TRAINING MANUAL

SMC
Seasonal Malaria Chemoprevention

Acknowledgements

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CONTENTS

Professor Sir Brian Greenwood, London School of Hygiene and Tropical Medicine

"Excitingly, this is something that is available to put into action immediately, so children will start to benefit from this approach now rather than in three or five years' time. The key is to ensure that the promise becomes a reality."

INTRODUCTION

This is a comprehensive reference document for use by those running SMC (Seasonal Malaria Chemoprevention) training. It assumes that SMC will be implemented using a Community Health Worker strategy.

Each section has the same flow. At the start of each section there is a brief introduction to the key elements in that section:

In this section you will cover:

0.0 What you will learn

At the end of each section, there is a summary of key points. The summary looks like this:

Key points to remember:

- A key point to remember

Acronyms used:

AE - Adverse Event
AQ - Amodiaquine
CHW - Community Health Worker
ESA - East and Southern Africa
IPT - Intermittent Preventive Treatment
SAE - Serious Adverse Event
SP - Sulfadoxine-Pyrimethamine
WHO - World Health Organization

1 OVERVIEW & EVIDENCE

In this section you will cover:

1.1 What is SMC?

In some parts of Africa, malaria transmission occurs primarily during the three or four months of the rainy season. Around 39 million children under five live in seasonal malaria areas, where an estimated 34 million malaria cases occur and over 150,000 children die each year. [1]

SMC is a preventive intervention focused on children under five living in those areas.

SMC, previously termed "intermittent preventive treatment in children", is defined as "the intermittent administration of full treatment courses of an antimalarial medicine during the high malaria season to prevent malarial illness with the objective of maintaining therapeutic antimalarial drug concentrations in the blood throughout the period of greatest malarial risk." [2]

SMC benefits

This intervention has been shown to be effective, cost-effective, well tolerated, and feasible for preventing malaria among children less than 5 years of age in areas with highly seasonal malaria transmission. [2]

5 million
Number of malaria episodes that SMC could help prevent each year [1]

20,000
Number of malaria deaths that SMC could help prevent each year [1]

25m
children aged 3 - 59 months living in the Sahel sub-region could benefit from seasonal malaria chemoprevention every year [1]

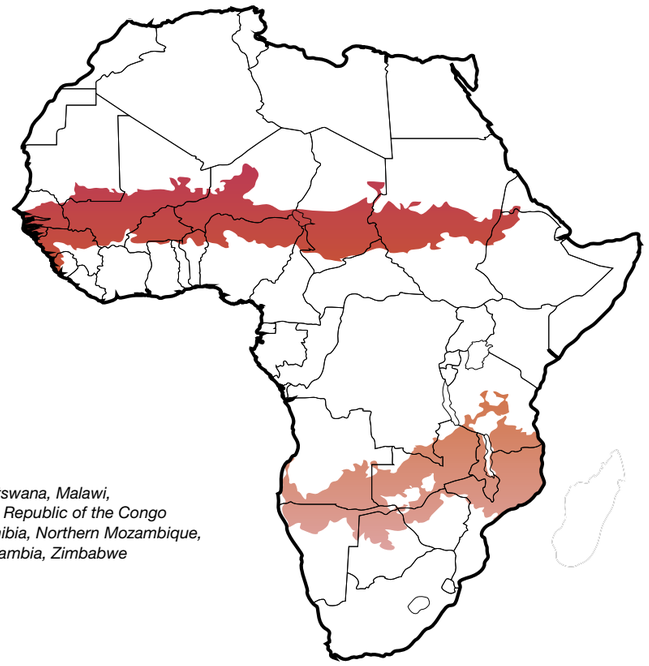
75-85%
of all malaria episodes prevented [1, 2]

75-85%
of severe malaria episodes prevented [1, 2]

1.2 Where does seasonal malaria occur?

Sahel: 25 million children under 5 [1]
Benin, Burkina Faso, Guinea, Guinea-Bissau, Mali, Mauritania, Niger, Nigeria, Central African Republic, Senegal, Sudan, Chad

ESA: 14 million children under 5 [1]
Angola, Botswana, Malawi, Democratic Republic of the Congo (DRC), Namibia, Northern Mozambique, Tanzania, Zambia, Zimbabwe



1.3 When should SMC be implemented?

SMC should be given during the high malaria transmission period (rainy season), when the incidence of malaria is high. [2]

The period of SMC administration should be chosen to target the period when children are most at risk of malaria attacks. [2] Exact start and end dates depend on the patterns of malaria transmission and rainfall, so **can vary within and between countries** as well as from one season to the next.

1 OVERVIEW & EVIDENCE

1.4 A WHO-recommended intervention

Over the past two years, studies have shown that providing healthy children with a monthly course of two existing malaria medicines (sulfadoxine-pyrimethamine (SP) and amodiaquine (AQ)) during peak transmission season can **prevent about 80% of severe and uncomplicated malaria cases**. [1]
Researchers estimate that about 5 million cases of malaria and about **20,000 deaths from malaria could be prevented annually if SMC were fully implemented.** [1]

20,000
deaths from malaria could be prevented annually [1]

80%
of severe and uncomplicated malaria cases could be prevented each year [1]

Based on these impressive results, the World Health Organization has conducted an evidence-based review. It has subsequently recommended SMC in those countries with seasonal transmission characteristics, and where the two component drugs are both still effective against *Plasmodium falciparum* malaria.
For children aged between 3 and 59 months in the Sahel sub-region, WHO recommends a single dose of SP, plus a three-day course of AQ, once a month, for 3 to 4 months during the malaria season.[2]

In December 2012, WHO published an SMC Field Guide (implementation manual) to provide malaria-endemic countries with practical, adaptable and ready-to-use materials for use throughout the intervention, from planning to monitoring phases. SMC is indicated as part of the malaria control strategies in areas of highly seasonal malaria transmission. [2]

Key interventions currently recommended by WHO for the control of malaria are: the use of long-lasting insecticidal nets (LLINs) and/or indoor residual spraying (IRS) for vector control, prompt access to diagnostic testing of suspected malaria and appropriate treatment of confirmed cases with effective artemisinin-based combination therapy.

SMC: should be used as a malaria control strategy, and not as a malaria elimination strategy.

Additional interventions which are recommended for the prevention of *Plasmodium falciparum* malaria targeting specific high risk groups in areas of high transmission include:

1. Intermittent Preventive Treatment in pregnancy (IPTp)
2. Intermittent Preventive Treatment in infants (IPTi)

The changing epidemiology of malaria makes a “one size fits all” approach redundant, and calls for control strategies targeted at specific populations and/or locations for maximal effectiveness.

1.5 Medicines used in SMC

Meta-analysis (pooled data from clinical studies) of 7 SMC studies, where a course of antimalarials was given periodically to children under 5 years during peak malaria season showed 80% reduction in clinical attacks of malaria, and a similar reduction in the incidence of severe malaria.[3]
The SP+AQ combination used in most trials was well tolerated. [1, 2]

In field trials testing SMC’s efficacy in protecting children from malaria, and a large-scale effectiveness study in Senegal, SP+AQ was the preferred drug combination. This was for the following reasons: [2]

- In clinical trials, SP+AQ gave greater protection than other drug combinations. The use of the two drugs in combination **limits the risk for selection for resistance** to either SP or AQ use as monotherapy.
- **Each drug retains its efficacy** in areas of Sahel and sub-Sahel with seasonal transmission where SMC is appropriate.
- The SP+AQ regimen is **well tolerated** and relatively cheap.
- The combination of SP+AQ **does not include artemisinin derivatives**. Therefore, artemisinin based combinations can be reserved for clinical cases where they are most useful.

A review of available data reported **no definite case of serious adverse events (SAEs) after more than 80,000** courses of SP+AQ had been administered to more than 30,000 children. However, no active case detection was done.

80,000
treatments were administered with no definite case of SAE

1.6 SMC real life experience

In Senegal, SMC, using trained Community Health Workers (CHW), was implemented through the existing health system. More than 790,000 courses were administered to more than 140,000 children. [2]

Key lessons learned: [2]

- Regular meetings with regional and district health authorities from the beginning, helped to improve understanding and trust and created a feeling of ownership at each level.
- The participation of community members in sensitisation and mobilisation built trust between implementers and the community.
- Providing incentives played a major role in the commitment of CHWs and health personnel during SMC implementation.
- Access to sufficient funding is important, to help plan and deliver activities and motivate staff.
- Combining SMC with vitamin A and albendazole (for de-worming) or alongside community case management of malaria showed how SMC can be successfully delivered alongside other health programmes.
- The right period for SMC administration can differ between localities within one country, due to differences in the pattern of transmission and other local factors.
- Training of all personnel involved is critical. Workshops explained how to recognize, manage and document adverse drug reactions, and leaflets outlining how to spot adverse reactions to SP or AQ were distributed. The ideal time to train CHWs is 2-4 weeks ahead of SMC beginning.

SMC has been administered to more than 175,000 children between 3 and 59 months in southern Mali and in two areas of Chad. [4]

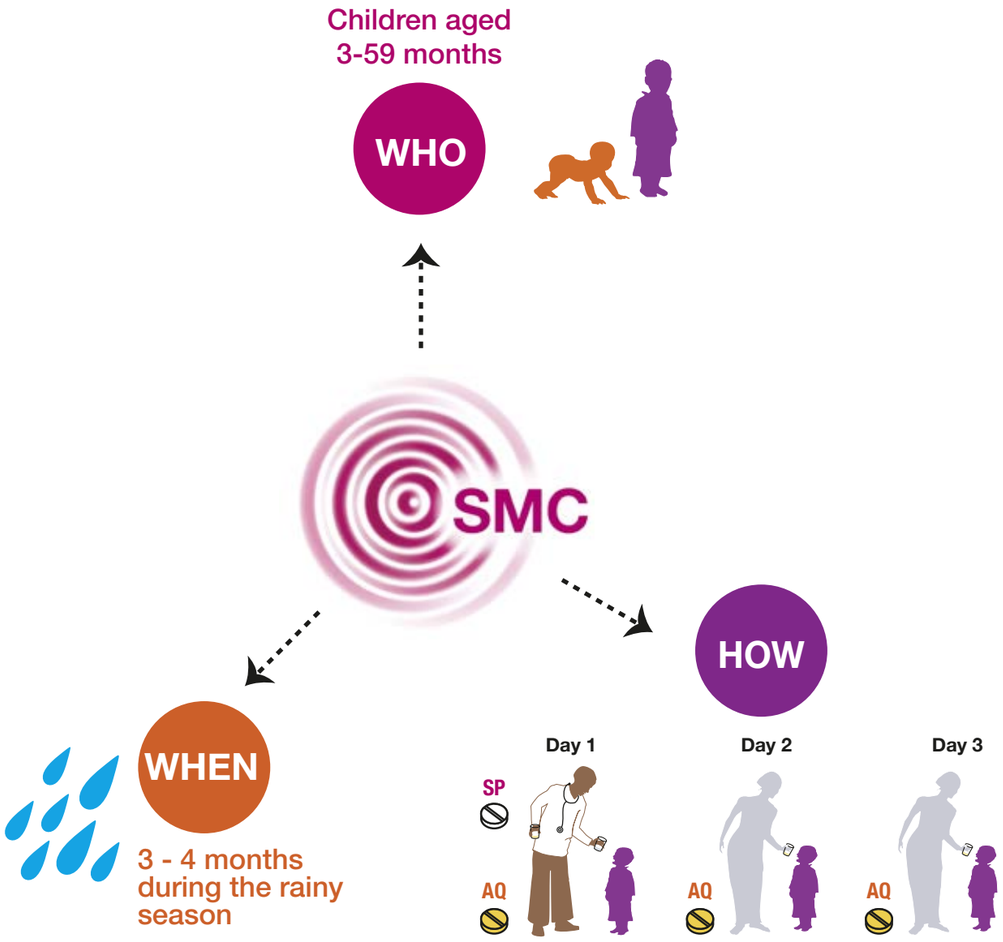
- Preliminary results from the programme show that the number of cases of simple malaria dropped by 65% in the intervention area in Mali, and by up to 86% in Chad. [4]
- A significant decrease in cases of severe malaria has also been recorded. [4]

Key points to remember:

- Community participation and health authority ownership of the SMC programme should be encouraged.
- Raising awareness of the SMC strategy and its benefits, ahead of delivery, is vital to avoid misunderstandings and negative perceptions.
- CHWs, supervised by staff from general health services, are the most efficient SMC delivery channel.
- SMC can be effectively implemented alongside community case management of malaria and administration of Vitamin A and albendazole.
- CHWs should be fully trained, to ensure coverage is high for all treatment cycles and that mothers understand their own role in administering SMC for each child.

2 PRACTICAL ASPECTS

In this section you will cover:



2.1 Who is SMC recommended for?

A complete treatment course of sulfadoxine-pyrimethamine (SP) plus amodiaquine (AQ) should be given to **children aged 3 - 59 months.**

IMPORTANT:

SMC should not be given to:

- A child l**ess than 3 months old**.
- A child who is **sick with uncomplicated or severe malaria** at the time of SMC administration. These children must be referred to a health centre for care using the integrated management of childhood illness (IMCI) guidelines. Mothers must be advised to bring children back after 30 days for the next round of SMC treatment.
- An HIV-positive child receiving **co-trimoxazole**.
- A child with **severe acute or chronic illness** or unable to take oral medication.
- A child who has received a dose of either SP, ASAQ or AQ or other drugs containing sulfonamide in the **last 30 days**. These children should be given an appointment for the next round of treatment.
- A child who is **allergic** to either drug (SP or AQ).

2.2 What: SP+AQ

WHO recommends that a complete treatment course of amodiaquine plus sulfadoxine-pyrimethamine (AQ+SP) should be given to children aged between 3 and 59 months at monthly intervals, beginning at the start of the transmission season, to a maximum of four doses during the malaria transmission season (provided both drugs retain sufficient antimalarial efficacy).

Loose tablets should be given as replacement doses when a child vomits, spits out or regurgitates the drugs.

- Labelling SMC drug packages in different colours for younger and older children helps mothers administer the right medication.

Missing one course of treatment does not prevent a child from receiving the next course of SMC drugs, provided it is not contraindicated for the child to receive SMC.

2.3 How is SMC prepared and administered?

There is no standard delivery system for SMC. The following delivery channels can be used:

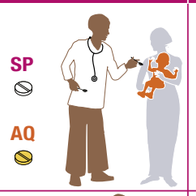
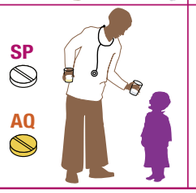
- Community-based delivery using:
  - Community health workers or community volunteers
  - Reproductive and child health (RCH) tracking teams
- Health facility-based delivery

3 INSTRUCTIONS & KEY MESSAGES FOR MEDICAL STAFF

In this section you will cover:

3.1 Administration of SMC

Dose varies depending on age.

AGE	DOSAGE	DAY 1	DAY 2	DAY 3
3-11 months	A single dose of 250/12.5mg SP on Day 1. 75mg AQ given once on Day 1, 2 and 3.*	SP AQ 	AQ 	AQ 
12-59 months	A single dose of 500/25mg SP on Day 1. 150mg AQ given once on Day 1, 2 and 3.	SP AQ 	AQ 	AQ 

The single dose of SP is given only on the first day together with the first dose of AQ.
Administration of at least the first dose (single dose of SP and the first dose of AQ) must be directly observed.
*Take half tablet of 150mg AQ / 500/25mg SP if strength/dose not available.

This is repeated each month during the transmission season.

It is important to split the tablets carefully when this is required. If the 2 halves are not even, they must be discarded and not given to children. Most manufacturers produce scored tablets (tablets with dividing lines) to make it easy to break them into 2 halves for correct dosing.

Intermittent Preventive Treatment with SP in infancy (IPTi) and SMC should not be administered together. For that reason, IPTi should not be used in SMC target areas. Alternative antimalarial combinations, containing neither SP nor AQ, must be provided to treat clinical malaria in the target age group.

3 INSTRUCTIONS & KEY MESSAGES FOR MEDICAL STAFF

What you need

Tablets
SP
AQ

Potable water

2 clean cups

1 clean spoon

Sugar

Step-by-step process

Step 1

Take one tablet of SP and one tablet of AQ.

1.Use correct dose for age of child.

3-11 months
SP 250/12,5mg
AQ 75mg

SP AQ

12-59 months
SP 500/25mg
AQ 150mg

SP AQ

Step 2

2. Separately crush SP and AQ drugs
3. Make sure all the powder is transferred into the cup
4. Mixed with clean/potable water
5. Add sugar to mask the bitterness of AQ
6. Stir

SP

AQ

Step 3

Give the medicines to the child separately starting with SP.

For child from 3 to 11 months of age, use a spoon to administer the medicine.

For the older child, use the cup.

Step 4

Keep the child under observation for 5 minutes.

5 minutes

Vomiting

If a child vomits, spits or regurgitates the medicines within 5 minutes, complete the following steps. (Young children are more likely to vomit).

5 minutes

No Vomiting

Proceed to **Step 8.**

Step 5

Wait 10 minutes.

10 minutes

Step 6

Give a replacement dose.

Step 7

Keep the child under observation for a further 5 minutes.

5 minutes

If a child vomits again, do not give replacement dose and alert the health centre.

If the child does not vomit, proceed to Step 8.

Step 8

Give to parents/care givers:

- 2 tablets of AQ for Day 2 and Day 3
- SMC Passport
- Tell them when to come back next month

3 INSTRUCTIONS & KEY MESSAGES FOR MEDICAL STAFF

It is vital to give the full treatment course

- Aim to administer three doses per treatment course to each eligible child, three (or four) times during the high malaria transmission season.
- Children who receive less than three courses or fewer doses per course of treatment are less protected against clinical malaria, therefore it is important that a child receives full doses of each course of treatment.
- Up to a maximum of four courses may be given yearly, depending on the patterns of malaria transmission.
- If a child misses treatment after the CHW visit, their mother should take them to the health centre in the next few days to receive SMC. If a child totally misses one treatment course because of illness or absence, treatment should be given at the next round of SMC, provided the child is present and well.

Missing one course of treatment does not prevent a child from receiving the next course of SMC drugs if there are no contraindications for the child to do so.

IMPORTANT:

Children who missed SMC doses in a given treatment course showed lower protection against malaria attacks between the last and the next treatment round.

The length of protection varies, depending on the drug regimen used and the prevailing levels of resistance to the drug. Therefore, it is important to keep a one month interval between treatment courses. This creates a high level of protection and minimises the selection for malaria parasites resistant to SP+AQ.

Treatment of breakthrough *Plasmodium falciparum* infections during the period of SMC should not include either SP or AQ, or combination drugs containing either of these medicines, such as AS+AQ.

3.2 Adverse Events

SMC drugs are well tolerated when given in standard doses and have a history of long-time use.

The most common mild adverse events caused by AQ are vomiting, abdominal pain, fever, diarrhoea, itching, headaches and rash.

These generally last for a short time. If they become severe, they can be treated symptomatically.

If they become severe, you must seek medical advice.


Vomiting


Mild skin reaction


Tummy pain or Diarrhoea


Drowsiness


Fever


Headache

3.3 Key Messages for caregivers (mothers)

- SMC drugs protect children against malaria during the rainy season
- SMC is given to all children aged 3 - 59 months
- SMC is a 3-day course
- The first dose is given by CHW
- 2nd and 3rd doses must be given at home at Day 2 & Day 3
- Treatment must be repeated every month over 3 or 4 months
- There are two different doses depending on the child's age
- There is one treatment per child
- Do not mix the tablets between children
- **Risk of adverse events: explain these to the mother and discuss actions she would take if a serious event happens**

3.4 Monitoring requirements

The aim is to routinely track essential elements of programme performance through record keeping, regular reporting, surveillance and periodic surveys.

At the end of the day CHWs must:

- ☑ count the number of treatment courses that have been given to children
- ☑ count the number of children who were missed
- ☑ discard broken tablets
- ☑ take completed forms back to the health centre
- ☑ provide brief report to the head nurse
- ☑ discuss with the nurse what went well or wrong
- ☑ prepare material for the next day (clean cups, clean spoons, check availability of SMC treatment courses)

At the end of the community round distribution, CHWs should report to the health centre on the number of treatment courses received, administered and remaining.

Supervision

Intensive supportive supervision should be put in place in the early stages of SMC implementation (first round/ first year) to identify and resolve problems. Supervision should be reduced to the minimum necessary once SMC delivering staff have acquired some experience. If required, retraining can be offered on site to those experiencing difficulties. Supervision should be carried out by the NMCP staff, the district medical staff and nurses at peripheral health centres. Full checklists for this can be found in the WHO Field Guide.

CHWs will be evaluated by supervisors. In addition, the supervisor should carry out a survey of a random sample of mothers to assess knowledge about SMC and how well the strategy has been accepted. This activity should be undertaken during the first round of SMC administration in the first year and can be repeated every 2-3 years.

Monitoring of adverse drug reactions

Monitoring of adverse drug reactions after administration of SMC drugs is an important aspect of SMC implementation. Health personnel, CHWs and mothers should be trained to identify and report adverse events. If CHWs identify serious or severe adverse events they should report to nurses at the health centre who will complete the necessary form and send it to the district medical office for appropriate action to be taken.

Key points to remember:

- The health centre needs to record the number of children with malaria or fever. It also needs to record whether these children have received SMC and how many doses of AQ they have taken.
- Coverage will be estimated using the number of children who should potentially receive SMC as recorded by the CHW and the number of children who actually receive the complete dose of SMC during each treatment course for each transmission season. The number of children who arrive at delivery points but cannot receive SMC should also be recorded.
- Monitoring of adverse drug reactions is an important aspect of SMC implementation.
- Health personnel, CHWs and mothers should be trained to identify and report adverse events. It is important that mothers report all adverse events, mild or trivial, and know what to do when they see them.
- The CHW must complete all necessary paperwork and reconcile the number of tablets on a daily basis.

4 MATERIALS

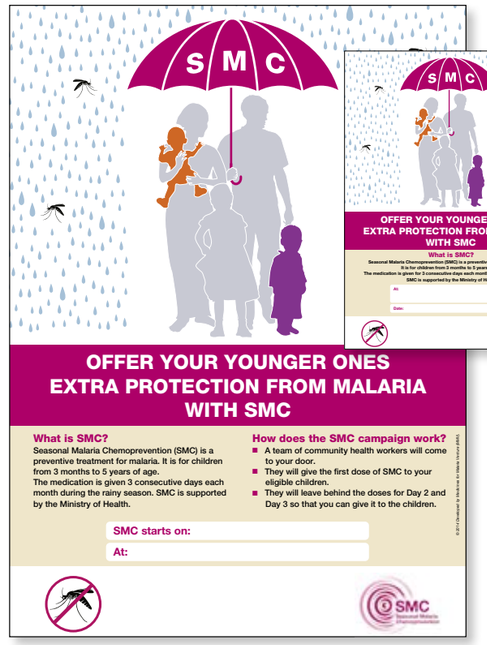
In this section you will learn:

4.1 What materials are available

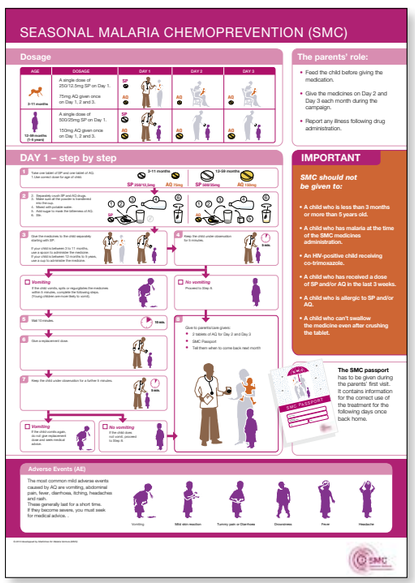
For CHW	For parents	For Monitoring Purposes
• Poster/Flyer • Clinic Poster • Wristbands	• SMC Passport	• Drug Counting Card • Child Counting Card • Adverse Events Form • Register

4.2 How to use the materials

For CHW



Poster/flyer – for use in villages and health centre. The flyer is same as the poster but smaller in size to facilitate widespread distribution.



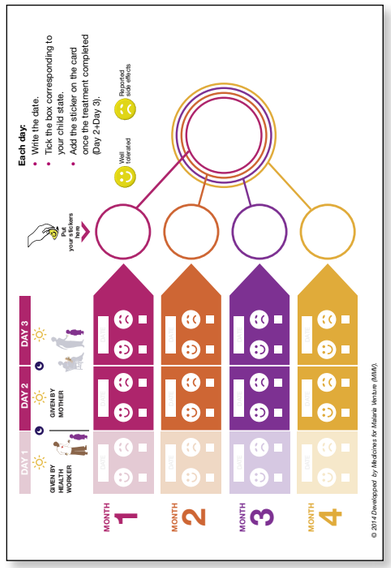
Clinic Poster – for use in villages and health centre. A summary of all key information.

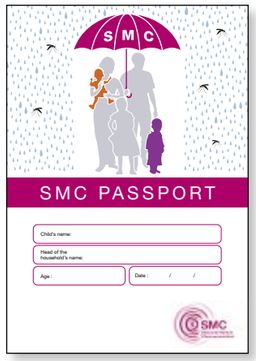
Wristband – for CHW to engage child with messaging around taking tablets on Days 2 & 3. Brightly coloured. They get a different coloured band for each cycle to help with compliance.

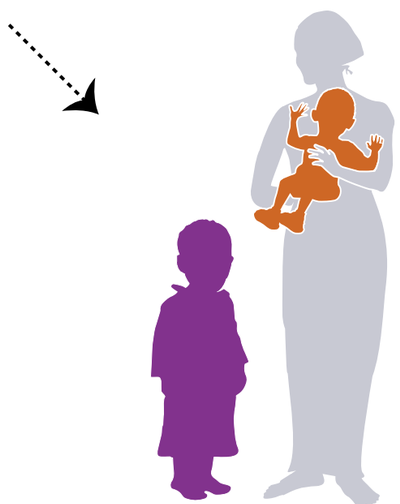
4 MATERIALS

For parents

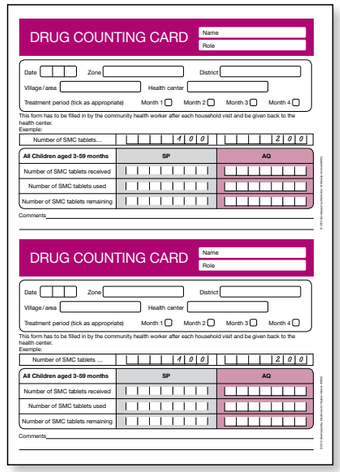
SMC Passport – This booklet contains key information for parents. It has a clear visual schematic illustrating the dosing schedule, stressing the importance of completing the full SMC course (i.e., Day 2 and Day 3) and the adverse events that the child may experience.



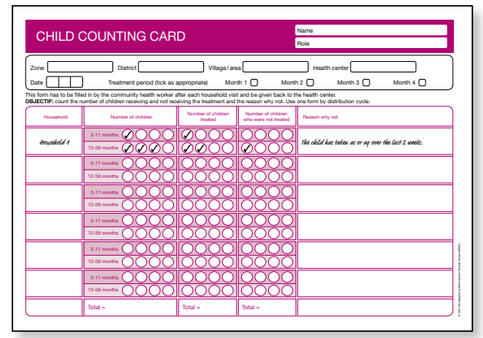




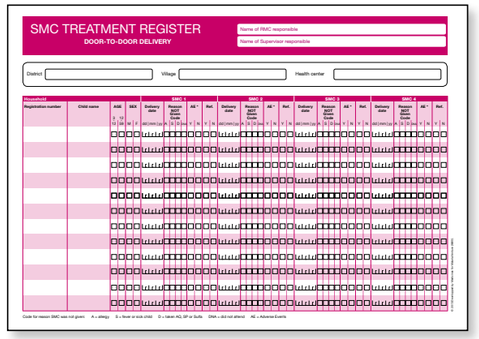
For monitoring



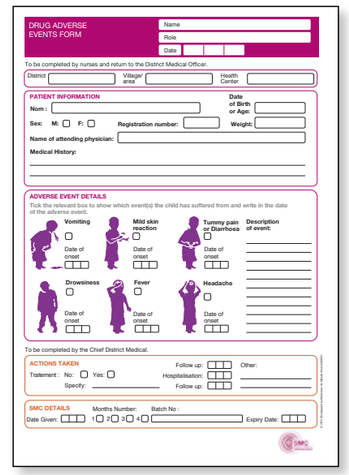
Drug counting card – simple form to manage number of doses of drug given and vs stock inventory. Helps with drug returns.



Child counting card – used by CHW to complete as child goes through SMC cycles. Used for reporting and managing vs target population in implementation plan.



Register – to record names of all children given SMC.



Adverse Events form – for every AE reported, must be filled in and returned to the health centre.

Key points to remember:

- There is a full range of materials available to help with all aspects of successful SMC implementation.
- Help mothers understand and remember what they need to do.

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