



**malaria  
consortium**

disease control, better health

**Malaria Consortium's  
seasonal malaria  
chemoprevention program:  
Philanthropy report 2020**

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

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# Contents

<b>Acronyms and abbreviations .....</b>	<b>4</b>
<b>1. Background .....</b>	<b>5</b>
1.1 Seasonal malaria chemoprevention .....	5
1.2 Malaria Consortium’s seasonal malaria chemoprevention program .....	6
<b>2. Philanthropically supported seasonal malaria chemoprevention implementation 2020 .....</b>	<b>9</b>
2.1 Burkina Faso .....	9
2.2 Chad .....	13
2.3 Nigeria .....	16
2.4 Togo .....	22
2.5 Mozambique .....	25
COVID-19 .....	29
<b>3. Strategic focus areas .....</b>	<b>35</b>
3.1 Quality .....	36
3.2 Monitoring and evaluation .....	37
3.3 Research .....	40
3.4 Digital tools .....	46
3.5 External relations .....	47
3.6 Security .....	47
<b>4. Budget .....</b>	<b>48</b>
<b>References .....</b>	<b>50</b>
<b>Appendix 1: SMC glossary .....</b>	<b>57</b>

## Acronyms and abbreviations

ACCESS-SMC	Achieving Catalytic Expansion of Seasonal Malaria Chemoprevention in the Sahel
AQ	amodiaquine
ASTMH	American Society of Tropical Medicine and Hygiene
CI	confidence interval
COVID-19	coronavirus disease
DOT	directly observed treatment
FGD	focus group discussion
Global Fund	Global Fund to Fight AIDS, Tuberculosis and Malaria
HBHI	high burden to high impact
HMIS	Health Management Information System
IPC	infection prevention and control
KII	key informant interview
LGA	local government area
M&E	monitoring and evaluation
mg	milligram
MoH	Ministry of Health
MSF	Médecins Sans Frontières
NGO	Nongovernmental organization
NMCD	National Malaria Control Division
NMEP	National Malaria Elimination Programme
OR	odds ratio
PMI	U.S. President's Malaria Initiative
PNCM	Programa Nacional de Controlo da Malária
PNLP	Programme National de Lutte contre le Paludisme
RBM	Roll Back Malaria
SMC	seasonal malaria chemoprevention
SP	sulfadoxine-pyrimethamine
SPAQ	sulfadoxine-pyrimethamine and amodiaquine
SuNMaP 2	Support to National Malaria Programme Phase 2
UK	United Kingdom
UNICEF	United Nations International Children's Emergency Fund
US	United States
USD	United States dollar
VAS	vitamin A supplementation
WHO	World Health Organization

# 1. Background

This report summarizes achievements and challenges in areas where Malaria Consortium used philanthropic funding, either exclusively or in combination with other funding sources, to support the implementation of seasonal malaria chemoprevention (SMC) in 2020. This includes philanthropic funding received through donations to Malaria Consortium's entities in the United Kingdom (UK) and the United States (US), primarily as a result of being awarded Top Charity status by GiveWell, a nonprofit organization dedicated to finding outstanding giving opportunities. The report also summarizes work carried out under Malaria Consortium's SMC program on a range of strategic focus areas and provides an overview of 2020 SMC expenditure supported with philanthropic funding.

## 1.1 Seasonal malaria chemoprevention

SMC is a highly effective intervention to prevent malaria infections caused by *Plasmodium falciparum* in areas where the burden of malaria is high and malaria transmission is seasonal. It involves the intermittent administration of an antimalarial medicine to at-risk populations during the peak malaria season. The objective is to maintain therapeutic antimalarial drug concentrations in the blood throughout the period of greatest malarial risk.

The World Health Organization (WHO) has recommended SMC as a malaria prevention strategy for children 3–59 months since 2012.<sup>[1]</sup> A combination of two antimalarials is used in SMC: sulfadoxine-pyrimethamine (SP) and amodiaquine (AQ). WHO recommends annual SMC rounds comprising four monthly SMC cycles — beginning at the start of the transmission season — in areas where more than 60 percent of clinical malaria cases occur during a maximum of four months, and where the clinical attack rate of malaria is greater than 0.1 attack per transmission season among children under five. Those areas are characterized by more than 60 percent of the annual rain falling within a period of three months. SMC is not currently recommended in areas where the therapeutic efficacy of SP and AQ is below 90 percent due to parasite resistance. In 2019, SMC was implemented in 13 countries in the Sahel region of Africa, targeting around 22 million children.<sup>[2]</sup> According to unpublished data collected by the SMC Alliance, a global SMC working group under the Roll Back Malaria (RBM) Partnership to End Malaria, more than 31 million children were targeted in 2020.

SMC is primarily delivered door-to-door by trained community distributors. A full course of SP plus AQ (SPAQ) is given over three consecutive days. On the day of the community distributor's visit to a household, one tablet of SP and one tablet of AQ are dispersed in water and administered under the supervision of a community distributor. This is called directly observed treatment (DOT). The remaining two doses of AQ are given to the caregiver to disperse and administer once daily over the next two days. Two age-based dosing regimens are available: a lower dose for infants 3–<12 months and a higher dose for children 12–59 months. SPAQ for use in SMC is packaged in co-formulated blister packs containing one full course of SPAQ. Each full course of SPAQ confers a high degree of protection from malaria infection for approximately 28 days. Protection decreases rapidly thereafter.<sup>[3]</sup>

The effectiveness of SMC has been well documented. In clinical trials, it has been found to prevent 75 percent of uncomplicated and severe malaria cases in children under five.<sup>[4]</sup> It has also been demonstrated that SMC can be delivered safely at scale. High coverage can be achieved through existing health system structures, typically using health facilities as functional units. Case-control studies in five countries have shown that SMC was associated with a protective effectiveness against

clinical malaria of 88 percent and a reduction in the number of malaria deaths in hospitals.<sup>[5]</sup> The weighted average economic cost of administering four monthly SMC cycles has been estimated at 3.63 United States dollars (USD) per child.<sup>[6]</sup>

The scale-up of SMC is commonly seen as a success story. In recent years, the global discourse among the malaria community is increasingly focusing on how the intervention can be adapted to different contexts, and which innovations can be introduced to maximize its contribution to the global fight against malaria.<sup>[7]</sup> **Box 1** summarizes the key questions concerning the future of SMC that are being discussed.

**Box 1: Key questions concerning the future of SMC**

1. Can SMC be an efficient malaria prevention strategy in areas where resistance to SP is known to be high?
2. Can SMC be an efficient malaria prevention strategy in areas where the transmission season is longer?
3. Should the number of monthly SMC cycles be varied according to the duration of the malaria transmission season?
4. Should the age range be extended to children under ten?
5. Can other community-based public health interventions be co-implemented with SMC?
6. Can digital technologies strengthen implementation of SMC?
7. What new drug regimens could replace SP and AQ in the future?

## 1.2 Malaria Consortium's seasonal malaria chemoprevention program

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 2013–2014, 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 support SMC in Burkina Faso, Chad and Nigeria. In 2020, we also supported SMC in Togo and started a research project exploring the feasibility, acceptability, and impact of SMC in Mozambique. Much of Malaria Consortium's funding for SMC comes from philanthropic donations. Our program has also been supported by institutional funders such as the Global Fund to Fight AIDS, Tuberculosis and Malaria (Global Fund), the Bill & Melinda Gates Foundation and by UK aid from the UK government through the Support to National Malaria Programme Phase 2 (SuNMaP 2) project in Nigeria. Across funding streams, Malaria Consortium's SMC program supported SMC delivery to more than 12 million children under five in 2020.<sup>[8]</sup>

SMC campaigns are implemented under the leadership of national malaria programs and through countries' existing health system structures. Consequently, Malaria Consortium's role in supporting SMC varies from country to country. However, we generally provide technical and logistical support on all SMC intervention components:



**a) Planning and enumeration**

Macro-planning typically begins around five months before the start of the annual SMC round. This involves agreeing campaign dates and modalities at the national and state levels, as well as discussing adaptations to the SMC intervention tools and guidelines. Micro-planning is conducted several months before the start of the SMC round, including budgeting based on detailed enumeration of the target population at the subnational level, required personnel, and commodities.

**b) Procurement and supply management**

Until very recently, there was only one manufacturer capable of producing quality-assured SPAQ in the required formulation, dosing, and packaging for use in SMC. A second manufacturer achieved the required international quality standards in April 2021. Global production capacity for SPAQ is limited and orders need to be placed around one year before the start of the annual SMC round. The medicines need to be transported from the manufacturer's production plant in 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. Once the medicines have passed country-level customs and quality assurance procedures, they are distributed further using country-level supply chain mechanisms, typically to the state or health district level, the lowest administrative level where suitable storage facilities exist. Last-mile distribution — the transport of commodities to the health facilities that serve as functional units for the SMC campaign — can be challenging due to poor infrastructure and limited storage facilities. In addition to SPAQ, SMC commodities include, for example, branded T-shirts, hijabs, bags, and pens for SMC implementers. Supply management also involves reverse logistics, which is the process of transporting SMC commodities back to a central warehouse at the end of the annual round.

**c) Community engagement**

Community engagement is an important component of SMC campaigns to ensure high acceptability of the intervention among beneficiaries, as well as to encourage adherence to the three-day SPAQ regimen by caregivers. Activities include sensitization meetings with local leaders, airing of radio spots, and town announcers disseminating relevant information during the campaign.

**d) Training**

SMC implementers are typically trained through a cascade model beginning at the national level about two months before the start of the annual SMC round, with each cadre of trainers subsequently training the next lower level of trainers and learners. Community distributors are typically trained at the health facility level. SMC training typically includes modules on identifying eligible children, referring sick children to a health facility, administering SPAQ safely, recording SPAQ administration, interpersonal communication, and safeguarding.

**e) SPAQ administration**

Community distribution of SPAQ is at the heart of the SMC intervention. Many community distributors are community health workers — a recognized cadre of community-based primary healthcare workers who receive a small stipend from the government. Others are recruited specifically for the SMC campaign, but all distributors should be literate and from the communities they serve. Community distributors typically work in pairs.

All healthy children 3–59 months are eligible for SMC, except those who are allergic to SP, AQ, or any other sulfa-containing medicines. Children who received a dose of SP or AQ within the past month should also not receive SMC. Those who have a fever or are unable to take oral medication should not receive SPAQ from community distributors, but will be referred to a health facility for further assessment and testing for malaria infection using a rapid diagnostic test. Children who test negative for malaria should receive SPAQ at the health facility if deemed safe by a health worker. Children who spit out or vomit within 30 minutes of SPAQ administration should be re-dosed once. Typically, all eligible children in a given area will be reached over a distribution period of four days per cycle.

**f) Case management and pharmacovigilance**

Children who are referred to health facilities by community distributors and who test positive for malaria infection should not receive SPAQ, but should be treated with effective antimalarial medicines according to country guidelines for the case management of malaria in children. While severe adverse events following administration of SPAQ are rare, mild side effects such as vomiting are more common. All adverse events should be reported via countries' pharmacovigilance systems and followed up according to country guidelines.

**g) Supervision**

During SMC distribution, community distributors are assisted by field supervisors who receive more in-depth training on supervision and mentoring skills. Each team of community distributors should be observed by, and receive constructive feedback from, a supervisor at least once every cycle. Supervision is coordinated by salaried health workers at the health facilities that serve as functional units for SMC distribution. Supervision is supported by district or local government area (LGA), provincial and central health authorities, as well as by Malaria Consortium staff.

**h) Monitoring and evaluation**

Administrative monitoring data — including on households visited, SPAQ administered to eligible children, and children referred to health facilities — are collected by community distributors on tally sheets, which are compiled by health workers at the end of each cycle and reported upwards to the district or LGA, and provincial and central health authorities. Stock reconciliation data — including physical counts — are collected through the national supply management systems. To identify areas that do not meet certain coverage or quality standards, Malaria Consortium routinely conducts end-of-cycle household surveys using lot quality assurance sampling methodology following all but the final SMC cycle. The objective of those surveys is to identify issues in SMC delivery and provide a starting point to engage with local and national stakeholders to take corrective actions to improve SMC delivery in subsequent cycles. Following the end of the annual SMC round, Malaria Consortium commissions more comprehensive end-of-round household surveys to determine SMC coverage and quality of SMC implementation.



## 2. Philanthropically supported seasonal malaria chemoprevention implementation 2020

In 2020, philanthropic funding enabled Malaria Consortium to deliver SMC to more than seven million children in Burkina Faso, Chad, Nigeria, Togo, and Mozambique. As many decisions on the scope and scale of SMC implementation are made about one year in advance, and discussions with national malaria programs and implementing partners were ongoing throughout 2020, this report also provides an overview of support Malaria Consortium expects to provide using philanthropic funding for SMC in 2021. A major factor in implementing SMC in 2020 was the emergence of the novel coronavirus disease (COVID-19). Delivering SMC campaigns in the context of a global pandemic required a range of adaptations. A section of this report is therefore dedicated to a discussion of Malaria Consortium's approach to minimizing the risk of COVID-19 infection for everyone involved in SMC campaigns. Note that detailed quantitative information about coverage and quality of SMC implementation in Burkina Faso, Chad, Nigeria, and Togo has been compiled in a separate report and is, therefore, not reported here.<sup>[9]</sup>

### 2.1 Burkina Faso

In 2019, Burkina Faso's total population was estimated at 20.32 million.<sup>[10]</sup> Malaria is highly endemic in all 13 of the country's regions,<sup>[11]</sup> with an estimated 7.86 million cases and 15,000 deaths from malaria in 2019, accounting for four percent of global malaria deaths.<sup>[2]</sup> Burkina Faso has been included in the high burden to high impact (HBHI) initiative,<sup>[12]</sup> which was launched by WHO and the RBM Partnership to End Malaria in 2018 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.<sup>[13]</sup>

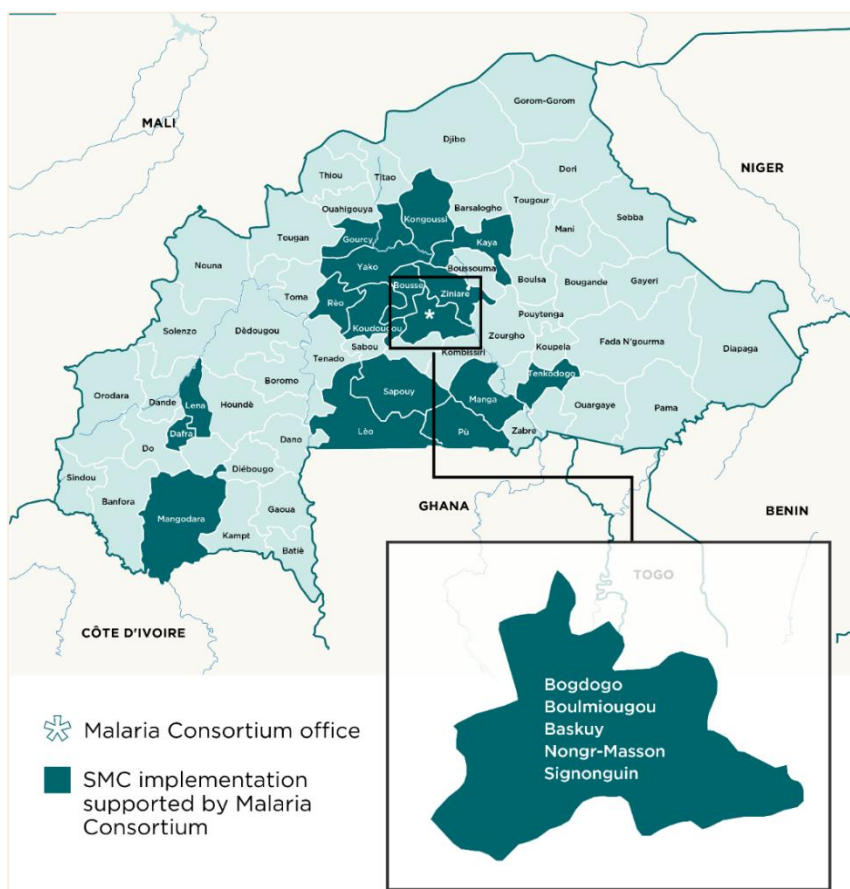
All 70 health districts in Burkina Faso are considered eligible for SMC, which was first implemented in seven health districts in 2014. In 2019, Burkina Faso achieved 100 percent geographical coverage of SMC, which was maintained in 2020, with a total target population of 3.93 million children under five. Funding for SMC was provided by the Global Fund, Malaria Consortium's philanthropic funding, the U.S. President's Malaria Initiative (PMI), and the United Nations International Children's Emergency Fund (UNICEF). When World Bank funding for SMC ended in 2019, the Global Fund agreed to cover the 20 health districts previously supported by the World Bank in 2020. Otherwise, funding arrangements remained unchanged compared to 2019. The increase in the target population reflects not only population growth, but also adjusted target population estimates in the five urban districts of Ouagadougou (**Table 1**).

Table 1: SMC funding 2020, Burkina Faso

Funding source	Number of health districts (2019)	Target population (2019)	Number of health districts (2020)	Target population (2020)
Global Fund	20	460,000	33	1,800,000
Philanthropic	23	1,320,000	23	1,620,000
PMI	12	410,000	12	420,000
UNICEF	2	90,000	2	90,000
World Bank	13	1,290,000	0	0
<b>TOTAL</b>	<b>70</b>	<b>3,570,000</b>	<b>70</b>	<b>3,930,000</b>

Malaria Consortium’s philanthropic funding was used to support SMC implementation in 23 health districts across nine regions (Figure 1). The health districts supported in 2020 were the same as in the previous year, including five urban health districts in Ouagadougou. Implementing SMC in urban districts presents specific challenges, including rapid population changes and informal settlements. A summary of Malaria Consortium’s insights on SMC in urban areas was published in a learning brief.<sup>[14]</sup> A total of 6,887,000 blister packs of SPAQ were procured and shipped to Burkina Faso in four consignments (Table 2) at a total cost of 2.19 million USD, including freight.

Figure 1: Health districts supported with Malaria Consortium’s philanthropic funding for SMC in 2020, Burkina Faso



**Table 2: Procurement of SPAQ for Burkina Faso, 2020**

Mode	Quantity	Arrival at port	Arrival at national medical store
Sea	880,800	08/05/2020	03/06/2020
Air	804,000	03/06/2020	17/06/2020
Sea	4,440,200	18/06/2020	06/07/2020
Air	762,000	17/06/2020	14/07/2020
<b>TOTAL</b>	<b>6,887,000</b>		

The national malaria program (Programme National de Lutte contre le Paludisme, PNL) set the start of the 2020 SMC campaign for 13<sup>th</sup> July. Four monthly SMC cycles were implemented in all 70 health districts. No delays or stock-outs of SPAQ were reported. The Minister of Health visited a health district that receives support from Malaria Consortium to observe SMC distribution during cycle three. A video about the visit was posted on the Facebook page of the Ministry of Health (MoH).<sup>[15]</sup>

Almost 25,000 individuals were trained in SMC distribution with philanthropic support before the start of the annual SMC round. In Burkina Faso, community distributors screen children for signs of malnutrition, which was also part of the training. Many of the community distributors in Ouagadougou were students whose studies had been suspended due to a COVID-19-related national lockdown. As schools and universities reopened in September, it was necessary to recruit around 2,000 additional community distributors before the start of cycle three (**Table 3**). To raise awareness of the SMC campaign, more than 1,600 radio spots and 40 television spots were broadcast. As mass media are particularly important as a source of information about SMC in urban areas, ten one-hour radio shows broadcast in the Ouagadougou area were dedicated to SMC over the course of the 2020 campaign.

**Table 3: Individuals trained in SMC distribution with philanthropic support in Burkina Faso, 2020**

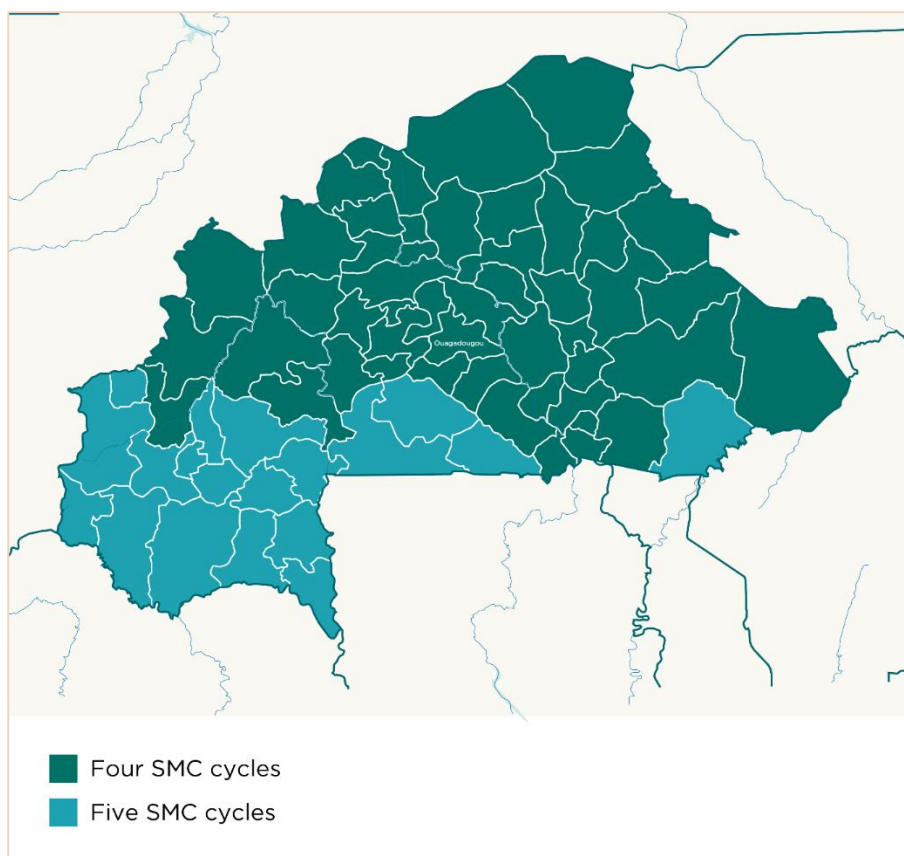
Cadre	Number of individuals	Number of days per training	Number of training events
National-level trainers	117	2	3
Regional trainers	88	1	9
District-level trainers and health workers	2,048	1	56
Community distributors (before cycle 1)	17,976	1	1,160
Community distributors (before cycle 3)	2,066	1	243
Town announcers	4,621	1	801
<b>TOTAL</b>	<b>26,916</b>		<b>2,272</b>

In a national SMC meeting in April, PNL and SMC implementing partners agreed to reallocate health districts to achieve greater geographical coherence of areas supported by the respective

implementing partners from 2021. In this process, the Global Fund, PMI and Malaria Consortium also agreed to split health districts supported by the World Bank until 2019 and covered by the Global Fund in 2020.<sup>i</sup> As a result of the changes, Malaria Consortium’s support will increase to 27 health districts and 1.88 million children in 2021, spread across six regions. Responding to a request from UNICEF to avoid an anticipated shortage of SPAQ, Malaria Consortium will also procure SPAQ for two health districts and 90,000 children, where UNICEF will cover all implementation costs.

Under the HBHI initiative’s ‘strategic information’ response element,<sup>[12]</sup> the PNLN conducted a stratification exercise with support from WHO, the Institute for Disease Modeling, and Northwestern University to determine the optimal mix of malaria interventions at the health district level. The exercise involved stratifying health districts based on epidemiological characteristics including prevalence, incidence, and all-cause mortality among children under five, and combining the epidemiological information with measures of seasonality, urbanization, and access to care. For SMC, the analysis also modeled the impact of varying the number of cycles depending on seasonality patterns. Based on the recommendations from this exercise, the PNLN decided to adopt five annual cycles of SMC from 2021 onwards in 19 of the country’s 70 health districts, primarily in the south (**Figure 2**), including 11 of the health districts that will be supported by Malaria Consortium.

**Figure 2: Number of annual SMC cycles to be implemented in 2021 by health district, Burkina Faso**



<sup>i</sup> Global Fund funding can vary from year to year. At times, requests above the initial funding allocation can be accommodated either through efficiencies or through a process known as ‘portfolio optimization.’

## 2.2 Chad

Chad's total population stood at 15.95 million in 2019.<sup>[16]</sup> About two-thirds live in areas of high malaria transmission, principally in the southern half of the country.<sup>[17]</sup> In 2019, there were an estimated 3.19 million cases of malaria and 9,000 deaths.<sup>[2]</sup>

Based on seasonality patterns, Chad's PNLP considers 62 of the country's 126 health districts eligible for SMC. SMC implementation started in 2013 covering four health districts. In 2020, for the first time, all eligible health districts were reached, with a total target population of 2.42 million children. Funding was provided by the Global Fund, Malaria Consortium's philanthropic funding, UNICEF, and Médecins Sans Frontières (MSF). The Global Fund supported SMC in 38 health districts, compared to 17 in 2019. MSF provided funding for SMC for the first time. Malaria Consortium's and UNICEF's support for SMC remained unchanged in 2020 (**Table 4**).

**Table 4: SMC funding 2020, Chad**

Funding source	Number of health districts (2019)	Target population (2019)	Number of health districts (2020)	Target population (2020)
Global Fund	17	440,000	38	1,300,000
Philanthropic	20	980,000	20	960,000
UNICEF	4	120,000	4	120,000
MSF	0	0	1 <sup>a</sup>	40,000
<b>TOTAL</b>	<b>41</b>	<b>1,540,000</b>	<b>63</b>	<b>2,420,000</b>

<sup>a</sup> The health district supported by MSF is not included in the PNLP's list of eligible health districts.

Malaria Consortium supported 20 health districts across four regions (**Figure 3**). The health districts supported were the same as in the previous year. The slightly lower 2020 target population compared with 2019 reflects adjusted planning figures, in particular for the urban health districts in and around N'Djamena. A total of 4,830,000 blister packs of SPAQ was procured and shipped to Chad in three consignments, at a total cost of 1.51 million USD, including freight (**Table 5**).

Figure 3: Regions supported with Malaria Consortium’s philanthropic funding for SMC in 2020, Chad



Table 5: Procurement of SPAQ for Chad, 2020

Mode	Quantity	Arrival at port	Arrival at national medical store
Sea	1,809,000	12/05/2020	18/07/2020
Sea	2,253,000	03/06/2020	09/07/2020
Air	768,000	19/06/2020	26/06/2020
<b>TOTAL</b>	<b>4,830,000</b>		



Taking into account campaign readiness across implementing partners, the PNLP scheduled the start of the 2020 SMC campaign for 30<sup>th</sup> July, instead of early July as intended before the start of the COVID-19 pandemic. In the 14 rural health districts supported by Malaria Consortium, the first SMC cycle was implemented as scheduled. The remaining six health districts — urban districts in and around N’Djamena — started the first cycle two days later due to a slight delay in introducing a cashless payment system in those areas. In all health districts supported by Malaria Consortium, the subsequent three SMC cycles were implemented respecting the recommended 28-day interval between cycles. No stock-outs of SPAQ were reported.

Philanthropic funding supported the training of more than 14,000 individuals before the start of the annual SMC round, including more than 10,000 community distributors (**Table 6**). Social mobilization meetings were held at province, district, and health facility levels, and more than 3,300 radio spots about the SMC campaign were broadcast on local radio stations.

**Table 6: Individuals trained in SMC distribution with philanthropic support in Chad, 2020**

Cadre	Number of individuals	Number of days per training	Number of training events
Province-level trainers	75	2	4
District-level trainers and health workers	317	2	32
Field supervisors and community distributors	12,650	1	827
Town announcers	1,019	1	317
<b>TOTAL</b>	<b>14,061</b>		<b>1,180</b>

As SMC funding from the Global Fund will decrease slightly in 2021, the PNLP has requested support from Malaria Consortium for an additional 90,000 children in five health districts in 2021. This will increase our support to 25 health districts in six regions, with a total target population of 1.09 million children under five. Chad intends to maintain 100 percent geographical coverage of eligible health districts in 2021. There are currently no plans to vary the number of SMC cycles or expand to additional geographies.

## 2.3 Nigeria

Nigeria has the largest population in Africa, estimated at 200.96 million in 2019.<sup>[18]</sup> More than 75 percent of the population lives in areas of high malaria transmission.<sup>[19]</sup> Nigeria has the highest malaria burden globally, accounting for 27 percent of malaria cases. In 2019, there were an estimated 60.96 million malaria cases and 95,000 deaths.<sup>[2]</sup> Consequently, Nigeria is one of the countries targeted by the HBHI initiative.<sup>[12]</sup>

Nigeria started implementing SMC in five LGAs in Katsina state in 2013. The first scale-up phase targeted nine states in the north of the country. In 2020, all eligible LGAs in those nine states were reached for the first time, with a combined target population of 11.73 million children. Funding for SMC was provided by the Global Fund, Malaria Consortium’s philanthropic funding, PMI and UK aid. There was a substantial increase in funding for SMC compared to 2019. The scale-up in 2020 was primarily due to increased support from the Global Fund and philanthropic funding. PMI increased their support to fully fund SMC in Zamfara state in 2020. MSF, who had provided funding for five LGAs in Borno state in 2019, did not support SMC in 2020, as this state was fully funded by the Global Fund (**Table 7**).

**Table 7: SMC funding 2020, Nigeria**

Funding source	Number of LGAs (2019)	Target population (2019)	Number of LGAs (2020)	Target population (2020)
Global Fund	8	340,000	122	6,450,000
Philanthropic	49	2,260,000	72	3,910,000
PMI	0	0	14	960,000
UK aid and philanthropic <sup>a</sup>	5	200,000	9	410,000
PMI and philanthropic <sup>b</sup>	14	1,070,000	0	0
MSF	5	340,000	0	0
<b>TOTAL</b>	<b>81</b>	<b>4,210,000</b>	<b>217</b>	<b>11,730,000</b>

<sup>a</sup> In 2019, philanthropic funding was used to procure SPAQ for five LGAs in Jigawa, with UK aid covering operational costs. In 2020, UK aid funding covered SPAQ, COVID-19-related commodities, and some operational costs for cycles one and two in nine LGAs in that state. Philanthropic funding was used for all other costs.

<sup>b</sup> PMI donated SPAQ for Zamfara in 2019, with philanthropic funding contributing operational costs.

The increased support from institutional donors allowed Malaria Consortium to use philanthropic funding to expand SMC to 72 LGAs and 3.91 million children in 2020, including in two states (Bauchi and Kebbi) not previously covered by SMC (**Figure 4**). In Jigawa, a mix of philanthropic funding and funding from UK aid was used. Out of the 27 LGAs in that state, 18 were exclusively supported with philanthropic funding. The remaining nine LGAs were earmarked for funding from UK aid through the SuNMaP 2 project. However, budget cuts in the wake of the creation of the Foreign, Commonwealth and Development Office meant that SuNMaP 2 had to focus on the provision of SPAQ, COVID-19-related commodities, and some operational costs for implementation of cycles one and two in those nine LGAs, whereas philanthropic funding was used to cover all other costs. A total of 18,267,000 blister packs of SPAQ was procured for the philanthropically supported states and

shipped to Nigeria in three consignments at a total cost of 5.80 million USD, including freight (Table 8).

Figure 4: States supported with Malaria Consortium’s philanthropic funding for SMC in 2020, Nigeria

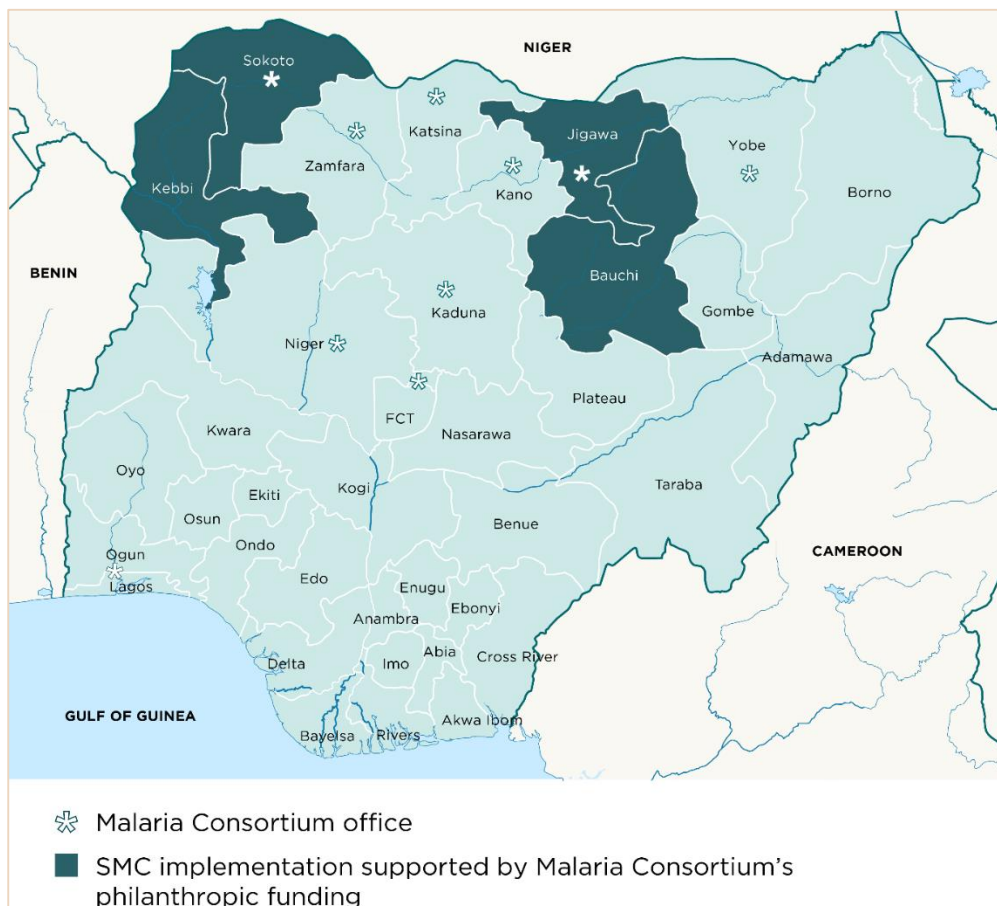


Table 8: Procurement of SPAQ for philanthropically supported states in Nigeria, 2020

Mode	Quantity	Arrival at port	Arrival at national medical store
Sea	8,172,000	30/05/2020	05/07/2020
Air	3,222,000	05/06/2020	25/06/2020
Sea	6,873,000	05/08/2020	03/10/2020
<b>TOTAL</b>	<b>18,267,000</b>		

On behalf of Nigeria’s National Malaria Elimination Programme (NMEP), Malaria Consortium led a review of SMC tools and training materials before the start of the 2020 round, with the aim of developing a revised set of tools and national guidelines for SMC implementation that will be used by all SMC implementers in the country. This exercise involved a desk review of tools used by different implementers; surveys with over 1,000 SMC community distributors, trainers, and wider stakeholders; and a national stakeholder meeting. A key recommendation was that the SMC tally sheet needed to be simplified. Many of the revised tools have been made accessible to the international SMC community in a resource library on Malaria Consortium’s website.<sup>[20]</sup> Later in the

year, Malaria Consortium also led the development of a national protocol for end-of-round household surveys.

The NMEP set the start of the 2020 SMC campaign for 9<sup>th</sup> July. Three of the four philanthropically supported states started SMC as scheduled. In Kebbi — one of the states not previously covered by SMC — cycle one started around two weeks later due to a delay in getting agreement from the state government for a memorandum of understanding with Malaria Consortium. There was a further three-week delay to cycle three in Kebbi due to challenges with getting approval for an import duty waiver for the final consignment of SPAQ from the Ministry of Finance. This delay was caused by the slow migration of the waiver application process to an electronic system, compounded by shortages among customs staff due to COVID-19. This also affected Jigawa, where cycle three was delayed by about one month. **Table 9** shows SMC distribution dates in the four philanthropically supported states in 2020. No stock-outs of SPAQ were reported from philanthropically supported states. However, many of the states supported by the Global Fund experienced shortages of SPAQ. To avoid stock-outs in cycle four in Kano and Katsina, Malaria Consortium agreed to donate 350,000 blister packs procured with philanthropic funding.

**Table 9: SMC distribution dates in philanthropically supported states in Nigeria, 2020**

State	Cycle one	Cycle two	Cycle three	Cycle four
Bauchi	9–12 July	8–11 August	10–13 September	7–10 October
Jigawa	9–12 July	8–11 August	10–13 October	7–10 November
Kebbi	25–28 July	22–25 August	9–12 October	6–9 November
Sokoto	9–12 July	8–11 August	10–13 September	10–13 October

Just under 40,000 individuals were trained on SMC with philanthropic support before the start of the annual SMC round, including more than 27,000 community distributors. To limit contact between SMC implementers, all national- and state-level trainings were conducted remotely (**Table 10**). In Nigeria, SMC distribution is supported by ‘lead mothers,’ a cadre of female volunteers who are tasked with sharing information about SMC within their communities and visiting households over the two days following community distributors’ visits to remind caregivers to administer AQ on days two and three. For the first time, the 2020 SMC campaign also involved ‘health educators,’ who coordinate and lead SMC-related community engagement activities at the LGA level. Due to the COVID-19 pandemic, community meetings were avoided and sharing information about the SMC campaign with beneficiaries primarily relied on mass media, including almost 1,400 radio spots. An excerpt from an interview with an SMC supervisor from Katsina about his experience of implementing SMC<sup>[21]</sup> can be found in **Box 2**.

**Table 10: Individuals trained in SMC distribution with philanthropic support in Nigeria, 2020**

Cadre	Number of individuals	Number of days per training	Number of training events
National-level trainers	91	4	4
State-level trainers	80	3	4
LGA-level trainers	405	2	42
Health workers	5,347	2	320
Community distributors	30,665	2	1,890
Town announcers	3,369	1	211
Health educators	99	2	12
Lead mothers	3,483	1	221
<b>TOTAL</b>	<b>39,488</b>		<b>2,441</b>

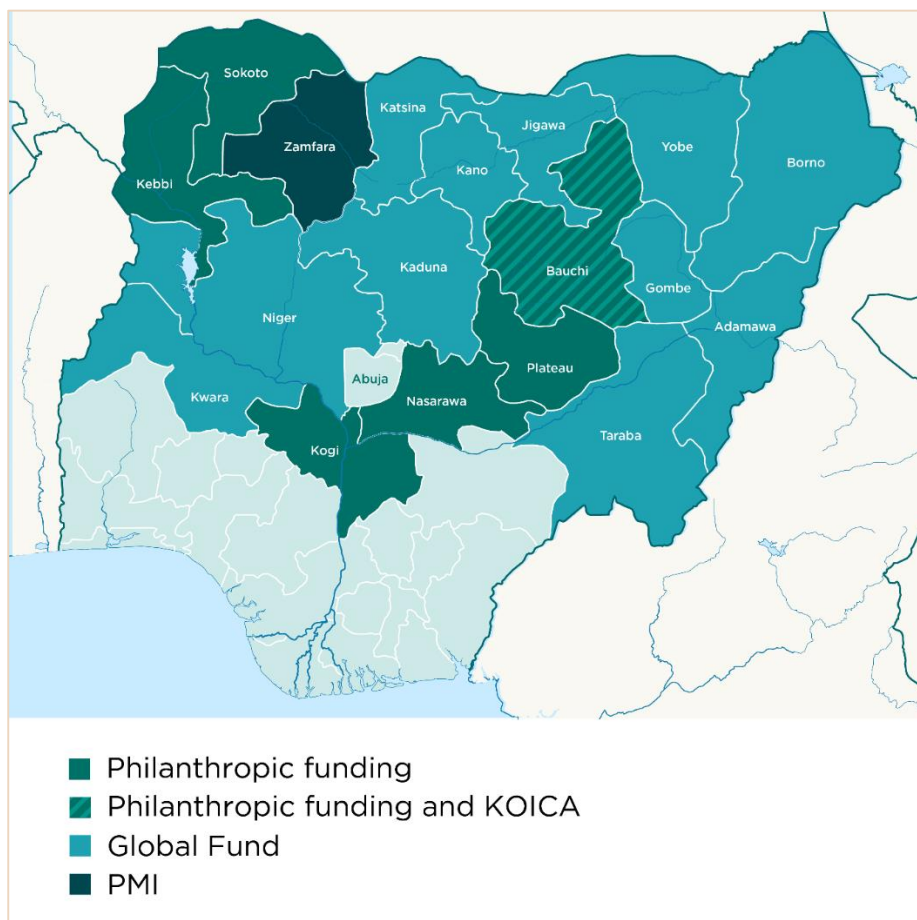
**Box 2: Feedback from an SMC field supervisor**

“I am very proud to be part of the SMC program. I have had a lot of training on how to manage children who are referred to the clinic with fever by the house-to-house SMC teams. [...] The meeting that Malaria Consortium held with community and religion leaders was a wise decision. Religious leaders use mosque sermons to inform people of the benefits of SMC and the same is done by community leaders. As soon as the town announcer starts making announcements, the men continuously ask when their locations will be visited, so as to ensure their wives are at home and their children can be given SMC drugs. [...] Since the children started taking SMC drugs in this community, episodes of malaria have reduced. SMC has also helped other health interventions, like acceptance of immunization for children.”

Umar Abba Yamel, SMC supervisor in Dutsi LGA, Katsina state, Nigeria

As part of the HBHI initiative, the NMEP conducted an exercise similar to the one described above for Burkina Faso to stratify geographical areas according to epidemiological, ecological, social, and economic determinants for the purpose of guiding malaria interventions. In Nigeria, this exercise was supported by WHO and Northwestern University. For SMC, the analysis defined eligibility as areas where the *Plasmodium falciparum* parasite rate (standardized to the age group 2–10 years, a commonly used index of malaria transmission intensity) is greater than five percent, and areas where more than 60 percent of rainfall occurs within four consecutive months. Note that this differs from the current WHO policy recommendation, which states that SMC-eligible areas are characterized by 60 percent of annual rainfall over a three-month period.<sup>[1]</sup> The NMEP will consider LGAs in 21 states eligible for SMC from 2021 onwards, compared to nine states pre-stratification. Thanks to increased support, particularly from the Global Fund and philanthropic funding, SMC will reach 18 of those states in 2021, with a combined target population of around 20 million children under five (**Figure 5**). The coverage gap in the three remaining states is around 1.69 million children.

Figure 5: Support for SMC in 2021 by state and funding source, Nigeria

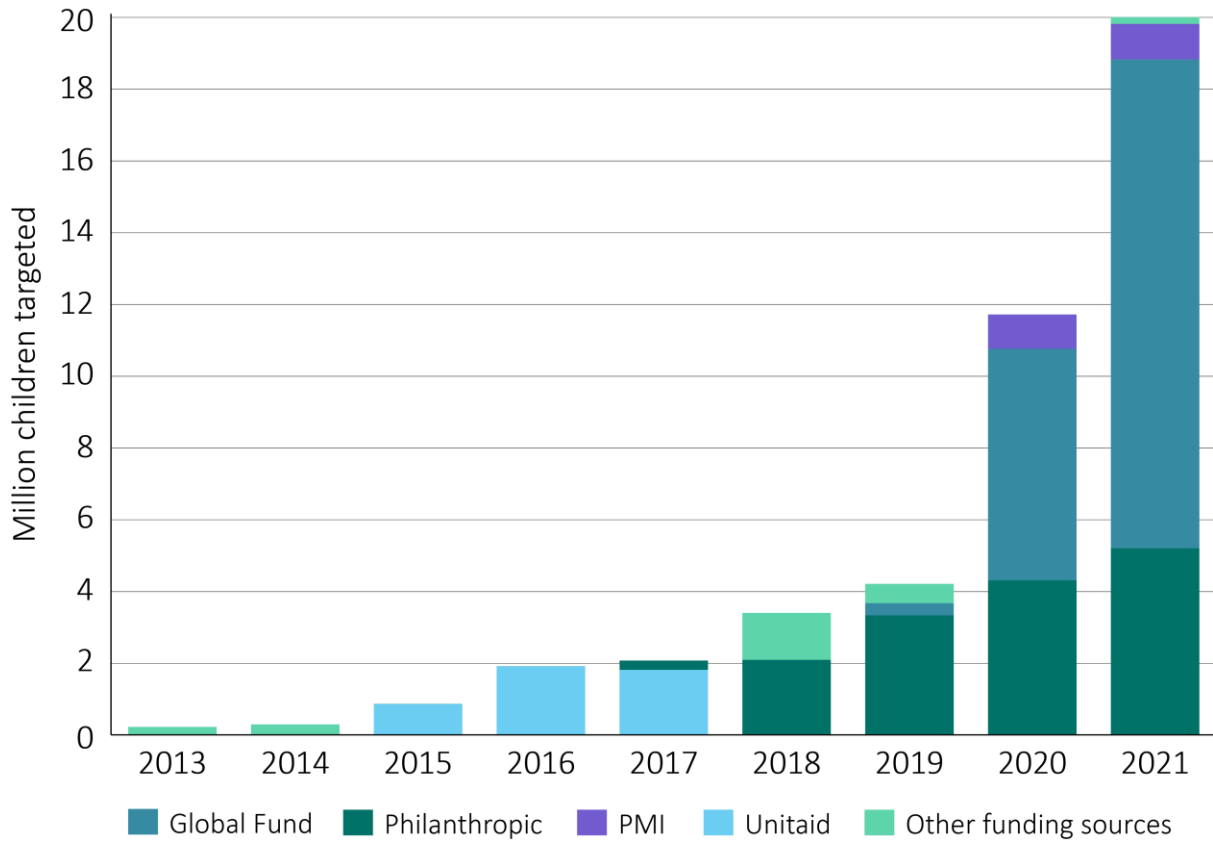


Malaria Consortium will use philanthropic funding to continue to support SMC in Kebbi and Sokoto. In Bauchi, where only 10 LGAs were considered eligible in 2020, we will expand to all 21 LGAs. Two of the new LGAs will be funded by the Korea International Cooperation Agency. We also plan to expand SMC to three states not previously covered: Kogi, Nasarawa, and Plateau, where five SMC cycles will be implemented due to the slightly longer rainy season. The total SMC target population in areas where philanthropic funding will be used in Nigeria in 2021 is 5.20 million children under five. **Figure 6** illustrates the scale-up of SMC in Nigeria since 2013.





Figure 6: Children targeted for SMC by funding source, Nigeria 2013–2021

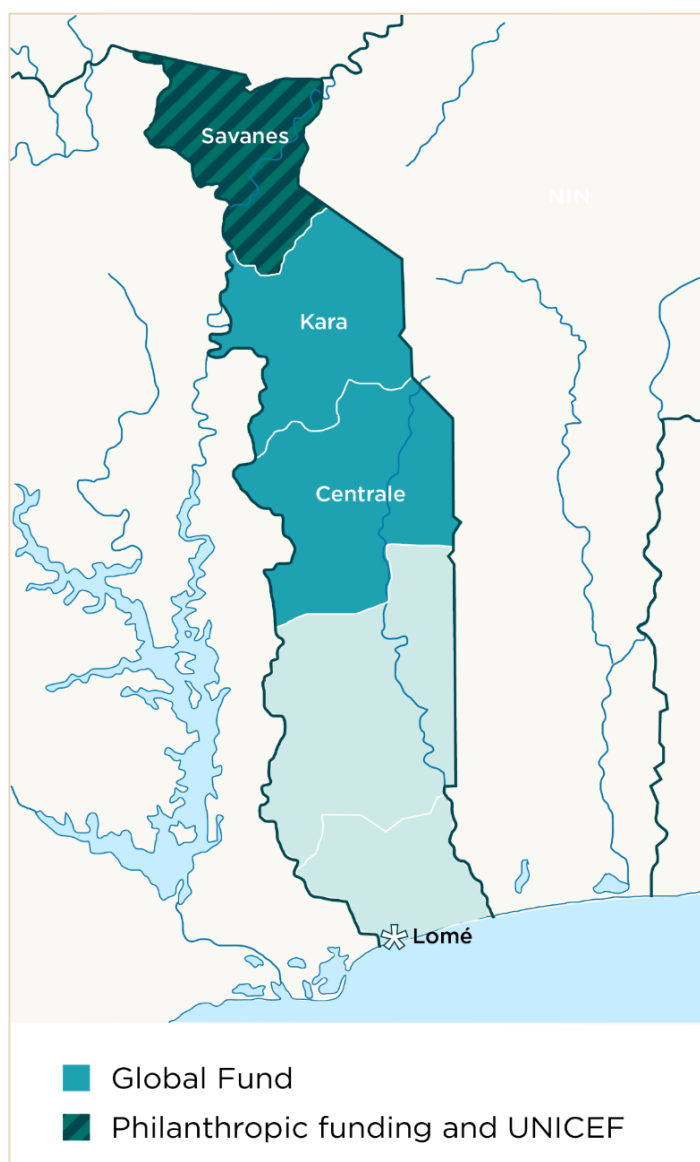


## 2.4 Togo

In 2019, Togo had a total population of 8.02 million.<sup>[22]</sup> Malaria is highly endemic in the entire country.<sup>[23]</sup> There were an estimated 1.33 million malaria cases and 5,000 deaths in 2019.<sup>[2]</sup>

SMC has been implemented since 2013, targeting the three northernmost regions of Centrale, Kara, and Savanes (**Figure 7**). While geographical coverage increased from five districts initially to all 19 districts in the eligible regions from 2016 onwards, SMC implementation has been consistently hampered by a lack of funding. In 2015, SMC could not be implemented. Between 2016 and 2019, only two or three SMC cycles were implemented. There has also been limited funding for intervention components associated with quality SMC implementation, such as training, supervision and monitoring and evaluation (M&E). While the funding gap for SMC has fluctuated over the years, consistent high-quality implementation of four cycles had not been achieved by 2019.

Figure 7: Support for SMC in 2020 by region and funding source, Togo



Togo's PNLP approached Malaria Consortium in 2019 to explore the possibility of using philanthropic funding to complement funding from the Global Fund and UNICEF to ensure SMC implementation according to WHO recommendations. In February 2020, a delegation from Malaria Consortium traveled to Togo for a scoping visit and to have in-depth discussions with the PNLP and implementing partners. During this visit, agreement in principle was reached for:

- the Global Fund to support the procurement of SPAQ and implementation of four SMC cycles in Centrale and Kara
- UNICEF to support the procurement of SPAQ for four SMC cycles and implementation of one SMC cycle in Savanes
- Malaria Consortium to support implementation of three SMC cycles in Savanes
- Malaria Consortium to support planning, training, and M&E in all three regions
- Malaria Consortium to provide technical advice on high-quality implementation of SMC.

Following approval from Malaria Consortium’s Board of Trustees, we planned to install a temporary country director in Lomé to start the process of registering Malaria Consortium as a foreign nongovernmental organization (NGO) in Togo and, subsequently, support the PNLP and the implementing partners in the planning for the 2020 SMC campaign. However, days before the scheduled departure of a regional Malaria Consortium colleague who had agreed to act as temporary country director, Togo closed its borders in response to the emerging COVID-19 pandemic. It was consequently not possible to establish a presence in the country and start the NGO registration process until much later in the year, and we were unable to recruit staff or provide detailed technical and logistical support to the 2020 SMC campaign. While SMC implementation in the regions supported by the Global Fund was not compromised in principle, implementation in the region supported by UNICEF was jeopardized. To ensure the campaign could go ahead in Savanes, Malaria Consortium agreed to provide a grant to the PNLP, covering the operational costs of three SMC cycles in that region. **Table 11** shows the 2019 and 2020 SMC target populations in Togo by funding source.

**Table 11: SMC funding 2020, Togo**

Funding source	Number of districts (2019)	Target population (2019)	Number of districts (2020)	Target population (2020)
Global Fund	12	290,000 <sup>a</sup>	12	300,000
UNICEF and philanthropic <sup>b</sup>	0	0	7	190,000
UNICEF	7	180,000 <sup>b</sup>	0	0
<b>TOTAL</b>	<b>19</b>	<b>470,000</b>	<b>19</b>	<b>490,000</b>

<sup>a</sup> Funding was only available for three SMC cycles in Global Fund-supported regions in 2019.

<sup>b</sup> UNICEF procured SPAQ and covered operational costs of one SMC cycle in 2020. Malaria Consortium provided a grant to cover operational costs for the remaining three SMC cycles.

<sup>c</sup> Funding was only available for two SMC cycles in UNICEF-supported regions in 2019.

In all three regions, SMC delivery started on 18<sup>th</sup> July. Four monthly SMC cycles were implemented, though there was a four-day delay to the start of cycle two due to conflicting mass campaigns that were prioritized by the MoH. No SPAQ stock-outs were reported. In Savanes — the region supported by Malaria Consortium’s grant — more than 3,300 individuals were involved in SMC delivery, including almost 1,800 community distributors.

We were able to recruit a country director in August, which allowed us to step up our technical support. To provide a baseline for future years and establish good practice in terms of monitoring SMC coverage and quality, we focused on developing tools and methods for an end-of-round coverage survey in all three states where SMC was implemented. We recruited an independent research firm to conduct the survey, and supported the training of data collectors, data analysis, and report writing. In October, the country director moved to Togo permanently and completed the first steps of the registration process, which enabled us to operate as an NGO, open an office, and recruit staff. We formally announced our support for SMC in Togo on our website at that point.<sup>[24]</sup>

In 2021, we plan to fully register as an NGO and expand our support for SMC in line with the funding arrangements described above. In Savanes, UNICEF has committed to procuring SPAQ for four cycles, but will not have funding to cover the operational cost of implementing one SMC cycle. Philanthropic funding will be used to cover the cost of all four SMC cycles in that region. There are no plans to vary the number of cycles in Togo or to expand to regions not currently covered by SMC.

## 2.5 Mozambique

Mozambique had a total population of 30.37 million in 2019.<sup>[25]</sup> Malaria is highly endemic in the entire country, with the highest prevalence in the north and along the coast.<sup>[26]</sup> There were 9.36 million malaria cases and 15,000 deaths in 2019.<sup>[2]</sup> Mozambique accounts for four percent of global cases and is a member of the HBHI initiative.<sup>[12]</sup>

A mid-term review of Mozambique's Malaria Strategic Plan 2017–2022<sup>[27]</sup> recommended SMC as a strategy to accelerate impact in the highest-burden locations. The national malaria program (Programa Nacional de Controlo da Malária, PNCM) approached Malaria Consortium about the possibility of piloting SMC in Mozambique in early 2020. As a first step, a prioritization exercise was conducted in collaboration with the PNCM, WHO, and the Clinton Health Access Initiative. The following criteria were applied to identify suitable implementation areas for the SMC pilot:

- seasonality: 60 percent of rainfall over a four-month period
- under-five mortality: highest scores given to areas where under-five mortality is highest
- access to care: highest scores given to areas where access to care is poor
- treatment seeking: highest scores given to areas with poor treatment seeking.

Based on these criteria, districts in the northern provinces were ranked. Taking into account operational considerations, the PNCM selected Nampula province for the SMC pilot (**Figure 8**). Two districts were selected from the highest-ranking districts: Malema and Mecubúri. As SP resistance is presumed to be widespread in Mozambique<sup>[28, 29]</sup> and SMC's effectiveness in this context needs to be demonstrated before scale-up can be recommended, the SMC pilot is designed as a two-year research study, with the first year focusing on exploring the feasibility and acceptability of SMC outside of the Sahel and the second year focusing on demonstrating impact. Lalaua was selected as a control district for some of the research components (**Figure 9**). The study is described in more detail in the research section below.

**Figure 8: Intervention and control districts for the 2020–2021 SMC pilot study, Mozambique**

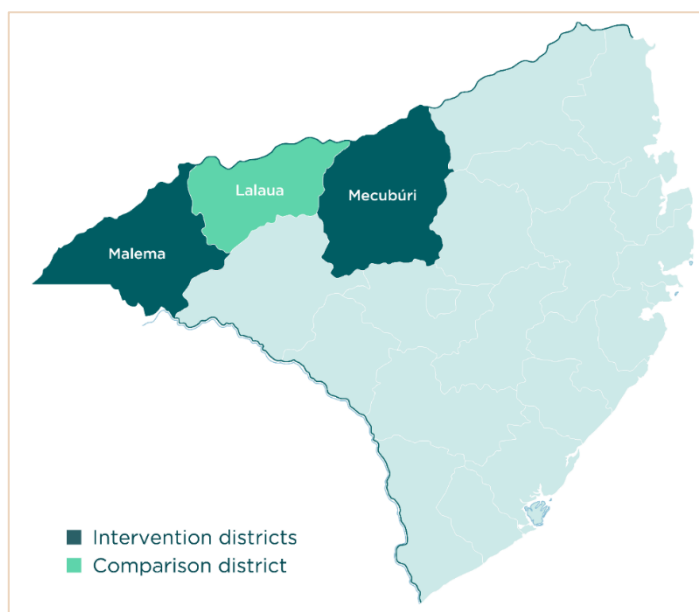
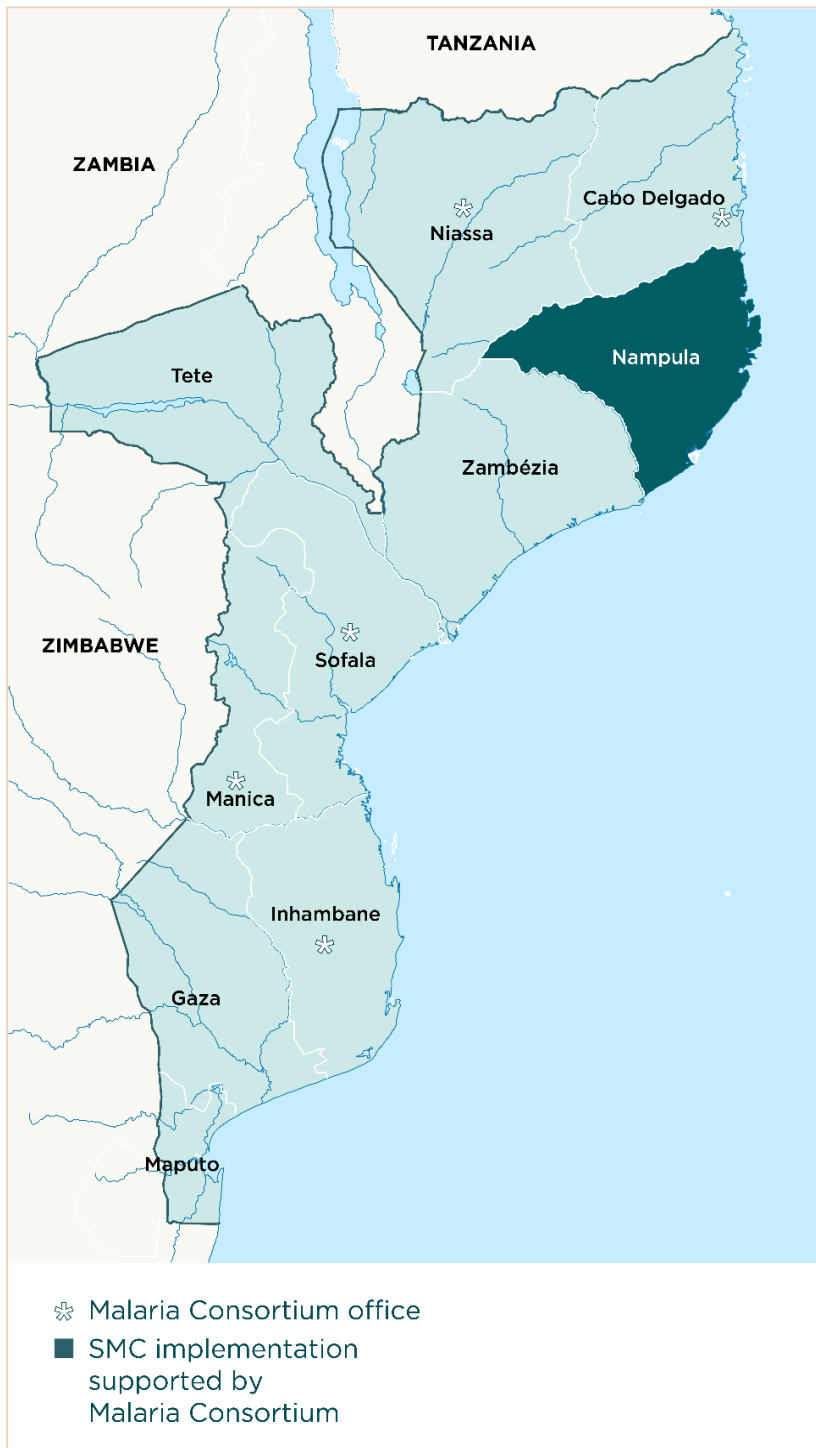


Figure 9: Provinces supported with Malaria Consortium’s philanthropic funding for SMC in 2020–2021, Mozambique

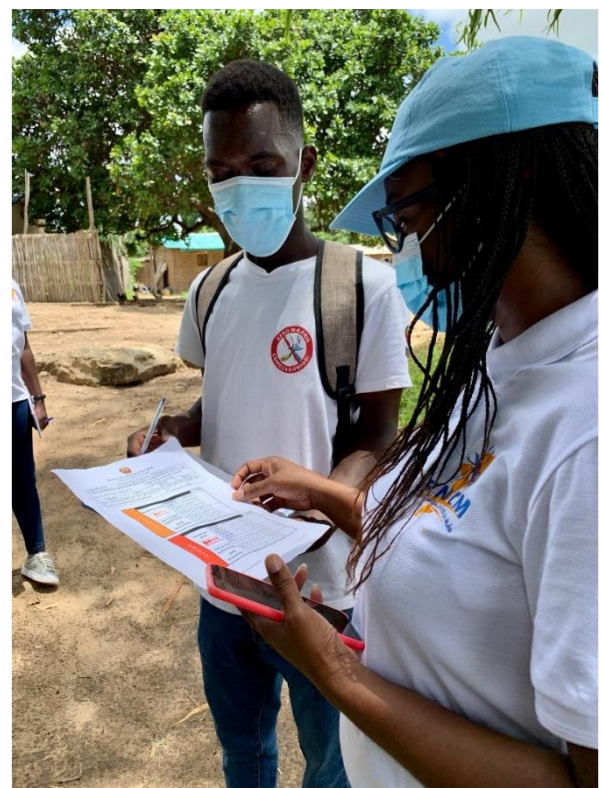




The SMC pilot in Mozambique applies the standard SMC implementation model that has been tried and tested in the Sahel. Four monthly SMC cycles consisting of three-day courses of SPAQ were delivered door-to-door to children 3–59 months by community distributors during the peak malaria season, which in northern Mozambique lasts from November to February. Unlike in west and central Africa, SMC implementation activities in Mozambique, therefore, do not align with the calendar year. Consequently, this report primarily discusses activities conducted in preparation for the annual SMC round. More detailed results will be included in next year’s annual report.

Following approval for the pilot project from the relevant MoH departments and the National Bioethics Committee, Malaria Consortium recruited a project team and opened a small office in Nampula. In collaboration with national, provincial, and district health authorities, our team reviewed the tools and materials used in Malaria Consortium-supported countries in west and central Africa and adapted them to the context in Mozambique. A total of 327,000 blister packs of SPAQ was procured and shipped to Nampula by sea for an estimated 72,000 children 3–59 months in the two intervention districts. During the first two cycles, it became clear that the target for the younger age group (3–<12 months) had been underestimated. To avoid stock-outs during subsequent cycles, a small top-up of 14,000 blister packs of SPAQ for the younger age group was procured and air-freighted to Mozambique. The total cost of SPAQ and freight was 115,000 USD.

The pilot project was formally launched in October 2020. Close to 1,200 individuals were trained on SMC delivery, including more than 700 community distributors (**Table 12**).



**Table 12: Individuals trained in SMC distribution with philanthropic support in Mozambique, 2020–2021**

Cadre	Number of individuals	Number of days per training	Number of training events
Malaria Consortium trainers	4	4	1
National- and province-level trainers	5	3	1
District-level trainers and health workers	36	3	2
Field supervisors and community distributors	795	2	33
Community mobilizers and community leaders	352	1	24
<b>TOTAL</b>	<b>1,192</b>	<b>13</b>	<b>61</b>

SMC distribution started on 16<sup>th</sup> November, with Mozambique’s Minister of Health attending the flag-off ceremony. Subsequent cycles were conducted in monthly intervals as scheduled. The round ended in February 2021. The scale of SMC implementation in 2021–2022 will be determined by research design considerations (see research section below).





## COVID-19

When WHO declared the COVID-19 outbreak as a global pandemic on 11<sup>th</sup> March 2020,<sup>[31]</sup> preparations for the 2020 SMC campaign were already underway. As the pandemic unfolded, the global SMC community was struggling to understand the implications for SMC, and there were doubts if SMC campaigns could go ahead at all. In line with WHO recommendations,<sup>[32]</sup> Malaria Consortium took the position early on that SMC is an essential health service and that discontinuing SMC would risk a substantial increase in malaria cases and deaths among children under five, which would put additional strain on health systems already under pressure because of COVID-19.<sup>[33]</sup> Recognizing that substantial adaptations would be required to minimize risk to SMC implementers and beneficiaries during the pandemic, Malaria Consortium led the development of global operational guidance for the safe implementation of SMC, which was published by the RBM Partnership.<sup>[34]</sup> We also developed more concrete internal infection prevention and control (IPC) guidelines that would apply to areas where Malaria Consortium supports SMC implementation (**Box 3**). Decisions often had to be made based on limited or inconclusive scientific evidence and we generally adopted a conservative approach to mitigate risk. The IPC guidelines required adaptations to all the SMC intervention components. For example, many planning meetings and some trainings were conducted remotely. Where virtual trainings were not practical, more training events had to be scheduled to respect the rules on physical distancing and the maximum number of participants. Moreover, the COVID-19 IPC guidelines had to be incorporated into SMC community engagement, training, and supervision materials. To help community distributors follow the COVID-19 guidelines while distributing SMC in their communities, Malaria Consortium adapted a job aid,<sup>[35]</sup> which was shared with the global SMC community. The job aid contained a number of COVID-19-related health messages that community distributors were encouraged to share with beneficiaries. In Nigeria, text messages reinforcing IPC guidelines and COVID-19 health messages were regularly sent to community distributors.

**1. Limiting in-person contact**

- Meetings and trainings should be conducted remotely where possible.
- Where in-person meetings and trainings are required, the number of participants should not exceed 20.

**2. Physical distancing**

- SMC implementers should maintain a distance of two meters at all times.
- SMC medicines should be administered by caregivers with community distributors supervising from a safe distance.
- Physical greetings should be avoided.

**3. Face masks**

- Face masks must be worn while interacting with beneficiaries and where physical distancing cannot be maintained.

**4. Hand washing**

- Soap, water, and hand-washing facilities or hand sanitizer should be available at all meeting/training venues and health facilities.
- SMC implementers need to wash their hands with soap or hand sanitizer before and after visiting each compound, before putting on and after taking off face masks, and at the beginning and end of each day of SMC distribution.

**5. Washing surfaces**

- Frequently touched surfaces at meeting/training venues and at health facilities need to be disinfected with bleach solution before and after each meeting/training or at the beginning and end of each day of SMC distribution.
- Gloves should be worn while disinfecting surfaces.
- SMC commodities and tools need to be disinfected with bleach solution or alcohol wipes at the start and end of each day of SMC distribution, and after every five households visited.
- Disposable spoons and cups should be provided in households where those items are not available.
- Two sets of SMC-branded clothes need to be provided, so implementers can wash them at the end of each day of SMC distribution.

**6. Preventing implementers with possible symptoms of COVID-19 from participating in the campaign**

- Implementers' temperature should be checked at the beginning and end of each day of SMC distribution using infrared digital thermometers.

**7. Waste disposal**

- Worn face masks and paper towels or alcohol wipes used to disinfect surfaces or commodities must be put in small plastic bags and double-bagged in larger bio-waste bags for safe disposal at health facilities.

Not least, COVID-19 presented an enormous procurement challenge. By the time the IPC guidelines had been finalized, the start of the annual SMC round in Burkina Faso, Chad, and Nigeria was only about two months away and large quantities of items needed to be procured and transported across countries, many of which were in short supply due to the increased global demand at the time (**Table 13**). We published a blog post about how COVID-19 affected SMC supply chains on our website.<sup>[36]</sup> Though at much smaller scale, the procurement efforts had to be repeated for the Mozambique project later in the year. While our internal COVID-19 guidelines did not apply to Togo, as we did not provide direct technical assistance in 2020, we did support the Togolese malaria program with a grant to fill a small funding gap for the procurement of face masks and hand sanitizer. The total cost of procuring COVID-19-related commodities for Malaria Consortium’s SMC program, including freight, was 2.14 million USD. It was not practical to quantify other COVID-19-related costs, such as increased staff costs to strengthen our technical COVID-19 response or more training events due to the limited number of participants per event.



**Table 13: COVID-19-related items for SMC procured by Malaria Consortium with philanthropic funding by country, 2020**

Item (unit)	Burkina Faso	Chad	Nigeria (philanthropic)	Nigeria (Global Fund) <sup>a</sup>	Togo <sup>b</sup>	Mozambique
Medical face masks (pieces)	571,154	254,700	815,100	-	17,635	42,184
Soap (bars)	14,606	6,163	21,216	27,450	-	443
Liquid soap (liters)	-	-	2,955	-	-	-
Buckets with tap and basin (pieces)	-	-	2,652	-	-	-
Hand sanitizer (liters)	11,974	15,484	28,399	31,894	735	3,006
Bleach (liters)	-	1,925	29,781	-	-	118
Bleach (tablets)	29,389	-	-	-	-	-
Reusable gloves (pairs)	870	-	5,964	-	-	29
Disposable gloves (pairs)	-	53,000	-	-	-	-
Spray bottles (pieces)	9,789	5,854	36,708	5,857	-	342
Paper towels (pieces)	697,116	514,000	1,174,600	-	-	13,600
Disposable cups and spoons (pieces)	190,480	193,988	218,600	-	-	14,389
Digital thermometers (pieces) <sup>c</sup>	-	349	2,652	-	-	81
Waste disposal bags (pieces)	13,708	28,339	208,243	-	-	120

<sup>a</sup> Philanthropic funding was used to procure COVID-19-related items considered essential according to Malaria Consortium’s internal guidelines, but not covered by Global Fund funding. This ensured implementation of our IPC guidelines across Malaria Consortium’s SMC program.

<sup>b</sup> The majority of COVID-19-related procurement for SMC in Togo was supported by the Global Fund and UNICEF.

<sup>c</sup> The Global Fund agreed to provide thermometers for use in the SMC campaign in Burkina Faso.



At the country level, we engaged with national COVID-19 task forces and supported advocacy efforts to ensure the full cooperation of implementing partners and governments in implementing SMC safely. Often, this involved finding solutions to challenges caused by national COVID-19 rules. For example, in Chad, we negotiated for national SMC supervisors to be allowed to travel between provinces to support SMC delivery despite a ban on travel between provinces. In Nigeria, we supported negotiations to allow free movement of SMC commodities between states. An advocacy brief was developed to support discussions with stakeholders in Nigeria.<sup>[37]</sup> Feedback from Nigeria's NMEP coordinator on the collaboration with Malaria Consortium to minimize risk during the COVID-19 pandemic can be found in **Box 4**.<sup>[38]</sup>

#### Box 4: Feedback on Malaria Consortium's response to COVID-19

“Working together with Malaria Consortium, we came up with so many innovative strategies to overcome issues of social distancing, hand washing [...] and adapting procedures to still do the door-to-door intervention. Malaria Consortium supported us in procuring personal protective equipment and by providing access to Zoom because of the need to do trainings online. This has proved really valuable and we have used it a lot in preparation for SMC and even in other interventions [...] and other interactions that we have with partners at the state level — it has gone a long way in helping us to be able to carry out the campaign successfully.”

Dr Audu Bala Mohammed, NMEP Coordinator, Nigeria

While there was no systematic attempt to monitor COVID-19 cases in areas where SMC was implemented, country teams tracked governments' COVID-19 data, as well as anecdotal reports from health facilities and SMC implementers. There is no indication that SMC may have contributed to increased transmission of COVID-19 during the 2020 SMC campaign. Malaria Consortium's Nigeria team presented our response to the COVID-19 challenge in a webinar hosted by Population Services International entitled 'Getting the most out of SMC: New learnings from Niger, Nigeria, and Benin' in September 2020.<sup>[39]</sup> A news article about the webinar was published on Malaria Consortium's website<sup>[40]</sup> and a recording of the webinar can be found on YouTube.<sup>[41]</sup> Our global approach was also summarized in two blog posts on our website<sup>[42, 43]</sup> and presented as an example of good practice during a call of the Every Breath Counts Coalition in November 2020. There is a perception that the SMC community's response to COVID-19 and Malaria Consortium's role in defining adaptations to minimize risk set an example that informed similar efforts for other health interventions, both globally and at the country level.

In late 2020, Malaria Consortium launched a project to model COVID-19 transmission and investigate its potential impact on SMC delivery in Burkina Faso and Chad. The project comprises two phases. In the first, data on COVID-19 mortality was used to parameterize dynamic compartmental models of COVID-19 transmission using Imperial College London's modeling approach to characterize the outbreaks in those countries and the impacts of infection control measures on transmission.<sup>[44]</sup> The second phase will attempt to characterize impacts of COVID-19 on SMC implementation and seek to provide recommendations to enhance the program's resilience to similar events going forward. We hope that this work will aid in understanding the dynamics of COVID-19 transmission and infection in west and central African settings and inform responses to potential future outbreaks.

Anticipating that SMC campaigns in 2021 will still need to be implemented in the context of the COVID-19 pandemic, Malaria Consortium conducted research on SMC implementers' adherence to COVID-19 IPC measures (see research section below), as well as a comprehensive learning exercise, which gathered feedback from a wide range of SMC program staff and a few external partners. While anecdotal evidence, for example from SMC supervisors, suggested that adherence to the IPC measures was generally adequate and few stock-outs of COVID-19-related commodities were reported, preliminary research data showed that the IPC measures were not always observed and some stock-outs did occur. However, it is not uncommon for observational studies to find low levels of compliance with IPC guidelines.<sup>[45]</sup> A key insight from the learning exercise is that sound IPC guidelines are central to the safe implementation of SMC. They need to inform national guidelines and campaign planning early on. Communicating and explaining the necessary adaptations to a range of stakeholders — from staff employed in SMC programs to partners, field implementers, and beneficiaries — is also vital. Research, learning, and the emerging scientific evidence base on COVID-19 will inform Malaria Consortium's approach in 2021.

### 3. Strategic focus areas

Malaria Consortium has defined a number of strategic focus areas for its SMC program, including quality, M&E, research, external relations, digital tools, and security. Below, we discuss progress on SMC program initiatives to strengthen those strategic focus areas. Unless otherwise stated, philanthropic funding was used to support those activities.



### 3.1 Quality

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.<sup>[46]</sup> In 2019, a work stream, led by Malaria Consortium’s Case Management Specialist and the Head of Technical West and Central Africa, was tasked with developing quality standards for SMC implementation. Over the course of 2020, the work stream drafted a document defining what high-quality SMC implementation means in relation to each of the SMC intervention components. The framework defines quality in the context of SMC as ‘ensuring the correct quantity of SPAQ is available and administered safely and correctly to eligible children each cycle, and is accurately recorded to contribute to measuring whether malaria cases have been prevented in areas targeted by SMC within the intended period of protection.’ It aims to gain commitment for continuous performance improvement and increase accountability for achieving and assuring excellence in all aspects of SMC delivery. While the quality framework document developed by the work stream discusses each intervention component in detail, it identifies 10 key standards that are essential for high-quality implementation of SMC (**Box 5**). The work stream also realized that more consistent SMC terminology across functions and locations would be helpful and has developed an updated SMC glossary (**Appendix 1: SMC glossary**).

#### Box 5: SMC quality standards developed by the quality work stream

1. Complete an SMC plan four months prior to each SMC campaign detailing the enumeration of targeted children, human resource capacity needs (including training and supervision), quantification of commodities, and expected operational costs.
2. Procure sufficient quality-assured SPAQ in time for it to be available at least two weeks before the start of the SMC round and ensure its continued availability until the end of the SMC round.
3. Procure and manage the supply and accountability of all SMC commodities and tools before, during, and after each cycle.
4. Sensitize and engage with communities before and during each SMC cycle.
5. Provide quality SMC training to trainers, supervisors, health facility workers, and community distributors within one month of each SMC campaign.
6. Deliver a full three-day course of SPAQ to eligible children each cycle of the SMC round during the period of highest malaria transmission.
7. Fully assess, treat, and record all children referred to the health facility during SMC.
8. Supervise, monitor, and report on the performance of each team of community distributors once per cycle.
9. Conduct routine M&E of SMC inputs, processes, outputs, outcomes, and impact throughout the SMC round.
10. Ensure the safeguarding of children, caregivers, community members, and community distributors during SMC delivery.



In preparation for the 2021 SMC campaign, the work stream is collaborating with Malaria Consortium's Capacity Development Specialist to conduct exercises with the SMC teams in Burkina Faso and Nigeria to reflect on our performance with regard to quality SMC implementation and to identify a small number of actionable quality improvement initiatives in each country. We also want to think more about how we embed continuous quality improvement specific to the SMC quality standards and how we can objectively assess the degree of quality we achieve across the program. In addition, we are supported by Malaria Consortium's Social and Behavior Change Specialist, who is working with the SMC team to develop a framework for community engagement in SMC.



### 3.2 Monitoring and evaluation

In 2019, we created an M&E work stream, which was co-led by the SMC Epidemiologist and Results Measurement Analyst. The work stream developed a comprehensive SMC M&E indicator framework, which defines standard indicators for the appraisal of program performance and assessment of the relationships between different aspects of SMC implementation (in terms of inputs, processes, and outputs) and the expected results (in terms of outcomes and impacts). The framework also outlines details on measurement of the indicators and processes for collection, processing, and analysis of relevant data. Most of the over 70 indicators are based on program-internal information, including administrative data, stock reconciliation data, and routine household surveys. The framework also accounts for external factors that affect program implementation, results, and collection and interpretation of program data. Developing the framework involved documenting the data flow across the different SMC components and mapping the objectives outlined onto SMC processes, outcomes, and impact components. It distinguishes seven objectives:

- maximizing coverage
- achieving high fidelity
- implementing with high quality
- securing high acceptability
- ensuring appropriate supply and demand
- enabling data-based decision-making
- guaranteeing safe SPAQ administration.

The indicator framework was launched at the end of 2020. The objectives of this exercise and the methods used in developing the framework have been described in a synopsis.<sup>[47]</sup> A publication describing the framework in a peer-reviewed journal is planned for 2021.

To guide the application of the M&E indicator framework across Malaria Consortium's SMC program and embed it in program delivery, the output-focused work stream has now been transformed into a standing M&E working group, which will serve as a platform for colleagues from across the SMC program whose remit includes M&E elements. The working group will collectively plan M&E activities, exchange learning and good practice, and discuss solutions to emerging challenges. We expect that as we implement the framework, the working group will continuously refine the indicators, as well as the methods and tools for data collection and analysis. Another objective of the working group will be to strengthen the use of M&E data to drive the continuous improvement of program performance. This will, for example, involve refining the processes for taking corrective actions between SMC cycles based on end-of-cycle survey results and using end-of-round survey data from previous years to inform quality improvement initiatives in preparation for the next SMC round.

Routine quantitative M&E methods to determine coverage and quality of SMC implementation are discussed in detail in a separate report.<sup>[9]</sup> In addition to those routine activities, our M&E team worked on several discrete analyses detailed below, often with the aim of determining the impact of SMC at scale and under programmatic conditions.

**a) An ecological analysis exploring the impact of SMC in Burkina Faso using national household surveys (2010–2017)**

This analysis investigated if the effect of SMC can be observed in publicly available household survey data sets, including those collected through the Demographic and Health Surveys program and Malaria Indicator Surveys. An ecological secondary analysis of data from Burkina Faso spanning 2010 to 2017 was performed to determine the odds of having malaria in health districts where SMC had been implemented compared to those that had not yet been reached by SMC. The analysis concluded that children living in a district with SMC had lower odds of having malaria compared to those living in a district without SMC, with similar odds for malaria confirmed by microscopy (odds ratio [OR]: 0.44, 95 percent confidence interval [CI]: 0.32–0.61) and malaria confirmed by rapid diagnostic test (OR: 0.38, 95 percent CI: 0.28– 0.50). Findings were presented at the annual meeting of the American Society of Tropical Medicine and Hygiene (ASTMH).<sup>[48]</sup> Further analysis looking at timing of surveys, decaying effect of impact, and triangulating with other data sources is being conducted, with a publication in a peer-reviewed journal planned in 2021.

**b) Assessing the impact of SMC on suspected and confirmed malaria cases in Chad using routine clinical data (2013–2018)**

This analysis used Health Management Information System (HMIS) data on malaria cases among children 0–59 months from health districts in Chad where SMC had been implemented in at least one high transmission season between 2013 and 2018. Two statistical models were fitted to estimate the monthly rate ratios for suspected and confirmed cases in areas with and without SMC. The analysis showed similar reductions in both suspected cases (rate ratio: 0.82, 95 percent CI: 0.72–0.94) and confirmed cases (rate ratio: 0.81, 95 percent CI: 0.71–0.93), with lower rates in areas with SMC implementation, equivalent to a reduction of nearly 20 percent. These findings were presented at the 2020 ASTMH meeting.<sup>[49]</sup> Following further sensitivity analyses based on less restrictive assumptions, a paper summarizing the study was submitted to the American Journal of Tropical Medicine and Hygiene in March 2021.

**c) Measuring the impact of SMC in Nigeria using propensity score matching to identify control areas (2017–2019)**

For this analysis, six LGAs were randomly selected from three states: Sokoto and Zamfara (intervention states), where SMC had been implemented between 2017 and 2019, and Kebbi (control state), which had not been reached by SMC during this period. Data were extracted from the outpatient registers of 113 health facilities in the selected LGAs. Propensity score matching (matched on rainfall, temperature, and elevation) was used to match the LGAs in the intervention states with control state LGAs. Monthly rates of confirmed malaria cases were compared between intervention and control LGAs. The analysis did not find a statistically significant effect of SMC implementation. However, it was noted that other factors, such as transmission intensity and coverage of other malaria prevention interventions, will need to be considered for a more reliable propensity score matching. A poster summarizing the findings was presented at the 2020 ASTMH meeting.<sup>[50]</sup>

**d) Investigating fever occurrence among under-fives and SMC adherence in northern Nigeria**

This project involved secondary analysis of data from Malaria Consortium’s 2019 end-of-round household survey in five states: Jigawa, Katsina, Sokoto, Yobe, and Zamfara, with a total sample of 5,215 households. The analysis explored the association between adherence to the SMC protocol and history of fever in the preceding month. Adherence to the protocol was categorized as high if the community distributor had observed DOT and shared three key messages about SMC; medium if the community distributor had observed DOT but not shared those key messages; and low if DOT was not observed. Association between protocol adherence and households’ concurrent use of insecticide-treated nets was also explored. The study found that the odds of fever occurrence were significantly lower with high (OR: 0.59) and medium (OR: 0.74) protocol adherence compared to low adherence. The largest reduction in fever occurrence was seen when protocol adherence was high and an insecticide-treated net was used. A poster summarizing the findings was presented at the 2020 ASTMH meeting.<sup>[51]</sup>

**e) Pharmacovigilance in SMC in northern Nigeria**

This analysis used data from a commodity management audit conducted in randomly selected health facilities in 2019 in five Nigerian states: Jigawa, Katsina, Sokoto, Yobe, and Zamfara. It involved secondary analysis of data from 1,127 health facilities to assess the availability of pharmacovigilance reporting tools, health workers trained on pharmacovigilance, and compliance with the protocol for reporting adverse events. A large majority of health facilities had national pharmacovigilance forms for reporting suspected adverse drug reactions available



(84 percent) and at least one trained health worker (91 percent). Only nine percent of health facilities documented at least one adverse event, most commonly vomiting. Of these, only 20 percent submitted appropriate forms to the state health authorities. A poster summarizing the findings was presented at the 2020 ASTMH meeting.<sup>[52]</sup>

**f) COVID-19 knowledge, beliefs, prevention behaviors, and misinformation in the context of an adapted SMC campaign in six northern Nigerian states**

This project analyzed data from an end-of-cycle household survey conducted in July 2020 in the states of Bauchi, Jigawa, Kano, Katsina, Sokoto, and Yobe. It investigated the associations between receiving information on COVID-19 from different sources — including from SMC community distributors — and knowledge of COVID-19 IPC behaviors and symptoms, as well as belief in misinformation. A representative sample of 40,157 caregivers of children eligible for SMC was obtained. Receiving information on COVID-19 from community distributors during the SMC campaign was significantly associated with higher odds of caregiver knowledge of COVID-19 IPC behaviors (OR: 1.78, 95 percent CI: 1.64–1.94) and symptoms (OR: 1.74, 95 percent CI: 1.59–1.90), as well as lower odds of belief in COVID-19 misinformation (OR: 0.92, 95 percent CI: 0.85–1.00). This demonstrates that SMC can be a useful platform to share public health information among target populations. The results were published in *Tropical Medicine and Health*.<sup>[53]</sup>

### 3.3 Research

Malaria Consortium is committed to contributing to the evidence base on SMC through conducting research that addresses knowledge gaps relating to SMC delivery, quality, and impact. This helps our program and our international and country partners to make informed decisions on SMC policy and practice. In 2019, we formed an SMC research work stream, led by our Research Advisor and Senior Research Specialist, to develop a research strategy for the SMC program. The strategy development process comprised the following activities:

- a rapid review of the published literature relating to SMC
- key informant interviews (KIIs) with the national malaria programs in Burkina Faso, Chad, and Nigeria
- a review of (preliminary) results from the research studies conducted by Malaria Consortium in 2019
- a Malaria Consortium internal research priority setting exercise, in which colleagues from across the SMC program were asked to define priority research questions through a two-stage online survey.

The research strategy was launched at the end of 2020. It outlines five research objectives for Malaria Consortium's SMC program:

1. conduct high quality research to generate new evidence to address challenges relating to the delivery of Malaria Consortium's established SMC implementation model and assess for impact
2. conduct high quality research to generate evidence about new implementation models for SMC (for example research on the effect of changing the timing and frequency of SMC in areas where the transmission season is longer)
3. strengthen organizational capacity to conduct relevant research on SMC and use research evidence effectively and ethically to underpin and drive our work

4. build partnerships with national and global research institutions and SMC stakeholders to conduct relevant research on SMC
5. seek new funding opportunities to increase investment in innovative research on SMC.

The strategy defines community participation, gender, equity, and sustainability as cross-cutting principles that underpin our SMC research. The research work stream also conducted a virtual workshop on academic writing for colleagues across the SMC program. The workshop was used to facilitate progress on writing up results from the SMC research studies Malaria Consortium conducted in 2019, including by authors with no previous experience with academic publications. To guide the operationalization of the SMC research strategy, the output-focused research work stream was turned into a standing research working group in 2021. The working group serves as an opportunity for colleagues from across the SMC program to agree on research priorities, exchange learning and good practice, and continuously review the emerging research evidence on SMC.

Our 2020 research activities were heavily affected by COVID-19. Many plans had to be changed and several studies had to be canceled. The team nevertheless managed to work on the wide range of studies detailed below.

**a) Extending SMC to five cycles: A feasibility and acceptability study in Cascades region, Burkina Faso**

Data collection for this study was completed in 2019, but data analysis was ongoing in 2020. While Burkina Faso generally started the 2019 SMC round in July, Malaria Consortium implemented an additional SMC cycle in June, targeting more than 30,000 children under five in Mangodara health district in southern Burkina Faso. The study used mixed methods to understand whether extending SMC to five cycles is feasible and acceptable, and reduces malaria incidence in children. Study methods included an end-of-round household survey, as well as KIIs and focus group discussions (FGDs) with policy makers, SMC implementers, and beneficiaries. The end-of-round survey found that SMC coverage was not affected by the additional SMC cycle, with high coverage being achieved across all five cycles. Adding an SMC cycle in areas where the rainy season is longer was acceptable to all types of respondents. A planned analysis of HMIS data to assess the impact of a fifth cycle on malaria cases in children under five was not possible, as HMIS data were not available due to a health worker strike that lasted for the entire duration of the 2019 SMC round. Study findings were presented at the 2020 ASTMH meeting.<sup>[54]</sup> A paper will be submitted for publication in a peer-reviewed journal in 2021.

**b) Perceptions of the feasibility and acceptability of extending the delivery of SMC to older children in Chad**

Household survey data suggest that administration of SPAQ to children over the age of five is not uncommon. This study explored perceptions of the feasibility and acceptability of extending SMC to older children, as well as the barriers to the correct delivery of SMC to the current target age group, through a series of KIIs and FGDs with policy makers, SMC implementers, and beneficiaries. All data were collected in 2019 and data analysis was completed in 2020. Respondents were broadly supportive of expanding SMC to older children. However, many felt that closing existing coverage gaps among children under five was a higher priority. Reasons given for administering SPAQ to children over five included social pressures from caregivers and difficulty in determining a child's age. A poster summarizing study findings was presented at the

2020 ASTMH meeting<sup>[55]</sup> and a paper was submitted to *Global Health Science and Practice* in February 2021.

**c) Accuracy of data submitted to the national electronic HMIS in Massaguet district, Chad**

This study emerged from the research assessing the feasibility and acceptability of extending SMC to older children. It involved a comparison of HMIS data from 14 health facilities with data extracted from those facilities' outpatient registers. Completeness and accuracy indicators were calculated. Data were collected in 2019 and data analysis was completed in 2020. The overarching aim of the study was to assess the utility of HMIS data for measuring the impact of SMC and other malaria prevention and control interventions. The study found generally high data completeness but low accuracy. Factors associated with data inaccuracy included high workload and the unavailability of required data collection tools. Presence of dedicated staff for data management was associated with increased accuracy of data reporting to the HMIS. A paper was submitted to *BMC Medical Informatics and Decision Making* in February 2021.

**d) Co-implementing vitamin A supplementation with SMC in Sokoto state, Nigeria: A feasibility study**

This mixed-methods study was conducted in 2019 to explore if delivering vitamin A supplementation (VAS) to children 6–59 months via SMC is feasible and acceptable. It involved co-implementation of both interventions, targeting 60,000 children during the fourth SMC cycle in one LGA in Sokoto. Household coverage surveys with around 180 respondents were conducted before and after co-implementation. VAS coverage increased significantly between baseline and endline, rising from two to 59 percent. SMC coverage and community distributors' adherence to DOT were not affected. KIIs and FGDs revealed that caregivers' acceptance of co-implementing the two interventions was generally high. However, SMC implementers cautioned that co-implementation is time consuming and results in extra work for community distributors. There were also concerns that community distributors could be confused over the different SMC and VAS dosage regimens for different age groups. Study results were published in a research brief<sup>[56]</sup> and presented at the 2020 ASTMH meeting.<sup>[57]</sup> A paper will be submitted for publication in a peer-reviewed journal in 2021.

**e) Assessing the usability of a geospatial platform for seasonal malaria chemoprevention in Nigeria**

In partnership with Akros, Malaria Consortium is piloting a geospatial platform called Reveal to support SMC delivery. The platform is described in more detail in the section about digital tools below. To test the platform's usability, Malaria Consortium piloted the tool in one LGA in Sokoto state, Nigeria, during the 2020 SMC campaign. The pilot included qualitative research, including a 'think-aloud' exercise to elicit the thoughts and opinions of 10 community distributors while performing a list of specified tasks with the Reveal tool. In addition, FGDs were conducted with stakeholders at the health facility, LGA, and state levels to understand how they felt about the training they had received, as well as assess their views on the usefulness of the platform during SMC distribution. The study rationale and methods were published in a synopsis.<sup>[58]</sup> Data analysis has been concluded and a publication in a peer-reviewed journal is planned for 2021.

**f) Assessing adherence to IPC guidelines for SMC during COVID-19**

As much of the research originally planned for 2020 had to be canceled, Malaria Consortium's research team shifted the focus to assessing how the IPC guidelines developed for SMC were

applied and perceived. A mixed-methods multi-country study spanning Burkina Faso, Chad, and Nigeria was designed and became the main SMC research project in 2020. Its objectives were to:

- assess adherence of SMC community distributors to IPC guidelines during two SMC cycles
- measure whether community distributors received COVID-19-related commodities required to adhere to IPC guidelines, such as face masks and hand sanitizer
- measure caregivers' satisfaction with the adapted SMC delivery model during COVID-19
- explore community distributors' views on the IPC measures and their perception of the factors hindering or facilitating adherence.

The study was conducted in partnership with the national malaria programs in Burkina Faso, Chad, and Nigeria, and three national co-implementers: Institut de Recherche en Sciences de la Santé in Burkina Faso, Université de N'Djamena in Chad, and Oxford Policy Management in Nigeria. The research involved structured observations of over 1,000 community distributors, more than 30 FGDs with community distributors, and a survey with around 130 caregivers. A summary of the study rationale and methods was published in a synopsis.<sup>[59]</sup> All data have been analyzed and a publication in a peer-reviewed journal is planned for 2021.

**g) A pilot study to assess the feasibility, acceptability, and protective effect of implementing SMC in Nampula province, Mozambique**

As discussed in the section above on SMC implementation in Mozambique, the SMC pilot was conceived as a two-year research project to demonstrate that SMC can be an effective malaria prevention strategy in an area where resistance to SP is assumed to be high. In the first year, the study aims to:

- document how the SMC implementation model used in the Sahel was adapted to the local context in Mozambique
- evaluate the process of implementing SMC in Mozambique, especially regarding coverage and quality
- assess the acceptability of SMC to beneficiaries, implementers, and policy makers
- determine the effectiveness of SMC in reducing malaria morbidity among children 3–59 months.

A hybrid effectiveness-implementation design was adopted, which involved the following components:

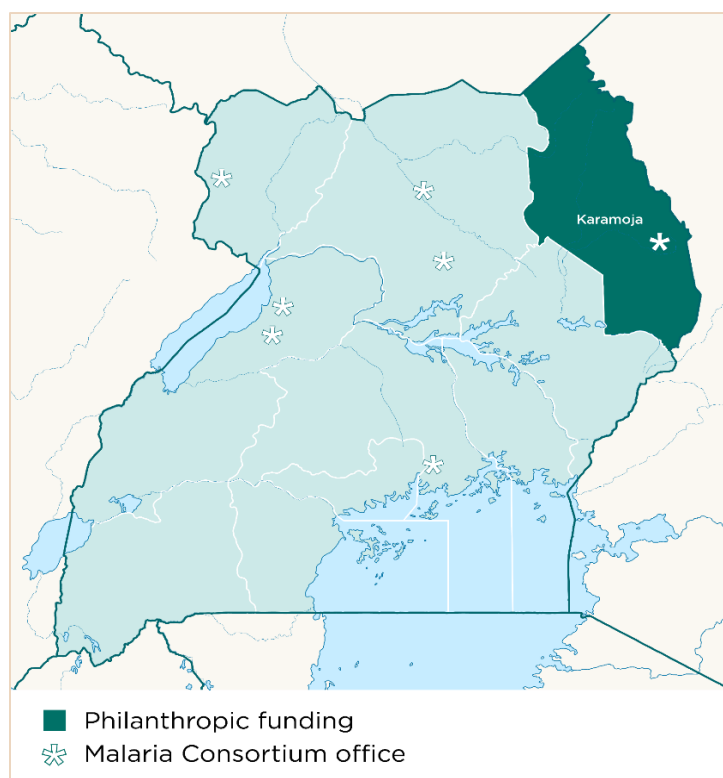
- documentation of the process of SMC implementation and adaptations compared to the model used in west and central Africa
- a representative end-of-round household survey with more than 1,800 respondents
- KIIs and FGDs with policy makers, SMC implementers, and beneficiaries
- analysis of HMIS data on malaria indicators reported at the health facility and district levels
- a non-randomized controlled trial involving around 800 children in an intervention and a control arm to determine the odds of clinically significant malaria outcomes among eligible children
- a molecular resistance markers study to determine baseline prevalence of SP and AQ resistance and any increase in resistance prevalence after one annual round of SMC.

The study is conducted in collaboration with the PNCM and the Centro de Investigação em Saúde de Manhica. It is co-funded by the Bill & Melinda Gates Foundation. The study rationale and methods were published in a synopsis.<sup>[60]</sup> A paper summarizing the study protocol was submitted to JMIR (Journal of Medical Internet Research) Research Protocols in February 2021. Research activities are ongoing. Results will be published over the course of 2021 and 2022. A scientific advisory committee comprising malaria experts, the donor community, and national stakeholders has been formed to advise on the interpretation of results from year one and the research design for year two.

#### h) Evaluating the feasibility, acceptability, and protective efficacy of SMC in two districts in Karamoja, Uganda

The Uganda Malaria Reduction and Elimination Strategic Plan 2021–2025<sup>[61]</sup> aims to move the country into the malaria pre-elimination stage and proposes new, innovative chemoprevention approaches to combat malaria, especially in children. Based on modeling conducted by the Swiss Tropical and Public Health Institute, SMC could be a viable malaria prevention strategy in the northeastern Karamoja region, where malaria transmission is seasonal and the highest prevalence rates in the country are consistently reported (**Figure 10**). However, as in Mozambique, SP resistance is presumed to be high in Uganda.<sup>[62]</sup>

**Figure 10: Regions supported with Malaria Consortium’s philanthropic funding for SMC in 2021, Uganda**



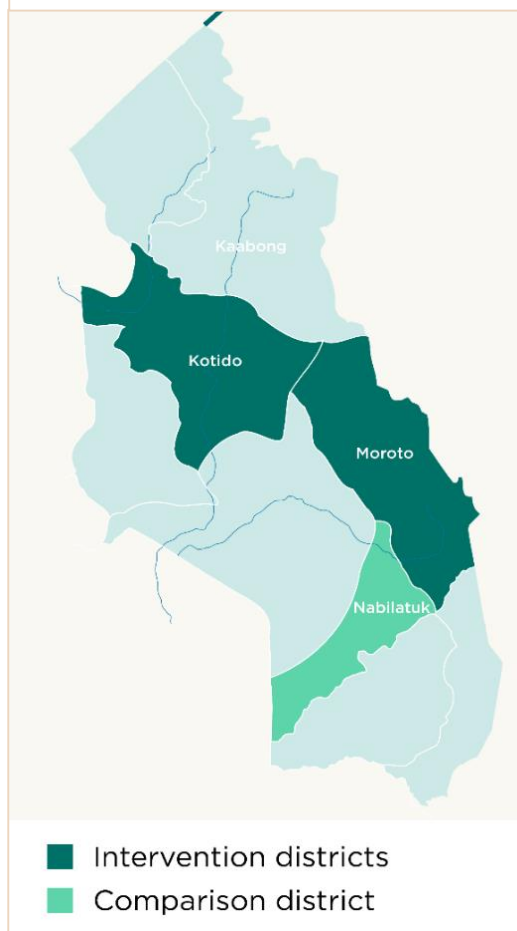
In 2020, the National Malaria Control Division (NMCD) of Uganda’s MoH approached Malaria Consortium with a request to support an SMC pilot project in Karamoja. Two districts with a combined target population of around 65,000 children under five were selected, with a third serving as a comparison for some of the research components (**Figure 11**). The rainy season in the area typically lasts from May to September. Accordingly, five SMC cycles will be

implemented, starting in May 2021. The hybrid effectiveness-implementation study design will be similar to the one adopted for the SMC pilot in Mozambique. The following research activities will be conducted in 2021:

- documentation of the process of SMC implementation
- end-of-round household survey
- KIIs and FGDs with policy makers, SMC implementers and beneficiaries
- analysis of District Health Information System data on malaria indicators reported at the health facility and district levels
- non-randomized controlled trial
- molecular resistance markers study
- malariometric survey to determine malaria prevalence.

The study will be conducted in collaboration with the NMCD and the Infectious Diseases Research Collaboration. The study protocol was approved by the relevant MoH departments, the Vector Control Division’s Institutional Review Board, and the Uganda National Council for Science and Technology. Malaria Consortium will recruit a project team to be based in a field office in Karamoja. Research activities will be conducted throughout 2021 and results will be published.

**Figure 11: Intervention and control districts for the 2021 SMC pilot study, Uganda**



2020 also saw the publication of a landmark paper summarizing coverage, effectiveness, safety, feasibility, drug resistance, and cost-effectiveness data from the ACCESS-SMC project in The Lancet.<sup>[5]</sup> The paper demonstrates that at-scale community delivery of SMC is safe and can achieve high coverage. Introducing SMC led to a reduction in malaria cases and deaths.

While the SMC pilots in Mozambique and Uganda will be the focus of Malaria Consortium's SMC research in 2021, the research team is also discussing options for operational research studies in Burkina Faso, Chad, Nigeria, and Togo. In addition, we have created a cross-cutting work stream including M&E and research colleagues who have been tasked with providing guidance on future work to determine the impact of SMC. This will include mapping the existing evidence and knowledge gaps, as well as advising on methods and designs to answer impact-related questions.

### 3.4 Digital tools

Digital tools have the potential to improve SMC by increasing coverage, efficiency, quality, transparency, and accountability. Though there is a range of possible usages within SMC, the adoption of digital tools has so far been slow. Since the second half of 2020, our SMC program has been supported by Malaria Consortium's Digital Health Specialist. We have also been working with Akros on the development of Reveal for SMC since 2019. Reveal is an open-source mobile platform that uses spatial intelligence and satellite imagery to address three areas that are often problematic in large-scale campaigns, especially in remote and hard-to-reach areas:

- Enumeration: Where is the target population and how many structures/people are there?
- Targeting: How can field movement of implementers be efficiently coordinated and guided to reach maximum coverage?
- Monitoring: How can delivery be tracked accurately and in real time?

The tool has four workflow components:

- Enumeration: Use of satellite imagery to enumerate residential structures and draw boundaries of operational areas.
- Configuration and planning: Data-collection forms (for example tally sheets, stock reconciliation, supervision tools), creation of teams, and allocation of teams to areas.
- Navigation and delivery: Community distributors can use the map for guidance while in the field and collect data on a handheld device.
- Monitoring and response: Supervisors can see and analyze data in real time.

As mentioned in the research section above, Malaria Consortium tested the Reveal tool in two LGAs in Sokoto state, Nigeria, during the 2020 SMC campaign. In February and March, Akros facilitated an in-depth data discovery and mapping exercise to understand and document information related to key SMC stakeholders, the workflow of the SMC campaign, and how data tools are used throughout SMC workflows. The next step was to validate these workflows to help develop collection forms and dashboards that will appear in the Reveal tool. This was done through a virtual workshop involving Akros and Malaria Consortium staff. Insights from this workshop were published in a blog post on our website.<sup>[63]</sup> Following further refinements of the Reveal platform, the tool was tested during SMC distribution in cycles three and four. The project was presented in a symposium on Spatial



Intelligence to Optimize Public Health Interventions at the 2020 ASTMH meeting.<sup>[64]</sup> Akros has been working on enhancements to the Reveal tool based on the 2020 usability study, including improved performance metrics and ‘on-app’ indicators for supervisors to be able to better monitor coverage targets in real time. In 2021, we plan to field test Reveal at a slightly larger scale in Nigeria. In the longer term, this would replace traditional paper-based record keeping with an innovative technology-driven solution that will digitize the monitoring of SPAQ distribution from the health facility to the community in real time. We are also exploring the possibility of building on Malaria Consortium’s upSCALE work — the upSCALE digital health platform supports community health delivery through the collection of real-time data — to digitize the SMC campaign in Mozambique.<sup>[65]</sup>

### 3.5 External relations

In 2020, we expanded our existing communications and advocacy strategy to include the full portfolio of external relations activities: advocacy, communications, and publications. We developed a global external relations strategy for our SMC program, which outlines goals, objectives, and measures of success for the 2020–2022 period. This was accompanied by an annual work plan that detailed specific activities that would be undertaken in 2020–2021 to support the continued success and scaling up of SMC in the countries we work in. Unfortunately, COVID-19 meant that many of the activities, such as workshops and meetings, could not be conducted as planned. Our advocacy efforts focused mainly on COVID-19 and are described in chapter 2.6 above. At the global level, Malaria Consortium co-hosted the annual global SMC planning and review meeting in Accra, Ghana, in February 2020.<sup>[66]</sup> The meeting brought together policy makers, SMC implementers, and funders working in the 13 countries that implemented SMC in 2019. Participants decided to formally set up the group — branded as the SMC Alliance — under the RBM Partnership’s Country/Regional Support Partner Committee. The new group will serve as a platform for the SMC community to compile information and learning about SMC and to discuss developments in SMC policy and practice. Over the course of the year, Malaria Consortium contributed to the development of terms of reference for the group, as well as the formation of an M&E subgroup. The group was formally launched during the 2021 annual meeting, which was held in March 2021. A subgroup for SMC research will also be created.

We also produced a high volume of communication outputs and publications, many of which are referenced throughout this report. To facilitate access to SMC-related resources and information, we improved the SMC pages on Malaria Consortium’s website and kept approximately 1,600 philanthropic donors up-to-date with four e-newsletters. We also secured coverage for our SMC program on external platforms including The Japan Times,<sup>[67]</sup> Daily Trust<sup>[68]</sup> and The Life You Can Save.<sup>[69]</sup> Finally, we produced and strategically disseminated a record number of publications to highlight the efficacy and value of SMC and strengthen Malaria Consortium’s reputation in the field. Many of these resources were translated into French and Portuguese to increase their reach and impact. The publications have been referenced in the relevant sections of this report. They can also be found in the publications database on Malaria Consortium’s website.<sup>[70]</sup>

### 3.6 Security

There is a significant security threat from extremist, criminal, and intercommunal violence in several areas where Malaria Consortium supports SMC implementation. It is generally accepted that there is a possibility that insecurity will increase across the Sahel region, but also in some areas in eastern and southern Africa. At present, these insecurities affect NGO activities in northern, eastern, and

southwestern Burkina Faso, northern Nigeria, in the Lake Chad area, northeastern Uganda, the Burkina Faso-Togo border and northeastern Mozambique. To manage the risk, Malaria Consortium’s teams have put in place local safety and security plans, staff movement protocols and standard operating procedures. We have invested in enabling team communication, security awareness and training. In 2020, we also strengthened our capacity to manage security risks by recruiting staff with a security focus in Burkina Faso, Chad, and Nigeria. In preparation for the 2021 SMC campaign, a work stream led by the Global Operations Manager has been tasked with developing a guide for SMC implementation in insecure contexts to support campaign planning and implementation. This initiative aims to ensure that SMC can continue to be implemented with minimal risk to implementers and with sufficient quality and accountability in areas that are considered medium and high risk, while leveraging local mechanisms to maintain high coverage.

## 4. Budget

The total expenditure of philanthropic funding used for SMC in 2020 was 31,373,016 million USD, around five percent less than the forecast submitted to GiveWell in June 2020 (**Table 14**). The philanthropic expenditure includes 723,949 USD received from Malaria Consortium’s US entity to support the procurement and freight of SPAQ for 470,000 children under one in two states supported with philanthropic funding (Jigawa and Kebbi).

**Table 14: Philanthropic funding for SMC 2020**

Budget line	Forecast (USD)	Expenditure (USD)	Variance (USD)	Variance (percent)
Burkina Faso	5,867,742	6,240,469	372,727	6
Chad	5,184,646	4,928,341	-256,305	-5
Nigeria	15,163,669	14,262,202	-901,467	-6
Togo	250,000	111,101	-138,899	-56
Mozambique	340,257	418,523	78,266	23
Above-country <sup>a</sup>	2,047,536	1,476,534	-571,002	-28
Research	659,328	523,008	-136,320	-21
External relations	108,889	51,443	-57,446	-53
Management fee (12 percent)	3,554,648	3,361,395	-193,253	-5
<b>TOTAL</b>	<b>33,176,715</b>	<b>31,373,016</b>	<b>-1,803,699</b>	<b>-5</b>

<sup>a</sup> International freight costs are shown on the above-country line as this is where they had been included in the forecast. In the detailed financial report and going forward, we will include freight costs on the respective country lines.

The variance between forecast and actual expenditure was primarily COVID-19 related. At the time of forecasting, not all quantification assumptions for COVID-19 related commodities had been worked out in detail and we assumed generally high costs given the global demand for those items. We also assumed that many items would need to be procured internationally (included on the above-country line). However, our procurement teams were able to rationalize procurement assumptions and secure reasonable prices, almost exclusively on national markets. In most cases,

the COVID-19 related expenditure was therefore substantially lower than anticipated. In Burkina Faso, on the other hand, additional training costs to accommodate COVID-19 rules on the maximum number of participants were underestimated.

At the time of forecasting, we optimistically expected that travel restrictions would be lifted during the second half of 2020. As restrictions very much remained in place, only minimal travel costs were incurred, which contributed to the underspend on the above-country, research, and external relations lines. As described above, COVID-19 affected our ability to recruit staff in Togo and provide support at the expected level, which meant the expenditure in that country was less than anticipated. In Mozambique, we underestimated the share of the annual SMC campaign budget that would be spent by December. Note however, that the SMC campaign in Mozambique does not align with the calendar year.

Malaria Consortium received a total of 261,333 USD of funding from UK aid for SMC in Jigawa state through the SuNMaP 2 project. A Bill & Melinda Gates Foundation grant for SMC research activities in Mozambique started in October 2020. However, it covers activities to be carried out in 2021 and no expenditure was incurred in 2020.

Malaria Consortium also received funding from the Global Fund to implement SMC in three states in Nigeria. This is not reported here, as Global Fund funding was used exclusively in those states. We also do not report SMC funding from the Global Fund and UNICEF in Togo, as those funders' contributions to SMC are provided directly to the PNLP.

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# Appendix 1: SMC glossary

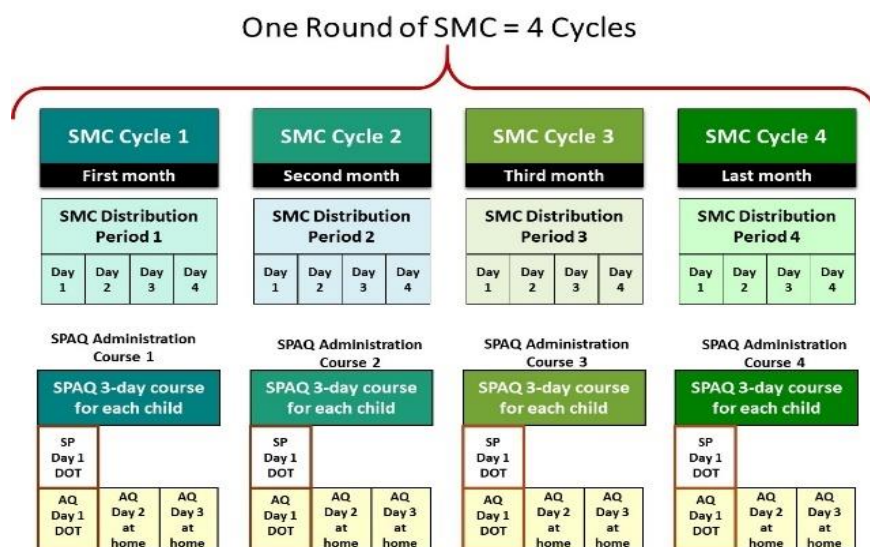
## SMC terminology

- **Seasonal malaria chemoprevention (SMC):** The intermittent administration of full treatment courses of an antimalarial medicine during the malaria season to prevent malarial illness with the objective of maintaining therapeutic antimalarial drug concentrations in the blood throughout the period of greatest malarial risk.

Currently, the antimalarial medicine is full three-day courses of SPAQ administered to children 3–59 months. The type of antimalarial medicine and age range could change in the future.

- **SPAQ:** A combination of the antimalarial medicines sulfadoxine-pyrimethamine (SP) plus amodiaquine (AQ) given during SMC to prevent malaria.
- **SPAQ dose range:** There are two child dose ranges of SPAQ:
  - infant dose for 3–<12 months: SP 250 milligrams (mg)/12.5mg and AQ 75mg
  - child dose for 12–59 months: SP 500mg/25mg and AQ 150 mg
- **SPAQ course:** A period of three days in which a full course of SPAQ is given. Each eligible child is given one course of SPAQ each cycle.
- **SPAQ co-blister pack:** One dispersible tablet of SP and three dispersible tablets of AQ in one co-blistered packet. Each blister pack contains one full course of SPAQ. One tablet of SP and one tablet of AQ are dispersed together in water and administered on day one of each course. The other two tablets of AQ are given to the caregiver to disperse and administer daily on day two and day three.
- **SMC cycle:** A one-month interval between each course of SPAQ.
- **SMC distribution period:** The number of days within each cycle when SPAQ is administered to eligible children.
- **SMC round:** The total number of SMC cycles in one year, which corresponds with the high transmission season for malaria. **Figure 12** shows a typical round of SMC comprising four SMC cycles.

Figure 12: A typical round of SMC



- **SMC delivery:** The processes and interventions required to safely administer SPAQ to eligible children each cycle. They include planning, enumeration, procurement of commodities and supply management, training, community engagement, SPAQ administration, case management and pharmacovigilance, supervision, safeguarding, and M&E.
- **Enumeration:** Determining the number of children 3–<12 months and 12–59 months in SMC targeted areas. Enumeration is part of the planning process.
- **Quantification:** Determining the quantity of SPAQ and SMC commodities required for the SMC round.
- **SMC implementation plan:** A written plan which outlines an estimate of human, logistics and financial resources required to implement all SMC activities. It also includes a plan for procurement and supply management, training, supervision, pharmacovigilance, security, risk preparedness, and M&E.
- **SMC delivery method:** The method or scheme used to reach >95 percent of eligible children and administer SPAQ at monthly intervals. The delivery method can be door-to-door, at fixed locations in the community or health facility, or coupled with other community health interventions.
- **Door-to-door delivery:** A method of delivering SMC by community distributors in the child’s household.
- **Fixed-point delivery:** A method of delivering SMC at a central location by community distributors or health facility workers, such as a health facility, school or central community location.
- **SMC campaign:** The period when all SMC activities are implemented in a given year and location. It begins with annual planning for SMC and ends when all data have been collected after the last cycle. The SMC campaign begins before the SMC round.

## SMC roles

- **Community distributor:** Community-based worker recruited and trained to administer SPAQ to eligible children during each SMC distribution period. Community distributors work in teams of at least two people.
- **Health facility:** Participating health facilities in each SMC catchment area. Several teams of community distributors report to a health facility.
- **Health facility worker:** Health workers working in SMC-selected health facilities are responsible for the stock management of SPAQ, case management of referred children, treatment of children with confirmed malaria, and administration of SPAQ to children who test negative for malaria. They are also responsible for completing the SMC tally sheet, SMC referral form, SMC daily summary form and SMC end-of-cycle report. In some cases, health facility workers are also responsible for supervising community distributors.
- **SMC supervisor:** Teams of community distributors are supervised during SMC distribution by SMC supervisors. Each SMC supervisor is responsible for a number of teams, observing the administration of SPAQ and providing constructive feedback, mentoring, and support. Each community distributor should receive supportive supervision at least once every SMC cycle. SMC supervisors and health facility workers are supervised by senior supervisors, for example from district or regional health authorities.
- **Town crier:** Individuals capacitated to mobilize and engage with communities before and during each SMC cycle to communicate the dates of the campaign and key messages about SMC.
- **SMC implementers:** All individuals involved in delivering SMC, including community distributors, supervisors, health facility workers, town criers, trainers, health authority, and Malaria Consortium staff.

## SMC forms

- **SMC tally sheet:** A daily log sheet used by community distributors to track the number of SPAQ doses given, re-dosed, and wasted. It is also used by health facility workers to track administrative coverage and drug accountability each day of each cycle.
- **SMC referral form:** A form given to the caregiver when a child is referred to the health facility during SMC. The health facility worker completes the bottom of the referral form at the health facility with the evaluation and outcome of the child's status.
- **SMC child record card:** A card given to the child's caregiver which tracks the total number of SPAQ tablets given each cycle.
- **Health facility daily summary form:** A form completed each day of the cycle by the health facility worker to summarize daily data from all tally sheets and referral forms in the health facility catchment area. Used to inform the end-of-cycle report.
- **End-of-cycle report:** A report completed by the health facility worker at the end of each cycle which summarizes the total number of children administered SPAQ by age group, re-dosed, and referred to the health facility SMC catchment area. Used to provide a summary of SPAQ stock reconciliation, wastage, and stock balance of blister packs at the end of each cycle.



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