# Seasonal Malaria Chemoprevention Coverage Survey Guinea, 2018

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Report May 2019.

The 2018 SMC coverage survey in Guinea was conducted by the University Gamal Abdel Nasser, Conakry and the London School of Hygiene & Tropical Medicine, in collaboration with the National Malaria Control Programme and Catholic Relief Services, Guinea.

UGANC/LSHTM (2019) Seasonal Malaria Chemoprevention Coverage Survey 2018. May, 2019.

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## ACKNOWLEDGMENTS

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| Indicator | Definition | Population | Value (95%CI) | N |
|---|---|---|---|---|
| Average coverage per cycle | Mean of coverage in cycles 1,2,3 and 4 | Children aged 3-59 months at cycle 1. | 71.6% (62.3,80.9) | 1771 |
| Mean number of treatments per child | Mean number of SMC treatments received | Children aged 3-59 months at cycle 1. | 2.87 (2.49,3.24) | 1771 |
| Coverage of 4 cycles | % received 4 treatments | Children aged 3-59 months at cycle 1. | 60.7% (50.3,70.3) | 1771 |
| Adherence | % received 3 doses at last cycle (if treated) | Children aged 3-59 months at cycle 4 | 97.5% (95.6,98.6) | 1448 |
| Reach of SMC programme | % who received at least one treatment | Children aged 3-59 months at cycle 1. | 79.3% (68.7,0.870) | 1771 |
| Coverage of cycle 1 | % treated at cycle 1 | Children aged 3-59 months at cycle 1. | 73.8% (63.9,81.8) | 1771 |
| Coverage of cycle 2 | % treated at cycle 2 | Children aged 3-59 months at cycle 1. | 73.7% (63.9,81.5) | 1771 |
| Coverage of cycle 3 | % treated at cycle 3 | Children aged 3-59 months at cycle 1. | 71.5% (60.6,80.3) | 1771 |
| Coverage of cycle 4 | % treated at cycle 4 | Children aged 3-59 months at cycle 1. | 67.6% (56.8,76.7) | 1771 |
| Treatment of older children | Mean number of SMC treatments received | Children aged 6-7yrs at the survey | 0.63 (0.24,1.02) | 327 |
| Awareness of SMC dates | % households heard date before last cycle | All households | 92.4% (85.9,96.1) | 1135 |
| LLIN use in children | % slept under an LLIN last night | Children 3-59 months who slept in the household last night | 30.2% (22.6,39.0) | 1835 |
| LLIN use (all ages) | % slept under an LLIN last night | All who slept in the household last night | 30.1% (22.3,39.4) | 5198 |
| ACCESS (% of population) | % that could sleep under LLIN (if 2/net) | All who slept in the household last night | 25.4% (18.7,33.5) | 5198 |
| % households with an LLIN | % households with an LLIN | All households | 39.7% (30.3,49.8) | 996 |
| ACCESS (% households) | % household with a LLIN for every to members | All households, all who slept there last night | 13.1% (8.4,19.8) | 996 |
| Caregiver knowledge about SMC | Mean score out of 10 | Carers of children 3-59 months | 6.90 (6.26,7.55) | 1135 |
| Reported CHW adherence to guidelines | Mean score out of 8 | Carers of a child who received SMC last cycle | 6.07 (5.41,6.72) | 1135 |
| SMC directly observed | % of first doses administered by CHW | Children 3-59 months who received SMC at last cycle | 99.0% (97.7,99.6) | 1447 |
| Interval between cycle 1 and cycle 2 | Difference between median cycle dates | Dates recorded on SMC cards | 34 days | 1192 |
| Interval between cycle 2 and cycle 3 | Difference between median cycle dates | Dates recorded on SMC cards | 36 days | 1150 |
| Interval between cycle 3 and cycle 4 | Difference between median cycle dates | Dates recorded on SMC cards | 29 days | 969 |

| **SMC card at survey** | % of children with SMC card | Children eligible for SMC | **60.9%** (52.1,69.1) | 1771 |
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## EXECUTIVE SUMMARY and RECOMMENDATIONS

Seasonal Malaria Chemoprevention (SMC) was introduced in Guinea in 2015 for children aged 3 months to 5 years, starting in 6 prefectures in 2015, expanding to 8 prefectures in 2016, and 10 in 2017 and 13 prefectures in 2018. SMC gives children a high level of personal protection from malaria. SMC programmes have been associated with substantial reductions in malaria cases and malaria deaths. High coverage of four monthly cycles is needed to maximise the impact of this intervention. This survey was conducted to assess coverage of SMC in 2018 in the prefectures of Gaoual, Koundara, Mali, Lelouma, Labe, Koubia, Tougué, Dinguiraye, Siguiri, Mandiana, Dbola, Kouroussa and Kankan where SMC was implemented in July, August, October and November of 2017.

A total of 1771 children eligible to receive 4 treatments, and 1106 caregivers, were surveyed in 66 clusters. A total of 999/1137 of households agreed to participate, a response rate of 87.9%. 327 children too old to be eligible for SMC, were also surveyed. Caregivers were interviewed about SMC treatments and the dates of treatments were recorded from their SMC card.

Of children eligible for four SMC treatments, 88.6% were issued with a card, and of these, 68.8% retained their card; a total of 60.9% children had a card for inspection at the survey. This compares with the 2017 survey where 89% of eligible children received an SMC card but only 38% had their SMC card available for inspection in the survey. Assessment of coverage therefore relied less on caregiver recall in this survey than in the 2017 survey. There was good agreement between caregiver recall and the SMC card.

**Timing of SMC cycles:** SMC cycles should take place at intervals of 28 days to ensure children remain protected. Cycle 1 took place in July, cycle 2 in August, cycle 3 in September and cycle 4 in October (Figure 4). The interval between the median dates of the cycles as recorded on SMC cards, was 34 days between cycle 1 and cycle 2, 36 days between cycle 2 and cycle 3, and 29 days between cycle 3 and cycle 4. The timing has improved compared to 2017 but should be reduced to 4 weeks rather than 5 weeks. Cases will increase in that 5th week as protection wanes rapidly after 4 weeks.

**Announcing dates of SMC campaigns:** Caregivers need to know the day when SMC will be distributed in their area in order to ensure they are available on that day. Overall, 94.7% of households were aware of the SMC campaign and 92.4% said they knew in advance the date of the cycle 4 campaign. But there was less awareness in Siguiri where only about a quarter of households did not know the date of SMC in advance.

**Caregiver knowledge about SMC:** Caregivers were asked if they understood key aspects of SMC, they scored 69% overall on a 10-point questionnaire. Most caregivers (82%) knew that SMC is used to prevent malaria and most (79%) knew that there are 2 tablets to be taken on the first day and one on each of the next two days (83%). However there was a widespread view that SMC drugs could be used for treatment if there was someone unwell in the household (only 44% of caregivers gave the correct response, that SMC drugs should not be used in this way). And many caregivers (39%) apparently did not appreciate the importance of completing the 3-day course of treatment.

**Community Health Worker adherence to SMC guidelines**, as reported by caregivers: CHWs should check the child's age, and before administering the treatment should ask about illness and refer the child if they are unwell, and should check the child has not had severe side effects to SMC before. They are also trained to explain to the caregiver how to administer the amodiaquine tablets on the next two days, and to advise caregivers about potential side effects and to bring the child to a health worker if they are become unwell after SMC. Most caregivers of children who had received SMC, reported that the CHW followed these guidelines correctly, but the percentage for each of the actions CHWs should perform was consistently lower than when the same questions were asked after the 2017 campaign.

**Administration of SMC:** The first dose was directly observed in 99% of cases, administered by the CHW (92.4%) or by the caregiver in the presence of the CHW (6.6%). Reported adherence to the unsupervised doses of amodiaquine was very high. Of eligible children treated at cycle 4, caregivers reported that 98.7% received a dose on day 2, and 99% the dose on day 3. 97.5% received both doses.

Analysis of administrative data from SMC campaign reports, showed that 1.49% of infant treatments and 0.47% of treatments to children 12-59 months, were vomited and a second dose administered. Infants were 3 times more likely to vomit than older children. The risk of vomiting was highest in the first cycle, and lowest in the fourth cycle. During SMC vsits, infants were more likely to be referred, due to illness, than older children (0.47% compared to 0.16%. In older children, referrals were more common during the first cycle than in the other cycles. Exclusion for other reasons than sickness, was more common in infants than in older children, ranging from 2.6% at cycle 1 to 0.92% at cycle 4. In children 12-59 months, 0.76% were excluded in cycle 1 falling to 0.39% in cycle 4.

**Reasons for missed treatments:** The most common reason for not receiving SMC was the caregiver or the child was away on the day the CHW visited.

**Caregivers suggestions to improve the SMC programme:** Caregivers were asked for suggestions to improve the SMC programme. There were 160 responses, the points most commonly made were to increase the age range, improve accessibility of remote areas, increase the number of months of SMC, build more health posts, provide SMC in the mines, and provided more bednets.

**SMC coverage:** Children aged 3 to 59 months at the time of cycle 1 are eligible to receive SMC four times, and should receive all of these treatments to maximise their protection. The mean number of treatments received per child was 2.9. Overall, 73.8% of children received SMC at cycle 1, 73.7% at cycle 2, 71.5% at cycle 3 and 67.6% at cycle 4. 79.3% received SMC at least once and 60.7% received four treatments.

Coverage in the three new prefectures, Dabola Kankan and Kouroussa, implementing SMC for the first time in 2018, was above 80% in each cycle, 91.8% received SMC a least once and 73.6% received 4 treatments.

Some variations in coverage from month to month are evident. In Gaoual, coverage increased at cycle 3 and decreased at cycle 4. In Koubia, coverage dropped after cycle 1. In Koundara, coverage was lower in cycles 3 and 4 than in the first two cycles. In Lelouma, coverage was lower in cycle 4 than in the first three cycles.

As in 2017, coverage was poor in Siguiri (40% or less received SMC each month),  and as this has the largest target population, this brings down the overall national figures of SMC coverage.

Overall, 21% of children did not receive any SMC treatments, the same figure as in 2017. Most of the children who did not receive any SMC are in Siguiri where 56% of children did not receive SMC.

**Treatment above the age limit:** Children aged above 6 years at the time of the survey, should not have received SMC. It appears that treatment of older children has been reduced in 2018. In 2017, 53.8% of this group received an SMC card and about 40% received SMC at each cycle. In 2018, only 17.5% received a card and about 15% received SMC at each cycle.

**Bednet use:** Caregivers were asked about bednet use by their children on the night before the survey. In addition, all persons who slept in the household the night before the survey were listed, all bednets owned by the household were also listed and inspected, and for each person, the net they slept under, if any, was noted.

30.2% of children slept under a net the night before the survey. There were notable variations with very low use of nets in some prefectures. In last year's survey, after the 2017 campaign, 43.6% of children were reported to have slept under a bednet the night before the survey.

Of a total of 5193 household members surveyed who slept in the household the night before the survey, 28.7% used a LLIN the night before the survey. Net use varied by area, ranging from 8.1% in Siguiri/Mandiana to 76.3% in Labe/Lelouma. Of 996 households surveyed, 39.7% had at least one LLIN and 13.1% had one LLIN for every 2 persons in the household. Access to a LLIN (the percentage of the population who could sleep under a LLIN if there were two people per net), was 25.4%. This compares with estimates of access to a LLIN in the 2016 MICS survey which ranged from 66% (region of Kankan) to 78% (region of Labe).

**Recommendations:**
Overall, coverage of SMC is good with levels of coverage maintained in 2018 despite a 40% increase in the target population. To improve overall coverage, solutions will need to be found to the problems with SMC delivery in mining areas where caregivers were often away from their home on the day of the campaign. SMC coverage should continue to be monitored. Areas with low coverage, and any new areas of SMC implementation, should be surveyed at the end of the 2019 transmission season. In areas with high coverage, delivery

can be monitored through administrative records (compiled from tally sheets and SMC drug utilisation), with a coverage survey less frequently.

Bednet use was low. The survey was conducted after the main malaria season and bednet use may be lower at this time than in the main season but nevertheless the percentage of children and of other age groups that reported using a bednet was surprisingly low. SMC should not be perceived as replacing the need for LLINs, reasons for low use of LLINs should be investigated and steps taken to increase access to LLINs.

To ensure the continues success of the SMC programme in Guinea it will be important to put in place a system to monitor efficacy of SMC, using case control studies to measure clinical protection in children, combined with monitoring of molecular markers of resistance to SMC drugs in the parasite population. Monitoring of molecular markers can be done most efficiently and effectively through antenatal clinics. It will also be important to strengthen pharmacovigilance, building on progress made through the ACCESS-SMC project. As well as working to strengthen the PV system nationally, safety monitoring can be strengthened in selected areas where training and supervision can be provided to ensure that health staff recognise events and report suspected adverse drug reactions.

HMIS data on malaria should be regularly assessed to track the impact of the SMC programme on malaria cases, and malaria deaths in hospital. This is challenging currently as the structure of datasets prior to DHIS2 do not facilitate comparison of the same facilities year to year, requiring manual recoding of the individual facilities. Analysis of these data is ongoing and will be reported separately. Collection of data on individual malaria cases at selected health facilities, will also be necessary to allow more detailed analysis of age distribution and seasonality than is possible with HMIS data which are aggregated in broad age groupings (under 5 and 5 and above).

## BACKGROUND AND OBJECTIVES

Malaria is endemic in Guinea, and the leading cause of under-5 deaths. Guinea is among the list of 18 countries which account for more than 80% of deaths due to malaria worldwide (WHO 2018)[3]. The main vectors are *Anopheles gambiae*, *An. funestus*, *An. melas* and *An. arabiensis*. Malaria occurs year-round with a highly seasonal pattern in the northern prefectures. Since 2015, Seasonal Malaria Chemoprevention (SMC), which involves the administration of a treatment course of sulfadoxine-pyrimethamine plus amodiaquine once a month to children aged 3–59 months during the high risk period each year (WHO 2013), has been used to prevent malaria in children under 5 years of age in the northern part of the country, supported by the ACCESS-SMC project, financed by UNITAID, in 2015 and 2016, and by CRS the Global Fund and PMI in 2017 and 2018.  SMC was introduced in Guinea in 6 prefectures in 2015, in 8 prefectures in 2016, and 10 prefectures in 2017. Coverage surveys in 2015 and 2016 showed In 2018 the area covered by SMC was expanded to include the prefectures of Dabola, Kouroussa and Kankan. As this represented a 40% increase in the target population it was important to assess the effectiveness of SMC delivery in 2018 through a coverage survey. The survey aimed to determine the percentage of children who received SMC in each cycle, the percentage who received the full four treatments, the adherence to the SMC regimen, and the use of insecticide-treated bednets, and to ask caregivers of children who did not receive four treatments, the reasons their children missed SMC treatments.

The delivery of SMC from 2015 to 2018 is summarised in the table below. The estimated percentage of children who received four SMC treatments was 57% in 2015 and 73% in 2016 and 63% in 2017.  It is important to note that sampling for the 2015 and 2016 surveys was based on the 1996 census, whereas for the survey conducted in 2017, and the present survey (2018), population data from the 2014 census were available, allowing a more representative selection of villages for the survey. The earlier census did not reflect the increased population in mining areas, a reliable census is a pre-requisite for planning representative population surveys, since while moderate changes in population size of existing settlements can be allowed for, the creation of new settlements creates a bias if these are not in the census list used for selection of survey communities. Thus the apparent decrease in the percentage of children who received SMC in 2017 reflects a more representative sampling frame for the selection of survey villages, which included mining areas in Siguiri where SMC has been most challenging. These areas were not included in the 2016 survey.

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[3] In 2017 there were an estimated 435000 deaths from malaria world-wide, 93% of these in Africa. In Africa, the most intense transmission occurs in areas with seasonal transmission in the Sahel and sub-Sahel. Countries in these regions with highly seasonal transmission, where Seasonal Malaria Chemoprevention (SMC) could be used, accounted for 48% of the estimated world total of malaria deaths in 2017. These estimates were obtained indirectly, based on estimates of all-cause mortality in children, and an assumed fraction of deaths due to malaria estimated predicted from parasite prevalence from surveys. This indirect method does not capture well more recent changes and may not take into account recent impact of SMC. However the estimates do serve to emphasise the importance of effective malaria control in the Sahel and sub-Sahel, for reducing the global burden of malaria deaths.

| Year | Prefectures | Target population | Doses administered | Mean coverage per cycle | % treated at least once | % treated four times | Number eligible reached[*] | Number fully protected[#] |
|------|-------------|-------------------|--------------------|--------------------------|--------------------------|----------------------|-----------------------------|----------------------------|
| **2015** | 6 | 210107 | 805131 | 80% | 94% | 57% | 197501 | 119761 |
| **2016** | 8 | 438123 | 1750224 | 88% | 96% | 73% | 420598 | 319830 |
| **2017** | 10 | 591071 | 2303709 | 73% | 79% | 63% | 466946 | 372375 |
| **2018** | 13 | 825994 | 3356780 | 72% | 79% | 61% | 655013 | 501378 |

*The target population multiplied by the estimate proportion of children who received at least one SMC treatment. #The target population multiplied by the proportion of children who received four treatments.

SMC involves administration of a course of treatment of sulfadoxine-pyrimethemine plus amodiaquine over three days, once per month for four months of the malaria transmission season, to prevent malaria illness. Children aged at least 3 months and less than 5 years of age are eligible to receive SMC, however children who were under 5 years of age at the first month continue to receive all four monthly treatments even if they reach the age of 5 during the 4-month period of SMC distribution. Each monthly treatment consists of a dose of sulfadoxine-pyrimethamine and a dose of amodiaquine, administered on the first day, and a dose of amodiaquine on each of the next two days. The drugs are distributed by community health workers (CHWs) who visit door to door to administer the first day's doses and leave the blister pack with the caregiver with instructions to administer the remaining amodiaquine doses on each of the next two days. CHWs check the age of the child and select the appropriate blister pack (lower dose for infants, higher dose for children 12-59 month), ask about allergies to SMC drugs, check whether the child has been given sulfadoxine-pyrimethamine or amodiaquine or any sulfa-containing antibiotic in the last 4 weeks, and check if the child has a fever. Children are eligible if they do not have known allergies to the drugs, have not been given amodiaquine of sulfa-containing medication in the last 4 weeks, and are not unwell. Children who are unwell should be referred to the nearest health centre where they can be appropriately treated, including treatment with an ACT if they have malaria. If they do not have malaria, they may receive SMC at the clinic. CHWs should also remind caregivers to bring the child to the health centre if the child becomes unwell at any time after taking SMC, and that the child can still develop malaria and so the guidance to seek treatment promptly in the case of fever should continue to be followed, and all household members should sleep under a treated bednet. Each course of SMC treatment provides about 90% protection from malaria for 28 days so that four treatments one month apart can provide a high degree of personal protection for 4 months. Introduction of SMC with high coverage has been found to reduce the incidence of malaria, severe malaria, and malaria deaths, substantially. To maximise the impact of the intervention, it is important that the first SMC cycle is timed to start at the beginning of the main transmission period; cycles should take place at monthly intervals; high coverage of 4 monthly treatments should be achieved; and caregivers should ensure children adhere to the daily regimen each month. Insecticide treated bednets should continue to be used, SMC should be an additional measure not a substitute for bednets. The survey therefore assessed bednet use by children and other members of the household.

## Scaling-up of SMC in Guinea 2015-2018

SMC was introduced in Guinea in 2015, in 6 prefectures with a target population of 210 107 children. The area covered was increased to 8 prefectures in 2016, 10 in 2017, and 13 in 2018 (Table 1 and Figure 1). In 2018 the target population of children was 825 994, an increase of about 40% compared to the target number in 2017. Siguiri and Kankan are the largest prefectures accounting for about one third of the target population of children in the 13 prefectures.

**Table 1: Expansion of SMC in Guinea 2015-2018**

| Prefecture | 2015 | 2016 | 2017 | 2018 |
|---|---|---|---|---|
| **Dinguiraye** | X | X | X | X |
| **Gaoual** | X | X | X | X |
| **Koubia** | X | X | X | X |
| **Koundara** | X | X | X | X |
| **Mali** | X | X | X | X |
| **Tougue** | X | X | X | X |
| **Mandiana** | | X | X | X |
| **Siguiri** | | X | X | X |
| **Labe** | | | X | X |
| **Lelouma** | | | X | X |
| **Dabola** | | | | X |
| **Kankan** | | | | X |
| **Kouroussa** | | | | X |
| **Target population** | 210107 | 438123 | 591071 | 825994 |

**Figure 1: Map of SMC scale-up 2015-2018**
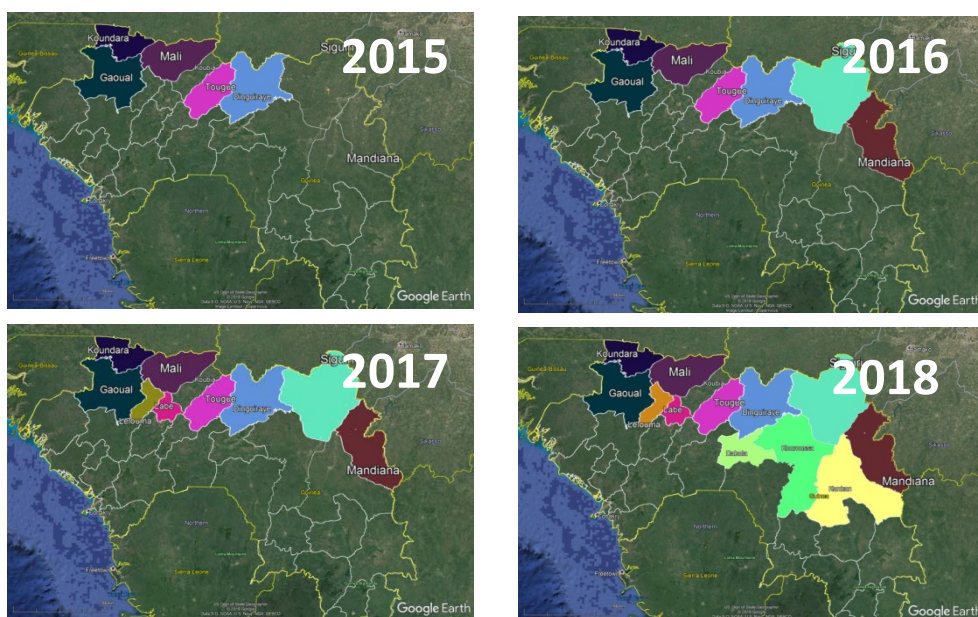
## SMC target population in 2018

The total estimated population of children to be treated was 825 994 (Table 2). The 2014 census estimates of the population were used for probability proportional to size selection of survey clusters and for calculation of survey weights.

**Table 2: Target population for SMC in 2018, by prefecture**

| Prefecture | Target population | Cumulative % | Clusters | 2014 Census population |
|---|---|---|---|---|
| **Siguiri** | 179333 | 21.7% | 11 | 708506 |
| **Kankan** | 105578 | 34.5% | 15 | 963264 |
| **Mandiana** | 77431 | 43.9% | 5 | 335921 |
| **Labe** | 73786 | 52.8% | 5 | 318938 |
| **Mali** | 68741 | 61.1% | 5 | 290614 |
| **Kouroussa** | 64442 | 68.9% | 8 | 545212 |
| **Gaoual** | 45819 | 74.5% | 3 | 196190 |
| **Dinguiraye** | 45797 | 80.0% | 4 | 199465 |
| **Lelouma** | 42084 | 85.1% | 2 | 163069 |
| **Dabola** | 41734 | 90.2% | 3 | 181129 |
| **Koundara** | 30335 | 93.8% | 2 | 131388 |
| **Tougue** | 28484 | 97.3% | 2 | 125405 |
| **Koubia** | 22430 | 100.0% | 1 | 101293 |
| **TOTAL** | 825994 | | 66 | 4260394 |

### METHODS

The survey was conducted from 22 Jan 2019 to 7 Feb 2019 in 13 prefectures. Sixty-six settlements were selected from 13 prefectures were SMC was implemented in 2018 in the country (Figure 2), with probability proportional to population size based on the 2014 General Population and Housing Census (RGPH), and in each selected settlement, in order to minimise selection bias, area sampling was used, whereby the settlement was divided into segments, one segment chosen at random, and all households in the selected segment included in the survey. Data were collected on tablet PCs which automatically selected the segment and recorded the GPS location of each dwelling visited. In each household, caregivers of children were asked about SMC treatments their child had received, and SMC record cards were inspected and photographed. All children aged 3 months to 7 years were included in order to determine coverage in the target age group (aged at least 3months at the time of treatment, and aged not more than 59 months at cycle1) and to determine the proportion of children just above the recommended age limit who received treatment. In addition, all persons who slept in the household the night before the survey were listed, all bednets owned by the household were also listed and inspected, and for each person, the net they slept under, if any, was noted.

**Figure 2: Location of SMC Coverage survey clusters.** (Note there are 66 clusters: Siguiri   11, Kankan 15, Mandiana 5, Labe 5, Mali 5,  Kouroussa  8,  Gaoual  3,  Dinguiraye  4,  Lelouma  2, Dabola 3, Koundara 2, Tougue 2, Koubia 1).
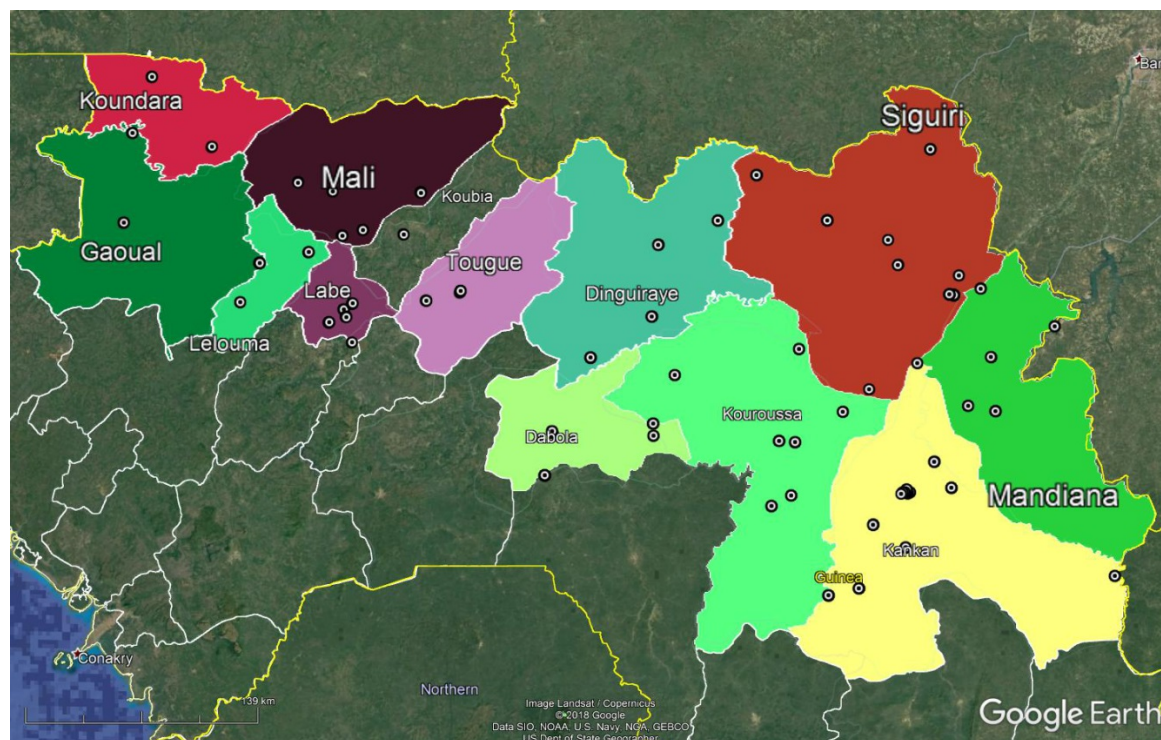


## Training, piloting and data collection

Training took place over 2 days, 17-18 Jan 2019. The training covered the use of the survey tools, understanding the questionnaires, and field methods. 30 participants participated in the training: 18 interviewers, 2 NMCP staff, 5 supervisors, 3 substitute interviewers, and 2 trainers. The first day covered operation of tablet PCs, tablet settings, and the use of the data entry software, and comprehension and practice in the use of the data entry forms. The second day covered taking photographs of SMC cards, recording GPS coordinates, saving and finalizing a form, making corrections and field methods. Data collection was then piloted in the field on Jan 22 and 23, 2019, teams were trained in segmentation of the village or sector of the survey, and administration of survey questionnaires. For the main survey, which started Jan 24 and ended on 7 Feb 2019, survey staff were organised in 6 teams.

## Data management

Data were collected using Android tablets (Nexus 7 (4 devices) and Samsung T285 Galaxy Tab A (17 devices)).  Software used was ODK.  The ODK form metadata are available from the main author if you wish to conduct a similar survey.  The form used nested repeat structures to enable the capture of data at the household, caregiver and child levels – with

linkage between the levels implemented directly through the ODK tool. The ODK aggregate server was based at the London School of Hygiene and Tropical Medicine.  The devices used strong encryption so that if devices were lost the data could not be seen by non-team members.  Encryption was also used on the aggregate server, and the only way to retrieve the meaningful data was by using suitably setup ODK Briefcase – which allowed the decryption of the data from the server.  The data were delivered as CSV files (in UTF 8 format).  These files were then inserted into spreadsheet workbooks (separate sheet for each level).  These spreadsheets were made available to members of LSHTM team and the data manager based in Guinea so that the data could be reviewed (for cleaning purposes) and for analysis. A separate MS Access version of the data sets was created, again using the source csv files, so that the images of the cards could also be reviewed against the data entered (Figure 3).  This was used to identify missing data from the cards.

**Figure 3: Screenshot of the ACCESS database showing comparison of data entered can be compared with images of SMC cards.**
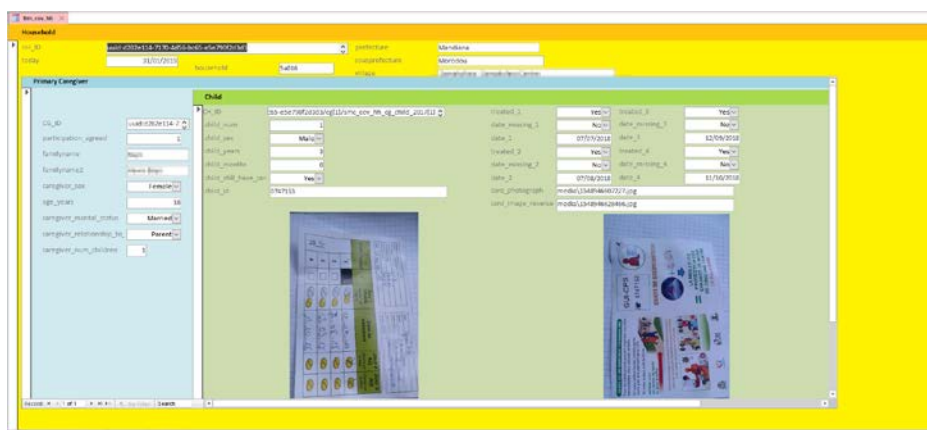


The MS Access database became the cleaned version of the database, and it was the source used for analysis.  The data were extracted from the Access database using MS PowerBI – which enabled the decoding of the data gathered into the meaningful labels (e.g. so Male and Female were generated, rather than 1 and 2), and the merging of the data from the different levels. All data sharing between teams was implemented using MyFiles – the secure sharing platform used by LSHTM.

**RESULTS**

## Layout of the results

Results for the key indicators are presented overall (average value for all 13 prefectures), and for each of four areas defined as follows:

Area 1 - prefectures which started SMC in 2015 (Gaoual, Koundara, Koubia, Mali, Dinguiraye, Tougué); Area 2 – prefectures which started SMC in 2016 (Mandiana and Siguiri)
Area 3 – prefectures which started SMC in 2017 (Labé, Lelouma)
Area 4 – prefectures which started SMC in 2018 (Dabola, Kouroussa, Kankan)

Estimates for each prefecture separately are also provided but for some prefectures the number of clusters is small and the survey is not designed to produce reliable estimates in these prefectures.

95% confidence intervals are presented for the key indicators which show the degree of uncertainty in the estimated value.

## Response rates

A total of 999 households participated in the survey (Table 3), 88% of all households visited. The location of the clusters is shown in Figure 1. A total of 2571 children were included, of these 1771 were aged 3-59 months at the time of cycle 1 and hence eligible to have received four SMC treatments. 327 children were aged 6-7 years when the survey was done and so were above 5 years of age at the time of SMC cycle 1.

**Table 3: Response rates and the number of households, children and other household members surveyed:**

| Households surveyed: | No. of households | % |
|---|---|---|
| Agreed to participate | 999 | 87.9% |
| No children of eligible age | 83 | 7.3% |
| Refused to participate | 3 | 0.3% |
| Unable to find someone to speak with | 52 | 4.6% |
| TOTAL | 1137 | |
| | | |
| **Children surveyed:** | No. of children | |
| Aged 3-59 months at cycle 1 (eligible for 4 SMC treatments) | 1771 | |
| Aged 5-6 years at survey | 306 | |
| Aged 6-7 years at survey (more than 5 years of age at cycle 1) | 327 | |
| Aged <3months at cycle 1 | 167 | |
| TOTAL (3 months to 7 years at survey) | 2571 | |
| | | |
| Aged at least 3 months at cycle 4 and <5yrs (eligible at C4) | 1857 | |
| | | |
| **Caregivers surveyed:** | 1106 | |

## Timing of SMC cycles

SMC treatments provide a high degree of protection for 28 days, after this time protection decreases rapidly. SMC cycles should therefore take place at intervals of about 28 days to ensure children remain protected. Cycle 1 took place in July, cycle 2 in August, cycle 3 in September and cycle 4 in October (Figure 4). The intervals between the median dates of the cycles as recorded on SMC cards, was 34 days between cycle 1 and cycle 2, 36 days between cycle 2 and cycle 3, and 29 days between cycle 3 and cycle 4. The timing has improved compared to 2017 but should be reduced to 4 weeks rather than 5 weeks. Cases will increase in that 5th week as protection wanes rapidly after 4 weeks.

**Figure 4: Timing of SMC cycles in 2018 compared to 2017**
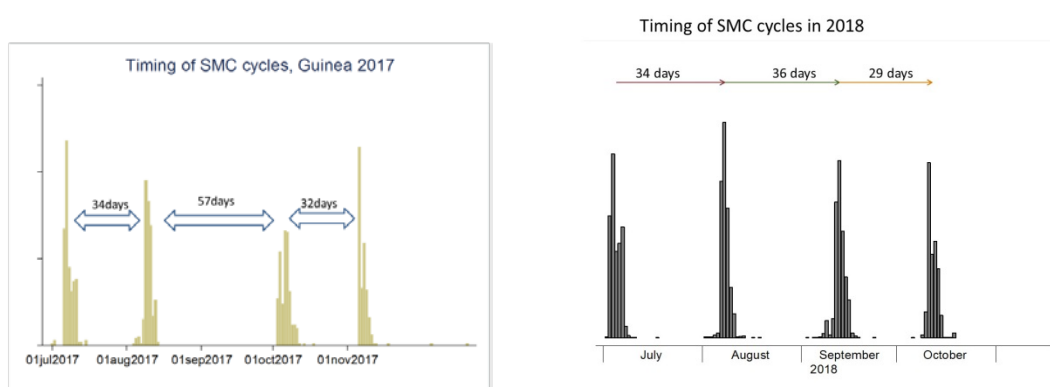


## Awareness about the SMC campaign

Caregivers should be to be aware of the purpose of the SMC programme and need to know the day when SMC will be distributed in their area in order to ensure they are available on that day. The survey asked one caregiver in each household if the household was aware about SMC and, for the most recent cycle (cycle 4) if they knew in advance the date the health workers would come. Overall, 94.7% of households were aware of the SMC campaign and 92.4% said they knew in advance the date of the cycle 4 campaign (Table 4). But there was less awareness in Siguiri where about a quarter of households did not know the date of SMC in advance (Table 5).

These results are similar to 2017 when 91.3% of households knew about SMC and before the fourth cycle, 88.6% of them had heard the date when CHWs would come.

**Table 4: Public awareness about SMC: the percentage of households that were aware of the campaign date, for cycle 4, in advance.**

| Area | % households aware of the date of cycle 4 in advance (95% confidence interval) |
|---|---|
| Dinguiraye, Gaoual, Koubia, Koundara, Mali, Tougue | 92.4%  (88.5%, 95.1%) |
| Siguiri, Mandiana | 86.2%  (81.5%, 89.9%) |
| Labe, Lelouma | 100.0% (95.8%, 100.0%) |
| Dabola, Kankan, Kouroussa | 99.2%  (97.6%, 99.8%) |
| TOTAL | 92.4%  (85.9%, 96.1%) |

**Table 5: Public awareness about SMC, by prefecture.**

| Prefecture | % households aware of the date (SMC cycle 4 2018) |
|---|---|
| Dabola | 97.9% |
| Dinguiraye | 97.5% |
| Gaoual | 86.0% |
| Kankan | 99.6% |
| Koubia | 100.0% |
| Koundara | 88.3% |
| Kouroussa | 100.0% |
| Labe | 100.0% |
| Lelouma | 100.0% |
| Mali | 89.3% |
| Mandiana | 100.0% |
| Siguiri | 76.5% |
| Tougue | 100.0% |

The most common sources of information about campaign dates were health workers, friends and neighbours, criers, the radio, and the mosque or church (Table 6). In Siguiri, households were less likely to have heard from the health worker. Radio messages reached about 40% of households.

**Table 6: Public awareness about SMC: where caregivers heard about date of the campaign.**

| | Health worker | Friends/ neighbours | Crier | Radio | Mosque/ Church |
|---|---|---|---|---|---|
| Dabola, Kankan, Kouroussa | 91.9% | 66.4% | 51.1% | 37.7% | 78.5% |
| Siguiri | 13.0% | 35.3% | 76.1% | 42.6% | 69.5% |
| Others* | 85.9% | 39.3% | 50.1% | 35.5% | 53.9% |

* Dinguiraye, Gaoual, Koubia, Koundara, Labe, Lelouma, Mali, Mandiana, Tougue

## Characteristics of caregivers

The caregiver was usually the child's mother (93%). 23% of caregivers looked after one child under the age of 5 years, 39% two children under 5, and 38% three or more children under 5. When asked how long they had been resident in the area, almost all (99%) said they had lived there for at least 6 months. Only 46% of caregivers had had any formal (or Koranic) education (Table 7).

**Table 7: Characteristics of caregivers**

|  |  | % of caregivers |
|---|---|---|
| **Number of children less than 5 years old in their care** | | |
|  | **1** | 23.1% |
|  | **2** | 38.5% |
|  | **3** | 24.4% |
|  | **4** | 11.3% |
|  | **5** | 2.4% |
|  | **6** | 0.3% |
| **Age** | | |
|  | **<18yrs** | 2.7% |
|  | **18-24yrs** | 22.8% |
|  | **25-34yrs** | 48.5% |
|  | **35-44yrs** | 20.2% |
|  | **45+yrs** | 5.8% |
| **Gender** | | |
|  | **Male** | 0.7% |
|  | **Female** | 99.3% |
| **Marital status** | | |
|  | **Single** | 0.6% |
|  | **Married** | 95.8% |
|  | **Widowed** | 2.9% |
|  | **Divorced** | 0.7% |
| **Relationship to child** | | |
|  | **Mother** | 93.0% |
|  | **Other** | 7.0% |
| **Resident for at least 6 months** | | 98.95% |
| **Any education (Koranic or formal)** | | 46.2% |

## Caregivers' knowledge about SMC

Caregivers were asked if they understood key aspects of SMC, they scored 69% overall on a 10-point questionnaire (Table 8). Most caregivers (82%) knew that SMC is used to prevent malaria and most (79%) knew that there are 2 tablets to be taken on the first day and one on each of the next two days (83%). However there was a widespread view that SMC drugs could be used for treatment if there was someone unwell in the household (only 44% of caregivers gave the correct response, that SMC drugs should not be used in this way). And many caregivers (39%) apparently did not appreciate the importance of completing the 3-day course of treatment (Tables 9 and 10).

**Table 8: Caregivers' knowledge about SMC:**

|    | Question | Correct response |
|----|----------|------------------|
| 1  | For how many months should the child take SMC | 4 |
| 2  | SMC is given to prevent malaria | Yes |
| 3  | SMC can prevent other diseases | No |
| 4  | How many tablets should the child take on the first day? | 2 |
| 5  | How many tablets should the child take on the second day? | 1 |
| 6  | How many tablets should the child take on the third day? | 1 |
| 7  | The child should swallow all the medication | Yes |
| 8  | I can give the tablets to someone else who is unwell | No |
| 9  | The child should complete the 3-day course of treatment | Yes |
| 10 | I should take the child to the health centre if unwell after SMC | Yes |

**Maximum score: 10**

**Table 9: Caregivers' knowledge scores on SMC and caregivers' reported adherence to guidelines by CHW:**

| Area | Average caregiver knowledge score (out of 10) (95%CI) | Average CHW score for adherence to guidelines (out of 8) (95%CI) |
|---|---|---|
| Dinguiraye, Gaoual, Koubia, Koundara, Mali, Tougue | 7.4 (6.5,8.4) | 5.8 (5.0,6.7) |
| Siguiri, Mandiana | 7.0 (6.2,7.8) | 6.1 (5.0,7.3) |
| Labe, Lelouma | 5.2 (3.4,7.0) | 4.5 (2.9,6.1) |
| Dabola, Kankan, Kouroussa | 7.5 (7.0,7.9) | 7.2 (6.8,7.7) |
| TOTAL | 6.9 (6.3,7.5) | 6.1 (5.4,6.7) |

| Prefecture | Average caregiver knowledge score (out of 10) | Average CHW score for adherence to guidelines (out of 8) |
|---|---|---|
| Dabola | 7.3 | 5.0 |
| Dinguiraye | 7.3 | 4.8 |
| Gaoual | 8.8 | 7.6 |
| Kankan | 6.8 | 7.6 |
| Koubia | 4.0 | 3.4 |
| Koundara | 8.5 | 7.1 |
| Kouroussa | 9.5 | 7.9 |
| Labe | 5.1 | 4.4 |
| Lelouma | 5.7 | 4.8 |
| Mali | 9.4 | 7.9 |
| Mandiana | 9.5 | 7.9 |
| Siguiri | 6.5 | 5.8 |
| Tougue | 5.0 | 4.3 |

**Table 10: Caregiver knowledge, % correct answers to each question**

| Question | % correct |
|---|---|
| For how many months should the child take SMC (4) | 59.9% |
| SMC is given to prevent malaria | 82.0% |
| SMC can prevent other diseases (correct answer No) | 68.9% |
| How many tablets should the child take on the first day? (2) | 79.4% |
| How many tablets should the child take on the second day? (1) | 82.8% |
| How many tablets should the child take on the third day? (1) | 82.8% |
| The child should swallow all the medication (Yes) | 67.7% |
| I can give the tablets to someone else who is unwell (No) | 43.7% |
| The child should complete the 3-day course of treatment | 60.9% |
| I should take the child to the health centre if unwell after SMC | 62.3% |

## Community Health Worker adherence to SMC guidelines, as reported by caregivers

CHW's should check the child's age, and before administering the treatment should ask about illness and refer the child if they are unwell, and should check the child has not had severe side effects to SMC before. They are also trained to explain to the caregiver how to administer the amodiaquine tablets on the next two days, and to advise caregivers about potential side effects and to bring the child to a health worker if they are become unwell after SMC. Caregivers of children who had received SMC, reported that the CHW generally followed these guidelines correctly (Table 11) but the scores were somewhat lower than when the same questions were asked after the 2017 campaign.

**Table 11: CHW adherence to guidelines**

|   | Action | % of caregivers who reported that the CHW performed the action at the last visit: | |
|---|--------|------|------|
|   |        | 2017 | 2018 |
| **1** | Check the child's age | 100.0% | 80.1% |
| **2** | Explain how to administer tablets | 99.6% | 79.8% |
| **3** | Check for illness or fever | 98.9% | 79.6% |
| **4** | Explain the common side effects of SMC drugs | 97.0% | 75.7% |
| **5** | Advise to bring the child to the health centre if they are unwell | 97.0% | 77.5% |
| **6** | Ask if the child had taken other medicines in the last 4 weeks | 95.8% | 71.1% |
| **7** | Ask if the child had side effects to SMC before | 92.9% | 70.1% |
| **8** | Ask about allergies to medicines | 91.7% | 72.8% |

## SMC administration at the last cycle before the survey (cycle 4)

Caregiver's recall is likely to be most accurate about the last SMC treatment, so questions about administration of SMC drugs were asked specifically about SMC treatment at the fourth cycle.

79.1% of children aged 3 months to 59 months received SMC in cycle 4. In 99.0% of treated children, the first dose was directly observed (administered by the CHW (92.4%) or by the caregiver in the presence of the CHW (6.6%)). A small number of children (0.2%) received the first dose from the caregiver later, not observed by the CHW; the reason given was that the child was away at the time the CHW visited. And for 0.8% of children, the caregiver received the blister pack but did not administer the first dose (Tables 12 and 13).

**Table 12: Percentage of SMC treatments directly observed**

| Area | % of treatments with first dose directly observed (DoT) |
|---|---|
| Dinguiraye, Gaoual, Koubia, Koundara, Mali, Tougue | 99.6% (97.5%,99.9%) |
| Siguiri, Mandiana | 99.7% (98.0%,100.0%) |
| Labe, Lelouma | 100.0% (95.5%,100.0%) |
| Dabola, Kankan, Kouroussa | 97.8% (94.7%,99.1%) |
| TOTAL | 99.0% (97.7%,99.6%) |

**Table 13:Administration of the first daily dose of cycle 4**

| Administration of the first dose of Cycle 4 | % of children |
|---|---|
| By the CHW | 92.4% |
| By caregiver, observed by CHW | 6.6% |
| By caregiver, unobserved | 0.2% |
| By caregiver, but not done | 0.8% |

The most common reasons for not receiving SMC at cycle 4 were the child was away or the caregiver was away (Table 14). A small number of caregivers reported they had lost the child's card and they could not receive SMC without having a card.

**Table 14: Reasons given by caregivers for missing SMC treatments**

| Reason | % |
|---|---|
| Child was away at the time | 48.0% |
| Caregiver not available | 12.4% |
| The health worker did not visit | 12.4% |
| Child was living away from home | 10.1% |
| Other reason | 8.4% |
| Child was unwell | 4.0% |
| Did not retain SMC card | 1.7% |
| Problems at distribution point | 0.9% |
| Child has history of allergies to drugs | 0.6% |
| Not aware of SMC | 0.6% |
| Family refused | 0.3% |
| Child refused | 0.3% |
| Unable to take child to health worker | 0.3% |

## Adherence

In common with other surveys, the reported adherence to the unsupervised doses of amodiaquine was very high. Of eligible children treated at cycle 4, caregivers reported that 98.7% received a dose on day 2, and 99% the dose on day 3. 97.5% received both doses.

Caregivers were asked if the child swallowed all the medicine, spat out some medicine, or vomitted all the medicine (Table 15). Most responded the child swallowed the medicine without vomitting. Of those who were treated, a total of 95.1% of children were reported to have received and swallowed the 3 daily doses.

**Table 15: Adherence**

| Adherence to the dose | Day 1 | Day 2 | Day 3 |
|---|---|---|---|
| Swallowed and did not vomit | 98.0% | 99.5% | 99.6% |
| Swallowed but spat or vomitted some | 1.0% | 0.5% | 0.4% |
| Swallowed but vomitted all immediately | 0.1% | 0.0% | 0.0% |
| Did not take the medicine | 1.0% | 0.0% | 0.0% |

The most common reasons for not receiving SMC at cycle 4 were that the child was away, the caregiver was away, or the CHW did not visit (Table 16).

In the few cases where caregivers said they had not administered the second and third amodiaquine doses, the main reasons given were that they were away, or they forgot.

**Table 16: Reasons dose 2 or 3 were not administered**

| Reason unsupervised doses were not administered | No. | % |
|---|---|---|
| **Carer away** | 17 | 45.9% |
| **Forgot** | 11 | 29.7% |
| **Child had side effects** | 3 | 8.1% |
| **Carer too busy** | 2 | 5.4% |
| **Lost the tablets** | 2 | 5.4% |
| **Did not understand** | 1 | 2.7% |
| **Other** | 1 | 2.7% |

## Caregivers' comments of the SMC programme

Caregivers were asked for suggestions to improve the SMC programme. There were 160 responses, the points most commonly made were to increase the age range, improve accessibility of remote areas, increase the number of months of SMC, build more health posts, provide SMC in the mines, and provided more bednets.

**Table 17: Caregivers' comments on the SMV programme**

| Comment | Number |
|---|---|
| **Increase age range (older children; pregnant women; elderly; all ages)** | 38.1% |
| **Increase the amount of SMC drugs** | 10.0% |
| **Improve roads/access** | 6.3% |
| **Increase the number of months of SMC delivery** | 5.6% |
| **Build a health post** | 4.4% |
| **Provide SMC in the mines** | 4.4% |
| **Provide more bednets** | 4.4% |
| **Content with SMC, continue** | 3.8% |
| **Increase the number of SMC cards** | 3.8% |
| **Increase the number of days per cycle** | 3.1% |
| **Increase the number of CHWs** | 3.1% |
| **Expand to other (all) prefectures** | 2.5% |
| **Improve conditions of CHWs, increase payments, cover transport costs** | 2.5% |
| **Build a hospital** | 1.9% |
| **Build a health centre** | 1.9% |
| **Announce campaign dates on time** | 1.9% |
| **Improve health service generally** | 1.3% |
| **More training for CHWs** | 0.6% |
| **Provide a second opportunity for children to receive SMC** | 0.6% |

## Time taken to receive SMC

SMC delivered door-to-door involves few costs to the household but someone responsible has to be available when the CHW visits and this may interfere with other activities. 94% of households reported that the mother was with the child during the CHW visit (Table 18). About 50% of households reported that they waited less than one hour for the CHW to visit, 23% more than an hour, but about a quarter could not say how long they waited (Table 19).

**Table 18: Household member who waited with the child for SMC**

| Who waited with the child | % of households |
|---|---|
| Mother | 94.4% |
| Grand-mother | 3.8% |
| Father | 1.1% |
| Aunt | 0.3% |
| Cousin | 0.2% |
| Grand-father | 0.1% |

**Table 19: Amount of time spent waiting for SMC**

| Time spent waiting for the CHW | % of households |
|---|---|
| Less than 1 hour | 50.1% |
| 1-2 hours | 13.8% |
| Up to half a day | 6.4% |
| A full day | 1.7% |
| More than one day | 1.2% |
| Don't know | 26.7% |

## Total number of SMC treatments received by each child

Children aged 3 to 59 months at the time of cycle 1 are eligible to receive SMC four times, and should receive all of these treatments to maximise their protection. The mean number of treatments per child was 2.9. Overall, 73.8% of children received SMC at cycle 1, 73.7% at cycle 2, 71.5% at cycle 3 and 67.6% at cycle 4 (Table 20). 60.7% received four treatments (Table 23).

Coverage in the three new prefectures, Dabola Kankan and Kouroussa, implementing SMC for the first time in 2018, was above 80% in each cycle.

Some variations in coverage from month to month are evident (Table 21). In Gaoual, coverage increased at cycle 3 and decreased at cycle 4. In Koubia, coverage dropped after cycle 1. In Koundara, coverage was lower in cycles 3 and 4 than in the first two cycles. In Lelouma, coverage was lower in cycle 4 than in the first three cycles.

As in 2017, coverage was poor in Siguiri (40% or less received SMC each month), and as this has the largest target population, this brings down the overall national figures of SMC coverage.

Overall, 21% of children did not receive any SMC treatments, the same figure as in 2017 (Table 23). Most of these are in Siguiri where 56% of children did not receive SMC (Table 24).

SMC coverage in each year since 2015 is compared in Table 22.

**Table 20: SMC coverage among children eligible for four treatments, by area (with 95%CI)**

| Area | Mean treatments per child | Mean coverage | Cycle 1 | Cycle 2 | Cycle 3 | Cycle 4 |
|---|---|---|---|---|---|---|
| **Dinguiraye, Gaoual, Koubia, Koundara, Mali, Tougue** | 3.63 | 90.9% (86.7%,95.0%) | 89.8% (83.2%,93.9%) | 91.7% (85.5%,95.3%) | 93.2% (89.1%,95.8%) | 88.9% (81.6%,93.5%) |
| **Siguiri, Mandiana** | 1.77 | 44.2% (29.6%,58.8%) | 46.4% (32.5%,60.8%) | 47.8% (34.2%,61.7%) | 43.4% (28.8%,59.3%) | 39.3% (25.3%,55.2%) |
| **Labe, Lelouma** | 3.31 | 82.8% (71.2%,94.4%) | 89.2% (83.9%,92.9%) | 89.7% (72.2%,96.7%) | 77.8% (57.6%,90.1%) | 74.6% (47.4%,90.6%) |
| **Dabola, Kankan, Kouroussa** | 3.37 | 84.2% (79.1%,89.3%) | 87.3% (82.0%,91.3%) | 84.3% (77.2%,89.5%) | 84.3% (77.4%,89.4%) | 80.7% (73.8%,86.2%) |
| **TOTAL** | 2.90 | 71.6% (62.3%,80.9%) | 73.8% (63.9%,81.8%) | 73.7% (63.9%,81.5%) | 71.5% (60.6%,80.3%) | 67.6% (56.8%,76.7%) |

**Table 21: Coverage in each cycle, by prefecture**

| Prefecture | C1 | C2 | C3 | C4 |
|---|---|---|---|---|
| Dinguiraye | 94.9% | 95.6% | 95.6% | 95.8% |
| Gaoual | 80.4% | 84.4% | 91.4% | 74.8% |
| Koubia | 90.9% | 81.8% | 81.8% | 81.8% |
| Koundara | 90.1% | 90.1% | 80.6% | 80.6% |
| Mali | 95.0% | 96.2% | 96.2% | 92.2% |
| Tougue | 79.2% | 87.9% | 97.0% | 94.3% |
| Siguiri | 38.5% | 40.0% | 34.8% | 29.8% |
| Mandiana | 94.9% | 95.9% | 96.6% | 97.6% |
| Labe | 88.1% | 88.7% | 77.6% | 79.1% |
| Lelouma | 92.8% | 92.9% | 78.5% | 60.6% |
| Dabola | 83.6% | 84.2% | 83.1% | 79.5% |
| Kouroussa | 88.8% | 91.4% | 94.7% | 92.4% |
| Kankan | 87.7% | 82.2% | 81.5% | 77.5% |

**Table 22: Comparison of coverage with 2015 and 2016: mean number of treatments per child in each year**

| Prefecture | 2015 | 2016 | 2017 | 2018 |
|---|---|---|---|---|
| Dinguiraye | 3.25 | 3.65 | 3.99 | 3.82 |
| Gaoual | 2.46 | 3.29 | 3.10 | 3.31 |
| Koubia | 3.26 | 3.52 | 3.54 | 3.36 |
| Koundara | 3.16 | 2.75 | 2.49 | 3.41 |
| Labé | | | 3.04 | 3.33 |
| Lelouma | | | 3.83 | 3.25 |
| Mali | 3.20 | 3.40 | 2.97 | 3.80 |
| Mandiana | | 3.46 | 3.49 | 3.85 |
| Siguiri | | 3.48 | 2.12 | 1.43 |
| Tougé | 3.50 | 3.89 | 3.79 | 3.58 |
| Dabola | | | | 3.30 |
| Kouroussa | | | | 3.67 |
| Kankan | | | | 3.29 |
| TOTAL | 3.15 | 3.46 | 2.93 | 2.90 |

**Table 23: Number of SMC treatments: percentage of children who received SMC 0,1,2,3,or 4 times**

| Number of treatments | TOTAL | Dinguiraye, Gaoual, Koubia, Koundara, Mali, Tougue | Siguiri, Mandiana | Labe, Lelouma | Dabola, Kankan, Kouroussa |
|---|---|---|---|---|---|
| 0 | 20.7% | 3.8% | 48.8% | 0.9% | 8.2% |
| | (13.0%,31.3%) | (2.1%,6.7%) | (34.6%,63.2%) | (0.1%,5.7%) | (4.6%,14.3%) |
| 1 | 3.1% | 2.0% | 2.3% | 11.1% | 2.7% |
| | (1.7%,5.6%) | (0.6%,6.2%) | (1.1%,4.7%) | (2.4%,38.7%) | (1.4%,5.3%) |
| 2 | 5.8% | 4.4% | 5.2% | 7.8% | 6.8% |
| | (3.8%,8.7%) | (1.8%,10.4%) | (2.2%,11.8%) | (2.7%,20.4%) | (3.6%,12.4%) |
| 3 | 9.6% | 6.5% | 10.8% | 16.3% | 8.6% |
| | (7.1%,12.8%) | (3.4%,12.3%) | (6.1%,18.2%) | (8.3%,29.7%) | (5.7%,12.9%) |
| 4 | 60.7% | 83.3% | 33.0% | 63.9% | 73.6% |
| | (50.3%,70.3%) | (73.3%,90.1%) | (20.0%,49.1%) | (49.5%,76.2%) | (65.1%,80.7%) |
| | | | | | |
| At least 1 | 79.3% | 96.2% | 51.2% | 99.1% | 91.8% |
| | (68.7%,87.0%) | (93.3%,97.9%) | (36.8%,65.4%) | (94.3%,99.9%) | (85.7%,95.4%) |

**Table 24: Number of SMC treatments: percentage of children who received SMC 0,1,2,3,or 4 times, by prefecture**

| Prefecture | 0 | 1 | 2 | 3 | 4 |
|---|---|---|---|---|---|
| **Dinguiraye** | 3.6% | 0.8% | 0.0% | 1.4% | 94.2% |
| **Gaoual** | 2.7% | 6.6% | 11.1% | 16.1% | 63.5% |
| **Koubia** | 9.1% | 9.1% | 0.0% | 0.0% | 81.8% |
| **Koundara** | 9.9% | 0.0% | 6.3% | 6.3% | 77.5% |
| **Mali** | 3.8% | 0.0% | 0.0% | 5.2% | 91.0% |
| **Tougue** | 0.0% | 0.0% | 15.1% | 11.4% | 73.5% |
| **Mandiana** | 2.4% | 0.0% | 0.0% | 5.6% | 92.1% |
| **Siguiri** | 56.3% | 2.7% | 6.0% | 11.6% | 23.4% |
| **Labe** | 0.0% | 13.5% | 4.6% | 17.0% | 65.0% |
| **Lelouma** | 3.6% | 3.5% | 18.0% | 14.3% | 60.6% |
| **Dabola** | 11.2% | 3.4% | 1.7% | 11.0% | 72.6% |
| **Kouroussa** | 3.5% | 2.5% | 3.3% | 4.3% | 86.3% |
| **Kankan** | 9.0% | 2.6% | 8.9% | 9.4% | 70.1% |

## Equitability of SMC coverage

**Table 25: SMC treatment by wealth ranking**

| SES | Mean number of SMC treatments (95%CI) | % that received four SMC treatments | % that received at least one SMC treatment | % that received no SMC |
|---|---|---|---|---|
| **Lowest** | 3.2 (2.8,3.7) | 71.8% (59.0%,84.6%) | 88.6% (78.3%,98.9%) | 11.4% (1.1%,21.7%) |
| **Low** | 3.3 (3.0,3.5) | 73.5% (64.9%,82.0%) | 87.5% (80.7%,94.4%) | 12.5% (5.6%,19.3%) |
| **Middle** | 3.1 (2.7,3.5) | 67.0% (56.6%,77.4%) | 84.5% (75.9%,93.2%) | 15.5% (6.8%,24.1%) |
| **High** | 2.8 (2.2,3.4) | 59.3% (45.0%,73.6%) | 77.2% (62.5%,91.9%) | 22.8% (8.1%,37.5%) |
| **Highest** | 2.4 (1.9,2.9) | 46.1% (31.3%,60.9%) | 69.3% (55.8%,82.9%) | 30.7% (17.1%,44.2%) |

**Table 26: % of children that received 4 SMC treatments, by wealth ranking and area**

| SES | Dinguiraye, Gaoual, Koubia, Koundara, Mali, Tougue | Siguiri, Mandiana | Labe,Lelouma | Dabola,Kouroussa, Kankan |
|---|---|---|---|---|
| **Lowest** | 79.8% (65.8%,93.9%) | 46.8% (12.6%,81.0%) | 71.2% (25.5%,117.0%) | 89.5% (80.6%,98.5%) |
| **Low** | 76.4% (63.4%,89.4%) | 46.8% (24.5%,69.2%) | 89.2% (68.3%,110.0%) | 79.1% (68.7%,89.4%) |
| **Middle** | 90.6% (83.1%,98.1%) | 36.4% (21.0%,51.7%) | 57.4% (45.0%,69.9%) | 77.1% (66.1%,88.1%) |
| **High** | 86.5% (74.5%,98.4%) | 28.5% (7.9%,49.1%) | 74.9% (64.3%,85.5%) | 71.7% (57.1%,86.3%) |
| **Highest** | 84.9% (72.2%,97.5%) | 30.0% (11.7%,48.3%) | 56.1% (27.6%,84.7%) | 63.2% (47.1%,79.2%) |

**Table 27: SMC treatment by gender**

| Gender | Mean number of SMC treatments | % that received four SMC treatments | % that received at least one SMC treatment | % that received no SMC |
|---|---|---|---|---|
| **Boys** | 2.9 (2.5,3.3) | 61.6% (51.3%,72.0%) | 79.9% (70.5%,89.3%) | 20.1% (10.7%,29.5%) |
| **Girls** | 2.8 (2.4,3.2) | 59.8% (49.2%,70.4%) | 78.6% (69.3%,87.9%) | 21.4% (12.1%,30.7%) |

**Table 28: Mean number of treatments, by gender, in each area**

| | Dinguiraye, Gaoual, Koubia, Koundara, Mali, Tougue | Siguiri, Mandiana | Labe,Lelouma | Dabola,Kouroussa, Kankan |
|---|---|---|---|---|
| **Boys** | 3.6 (3.4,3.9) | 1.8 (1.2,2.5) | 3.3 (2.7,4.0) | 3.4 (3.1,3.6) |
| **Girls** | 3.6 (3.4,3.8) | 1.7 (1.2,2.3) | 3.3 (3.0,3.6) | 3.4 (3.2,3.6) |

**Table 29: Percentage of children that received four treatments, by gender in each area**

|  | Dinguiraye, Gaoual, Koubia, Koundara, Mali, Tougue | Siguiri, Mandiana | Labe, Lelouma | Dabola,Kouroussa, Kankan |
|---|---|---|---|---|
| **Boys** | 82.3% (72.6%,92.0%) | 33.8% (18.0%,49.7%) | 69.5% (44.7%,94.3%) | 74.1% (64.4%,83.7%) |
| **Girls** | 84.4% (75.2%,93.6%) | 32.0% (16.9%,47.1%) | 57.1% (39.4%,74.9%) | 73.2% (66.0%,80.4%) |

## Treatment of children above the age of 5

Children who are 5 years of age and above at the time of the first SMC cycle, should not receive SMC. The dose has been calculated according to age and if children above the age of 5 are given the blister pack intended for the 12-59-month group, they may be under-dosed, this can select for resistance as parasites are exposed to sub-therapeutic doses of SMC drugs. Children aged above 6 years at the time of the survey, should not have received SMC. It appears that treatment of older children has been reduced in 2018 (Table 25). In 2017, 53.8% of this group received an SMC card and about 40% received SMC at each cycle. In 2018, only 17.5% received a card and about 15% received SMC at each cycle.

**Table 30: Treatment of children above the age limit for SMC (aged 6-7 years at the survey)**

| Year | Mean number of treatments | Treated at cycle: | | | | Given an SMC card | Number surveyed |
|------|---------------------------|-----|-----|-----|-----|------|------|
| | | 1 | 2 | 3 | 4 | | |
| **2017** | 1.68 | 42.8% | 43.9% | 43.5% | 38.2% | 53.8% | 189 |
| **2018** | 0.63 | 16.3% | 16.5% | 15.3% | 14.9% | 17.5% | 327 |

## Retention of SMC cards

Of children eligible for four SMC treatments, 88.6% were issued with a card, and of these, 68.8% retained their card; a total of 60.9% children had a card for inspection at the survey (Table 26). This compares with the 2017 survey where 89% of eligible children received an SMC card but only 38% had their SMC card available for inspection in the survey. Assessment of coverage therefore relied less on caregiver recall in this survey than in the 2017 survey.

There was good agreement between caregiver recall and the SMC card (Table 27).

**Table 31: Percentage of children eligible for 4 treatments, who had a card for inspection at the survey**

| Area | % children with SMC card for inspection | 95%CI |
|---|---|---|
| Dinguiraye, Gaoual, Koubia, Koundara, Mali, Tougue | 82.7% | (74.9%,88.4%) |
| Siguiri, Mandiana | 35.2% | (24.5%,47.5%) |
| Labe, Lelouma | 96.3% | (91.5%,98.4%) |
| Dabola, Kankan, Kouroussa | 64.7% | (55.5%,73.0%) |
| TOTAL | 60.9% | (52.1%,69.1%) |

| Prefecture | % children issued with a card | % children with SMC card for inspection |
|---|---|---|
| Dabola | 87.6% | 63.5% |
| Dinguiraye | 96.4% | 75.2% |
| Gaoual | 96.2% | 84.9% |
| Kankan | 90.3% | 60.9% |
| Koubia | 90.9% | 81.8% |
| Koundara | 90.5% | 79.7% |
| Kouroussa | 96.5% | 78.6% |
| Labe | 100.0% | 96.2% |
| Lelouma | 96.4% | 96.4% |
| Mali | 93.5% | 88.2% |
| Mandiana | 98.7% | 47.7% |
| Siguiri | 76.0% | 33.1% |
| Tougue | 100.0% | 100.0% |

**Table 32: Agreement between caregiver report and SMC card**

| Cycle | Card 0 Carer 0 | Card 1 Carer 1 | Card 0 Carer 1 | Card 1 Carer 0 | % agreement |
|---|---|---|---|---|---|
| 1 | 79 | 934 | 9 | 91 | 91.0% |
| 2 | 87 | 923 | 23 | 80 | 90.7% |
| 3 | 104 | 921 | 22 | 66 | 92.1% |
| 4 | 170 | 810 | 69 | 64 | 88.1% |

## Bednet use by children

Bednet use the night before the survey was recorded in the survey for children receiving SMC. Insecticide-treated bednets are the most cost-effective method of malaria prevention, SMC adds to this protection but does not replace the need to use bednets - ITNs or LLINs (long-lasting insecticide-treated nets).

In last year's survey, after the 2017 campaign, 43.6% of children in the survey (children eligible to receive SMC) were reported to have slept under a bednet the night before the survey.

In this survey, 30.2% of children slept under a net the night before the survey (Table 28). The survey was conducted after the main malaria season and bednet use may be lower at this time than in the main season but nevertheless bednet use was surprisingly low. There were notable variations with very low use of nets in some prefectures.

**Table 33: Percentage of children 3-59months who slept under a bednet (of any type) the night before the survey**

| Area | % slept under a net last night | 95%CI |
|---|---|---|
| Dinguiraye, Gaoual, Koubia, Koundara, Mali, Tougue | 62.0% | (46.7%,77.3%) |
| Siguiri, Mandiana | 13.0% | (6.4%,19.6%) |
| Labe, Lelouma | 79.3% | (65.4%,93.2%) |
| Dabola, Kankan, Kouroussa | 18.2% | (7.4%,29.0%) |
| TOTAL | 30.2% | (22.0%,38.4%) |

| Prefecture | % children 3-59 months who slept under a net the night before the survey | Number of children surveyed |
|---|---|---|
| Dabola | 61.8% | 134 |
| Dinguiraye | 50.8% | 138 |
| Gaoual | 88.1% | 79 |
| Kankan | 14.2% | 457 |
| Koubia | 9.1% | 11 |
| Koundara | 96.7% | 29 |
| Kouroussa | 0.0% | 193 |
| Labe | 85.6% | 81 |
| Lelouma | 63.1% | 27 |
| Mali | 47.3% | 79 |
| Mandiana | 0.1% | 118 |
| Siguiri | 15.1% | 456 |
| Tougue | 75.3% | 35 |

## Bednet use by all household members

A total of 5260 household members were surveyed (Table 34), of whom 5139 slept in the household the night before the survey. Household size ranged from 2 to 16 (Table 35). The survey was limited to households that had at least one child under 7 years of age and aged at least 3 months.

**Table 34: Age distribution of those surveyed**

| Age in years | Number of individuals |
|---|---|
| **0-4** | 2,015 |
| **5-9** | 800 |
| **10-14** | 282 |
| **15-19** | 229 |
| **20-24** | 241 |
| **25-29** | 381 |
| **30-34** | 391 |
| **35-39** | 343 |
| **40-44** | 216 |
| **45+** | 362 |
| **TOTAL** | 5,260 |

(5193/5260 slept in the household the night before the survey)

**Table 35: Household size: Number of households, by household size, in each wealth ranking. The largest households are in the highest wealth ranking.**

| | Wealth ranking | | | | | |
|---|---|---|---|---|---|---|
| **Household size** | Lowest | Low | Middle | High | Highest | Total |
| **2** | 6 | 6 | 8 | 2 | 0 | 22 |
| **3** | 22 | 49 | 32 | 30 | 17 | 150 |
| **4** | 23 | 64 | 65 | 58 | 50 | 260 |
| **5** | 21 | 45 | 50 | 53 | 43 | 212 |
| **6** | 11 | 26 | 36 | 30 | 39 | 142 |
| **7** | 3 | 22 | 19 | 21 | 28 | 93 |
| **8** | 5 | 5 | 11 | 13 | 11 | 45 |
| **9** | 1 | 1 | 6 | 9 | 14 | 31 |
| **10** | 0 | 3 | 4 | 6 | 4 | 17 |
| **11** | 0 | 0 | 3 | 3 | 11 | 17 |
| **12** | 0 | 0 | 0 | 1 | 8 | 9 |
| **14** | 0 | 0 | 1 | 1 | 0 | 2 |
| **15** | 0 | 0 | 0 | 0 | 1 | 1 |
| **16** | 0 | 0 | 0 | 0 | 1 | 1 |
| **TOTAL** | 92 | 221 | 235 | 227 | 227 | 1002 |

 (996 households consented and included members who slept in the household the night before the survey)

Overall, 28.7% used a LLIN the night before the survey. Net use varied by area (Table 36), ranging from 8.1% in Siguiri/Mandiana to 76.3% in Labe/Lelouma.

**Table 36: % that used a net, among those that slept in the household the night before the survey (number surveyed)**

| Area | Any net | LLIN | Intact net | Net <2years old |
|---|---|---|---|---|
| **Dinguiraye, Gaoual, Koubia, Koundara, Mali, Tougue** | 59.9% | 59.3% | 37.3% | 5.3% |
| | 1168 | 1168 | 1168 | 1168 |
| **Siguiri, Mandiana** | 8.9% | 8.1% | 4.1% | 1.6% |
| | 1694 | 1689 | 1694 | 1694 |
| **Labe, Lelouma** | 76.3% | 76.3% | 48.0% | 17.4% |
| | 431 | 431 | 431 | 431 |
| **Dabola, Kankan, Kouroussa** | 17.3% | 17.3% | 7.9% | 6.8% |
| | 1905 | 1905 | 1905 | 1905 |
| **Total** | 29.0% | 28.7% | 16.6% | 5.7% |
| | 5198 | 5193 | 5198 | 5198 |

Of 996 households surveyed, 39.7% had at least one LLIN and 13.1% had one LLIN for every 2 persons in the household (Table 37, 38).

**Table 37: Access to a bednet: % of households with at least one net, and % of households with at least one net for every two people who slept in the household the night before the survey**

| | | % households (95% CI) |
|---|---|---|
| **Any type of net** | At least one net per household | 40.4% (30.7%,50.1%) |
| | At least one net for every two persons | 13.1% (7.5%,18.7%) |
| **LLIN** | At least one net per household | 39.7% (29.8%,49.5%) |
| | At least one net for every two persons | 13.1% (7.5%,18.7%) |
| **Intact net** | At least one net per household | 24.7% (17.4%,32.0%) |
| | At least one net for every two persons | 7.2% (3.5%,10.8%) |
| **Net less than 2 years old** | At least one net per household | 7.5% (4.7%,10.3%) |
| | At least one net for every two persons | 0.9% (0.1%,1.7%) |

**Table 38: % of households with at least one bednet (LLIN), and % households with at least on bednet per 2 persons who slept in the household the night before the survey.**

| | | Dinguiraye, Gaoual, Koubia, Koundara, Mali, Tougue | Siguiri, Mandiana | Labe, Lelouma | Dabola, Kankan, Kouroussa |
|---|---|---|---|---|---|
| **Any type of net** | One net/HH | 67.0% (55.9%,78.2%) | 18.9% (10.8%,27.1%) | 90.6% (81.2%,100.0%) | 19.5% (8.2%,30.9%) |
| | One net/2 persons | 29.1% (18.1%,40.1%) | 1.0% (-0.3%,2.3%) | 39.3% (27.3%,51.4%) | 1.4% (-0.4%,3.1%) |
| **LLIN** | One net/HH | 67.0% (55.9%,78.2%) | 16.5% (8.2%,24.7%) | 90.6% (81.2%,100.0%) | 19.5% (8.2%,30.9%) |
| | One net/2 persons | 29.1% (18.1%,40.1%) | 1.0% (-0.3%,2.3%) | 39.3% (27.3%,51.4%) | 1.4% (-0.4%,3.1%) |
| **Intact net** | One net/HH | 43.9% (32.6%,55.2%) | 11.6% (2.4%,20.9%) | 55.6% (32.7%,78.4%) | 9.6% (3.2%,15.9%) |
| | One net/2 persons | 18.0% (8.8%,27.3%) | 0.3% (-0.3%,1.0%) | 19.6% (7.3%,32.0%) | 0.0% (0.0%,0.0%) |
| **Net<2yrs old** | One net/HH | 7.4% (3.5%,11.3%) | 4.1% (0.5%,7.8%) | 16.6% (4.1%,29.2%) | 7.1% (2.0%,12.1%) |
| | One net/2 persons | 1.9% (0.1%,3.8%) | 0.0% (0.0%,0.0%) | 3.6% (-0.3%,7.5%) | 0.0% (0.0%,0.0%) |

Access to a LLIN, the percentage of the population who could sleep under a LLIN if there were two people per net, was 25.4% (Table 39). This compares with estimates in the 2016 MICS survey which ranged from 66% (regin of Kankan) to 78% (region of Labe), Table 40.

**Table 39: Percentage of the population who slept in the household the night before the survey, who could sleep under a net if two people slept under each net (values in the main part of the table are row percentages).**

| Number who slept in the household the night before the survey | No. of nets (LLIN) in the household | | | | | | No. of households | % who could sleep under a net if 2/net |
|---|---|---|---|---|---|---|---|---|
| | 0 | 1 | 2 | 3 | 4 | 5 | | |
| 1 | 100.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 1 | 0.0% |
| 2 | 20.0% | 71.4% | 8.6% | 0.0% | 0.0% | 0.0% | 24 | 80.0% |
| 3 | 53.8% | 33.7% | 11.1% | 1.4% | 0.0% | 0.0% | 156 | 35.0% |
| 4 | 55.6% | 24.5% | 17.3% | 1.1% | 1.5% | 0.0% | 253 | 32.1% |
| 5 | 61.3% | 14.7% | 17.2% | 5.3% | 1.5% | 0.0% | 209 | 26.4% |
| 6 | 74.7% | 6.2% | 10.6% | 7.5% | 1.1% | 0.0% | 141 | 17.7% |
| 7 | 68.0% | 6.0% | 13.0% | 7.6% | 5.4% | 0.0% | 93 | 21.1% |
| 8+ | 66.0% | 5.4% | 9.2% | 12.3% | 2.3% | 4.8% | 119 | 19.6% |
| Total | 60.3% | 18.8% | 13.7% | 4.9% | 1.6% | 0.7% | 996 | 25.4% |

**Table 40: Results from the 2016 MICS for comparison**

| | % of households with at least one bednet | | % of households with at least one net per 2 persons who slept there the night before the survey | % of the population who have access to a bednet (if 2 persons per net) | % of children under 5 years of age who slept under a net the night before the survey |
|---|---|---|---|---|---|
| | Any type | LLIN | LLIN | LLIN | LLIN |
| **Boke** | 90.4% | 90.0% | 54.0% | 77.9% | 76.0% |
| **Labe** | 91.4% | 91.1% | 61.5% | 78.2% | 68.8% |
| **Faranah** | 92.3% | 90.8% | 52.8% | 77.1% | 83.7% |
| **Kankan** | 82.3% | 81.0% | 44.8% | 66.0% | 65.2% |

Source: Institut National de la Statistique (2017) Enquête par grappes à indicateurs multiples (MICS, 2016), Rapport final, Conakry, Guinée.

## Annex A: Sampling methods

The primary outcomes to be assessed in the survey were the percentage of eligible children who received SMC in each cycle and the percentage of children who received SMC four times. Children aged 5-7 years were to be included in the survey to determine the extent of SMC treatment above the age limit. It was also planned to ask about adherence to SMC doses, and reasons for missed treatments, and (for al household members) the use of long-lasting insecticide-treated bednets (LLINs).

If we aim to estimate the percentage of children who received SMC in each cycle with a margin of error of +/- 6%, we need 66 clusters of about 20 children per cluster. Clusters will be selected with probability proportional to population size (PPS), so that more clusters will be chosen in prefectures with larger population. 66 clusters selected with PPS results in the following allocation of clusters by prefecture:

Dabola 3, Kankan 15, Kouroussa 8
2017 prefectures: Dinguiraye, 4; Mandiana, 5; Siguiri, 11; Gaoual, 3; Koubia, 1; Koundara, 2; Labe, 5; Lelouma, 2; Mali, 5; Tougue, 2
TOTAL: 66

**Sample size calculation:** The margin of error on the survey estimates of SMC coverage, will depend on the level of coverage, the number of children surveyed, the number of clusters, and the design effect. Children within the same cluster tend to be similar in terms of the number of SMC treatments they received, the design effect measures the effect of this on the precision of survey estimates of coverage. For a given total sample size, one obtains better precision by having more clusters and fewer children per cluster, but logistic constraints limit the number of clusters, due to travel time and cost, and also because to ensure sampling is not biased, care is needed in each cluster to map where the dwellings are, divide the map into segments, and then to ensure all dwellings in the selected segment are visited. If the coverage is 80%, the margin of error is expected to be +/- $100 \times \{1.96 \times \sqrt{(Deff)} \times \sqrt{[0.8 \times (1-0.8)/(b \times C)]}\}$ where C is the number of clusters, b the mean number of children surveyed in each cluster, and Deff is the design effect. The design effect itself depends on the average number of children surveyed in each cluster (b), and the 'rate of homogeneity' which is a measure of the degree of similarity among children in a cluster: $Deff=1+(b-1)roh$ . From last year's survey, the roh value for the percentage of children who received four treatments was 0.3 and for the coverage per cycle between 0.41 and 0.54. If we include b=10 children in each cluster, the design effect for the percentage receiving 4 treatments is $1+(10-1) \times 0.3=3.7$. If we have 66 clusters, the margin of error on a coverage of 80% will be: $1.96 \times \sqrt{[3.7] \times (0.8 \times (1-0.8)/(10 \times 66)]}=+/-5.9\%$. If there are 20 children per cluster, the design effect increases to $Deff=1+(20-1) \times 0.3=6.7$, but the margin of error is little changed: $1.96 \times \sqrt{[6.7] \times (0.8 \times (1-0.8)/(20 \times 66)]}=+/-5.6\%$.

It was therefore planned that segments should be chosen to include about 10-15 eligible children and as before should also include children age 5-7yrs to be able to determine the extent of treatment of older children. Clusters with 20 children aged 3 months to 7 years would include about 15 children 3-59 months and 5 children 5-7yrs. This would give a total sample size of about 66x20=1320.

Compact segment sampling was to be used as before but with segments chosen to include about 10-15 eligible children.  The expected precision in the 10 districts that had SMC in 2017 would be about +/-9% and the precision in the 3 new prefectures would be about +/-12%, and for overall coverage about +/-6%.

The survey was conducted in the prefectures of Gaoual, Koundara, Mali, Lelouma, Labe, Koubia, Tougué, Dinguiraye, Siguiri and Mandiana, Dabola, Kouroussa and Kankan, which implemented SMC in 2018.  Ten of these prefectures were surveyed in 2017, Gaoual, Koundara, Mali, Lelouma, Labe, Koubia, Tougué, Dinguiraye, Siguiri and Mandiana. The estimated total population size of these 10 prefectures was 2,570,789 based on the 2014 census. In 2017, a sampling interval of 2,570,789/40= 64269.725 was used to select 40 settlements with probability proportional to size, using systematic sampling from a list of all 9352 settlements in the 10 prefectures, after sorting by prefecture to give an implicit stratification. The same sampling interval was used to select communities in Dabola, Kouroussa and Kankan in 2018. The total population of thee three prefectures from the 2014 census was 1,689,605, and interval of 64269.725 gives a sample of 26 settlements. Thus a total of 66 settlements were surveyed.

A rough sketch map of each selected settlement was made showing areas of habitation and local landmarks. Each map was then divided into segments of approximately equal size, the number of segments being chosen so that one segment would be expected to yield approximately the required number of children, based on the estimated total population size, while as far as possible taking advantages of local features to facilitate identification of segment boundaries on the ground. Children aged at least 3 months at SMC cycle 4 in October, (hence at least 6 months at the time of the survey, conducted the following January) and less than 7 years at the time of the survey, were eligible to be included. It was assumed that this age group represents about 20% of the total population. A total sample size of about 1320 children was required, i.e. 1320/66=20 children on average from each settlement. Each settlement was therefore divided into $S=floor(N_i \times 0.2/20)$ segments, where $N_i$ was the population from the 2014 census. The segments were numbered on the map and then the number of segments created was entered into a tablet PC which used simple random sampling to select a segment number to be surveyed. Every dwelling within the chosen segment was then visited and every child between the age of 9 months and 7 years, who had stayed in the house the night before the survey, was included in the survey. The GPS location of each dwelling visited was automatically recorded by the tablet PC used to collect interview data. The number surveyed in each settlement therefore could vary but the average was expected to be about 20 if the population data were accurate. There were 17 settlements that were selected which were too large for segmentation to be practical, and there was no information available about sub-divisions of these segments that could be used to select a smaller area. For these settlements, the total area was estimated by taking GPS locations around the perimeter of the inhabited area. A single location was then chosen, by randomly generating an x and y coordinate within the settlement (this was done independently of the survey team and the location sent to them by email). Interviewers surveyed houses around this point, recording the GPS location of each dwelling, and continuing outwards, without missing any dwellings, until the required number of children (20) had been reached. In the final dwelling, all children eligible for the survey were included so the final sample size could exceed 20.

The sampling probability is $pi=66 \times (N_i/N_T) \times f_i \times R_i$, for individuals in settlement I, where $N_i$ is the population of village i from the 2014 census and $N_T$ is the total population of the 13 prefectures and $R_i$ is the response rate in cluster i. For the settlements that were segmented, $f_i = (1/S_i)$, where $S_i$ is the number of segments. For the settlements which were too large to segment, $f_i=(a_i/A_i)$, where $a_i$ is the sampled area in settlement i, and $A_i$ is the total area of the settlement. This is a rough and ready way to estimate sampling probabilities, where it can be assumed population density is approximately uniform. It is sensitive to the way the sampled polygon is defined. To calculate sampled areas for the 17 large settlements, we plotted the GPS locations of the surveyed dwellings onto aerial photos of the settlements in Google Earth, and defined a polygon that was midway between the convex hull of the sampled coordinates and the next adjacent dwellings outside the sampled area, in the photograph. The convex hull itself would underestimate the sampled area.

The sampling weight for each child (the number of children in the population that each child surveyed represents) was $1/p_i$.

Standard errors of estimates of indicators were computed using linearized variance formulae for ratio estimators. For binary variables, confidence intervals for proportions were obtained after using a logit transformation, to ensure the confidence limits fell in the range (0,1).

## Table A1: List of clusters

| Prefecture | Sousprefecture | District /quartier | Village /Secteur | Population | Cluster number | Response rate | Segments | Area/m² | Sampled area/m² | Sampling probability | Weight |
|---|---|---|---|---|---|---|---|---|---|---|---|
| MANDIANA | Balandougouba | Sidikila II | Sidikila II Centre | 3616 | 1 | 1.000 | 36 | | | 0.00156 | 642.7 |
| MANDIANA | Dialakoro | Samory Touré | Samory TOURE | 3794 | 2 | 1.000 | 37 | | | 0.00159 | 629.5 |
| MANDIANA | Kinieran | Mbalia | Mbalia Centre | 12710 | 3 | 1.000 | | 1081830 | 89681 | 0.01632 | 61.3 |
| MANDIANA | Koundian | Koundian I | Namafouada | 131 | 4 | 1.000 | 1 | | | 0.00203 | 492.8 |
| MANDIANA | Morodou | Samakofara | Samakofara Centre | 1199 | 5 | 1.000 | 11 | | | 0.00169 | 592.2 |
| GAOUAL | Foulamory | Tabadian | Nyor Nyor | 668 | 6 | 1.000 | 7 | | | 0.00148 | 676.4 |
| GAOUAL | Koumbia | Dara Bowé | Dara Bowé Centre | 1315 | 7 | 1.000 | 13 | | | 0.00157 | 638.2 |
| GAOUAL | Malanta | Kounsi | Peguéty | 247 | 8 | 1.000 | 2 | | | 0.00191 | 522.7 |
| KOUNDARA | Guingan | Kifaya | Angona | 87 | 9 | 1.000 | 1 | | | 0.00135 | 742.0 |
| KOUNDARA | Sambailo | Sambailo Centre | Thiuopoutel | 497 | 10 | 1.000 | 5 | | | 0.00154 | 649.4 |
| DINGUIRAYE | Banora | Boubèrè | Boubèrè Centre | 793 | 11 | 1.000 | 8 | | | 0.00154 | 651.2 |
| DINGUIRAYE | Diatifere | Mamoudouya I | Bandianya | 531 | 12 | 1.000 | 5 | | | 0.00165 | 607.8 |
| DINGUIRAYE | Dinguiraye-centre | Tinkisso | Souloukoufalan | 257 | 13 | 0.950 | 3 | | | 0.00126 | 793.2 |
| DINGUIRAYE | Selouma | Selouma Centre | Sakabari | 557 | 14 | 0.950 | 6 | | | 0.00137 | 731.9 |
| SIGUIRI | Doko | Kouremalé | Kouremalé Centre | 8784 | 15 | 1.000 | | 2195906 | 8576 | 0.00053 | 1881.7 |
| SIGUIRI | Franwalia | Franwalia Centre | Franwalia Centre | 5807 | 16 | 0.833 | | 995165 | 6300 | 0.00047 | 2107.1 |
| SIGUIRI | Kintinian | Balato III | Balato Centre III | 6354 | 17 | 1.000 | | 1259773 | 8171 | 0.00064 | 1566.3 |
| SIGUIRI | Kintinian | Fatoya | Fatoya Centre | 11449 | 18 | 1.000 | | 1713351 | 7131 | 0.00074 | 1354.7 |
| SIGUIRI | Malea | Maléah Centre | Maléah Centre | 2245 | 19 | 1.000 | 22 | | | 0.00158 | 632.6 |
| SIGUIRI | Niagassola | Kignekourou | Faraboloni | 436 | 20 | 0.929 | 4 | | | 0.00157 | 637.8 |
| SIGUIRI | Norassoba | NanenTraoré | Nanen Traoré Centre | 4362 | 21 | 1.000 | | 1365449 | 29993 | 0.00148 | 673.7 |
| SIGUIRI | Siguiri-centre | Dankakoura | Dankakoura Centre | 1734 | 22 | 0.971 | 17 | | | 0.00153 | 652.0 |
| SIGUIRI | Siguiri-centre | Saourou | Saourou Centre | 4372 | 23 | 1.000 | | 384840 | 7614 | 0.00134 | 746.3 |
| SIGUIRI | Siguiri-centre | Sougoula | Sougoula Centre | 2362 | 24 | 1.000 | 21 | | | 0.00174 | 573.9 |
| SIGUIRI | Siguirini | Talabé | Talabé Centre | 648 | 25 | 0.958 | 6 | | | 0.00160 | 623.7 |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| KOUBIA | Matakaou | Matakaou Centre | Dougouwoulen | 334 | 26 | 0.750 | 3 | | | 0.00129 | 773.1 |
| MALI | Donghol Sigon | Dougaya | Dioma Roundé | 413 | 27 | 1.000 | 4 | | | 0.00160 | 625.2 |
| MALI | Fougou | Kansaghel | Laami | 121 | 28 | 1.000 | 1 | | | 0.00187 | 533.5 |
| MALI | Madina Wora | Pellissaré | Donghol Doubhi | 131 | 29 | 1.000 | 1 | | | 0.00203 | 492.8 |
| MALI | Salambande | Koya | Koya Centre | 139 | 30 | 1.000 | 1 | | | 0.00215 | 464.4 |
| MALI | Yembereng | Sinthiourou | Diaguitarè | 113 | 31 | 1.000 | 1 | | | 0.00175 | 571.3 |
| TOUGUE | Konah | Bourouwal | Kounsen | 234 | 32 | 0.750 | 2 | | | 0.00136 | 735.6 |
| TOUGUE | Tougue centre | Tougué I | Dioloki | 285 | 33 | 0.700 | 2 | | | 0.00155 | 647.1 |
| LABE | Garambe | Garambé Centre | Bassanya II | 644 | 34 | 0.739 | 6 | | | 0.00123 | 813.7 |
| LABE | Labé centre | Daka II | Secteur II | 7182 | 35 | 0.737 | | 802786 | 42257 | 0.00432 | 231.7 |
| LABE | Labé centre | Madina | Dianyabhè Mosquée | 1525 | 36 | 0.531 | 15 | | | 0.00084 | 1195.2 |
| LABE | Noussy | Kassangui | Dow Kougue | 16 | 37 | 1.000 | 1 | | | 0.00025 | 4034.5 |
| LABE | Tountouroun | Tounny | Gadha Thiolliwel | 174 | 38 | 0.875 | 1 | | | 0.00236 | 424.0 |
| LELOUMA | Lafou | Bombi Bourou | Yalaya | 103 | 39 | 0.733 | 1 | | | 0.00117 | 854.6 |
| LELOUMA | Sagale | Bamikountou | Gnekori | 85 | 40 | 0.900 | 1 | | | 0.00119 | 843.8 |
| DABOLA | Banko | Dalado | Daffela | 192 | 41 | 1.000 | 1 | | | 0.00297 | 336.2 |
| DABOLA | Dabola-centre | Foundeng II | Foula | 1524 | 42 | 1.000 | 15 | | | 0.00157 | 635.3 |
| DABOLA | Kindoye | Kindoye II | Fissanya | 146 | 43 | 0.964 | 1 | | | 0.00218 | 458.5 |
| KANKAN | Balandougou | Koba | Koba Centre | 2044 | 44 | 1.000 | 20 | | | 0.00158 | 631.6 |
| KANKAN | Bate-nafadji | Djelibakoro | Total | 9282 | 45 | 1.000 | | 1132450 | 6873 | 0.00087 | 1145.9 |
| KANKAN | Boula | Kalafilila | Total | 3045 | 46 | 1.000 | 30 | | | 0.00157 | 636.0 |
| KANKAN | Kankan-centre | Aviation | Total | 8560 | 47 | 1.000 | | 3568746 | 32063 | 0.00119 | 839.4 |
| KANKAN | Kankan-centre | Briqueterie | Total | 12168 | 48 | 1.000 | | 2409247 | 26167 | 0.00205 | 488.4 |
| KANKAN | Kankan-centre | Farako I | Total | 6511 | 49 | 1.000 | | 355552 | 6145 | 0.00174 | 573.6 |
| KANKAN | Kankan-centre | Hermakonon II | Total | 8824 | 50 | 1.000 | | 399040 | 6716 | 0.00230 | 434.7 |
| KANKAN | Kankan-centre | Madina | Secteur II | 5860 | 51 | 1.000 | | 1387773 | 29940 | 0.00196 | 510.6 |
| KANKAN | Kankan-centre | Salamaninda | Secteur III | 3519 | 52 | 1.000 | 35 | | | 0.00156 | 642.0 |
| KANKAN | Kankan-centre | Timbo | Secteur II | 846 | 53 | 1.000 | 8 | | | 0.00164 | 610.4 |
| KANKAN | Koumban | Koumban I | Koumban I Centre | 2080 | 54 | 1.000 | 20 | | | 0.00161 | 620.7 |
| KANKAN | Missamana | Djimbala | Secteur III | 2484 | 55 | 1.000 | 24 | | | 0.00160 | 623.7 |
| KANKAN | Moribayah | Moribaya Centre II | Moribaya II Centre | 778 | 56 | 1.000 | 7 | | | 0.00172 | 580.8 |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **KANKAN** | Tinti-Oulen | Gbanankoura | Total | 2435 | 57 | 1.000 | 24 | | | 0.00157 | 636.2 |
| **KANKAN** | Tokounou | Sansambaya | Sansambaya Centre | 1085 | 58 | 1.000 | 10 | | | 0.00168 | 594.9 |
| **KOUROUSSA** | Balato | Balato Centre | Fodedou | 390 | 59 | 1.000 | 3 | | | 0.00201 | 496.5 |
| **KOUROUSSA** | Banfele | Nafadji | Total | 4492 | 60 | 1.000 | | 129739 | 9799 | 0.00526 | 190.3 |
| **KOUROUSSA** | Cissela | Fadoussaba | Total | 10985 | 61 | 1.000 | | 604702 | 35272 | 0.00993 | 100.7 |
| **KOUROUSSA** | Cissela | Sonokoro | Total | 2578 | 62 | 1.000 | 25 | | | 0.00160 | 626.0 |
| **KOUROUSSA** | Doura | Farakoba | Farakoba Centre | 1728 | 63 | 1.000 | 17 | | | 0.00157 | 635.1 |
| **KOUROUSSA** | Kiniero | Missamana | Total | 945 | 64 | 1.000 | 9 | | | 0.00163 | 614.8 |
| **KOUROUSSA** | Kouroussa centre | Doula | Kignedouba | 324 | 65 | 1.000 | 3 | | | 0.00167 | 597.7 |
| **KOUROUSSA** | Kouroussa centre | Wassabada | Secteur II (Raiko) | 9031 | 66 | 1.000 | | 740557 | 33152 | 0.00626 | 159.7 |

Total implied population at time of survey, aged 3-59 months, based on survey weightings: 1,245,873

Total implied population 3 months to 7 years: 1,538,596. Total aged 5-7 years: 292,723

Total 2014 census population: 4,260,394

Estimated target population: 825,994

**Table A2: Standard error, design effect and rate of homogeneity for the main indicators**

| Indicator | N | Value | s.e. | 95%CI | Deff | Deff$_{weight}$ | Deff$_{cluster}$ | roh | b |
|---|---|---|---|---|---|---|---|---|---|
| Average coverage per cycle | 1771 | 0.716 | 0.0466 | (0.623,0.809) | 23.335 | 1.378 | 16.937 | 0.439 | 37.3 |
| Mean number of treatments per child | 1771 | 2.87 | 0.1864 | (2.49,3.24) | 23.335 | 1.378 | 16.937 | 0.439 | 37.3 |
| Coverage of 4 cycles | 1771 | 0.607 | 0.0505 | (0.503,0.703) | 18.905 | 1.328 | 14.241 | 0.365 | 37.3 |
| Adherence | 1448 | 0.975 | 0.0071 | (0.956,0.986) | 2.996 | 1.034 | 2.898 | 0.062 | 31.7 |
| Reach of SMC programme | 1771 | 0.793 | 0.0457 | (0.687,0.870) | 22.475 | 1.441 | 15.600 | 0.402 | 37.3 |
| Coverage of cycle 1 | 1771 | 0.738 | 0.0452 | (0.639,0.818) | 18.713 | 1.401 | 13.361 | 0.340 | 37.3 |
| Coverage of cycle 2 | 1771 | 0.737 | 0.0444 | (0.639,0.815) | 18.019 | 1.360 | 13.253 | 0.338 | 37.3 |
| Coverage of cycle 3 | 1771 | 0.715 | 0.0498 | (0.606,0.803) | 21.525 | 1.382 | 15.575 | 0.401 | 37.3 |
| Coverage of cycle 4 | 1771 | 0.676 | 0.0506 | (0.568,0.767) | 20.648 | 1.347 | 15.326 | 0.395 | 37.3 |
| Treatment of older children | 327 | 0.157 | 0.0481 | (0.061,0.254) | 6.139 | 0.992 | 6.191 | 0.269 | 20.3 |
| Awareness of SMC dates | 1135 | 0.924 | 0.0245 | (0.859,0.961) | 8.548 | 1.690 | 5.057 | 0.192 | 22.1 |
| LLIN use in children | 1835 | 0.302 | 0.0411 | (0.226,0.390) | 14.737 | 1.386 | 10.635 | 0.251 | 39.4 |
| LLIN use (all ages) | 5198 | 0.301 | 0.0432 | (0.223,0.394) | 46.021 | 1.415 | 32.528 | 0.292 | 109.1 |
| ACCESS to LLIN (population) | 5198 | 0.254 | 0.0371 | (0.187,0.335) | 37.772 | 1.447 | 26.108 | 0.232 | 109.1 |
| ACCESS to LLIN (%HH with an LLIN) | 996 | 0.397 | 0.0493 | (0.303,0.498) | 10.099 | 1.378 | 7.330 | 0.352 | 19.0 |
| ACCESS to LLIN (% HH with 1 net per 2) | 996 | 0.131 | 0.0282 | (0.084,0.198) | 6.962 | 1.757 | 3.962 | 0.165 | 19.0 |
| Caregiver knowledge about SMC | 1135 | 6.90 | 0.3216 | (6.26,7.55) | 10.322 | 1.370 | 7.533 | 0.310 | 22.1 |
| Reported CHW adherence to guidelines | 1135 | 6.07 | 0.3271 | (5.41,6.72) | 12.084 | 1.424 | 8.486 | 0.355 | 22.1 |
| SMC directly observed | 1447 | 0.990 | 0.0041 | (0.977,0.996) | 2.541 | 0.992 | 2.563 | 0.051 | 31.7 |
| Interval between cycle 1 and cycle 2 | 1192 | 34 | | | | | | | |
| Interval between cycle 2 and cycle 3 | 1150 | 36 | | | | | | | |
| Interval between cycle 3 and cycle 4 | 969 | 29 | | | | | | | |
| SMC card at survey | 1771 | 0.609 | 0.0429 | (0.521,0.691) | 13.699 | 1.273 | 10.758 | 0.269 | 37.3 |

The rate of homogeneity, roh, was calculated as (Deff$_{cluster}$-1)/(b-1), where Deff$_{cluster}$ is the design effect due to clustering, calculated from the overall design effect, and the design effect due to weighting, Deff$_{clustering}$= Deff$_{overall}$/ Deff$_{weighting}$, and b is the weighted mean cluster size, b=$\sum n_i^2/\sum n_i$ (where $n_i$ is the number of respondents in cluster i).

# Annex B: Administrative data

Administrative data from SMC reports from the 2018 campaign, are summarised in Tables B1-B6.

Vomitting: Overall, 1.49% of infant treatments and 0.47% of treatments to children 12-59 months, were vomited and a second dose administered (Table B1). Infants were 3.2 times (95%CI 3.0,3.4) more likely to vomit than older children. The risk of vomiting was highest in the first cycle, the risk ratio for vomiting in the fourth cycle, compared to the first, as 0.44 (95%CI 0.38,0.50).

### Table B1: % of children who vomitted

| Cycle | 3-11months | | | 12-59months | | | Risk ratio (95%CI) (both ages combined) | Risk ratio (95%CI) (ages compared) |
|---|---|---|---|---|---|---|---|---|
| | Treated | Vomitted and re-dosed | % repeated dose | Treated | Vomitted and re-dosed | % repeated dose | | |
| 1 | 133720 | 2951 | 2.21% | 662365 | 4995 | 0.75% | 1 | 2.9 (2.8,3.0) |
| 2 | 147047 | 2016 | 1.37% | 700180 | 2966 | 0.42% | 0.59 (0.53,0.66) | 3.2 (3.1,3.3) |
| 3 | 150721 | 2001 | 1.33% | 715925 | 2916 | 0.41% | 0.57 (0.50,0.65) | 3.3 (3.1,3.4) |
| 4 | 143382 | 1592 | 1.11% | 707139 | 2107 | 0.30% | 0.44 (0.38,0.50) | 3.7 (3.5,3.9) |
| TOTAL | 574870 | 8560 | 1.49% | 2785609 | 12984 | 0.47% | | 3.2 (3.0,3.4) |

Referral: Infants were more likely to be referred, due to illness, than older children (0.47% compared to 0.16%, risk ratio 3.1 (95%CI 1.8,5.2), Table B2. In older children, referrals were more common during cycle than other cycles.

### Table B2: % of children who were referred

| | Infants 3-11 months | | | Children 12-59 months | | | Risk ratio (95%CI) (both ages combined) | Risk ratio (95%CI) (ages compared) |
|---|---|---|---|---|---|---|---|---|
| | Seen | Referred | %referred | Seen | Referred | %referred | | |
| 1 | 138358 | 981 | 0.71% | 669720 | 2194 | 0.33% | 1 | 2.2 (2.1,2.3) |
| 2 | 149625 | 405 | 0.27% | 704465 | 842 | 0.12% | 0.37 (0.29,0.47) | 2.3 (2.1,2.5) |
| 3 | 153530 | 1125 | 0.73% | 719926 | 842 | 0.12% | 0.57 (0.35,0.92) | 6.5 (4.0,11) |
| 4 | 144974 | 255 | 0.18% | 710397 | 483 | 0.07% | 0.22 (0.18,0.28) | 2.6 (2.3,2.9) |
| TOTAL | 586487 | 2766 | 0.47% | 2804508 | 4361 | 0.16% | | 3.1 (1.8,5.2) |

**Table B3: Referral of sick children (infants), by prefecture**

| Infants 3-11 months | Cycle 1 | | | Cycle 2 | | | Cycle 3 | | | Cycle 4 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Prefecture | No. Seen | No. referred | % referred | No. seen | No. referred | % referred | No. seen | No. referred | % referred | No. seen | No. referred | % referred |
| Dabola | 5386 | 64 | 1.19% | 5823 | 10 | 0.17% | 5990 | 6 | 0.10% | 5175 | 9 | 0.17% |
| Dinguiraye | 8712 | 62 | 0.71% | 8201 | 43 | 0.52% | 8653 | 29 | 0.34% | 7913 | 12 | 0.15% |
| Gaoual | 9221 | 32 | 0.35% | 8116 | 8 | 0.10% | 8214 | 15 | 0.18% | 8430 | 9 | 0.11% |
| Kankan | 16397 | 192 | 1.17% | 18859 | 37 | 0.20% | 19336 | 48 | 0.25% | 17594 | 21 | 0.12% |
| Koubia | 3334 | 69 | 2.07% | 3429 | 41 | 1.20% | 3444 | 13 | 0.38% | 3788 | 10 | 0.26% |
| Koundara | 4650 | 17 | 0.37% | 4387 | 25 | 0.57% | 4489 | 13 | 0.29% | 4629 | 6 | 0.13% |
| Kouroussa | 9672 | 149 | 1.54% | 12210 | 27 | 0.22% | 12244 | 9 | 0.07% | 11695 | 9 | 0.08% |
| Labé | 11382 | 35 | 0.31% | 11527 | 21 | 0.18% | 12245 | 832 | 6.79% | 10727 | 24 | 0.22% |
| Lelouma | 5459 | 56 | 1.03% | 6334 | 20 | 0.32% | 6166 | 24 | 0.39% | 6334 | 13 | 0.21% |
| Mali | 14018 | 69 | 0.49% | 13825 | 98 | 0.71% | 13679 | 67 | 0.49% | 13678 | 88 | 0.64% |
| Mandiana | 14034 | 97 | 0.69% | 16460 | 54 | 0.33% | 15978 | 62 | 0.39% | 14235 | 40 | 0.28% |
| Siguiri | 31347 | 116 | 0.37% | 36253 | 9 | 0.02% | 38712 | 0 | 0.00% | 35978 | 9 | 0.03% |
| Tougue | 4746 | 23 | 0.48% | 4201 | 12 | 0.29% | 4380 | 7 | 0.16% | 4798 | 5 | 0.10% |
| Total | 138358 | 981 | 0.71% | 149625 | 405 | 0.27% | 153530 | 1125 | 0.73% | 144974 | 255 | 0.18% |

**Table B4: Referral of sick children (children)**

| Children 12-59months | Cycle 1 | | | Cycle 2 | | | Cycle 3 | | | Cycle 4 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Prefecture | No. seen | No. referred | % referred | No. seen | No. referred | % referred | No. seen | No. referred | % referred | No. seen | No. referred | % referred |
| Dabola | 31467 | 215 | 0.68% | 35871 | 21 | 0.06% | 36413 | 16 | 0.04% | 37517 | 19 | 0.05% |
| Dinguiraye | 36927 | 131 | 0.35% | 37295 | 58 | 0.16% | 37160 | 81 | 0.22% | 37756 | 32 | 0.08% |
| Gaoual | 36987 | 73 | 0.20% | 36316 | 29 | 0.08% | 36170 | 55 | 0.15% | 36631 | 13 | 0.04% |
| Kankan | 81681 | 400 | 0.49% | 88049 | 101 | 0.11% | 90162 | 78 | 0.09% | 88458 | 63 | 0.07% |
| Koubia | 18169 | 86 | 0.47% | 18894 | 95 | 0.50% | 19059 | 60 | 0.31% | 18733 | 26 | 0.14% |
| Koundara | 24948 | 63 | 0.25% | 24201 | 81 | 0.33% | 25597 | 65 | 0.25% | 25290 | 28 | 0.11% |
| Kouroussa | 48183 | 411 | 0.85% | 54895 | 77 | 0.14% | 56639 | 37 | 0.07% | 56038 | 31 | 0.06% |
| Labé | 61745 | 111 | 0.18% | 65228 | 76 | 0.12% | 65772 | 104 | 0.16% | 65314 | 74 | 0.11% |
| Lelouma | 34056 | 144 | 0.42% | 35193 | 82 | 0.23% | 35870 | 113 | 0.32% | 35399 | 45 | 0.13% |
| Mali | 53674 | 92 | 0.17% | 54538 | 118 | 0.22% | 54997 | 110 | 0.20% | 54735 | 78 | 0.14% |
| Mandiana | 64750 | 159 | 0.25% | 66916 | 63 | 0.09% | 67762 | 72 | 0.11% | 67580 | 39 | 0.06% |
| Siguiri | 153156 | 194 | 0.13% | 163166 | 14 | 0.01% | 170305 | 11 | 0.01% | 163555 | 12 | 0.01% |
| Tougue | 23977 | 115 | 0.48% | 23903 | 27 | 0.11% | 24020 | 40 | 0.17% | 23391 | 23 | 0.10% |
| Total | 669720 | 2194 | 0.33% | 704465 | 842 | 0.12% | 719926 | 842 | 0.12% | 710397 | 483 | 0.07% |

Exclusion: Exclusion for other reasons than sickness, was more common in infants than in older children, ranging from 2.6% at cycle 1 to 0.92% at cycle 4. It is possible the main reason was age eligibility. In children 12-59 months, 0.76% were excluded in cycle 1 falling to 0.39% in cycle 4 (Table B5-B6).

**Table B5: Exclusions for other reasons (infants)**

| Infants 3-11months | Cycle 1 No. seen | No. excluded | % excluded | Cycle 2 No. seen | No. excluded | % excluded | Cycle 3 No. seen | No. excluded | % excluded | Cycle 4 No. seen | No. excluded | % excluded |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Dabola | 5386 | 136 | 2.53% | 5823 | 55 | 0.94% | 5990 | 55 | 0.92% | 5175 | 56 | 1.08% |
| Dinguiraye | 8712 | 91 | 1.04% | 8201 | 39 | 0.48% | 8653 | 32 | 0.37% | 7913 | 28 | 0.35% |
| Gaoual | 9221 | 177 | 1.92% | 8116 | 17 | 0.21% | 8214 | 20 | 0.24% | 8430 | 14 | 0.17% |
| Kankan | 16397 | 302 | 1.84% | 18859 | 100 | 0.53% | 19336 | 107 | 0.55% | 17594 | 48 | 0.27% |
| Koubia | 3334 | 175 | 5.25% | 3429 | 85 | 2.48% | 3444 | 53 | 1.54% | 3788 | 43 | 1.14% |
| Koundara | 4650 | 71 | 1.53% | 4387 | 31 | 0.71% | 4489 | 65 | 1.45% | 4629 | 22 | 0.48% |
| Kouroussa | 9672 | 212 | 2.19% | 12210 | 34 | 0.28% | 12244 | 56 | 0.46% | 11695 | 34 | 0.29% |
| Labé | 11382 | 744 | 6.54% | 11527 | 378 | 3.28% | 12245 | 237 | 1.94% | 10727 | 189 | 1.76% |
| Lelouma | 5459 | 159 | 2.91% | 6334 | 73 | 1.15% | 6166 | 69 | 1.12% | 6334 | 37 | 0.58% |
| Mali | 14018 | 544 | 3.88% | 13825 | 302 | 2.18% | 13679 | 267 | 1.95% | 13678 | 257 | 1.88% |
| Mandiana | 14034 | 330 | 2.35% | 16460 | 109 | 0.66% | 15978 | 78 | 0.49% | 14235 | 81 | 0.57% |
| Siguiri | 31347 | 510 | 1.63% | 36253 | 863 | 2.38% | 38712 | 597 | 1.54% | 35978 | 500 | 1.39% |
| Tougue | 4746 | 189 | 3.98% | 4201 | 80 | 1.90% | 4380 | 48 | 1.10% | 4798 | 19 | 0.40% |
| **Total** | 138358 | 3640 | 2.63% | 149625 | 2166 | 1.45% | 153530 | 1684 | 1.10% | 144974 | 1328 | 0.92% |

## Table B6: Exclusions for other reasons (children)

**Children 12-59months**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Dabola | 31467 | 491 | 1.56% | 35871 | 165 | 0.46% | 36413 | 140 | 0.38% | 37517 | 183 | 0.49% |
| Dinguiraye | 36927 | 94 | 0.25% | 37295 | 41 | 0.11% | 37160 | 80 | 0.22% | 37756 | 66 | 0.17% |
| Gaoual | 36987 | 125 | 0.34% | 36316 | 35 | 0.10% | 36170 | 64 | 0.18% | 36631 | 13 | 0.04% |
| Kankan | 81681 | 633 | 0.77% | 88049 | 173 | 0.20% | 90162 | 223 | 0.25% | 88458 | 130 | 0.15% |
| Koubia | 18169 | 150 | 0.83% | 18894 | 95 | 0.50% | 19059 | 91 | 0.48% | 18733 | 94 | 0.50% |
| Koundara | 24948 | 76 | 0.30% | 24201 | 43 | 0.18% | 25597 | 153 | 0.60% | 25290 | 129 | 0.51% |
| Kouroussa | 48183 | 656 | 1.36% | 54895 | 127 | 0.23% | 56639 | 189 | 0.33% | 56038 | 168 | 0.30% |
| Labé | 61745 | 826 | 1.34% | 65228 | 526 | 0.81% | 65772 | 678 | 1.03% | 65314 | 577 | 0.88% |
| Lelouma | 34056 | 206 | 0.60% | 35193 | 94 | 0.27% | 35870 | 171 | 0.48% | 35399 | 114 | 0.32% |
| Mali | 53674 | 218 | 0.41% | 54538 | 293 | 0.54% | 54997 | 291 | 0.53% | 54735 | 224 | 0.41% |
| Mandiana | 64750 | 466 | 0.72% | 66916 | 140 | 0.21% | 67762 | 126 | 0.19% | 67580 | 102 | 0.15% |
| Siguiri | 153156 | 1001 | 0.65% | 163166 | 1623 | 0.99% | 170305 | 908 | 0.53% | 163555 | 926 | 0.57% |
| Tougue | 23977 | 166 | 0.69% | 23903 | 59 | 0.25% | 24020 | 40 | 0.17% | 23391 | 25 | 0.11% |
| **Total** | **669720** | **5108** | **0.76%** | **704465** | **3414** | **0.48%** | **719926** | **3154** | **0.44%** | **710397** | **2751** | **0.39%** |