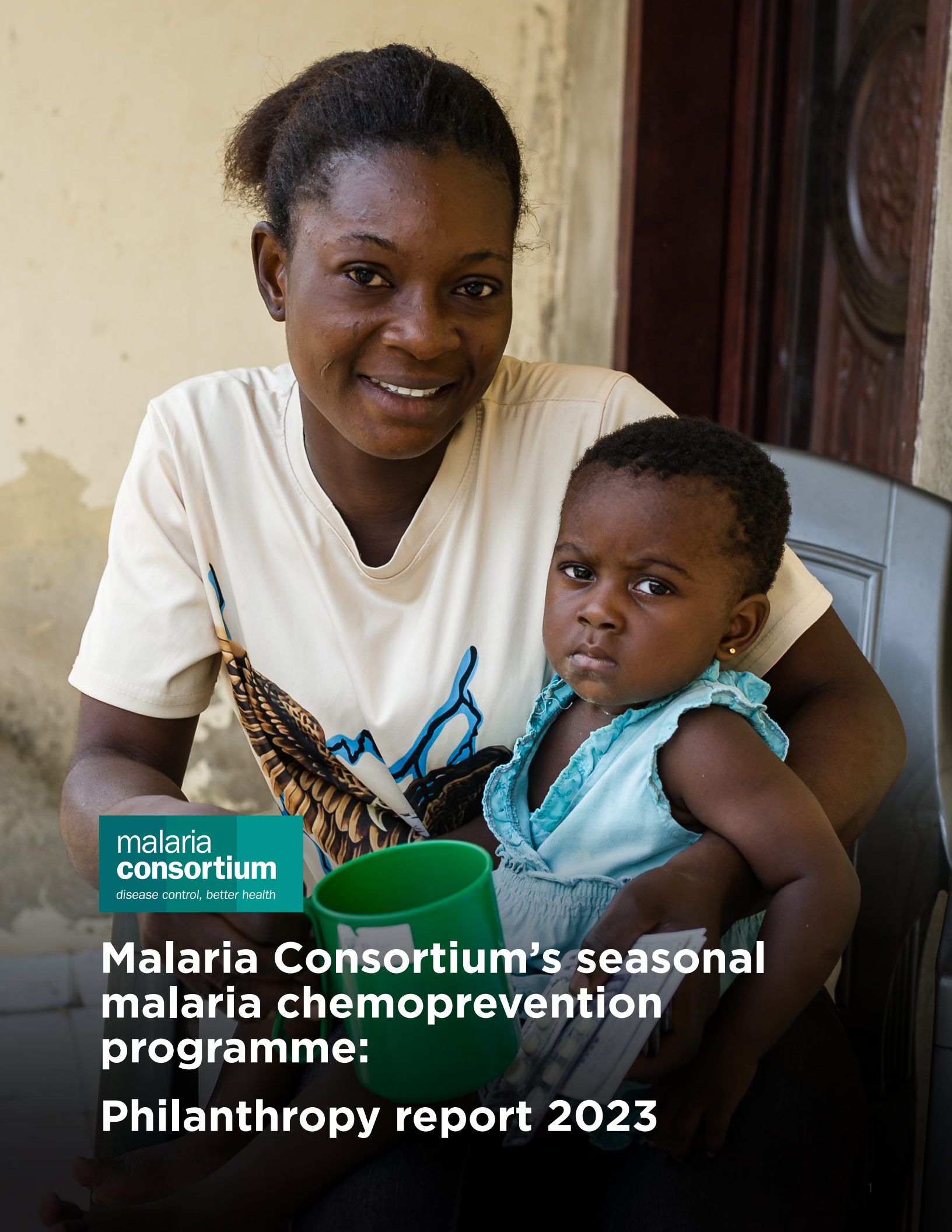

malaria consortium
disease control, better health

Malaria Consortium's seasonal malaria chemoprevention programme:

Philanthropy report 2023

April 2024

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Established in 2003, Malaria Consortium is one of the world's leading non-profit organisations specialising in the prevention, control and treatment of malaria and other communicable diseases among vulnerable populations. Our mission is to 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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Foreword

As we come to the end of Malaria Consortium's 20th anniversary year, it brings me immense pride to present our 2023 Seasonal Malaria Chemoprevention (SMC) Philanthropy Report. This report encapsulates the essence of our journey over the past 12 months, our impact, and our commitment to combatting malaria, a disease that continues to affect millions of lives globally.

Throughout the past two decades, Malaria Consortium has strived to be at the forefront of innovation and evidence-based interventions in global health. Our SMC programme stands as a testament to our dedication to translating evidence into tangible, scalable solutions — from the early feasibility studies in 2013 and 2014, to our leadership of the catalytic ACCESS-SMC programme, which saw SMC rapidly scaled up to reach around seven million children in the Sahel region in 2017. In 2023, our SMC programme supported SMC to 25 million children across seven countries, representing around half of the global total. We're so pleased with the role we have played at the forefront of this scale-up, working with national malaria programmes and other partners to reach as many eligible children as possible with this life-saving preventive treatment.

It is incredible that the progress made in scaling up SMC in recent years has taken place even amongst the challenges posed by the COVID-19 pandemic. As we reflect on this period, it is important to acknowledge the resilience and dedication of our teams in navigating through these unprecedented times, in partnership with national authorities in each of our countries of operation. In 2023, with the gradual lifting of procedures and restrictions imposed during the pandemic, we have been able to intensify our efforts to reach more communities in need.

Our focus on innovation and research continues to be a cornerstone of our work at Malaria Consortium. In 2023, key highlights from our research efforts include advancements in improving medicine adherence among target populations, the successful addition of a 5th cycle of SMC in some areas, generating robust data on drug resistance patterns and the integration of SMC with other health services, including Vitamin A supplementation. We also shared exciting findings from our implementation studies exploring the use of SMC in new geographies outside of the Sahel region. Looking ahead to 2024 and beyond, we recommit ourselves to this spirit of innovation. For example, there are exciting developments and opportunities in the field of malaria vaccines. We will see how malaria vaccines will become a vital new tool to combat the disease and how it will sit alongside SMC and other tools, including long-lasting insecticide treated nets, to help to drive down the malaria burden across all populations.

Finally, I would like to express our deepest gratitude to all our stakeholders who have made this progress possible. Our donors, governments, partners, communities, implementers, and supporters have played a pivotal role in advancing our mission and contributing to the success of our SMC programme in 2023. Their unwavering support and collaboration have been instrumental in creating transformational change and saving lives.

This report is a testament to our collective efforts and the impact we can achieve when we work together towards a malaria-free future.

Dr James Tibenderana

Chief Executive, Malaria Consortium

Executive summary

This report summarises how Malaria Consortium used philanthropic funding for seasonal malaria chemoprevention (SMC), either exclusively or in combination with other funding sources, in 2023. Philanthropic funding received for SMC is largely as a result of being awarded Top Charity status by GiveWell, a non-profit dedicated to finding outstanding giving opportunities. Malaria Consortium's SMC programme also benefits from the efforts of a range of philanthropic and fundraising groups around the world, as well as donations from individual philanthropists.

SMC is a highly effective community-based intervention to prevent malaria infections in areas where malaria morbidity and mortality are high and malaria transmission is seasonal. In those areas, malaria cases peak over a period of a few months every year, typically coinciding with the rainy season. SMC involves the intermittent administration of antimalarial medicines to populations at risk from malaria during this peak transmission season. The objective is to maintain therapeutic antimalarial drug concentrations in the blood throughout the period of greatest risk.

This report describes the rationale for SMC as a malaria prevention strategy and how the intervention continues to be improved and scaled where appropriate. It also discusses Malaria Consortium's role as an SMC implementing partner, describing how we work in close partnership with national malaria programmes to implement high-quality SMC campaigns, providing technical and logistical support across all SMC intervention components: administration of SMC medicines; planning and enumeration; procurement and supply management; community engagement; training; supervision; referral and pharmacovigilance; and monitoring and evaluation. We also discuss our work on SMC digitalisation, risk management and payments to SMC implementers, which cut across all intervention components.

In 2023, Malaria Consortium's SMC programme targeted over 25 million children in seven countries: Burkina Faso, Chad, Mozambique, Nigeria, South Sudan, Togo and Uganda. This represents just under half of all children targeted globally that year. Over 17 million children were targeted with philanthropic funding or co-funding. Additional funding for Malaria Consortium's SMC programme is provided by the Global Fund to Fight AIDS, Tuberculosis and Malaria and the Korea International Cooperation Agency.

SMC campaigns in each country are owned and led by their national malaria programmes, supported by Malaria Consortium, with nuances in each setting that are detailed in this report, alongside key achievements and challenges in areas where philanthropic funding was used. In total, across the seven supported countries, Malaria Consortium used philanthropic funding to procure around 81.7 million courses of SMC medicines in 2023. Philanthropic funding or co-funding also supported more than 190,000 SMC implementers involved in the delivery of SMC campaigns. According to administrative data, a mean of 17,440,950 courses of SMC medicines were distributed per cycle, representing administrative coverage of 102 percent. Household surveys showed more accurate coverage results ranging between 79 percent and 100 percent of children receiving SMC medicines per cycle.

With expertise in SMC implementation and research, Malaria Consortium is uniquely placed to contribute to the evidence base for SMC. We specialise in developing and assessing solutions to operational challenges that enhance the quality of SMC delivery, understanding how SMC influences estimates of malaria burden and testing innovative approaches that will shape the future of SMC. This integrated approach underscores our commitment to advancing both practical implementation and evidence-based strategies in malaria prevention and control. In 2023, Malaria Consortium's SMC research was published in a number of peer-reviewed journals and presented at national and international academic conferences. Research studies conducted in 2023 included studies to assess the impact of expanding SMC to new geographies; evaluating the role community leaders, role models and lead mothers can play in strengthening SMC implementation; and assessing caregiver knowledge of, and adherence to, SMC administration.

We also continue to engage at a national, regional and global level with malaria stakeholders as a part of our wider external relations plan for SMC. We remain an active member of the SMC Alliance, a workstream under the RBM Partnership to End Malaria's Country/Regional Support Partner Committee. In 2023, Malaria Consortium led on the production of a report published by the SMC Alliance marking 10 years of SMC implementation. Malaria Consortium has served as the secretariat of the SMC Alliance subgroups on research and communications and advocacy since 2022 and contributes to the subgroup on monitoring and evaluation.

The growth in scale of SMC in recent years, alongside the growing evidence base for SMC and the emergence of new malaria prevention tools including malaria vaccines and innovation in digitalisation and the integration of SMC with other health services, means that efforts to help define the future of SMC will continue to grow in 2024 and beyond.

Contents

Acronyms and abbreviations

ACCESS-SMC. Achieving Catalytic Expansion of Seasonal Malaria Chemoprevention in the Sahel

AL. . . . . artemether-lumefantrine

AQ . . . . . amodiaquine

ASAQ . . . . . artesunate-amodiaquine

ASTMH . . . . American Society of Tropical Medicine and Hygiene

CI . . . . . confidence interval

COVID-19. . . coronavirus disease

cRCT . . . . . cluster-randomised controlled trial

DNA . . . . . deoxyribonucleic acid

DOT . . . . . directly observed therapy

DP. . . . . dihydroartemisinin-piperaquine

eGov . . . . . eGovernments Foundation

EPI. . . . . Essential Programme on Immunisation

FCT. . . . . Federal Capital Territory

FGD. . . . . focus group discussion

Global Fund. . Global Fund to Fight AIDS, Tuberculosis and Malaria

iCCM. . . . . integrated community case management

IDPs. . . . . internally displaced people

IRO . . . . . independent research organisation

KII. . . . . key informant interview

KOICA . . . . . Korea International Cooperation Agency

LGA. . . . . local government area

M&E . . . . . monitoring and evaluation

MNCHW . . . Maternal, Newborn and Child Health Week

MSF. . . . . Médecins Sans Frontières

NMCD. . . . . National Malaria Control Division

NMEP . . . . . National Malaria Elimination Programme

OR . . . . . odds ratio

PhD. . . . . Doctor of Philosophy

PMI. . . . . U.S. President's Malaria Initiative

PNCM . . . . . Programa Nacional de Controlo da Malária

PNLP . . . . . Programme National de Lutte contre le Paludisme

RDT. . . . . rapid diagnostic test

SMC . . . . . seasonal malaria chemoprevention

SP . . . . . sulfadoxine-pyrimethamine

SPAQ. . . . . sulfadoxine-pyrimethamine plus amodiaquine

UK . . . . . United Kingdom

UNICEF . . . . United Nations Children's Fund

US. . . . . United States

USD. . . . . United States dollar

VAS. . . . . vitamin A supplementation

VHT . . . . . village health team

WHO. . . . . World Health Organization

1. Introduction

Malaria Consortium is a leading implementer of seasonal malaria chemoprevention (SMC), a highly effective community-based intervention to prevent malaria infections in areas of seasonal malaria transmission. The majority of the organisation's funding for SMC comes from philanthropic sources. This includes grants and 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,[1,2] a non-profit dedicated to finding outstanding giving opportunities and publishing the full details of its analysis to help donors decide where to give. Donors support SMC by donating through Malaria Consortium's website, through GiveWell's website or a range of other organisations including The Life You Can Save and national Effective Altruism organisations.

This report is primarily intended for philanthropic donors who have supported or are considering supporting Malaria Consortium's SMC programme.

Chapter 2 describes the rationale for SMC as a malaria prevention strategy and recounts how the intervention has been scaled up over the last decade.

Chapter 3 discusses Malaria Consortium's role as an SMC implementing partner, describing how we work in close partnership with national malaria programmes to implement high-quality SMC campaigns.

Chapter 4 provides an overview of Malaria Consortium's SMC portfolio in 2023, irrespective of funding source.

Chapter 5 describes SMC delivery in areas where Malaria Consortium used philanthropic funding or co-funding, highlighting achievements and challenges in each of the seven countries we supported in 2023: Burkina Faso, Chad, Mozambique, Nigeria, South Sudan, Togo and Uganda. While top-level coverage results are presented, a more detailed summary of coverage and quality indicators from all areas where Malaria Consortium supported SMC delivery with philanthropic funding or co-funding in 2023 can be found in a separate report.[3]

Chapter 6 describes Malaria Consortium's contribution to research, including the different types of SMC research we undertake. We describe examples of Malaria Consortium's SMC research and publications arising from this work.

Chapter 7 summarises Malaria Consortium's SMC external relations work, including SMC-related communications, publications and advocacy.

Chapter 8 provides an overview of philanthropic SMC expenditure in 2024, as well as contributions to Malaria Consortium's SMC work from other funders.

2. Seasonal malaria chemoprevention

In 2022, the Africa region, as defined by the World Health Organization (WHO), accounted for 94 percent of the 249 million cases of malaria globally and 95 percent of the 608,000 deaths. Children under five are most susceptible to the disease and the potentially severe consequences, accounting for 80 percent of these deaths. This translates to over a thousand young lives lost daily and underscores the critical need for preventive measures and treatment for malaria.[4]

In many areas of the African continent, malaria transmission follows a seasonal pattern, with malaria cases peaking over a period of a few months every year, typically coinciding with the rainy season. SMC involves the intermittent administration of antimalarial medicines to children belonging to age groups at high risk of severe malaria during this peak transmission season. The objective is to maintain therapeutic antimalarial drug concentrations in the blood throughout the period of greatest risk.

SMC has been recommended as a malaria prevention strategy by the WHO since 2012,[5] initially focusing on children 3–59 months as this age group is generally most affected by malaria illness and deaths. Based on a meta-analysis of trials conducted over the previous decade,[6] it was estimated that SMC could prevent 75 percent of uncomplicated and severe malaria cases in children under five. A combination of two antimalarials was recommended for use in SMC: sulfadoxine-pyrimethamine (SP) and amodiaquine (AQ), with a full therapeutic course of SP plus AQ (SPAQ) expected to confer a high degree of protection from malaria for approximately 28 days.[7] For uninterrupted protection, SPAQ therefore needs to be administered monthly during the peak transmission season. The initial policy recommendation was for annual SMC rounds comprising four monthly SMC cycles — beginning at the start of the transmission season, with a full therapeutic course of SPAQ given each cycle. SMC was not recommended in areas where the therapeutic efficacy of SPAQ is below 90 percent due to parasite resistance.[5] Consequently, the Sahel region of West and Central Africa was prioritised for the scale-up of SMC as resistance to SPAQ in the region was assumed to be low. To support national malaria programmes in rolling out the intervention, the WHO published a field guide in 2013, which provided technical information and operational tools to inform decision-making on how and where SMC should be implemented.[8] The recommendation to deploy SMC in suitable areas was reinforced in the WHO's Global Technical Strategy for Malaria 2016–2030.[9]

Between 2015 and 2017, the Achieving Catalytic Expansion of SMC in the Sahel (ACCESS-SMC) project, funded by Unitaid and led by Malaria Consortium, accelerated the scale-up of SMC across the region. At its peak, ACCESS-SMC reached close to seven million children in Burkina Faso, Chad, The Gambia, Guinea, Mali, Niger and Nigeria. The project also contributed towards building the evidence base for SMC as a safe and effective intervention when implemented at scale.[10] Case-control studies in the seven ACCESS-SMC countries showed that SMC under programmatic conditions provides high levels of protection comparable to those found in trial settings, with an average protective effectiveness of 88 percent against clinical malaria over a 28-day period.[11] The weighted average economic cost of administering four monthly SMC cycles was estimated at 3.63 United States dollars (USD) per child, with economic cost savings to ACCESS-SMC countries' health systems through reducing the cost of malaria diagnosis, treatment and hospital admissions.[12]

SMC has since been embraced and further scaled up by governments, with support from donors such as the Global Fund to Fight AIDS, Tuberculosis and Malaria (Global Fund), the U.S. President's Malaria Initiative (PMI), the United Nations Children's Fund (UNICEF), UK aid from the UK government, Médecins Sans Frontières (MSF), the Korea International Cooperation Agency (KOICA) and philanthropic funding for Malaria Consortium's SMC programme. In 2022, 10 years after WHO issued the initial policy recommendation, SMC was implemented in 17 countries, targeting 49 million children.[13]

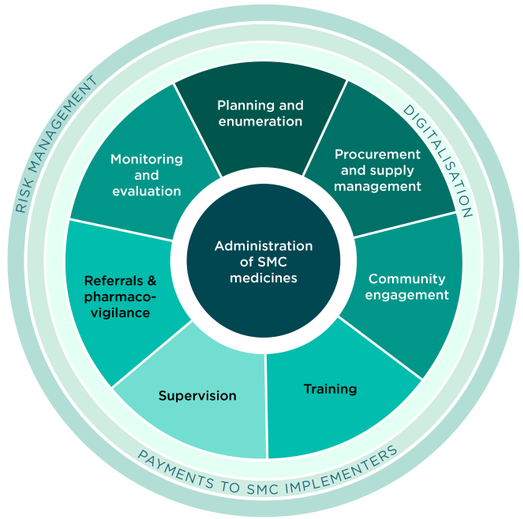
Also in 2022, the WHO published revised Guidelines for Malaria,[14] which encourage national malaria programmes to expand access to chemoprevention, including SMC. The guidelines provide greater flexibility to malaria-endemic countries to adapt malaria strategies to their specific context and epidemiology, emphasising the importance of local evidence and determining the optimal mix of interventions at the subnational level. Many countries have conducted systematic, evidence-based stratification exercises to determine the optimal mix of malaria interventions in different locations, taking into account epidemiological characteristics such as malaria prevalence, incidence and all-cause mortality among children under five, as well as measures of seasonality, urbanisation and access to healthcare. For SMC, the guidelines no longer define geographic restrictions and they provide greater flexibility in recognising age-based risk.[15] This means that SMC can now be considered in areas outside of the Sahel where malaria transmission is seasonal. In principle, SMC could also be extended to children over five where there is evidence that they are at high risk of severe malaria. The guidelines state that malaria programmes should assess the suitability of SMC based on the local malaria epidemiology and available funding.

In 2023, the WHO published an updated SMC field guide, which provides further operational guidance on the deployment of SMC.[16] It confirms SPAQ as the drug regimen of choice and identifies areas that are suitable for SMC as those where 60 percent of clinical malaria cases occur during a maximum of four months. The number of SMC cycles to be implemented per annual round should be between three and four, depending on the duration of the high transmission season.

3. Malaria Consortium as an SMC implementing partner

SMC is implemented through annual community-based campaigns under the leadership of national malaria programmes and through countries' existing health system structures. As systems, requirements and context differ, Malaria Consortium's role in supporting SMC varies from country to country. In general, we support countries in delivering high-quality SMC across all the components that together make up SMC as a public health intervention (Figure 1): administration of SMC medicines; planning and enumeration; procurement and supply management; community engagement; training; supervision; referral and pharmacovigilance; and monitoring and evaluation (M&E). We also support efforts to digitalise SMC, payments to SMC implementers and risk management, which cut across all components of the intervention.

Figure 1. SMC intervention components



3.1 Quality delivery of SMC

Quality and continuous quality improvement are central to our role as an SMC implementing partner. We conceptualise the quality of SMC delivery as the extent to which it is safe, efficacious, timely, efficient, equitable and people centred.[17] Our approach is guided by an SMC quality framework, which defines 10 quality standards (Figure 2). While the framework is operationalised differently in different countries, the standards serve as benchmarks that, if followed well and consistently, ensure high-quality delivery of SMC.

Figure 2. SMC quality standards

1. Complete an SMC plan four months prior to each SMC round, which includes enumeration of targeted children and human resource capacity needs such as training and supervision, quantification of commodities and expected budget
2. Procure sufficient quality-assured SPAQ in time to be available at least two weeks before the start of the SMC round and ensure its continued availability until the end of the round
3. Procure and manage the supply and accountability of all SMC commodities and tools before, during and after each SMC cycle
4. Sensitise 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 round
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, maintaining 28-day intervals between cycles
7. Fully assess, treat and record all children referred for testing and treatment during SMC
8. Supervise, monitor and report on the performance of each community distributor team once per cycle
9. Conduct routine monitoring and evaluation 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

One dimension we are considering when thinking about equity is the role gender plays in SMC delivery. Spotlight 1 outlines how gender and SMC delivery intersect at the household, community and health system level.

SPOTLIGHT 1:

Gender and SMC

Gender relates to the socially constructed characteristics, roles, attitudes, behaviours and opportunities attributed to men and women. The role of gender in mass campaigns is often overlooked and under-conceptualised. Reflecting on the intersection of gender and SMC can result in valuable insight to SMC programming and research.

Why does gender matter for SMC?

In the household. Caregivers play a crucial role in administering the SMC medicines to their children. Division of labour, gendered roles within the household and societal norms attached to gender can determine who is at home at the time of SMC distribution, who administers SMC medicines to children and how the decision to give SMC medicines to children is made. Existing gendered dynamics can also influence gendered outcomes of SMC, such as what benefits are experienced by whom, potential opportunity costs and gaps.

In communities. Ensuring equitable access to SMC in target communities entails accounting for and addressing potential social, cultural and economic barriers that could limit reach, access to and participation in SMC. Gendered societal norms can, for instance, influence who accesses information about SMC, what communication channels are the most effective in any given community and who is able to participate in the programme.

In the health system. Various levels of the health system, including community health workers and facility-based health workers, are involved in SMC delivery. Community health workers sometimes serve as community distributors and often act as community sensitisers, and health workers at facilities often act as SMC supervisors. Gender norms can influence who is part of the health workforce, at what level, and what opportunities and gaps they experience.

In the SMC programme. Meaningfully considering gender in SMC programming can lead to gender-sensitive and potentially gender-transformative adaptations. Conversely, lack of awareness of gendered gaps, barriers and outcomes of SMC can risk exacerbating existing gender inequalities.

Case study: Gender and SMC in Karamoja, Uganda

A recent qualitative study conducted by Malaria Consortium in Karamoja, Uganda, found that the type of benefits experienced with SMC were often related to gendered roles within households and communities. For instance, mothers were seen as having a central role in childcare, which also entailed caring for sick children and taking them to health facilities in case of sickness. With the perceived reduction in child malaria illness, which many participants ascribed to SMC, female caregivers were reported to benefit from decreased health facility visits and increased productive time. Fathers, largely seen as the main financial providers, were reported to benefit from decreased health expenditures, which, in the pastoralist context of Karamoja, meant that they did not have to sell cattle to raise money. On the other hand, some potential gendered gaps were identified, such as low male engagement in SMC and concerns over reliance on female caregivers for SMC administration in the households, and delays in their work and chores as a result.

To address the identified gaps, Malaria Consortium will work to ensure involvement of male caregivers in SMC sensitisation activities and consider introducing referral pathways to support services for people experiencing intimate partner violence.

Continuous quality improvement requires that quality be measured, and lessons learnt be documented and disseminated. At the country level, this includes regular review meetings that bring together SMC stakeholders to reflect on quality of SMC delivery and how quality can be improved. Malaria Consortium SMC country teams are encouraged to establish and monitor quality improvement plans. In 2024, with the help of a new Senior Quality Advisor, we plan to review and update our SMC quality framework, as well as facilitate the exchange of learning and good practice across countries we support.

3.2 SMC intervention components

3.2.1 Administration of SMC medicines

The community-based distribution of SMC medicines by community distributors is at the heart of SMC. Some community distributors are community health workers who are trained to provide basic health services at the community level. In most countries, however, the majority of community distributors are volunteers recruited and trained specifically for the SMC campaign. Community distributors typically work in pairs, going door-to-door to identify eligible children and administer SMC medicines. Typically, this process is coordinated by health facilities, whose catchment areas serve as the functional unit of SMC delivery.

Most healthy children aged between three and 59 months are eligible for SMC, except those who are allergic to the medicines and those who received SP or AQ from any other source than SMC within the past month. There are two age-based SPAQ dosing regimens: a lower-strength regimen for infants 3–<12 months and a higher-strength regimen for children 12–59 months. A full course of SPAQ is given over three consecutive days. On the day of the community distributors' visits to households, 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 therapy (DOT). The remaining two doses of AQ are given to the caregiver to administer once daily over the next two days. During their visit to households, community distributors will share basic health messages with caregivers, including reminders to administer the full course of SPAQ to their children. They also encourage uptake of other malaria prevention and control interventions, including for household members not covered by SMC, such as the use of mosquito nets.

In a given area, SMC medicines are typically distributed to the target population over a period of four or five days each cycle. This is called the 'distribution period'. All SMC cycles in a given year are referred to as a 'round' of SMC. While the vast majority of SMC medicines are distributed using this approach, in a few contexts, for example urbanised areas, fixed-point strategies may be employed, which involve the distribution of SMC medicines in highly frequented locations such as marketplaces or places of worship.

3.2.2 Planning and enumeration

Planning for SMC typically begins around five months before the start of the annual SMC round. This involves agreeing campaign modalities at the central level, as well as reflecting on lessons learnt in previous years to inform adaptations to the SMC intervention tools and protocols. The planned start date of the annual SMC round is also agreed during the planning stage, ideally just before the anticipated start of the high transmission season, based on a review of historical malaria case and rainfall data. To ensure alignment across the health system, it is important that a broad range of government stakeholders are involved in SMC planning, including, for example, the primary healthcare departments that oversee service provision at health facilities, authorities in charge of pharmacovigilance and those responsible for medical supplies.

Micro-planning at the subnational level is conducted about four months before the start of the SMC round. This includes quantifying the commodities and determining the number of SMC implementers needed at the local level, as well as developing detailed budgets and work plans.

3.2.3 Procurement and supply management

SMC campaigns depend on the timely availability of appropriate quantities of commodities. In addition to SPAQ, this also includes, for example, branded T-shirts, hijabs, bags and pens for use by community distributors and supervisors. While SPAQ is procured internationally, other commodities are typically sourced in the country where they will be used. As a UK-based organisation, Malaria Consortium's drug and medical supply chain management is subject to Good Distribution Practice regulations and standards set out by the UK Medicines and Healthcare Products Regulatory Agency. For example, we procure SPAQ only from manufacturers who have been assessed by the WHO and found to be acceptable for procurement by UN agencies.

At the country level, commodities are usually transported using existing health system supply chain mechanisms. Supply chain management activities Malaria Consortium supports at the country level generally include the transport to suitable warehouses, last-mile distribution to the health facility level, reverse logistics — the return of unused commodities to central warehouses after SMC distribution — and stock reconciliation. A blog post on Malaria Consortium's website outlines the steps involved in managing the transport of SMC medicines from the manufacturers to the local level in more detail.[18] Spotlight 2 describes how Malaria Consortium supports the management of SMC commodities in Nigeria.

SPOTLIGHT 2:

Supply chains management in Nigeria

Effective supply chain management of SMC commodities ensures timely availability of SMC medicines and other commodities. It also ensures accountability for all commodities deployed during the campaign. While SMC medicines are procured internationally, other commodities are sourced from Nigerian suppliers. We refer to the transport of commodities from the port of entry or the suppliers' sites to state-level central medical stores as long-haul distribution. Usually, we outsource long-haul distribution to third-party logistics providers. Commodities are stored at the central medical stores in preparation for SMC distribution.

The quantity of commodities required in the catchment area of each health facility that participates in SMC coordination is determined during the micro-planning stage. Based on this information, we develop a last-mile distribution plan for each cycle. As SPAQ is produced in cartons of 50 blister packs, we round up the quantities we need to transport to each health facility accordingly. We also often add a buffer of five to 10 percent to account for unexpected target population increases. Starting with cycle 2, we factor consumption data from previous cycles into the quantification of commodities that need to be made available at the health facility level.

We aim to make SMC commodities available at the health facility level at least three days before the start of the distribution period of each cycle. National Issues and Receipt Vouchers are completed to document the receipt of SMC commodities at health facilities. We carry out spot checks to validate that commodities have arrived at the required quantities and that they are in adequate condition.

On SMC distribution days, community distributors visit health facilities as early as eight o'clock in the morning, where they receive commodities from health workers. Usually, community distributors work in pairs, with each pair receiving 80 blister packs of SPAQ. At the end of the distribution day, the teams come back to the health facility to return any unused commodities. In most of the areas we support, the distribution period lasts four days per cycle, which means the community distributors aim to reach all eligible children in a given health facility catchment area over a period of four days.

At the end of the distribution period of each cycle, all remaining SMC commodities are transported from health facilities to state medical stores. Stock reconciliation exercises are conducted, which involve physical stock counts and comparing the quantity of commodities received, consumption recorded and quantity of commodities returned.

Malaria Consortium adopts a range of measures to minimise the risk of stock-outs and disruption of SMC campaigns due to supply chain issues, including long procurement lead time, uncertain target population figures and shipping delays.

Long procurement lead time

While manufacturers' production capacity has increased over the years, so has the global demand for SPAQ. The manufacturing lead time can be up to 10 months and, consequently, orders should ideally be placed around one year before the anticipated start of the annual SMC round.

Uncertain target population figures

As more granular target population figures are typically only produced during micro-planning a few months before the start of the round, approximate target population estimates need to be used to estimate the required quantities of SPAQ by age band. Assumptions about wastage — for example, when a blister pack is damaged during SMC distribution — and an appropriate buffer to mitigate the risk of stock-outs due to, for example, population movement, are also considered.

Shipping delays

Currently, there are no manufacturers of quality-assured SPAQ in SMC-implementing countries. Once the medicines have been produced, they therefore need to be transported to the countries where they will be used, preferably by sea owing to the lower freight cost, or by air at a higher cost if the consignment is required at short notice. Sea freighting in particular can be affected by global supply chain constraints. In recent years, the coronavirus disease (COVID-19) pandemic, the war in Ukraine and the crisis in the Red Sea have all contributed to global shipping disruptions, labour shortages and port congestion,[19] resulting in longer delivery times and increased cost.

In areas where Malaria Consortium's SMC support is confirmed for at least two years, we sometimes opt to procure sufficient stock, not only for the next annual round but also the first cycle of the following round, to minimise the risk of procurement or supply-chain-related delays or stock-outs. We refer to this strategy, which also minimises the need to resort to more costly air freighting, as 'pre-positioning' of commodities. This is facilitated by the comparatively long shelf life of SPAQ and the strong supply chain processes countries have put in place to ensure that medicines are used before their expiry date. Those processes are commonly referred to as 'first-expire-first-out'.

3.2.4 Community engagement

Community engagement refers to the active participation of people and communities in health campaigns. The aim is to ensure that their voices are heard and their active contribution to decision-making is safe, equitable and effective. Community engagement is an important component of SMC campaigns to ensure high acceptability of the intervention among communities, as well as to encourage adherence to the three-day SPAQ administration protocol by caregivers. Activities typically include sensitisation meetings with local leaders, radio spots, and town announcers disseminating relevant information before and during the campaign. The process of selecting community distributors is led by the community, and distributors typically operate in the communities in which they live. Selection criteria for community distributors typically include that they should be available for the entire round, commit to attending trainings, and that they have basic literacy and numeracy skills. Gender is also often taken into account, depending on local norms and customs. For example, in some areas, only female community distributors are allowed to enter households. In some countries, influential community members are formally involved in SMC distribution. For example, they attempt to persuade caregivers who have refused to accept SMC medicines for their children, or they systematically visit households on the day after the distributors' visit to remind caregivers to administer the remaining AQ doses.

3.2.5 Training

SMC implementers are trained through a cascade model beginning at the central 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, field supervisors and town announcers are typically trained at the health facility level just before the start of the round. SMC training includes modules on identifying eligible children and ensuring that those who are not eligible do not receive SMC medicines, referring sick children to a health worker, administering SPAQ safely, recording SPAQ administration, interpersonal communication and safeguarding. In some countries, separate trainings are conducted on supply chain management and health education.

3.2.6 Supervision

During SMC distribution, community distributors are assisted by field supervisors who receive more in-depth training on supervision and mentoring skills. Supervision is typically coordinated by facility-based health workers, sometimes with support from community health workers. Malaria Consortium staff and local, regional and central health authorities also support SMC supervision.

3.2.7 Referral and pharmacovigilance

Children who have a fever or are unable to take oral medication should not receive SPAQ from community distributors, but will be referred to a qualified health worker — either a facility-based health worker or a community health worker — who will test for malaria infection using a rapid diagnostic test (RDT). Children who test negative for malaria will receive SPAQ from the health worker. Those who test positive for malaria infection do not receive SPAQ. Instead, they will be treated with effective antimalarial medicines according to country guidelines.

While severe adverse events following administration of SPAQ are very rare, they do occur. Affected children need to be seen and assessed by a health worker. Mild side effects such as vomiting are more common. All adverse events are reported via the pharmacovigilance systems countries have put in place and are followed up according to country guidelines.

3.2.8 Monitoring and Evaluation

We undertake M&E activities to track the performance of our SMC portfolio and to inform decision-making and priority-setting. Our M&E approach is guided by a comprehensive M&E framework for SMC, which facilitates the assessment of the outcomes of our work and the effectiveness of our processes. The framework assesses the relationship between different aspects of SMC implementation and the expected results, while also accounting for external factors that can affect SMC or our ability to measure impact. A summary of the framework and how it was developed was recently published in the Malaria Journal.[20] The framework has informed an SMC M&E toolkit that has been published by the M&E subgroup of the SMC Alliance,[21] which in turn has been incorporated into the M&E section of the WHO SMC field guide.[16]

Administrative programme data — including households visited, SPAQ administered to eligible children on day 1, and children referred to health facilities — are collected by community distributors during SMC distribution. To calculate administrative coverage, the number of day 1 SPAQ doses as recorded by community distributors is divided by the estimated target population. It is not uncommon to find administrative coverage of over 100 percent, for example where SMC target population figures underestimate the true under-five population or where community distributors incorrectly administer SPAQ to children over five but record this as administration to children under five.

To identify areas that do not meet certain coverage or quality targets, Malaria Consortium routinely conducts end-of-cycle household surveys using the lot quality assurance sampling methodology, following all but the final SMC cycle. The objective of those surveys is to support data-informed decision-making by identifying issues in SMC delivery and providing a starting point to engage with local and national stakeholders to take corrective actions to improve SMC delivery in subsequent cycles. A poster

presented at the 2023 annual meeting of the American Society of Tropical Medicine and Hygiene (ASTMH) discusses how the end-of-cycle surveys were used to improve coverage and quality as SMC was rolled out to new districts in Mozambique.[22]

Following the end of the annual SMC round, we commission comprehensive and nationally representative end-of-round household surveys to estimate SMC coverage and to measure aspects of the quality of SMC implementation across all cycles. End-of-round surveys are conducted by independent survey providers and serve as an external validation of our work. They also provide insights that can be used to inform improvements in subsequent SMC campaigns. A poster presented at the ASTMH conference in 2023 illustrates how comparing end-of-round survey data from two years was used to evaluate how SMC in Uganda had transitioned from a small research project in two districts in 2021 to routine implementation across a subregion in 2022.[23]

3.3 Cross-cutting implementation components

3.3.1 Digitalisation

Digital tools have the potential to transform the way health campaigns like SMC are delivered, by strengthening campaign quality, efficiency, accountability, equity and cost-effectiveness. There are multiple use cases for digital tools in SMC (Table 1), cutting across most intervention components and supporting overall campaign management and oversight.

Table 1. Potential benefits of digitalising SMC

SMC intervention component	Potential benefits of digitalistion
Administration of SMC medicines	Maximise efficiency through real-time tracking of administrative data Strengthen equity and access to SMC among hard-to-reach populations by enabling timely identification of areas of low coverage Track administration of SMC medicines to individual children over time
Planning and enumeration	More accurate target population estimates through geo-enabled enumeration Creation of detailed operational plans based on geo-referenced enumeration data Minimise duplication across health campaigns
Procurement and supply management	More precise stock inventory and increased accountability through tracking of commodities Ensure availability of adequate quantities of commodities, avoiding stockouts or overstocking
Community engagement	Reach larger audience with engaging content and messaging Ability to evaluate demand generation effectiveness and adapt activities accordingly
Training	Measure and track knowledge improvements Remote access to training materials
Supervision	Tracking of supervision engagements Deployment of supervision resources in underperforming locations
Referral and pharmacovigilance	Tracking of patient referral and treatment Tracking of adverse events
M&E	Enable data-driven decision-making based on real-time data
Payments to SMC implementers	Increased accountability through cashless payment solutions, ensuring that payments are made only to individuals who participated in SMC activities and only for days when they were actively involved in the SMC delivery Ensure timely payment of SMC implementers

Malaria Consortium believes that efforts to digitalise SMC can only be sustainable if they are based on an overarching digital architecture that aims to enable multi-use, integrated approaches across different health campaigns, case management and surveillance, as well as interoperability with routine health management information system platforms. We therefore discourage standalone digitalisation initiatives that focus exclusively on SMC and the development of siloed digital solutions. Instead, we support our partners in developing coherent digital strategies and building SMC use cases as part of broader digitalisation initiatives. Spotlight 3 illustrates two examples of digitalisation initiatives Malaria Consortium supported in 2023.

SPOTLIGHT 3:

Examples of Malaria Consortium's work on SMC digitalisation

Malaria Consortium has been working closely with the National Malaria Control Programme — Programa Nacional de Controlo da Malária (PNCM), the Bill & Melinda Gates Foundation and eGovernments Foundation (eGov) to develop a digital SMC tool for eGov's DIGIT health campaign management platform in Mozambique. The platform, known as Salama in Mozambique, is a free, open-source product that uses modular, configurable building blocks, which means it can be adapted and scaled for campaigns across multiple diseases. It was adopted by the PNCM initially for use in mosquito net campaigns and SMC, but with the intention to expand to other health areas in the future. Malaria Consortium participated in several design workshops that informed the development of the tool and is a member of a PNCM-led technical working group that steers decisions around the scope, training approach and implementation plan. Our main responsibility is to ensure that SMC forms, processes and data flows are reflected in the new tool, including the registration of households and children, SPAQ administration, recording of suspected adverse events, inventory tracking, as well as some monitoring and supervision functions. User acceptance testing was conducted in November 2023, with only minor required changes identified.

Malaria Consortium was also consulted on the longer-term roadmap for the DIGIT platform. A delegation from Malaria Consortium attended a workshop hosted by eGov in October 2023 to discuss future plans for the integrated campaign management solution, as well as the role implementing partners like Malaria Consortium can play in building and supporting the rollout of specific use cases such as SMC. The tool will be used in all districts of Nampula province during the 2023/24 SMC round, which started in January 2024 and the collection of administrative data will be fully digitised.

In Nigeria, we tested a digital solution in the Federal Capital Territory (FCT) and Oyo state in 2023. The solution was based on DHIS2, a web-based platform most commonly used as an HMIS platform. We were particularly interested in evaluating the feasibility of implementing a bring-your-own-device approach. This involved over 2,500 community distributors and 169 health workers utilising their own personal mobile devices to digitally record the registration of households and individuals, as well as SPAQ administration data. Several challenges were identified, including low digital literacy among SMC implementers and application compatibility issues with older Android devices running on outdated operating systems. Questions concerning data protection also needed to be considered. The bring-your-own-device approach promises to be cost-effective and sustainable, as it eliminates the need to procure and maintain large quantities of mobile devices for use in health campaigns. However, the areas where we tested this approach in 2023 were less rural than most areas where SMC is implemented in Nigeria, and we are unsure how feasible it will be to replicate the approach in more rural areas. Using the tool in 2023 generated helpful learning and, together with learning from digitalisation initiatives in areas not supported with philanthropic funding, will inform future health campaign digitalisation efforts in Nigeria.

In addition to working with our partners at the country level to strengthen the use of digital tools in SMC, we also engage in the global conversation on campaign digitalisation. We are members of the Integrated Campaign Digitalisation working group, which is led by the Clinton Health Access Initiative and the WHO Regional Office for Africa, and are members of the steering committee of an annual international meeting on campaign digitalisation, together with partners including the International Federation of Red Cross and Red Crescent Societies, the Bill & Melinda Gates Foundation, Catholic Relief Services, the Clinton Health Access Initiative, the WHO and Gavi, the Vaccine Alliance.

In 2024, we aim to elaborate on our approach to SMC digitalisation and support selected digitalisation initiatives in collaboration with our country and global partners.

3.3.2 Payments to SMC implementers

Paying hundreds of thousands of SMC implementers on time while ensuring accountability and transparency requires substantial efforts. Wherever possible, Malaria Consortium supports cashless payments, either via bank transfer or via mobile money. This typically requires negotiating and contracting with service providers, creating a database of SMC implementers, reviewing justification documents like lists of implementers who participated in SMC distribution activities, and processing the payments.

While we have made progress over the last few years in terms of embedding cashless payments in SMC, the process remains challenging. Common issues are that implementers do not have an account with the service provider, that their accounts are not registered in their own name, or that the phone numbers provided for mobile payments are incorrect. There are also challenges relating to the exchange of information between health authorities, service providers and Malaria Consortium. Roles and responsibilities are not always clearly defined, understood or accepted by all parties involved. In the absence of biometric verification, the verification of an implementer's identity, checking of account details and validation of documents that justify payment are cumbersome and require input from programme, operations and finance staff. As a result, payment delays are not uncommon, which can affect SMC implementers' morale and willingness to participate in the campaign. In some areas, especially those affected by insecurity, processing mobile payments is further complicated by the destruction of the telecommunications infrastructure on which mobile networks rely. Developing robust standard operating procedures that are accepted among all parties involved and reducing payment delays remain operational priorities in many of the countries where Malaria Consortium supports SMC delivery.

3.3.3 Risk management

Minimising risk to everyone involved in SMC campaigns, including communities, SMC implementers and Malaria Consortium staff is an important part of our work. This includes risk resulting from insecurity, safeguarding, natural disasters and health-related risks.

Insecurity

Over the last few years, security threats in many of the areas where Malaria Consortium supports SMC implementation have increased substantially, including from armed groups and criminals, as well as from intercommunal violence. It is generally accepted that insecurity is likely to increase further over the coming years. Rising insecurity has led to an increase in internally displaced people (IDPs) and refugees in many SMC-implementing countries. Often, IDPs and refugees live in informal camps, which pose challenges in terms of estimating the target population and quantifying commodities, accessing households, and maintaining trust between community distributors and target communities. In addition, election campaigns, while not directly affecting SMC delivery, can sometimes absorb the attention of government stakeholders, leaving limited capacity for planning and overseeing health campaigns like SMC.

To manage insecurity-related risk, Malaria Consortium's teams have put in place safety and security plans, staff movement protocols and standard operating procedures. We have invested in enabling team communication, security awareness and security training. We also enhanced our capacity to manage security risks by recruiting staff with a security focus in our SMC countries, who continuously monitor and assess the security situation in the areas where we operate. This involves security mapping and assigning areas to different levels of risk: low, medium and high.

Malaria Consortium has developed security adaptation principles that outline how SMC needs to be adapted in medium- and high-risk areas to minimise risk to communities, SMC implementers and Malaria Consortium staff, while ensuring maximum accountability, coverage and quality of SMC implementation. Recognising that security risks can never be mitigated against completely and that some residual risk will always remain, the principles outline adaptations for each SMC intervention component. The principles draw on learning from all SMC countries with the aim of defining a comprehensive and harmonised approach that can inform our work across Malaria Consortium's SMC portfolio. A core principle is that Malaria Consortium staff can operate in medium-risk areas if approved by senior country management. However, Malaria Consortium staff cannot enter high-risk areas. In those areas, we work with our partners to identify how we can continue to deliver SMC within acceptable risk thresholds; for example, by making use of government structures, with support and oversight provided by Malaria Consortium remotely. In some of the most severely affected areas, that may involve transporting SMC commodities with the support of countries' security forces.

Safeguarding

Malaria Consortium is also committed to the welfare of our staff, partners and the communities with whom we work. We have safeguarding policies and processes in place to prevent abuse and exploitation, especially of children and adults in vulnerable circumstances. Our commitment to safeguarding is referenced in the agreements and contracts we have with SMC partners and we work with national malaria programmes to embed safeguarding in SMC campaigns, for example, by including a safeguarding module in the training of SMC implementers.

Natural disasters

Other risks that have gained prominence over the last few years are heavy rains, tropical storms and severe flooding. While SMC is, by its very nature, an intervention that is implemented during the rainy season, flooding is increasingly common. For example, Mozambique was affected by cyclone Freddy in February and March 2023,[24] impeding access to remote areas during the 2022/23 SMC round in Nampula province.

SMC delivery, Mozambique

Health-related risks

Since 2020, SMC campaigns have been implemented in the context of the COVID-19 pandemic, which has posed a significant risk of transmission to SMC implementers and communities. Minimising this risk has required adaptations to the SMC delivery model. For example, more training events have been scheduled to limit the number of participants per event. Physical distancing has also been facilitated by encouraging caregivers to administer the medicines to their children, with community distributors supervising from a safe distance. In addition, large quantities of COVID-19-related commodities, such as face masks and hand sanitiser, have been made available to SMC implementers. Malaria Consortium's insights from implementing SMC during the first year of the pandemic, based on comprehensive consultations with colleagues from across Malaria Consortium's SMC portfolio and external partners, were published in a learning paper.[25]

In preparation for the 2023 SMC campaigns, we reviewed and updated our internal COVID-19 guidance, taking into account that the COVID-19 risk was generally considered lower than in previous years and most countries had lifted COVID-19-related restrictions. Unlike in previous years, where we had defined minimum infection prevention and control standards that applied to all areas where the organisation supports SMC, we adopted a risk-based approach, where minimal measures were in place in settings where the disease was considered endemic and more stringent measures in place in epidemic settings. As of 2024, following the WHO's declaration that COVID-19 is no longer a global health emergency,[26] we will no longer define internal standards, committing to adopting guidance issued by relevant government agencies instead.

While COVID-19 has posed the biggest challenge to SMC delivery in recent years, outbreaks of other diseases occasionally affect programme delivery — often indirectly as they tend to bind resources and capacity of health sector actors. For example, Mozambique experienced a cholera outbreak in 2023[27] and Uganda was affected by an outbreak of Ebola in 2022 and 2023.[28] While SMC-implementing areas were not among the worst affected, controlling the outbreaks required a concerted effort from governments and partners, limiting the capacity to coordinate the delivery of routine mass campaigns such as SMC.

4. Malaria Consortium's SMC portfolio 2023

In 2023, Malaria Consortium supported SMC delivery to almost 25 million children in seven countries: Burkina Faso, Chad, Mozambique, Nigeria, South Sudan, Togo and Uganda (Figure 3).

Out of a total of 25.09 million children targeted with Malaria Consortium's support in 2023, 16.34 million were targeted exclusively with philanthropic funding. An additional 920,000 children were supported through co-funding arrangements with the Global Fund, UNICEF and KOICA. Global Fund funding exclusively was used to support SMC delivery to the remaining 7.83 million children (Table 2).

Figure 3. Countries where Malaria Consortium supported SMC in 2023

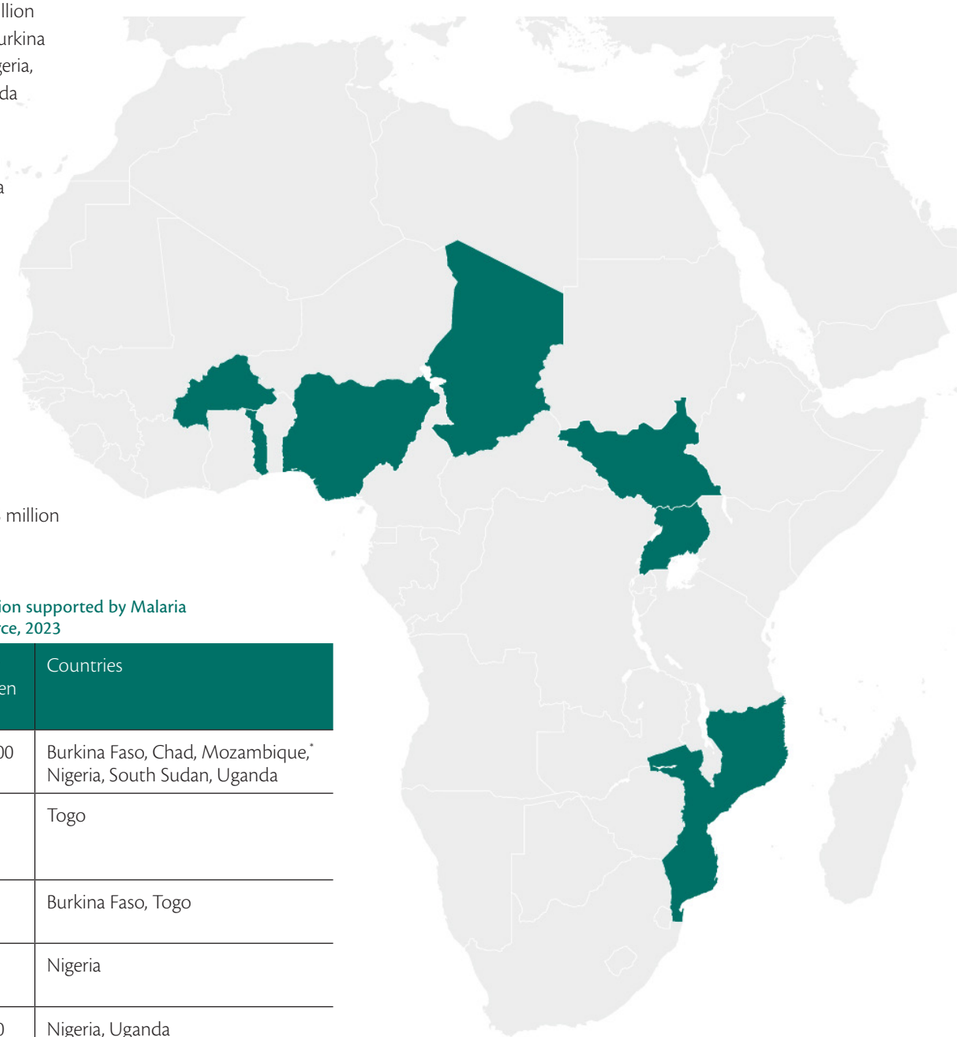


Table 2. SMC target population supported by Malaria Consortium by funding source, 2023

Funding source	Number of children targeted	Countries
Philanthropic	16,340,000	Burkina Faso, Chad, Mozambique,* Nigeria, South Sudan, Uganda
Philanthropic and Global Fund	310,000	Togo
Philanthropic and UNICEF	310,000	Burkina Faso, Togo
Philanthropic and KOICA	300,000	Nigeria
Global Fund	7,830,000	Nigeria, Uganda
TOTAL	25,090,000	

Target population figures have been rounded to the nearest 10,000.

*As the peak malaria transmission season cuts across calendar years in Mozambique, target population figures are reported for the calendar year in which the transmission season started. This does not necessarily coincide with the calendar year when the SMC round started. The 2023/24 SMC round was delayed until February 2024.

According to unpublished data compiled by the SMC Alliance, a workstream under the RBM Partnership to End Malaria's Country/Regional Support Partner Committee, the global SMC target population in 2023 was approximately 53 million. Malaria Consortium therefore supported SMC delivery to just under half of all children targeted that year.

5. Philanthropically supported SMC delivery in 2023

5.1 Overview

In 2023, philanthropic funding supported SMC delivery to a target population of 17.24 million children across Burkina Faso, Chad, Mozambique, Nigeria, South Sudan, Togo and Uganda (Table 3). While in most locations, SMC delivery was supported exclusively with philanthropic funding, funding from institutional donors such as the Global Fund, UNICEF and KOICA was used alongside philanthropic funding. Those co-funding arrangements are described in more detail below.

The target population supported with philanthropic funding in 2023 compares with 16.08 million children targeted with philanthropic support in 2022.[29] The slight target population increase in 2023 was primarily due to population growth. Around 58 percent of the philanthropically supported target population lived in areas where four SMC cycles were implemented. The remaining 42 percent received five cycles.

Table 3. SMC target population supported with philanthropic funding or co-funding, 2022–2023

Country	2022	2023
Burkina Faso	2,110,000	2,180,000
Chad	1,200,000	1,360,000
Mozambique*	1,300,000	1,480,000
Nigeria	10,720,000	11,500,000
South Sudan	20,000	60,000
Togo	500,000	510,000
Uganda	230,000	150,000
TOTAL	16,080,000	17,240,000

Target population figures have been rounded to the nearest 10,000.

*As the peak malaria transmission season cuts across calendar years in Mozambique, target population figures are reported for the calendar year in which the transmission season started. This does not necessarily coincide with the calendar year when the SMC round started. The 2022/23 and 2023/24 rounds were delayed until January 2023 and February 2024 respectively.

Malaria Consortium used philanthropic funding to procure around 81.7 million blister packs of SPAQ in 2023. Philanthropic funding or co-funding also supported more than 190,000 SMC implementers involved in the delivery of SMC campaigns. According to administrative data, a mean of 17,440,950 doses of SPAQ were administered by community distributors per cycle across the seven supported countries, representing administrative coverage of 102 percent.

In 2024, we expect to use philanthropic SMC funding to support SMC delivery to around 18 million children in the seven countries we supported in 2023. We also agreed with the national malaria programme in Côte d'Ivoire to provide technical assistance on introducing SMC in the country in 2024. We do not expect to fund SMC delivery in Côte d'Ivoire in 2024 but will explore the possibility to support more fully as an implementing partner, with responsibility for SMC delivery in a given area in future years with the national malaria programme, GiveWell and other funders.

5.2 Burkina Faso

Background

Burkina Faso's total population was estimated at 22.67 million in 2022.[30] The security situation in Burkina Faso has deteriorated significantly in recent years and remains volatile following a coup d'état that resulted in the overthrow of the President in 2022. Attacks by armed extremists, who are estimated to control up to 50 percent of the country's territory, surged and civilians were affected by counterinsurgency operations, with nearly 7,600 conflict-related deaths in 2023 and more than two million IDPs since 2016.[31]

Malaria is endemic throughout the country, with a seasonal peak between June and October. There were 11.42 million confirmed cases and 4,200 deaths from malaria in 2022, accounting for 3.2 percent of global cases and 2.7 percent of global deaths.[13] Access to healthcare has been severely limited by insecurity, with 413 health facilities affected in December 2023.[32]

SMC scale-up and support

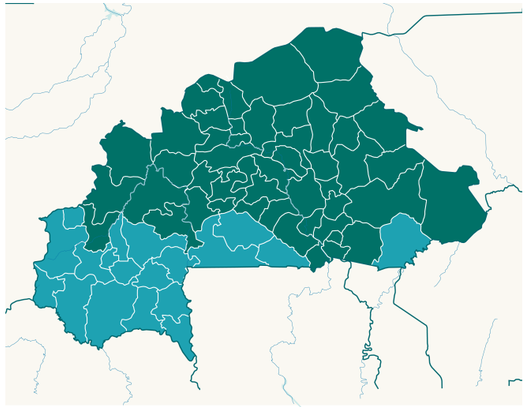
SMC implementation in Burkina Faso started in 2014 in seven health districts. Funding support for SMC gradually increased over the following years. In 2019, Burkina Faso achieved 100 percent geographical SMC coverage, with all of the country's 70 health districts reached. Full geographical coverage has been maintained in subsequent years. The total SMC target population in 2023 was 4.51 million children (Table 4). The slight target population increase compared with 2022 was due to population growth. As in previous years, funding for SMC was provided by Malaria Consortium's philanthropic funding, the Global Fund, PMI and UNICEF (Figure 4). Based on a WHO-supported systematic stratification exercise, 19 health districts currently implement five SMC cycles per round (June–October), while the remaining 51 health districts implement four cycles (July–October) (Figure 5).

Table 4. SMC target population by funding source, Burkina Faso, 2022–2023

Funding source	Number of health districts (2022)	Target population (2022)	Number of health districts (2023)	Target population (2023)
Philanthropic	27	2,000,000	27	2,070,000
Global Fund	22	1,450,000	22	1,470,000
PMI	19	830,000	19	860,000
UNICEF and philanthropic*	2	110,000	2	110,000
TOTAL	70	4,390,000	70	4,510,000

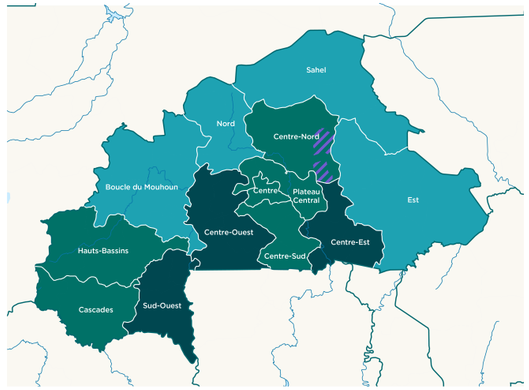
Target population figures have been rounded to the nearest 10,000.
*Philanthropic funding is used to procure SPAQ for two health districts, while UNICEF covers all other costs

Figure 3. SMC support by region and funding source, Burkina Faso, 2023



Four SMC cycles
Five SMC cycles

Figure 4. Number of SMC cycles implemented by health district, Burkina Faso, 2023



Philanthropic funding
UNICEF & philanthropic funding
Global Fund
PMI

Philanthropically supported SMC delivery in 2023

The health districts supported by Malaria Consortium in 2023 remained unchanged compared with the previous year. A total of 2.07 million children in 27 health districts were supported exclusively with philanthropic funding. As in the previous year, Malaria Consortium also used philanthropic funding to procure SPAQ for 110,000 children in two additional health districts, where all other SMC-related costs were covered by UNICEF. Out of the 29 health districts supported with philanthropic funding, 11 implement five SMC cycles. Those districts account for 30 percent of the philanthropically supported target population. The remaining 18 philanthropically supported health districts implement four SMC cycles.

A total of 11,880,000 blister packs of SPAQ was procured with philanthropic funding and shipped to Burkina Faso by sea. The medicines arrived at the central warehouse in April. Based on recommendations of a quality assessment conducted by Malaria Consortium, we worked with the Permanent Secretary for the Elimination of Malaria to introduce a number of improvements in preparation for the 2023 SMC round. These included a guidance document displayed in health facilities on the potential side effects of SPAQ and how to manage them, a document detailing different types of SMC implementers' roles and responsibilities for use by managers and supervisors, and a commitment to ensure children in IDP camps receive SMC. Over 32,000 SMC implementers were trained with philanthropic support in more than 2,000 training events, including around 22,500 volunteers who served as community distributors (Table 5).

Table 5. SMC implementers trained with philanthropic support, Burkina Faso, 2023

Cadre	Number of SMC implementers	Number of days per training	Number of training events
National-level trainers	40	2	1
Supply chain managers	41	3	1
Regional-level trainers and supervisors	139	1	6
District health staff	265	1	27
Health workers	3,275	1	94
Community distributors	22,577	1	1,098
Town announcers	5,930	1	913
TOTAL	32,267		2,140

The 2023 SMC round in philanthropically supported health districts implementing five cycles started on 22 June (Table 6). A launch event, chaired by the Minister of Health and Public Hygiene, was held in one of the health districts supported by Malaria Consortium. Health districts implementing four cycles started the 2023 round on 20 July. All subsequent cycles were implemented according to schedule, despite widespread security concerns, which resulted in substantial population movements and around seven percent of health facilities in Malaria Consortium-supported areas not being functional during SMC distribution. In September, the Minister of Health and Public Hygiene joined supervision activities in two health districts that are supported by Malaria Consortium. A clip from a news bulletin, including an interview with Malaria Consortium's Country Director, was posted on Facebook.[33] The 2023 round ended on 15 October in all philanthropically supported health districts.

Table 6. SMC distribution dates in philanthropically supported health districts, Burkina Faso, 2023

	Cycle 1	Cycle 2	Cycle 3	Cycle 4	Cycle 5
11 health districts implementing five cycles	22–25 June	20–23 July	17–20 August	14–17 September	12–15 October
18 health districts implementing four cycles	20–23 July	17–20 August	14–17 September	12–15 October	-

According to administrative data, a mean of 2,416,614 day 1 doses of SPAQ were administered by cycle in health districts supported by Malaria Consortium, which represents administrative coverage of 111 percent. We believe the high administrative coverage primarily reflects a higher than estimated true target population, caused by an influx of IDPs from areas that are not supported by Malaria Consortium and that are affected by insecurity, to some of the more stable health districts in the regions supported by Malaria Consortium. SMC coverage in terms of the proportion of children who received SMC medicines from community distributors on day 1 according to household surveys in those health districts was also high in all cycles, ranging between 95 percent and 98 percent (Table 7).

Table 7. Proportion of children (percent) who received day 1 SMC medicines from community distributors in philanthropically supported health districts according to household surveys, Burkina Faso, 2023

Cycle 1	Cycle 2	Cycle 3	Cycle 4	Cycle 5
96.2	97.2	96.9	98.1	94.7

Because health districts implementing five cycles start the SMC round one month before those implementing four cycles, only results from health districts implementing five cycles are shown under cycle 1. Cycles 2 to 5 comprise results from all health districts. For health districts implementing four cycles, what is shown under cycle 2 in this table relates to the first cycle implemented in those districts etc. Because of the different sampling frame used in cycle 1, when fewer health districts implemented SMC, results from this cycle are not directly comparable with the results from subsequent cycles. Also note that health districts that were considered high-risk at the time of a given survey were excluded from the sampling frame.

Plans for 2024

Malaria Consortium expects to support SMC delivery with philanthropic funding in the same health districts in 2024 as in 2023, including two health districts where philanthropic funding is only used to procure SPAQ, while UNICEF covers all other costs.

The approximate SMC target population in the 29 health districts supported by Malaria Consortium will be 2.26 million. This year, we plan to focus on strengthening supportive supervision for community distributors to improve adherence to DOT and supporting the continuous analysis of routine malaria data at the health district level.

5.3 Chad

Background

The total population in Chad stood at 17.72 million in 2022.[34] The country is impacted by multidimensional crises in the Lake Chad area, including armed insurgencies and climate-related weather events, creating a challenging humanitarian situation in some areas. Following the death of the President in 2021 and the declaration of his son as head of a Transitional Military Council, there were violent protests throughout 2022 and 2023. Efforts to foster national reconciliation culminated in a constitutional referendum in December 2023, but outbreaks of violence in N'Djamena and other urban areas remained common throughout the year.[31]

About two-thirds of Chad's population live in areas of high malaria transmission, principally in the southern half of the country, with the highest number of malaria cases occurring between June or July and October. In 2022, there were 3.63 million malaria cases and 14,000 deaths.[13]

SMC scale-up and support

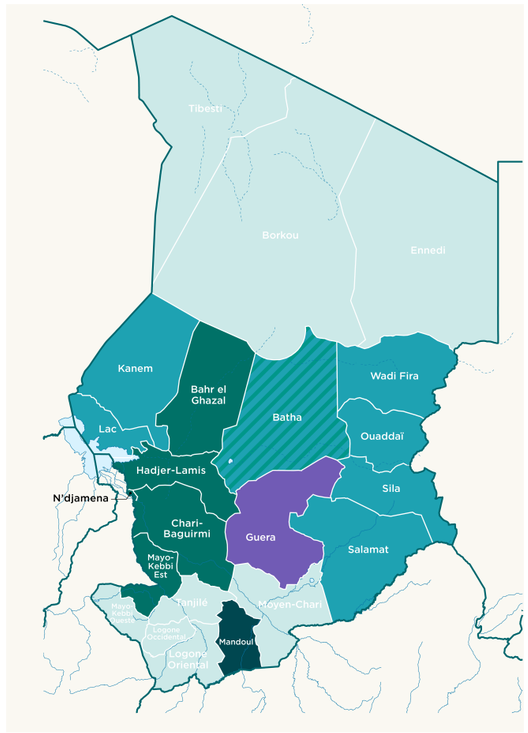
Starting with four health districts in 2013, SMC was gradually scaled up in Chad, reaching 77 health districts in 2023, with a total SMC target population of 2.57 million children (Table 8). The higher number of health districts implementing SMC compared with 2022 was due to administrative changes, with several new health districts being created by subdividing health districts that had been previously reached by SMC. Funding for SMC was provided by Malaria Consortium's philanthropic funding, the Global Fund, UNICEF and MSF (Figure 6). The slight decrease in the total SMC target population compared with the previous year is a result of one Global Fund supported health district not being included in the 2023 round due to security concerns. Almost all SMC-implementing health districts in Chad implement four SMC cycles per round (July–October). Only four health districts supported by MSF implement five cycles.

Table 8. SMC target population by funding source, Chad, 2022–2023

Funding source	Number of health districts (2022)	Target population (2022)	Number of health districts (2023)	Target population (2023)
Philanthropic	27	1,200,000	27	1,360,000
Global Fund	35	1,180,000	41	1,000,000
UNICEF	5	120,000	5	150,000
MSF	1	100,000	4*	60,000
TOTAL	68	2,600, 000	77	2,570,000

Target population figures have been rounded to the nearest 10,000.
*In one of the health districts supported by MSF, only the catchment area of one out of a total of nine health facilities is targeted for SMC.

Figure 5. SMC support by region and funding source, Chad, 2023



Philanthropically supported SMC delivery in 2023

Malaria Consortium used philanthropic funding to deliver SMC to a target population of 1.36 million children in 27 health districts. The geographical reach of Malaria Consortium's support for SMC in Chad in 2023 was the same as in the previous year.

A total of 5,976,000 blister packs of SPAQ was shipped to Chad by sea. The shipment arrived at the central warehouse in May. In July, Malaria Consortium loaned around one million blister packs of SPAQ procured with philanthropic funding to health districts supported by the Global Fund to enable the timely start of the annual SMC round in those areas. Those medicines were returned in two instalments in September 2023 and January 2024. Malaria Consortium also donated 42,000 blister packs of SPAQ procured with philanthropic funding to the national malaria programme (Programme National de Lutte contre le Paludisme — PNLP) for use in areas supported by other funders that experienced an influx of refugees from neighbouring Sudan. More than 11,000 SMC implementers, including around 8,100 volunteer community distributors, were trained in over 900 training events (Table 9).

Table 9. SMC implementers trained with philanthropic support, Chad, 2023

Cadre	Number of SMC implementers	Number of days per training	Number of training events
National- and province-level trainers and supervisors	20	2	1
Zonal trainers and supervisors and district medical chiefs	54	2	4
District-level trainers and supervisors and health workers	597	1	27
Field supervisors and community distributors	9,008	1	456
Town announcers	1,339	1	456
TOTAL	11,018		944

All philanthropically supported health districts in Chad implement four SMC cycles. In all but one of those health districts, the SMC round started as scheduled on 14 July (Table 10). In one district, SMC distribution started with a two-day delay due to a measles outbreak. Two health districts experienced a one-day delay to cycle 3 because of a conflicting meeting to validate routine vaccination data. All philanthropically supported health districts concluded the 2023 round between 10 and 12 October.

Table 10. SMC distribution dates in philanthropically supported health districts, Chad, 2023

	Cycle 1	Cycle 2	Cycle 3	Cycle 4
24 health districts	14–17 July	11–14 August	9–12 September	7–10 October
2 health districts	14–17 July	11–14 August	10–13 September	7–10 October
1 health district	16–19 July	13–16 August	11–14 September	9–12 October

Administrative data indicated that a mean of 1,364,199 day 1 doses of SPAQ were administered per cycle, representing administrative coverage of 102 percent. Household surveys found SMC coverage in terms of the proportion of children who received SMC medicines from community distributors between 94 percent and 97 percent (Table 11).

Table 11. Proportion of children (percent) who received day 1 SMC medicines from community distributors in philanthropically supported health districts according to household surveys, Chad, 2023

Cycle 1	Cycle 2	Cycle 3	Cycle 4
94.9	93.9	97.1	96.0

Plans for 2024

Malaria Consortium expects to support SMC delivery with philanthropic funding in 30 health districts. The increase in the number of supported health districts is due to administrative changes. The geographical area supported remains unchanged compared with 2023. The approximate target population will be 1.42 million. We plan to focus on testing a digital solution in one health district, strengthening supportive supervision to improve adherence to DOT and coordinating end-of-cycle surveys in-house rather than outsourcing to reduce cost and improve timely availability of results.

Following GiveWell's decision in early 2023 to phase out philanthropic SMC funding for Chad because it is below its current cost-effectiveness threshold,[35] Malaria Consortium worked with the PNLP to develop a transition strategy and to identify alternative funding sources that could cover the health districts previously supported with philanthropic funding as of 2025.

5.4 Mozambique

Background

Mozambique had a total population of 32.97 million in 2022.[36] Throughout the year, insecurity persisted in some areas of Mozambique, particularly in the northern province of Cabo Delgado. Due to this prolonged situation, there has been a rise in IDPs moving south into Nampula province, where Malaria Consortium operates.[37]

Malaria continues to be highly endemic across the entire country, with the highest prevalence in the north and along the coast. Unlike in all other SMC-implementing countries supported by Malaria Consortium, the high malaria transmission season in northern Mozambique cuts across calendar years, approximately between December and March. Activities conducted in the calendar year 2022 in preparation for the 2022/23 SMC campaign were described in last year's SMC philanthropy report.[29] In this report, we describe SMC activities conducted in 2023, which includes SMC distribution during the 2022/23 round and activities in preparation for the 2023/24 round.

SMC scale-up and support

A mid-term review of Mozambique's Malaria Strategic Plan 2017–2022[38] recommended SMC as a strategy to accelerate impact in the highest-burden locations. SMC was first introduced in two districts in Nampula province, where under-five mortality is high and malaria transmission is seasonal, as part of an implementation study conducted by Malaria Consortium and the PNCM during the 2020/21 high transmission season. In 2022/23, the intervention was scaled up to all 23 districts in Nampula province. Mozambique was the first country outside of the Sahel to scale-up SMC. A high-profile launch event to celebrate this achievement was held in January 2023, which was attended by the by the Minister of Health and a range of senior officials representing government and partners.[39] Malaria Consortium published a learning brief that reflects on the process of transitioning from a research project to an at-scale implementation programme, including insights from visiting Nigeria to learn from this country's experience of implementing SMC at scale. Key lessons identified include the facilitating role of a national technical working group that brings together government authorities and implementing partners, as well as the need to integrate SMC into the national strategy.[40]

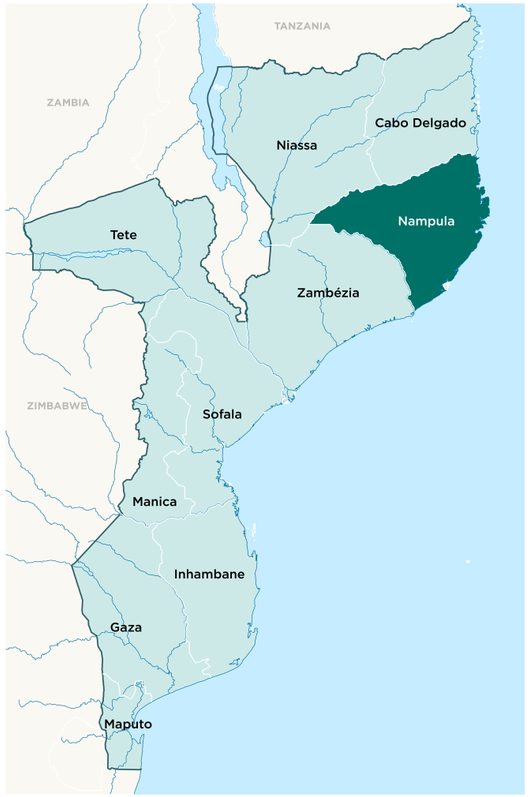
The scale achieved during the 2022/23 SMC round was maintained during the 2023/24 high transmission season, targeting 1.48 million children (Table 12) in all 23 districts of Nampula province (Figure 7). The target population increase compared with the previous round was due to population growth, including IDPs from neighbouring Cabo Delgado province. To date, SMC in Mozambique has only been implemented in Nampula province and all funding has been provided by Malaria Consortium's philanthropic funding for SMC. All districts implement four SMC cycles per round.

Table 12. SMC target population by funding source, Mozambique, 2022/23–2023/24

Funding source	Number of districts (2022/23)	Target population (2022/23)	Number of districts (2023/24)	Target population (2023/24)
Philanthropic	23	1,300,000	23	1,480,000
TOTAL	23	1,300,000	23	1,480,000

Target population figures have been rounded to the nearest 10,000.

Figure 6. SMC support by province and funding source, Mozambique, 2023/24



Philanthropically supported SMC delivery in 2023

A total of 5,598,000 blister packs of SPAQ was procured with philanthropic funding for the 2022/23 SMC round in Mozambique and shipped to the country by sea. The medicines arrived in Nampula in November 2022. More than 15,000 SMC implementers were trained in almost 800 training events between November 2022 and January 2023 (Table 13). This included around 12,000 volunteer community distributors and 1,700 community health workers in Mozambique, known locally as agentes polivalentes de saúde.

Table 13. SMC implementers trained with philanthropic support, Mozambique, 2022/23

Cadre	Number of SMC implementers	Number of days per training	Number of training events
National-level master trainers	30	2	2
Province-level trainers and supervisors	97	2	5
District-level trainers and supervisors	563	2	35
Field supervisors, community health workers and community distributors	14,993	2	750
TOTAL	15,683		792

The start of the 2022/23 round was initially planned for December 2022, but was postponed until 27 January 2023 (Table 14), when formal approval for the scale-up of SMC was received from the Minister of Health. As the consumption of SPAQ for children 3–<12 months was somewhat higher than anticipated during the planning stage, Malaria Consortium air freighted 270,000 blister packs of SPAQ for this age group from Nigeria to Mozambique in April to minimise the risk of stock-outs. Cycle 3 was delayed by about one month and cycle 4 by about one week due to delays in processing payments to SMC implementers. Challenges included delays in compiling a comprehensive database of SMC implementers, implementers not having an active account with the mobile payment providers and mismatching payment details such as the spelling of names or mobile numbers. The 2023 round concluded on 5 June in all 23 districts. While the round ended several weeks after what is considered the peak malaria transmission season based on historical data, the decision was made to implement four cycles despite the delays following a review of routine HMIS data from 2023, which suggested that malaria cases in the province were still high in April and May. While one district was considered high-risk as the conflict in Cabo Delgado occasionally spilled over into neighbouring areas of Nampula province, this was managed as recommended in Malaria Consortium's SMC security adaptation principles and did not affect SMC delivery.

SMC delivery, Mozambique

Table 14. SMC distribution dates in philanthropically supported districts, Mozambique, 2022/23

	Cycle 1	Cycle 2	Cycle 3	Cycle 4
23 districts	27–30 January	24–27 February	27–30 April	2–5 June

According to administrative data, a mean of 1,299,323 day 1 doses of SPAQ were distributed per cycle. This represents administrative coverage of 100 percent. Household surveys found somewhat lower coverage in terms of the proportion of children who received SMC medicines from community distributors on day 1, ranging from 77 percent in cycle 4 and 90 percent in cycle 3 (Table 15). We believe that the higher administrative coverage is explained in part by IDPs moving into Nampula province from neighbouring Cabo Delgado, resulting in an underestimation of the target population. Household surveys found a relatively high proportion of children over five receiving SPAQ. Frequent administration of SMC medicines to children above the eligible age range was confirmed anecdotally through supervision. It is therefore likely that administration of SMC to age-ineligible children also contributed to the high administrative coverage compared with the lower coverage as measured through household surveys.

Table 15. Proportion of children (percent) who received day 1 SMC medicines from community distributors in philanthropically supported districts according to household surveys, Mozambique, 2022/23

Cycle 1	Cycle 2	Cycle 3	Cycle 4
-	-	89.6	77.2

For operational reasons, surveys were not conducted following cycles 1 and 2.

In preparation for the 2023/24 round, which was scheduled to start in December 2023, a total of 6,898,000 blister packs of SPAQ was procured with philanthropic funding and shipped to Mozambique by sea. The medicines arrived in Nampula in October 2023. Training of SMC implementers commenced in November and was ongoing at the end of the year.

As the SMC programme in Nampula is maturing, efforts were made during the planning stage for the 2023/24 round to further reduce the cost of implementing SMC in the province, including reducing the number of days government staff spend at SMC-related events and meetings, integrating the distribution of SMC commodities into the Ministry of Health's routine distribution mechanisms for medicines, and lowering the ratio of SMC implementers per health facility catchment area. A learning paper detailing Mozambique's experiences in scaling up SMC from research study to scale is being prepared and will be published later in 2024.

Plans for 2024

The 2023/24 round started on 2 February 2024, about six weeks later than planned, primarily to ensure readiness of the Salama digital SMC tool. Administrative data collection has been fully digitised.[41] The round will conclude in May 2024. We plan to continue to support the same 23 districts in Nampula province during the 2024/25 SMC round, which we expect to start in December 2024, targeting an estimated 1.56 million children. As Mozambique prepares to potentially expand SMC to other provinces, Malaria Consortium will support the PNCM in developing an SMC implementation manual. We will also continue to work with the PNCM and eGov on refinements to the Salama digital tool and how its use is operationalised.

5.5 Nigeria

Background

Nigeria is Africa's most populous country, with an estimated 218.54 million inhabitants in 2021.[42] National and state-level elections were held in February and March 2023 to elect the President, members of the legislature, some state governors and members of the state legislatures. While the elections took place successfully, many results, including the final outcome of the presidential election, were contested. Nigeria's Supreme Court ruled in October 2023 on the presidential elections, confirming the election of President Bola Ahmed Tinubu who succeeded Muhammadu Buhari. The general security¬¬¬ continued to deteriorate through 2023 — particularly in North East, North West and North Central Nigeria — owing to the presence of extremist groups, criminal and militant activity and incidents of intercommunal violence.[43] Multiple mass casualty incidents and kidnappings were reported, in addition to the closure of IDP camps, further exacerbating humanitarian need in the region.[44] It is estimated that there are a total of 1.2 million IDPs across the eight states in the northcentral and northwestern regions of the country due to violence.[45]

Economic challenges in 2023 also saw inflation rise steadily throughout the year to around 29 percent in December, an eight percent increase year-on year, impacting heavily on the cost of living.[46] At the same time, the Nigerian naira saw a sharp devaluation over the course of 2023. It lost 25 percent of its value in June and continued to lose another 46 percent of its value by December.[47]

Malaria is endemic in the majority of the country and 97 percent of the population are considered to be at risk. In the south, malaria transmission is perennial, whereas in the north, there are seasonal peaks of four to five months between June and November. In 2022, there were 66.7 million malaria cases and 190,000 deaths, accounting for 27 percent of global cases and 31 percent of global deaths.[13]

SMC scale-up and support

Nigeria started implementing SMC in only a few local government areas (LGAs) in 2013. The first scale-up phase targeted nine Sahelian states in the north of the country (parts of Bauchi, as well as all of Borno, Jigawa, Kano, Katsina, Kebbi, Sokoto, Yobe and Zamfara). In 2020, all LGAs in those nine states were reached for the first time. In 2021, a systematic stratification exercise resulted in the National Malaria Elimination Programme (NMEP) considering all of Bauchi state and an additional 11 states (Adamawa, parts of Benue, Gombe, Kaduna, Kogi, parts of Kwara, Nasarawa, Niger, parts of Oyo, Plateau, parts of Taraba) plus the FCT eligible for SMC. All of the eligible areas were reached for the first time in 2022. This scale was maintained in 2023, with a total target population of 28.49 million children (Table 16) in 411 LGAs (Figure 8). The increase in the SMC target population was due to population growth. Funding support was provided by the Global Fund, Malaria Consortium's philanthropic funding for SMC, PMI and KOICA. Out of the 411 eligible LGAs, 83 implement five cycles per round (typically June–October), while the remaining 382 LGAs implement four cycles (typically July–October) (Figure 9).

Table 16. SMC target population by funding source, Nigeria, 2022–2023

Funding source	Number of LGAs (2022)	Target population (2022)	Number of LGAs (2023)	Target population (2023)
Global Fund	220	13,590,000	220	13,970,000
Philanthropic	152	10,440,000	152	11,200,000
PMI	37	2,650,000	37	3,020,000
KOICA and philanthropic*	2	280,000	2	300,000
TOTAL	411	26,969,000	411	28,490,000

Target population figures have been rounded to the nearest 10,000.
aIn 2022, philanthropic funding was used to cover SPAQ for one cycle, as well as around 40 percent of the cost of allowances paid to SMC implementers during the annual round. All other costs were covered using funding from KOICA. In 2023, philanthropic funding was used to cover international freight costs, while all other costs were covered by KOICA.

Figure 7. SMC support by state and funding source, Nigeria, 2023

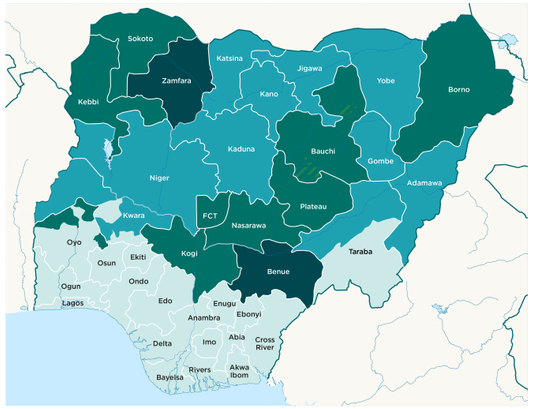
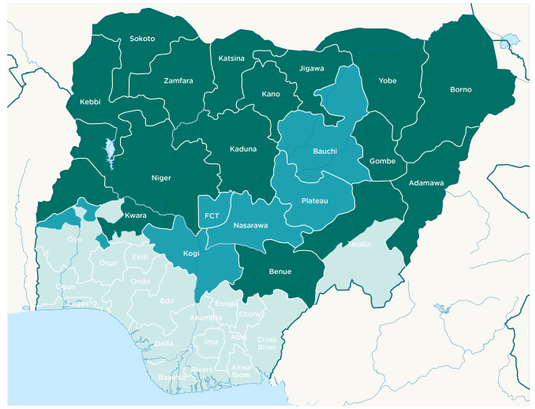


Figure 8. Number of SMC cycles implemented by state, Nigeria, 2023



Philanthropically supported SMC delivery in 2023

Philanthropic funding exclusively was used to support SMC delivery to a target population of 11.20 million children in 152 LGAs in Bauchi, Borno, the FCT, Kebbi, Kogi, Nasarawa, Oyo, Plateau and Sokoto. The same areas were supported with philanthropic funding in the previous year. Philanthropic funding for SMC in Borno was initially intended as a one-year stopgap only to cover a funding gap that emerged just a few months before the planned start of the 2021 round.[48] However, Malaria Consortium continued to support SMC in the state with philanthropic funding in 2022 and 2023, as the expected funding arrangements through a loan from the World Bank had not been finalised and there was no alternative funding available for SMC in both years. As in the previous year, philanthropic funding also supported SMC delivery in two LGAs in Bauchi state through the KOICA-funded SMC Impact project in 2023. Philanthropic funding only covered the cost of international freight for SMC medicines, while KOICA funding was used for all other costs.

A total of 55,080,000 blister packs of SPAQ was procured for the philanthropically supported states in Nigeria. This includes SPAQ for the two SMC Impact LGAs in Bauchi. Due to the large quantity of SPAQ procured, orders were split between two manufacturers and shipped in four consignments by sea. The shipments arrived at the destined state-level warehouses between April and June. Around 125,000 SMC implementers were trained with philanthropic support in over 4,000 training events (Table 17), including almost 80,000 volunteers who served as community distributors and over 10,000 lead mothers. This cadre of female volunteers is tasked with sharing information about SMC within their communities and visiting households over the two days following community distributors' visits, to encourage adherence to the three-day SPAQ regimen. In addition, more than 10,000 community leaders were trained to support community sensitisation and engagement. The numbers presented here do not include SMC implementers trained in the two SMC Impact LGAs, as no philanthropic funding was used to support this activity.

Table 17. SMC implementers trained with philanthropic support, Nigeria, 2023

Cadre	Number of SMC implementers	Number of days per training	Number of training events
National-level technical specialists	31	5	1
National-level supply chain specialists	10	5	1
National-level health educators	9	5	1
State-level technical specialists	521	3	19
State-level supply chain specialists	159	3	9
State-level health educators	158	3	9
Health workers	5,521	2	186
LGA-level supervisors	11,011	2	366
Community distributors	79,300	2	2,645
Community leaders	7,112	1	238
Town announcers	10,489	1	349
Lead mothers	10,544	1	352
TOTAL	124,875		4,175

Responding to a request from the NMEP to support the implementation of five SMC cycles in all LGAs in Bauchi, philanthropic funding was used to cover an additional cycle in 10 LGAs in the state that had previously implemented four cycles. This meant the total number of philanthropically supported LGAs implementing four cycles in 2023 was 71 (representing 44 percent of the target population), while 83 implemented five cycles (accounting for 56 percent of the target population). The SMC rounds started between 16 June and 3 August and concluded between 9 October and 7 November. Delays in several states were caused by conflicting health campaigns, supply chain challenges and concerns over insecurity. Table 18 shows SMC implementation dates by state and cycle, including reasons for delays.

Table 18. SMC distribution dates in philanthropically supported states, Nigeria, 2023

State	Implementation dates	Delays and challenges
Bauchi	Cycle 1: 15–18 July Cycle 2: 12–15 August Cycle 3: 9–12 September Cycle 4: 7–10 October Cycle 5: 4–7 November	The start of the round had initially been envisaged for mid-June but was postponed until mid-July due to a conflicting mosquito net distribution campaign.
Borno (two LGAs)	Cycle 1: 3–6 August Cycle 2: 31 August – 3 September Cycle 3: 28 September – 1 October Cycle 4: 26–29 October	The start of the round was envisaged for the end of June but had to be postponed until early August because of delays in developing a database of SMC implementers.
Borno (25 LGAs)	Cycle 1: 3–6 August Cycle 2: 31 August – 3 September Cycle 3: 29 September – 2 October Cycle 4: 26–29 October	25 LGAs in Borno experienced an additional one-day delay to cycle 3 due to a conflicting training organised by the WHO.

FCT (five area councils)	Cycle 1: 14–17 July Cycle 2: 12–15 August Cycle 3: 10–13 September Cycle 4: 7–10 October Cycle 5: 4–7 November	The start of the round was scheduled for the end of June but was postponed until mid-July due to challenges in securing the supply of training tools and implementation materials.
FTC (one area council)	Cycle 1: 14–17 July Cycle 2: 12–15 August Cycle 3: 10–13 September Cycle 4: 7–10 October Cycle 5: 4–7 November	Cycle 1 distribution started one day later in one area council due to last-mile distribution challenges. The 28-day interval was maintained for cycles 2 and 3, but implementation dates were synchronised with other LGAs in the FCT for operational reasons in cycles 4 and 5.
Kebbi	Cycle 1: 14–17 July Cycle 2: 11–14 August Cycle 3: 8–11 September Cycle 4: 6–9 October	Annual round implemented as scheduled
Kogi and Nasarawa	Cycle 1: 24–27 June Cycle 2: 22–25 July Cycle 3: 19–22 August Cycle 4: 16–19 September Cycle 5: 14–17 October	Delays in the supply of training materials and implementation materials resulted in a one-week delay to the start of the round.
Oyo	Cycle 1: 16–19 June Cycle 2: 14–17 July Cycle 3: 11–14 August Cycle 4: 8–11 September Cycle 5: 6–9 October	Annual round implemented as scheduled
Plateau	Cycle 1: 14–17 July Cycle 2: 10–14 August Cycle 3: 8–11 September Cycle 4: 6–9 October Cycle 5: 3–6 November	The start of the round was scheduled for the end of June but had to be postponed until mid-July due to insecurity in the state.
Sokoto	Cycle 1: 22–25 July Cycle 2: 19–22 August Cycle 3: 16–19 September Cycle 4: 14–17 October	Annual round implemented as scheduled

In general, the security situation in Nigeria was volatile throughout the year. At times, more than half of the LGAs supported with philanthropic funding were considered medium- or high-risk, requiring adaptations to the SMC implementation approach. Malaria Consortium published a learning brief, which outlines how we successfully delivered SMC to over two million children in hard-to-reach areas affected by insecurity in Borno in 2021.[49,50] It identifies strong collaborations with partners that have an established presence and expertise on the ground, as well as the need to use adaptive and flexible approaches to campaign delivery as success factors. Adaptations included modifying the classification of households to include tents in IDP camps, as well as the use of military escorts and helicopter services for transporting commodities.

In highly urbanised areas of the FCT, which comprises the capital city of Abuja, the SMC implementation model was adapted to maximise coverage and quality of SMC delivery. In 2022, when SMC was introduced in the FCT, three main challenges were identified: i) inaccurate target population estimates and understanding of the locations where the target population live, especially in large housing estates and informal settlements; ii) involvement of few community distributors from the local area as the health volunteer networks that exist elsewhere do not exist in urban areas; iii) traditional community engagement approaches like town announcers and word of mouth are less effective than in rural areas. In preparation for the 2023 round, housing estates and informal settlements were mapped with support from local authorities to better understand the target population. We also worked with local authorities to identify volunteers from the area who can act as community distributors. In addition to the door-to-door distribution approach, fixed distribution points, for example in marketplaces, were introduced, and SMC community engagement activities, including messaging through mass media, started several months earlier in Abuja than in rural areas.

Across all philanthropically supported states, a mean of 11,670,790 million courses of day 1 SPAQ were administered per cycle, representing administrative coverage of 102 percent. SMC coverage in terms of the proportion of children who received SMC medicines from community distributors on day 1 according to household surveys in those states was between 93 percent and 95 percent (Table 19).

Table 19. Proportion of children (percent) who received day 1 SMC medicines from community distributors in philanthropically supported states according to household surveys, Nigeria, 2023

Cycle 1	Cycle 2	Cycle 3	Cycle 4	Cycle 5
92.9	94.0	93.8	94.0	94.9

Because of security concerns, an end-of-cycle survey could not be implemented in Borno following cycle 3. Data shown here for cycle 3 do therefore not include Borno.

Plans for 2024

In 2024, we expect to reach around 11.9 million children in the same geographies as in 2023. This includes 310,000 children in the two SMC Impact LGAs, where KOICA will provide the majority of funding. With agreement from GiveWell, we will continue to support SMC in Borno, as funding arrangements through the Impact project, which is funded through a World Bank loan, have not been finalised. Note that this project is not related to the similarly named and KOICA-funded SMC Impact project. Operationally, we plan to focus on respecting planned SMC start dates and the 28-day interval between cycles, supporting the NMEP in developing a holistic, integrated approach to health campaign digitalisation and ensuring timely payments to SMC implementers.

Following GiveWell's decision to provide a grant to Malaria Consortium to deliver vitamin A supplementation (VAS) alongside SMC,[51] we are also preparing to co-implement those interventions in Bauchi and Niger states in 2024.

5.6 South Sudan

Background

In 2022, South Sudan's total population was estimated 10.91 million.[52] The country contended with complex humanitarian challenges throughout 2023, characterised both by ongoing internal struggles between the government, opposing forces and other militias, and by conflict and political upheaval in neighbouring Sudan. It is estimated that 9.4 million people in South Sudan, including around five million children, need humanitarian assistance. Food insecurity has increased, with 7.8 million people in South Sudan estimated to fall short of their minimum food needs in 2023.[53]

Malaria is endemic across South Sudan with the entire population at risk of infection. In the north-west of the country, a seasonal peak is observed between June and October. There were 2.78 million malaria cases in 2022, resulting in an estimated 6,700 deaths.[13]

SMC scale-up and support

SMC was introduced in South Sudan in selected villages in one county of Northen Bahr el Ghazal state in 2022 as part of an implementation study conducted by Malaria Consortium and the National Malaria Control Programme, with a target population of 20,000. In 2023, the target population grew to 60,000 (Table 20), because SMC was expanded to all villages in the county where the study had been conducted in the previous year, as well as a second county, which had served as a control in 2022 (Figure 10). The target population also increased due to an influx of refugees and returnees as a consequence of the conflict in neighbouring Sudan. During the 2023 SMC round, approximately 500 SMC-eligible children lived in an official camp for IDPs in one of the SMC-implementing counties. While MSF had previously conducted mass drug administration using SPAQ in the catchment area of one health facility in Northen Bahr el Ghazal, SMC as a community-based seasonal campaign has so far only been implemented in the two counties in Northern Bahr el Ghazal mentioned above and all funding has been provided by Malaria Consortium's philanthropic funding for SMC. Local seasonality patterns suggest that five SMC cycles should be implemented per round.

Table 20. SMC target population by funding source, South Sudan, 2022–2023

Funding source	Number of counties (2022)	Target population (2022)	Number of counties (2023)	Target population (2023)
Philanthropic	1	20,000	2	60,000
TOTAL	1	20,000	2	60,000

Target population figures have been rounded to the nearest 10,000.

Figure 9. SMC support by state and funding source, South Sudan, 2023

Philanthropically supported SMC delivery in 2023

A total of 387,000 blister packs of SPAQ was procured with philanthropic funding in 2023. Funding arrangements for South Sudan were only confirmed in March 2024. To minimise delays, medicines were air freighted to Northern Bahr el Ghazal, where they arrived in July. In addition to SPAQ, Malaria Consortium procures artemether-lumefantrine (AL) for health facilities in SMC-implementing areas in South Sudan. This is because South Sudan routinely uses artesunate-amodiaquine (ASAQ) as the first-line treatment of malaria cases. There is a risk of overdosing on AQ if children who receive SPAQ for SMC also receive ASAQ for the treatment of malaria. In SMC-implementing areas, the first-line treatment therefore had to be changed to AL, which is not commonly available at health facilities. In total, 36,810 AL treatments were procured with philanthropic funding and air freighted to South Sudan, where they arrived in August. Community engagement activities, including community meetings and radio spots, were intensified to emphasise that individuals who have received ASAQ should not receive SPAQ. More than 300 SMC implementers were trained in six training events, including around 288 boma health workers, a salaried cadre of community health workers who serve as community distributors in South Sudan (Table 21). Given the small scale of the project, only one training was conducted for trainers and supervisors at the national, state and county level, as well as for health workers.

Table 21. SMC implementers trained with philanthropic support, South Sudan, 2023

Cadre	Number of SMC implementers	Number of days per training	Number of training events
National, state and county-level trainer/supervisors and health workers	23	3	1
Supervisors	18	3	1
Boma health workers	288	3	4
TOTAL	329		6

The SMC round started as soon as possible following the arrival of SPAQ on 10 August (Table 22), about six weeks later than planned. Subsequent cycles were implemented as scheduled, including in a camp that saw a steady influx of refugees from Sudan as the 2023 SMC round progressed. Because of the delayed start, it was decided that only four cycles would be implemented in 2023, as implementing a fifth cycle would have extended SMC beyond the end of the high transmission period. Accordingly, the annual round ended on 6 November in both philanthropically supported counties.

Table 22. SMC distribution dates in philanthropically supported counties, South Sudan, 2023

	Cycle 1	Cycle 2	Cycle 3	Cycle 4
2 counties	10–14 August	8–12 September	6–10 October	3–6 November

A mean of 68,807 doses of day 1 SPAQ were administered per cycle. This represents administrative coverage of 111 percent. SMC coverage in terms of children receiving SMC medicines on day 1 from boma health workers as measured by household surveys increased over the course of the round from 80 percent to 99 percent (Table 23). This includes children living in an IDP camp. Reaching those children required several adaptations to the SMC delivery model (Spotlight 4).

Table 23. Proportion of children (percent) who received day 1 SMC medicines from boma health workers in philanthropically supported counties according to household surveys, South Sudan, 2023

Cycle 1	Cycle 2	Cycle 3	Cycle 4	Cycle 4
79.4	83.1	82.9	99.1	3–6 November

SPOTLIGHT 4:

Implementing SMC in an IDP camp

With its complex challenges, implementing SMC in an IDP camp necessitated an extra layer of effort to understand the unique security dynamics. In our experience, three pillars are key to the successful delivery of SMC in such settings: stakeholder engagement, proactive security management and adherence to Malaria Consortium's security adaptation principles for SMC.

Working closely with the NMCP, we engaged with a wide array of distinct stakeholders, including the United Nations High Commissioner for Refugees, camp management committees, local leaders from the refugee community, the State Ministry of Health, county health departments, other non-governmental organisations providing services in the camp, and relevant security bodies. Regular meetings were organised with all stakeholders to discuss plans for SMC and address concerns. Additionally, the Malaria Consortium team attended weekly coordination meetings to stay abreast of any new developments and align activities with other actors in the camp.

Malaria Consortium also implemented stringent security measures and operational protocols during SMC delivery. Before each SMC cycle, approval was sought from relevant authorities and community leaders. Inside the camp, the team gathered information and updates, ensuring they were aware of any potential security risks or changes in the situation. Furthermore, our team made a concerted effort to establish direct communication channels with local leaders, obtaining their phone numbers and maintaining regular contact. This proactive approach facilitated quick responses to emerging issues, enhanced community trust, and ensured the safety of staff and the refugee communities alike.

Malaria Consortium's work in South Sudan also benefited from oversight by Malaria Consortium's global operations team, and all activities were governed by the organisation's global security guidelines and SMC security adaptation principles. This was essential in ensuring the safety of all involved in SMC delivery.

Plans for 2024

Malaria Consortium will continue to support SMC in the two counties in Northern Bahr el Ghazal with philanthropic funding in 2024. The target population will be around 80,000. Areas for improvement we intend to focus on in 2024 include reducing the number of age-ineligible children who receive SMC through improving training and supervision and strengthening the link between SMC and the country's pharmacovigilance system.

5.7 Togo

Background

Togo had a total population of 8.85 million in 2022.[54] Regional insecurity continued to impact Togo in 2023, particularly in the northern Savanes region, which has been subject to a state of emergency decree since June 2022 that was recently extended to March 2025. This insecurity largely relates to spill over from insurgent activity in neighbouring Burkina Faso and Mali.[55]

Malaria is highly endemic throughout the country and is the leading cause of death of children under five. While malaria transmission is perennial in the south, northern regions experience a seasonal peak between June or July and September or October. In 2022, there were 2.04 million malaria cases and 3,400 malaria deaths.[13]

SMC scale-up and support

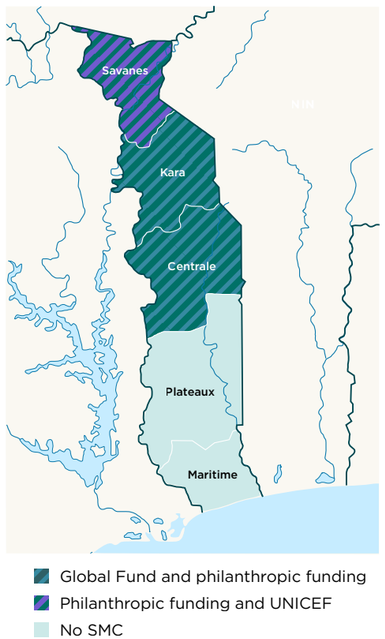
SMC has been implemented in Togo since 2013. The three northernmost regions of Centrale, Kara and Savanes were initially considered eligible for SMC. Geographical coverage increased from five districts initially to all 19 districts in those three regions from 2016 onwards. In 2023, around 510,000 children (Table 24) were targeted, with funding from the Global Fund, Malaria Consortium's philanthropic funding and UNICEF (Figure 11). All districts implement four cycles per round.

Table 24. SMC target population by funding source, Togo, 2022–2023

Funding source	Number of districts (2022)	Target population (2022)	Number of districts (2023)	Target population (2023)
Global Fund and philanthropic*	12	310,000	12	310,000
Philanthropic and UNICEF**	7	200,000	7	200,000
TOTAL	19	510,000	19	510,000

Target population figures have been rounded to the nearest 10,000.
*The Global Fund covers the majority of costs, but philanthropic funding is used to cover selected activities including training and household surveys.
**UNICEF covers the cost of SPAQ, while philanthropic funding is used for all SMC implementation costs.

Figure 10. SMC support by region and funding source, Togo, 2023



Philanthropically supported SMC delivery in 2023

SMC in the three eligible regions is supported by Malaria Consortium's philanthropic funding through co-funding arrangements with the Global Fund and UNICEF. In the 12 districts of Centrale and Kara regions, the Global Fund covers SPAQ and the majority of SMC implementation costs. Some activities, including training and household surveys, were supported with philanthropic funding. The 2023 SMC target population in those regions was 310,000. In the seven districts of Savanes region, UNICEF covered the cost of SPAQ, while philanthropic funding was used for all other SMC implementation costs. In 2023, the SMC target population in this region was 200,000. Because of the co-funding arrangements with the Global Fund and UNICEF, philanthropic funding is not used to procure SPAQ for Togo. However, in June, Malaria Consortium facilitated a loan of 700,000 blister packs from Burkina Faso to Togo. This was necessary to ensure the timely start of the SMC round despite the delayed delivery of SMC medicines procured by other funders. The loan was returned to Burkina Faso in October.

Philanthropic funding supported training of almost 4,000 SMC implementers in over 200 training events, including around 3,500 volunteer community distributors (Table 25). National and regional trainers were the same as last year, so only a short briefing was provided rather than a full training.

Table 25. SMC implementers trained with philanthropic support, Togo, 2023

Cadre	Number of SMC implementers	Number of days per training	Number of training events	Target population (2023)
National- and regional-level trainers and supervisors	7	3	1	310,000
District-level supervisors	52	3	2	200,000
Health workers	490	2	24	510,000
Community distributors	3,447	2	207	
TOTAL	3,996		234	

While the start of the SMC round was initially planned for June, conflicting priorities within PNLP meant that micro-planning could only be conducted in May. It was decided to start cycle 1 distribution on 7 July in all SMC-implementing districts (Table 26). Four cycles were implemented as planned, including in one district in the north of the country, which was considered high-risk due to security concerns. The 2023 round ended on 7 October in all districts. While not funded philanthropically, the PNLP tested the use of a digital tool for the collection of administrative SMC data. Malaria Consortium staff supported this process through the provision of technical advice, including on timely availability and use of the digitally collected data.

Table 26. SMC distribution dates in philanthropically supported districts, Togo, 2023

	Cycle 1	Cycle 2	Cycle 3	Cycle 4
19 districts	7–9 July	7–9 August	7–9 September	5–7 October

Table 27. Proportion of children (percent) who received day 1 SMC medicines from community distributors in philanthropically supported districts according to household surveys, Togo, 2023

Cycle 1	Cycle 2	Cycle 3	Cycle 4	Cycle 4
99.4	99.1	99.7	89.1	5–7 October

Districts that were considered high-risk at the time of a given survey were excluded from the sampling frame.

Administrative data showed that a mean of 453,159 doses of day 1 SPAQ were administered per cycle, representing administrative coverage of 88 percent. Household surveys found SMC coverage in terms of the proportion of children who received SMC medicines from community distributors ranging from 89 percent to 100 percent (Table 27).

Plans for 2024

Results from a stratification exercise conducted in 2023 suggest that an additional four districts in Plateaux region meet SMC eligibility criteria and that all districts should implement five rather than four SMC cycles per round. The 2024 target population in the 23 districts that are now considered eligible will be 620,000. At the time of writing this report, the exact contributions of different funders in support of this expansion had not yet been confirmed. While Malaria Consortium is generally supportive of efforts to include more districts and increase the number of cycles, we expect that our overall philanthropic funding envelope in 2024 will remain comparable to previous years. From an operational perspective, we will focus on integrating safeguarding into SMC implementers' training and strengthening the capacity of district-level SMC implementers to compile and analyse administrative and routine HMIS data.

5.8 Uganda

Background

Uganda's total target population stood at 47.25 million in 2022.[56] The country is relatively stable and not affected by the same level of violence as other countries where Malaria Consortium supports SMC.

Malaria is highly endemic in the entire country. Transmission is perennial in much of the country, but there are areas with a seasonal transmission peak between May and September in the northeastern parts of the country. In 2022, there were an estimated 12.7 million malaria cases and 18,000 deaths. Uganda ranks third in terms of malaria cases globally, accounting for 5.1 percent of global cases.[13]

SMC scale-up and support

Based on modelling by the Swiss Tropical and Public Health Institute,[57] the Uganda Malaria Reduction and Elimination Strategic Plan 2021–2025 recommends the introduction of SMC in the Karamoja subregion,[58] where malaria transmission is seasonal and the highest prevalence rates in the country are consistently reported. SMC was introduced in two districts of Karamoja in 2021 as part of an implementation study conducted by Malaria Consortium together with the National Malaria Control Division (NMCD). In 2022, SMC was implemented in eight districts, targeting 240,000 children. In 2023, the target population increased to 250,000 (Table 28), thanks to the expansion to one additional district (Figure 12). This means all nine districts of Karamoja were covered in 2023. Funding was provided by Malaria Consortium's philanthropic SMC funding and the Global Fund. Reflecting local seasonality patterns, all districts aim to implement five SMC cycles per round between May and September.

Figure 11. SMC support by district and funding source, Uganda, 2023

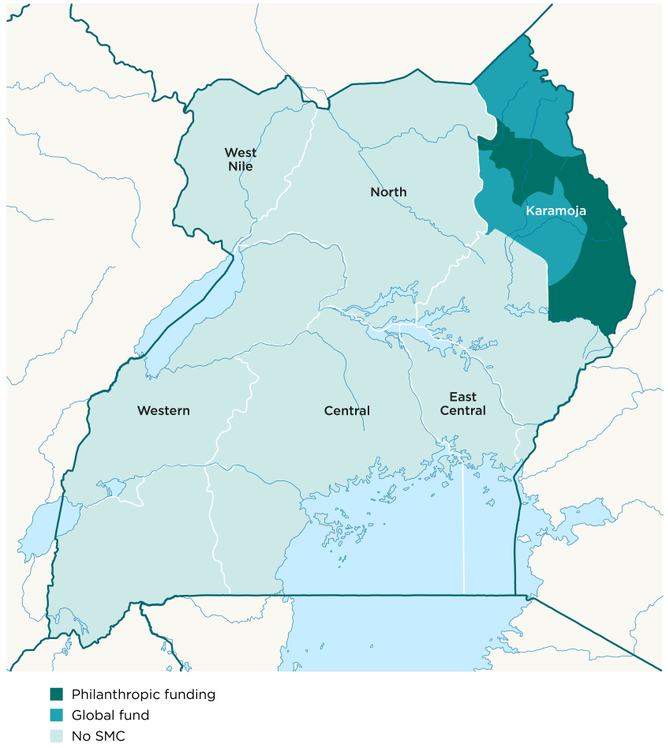


Table 28. SMC target population by funding source, Uganda, 2022–2023

Funding source	Number of districts (2022)	Target population (2022)	Number of districts (2023)	Target population (2023)
Philanthropic	4	150,000	5	150,000
Philanthropic and Global Fund*	4	90,000	0	0
Global Fund	0	0	4	100,000
TOTAL	8	240,000	9	250,000

Target population figures have been rounded to the nearest 10,000.
*In 2022, while the Global Fund supported the majority of costs, philanthropic funding was used to support project management and Malaria Consortium operational costs.

Philanthropically supported SMC delivery in 2023

Malaria Consortium used philanthropic funding to support SMC delivery to a target population of 150,000 children in five districts in 2023. Four of those districts had been fully funded philanthropically in 2022. The fifth district was primarily funded philanthropically in 2022 but Global Fund covered part of the cost of SPAQ. In 2022, philanthropic funding was used to cover project management and Malaria Consortium operational costs in three additional districts, where the Global Fund covered all other costs. In 2023, those three districts were fully supported by the Global Fund.

A total of 1,521,000 blister packs of SPAQ was procured with philanthropic funding. The SPAQ was shipped by sea and arrived in May. Philanthropic funding was used to train almost 2,700 SMC implementers in 74 training events, including around 2,500 village health team (VHT) members, a recognised cadre of salaried community health workers who serve as community distributors in Uganda (Table 29). As all national-, regional- and district-level trainers, and most health workers, had been involved in the 2022 round, only a brief refresher training was offered for those cadres.

Table 29. SMC implementers trained with philanthropic support, Uganda, 2023

Cadre	Number of SMC implementers	Number of days per training	Number of training events
National-, regional- and district-level trainers and supervisors	50	1	5
Health workers	172	1	5
VHTs	2,466	1	64
TOTAL	2,688		74

To facilitate supervision by national and regional health authority staff, implementation dates were staggered in philanthropically supported districts, with three districts starting the 2023 round on 15 May and the remaining two districts starting four days later on 19 May (Table 30). All districts implemented five SMC cycles. No delays were experienced, and the annual round concluded on 8 September and 11 September, respectively. Several measures were taken to reduce the cost of implementing SMC in Karamoja, including reducing the SMC distribution period per cycle from four to three days, increasing the use of vehicles owned by districts rather than hiring cars, and transporting commodities to health facilities only once for the entire round instead of for each cycle.

Table 30. SMC distribution dates in philanthropically supported districts, Uganda, 2023

	Cycle 1	Cycle 2	Cycle 3	Cycle 4	Cycle 5
3 districts	15–17 May	13–15 June	11–13 July	8–10 August	5–8 September
2 districts	19–21 May	17–19 June	15–17 July	12–14 August	9–11 September

According to administrative data, the mean number of day 1 SPAQ doses administered was 154,219 per cycle. This represents administrative coverage of 100 percent. Household surveys confirmed high SMC coverage in terms of the proportion of children who received day 1 SPAQ from VHTs, ranging from 98 percent to 100 percent (Table 31).

Table 31. Proportion of children (percent) who received day 1 SMC medicines from VHTs in philanthropically supported districts according to household surveys, Uganda, 2023

Cycle 1	Cycle 2	Cycle 3	Cycle 4	Cycle 5
100	98.0	99.0	98.0	99.9

Many inhabitants of Karamoja are nomadic pastoralists. Spotlight 5 discusses how using VHTs that are familiar with the local context was instrumental in achieving high SMC coverage among this population.

SPOTLIGHT 5:

Reaching Karamoja's nomadic populations

One challenge we face in successfully implementing SMC in the Karamoja subregion is the logistical complexity of reaching predominantly nomadic pastoralist populations. The traditional fixed-point healthcare delivery models were often found to be ineffective in this area in the past, prompting the need for a strategy that mirrored the nomadic lifestyle of the Karamojong people. The solution was the mobilsation of well-trained community health workers supported by local health authorities and cultural leaders — also known as manyata leaders — who are familiar with nomadic migration patterns and adept in navigating the rugged landscapes to administer life-saving SMC medicines door-to-door.

SMC delivery, Uganda

The door-to-door approach resulted in very high coverage — often above 90 percent as shown by our end-of-cycle and end-of-round household surveys. The initiative saw a marked reduction in malaria cases as recorded in the routine health management information system. For example, in Abim district, the malaria incidence in children under five declined from 94 per 1,000 persons in July 2022 to 33 per 1,000 persons in October 2022. In 2021, before SMC was introduced, malaria cases remained relatively stable over the same period (94 per 1,000 persons in May to 87 per 1,000 persons in October).

Janet, a mother from Kakoliye village in Moroto district, reported that her children, who frequently used to require hospital treatment for malaria, now rarely fall sick: "I have never seen any child of mine suffer from malaria since the VHTs started giving our children SMC drugs."

Malaria Consortium's work in Karamoja serves as a model for malaria prevention in nomadic and hard-to-reach populations globally. The successful implementation of SMC in Karamoja illustrates how adaptable, community-centric approaches can overcome the most daunting of challenges.

Plans for 2024

The NMCD aims to ensure continued delivery of SMC in all nine districts of Karamoja in 2024, with a combined target population of approximately 270,000. At the time of writing this report, the exact extent of available Global Fund funding for SMC had not yet been confirmed. However, the overall philanthropic funding envelope for SMC in Karamoja in 2024 is expected to remain comparable to that in 2023. Operationally, Malaria Consortium will support the NMCD in integrating key SMC indicators into the routine HMIS. We will also introduce mentorship for VHTs and health workers during supervision and review meetings to improve adherence to the SMC protocol; increase efforts to reach children in hard-to-reach areas such as mobile kraals, mining sites and urban settlements; and strengthen community engagement through the use of community-level mobilisers during the SMC round.

6. Malaria Consortium's contribution to SMC research

6.1 Overview

Malaria Consortium believes that policy and practice should be informed by evidence. Building on our practical expertise in implementing public health interventions, our research provides evidence for policy makers and implementing partners to make decisions to improve programme performance and quality of implementation. Key to our research are our relationships with academic partners, national malaria programmes and local communities. We are one of a small number of non-governmental organisations in the UK that has been awarded independent research organisation (IRO) status by Research Councils UK.[59]

With our expertise in both SMC implementation and research, Malaria Consortium is uniquely placed to contribute to building the evidence base for the intervention. Our SMC research helps us and our partners to continuously improve the delivery of SMC, assess its impact and inform the decisions that will shape the future of SMC. The majority of the work described in this chapter was supported with philanthropic funding for SMC. Where studies were supported by other funders, this is noted in the text. We aim to publish research findings in peer-reviewed journals and at national and international academic conferences. Our publications are referenced throughout this report. One of the key global platforms for sharing malaria research is the annual meeting of the ASTMH. A blog post published on Malaria Consortium's website summarises the SMC content Malaria Consortium presented at the annual meeting in 2023.[60]

6.2 Developing and evaluating solutions to operational challenges

We are confident that SMC campaigns supported by Malaria Consortium are delivered to a high standard of quality. However, there is always room for improvement. Often, strengthening SMC delivery requires us to apply lessons learnt from previous SMC campaigns by reflecting on our work and listening to feedback from partners, implementers and the communities where SMC is implemented. Sometimes, more systematic operational research is required to understand why aspects of the campaign are not working as well as they could and what could be done to improve. Similarly, the impact of minor adaptations to the SMC delivery approach is typically assessed through routine M&E data, but more substantial adaptations may call for more rigorous evaluation using research methods. We are also increasingly using the data collected through routine household surveys or previous research studies for secondary analyses to shed light on areas that require improvement.

Many of the studies Malaria Consortium has conducted together with its partners relate to community engagement, acceptability of SMC among communities and adherence to the SMC protocol, for example in terms of ensuring children receive the full course of SMC medicines each cycle and preventing the administration of SMC medicines to children over five.

Predictors of caregiver adherence to administration of day 2 and 3 AQ in Burkina Faso, Nigeria and Togo

Using data from SMC coverage surveys conducted by Malaria Consortium in Burkina Faso, Nigeria and Togo in 2020 and fitting multivariate random-effects logistic regression models, this study identified predictors of adherence to administration of AQ on day 2 and day 3 among caregivers whose children had received day 1 SPAQ from a community distributor. It found that awareness of the importance of administering day 2 and day 3 AQ among caregivers (odds ratio [OR]: 2.19, 95 percent confidence interval [CI] 1.69–2.82, p<0.001), as well as home visits to caregivers by lead mothers (OR: 2.50, 95 percent CI 1.93–2.24, p<0.001) were significantly associated with caregiver adherence to day 2 and day 3 AQ administration. This highlights the importance of community engagement and the positive influence that community-level implementers can have on promoting adherence to the SPAQ administration protocol. The results of this secondary analysis were published in the Malaria Journal.[61]

Caregiver knowledge, receipt of full courses of SPAQ and administration of SMC medicines to children over five in Nigeria

Using data from routine end-of-round household surveys conducted by Malaria Consortium in eight Nigerian states and the FCT in 2022, we assessed caregivers' knowledge of various aspects of SMC and their confidence in its effectiveness. We also assessed factors associated with the receipt of full courses of SPAQ and the extent to which SMC medicines are administered to children over five.

Higher odds of SMC confidence were observed among caregivers with knowledge of the purpose of SMC (OR: 1.65, 95 percent CI: 1.22–2.23, p=0.001) and the importance of receiving a full course of SMC medicines (OR: 4.69, 95 percent CI: 3.47–6.33, p=<0.001). Knowledge of age eligibility (OR: 1.36, 95 percent CI: 1.01–1.83, p=<0.041) was also associated with SMC confidence among caregivers. Children who received day 1 SPAQ as DOT were almost three times more likely to receive a full course of SPAQ (adjusted OR: 2.75, 95 percent CI: 1.69–4.47, p=<0.001). Around 30 percent of age-ineligible children received at least one dose of SMC medicines. Lower odds of an age-ineligible child receiving SMC were observed when caregivers had knowledge of SMC age-eligibility. Higher odds of SMC receipt were found among age-ineligible children when caregivers had confidence in the protective effect of SMC. Results were presented at the 2023 ASTMH conference[62-64] and were published in the Malaria

Journal.[65] Together with our partners, we will explore how this can be minimised, for example by strengthening key messages shared with caregivers and community distributor training.

The role of community leaders in SMC in Mozambique

Recognised community leaders play an important role in sensitising and mobilising communities for SMC in Mozambique. A qualitative study was conducted in 2021 in Nampula province, Mozambique, to assess the impact of community leaders on acceptability of SMC. The study comprised key informant interviews (KIIs) with stakeholders at community, provincial, national and district levels, as well as focus group discussions (FGDs) with caregivers of children who received SMC, community distributors and supervisors. Caregivers frequently reported that they were influenced by community leaders' explanations about the benefits of SMC. The study recommends that the role of community leaders should be recognised and formalised as SMC is scaled up in Mozambique.[66]

Community health workers' and lead mothers' capacity to support SMC in Mozambique, Nigeria, South Sudan and Uganda

Community health workers often hold essential roles in SMC campaigns — either as community distributors or supervisors of community distributors. Other government-recognised cadres of community health actors, like lead mothers, often support community engagement, caregiver support and referrals. This secondary analysis investigated the factors that impact those actors' ability to effectively support SMC campaigns. Re-analysing qualitative data collected by Malaria Consortium and local research partners in Mozambique, Nigeria, South Sudan and Uganda, this study identified four key themes:

- Physical access, for example inadequate transportation and adverse environmental conditions
- Effective communication and level of knowledge
- Workload and motivation, for example because of delayed payments
- Systemic and contextual factors like literacy.

The study recommends that the contributions of community health workers and other community actors like lead mothers should be monitored and recognised — in addition to those of volunteer community distributors. It also recommends the development of a framework to define and describe the roles of different types of SMC implementers.[67]

Optimising the role of lead mothers in SMC, Nigeria

This study comprised three phases. During the formative stage, a literature review and KIIs with community leaders, and national, state and local government health officials, provided insights that were used to define the role of lead mothers and enhance their capacity to strengthen high-quality SMC delivery. The development stage included a co-design workshop with key stakeholders. The evaluation stage involved baseline and endline household surveys to assess the impact of lead mothers on SMC outcomes, as well KIIs and FGDs with key stakeholders.

The formative assessment indicated that, through their strong connection to communities, lead mothers influence caregivers to adopt healthy malaria prevention behaviours during SMC campaigns, including giving their children the required doses of AQ over the two days following the community distributors' visit to the household. The research also pointed to some areas that required improvement, including recruitment criteria, training, work planning and supervision, and timely payment of lead mothers. Results from the formative assessment were published in the Malaria Journal.[68]

Working with NMEP and others, the lead mothers approach was adapted based on the formative phase. In particular, this involved strengthening the key messages lead mothers share with community members, as well as developing targeted training materials for lead mothers. Data collection on the evaluation of the adapted approach concluded in 2023 and results will be published in 2024.

Using the role model approach to improve administration of SPAQ in Burkina Faso, Chad and Togo

In 2021, Malaria Consortium and partners conducted a formative study in Burkina Faso, Chad and Togo to identify positive caregiver behaviours around the administration of SMC medicines. Those behaviours included incentivising children with rewards for accepting the medicines; spouses, family members or neighbours reminding caregivers to administer day 2 and 3 AQ; and placing blister packs in a prominent place such as near ingredients used for cooking. Some behaviours that should be discouraged were also identified, including mixing SPAQ with food or drink; and using force to make the child take the medicines. Results from the formative research stage were disseminated among country-level stakeholders and presented at the annual meeting of the ASTMH.[69,70]

In 2022, role models were trained to deliver interactive monthly sessions within their communities, with the goal of sharing behaviours and reinforcing key messages. The impact of promoting the identified role model behaviours on SMC outcomes was assessed at the end of the 2022 SMC campaign and many of the adaptations were used at scale during the 2023 rounds. For example, in Burkina Faso, the community distributor training was updated to include messaging that encourages other family members to remind mothers to administer AQ on day 2 and 3. In Chad, messages shared by community distributors included a suggestion to keep the AQ tablets near where families keep sugar so caregivers are reminded whenever they prepare food or tea; while in Togo, community distributors conducted sensitisation sessions in their communities a few weeks before the start of the round, promoting behaviours such as rewarding children for taking the medicines. In addition, posters exemplifying positive behaviours were developed and displayed at health facilities participating in SMC in Burkina Faso. Study results will be published in 2024.

Urban-rural differences in SMC coverage in Nigeria

This comparative cross-sectional study used data from end-of-round household surveys conducted by Malaria Consortium in nine states where SMC was delivered in Nigeria in 2022. Urban-rural differences in SMC outcomes and child and caregiver characteristics were assessed, first by using Pearson's chi-square test for independence for categorical variables. Univariate multilevel mixed-effect logistic regression models, with random intercepts for cluster units, were used to quantify the strength of association between location and each SMC coverage and related outcomes.

The study found significant urban-rural differences in terms of SMC coverage and related outcomes, with children residing in urban areas having lower odds of receiving SMC medicines as per the standard SMC protocol. For example, urban children had lower odds of the receipt of day 1 SPAQ (OR: 0.507, 95 percent CI: 0.304–0.846, p=0.009) and receiving day 1 SPAQ as DOT (OR: 0.551, 95 percent CI: 0.394–0.771, p<0.001). Caregivers in urban areas had lower odds of being knowledgeable of SMC (OR: 0.649, 95 percent CI: 0.491–0.859, p=0.002) and believing in the protective effect of SMC (OR: 0.600, 95 percent CI: 0.390–0.921, p=0.020). The study underscores the need for context-specific strategies to ensure optimal delivery of SMC in urban contexts, including the use of mass media for community engagement, the addition of fixed distribution points to complement the door-to-door delivery approach, and the use of private health facilities supervising units instead of public health facilities. The results of this study were published in the Malaria Journal.[71]

Access to SMC among nomadic populations in Chad

While SMC campaigns generally achieve high coverage, it has been speculated that some populations may not be optimally served through door-to-door campaigns because of their mobility. Our research in 2023 addressed the needs of one such group: nomadic populations in Chad. This study aimed to assess the feasibility and acceptability of SMC among nomadic populations, determine factors affecting the administration of SPAQ in those populations, and develop strategies to strengthen access to SMC among eligible children in nomadic populations.

A study protocol was developed that involved a mixed-methods design, including KIIs, cross-sectional surveys and geospatial analysis. Malaria Consortium signed an agreement with the Ministry of Health department in charge of services for hard-to-reach populations with the aim of improving access to SMC services for nomadic populations. Data collection was completed in 2023 and results will be published in 2024. We also plan to convene a co-design workshop with key stakeholders and community members to develop strategies to increase access to SMC among nomadic populations. Adaptations to the SMC intervention will be tested and evaluated in 2024 and coverage and acceptability outcomes will be evaluated.

6.3 Assessing the impact of SMC

There is ample evidence of the effectiveness of SMC from studies conducted by Malaria Consortium and others in different geographies, including Burkina Faso, Mali, Cameroon, Togo, Mozambique and Uganda.[72-77] This includes evidence from studies exploring the intervention's impact in terms of reducing malaria cases in children under five during the peak transmission season when implemented at scale. There remains, however, a need to monitor the impact of the intervention over time. As WHO guidance on the use of SMC evolves, there is also a need to assess the impact of expanding the intervention to new geographies, varying the number of cycles or expanding SMC to older children. Finally, as parasites develop resistance to antimalarials, we need to monitor the spread of resistance to SPAQ and assess the extent to which this poses a threat to the effectiveness of SMC. The studies on SMC in Mozambique and Uganda described in this section were conceived as coherent, multi-component studies, and study protocols were published in peer-reviewed journals.[78-80]

Transmission modelling to estimate the impact of SMC at scale

It can be challenging to identify impact in routine data due to issues in data quality, measurement error and bias. For example, over the years 2013–2018 in Burkina Faso, average monthly malaria cases per health facility in children under five increased despite the introduction of SMC in 2014. However, rather than indicating a lack of SMC effectiveness, the increase in malaria cases can be explained by factors such as changes in access to health services following a removal of user fees for children under five, and improvement in case detection and diagnostics. Prevalence data from nationally representative household surveys, such as the Demographic and Health Surveys and Malaria Indicator Surveys, which are routinely and regularly conducted in many countries, provide reliable representative estimates of malaria prevalence at a specific time and place. They could potentially be used as an alternative, sustainable data source to assess the impact of SMC. To test this hypothesis, an ecological study based on analysis of survey, rainfall, geographical and SMC programme data from Burkina Faso (2010–2017) and Nigeria (2010–2018) was undertaken to assess the impact of SMC. Mixed-effects logistic regression was performed to predict presence of malaria infection in children 6–59 months. In Burkina Faso, there was a substantial decrease in the odds of RDT-positive malaria infection in children living in areas where SMC was implemented

during the months when SMC is delivered (OR: 0.28, 95 percent CI: 0.21–0.37, p<0.001). The same trend was found in Nigeria (OR: 0.40; 95 percent CI: 0.30–0.55, p<0.001). The odds of malaria were lower up to two months post-SMC in Burkina Faso (OR: 0.33; 95 percent CI: 0.17–0.64, p<0.001).[81]

Building on this work, we calibrated a malaria transmission model to fit to microscopy-confirmed malaria prevalence in 62 health districts of Burkina Faso based on Demographic and Health Survey data (2010–2018). Calibration was conducted using the maximum likelihood by varying mosquito density. Factors included in the model were rainfall, mosquito net use and treatment. We then simulated the impact of SMC with 70 percent coverage in children 3–59 months and compared the modelled predictions of clinical cases to routine data showing the number of children with malaria that was confirmed by RDT. Before the introduction of SMC, there were unexpected seasonal shifts in the age distribution of cases, which increased along with the malaria burden. We successfully replicated these results in modelled outputs before SMC introduction by factoring in assumptions regarding non-malarial fevers, asymptomatic malaria, treatment seeking and the impact of the removal of user fees. This suggests that age-related variations in routine data can mask the impact of SMC.[82]

This work forms part of a Doctor of Philosophy (PhD) project at Imperial College London. Future research will further examine whether the model's simulated SMC coverage aligns with observations in routine data over time and across each SMC cycle.

SMC effectiveness in Nigeria

This study was conducted in the FCT, Kogi and Oyo and involved extracting data on malaria cases in children 3–59 months and 5–10 years from the registers of around 30 health facilities, covering 2021 (pre-SMC) and 2022 (first year of SMC implementation). Descriptive and summary statistics were computed for a range of indicators. To estimate the impact of SMC, mixed-effects negative binomial regression models with random intercepts for health facility catchment areas were used to examine the relationship between periods (2021 versus 2022) for mean population-adjusted monthly confirmed malaria cases and other key outcomes, including severe cases and malaria attributable deaths. The models were adjusted for time-varying factors and potential confounders such as monthly rainfall and temperature, population growth, health-seeking behaviour and malaria testing rates. Impact was measured in terms of incidence rate ratios. Results will be available in 2024.

Assessing the impact of extending SMC from four to five monthly cycles in Burkina Faso

Based on systematic stratification exercises to inform subnational tailoring of malaria interventions, many SMC-implementing countries have expanded SMC from four monthly cycles per round to five monthly cycles in areas where the peak malaria transmission season is longer. In Burkina Faso, this change was introduced in 2021. However, to date, there is limited evidence on the impact of adding a fifth monthly cycle under programmatic conditions at scale.

This study assessed the impact on malaria incidence and mortality of an additional cycle of SMC in 19 health districts, using routine surveillance data 2015–2021. Newey-West interrupted time-series analysis and negative binomial regression models were used to explore and compare district-level monthly trends of malaria incidence between the periods of four and five SMC cycles. Models were adjusted for time-varying factors such as population growth, health-seeking behaviour and malaria testing rates. A general decline in the peak incidence of reported malaria cases was observed across districts, following the introduction of the fifth cycle in 2021. Compared with the four-cycle (pre-2021) period, the incidence of malaria confirmed by RDT was lower in the five-cycle period (2021), with an incidence rate ratio of 0.91 (95 percent CI: 0.85–0.97, p=0.004). Results were presented at the 2023 annual meeting of the ASTMH, acknowledging that further research involving more robust and additional data points over an extended period of time is needed to better understand the impact of extending SMC from four to five monthly cycles per round.[83]

SMC effectiveness in East and southern Africa: Mozambique and Uganda

The Sahel region of West and central Africa has historically been prioritised for the scale-up of SMC due to the highly seasonal malaria transmission pattern and low prevalence of molecular markers associated with parasite resistance to SPAQ. Current WHO guidelines no longer define geographic restrictions on the use of SMC, which has prompted interest in the use of the intervention in areas of East and southern Africa that meet eligibility criteria in terms of seasonality of malaria transmission and transmission intensity. In collaboration with the respective national malaria programmes and local research partners, Malaria Consortium conducted two studies to assess if SMC can be effective in preventing clinical disease during the peak transmission season in Nampula province, Mozambique, and Karamoja subregion, Uganda.

Both studies initially comprised non-randomised controlled trials in 2021, where SMC was implemented in a small number of districts, which were compared against other districts where SMC was not implemented. In both locations, SMC was found to be highly effective, with an 83 percent protective effect in Mozambique[84] and a 92 percent protective effect in Uganda.[77] In the following year, more rigorous cluster-randomised controlled trials (cRCT) were implemented in both locations. In Mozambique, an open-label, two-arm cRCT was conducted in two districts of Nampula province in 2022, with the aim of assessing the protective effectiveness of SMC with SPAQ in terms of preventing RDT-confirmed clinical malaria among children 3–59 months during the high transmission season. In Uganda, an open-label, three-arm cRCT was conducted in 2022 in one district of Karamoja to assess the effectiveness of SMC using SPAQ and an alternative drug regimen, dihydroartemisinin-piperaquine (DP). The primary outcome in both studies was the incidence of malaria confirmed by RDT in eligible children as ascertained through optimised passive surveillance. Primary analysis was based on time to RDT-confirmed malaria event (accounting for recurrent episodes) on an intention-to-treat basis, accounting for clustering, with no assumption of post-infection immunity. Kaplan-Meier survival plots were used to illustrate the probabilities of occurrence of outcomes over time and across study arms. Cox proportional hazard regression models were used to quantify the protective effectiveness of SMC medicines relative to control.

Preliminary results from both studies were presented at the 2023 ASTMH conference. In Mozambique, the hazards of fever were reported to be reduced by 62 percent in children in the intervention arm compared with those in the control arm.[76] In Uganda, children who received SMC using SPAQ had 94 percent lower hazard of having an RDT-confirmed malaria episode. For those who received DP, the hazard was reduced by 96 percent.[85] Final results and more comprehensive analyses from both studies will be published in peer-reviewed journals in 2024.

SMC effectiveness in East and southern Africa: South Sudan

This non-randomised, quasi experimental study was conducted in collaboration with South Sudan's NMCP in two counties of Northern Bahr el Gazal in 2022. In one of those counties, five SMC cycles were implemented, while the second county served as a control with no SMC. Data were obtained from repeated cross-sectional household surveys of caregivers of children 3–59 months using cluster sampling. A wave 1 survey took place before SMC implementation, while waves 2 and 3 took place after the second and fourth monthly SMC cycles. Difference-in-differences analyses were performed by fitting logistic regression models with interactions between county and wave. The study found high effectiveness of SMC using SPAQ in terms of reducing malaria during the high transmission season in children 3–59 months, with odds of caregiver-reported RDT-confirmed malaria 82 percent lower in the previous one-month period prior to wave 2 (OR: 0.18, 95 percent CI 0.07–0.49, p=0.001) and wave 3 (OR: 0.18, 95 percent CI 0.06–0.54, p=0.003) in the intervention arm compared to the control. Study results were published in the Malaria Journal.[86]

Assessing parasite resistance to SMC medicines

The landmark study assessing the impact of the scale-up of SMC through the ACCESS-SMC project found that molecular markers associated with parasite resistance to SPAQ remained uncommon in the Sahelian countries where the project had been implemented but recommended that situation be carefully monitored.[10] This is particularly relevant as SMC is expanded to areas in East and southern Africa, where resistance to the SMC medicines is widespread.[87] Assessing resistance to SPAQ is typically done through molecular markers surveys, which involve taking blood samples from symptomatic children whose malaria infection has been confirmed by RDT, extracting the malaria parasite's deoxyribonucleic acid (DNA) from the samples and then performing analyses to detect the presence of certain genetic markers that are associated with resistance to SP or AQ. Often, those surveys are conducted before and after SMC distribution to assess if SMC is contributing to the spread of resistance.

Malaria Consortium and partners conducted such surveys in Burkina Faso, Nigeria, Mozambique, South Sudan and Uganda in recent years. The studies in Mozambique and Uganda were funded by the Bill & Melinda Gates Foundation. Preliminary results from Burkina Faso, Mozambique and Uganda were presented at the 2023 ASTMH conference. In Burkina Faso, the prevalence of relevant SPAQ resistance markers was relatively low, though some changes were observed before and after SMC distribution.[88] In Mozambique and Uganda, the prevalence of molecular markers associated with SP resistance was generally high, whereas prevalence of markers associated with AQ resistance was comparatively low, with local variations.[89,90] Final results from all resistance markers studies will become available over the course of 2024.

Assessing the chemoprevention efficacy of SMC medicines

Chemoprevention efficacy refers to medicines' ability to clear existing infections and prevent new ones over a short period of time. In 2022, the WHO published a standard protocol for the assessment of the chemoprevention efficacy for monitoring and evaluating the efficacy of medicines used for malaria chemoprevention.[91] Malaria Consortium and local research partners have been working with the WHO to field test and validate the protocol. So far, those studies have been conducted in Burkina Faso, Mozambique, Nigeria, South Sudan and Uganda. The studies in Mozambique and Uganda were funded by the Bill & Melinda Gates Foundation.

In the context of SMC, chemoprevention efficacy studies involve taking blood samples from children who have received a full course of SMC medicines under the supervision of a trained distributor at different time points during the 28-day period during which SPAQ is assumed to confer protection from malaria. Typically, samples are taken on the day when the first doses of SP and AQ are administered (day 0) and then again on days 7, 14 and 28. The presence of malaria parasites in the blood is determined through microscopy and quantitative polymerase chain reaction. This method allows us to detect the presence of genetic markers commonly associated with parasite resistance to the SMC medicines. In addition, pharmacometric analyses are performed on samples taken on days 7 and 28 to determine drug concentrations, which allows us to understand how well the medicines are metabolised and eliminated over time. Taken

together, the results enable us to assess not only if the medicines in the dosage provided are efficacious in clearing existing infections and preventing new ones, but also, where parasites survive and breakthrough infections occur, whether this is a result of parasite resistance or suboptimal dosing.

Preliminary results from a chemoprevention efficacy study conducted in Mozambique were presented at the annual meeting of the ASTMH in 2023. The study found that while SPAQ is preventing clinical disease, its ability to clear existing subclinical malaria infections in a context of high parasite resistance is suboptimal despite the presence of therapeutic drug levels.[92] Data analysis on all studies is ongoing and final results will become available over the course of 2024. This work is led by a Technical Specialist at Malaria Consortium as part of a PhD project at Oxford University.

6.4 Shaping the future of SMC

For the foreseeable future, SMC is likely to remain a cornerstone of malaria prevention and control in areas where malaria transmission is seasonal and transmission intensity is high, but we are likely to see several fundamental changes to how SMC is implemented and how it intersects with other malaria prevention and control measures.

A central theme Malaria Consortium continues to work on is the integration of other interventions into the SMC delivery platform, which consistently reaches a large number of children. For example, Burkina Faso successfully integrated malnutrition screening into SMC delivery. In some cases, interventions may not be delivered through the same mechanisms as SMC, but a partially integrated or synchronised approach can maximise the combined public health impact. For example, SMC campaigns could be used to check on household use of mosquito nets or identify and refer children who have not received childhood vaccinations. Utilising the successful SMC platform for other community-based interventions and coordinating across health programmes has the potential to unlock efficiencies at the health system level, maximising coverage and reducing overall cost.

Another approach to minimising cost and ensuring the sustainability of the intervention could involve embedding SMC within routine community health service delivery. This would mean SMC would no longer be delivered through stand-alone campaigns, but through routine activities such as household visits by community health workers. However, this raises questions in terms of workload, task shifting and respecting the 28-day rhythm between SMC cycles.

SMC plus VAS in Nigeria

In Nigeria, VAS is typically delivered twice a year through Maternal, Newborn and Child Health Week (MNCHW) campaigns, alongside other interventions such as routine immunisation, nutrition screening and growth monitoring. However, VAS coverage has remained low.[93] Building on a study conducted by Malaria Consortium in 2019 to explore if delivering VAS to children 6–59 months via SMC is feasible and acceptable,[94] Malaria Consortium carried out further research on this topic at a larger scale in 2021. The follow-up study targeted around 165,000 children during SMC cycle 4 in two LGAs of Bauchi. A convergent mixed-methods design, including KIIs and FGDs, as well as baseline and cross-sectional endline household surveys, was used to explore the feasibility and acceptability of integrating VAS with SMC among caregivers, community distributors, health workers and policymakers, as well as to assess the effectiveness and safety of the approach. The study also included a cost analysis. The study was primarily funded through a grant from the Health Campaign Effectiveness programme at the Task Force for Global Health.

At endline, the proportion of children who received at least one dose of VAS in the last six months increased significantly from two to 59 percent. There were no adverse effects on the coverage of SMC delivery, with 70 percent of eligible children reached at baseline, increasing to 76 percent at endline. VAS did not appear to negatively affect the quality of SMC delivery. Intervention costs were determined at 0.94 USD per child and cycle for SMC only, and 1.18 USD per child for SMC and VAS. Caregivers liked the intervention because of the perceived health benefits to their children. The study concluded that full integration of SMC and VAS is feasible, with minimal incremental cost, and is acceptable to implementers and communities.[95]

Integrating SMC into Togo's national community health system

Many stakeholders are interested in the idea of integrating SMC into routine health service delivery to ensure the intervention's long-term sustainability. In 2022, Malaria Consortium worked with the PNLP and a local research partner in Togo to conduct formative qualitative research to explore the feasibility and acceptability of the closer integration of SMC with routine community health services such as integrated community case management (iCCM) of childhood diseases.

Through KIIs and FGDs with a range of stakeholders, including international, national and community actors, the study concluded that the integration of SMC into routine community health services was seen as feasible when supported by detailed planning, enhanced community participation and an increased numbers of trained community health workers. The integration was also seen as acceptable due to the positive perception of both SMC and community health workers at the community level.

In 2023, we hosted co-design workshops with a range of national, province of district-level stakeholders to define an operational model for integrating SMC into routine service delivery. We are now in the process of validating this operational model for implementation and evaluation in 2024. Results from the formative research and design stage will be published in a peer-reviewed journal.

6.5 SMC research in 2024 and beyond

Malaria Consortium will continue to invest in SMC research and to publish our findings in peer-reviewed journals and at academic conferences. Our research in 2024 will focus on SMC in new geographies, digitalisation, integration and the intersection of SMC and vaccines.

SMC in new geographies

A particular focus in 2024 will be on presenting and discussing final results from the series of studies we conducted to assess the suitability of SMC in East and southern Africa. So far, we have found that SMC is feasible, acceptable and effective in terms of preventing clinical disease among children under five during the high transmission season in those locations, despite high prevalence of molecular markers associated with parasite resistance to the SMC medicines, especially SP. There was no evidence to suggest that SMC contributed to the spread of resistance, though we have data from only a limited number of locations and covering a relatively short period of time. Preliminary chemoprevention efficacy results suggest that subclinical infections towards the end of the intended period of protection do occur.

Over the course of 2024, we will have final data from most of the different study components and from three locations — Mozambique, South Sudan and Uganda. We will be able to look at the results holistically to better understand how well SMC is working in East and southern Africa. Comparing those results with studies conducted in Burkina Faso and Nigeria, which will also become available over the course of the year, will help us to better define the relationship between effectiveness, chemoprevention efficacy and resistance. In 2024, we would also like to investigate the role immunity plays in this context.

Work on the project we call 'Rapid Assessments' will continue in 2024. This project aims to generate further evidence on the suitability of SMC in a series of new locations in East and southern Africa.[96] The mix of research methods used in the rapid assessments will differ between different locations, depending on what data are already available in a given location. Possible study components include cRCTs, chemoprevention efficacy studies, resistance markers studies and acceptability studies. The study protocol has been accepted for publication in JMIR Research Protocols. As part of the rapid assessments project, we are working with Imperial College London to calibrate a dynamic model that can predict the effectiveness of SMC in new geographies. In 2024 and 2025, we plan to conduct rapid assessments in a new region in Mozambique — where we expect the resistance profile to be different from Nampula — and in Malawi.

While the results will initially be particularly useful in informing the deployment of SMC in East and southern Africa, we believe that the findings are also relevant for SMC in West and Central Africa. In 2024, we plan to engage SMC stakeholders across Africa in conversations about the implications of this work, for example in terms of defining sustainable mechanisms for monitoring parasite resistance to SPAQ and exploring alternative drug regimens.

Digitalisation

As the use of digital tools in SMC increases, we are particularly interested in exploring how campaign digitalisation affects the cost-effectiveness of SMC. In 2024, we will be working with academics at the London School of Economics to perform an economic analysis of digitalising SMC in Mozambique.

Integration

The study on integrating SMC into routine community delivery of health services in Togo will continue in 2024, looking at evaluating coverage, feasibility and acceptability outcomes. We expect to test and evaluate the operational model that was developed together with stakeholders at a small scale. We also plan to conduct research alongside the scale-up of SMC plus VAS in two states of Nigeria this year, which will explore the impact of integrating SMC and VAS on uptake of other interventions that are delivered through MNCHWs. This is to ensure that removing VAS from the package of MNCHW services and increasing VAS coverage through co-implementation of SMC does not come at the expense of lower uptake of other MNCHW services. With funding from the Bill & Melinda Gates Foundation, we will also study the impact of integrating the delivery of SMC plus azithromycin, a broad-spectrum antibiotic, which has been identified as a potential high-impact intervention to promote child survival in areas where under-five mortality is high and largely driven by infectious causes.[97]

SMC and vaccines

Innovations such as malaria vaccines or monoclonal antibodies are likely to affect how and where SMC is deployed in the future. Malaria vaccines in particular have received considerable attention recently, following the WHO's recommendation to scale up the use of the RTS,S/AS01 vaccine among children in sub-Saharan Africa in 2021[98] and the use of the R21/Matrix-M vaccine in 2023.[99] In areas where malaria transmission is seasonal, studies have demonstrated that maximum benefit can be achieved by combining seasonal vaccination with SMC, with a combination of seasonal vaccination plus SMC providing a higher level of protection than either of those interventions alone.[100] We are also interested in the role SMC can play in increasing uptake of routine childhood immunisation. Vaccines for common childhood illnesses prevent up 4.4 million deaths every year,[101] but coverage is often suboptimal. SMC presents opportunities for synergies and coordination between SMC and vaccination programmes. Spotlight 6 discusses the intersection of SMC and vaccines in more detail.

SMC delivery, Nigeria

SPOTLIGHT 6:

SMC and vaccines

The Essential Programme on Immunisation (EPI) provides life-saving childhood vaccines that protect against critical preventable disease around the world, including measles, polio, and pertussis. The identification and catch-up of children who are unvaccinated ('zero-dose' children) or under-vaccinated is an important goal for many countries, to ensure that these life-saving vaccines are reaching as many children as possible. Often, the children who are missed by the EPI programme are considered hard to reach and may also be missing other critical health services.

One of the hallmarks of the SMC programme is its ability to reach large numbers of households through door-to-door campaigns, including in hard-to-reach communities. This means SMC interactions with families could be used to identify zero-dose and under-vaccinated children, and to link them with EPI services. In 2024, Malaria Consortium will be testing a programme in Burkina Faso and Togo to identify these at-risk children during SMC distribution. Working with national malaria programmes and EPI programmes in both countries, we will design targeted strategies to increase vaccination access and coverage where gaps are identified. SMC community distributors will be trained to collect key indicators related to vaccination during household visits and will provide families with relevant information on available vaccination services, as well as the benefit of immunisations. We will also consider providing outreach and mobile vaccination services in areas where vaccination coverage is low.

2024 will also mark the at-scale rollout of the malaria vaccine, as 20 countries in Africa plan to introduce the malaria vaccine into the EPI. This is an important addition to the toolbox in the fight against malaria but does not replace existing malaria prevention services. The efficacy of the malaria vaccine in clinical trials was measured assuming other key interventions such as mosquito nets, indoor residual spraying and SMC are in place. Research has also indicated that seasonal implementation of the malaria vaccine (for either the priming doses or booster dose) in combination with SMC can improve vaccine effectiveness.

Malaria Consortium is committed to supporting ministries of health in countries where we work to make programmatic decisions about the introduction of malaria vaccines that are operationally feasible and maximise impact. As countries introduce malaria vaccines, we are working with national technical advisory groups to support decision-making on vaccine schedules, community engagement and programme planning. We are also working to ensure communities and health workers understand the importance of continued malaria control efforts, such as mosquito net use, SMC and community case management of fevers.

SMC delivery, Burkina Faso

7. External relations

Malaria Consortium maintains and executes an external relations plan for SMC that reflects its position as a global leader on SMC. Through this plan, we broadly seek to contribute to relevant debates about SMC policy and practice and advocate for sustainable financing for SMC from three core channels: governments, institutional donors and philanthropists. Over the course of 2023, we continued to produce various communications and publications outputs in support of those aims, including blogs, news pieces and non-peer-reviewed publications to highlight Malaria Consortium's work on SMC and its impact. Those outputs are referenced throughout this report.

We also engage regularly with a wide range of global and regional stakeholders to discuss our work. In addition to bilateral meetings, a key platform for those discussions is the SMC Alliance. Malaria Consortium proactively participates in the regular calls that are open to all members and we are represented in the planning committee for its annual meeting. The 2023 annual meeting was held in Conakry, Guinea, over three days in late February and early March. It was attended by over 100 delegates from SMC-implementing countries, multilateral organisations like the WHO, implementing partners, donors and researchers. Philanthropic SMC funding was used to support attendance of up to two representatives from the national malaria programmes of countries where Malaria Consortium supports SMC. Malaria Consortium chaired a session on SMC in new geographies, which included presentations from Mozambique and Uganda. The meeting was also used to launch a report to celebrate 10 years of SMC intervention since it was first recommended by the WHO in 2012. The report recounts how SMC progressed from concept to scale, and recognises the contributions from national malaria programmes, bilateral agencies, donors, implementing partners and researchers.[102]

In addition to participating in the activities of the wider SMC Alliance, we also serve as the secretariat of its research and communications and advocacy subgroups. For the research subgroup, we organise regular calls where emerging SMC research is shared and discussed and we coordinate a global SMC research priority-setting exercise using the eDelphi method. This involves asking a large group of different SMC stakeholders to define and rank SMC-related research priorities. Results and a peer-reviewed publication are expected in 2024. Our work for the communications and advocacy subgroup in 2023 included leading on the production of the abovementioned report to mark 10 years of SMC. While we do not have a formal role in the SMC Alliance M&E subgroup, we participate in its activities. In 2023, Malaria Consortium colleagues presented their work in a webinar on 'Decoding the impact of SMC: Data analysis, evaluation and post-intervention insights',[103] which Malaria Consortium hosted on behalf of the SMC Alliance M&E subgroup.

In addition, Malaria Consortium continued to work with the philanthropic community to promote SMC and highlight its impact. Malaria Consortium was represented at the EAGxCambridge conference and we presented our SMC work in a meeting with the University of Manchester's Effective Altruism Society. Malaria Consortium's Chief Executive also discussed SMC at a webinar hosted by GiveWell, which focused on malaria research.[104]

8. Philanthropic SMC expenditure

The total expenditure of philanthropic funding used for SMC in 2023 was approximately 59 million USD, around 23 percent less than the forecast submitted to GiveWell in June 2023 (Table 32). This includes a contribution of 1,483,234 USD from Malaria Consortium US to support Malaria Consortium staff costs in Nigeria. It also includes 29,854 USD of unspent funds from two Bill & Melinda Gates Foundation grants, which the Foundation kindly agreed could be used towards the cost of testing the Salama digital tool in Mozambique.

Table 32: Philanthropic expenditure for SMC, 2023

Budget line	Forecast (USD)	Expenditure (USD)	Variance (USD)	Variance (percent)
Burkina Faso	8,671,521	8,477,077	-194,444	-2
Chad	4,657,309	4,257,671	-399,638	-9
Mozambique	10,261,434	7,212,916	-3,048,518	-30
Nigeria	43,352,133	32,465,128	-10,887,005	-25
South Sudan	1,168,248	1,007,443	-160,805	-14
Togo	1,354,299	1,236,679	-117,620	-9
Uganda	1,803,417	1,680,288	-123,129	-7
New country	50,000	0	-50,000	-100
Rapid assessments*	325,933	261,741	-64,192	-20
Above-country	866,871	863,782	-3,089	0
Digitalisation	314,512	110,997	-203,515	-65
Research	3,629,043	1,436,376	-2,192,667	-60
External relations	272,818	249,783	-23,035	-8
TOTAL	76,727,538	59,259,882	-17,467,657	-23

*Costs associated with SMC implementation as part of the Rapid Assessments projects are shown on this line. Rapid Assessments research costs have been included on the Research line.

Much of the underspend compared with the budget was caused by the devaluation of the Nigerian naira. At the time of budgeting, the exchange rate was over 40 percent higher than the exchange rate used at the end of the year. This led to a substantial decrease in SMC expenditure in Nigeria in USD terms, despite a somewhat higher expenditure in naira terms due to inflation and a higher number of SMC implementers compared with previous years. In Mozambique, the delayed start of the 2023/24 round meant that many activities that had been budgeted in 2023 only happened in 2024, which resulted in lower than expected expenditure in 2023. The devaluation of the naira and delayed start of the 2023/24 SMC round in Mozambique also resulted in an underspend compared with the budget on the digitalisation budget line, as Nigeria and Mozambique were the locations of Malaria Consortium's main digitalisation projects in 2023. The lower than anticipated research expenditure was primarily due to chemoprevention efficacy study sample analyses taking longer than planned, which means the majority of payments will only be made in 2024. At the time of budgeting, we had also assumed that at least one Rapid Assessment would be conducted in 2024. However, data collection only started in 2024 and, consequently, Rapid Assessment research costs were minimal in 2023.

In addition to philanthropic funding for SMC, Malaria Consortium received co-funding for SMC from the Bill & Melinda Gates Foundation, the Global Fund and KOICA to implement the activities described in this report (Table 33). Co-funding provided by the Global Fund and UNICEF in Burkina Faso and Togo is not reported here, as those contributions are provided directly to the respective national malaria programmes.

SMC delivery, Uganda

Table 33: Malaria Consortium's SMC expenditure using third-party co-funding, 2023

Funding source	Expenditure (USD)	Notes
Bill & Melinda Gates Foundation	734,815	Grant for an end-of-round household survey, chemoprevention efficacy cohort study and resistance markers study as part of the SMC implementation study in Mozambique (INV-033337).
Bill & Melinda Gates Foundation	753,820	Grant for an end-of-round household survey, chemoprevention efficacy cohort study, resistance markers study and qualitative research as part of the SMC implementation study in Uganda (INV- 039889).
KOICA	627,248	This funding covered the majority of implementation costs in two LGAs in Bauchi state through the SMC Impact project. Philanthropic funding was used to support international freight costs for shipping SPAQ to the state.

Malaria Consortium also received funding from the Global Fund to implement SMC in four states in Nigeria and in four districts in Uganda. As no philanthropic funding was used to co-finance those activities, the costs are not included in this report.

9. Concluding remarks

With thanks to our philanthropic supporters and other donors, Malaria Consortium again supported the delivery of SMC to more children than in the year before. In 2023, we supported SMC delivery to over 25 million children which, in turn, contributed to another global milestone: 2023 marked the first time SMC reached over 50 million children globally in one year. This significant achievement is testimony to the continued leadership of national malaria programmes and stakeholders at every level of the health systems in each SMC-implementing country.

2023 was also characterised by global economic turbulence and increasing insecurity in some SMC-implementing countries. These two factors have proved to be significant challenges to SMC implementation in some contexts and the success of the campaigns in spite of these challenges is again testimony to the spirit of collaboration that underpins the success of SMC across the African continent.

In 2024, Malaria Consortium will work with partners to maintain the enormous scale of the programme, reaching eligible children across seven countries. We will also provide technical assistance to Côte d'Ivoire's National Malaria Control Programme for the first time as they plan and conduct their 2024 campaign. While the economic and security challenges seen in 2023 are unlikely to abate in 2024, optimism can be derived from the successful scale-up of SMC in the East and southern Africa region for the first time, the momentum behind the digitalisation of SMC and the promise offered by complementary novel malaria prevention tools, including vaccines.

With profound thanks to our philanthropic supporters, Malaria Consortium will continue to reach as many eligible children as possible with life-saving SMC medicines in 2024 and to innovate to improve the quality and efficiency of SMC implementation wherever possible.

"Initially, there was scepticism about collecting and using the SMC medicine. However, attitudes changed when people witnessed the effect."

"We no longer need to purchase drugs from stores or visit hospitals frequently and complaints from children feeling unwell have significantly reduced"

Ayegbeyin Kolawole James, community leader, Orisunbare, Oyo state, Nigeria

"My two children received the malaria medicines for five months during the rainy season and they never felt sick with malaria again. Now I can focus on providing food for my family where I used to struggle to provide for them and ensure medical care"

Aluet, a caregiver in Hongwekdit boma, Aweil South county, South Sudan

"From when my child received the medicines, he did not get sick and now I can worry less about him"

"I will try to share this with others in my community as I am a community leader and I hope this will increase acceptance"

Malong, a caregiver Panthou Payam in Aweil South County, South Sudan.

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3 GOOD HEALTH AND WELL-BEING
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