be organized. Eventually, Malaria Consortium agreed to take on responsibility for last-mile distribution for cycle 1, which started two days later than planned, on 27 July. In cycle 2, eight LGAs in Zamfara experienced a five-day delay due to a clash with a polio campaign. The recommended 28-day interval between SMC cycles was maintained in those LGAs in cycle 3. The above-mentioned challenges, with regard to obtaining the import duty waiver, customs clearance and transport to LGA level from the seaport and airport led to substantial delays to cycle 4 in Jigawa, Sokoto and Zamfara. **Table 13** outlines the extent of delays experienced by state.

Table 13. Delayed implementation of SMC cycles by state, Nigeria 2019.

State	Delayed implementation of SMC cycles
Katsina	No delays were experienced. Cycle 4 was implemented as scheduled despite of the delay in obtaining an import waiver for the final consignment of SPAQ, thanks to redistributing excess quantities from other states (mainly Jigawa) from previous cycles. Katsina was prioritized for cycle 4 because the quantities of excess SPAQ available after cycle 3 would only have covered a small portion of the target population in other states, while they were sufficient to cover all eight LGAs (four of them philanthropically funded) where SMC was implemented in Katsina.
Jigawa	All 27 LGAs experienced a six-week delay to cycle 4. Roughly half of the delay was due to the delay in obtaining the import waiver for the final consignment of SPAQ. The remaining delay was due to delays in clearing customs at the seaport in Lagos. It was also longer than in other states because of the greater distance between the seaport in Lagos and Jigawa than between the airport in Abuja and the other states.
Sokoto	All but two of the 23 LGAs experienced a three-week delay to cycle 4 owing to the delay in securing the import waiver for the final consignment of SPAQ. Excess quantities of SPAQ from previous cycles were sufficient to cover the LGA where Malaria Consortium conducted an implementation research study exploring the co-implementation of SMC and vitamin A distribution, as well as a neighboring LGA.
Zamfara	All LGAs started SMC implementation two days later than planned owing to a misunderstanding between PMI and the state malaria program regarding responsibilities for last-mile distribution of SPAQ from LGAs to health facilities. In cycle 2, eight out of 14 LGAs experienced a further five-day delay because SMC campaign dates clashed with a polio campaign. In those LGAs, cycle 3 was implemented maintaining the 28-day interval between cycles. In cycle 4, the same eight LGAs experienced a further five-day delay caused by

State	Delayed implementation of SMC cycles
	the delay in obtaining the import waiver for the final consignment of SPAQ. Excess quantities of SPAQ from previous cycles were used in the remaining six LGAs, where cycles 2-4 were implemented as scheduled.

In Burkina Faso and Chad, payments of per diems for community distributors and supervisors are processed by the health authorities. However, in Nigeria, payments are handled directly by the Malaria Consortium country team, with a strong preference for bank transfers wherever possible to ensure accountability. It was a requirement that all frontline implementers had a bank account, and much of the responsibility for processing payments had been de-centralized to Malaria Consortium's state-level teams to avoid bottlenecks owing to the limited capacity to process a large number of payments in a short period of time at the national level. The team also developed an app based on OTK mobile technology (Acumen Data Systems), which checked bank details and flagged gaps, errors or inconsistencies during the enrolment process. Despite those efforts, a backlog of outstanding payments built up over the course of the campaign, with some payments for previous SMC cycles not being processed before the start of the next cycle, which may have affected implementers' motivation and retention. Temporary finance staff were brought in after cycle 2, and by the end of the campaign most implementers had been paid.

Heavy rains and flooding affected SMC delivery in some areas, especially during cycle 2. As in Chad, these did not appear to have resulted in substantial delays or lower coverage. Security is a growing concern in Nigeria. While the vast majority of LGAs where we implemented SMC using philanthropic funding in 2019 are considered safe, over the course of the 2019 campaign safety concerns were raised over violent ethnically-motivated clashes, kidnappings and road safety.

g) Supervision, monitoring and evaluation

For the first time, the training of supervisors in 2019 included a full day dedicated specifically to the process and the principles of supportive supervision and performance improvement. A two-tier supervision model was introduced, which involved a dedicated senior supervisor with responsibility for around ten health facilities. Senior supervisors added a layer of quality assurance and, based on anecdotal evidence, helped to ensure the availability of tools and materials for community distributors. Supervision exchanges involving LGA, state or national-level supervisors were recorded digitally using an app developed using OTK mobile (Acumen Data Systems), including a dashboard that was used to inform decisions during daily review meetings at state level. LGAs reporting poor performance were prioritized for supervision by state and national-level supervisors in subsequent cycles.

LQAS coverage surveys following cycles 1 to 3 and a representative end-of-round household survey were conducted by an independent research firm. To reduce bias, and unlike in previous years when data collectors had been recruited from among local health authority staff, all data collectors were recruited externally.

Security concerns restricted Malaria Consortium's ability to supervise, monitor and evaluate the program in the catchment areas of 133 health facilities in 26 LGAs across the four states.

Program management

SMC program scale 2020

Due to the need to plan SMC campaigns well in advance, much of the program management-related activities in a given year are about determining the scale of the program in the following year. Below is a summary of Malaria Consortium's plans for 2020.

Burkina Faso

The scale of Malaria Consortium's SMC program in Burkina Faso will remain unchanged in 2020. While the World Bank has ended its support for SMC, the Global Fund has agreed to support the health districts previously funded by the World Bank in 2020. A total of 6.85 million blisters have been ordered, anticipating high demand in Ouagadougou, as well as a need for additional SPAQ to conduct robust research on the impact of implementing a fifth monthly SMC cycle.

Chad

Malaria Consortium is not planning to expand the scale of its SMC program in Chad in 2020. In areas where Malaria Consortium did not implement SMC, the 2019 campaign experienced multiple planning challenges, delays and missed SMC cycles. The country is therefore prioritizing consolidating and improving implementation of areas already covered by SMC over expansion. Even though our SMC program in Chad did not experience challenges to the same extent as other partners', this matches our strategic preference, especially as we have a newly hired Country Director. We anticipate expanding to some of the areas not currently reached by SMC in 2021. For the 2020 campaign, 4.83 million blister packs of SPAQ have been ordered.

Nigeria

In 2020, Global Fund and PMI will substantially increase funding for SMC in Nigeria. The Global Fund has committed to funding SMC implementation in all LGAs in Kano, Katsina and Yobe, with Malaria Consortium as implementing partner. PMI will fully fund SMC implementation in Zamfara. The increased investment from other funders has given Malaria Consortium the flexibility to use philanthropic funding to continue to implement SMC in Jigawa and Sokoto, and to expand to Kebbi and Bauchi, two states not previously reached by SMC[ix]. While institutional funding for the scale-up is currently only confirmed for 2020, the reduction in the expected coverage gap from over eight million children in 2019 to under one million children in 2020 is remarkable. For the 2020 campaign, a total of 18.27 million blister packs of SPAQ have been ordered for states that will be supported with philanthropic funding.

Togo

Malaria Consortium has repeatedly received requests from national malaria programs to support SMC campaigns in additional countries. In 2019, the SMC team conducted an analysis of coverage and funding gaps in a range of countries that are eligible for SMC, taking into account factors such as malaria prevalence, existing relationships with malaria programs, security and potential demand for Malaria Consortium's expertise beyond SMC. Togo emerged as the preferred candidate for expansion to a new country in 2020.

Informal discussions with Togo's national malaria program started in late 2019 and it emerged that support for SMC is required, despite some funding being provided by Global Fund and UNICEF. However, funding had consistently been insufficient to implement the recommended four monthly SMC cycles. There had also been insufficient funding for essential intervention components, including training and supervision for community distributors. In early 2020, a delegation from Malaria Consortium visited Togo to explore the feasibility of establishing a presence in-country. As of March 2020, agreement in principle has been reached with the national malaria program, and approval for expansion to Togo has been obtained from Malaria Consortium's Board of Trustees. Discussions with the national malaria program to agree a budget have started and there are plans to recruit a Country Representative to formally register Malaria Consortium as a non-governmental organization. However, owing to the COVID-19 pandemic, this process is currently on hold. If a mechanism can be found to support the 2020 SMC campaign in Togo, this would involve reaching approximately 480,000 children in the three northernmost regions of the country, where malaria transmission is seasonal. Following Malaria Consortium's offer of support, Global Fund and UNICEF both committed to funding SPAQ for four SMC cycles, as well as basic implementation costs such as per diems for community distributors. Malaria Consortium will use philanthropic funding to support intervention components associated with quality implementation, including planning, training, community engagement and supervision. We will also support strengthening of M&E, for example by funding independent coverage surveys.

Communications and advocacy

With support from Malaria Consortium's global external relations team, we ran several key communications activities in 2019 to provide the latest information to our partners, donors and the general public. This included five blogs and three news pieces for the Malaria Consortium website, publishing materials on our social media channels, and four email newsletters to an audience of more than 1,500 philanthropic donors. We also improved the SMC-dedicated landing page on our

[ix] In light of the current COVID-19 pandemic, it may be necessary to reconsider the feasibility of implementing SMC safely in an area where implementers would have no prior experience of the intervention.

website and hired a photographer to capture images of the SMC campaign in Burkina Faso, which have been used across all of our communication channels.

From an advocacy perspective, key activities focused on strengthening relationships with global SMC stakeholders, most notably WHO.

- Two representatives from Malaria Consortium's senior technical team were invited to attend a **WHO technical consultation** on SMC in October 2019. The meeting served to review the evidence generated since WHO issued its recommendation to scale up SMC in 2012, particularly with regard to potential future policy recommendations on the timing and frequency of SMC cycles, extending the age range and integrating with other public health interventions.
- Following the meeting, WHO commissioned a consultant to revise the **SMC field guide** published in 2013 **[7]**. Malaria Consortium has supported the revision of the field guide by reviewing and commenting on drafts and by providing sample tools and materials for inclusion in the revised guide. Publication is expected in the first half of 2020.
- Malaria Consortium co-hosted the annual **global SMC planning and review meeting** in Accra in March 2020, which brought together policy makers, SMC implementers and partners working in the 13 countries that implemented SMC in 2019 (see photo above). Participants decided to revive the RBM SMC Working Group, which had been dormant for a number of years. Terms of reference and governance structures will be developed over the coming months.
- The National Malaria Elimination Program asked Malaria Consortium to lead a **technical working group tasked with reviewing and revising all tools used in SMC in Nigeria**. The work is ongoing and revised tools are expected to be available in time for the 2020 SMC campaign.
- Malaria Consortium's West & Central Africa Programmes Director met the **Minister of Health in Burkina Faso** who highlighted her appreciation for Malaria Consortium's support, especially our quick, positive response to the government's request to implement SMC in Ouagadougou in 2019.
- A delegation from **GiveWell visited our Burkina Faso SMC program** in August 2019. The visit served to improve GiveWell's understanding of how Malaria Consortium implements SMC, as well as to discuss the funding landscape, M&E processes and Malaria Consortium's role in the broader landscape of SMC. It included meetings with government and implementation partners, as well as a visit to two districts to observe SMC being administered.

Research

Three implementation research studies were implemented across Malaria Consortium's SMC program in 2019:

- **Tailoring SMC to different malaria transmission contexts: a pilot implementation study in Burkina Faso**

  This study explores the feasibility and acceptability of expanding SMC to five monthly SMC cycles in a health district where the rainy season typically exceeds four months. The study feeds into the global policy debate around varying timing and frequency of SMC implementation to maximize impact.

- **Understanding barriers to delivery and feasibility and acceptability of extending SMC to children under ten in Chad**

  This study seeks to understand common barriers to SMC delivery according to protocol, in particular around community distributors' ability to determine age eligibility criteria. It also explores the acceptability of extending SMC to children under ten among different types of stakeholders, which is relevant in the context of the global policy debate about extending the age range of SMC beyond children under five.

- **Co-implementation of SMC and vitamin A distribution: a pilot study in Nigeria**

  This study evaluates the feasibility and acceptability of integrating vitamin A distribution with SMC administration. It is relevant in the context of the global discourse on sustainability and health systems strengthening, as integrated delivery of public health interventions has the potential to leverage synergies across programs.

Most of the data collection for the three studies has been completed. Data analysis and publication writing are ongoing. Please note that research activities do not align with the calendar year as closely as most SMC implementation activities do. Malaria Consortium is committed to publishing research results and will share relevant findings as they become available.

In addition to finalizing the studies mentioned above, Malaria Consortium's research team is working on developing proposals for new studies. Three new studies have been discussed:

- We are planning to pilot the use of a **spatial intelligence** tool called Reveal in Sokoto, Nigeria. Spatial intelligence tools use satellite imagery to identify residential structures, which has the potential to improve campaign planning, delivery and evaluation. In particular, we are interested in evaluating whether Reveal enables community distributors to collect more accurate, complete and timely coverage data. For this project, we are partnering with Akros, a company that developed a precursor to Reveal called mSpray® for use in indoor residual spraying **[8]**.
- In Burkina Faso, we would like to build on pilot testing of the feasibility and acceptability of implementing five monthly SMC cycles conducted in 2019. In 2020, we plan to vary the **timing and frequency** of SMC cycles in a district in southern Burkina Faso and evaluate how this may impact malaria incidence.
- **Quality** has emerged as one of the core concepts of Malaria Consortium's work in 2019. The research team is planning to conduct a multi-country study exploring barriers to and drivers of high-quality SMC implementation, most likely in Chad and Nigeria, and possibly including Togo.

Research plans for 2020 will need to be reviewed in light of the current COVID-19 pandemic. Following the recent finalization of the endline resistance markers survey report produced under ACCESS-SMC **[9]**, we also recognize the need to closely monitor the development of **resistance to SP and AQ**. It is likely that Malaria Consortium will be involved in global discussions regarding follow-on resistance markers studies in 2020 or 2021.

Strategic priorities

Four strategic priorities have been defined with the aim of harmonizing our approach across Malaria Consortium's SMC program: quality, evidence, communications and advocacy, and security. In 2019, five work streams involving representatives from Malaria Consortium's country and program-level teams, as well as from a variety of organizational functions were established and tasked with producing relevant frameworks and strategies. A team meeting in Paris had been scheduled for early March 2020 to discuss and validate the work streams' outputs and to develop plans for putting them into action. However, the meeting had to be cancelled owing to the COVID-19 pandemic. The work streams are currently developing alternative plans and timelines to finalize their outputs remotely. Recognizing that some of the content generated will be of interest to the global SMC community, we will make our work publicly available where appropriate.

a) Quality

Mass campaigns often focus exclusively on coverage to evaluate program performance. However, to achieve the desired health impact, implementing with high quality is equally important. In the context of public health campaigns, quality is typically conceptualized in terms of the degree to which they are safe, efficacious, timely, efficient, equitable and people-centered **[10]**. The quality work stream is co-led by Malaria Consortium's Case Management Specialist and the Head of Technical West & Central Africa. It has been tasked with defining quality standards for each intervention component, describing benchmarks, requirements, specifications and guidelines that, if followed well and consistently, ensure the program achieves the desired impact. Standardization is also expected to result in improved cost-effectiveness, less wastage, and more reliable data. Applied to SMC, high-quality implementation ensures that the correct quantity of SPAQ is available and administered safely and correctly to eligible children each cycle and that doses administered are accurately recorded.

b) M&E

To strengthen and harmonize how Malaria Consortium's SMC program measures performance, the SMC Epidemiologist and a Results and Measurement Analyst are co-leading a work stream tasked with developing an M&E indicator framework. The framework will guide the collection and analysis of data relating to program inputs, processes and outputs, with a view to improving quality and use of program data. It will also define how we demonstrate coverage and quality of program implementation and how we assess the impact of SMC. This will include reaching agreement across

the program on a problem statement that clearly defines the objective of implementing SMC and a list of M&E indicators, with details on their measurement and processes for collection, processing and analysis of relevant data.

c) Research and learning

The research work stream is led by the Research Advisor and is developing a research strategy for Malaria Consortium's SMC program. Based on learnings from the studies implemented to date, a literature review, and an analysis of global and national research priorities, the strategy will outline how Malaria Consortium's research can add the most value to the evidence base with regard to SMC policy and practice. It will also discuss our approach to building organizational capacity to conduct high-quality, pragmatic and policy-relevant research, as well as the partnerships we will need to build to complement our strengths and expertise.

The program also aims to further strengthen its approach to adaptive program management, enabling teams to address complex challenges and unforeseen change through continuous learning and engagement with stakeholders.

d) Communications and advocacy

Malaria Consortium's Communications Manager and Advocacy Manager are co-leading a work stream that has been tasked with developing a communications and advocacy strategy for Malaria Consortium's SMC strategy. This involves the definition of our medium-term and longer-term vision for SMC and how we would like to position Malaria Consortium externally to achieve our vision. A key component of this exercise will be to map out national, regional and global stakeholders and to identify platforms and mechanisms for effective exchange and engagement.

e) Security

In light of the increasingly fragile security situation in many areas where we implement SMC, Malaria Consortium's Global Operations Manager is leading our work on defining how we respond and adapt our program to different types and levels of risk. In the first instance, this involved a review of our staffing structure and security-related standard operating procedures. In all three countries where we implemented SMC in 2019, we either created roles with a specific focus on managing security or we re-formulated existing staff's job descriptions to include more of a focus on security issues. The work stream is now working on a document that outlines how the different SMC intervention components will need to be adapted in areas where the risk to our own staff is assessed as substantial and where our ability to travel and support program activities on the ground will be restricted. This could involve dropping or outsourcing activities to local partners, or it could involve supporting activities in a different way, for example remotely.

Risks and challenges

Table 14 outlines some of the key risks and challenges affecting SMC implementation, as well as Malaria Consortium's mitigating responses.

Table 14. Risks and challenges affecting SMC implementation.

Risk/challenge	Responses
Unreliable population estimates affect ability to plan effectively	Where appropriate and available, we will triangulate information from various data sources to estimate target populations, including other mass campaigns and health facility-level data. In the longer term, we believe that

Risk/challenge	Responses
	spatial intelligence tools have the potential to disrupt current practice and substantially improve planning from community level right up to the national level.
Limited global production capacity for SPAQ	A second manufacturer was expected to enter the market in 2019, but unfortunately, this did not materialize. Despite the progressive increase in demand for SPAQ, no changes in the market space are expected to happen in time for the 2020 campaign. Malaria Consortium has established a formal cooperation mechanism with other major buyers of SPAQ (PMI, Global Fund, UNICEF) to coordinate orders with the aim of leveraging the full current production capacity and ensuring timely availability of the medicines in all countries where SMC is implemented. At times, this means we have to accept that consignments need to be shipped by air freight at a higher cost.
Country-level regulations delay clearance of imported SPAQ for distribution	In Chad, the main challenge is the time it takes to have consignments batch tested by a laboratory in France. We factor this delay into our stock management planning, but there is also a good chance that, of this year, a local laboratory will receive government approval to conduct the tests, which should reduce the time between arrival in-country and clearance for distribution. We also typically start the transport of SPAQ to district-level warehouses while the testing is ongoing. In Nigeria, the main challenges are the import duty waiver from the Ministry of Finance and customs clearance from the Nigeria Customs Service. To avoid delays, we aim to import SPAQ in as few consignments as possible, alerting the authorities as early as possible. We will be unable to accommodate eleventh-hour requests to increase the scale of the program.
Climate variability and limited understanding of rainfall patterns affect ability to determine optimal start of the SMC campaign	There is a global policy debate about the optimal timing and frequency of monthly SMC cycles. The debate feeds into efforts to stratify malaria interventions at the sub-national level according to epidemiological, ecological, social and economic factors that determine receptivity and vulnerability to malaria transmission. Malaria Consortium will contribute to this debate by conducting research on the effectiveness of implementing a fifth SMC cycle. As part of our work on measuring impact, we are also looking to incorporate climate data into our M&E framework.
Clashes with other types of campaigns delay SMC administration	Coordination between SMC stakeholders has been improving steadily over the last few years. We will need

Risk/challenge	Responses
	to increase our efforts to a) involve more stakeholders from across the malaria and public health spectrum in campaign planning to flag up potential clashes early; and b) advocate for the importance of SMC and respecting the timing of monthly SMC cycles at the national level.
Heavy rains and flooding affect SMC administration	While rain and flooding do not appear to have caused substantial delays, in the few areas where we expect significant flooding, we will increase safety by providing life jackets to implementers and we will enable implementers to travel by appropriate means, such as canoes.
Population movements affect ability to achieve equity and reach all eligible children	Population movements can be the result of nomadic lifestyles, internal displacement due to insecurity and violence, or seasonal migration between rural and urban areas. We aim to discuss the challenge of reaching those populations with SMC stakeholders at national and local levels and will test strategies to increase equity where appropriate. This could, for example, involve working with civil society organizations representing the interests of mobile populations. In the medium-term, we are also considering if spatial intelligence tools could help increase equity, for example by tracking migration patterns.
Limited understanding of safeguarding puts beneficiaries, implementers and staff at risk of exploitation	Malaria Consortium has implemented a safeguarding policy and is investing in training staff and partners. Within SMC delivery, responsibility for safeguarding of implementers and beneficiaries ultimately lies with national governments and malaria programs, but Malaria Consortium will reflect the need to strengthen safeguarding procedures in memoranda of understanding, contracts etc.
Increased security threats affect ability to plan and implement SMC	See strategic priorities above
Limited capacity to ensure timely processing of payments affects implementers' motivation and retention	Malaria Consortium's country team in Nigeria is recruiting additional finance staff to avoid bottle necks caused by limited capacity to process payments. Review and approval processes will be further de-centralized. We will also explore alternative payment options such as mobile payments, but ensuring accountability remains of crucial concern.

At the time of writing this report, the global spread of the COVID-19 pandemic emerged as a major risk to the 2020 SMC campaign. In line with WHO recommendations, Malaria Consortium believes that wherever possible SMC should be implemented as an essential health service during the

pandemic, with appropriate enhanced safety modifications to minimize the risk for the various stakeholders involved in the program. There is also the potential opportunity to utilize the existing SMC infrastructure to support health systems' COVID-19 response, for example by using community engagement activities to reinforce public health messages. Contingency planning is ongoing.

Budget

The total expenditure of philanthropic funding used for SMC in 2019 was 21.8 million US dollars (USD), around 6% less than the forecast submitted to GiveWell in July 2019 (**Table 15**).

Table 15. Philanthropic funding for SMC 2019.

Budget line	Forecast (USD)	Expenditure (USD)	Variance (USD)	Variance (%)
Burkina Faso	5,425,659	4,780,216	-645,443	-12%
Chad	4,114,648	3,910,097	-204,551	-5%
Nigeria[a]	10,239,305	9,761,448	-477,857	-5%
Above-country	1,356,336	1,189,990	-166,346	-12%
Research	359,937	188,001	-171,936	-48%
Management fee	2,149,589	2,379,570	239,982	11%
TOTAL	**23,645,474**	**22,209,323**	**-1,436,151**	**-6%**

[a] In the forecast, expected third-party contributions had been included in the total for Nigeria, but have been removed here. See Table 16 for third-party contributions in 2019.

A major reason for the underspend was that at the time of the forecast, immediately after completion of SMC cycle 1, the scale of the higher than expected target numbers in Ouagadougou was not yet clear. In the absence of administrative data owing to the health worker strike, the team had to rely on anecdotal evidence and estimated that the true target may be higher than anticipated by a maximum of 300,000 children. The forecast was therefore increased to include a substantial top-up order of SPAQ[x], which was expected to be air freighted to Burkina Faso in order to be avoid stock-outs in cycles 3 and 4. However, with more information from the urban health districts becoming available, the estimate was revised down to around 160,000 additional children. Thanks to redistribution of excess stock from rural health districts and benefiting from access to the *panier commun*, a top-up order was not necessary. In addition, while it was clear during cycle 1 that the implementation strategy in Ouagadougou needed to be adjusted, for example by recruiting more community distributors, it was not possible to base the forecast on a detailed revised implementation plan and the cost of the required adjustments was overestimated.

Other factors affecting annual expenditure included the following:

- Several of the budgeted activities in Chad did not happen, for example the LQAS survey after SMC cycle 2 and supervision from national malaria programme staff.

[x] The cost of SPAQ is generally shown in the budget line of the country where the medicines were used. Freight costs are included in the above-country line.

- In Nigeria, the budget assumed that funding provided by state governments would be minimal. However, some states did fund activities such as flag-off ceremonies and management of commodities, which reduced program expenditure.
- The contract with Akros, the company that develops the Reveal spatial intelligence platform, took longer to negotiate, mainly due to the supplier's internal policies guiding travel to security challenged areas. Costs for the development of Reveal will only be incurred in 2020.
- Malaria Consortium started conducting implementation research on SMC in 2019. The cost of the initial studies was overestimated, and we failed to take into account that, unlike most SMC implementation, research activities do not align closely with the calendar year. Consequently, some of the costs relating to the first set of studies will only be incurred in 2020.
- It was agreed between GiveWell and Malaria Consortium in March 2020 to apply a management fee of 12% of expenditure instead of 10%.

In addition to philanthropic funding, Malaria Consortium received contributions from PMI, DFID and Vitamin Angels (**Table 16**).

Table 16. Third-party contributions to Malaria Consortium's philanthropically-supported SMC program, 2019.

Organization	Value of contribution (USD)	Notes
PMI	880,000	In-kind contribution of SPAQ for use in Zamfara
DFID	204,133	Operational costs of implementing SMC in five LGAs in Jigawa
Vitamin Angels	1,760	Vitamin A for use in implementation research study on co-implementing SMC and vitamin A distribution in Nigeria
TOTAL	**1,085,893**	

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