Final evaluation

Maternal, Newborn and Child Health Project in Mali of the Canadian Red Cross (2016-2021)

Meta Review

Peter R. Berti, HealthBridge

3 February 2022

HealthBridge
RESEARCH • POLICY • ACTION • DEVELOPMENT

Contents

INTRODUCTION

The project *Improving Maternal, Newborn and Child Health in Mali* took part from 2016 to 2021 in six health districts in the regions of Sikasso and Koulikoro, Mali. The project has been implemented by the Canadian Red Cross in collaboration with the Malian Red Cross and the Ministry of Health and Social Development of Mali, working to support the delivery of health services in the challenging context of low economic and social development, fluctuating security concerns and, in the last stage of the project, the rise of Covid-19.

In this review, the project's work is considered in four broad themes: Prenatal Health Care (ANC), the Birth Experience, Child Health, and Family Planning. To first describe broad trends in Malian health in which the project was working, DHS data were summarized for relevant indicators over the last two decades. The data summarized in **Table 1** were extracted from DHS[1] and from the project baseline report[2].

While there is a trend for steady improvement in each of the four themes of ANC, the Birth Experience, Child Health and Family Planning, clearly there is still scope for improvement. This review considers if there has been improvement in the project areas and if the improvement can be reasonably attributed to the work of the project.

Table 1. Changes in 11 indicators in Koulikoro and Sikasso from 2001 to 2018, according to data from DHS and the project baseline survey.

	Koulikoro					**Sikasso**				
Source	DHS	DHS	DHS 2012-13	BL	DHS	DHS	DHS	DHS 2012-13	BL	DHS
Year	2001	2006		2016	2018	2001	2006		2016	2018
ANC from a skilled provider	61	71	74	84	84	64	71	79	82	76
4+ ANC visits	28	37	45	44	49	31	34	40	34	35
Health facility delivery	49	53	63	81	78	39	43	63	83	71
Treatment of diarrhea with ORS or RHF	41	25	47	27	21	26	19	43	25	31
Children stunted	40	39	40	27	25	53	45	40	33	32
Children wasted	12	16	11	12	8	11	16	13	9	7
Children underweight	28	29	24	25	18	35	31	27	26	20
Infant mortality rate	121	114	61	48	49	126	132	76	73	67
Breastfeeding within 1 hour of birth	19	29	55	60	69	37	45	59	54	65
Married women currently using contraception	7	9	10	22	20	7	7	11	22	20

[1] https://dhsprogram.com/Countries/Country-Main.cfm?ctry_id=25&c=Mali&Country=Mali&cn=&r=1, accessed on 31 Jan 2022

[2] Strengthening Maternal, Newborn and Child Health in Mali (2016-2020): Baseline household study report.

Unmet need for family planning	34	33	27	22	27	32	30	29	17	23

METHODS

For this review, data were analysed from the project area's health system, and project documentation were reviewed for relevant information. The findings were summarized and presented to the project team for feedback. Their feedback was incorporated into this report.

Analysis of HMIS indicators

The Health Management Information System (HMIS) data for the project districts were downloaded directly from the DHIS2 platform on 5 January 2022 and saved as an Excel file. There were data from 30 indicators. Most of the indicators had data each year 2016 to 2020 from each community health centre (CSCom), but some indicators were missing from some CSComs for the first one to four years. A summary of the indicators is in **Appendix 1, Table A1**, including their full name in French and the English abbreviation that will be used to refer to them throughout this report. Three indicators were not reported 2016-2018 and so were not analysed further (PNCneo, Implant, FemCondom). Four indicators (NeoDeath, MatDeath, DIUPP, SurgicalFP) had very low totals each year and were not analysed further. The indicator EBF was not analysed as the methods for EBF data collection at the CSComs was not clear (and is notoriously difficult to measure).

The remaining 22 indicators were analysed in a few different ways.

1. The CSComs were placed in one of three categories, according to the proportion of the CSCom's catchment area population that was further than 5k from the CSCom. The Red Cross intervention was focused on communities further than 5km from the CSCom, were the iCCM sites were located. The change in the indicators from year to year was then compared in CSComs with <30%, 30 to 50%, or >50% of the population fully covered by the project. There were no appreciable differences between the three categories of CSComs. This could in part be because the populations within 5km also received some benefit from the project including:
    a. mass media messaging through radio that went out during the 4th and 5th year of the project using improved methods (MNCH/SRHR topics including sensitive ones, different ways of broadcasting including interactive programs with the audience, the profile of people in the radio programs and the scale of broadcast using 18 radio stations);
    b. training of CSCOM staff on MNCH services and gender training;
    c. training of rural maternity homes on MNCH services;
    d. interventions by the MoH as part of their normal activities.

    The results of these data are not meaningful and are not included in this report.

2. It was noted by project staff that there were differences in performance in the different districts. In particular, it was noted that Dioila was a very strong performer, and there were some problems in Nara that led to delays in implementation due to remoteness and insecurity. Therefore, the data were analysed by district. They were analyzed both as the sum of numbers reported (the sum in each year from all CSComs within a district), and, to

facilitate comparison between the districts, the sum in each year, per 1000 population in the CSComs reporting. The sum per year per 1000 population is used for this review.

Note that there is no need to subject these sums to statistical analysis to test for "significant differences". The data are from the entire "sampling universe" (i.e., all the CSComs within the project districts) so there is no sampling error, and no approximation in the estimates.[3] Given the nature of the monitoring data, there is no control or counter-factual, and how much of the change in the indicators is due to the project and how much would have happened anyways without the project is difficult to estimate. Rather, the available information is examined for convergence of data sources – are the changes documented with the HMIS data consistent with the information in the various project reports and with observations of project staff?

Quality control testing of the HMIS data was carried out, reported in **Appendix 2**. The average number per 1000 population, averaged over all the CSComs in a district, for each indicator, is shown in **Appendix 7.**

The indicators were grouped into the themes: ANC, Birth experience, Child Health, and Family Planning, and the results are presented by theme. Eighteen of the indicators are presented in the appendices, and four indicators (LiveBirth, Screened, NaturalFP, NewReg) which did not add additional, useful presentation are not presented.

Extraction of data from project reports

Project reports were reviewed, and information relevant to the four themes was extracted. The reports reviewed were:

- *Baseline Report* (Strengthening Maternal, Newborn and Child Health in Mali (2016-2020): Baseline household study report. Sick Kids. 10 Feb 2017).
- *Qualitative Report* (Qualitative Study for the Endline Evaluation: Improving the health of mothers, newborns and children in Mali. Sherri Bisset. 2 Sep 2021).
- *Endline Report* (Strengthening Maternal, Newborn and Child Health in Mali: Endline indicator report. Sick Kids. 12 Mar 2021).
- *CHW Endline Survey Report* (tables only, no title, no date).
- *Emergency Transport Report* (Report assessing the impact of the emergency transport system on MNCH2 in the MNCS2 response districts. Malian Red Cross, Canadian Red Cross. No date).
- *Radio Report* (Improving Maternal, Newborn and Child Health in Mali (2016-2020): General report on the broadcasting of radio messages. Draft. Feb 2021)

Integrate and interpret

Following the analysis of the HMIS data and the review of the project reports, the findings were integrated within each of the four themes and considered if the different sources of information were mutually supportive, or contradictory. Were the changes, or stasis, in the HMIS data consistent with the

[3] Of course, there could still be error in the data entry or data management, but that is not something that is addressed through significance testing.

information in the reports? Preliminary findings were shared with the project team and their input and feedback was received and incorporated.

RESULTS

Prenatal Care (ANC)

The proportion of pregnant women receiving ANC has been gradually increasing in Mali over the past 20 years, although at baseline there will still only 37% with four or more ANC. Increasing ANC was a focus of the project and received significant effort, with promotion in the communities, training of the CHWs to promote ANC, and materials supplied to the CSComs to improve their capacity. During the project, the rate of ANC4+ in the six districts increased from 11.4 to 14.0 per 1000 population (22%). Dioila had an especially large increase from 15.7 to 23.0 per 1000 population (47%).

Banamba experienced a large increase in ANC4+ from 2016 to 2018, followed by a decrease (although remaining higher than in 2016), probably due to increased insecurity in the district. While the project still exceeded its objective of a 20% increase in ANC, if Banamba had not had the security issues and was able to continue increasing ANC4+ rate through to 2020, then there would have been an increase of around 25% over baseline levels.

While there is still room for improvement, with ANC4+ levels still likely below 50%, there have been important improvements, and the project likely made major contributions to those improvements.

See **Appendix 3** for the detailed analysis.

The Birth Experience

Increasing the number of births attended by skilled health personnel was a key goal of the project, and significant efforts were put towards this effort, particularly the training of birth attendants and matrons, and the supply of medications, equipment, and solar power to the CSComs. At baseline, 82% of live births were in health facilities, a proportion that has been steadily increasing over the last two decades, and approximately half of the births were attended by SBAs and half by Matrons. During the project the number of births attended by SBAs rose and the number attended by Matrons dropped so that the overall proportion attended by one or the other stayed about the same. Maintaining the same number of births attended by SBAs or matrons is still a success for the project, because, given the training the matrons and the SBAs received, it indicates the quality of care at the typical birth has improved. This is partly reflected in an increase in GATPA (management of the third stage of labour), which rose by about 11%, early initiation of breastfeeding which rose about 9%, and post-natal care visits which rose by 35%. The result also indicates that the proportion of home births did not change, and this may be a target for future work in the districts.

See **Appendix 4** for the detailed analysis.

Child Health and Nutrition

The rates of stunting, wasting and underweight in children in Koulikoro and Sikasso has decreased substantially over the last two decades, but at baseline there were still high levels (32%, 9% and 25%

stunted, wasted, and underweight, respectively). To help lower these rates, the project provided training to CHWs and health centre staff to improve their diagnosis and treatment of common childhood illnesses. Community promotion encouraged families to seek treatment for their ill children, and because of the training the CHWs had received, the treatment could often be provided in the village with no need to travel to the CSComs. A mid-project evaluation indicated that CHW provided accurate diagnosis of illnesses but often the prescribed treatment was incorrect. Once this was recognized, the project provided more training on treatment, presumably improving the appropriateness of the treatments. These efforts contributed to an approximate halving of stunting, wasting and underweight rates in the project districts.

See **Appendix 5** for the detailed analysis.

Family Planning

The typical woman in Mali has her first child as a teenager and has six children during her life. There is strong traditional, cultural pressure to maintain high birth rates. At baseline only 22% of the women used contraceptives and yet the unmet need for contraceptives was only 18%. In other words, most woman do not use contraceptives and do not want to use them. The project recognized the health impacts of the high fertility rates, particularly for young teenagers, and worked to raise awareness of family planning options and to increase availability of contraceptives. In particular, the CHWs were able to distribute contraceptive pills and injectable contraceptives. The rate of use of each of the 11 different contraceptive methods tracked in HMIS was highly variable. In order to determine overall changes in contraceptive use, the "couple-years of protection" (CYP) was calculated, using different conversion factors for each form of contraception[4]. CYP increased from 96,469 at baseline to 142,482 at endline, an increase of almost 50%.

See **Appendix 6** for the detailed analysis.

LIMITATIONS

This review has several limitations.

The HMIS data, while of reasonably good quality, are not without error (see Appendix 2). Errors may be of three types:

i. An event that should have been recorded, was not recorded (e.g., an ANC visit was not recorded), or an event that did not happen was recorded as if it did (e.g., an ANC visit was recorded as the fourth ANC visit, when it was the third visit). There is no information about how often this may have happened.

ii. Data of events from some rural maternity homes were not recorded prior to 2020. This may have led to an underestimation of up to 15% for some indicators. However, the change in most indicators from year to year is relatively steady (see the graphs in

[4] https://www.usaid.gov/global-health/health-areas/family-planning/couple-years-protection-cyp

Appendices 3 to 6) and there was not a sudden surge from 2019 to 2020, indicating that the underestimation was mild and would not markedly impact the evaluation assessment.

iii. Transcription of data from the hand-written registers to the HMIS online database was sometimes not done accurately. However, the errors appear to be random (an equal number of overestimates as underestimates) so that the overall trends are probably accurately represented in the data set.

Overall, the data seem reasonable and are generally, but not always, internally consistent.

A second limitation is that there are no data from control sites, there is no counter-factual. The health indicators in Mali are generally improving and perhaps there would have been improvement in the project districts without project involvement - however, this is unlikely. Without the project in place, the resources would simply be unavailable. The Ministry of Health would not have been able to invest $20M into the local health system. The reason that health in Mali is gradually improving is in part because there are NGOs like the Red Cross in almost every part of Mali, complementing and improving the local health system.

A third limitation is from the inherent limited ability of this external reviewer to understand and appreciate a long, large, complex project from reading a few hundred pages of reports, and a few hours of conversations with project staff. However, given the limitations imposed by Covid, the creativity of the project team in finding a different way to evaluate the project is commendable.

SUMMARY AND CONCLUSION

Through a broad, intensive intervention, focused on training health workers, improving health centre facilities, community promotion, and improvements to the Emergency Transport System, the project has contributed to a broad range of improvements. The project target for most indicators was a 20% improvement.

There was a moderate increase in the proportion of women receiving antenatal care; ANC4+ increased 14%, and with better security it is probable the 20% target could have been reached.

There was improved capacity of birth attendants, for expected healthier birth experiences. The number of births with skilled attendants was already quite high at baseline, and a “last mile problem” would have made it hard to reach the one-fifth of the births that were not with skilled birth attendants.

There was steady improvement in child growth status during the project, with stunting falling to approximately half of 2016 levels. While there is still room to improve, the progress during the last five years has been encouraging.

There was an overall increase in family planning resulting in an increase of almost 50% in CYP. To get a better understanding of changes in all the contraceptives and met and unmet family planning needs would require different data, not available at this time.

The project has made important contributions to health in Koulikoro and Sikasso, and in carrying out this work the Red Cross teams in Canada and Mali have learned more about how to do effective work in the districts. If the team continues to work as they have, learning as they go, this reviewer is confident that there will be further important improvements in the health of the women and children of Mali.

Appendix 1. Details of indicators downloaded from HMIS.

Table A1. Number of CSComs reporting each indicator each year, and whether their data were analyzed (A), and presented in the Appendix (P).

Indicator full name, French	Indicator abbreviation, English	A,P	Number of CSComs reporting indicator each year				
			2016	2017	2018	2019	2020
CPN effective	ANCeffective	A,P	159	161	165	164	175
Nombre Accouchements au centre de santé avec application de la GATPA	GATPA	A,P	160	161	165	165	174
Nombre Accouchements au centre de santé fait par la Matrone et ATRS	MatronBirth	A,P	159	161	164	163	171
Nombre d'accouchements au centre de santé fait par du personnel qualifié	SBA	A,P	155	159	164	165	175
Nombre de decès de Nouveau-nés dans les 24 heures	NeoDeath	-	160	158	162	165	171
Nombre de decès maternel	MatDeath	-	160	160	164	164	173
Nombre de femme ayant bénéficié d'au moins 4 CPN	ANC4	A,P	160	161	165	165	175
Nombre de naissances vivantes	LiveBirth	A	160	161	165	165	175
Nombre de nouveau-né vus en consultation post natale	PNCneo	-	0	0	0	165	175
Nombre de nouveau-nés avec un poids inférieur à 2500g	LBW	A,P	158	160	159	165	175
Nombre de nouveau-nés mis au sein dans les 30 min qui suivent l'accouchement	BF30min	A,P	160	161	165	165	175
Nombre d'enfants âgés de 6 à11 mois ayant été allaités exclusivement au sein de sa naissance à 6 mois	EBF	-	156	159	163	163	173
Nombre d'enfants de 6-59 mois dépistés	Screened	A	160	159	165	165	175
Nombre d'enfants de 6-59 mois dépistés malnutris Aigus	AcuteMN	A,P	155	158	159	165	175
Nombre d'enfants de 6-59 mois souffrant de retard de croissance	Stunted	A,P	160	159	165	165	171
Nombre d'enfants de 6-59 mois souffrant d'insuffisance pondérale	UnderWt	A,P	159	161	164	164	175
Nombre d'utilisateur d'implanon PF	Implant		0	0	0	165	169
Nombre d'utilisateur d'implant (jadelle) PF	Jadelle	A,P	159	161	165	165	175
Nombre d'utilisateurs de collier du cycle PF	NaturalFP	A	160	161	165	164	171
Nombre d'utilisateurs de condoms féminins PF	FemCondom	-	0	0	0	165	174
Nombre d'utilisateurs de Condoms masculins PF	MaleCondom	A,P	158	158	165	163	173
Nombre d'utilisateurs de contraception chirurgicale volontaire PF	SurgicalFP	-	159	161	165	164	175
Nombre d'utilisateurs de DIU PF	DIU	A,P	159	159	162	163	171
Nombre d'utilisateurs de DIUPP PF	DIUPP	-	0	0	0	165	172
Nombre d'utilisateurs de MAMA PF	MAMA	A,P	157	157	163	165	173
Nombre d'utilisateurs de Pilule COC PF	Pill	A,P	158	161	165	163	174
Nombre d'utilisateurs d'injectables DMPA-IM	Inject	A,P	160	161	164	165	175
Nombre nouvelles consultations post-natales	PNC	A,P	160	161	165	165	174
Nombre nouvelles inscriptions (NC) à la CPN (CPN1)	NewReg	A	160	161	165	165	175
Nombre Total de CPN (NC et AC)	TotalANC	A,P	160	161	165	165	175

Appendix 2. Quality Control testing of HMIS data

Part A.

As a quality control test, the frequency of various indicators and the differences between them is considered. For example, the Total number of ANC visits within a CSCom each year must be greater than the number of ANC4 in that CSCOM in the same year. We counted the number of CSComs where Total ANC was greater than ANC4: 792 out of 794 cases over the five years of data. The two cases where Total ANC was not greater than ANC4 are indicative of some sort of data management error, but 2 cases out of 794 is not a high error rate. Other cases are not so clear. For example, the total number of Live Births should always exceed the number of births where GATPA was employed, but in fact there were 192 CSCom-Years where this was not the case. All the results are presented below. The indicator LiveBirth was not used in this review; GATPA is used with some reservations.

Table A2. TotalANC > ANCeffective

Comparison		Yes	No	missing
	2016	152	1	16
	2017	155	0	14
	2018	159	0	10
	2019	158	0	11
	2020	168	1	0
		792	2	51

Table A3. TotalANC > ANC4

Comparison		Yes	No	missing
	2016	152	1	16
	2017	155	0	14
	2018	158	1	10
	2019	158	0	11
	2020	169	0	0
		792	2	51

Table A4. LiveBirth > GATPA

Comparison		Yes	No	missing
	2016	115	32	22
	2017	121	31	17
	2018	112	40	17
	2019	112	46	11
	2020	123	43	3
		583	192	70

Table A5. LiveBirth > SBA+Matron

Comparison		Yes	No	missing
	2016	79	68	22
	2017	94	58	17
	2018	88	64	17
	2019	95	63	11
	2020	92	74	3
		448	327	70

Table A6. SBA+Matron > GATPA

Comparison		Yes	No	missing
	2016	130	17	22
	2017	137	15	17
	2018	130	22	17
	2019	143	15	11
	2020	146	20	3
		686	89	70

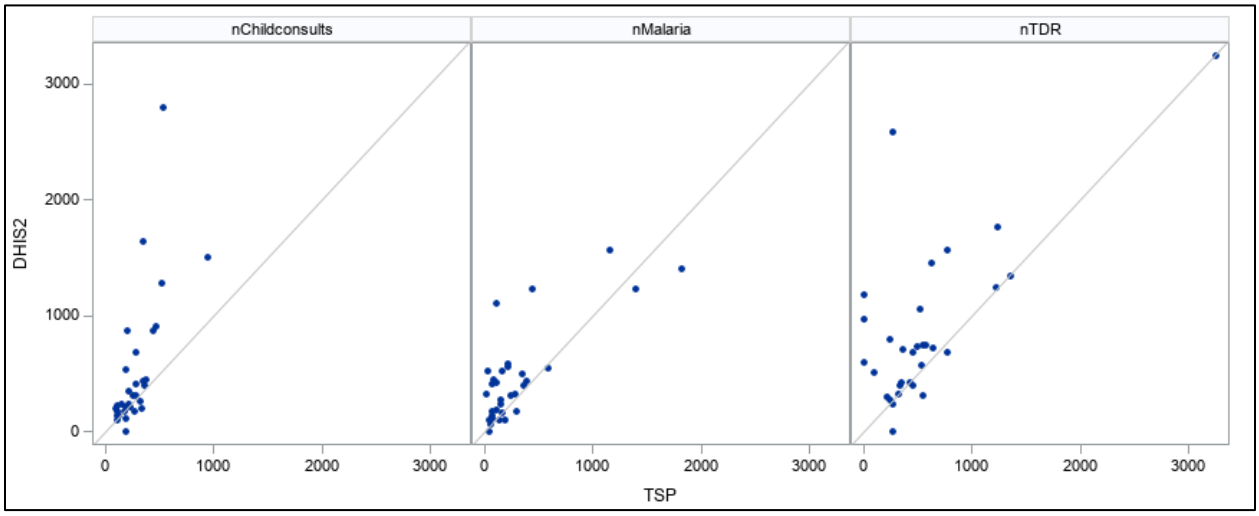
Part B

The Red Cross conducted an audit of HMIS data in 2016 and repeated the audit in 2020. Some errors and issues were identified in 2016 and the system was strengthened. To quantify the accuracy observed in the audit, two types of analyses were conducted.

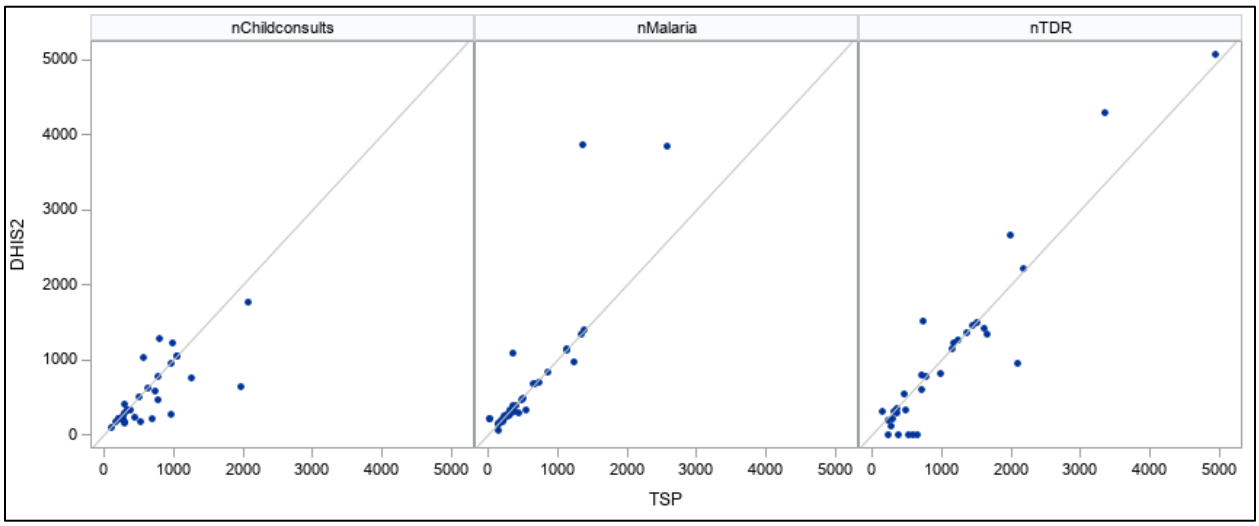
(1) The key measure of the accuracy was a comparison of what the CSComs uploaded to the HMIS and what they should have uploaded (based on a review of CSCom records, called here "TPS"). If there was perfect agreement between HMIS and TPS the slope of the regression line would be 1, and the R-square would be 1. In the scatterplots below, if there were perfect agreement, every point would fall on the grey line. There was not perfect agreement, but two points are clear: (i) There was greater agreement at endline then at baseline; (ii) the errors at baseline tended to be overestimates (the data entered in DHSIS would be slightly higher than they should have been), and the errors at endline are more random with an approximate equal number of over and underestimates. These patterns are also apparent in the scatterplots for the other seven indicators covered in the audit.

Scatterplot of number of child consults, number of malaria cases diagnosed and number of rapid test kits for malaria conducted at baseline and endline.

A: Baseline, 2016.



B: Endline, 2020



.

(2) If there were perfect agreement between HMIS and TPS data the average difference between them would be zero, and the percent identical would be 100%. The results for all 10 indicators are summarized in Table A7, along with the slope and R-square from the regressions.

Table A7. Summary of audit data at baseline and endline for 10 indicators.

	Baseline				Endline			
	Slope	R-Square	ave diff	% identical	Slope	R-Square	ave diff	% identical
n Child consults	2.36	0.47	241	0%	0.64	0.53	-104	41%
n condoms distributed	na	na	11	78%	1.23	0.08	40	63%
n family planning, new	1.04	0.53	11	0%	0.98	0.85	7	69%
n cases ARI	0.88	0.56	1	9%	0.84	0.75	-19	44%
n Malaria cases	0.78	0.59	163	0%	1.43	0.74	129	25%
n pill packs distributed	0.52	0.0008	12	31%	1.44	0.81	10	41%
n rapid tests done	0.81	0.47	314	6%	1.1	0.89	-56	22%
n rapid tests positive	0.78	0.22	251	0%	1.05	0.92	-42	78%
n family planning, total	0.88	0.61	31	0%	1.3	0.63	19	25%
n severe ARI	0.7	0.12	13	6%	0.99	0.82	-13	34%

The pattern of overestimation at baseline and random error at endline indicates that the analyses of HMIS data carried out in this report would, if anything, underestimate project impact. Unfortunately, the audit did not include some of the key indicators used in this report, such as number of births with skilled birth attendant, number of ANC visits, or number of stunted children. However, there is no reason to expect the pattern to be markedly different for those indicators. All in all, these analyses increase this reviewer's confidence in the results presented in this report.

Appendix 3. Prenatal Care (ANC)

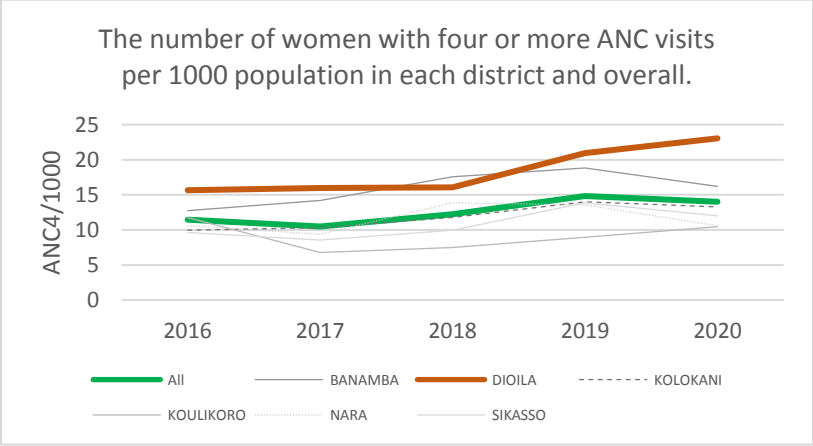
Summary of conditions in 2016, from the Baseline report

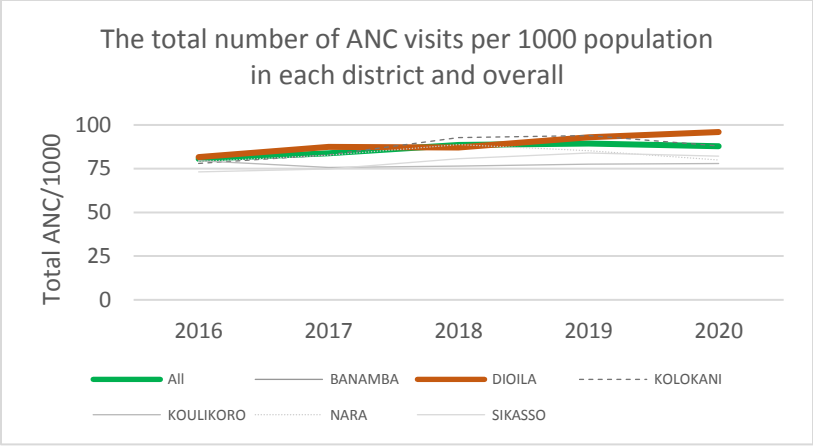
At baseline 83% of pregnant women had had at least one ANC, and 37% had ANC4+. For the 17% who did not attend ANC, various reasons were provided, including no transportation or too far, not a customary practice, not perceived as necessary, not allowed to by family or husband, or too costly. Most of the women (90%+) report that the ANC included measuring blood pressure, measuring uterine height, assessing fetal heart, IPT for malaria and iron+folic acid supplements. Less commonly, urine (60%) or blood (65%) samples were taken, they were tested for HIV/AIDS (47%) and they were vaccinated twice for tetanus (51%). 29% of fathers attended at least one ANC.

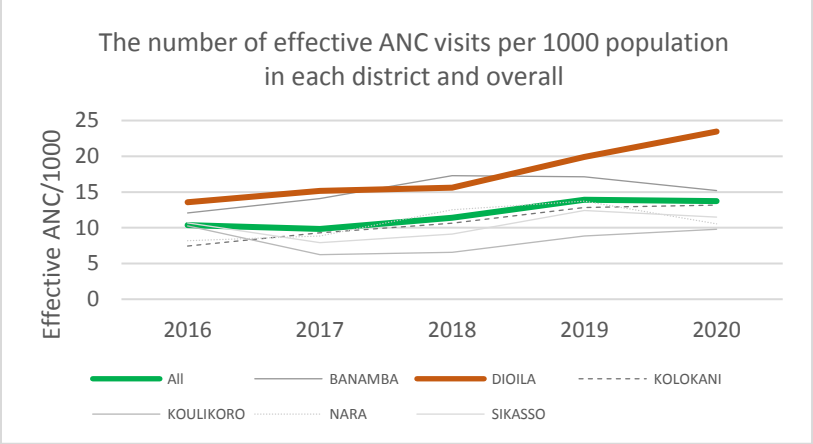
Evidence from HMIS

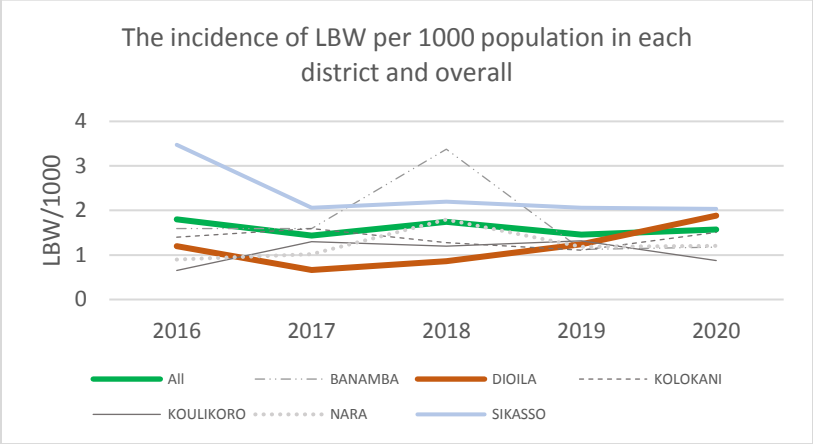
The key HMIS indicators used were ANC4 (the number of women who attended four or more ANCs), Total ANC (the total number of ANC visits by the health system), and ANC Effective (ANC visits where the woman received an insecticide treated bed net, iron supplements, malaria medications and a tetanus vaccine) per 1000 people. The number were summed over each district and divided by the district population in each year.

Overall, ANC4, Total ANC and ANC Effective increased slightly from 2016 to 2020. However, the overall gradual changes mask variable changes within each district. Dioila is notable for its significantly greater improvement than the other districts. Banamba improved greatly from 2016 to 2018 but then regressed somewhat, although still ended up with levels at least 15% higher in 2020 than 2016. Perhaps as a sign of improved ANC rates, there was an overall 13% decrease in low-birth-weight incidence.









Evidence from Qualitative Report

Training

- CHWs (who were recruited, trained, and paid by the project) referred women to CSCOMs for ANC. CHWs learned that it was recommended to have four ANCs.
- However, it was noted that training in the CSComs did not include training on how to treat women with respectful manner and this may have decreased their effectiveness.
- It was noted that workload for CHWs was impossibly high, and they would not have been able to do everything planned, although they worked long hours to make up for it.

Materials

- The project provided medications, equipment, materials, and solar panels to the CSComs. The provisions were in line with the CSCom needs and contributing to building the CSComs reputation and capacity.

Promotion

- Radio programs were appropriate and had broad (not universal) acceptance. Programs evolved to meet needs and preferences of the communities.
- Gender champions promoted ANC (although this was not the focus of the gender champions)
- Some men became aware of importance of ANCs and began to accompany wives to ANC and PNC

Other

- Some DTCs reported increased ANC
- ASCACO respondents reported greatly increased ANC rates; one village reported 95% of women came for ANC
- Emergency Transport system was poorly funded and did not work well
- "Overall, the CSCOM actors shared that health facility utilization among women and girls had increased. Increased utilization was described by improved consultations rates for prenatal and postnatal care, family planning, vaccination, and child malnutrition."

Evidence from Endline Report

- The number of community sessions on ANC rose from 0 in 2016 and 2017 to more than 10,000 in 2018 and 2019, and 6,164 in 2020
- 75% of CHWs had discussions at least once per week on the importance of ANC.
- 26% of CHWs could identify all 8 danger signs during pregnancy that would indicate a pregnant woman should seek immediate care; 6% could not identify any signs. On average, CHWs could identify 5 signs.
- The second most common use of Emergency Transport was to transport pregnant women to ANC (71% of CHWs report ET is used for ANC).

Evidence from CHW End-line Survey Report

Almost all CHWs have household visits and community sessions on maternal health at least once per month. They discuss pregnancy danger signs in the visits, ANC care, delivery preparation, delivery at a health facility, PNC, reducing women's work, and male involvement at least once a month. The discussions are mostly with women, but sometimes with men, grandmothers and mothers in law, and adolescent boys and girls. About two-thirds also discussed with chiefs, elders, and religious leaders.
The women and girls were almost always very interested in discussions about maternal health, but the men and boys were in some cases only somewhat interested.
Most CHWs are confident in their ability to identify danger signs of pregnancy, but many of the signs are recognized by only ~60% of CHWs.
All the CHWs use Boite D'image for their activities, which reportedly improved effectiveness of their education efforts.

In response to a question about *Gender barriers to ANCs,* most CHWs agreed that lack of decision-making authority of women (58%) and that women must rely on men to pay for services, and most do not have their own finances and/or savings (55%) were barriers. Many CHWs also agreed that men not trusting women with money for ANC visits (47%), women having to be accompanied by men (40%), opposition and influence of mothers in law (22%), and a community-wide understanding by men and boys that women are incapable of understanding ANC needs or that women have lesser intelligence (19%) were also important barriers.
In order to overcome these barriers, CHWs report that they discussed with couples the importance of joint decisions for birth plans (74%), discussed with couples the importance of men participating in ANC visits (70%), provided information on how ANC contributes to healthy pregnancies and babies (57%), encouraged women to save for ANC (54%) and encouraged men to pay for ANC (54%).

Evidence from Emergency Transport Report
Overall, the Emergency Transport System functioned well (contrary to qualitative report). The project facilitated the development of 189 ET systems, covering 189 villages, or more. Some ETS existed before the project so by 2020 there were 249 ETS in place in the project districts. The referencing time improved with the establishment of ETS. 93% of referenced cases arrive at the CSCom with an hour (28% before ETS), and the number of references appear to have doubled to nearly 600 (69% women) in last six months prior to survey.
The specific benefit to ANC is not discussed in this report, but the Endline report says ETS commonly used for ANC. Project staff reported that the ETS was used when there were complications during pregnancy, and not specifically for ANC.

Evidence from Radio Report
The messages were carefully developed and pilot tested before airing. More messages were broadcast than originally planned due to the strong relationships with community health promotion and the radio stations.
Two-thirds of project communities were covered by broadcasts. In uncovered communities volunteers helped share the messages through their phones.
There were about 39 different topics in the radio messages and numerous aspects of child health were addressed, including early childhood feeding, malaria prevention, hygiene, and vaccinations. There were about 380 hours of total broadcast time shared on all the topics. It is unclear how much was devoted to each topic. ANC was covered July – September 2019.

Summary
Increasing ANC was one focus of the project, with important promotion from the CHWs, community volunteers, and the radio messages, and ANC did increase during the course of the project, particularly in the district of Dioila. The evidence is consistent that the activities related to ANC were well executed, and the increase in the various indicators of ANC in the HMIS data indicate that it is likely that the project contributed to the increase. The decrease in Banamba from 2018 to 2020 is probably related to staff turnover at that time (11 of 20 DTCs changed in 2018) and security worsened in parts of Banamba in 2019.

Conclusion

Baseline estimates of ANC4+ were around 40% and HMIS data indicates that it increased by approximately 22%, suggesting that ANC4+ will now be around 50%. The project had a target of 20% improvement. It is excellent that the project target was reached, but there is still scope for improvement. In the district of Dioila improvement was approximately 47%. It is recommended that the approach used in Dioila be studied and, if feasible, expanded within Dioila and in other districts as well. Furthermore, to further improve antenatal health and reduce the incidence of low birth weight, other aspects of maternal health may be considered including food security and maternal anemia.

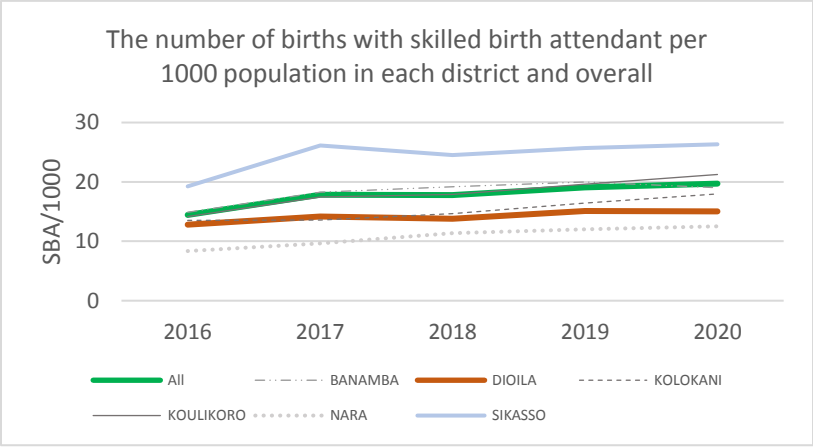
Appendix 4. The Birth Experience

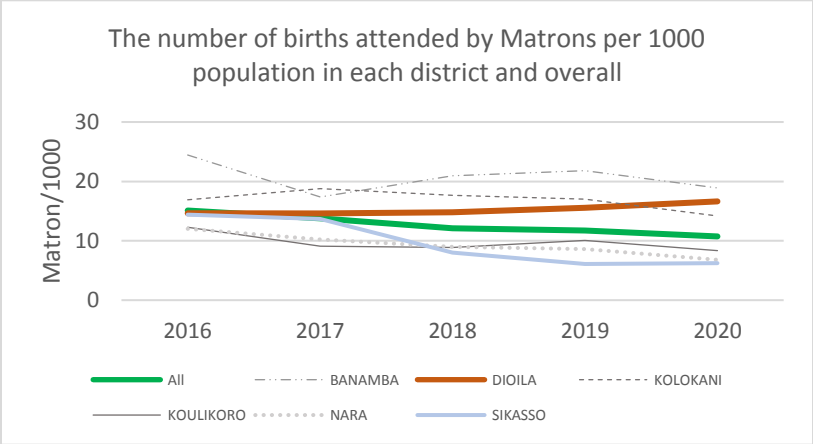
Summary of conditions in 2016, from the Baseline report

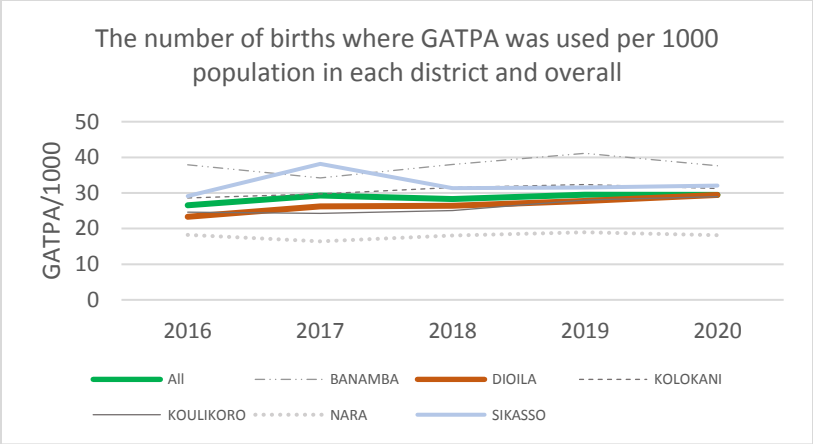
At baseline 82% of live births in the past two years were in a health facility (54% in CSCOMS, 13% in maternity clinics), and 18% were at home. A clinician or nurse attended 44% of births, and a matron attended 39% of births, for a total of 83% of births with a skilled birth attendant. Most women (92%) reported the child was dried immediately after birth, but few reported skin-to-skin contact (20%), wrapped in a towel (5%), safe cord application (30%) and delayed first bath (8%).

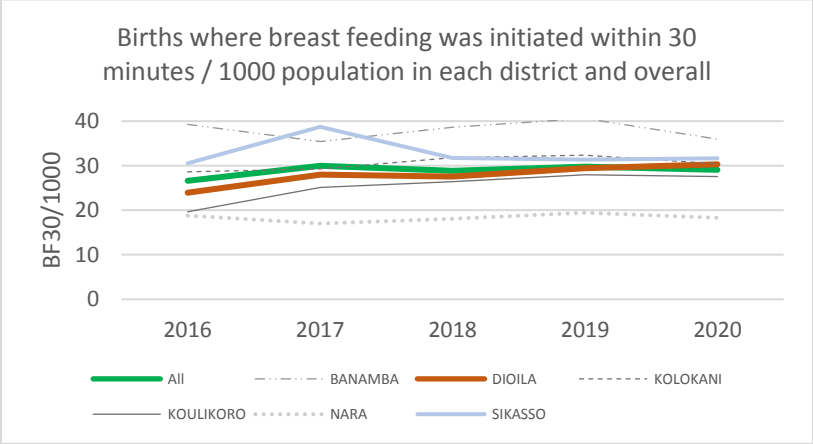
Evidence from HMIS

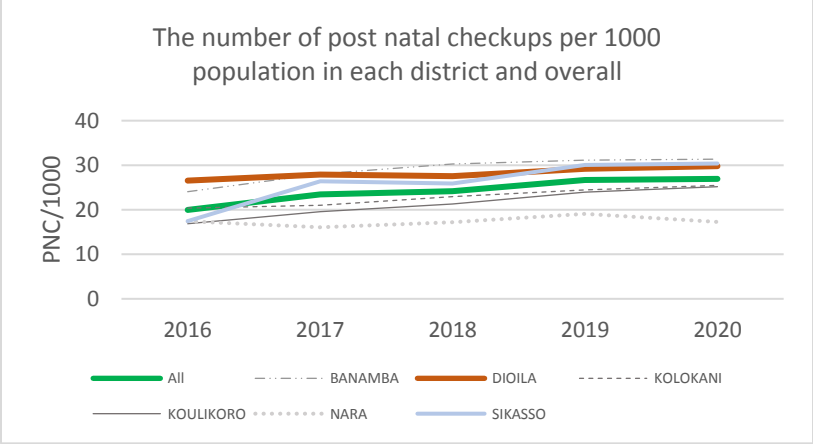
The rate of Skilled Birth Attendants improved steadily in all the districts, with an overall increase of about 36%. This is one indicator where Dioila's improvement was less than average at 17%. Conversely, Dioila was the only district with an increase in births attended by Matrons. Other related indicators also showed improvements, with an increase in GATPA (management of the third stage of labour) of about 11%, an increase in breastfeeding initiation within 30 minutes of birth of about 9%, and an increase in PNC of 35%.











Evidence from Qualitative Report

Training

- "Mid-wives, rural Matrons and other health professionals reported learnings on maternal clinical competencies and quality of care. These learnings were associated with the trainings targeting mid-wives and included other actors from the CSCOM such as the DTC, and the nurse obstetrician.

Matrons either participated directly in these trainings or were included in the trainings 'cascaded' by the mid-wives who were working at the CSCOM."

- "After the training, mid-wives discussed the importance of planning for birth as well as following-up for post-natal care. They began screening for HIV and holding post-natal consultations during which time family planning, exclusive breastfeeding for 6 months, vaccination and nutrition were discussed. Improvements were also reported regarding the manner with which mid-wives received and cared for women, whereby they heard echoes that community members appreciated the changes in the way they were cared for in the health facility. Indeed, improved approaches to consultation, medical practices and hygiene were perceived by CSCOM actors as having had a favorable influence on the community members' interest to consult the health facility."
- "Activities aimed at reinforcing the role of the rural maternity and strengthening their capacities also occurred less than planned. Just one out of 7 planned supervisions were realised for the rural maternities. This might be explained due to the late arrival of this project component. Namely, support to rural maternities was not part of the initial project plan as rural maternities were not recognized to be part of the 'pyramid of care'."
- "the project provided trainings aligned with needs to improve clinical competencies of the health professionals, including using up-to-date tools, addressing poor sanitation practices, and eliminating behaviours that created an atmosphere in which patients felt unwelcomed."

Materials

- The project provided medications, equipment, materials, and solar panels for reliable power supply to the CSComs, in line with the CSCom needs and contributing to building the CSComs reputation and capacity to deal with birth emergencies. This included equipment for newborn resuscitation which would have directly improved the birth outcome, and sanitation materials which led directly to improved hygiene practices in the CSComs.
- Newborn care (weight, temperature, danger signs, supra-costal pulls, refusing breast) practices were improved due to the provision of a tool on how to closely follow the development of labour ('partogramme'). Abilities to care for premature babies had been improved through the learning of the 'Kangaroo' method.

Promotion

- The radio messages and stories contributed to raise awareness and change attitudes and behaviour. For example, according to the local SEC actors, because of the radio messages … men were more likely to accompany their wives to the hospital postpartum ….

Other

- It was reported that two-thirds of births took place in communities
- There was a financial disincentive to go to CSComs – "the cost of receiving services from a rural maternity was less than half the cost of receiving the same maternal service at the health facility"
- The Project recognized that the rural maternities were trusted and depended on, and therefore project worked to strengthen them. "In March 2019, these results contributed to a formal recognition of the Matrons in the national policy, which is described as a step forward both for

MNCH in general, and for women's empowerment and respect for women's traditional knowledge and practice of MNCH in particular."

- There were some reports of horrific care, and disrespectful care was common in some areas (such as Bamako), less so in others (such as region of Koulikoro, where it was reported it was an implicit part of good care). But "Overall, when the CSCOM actors were asked if they had received training on respectful and dignified care, most reported they had not. The concept was unfamiliar to most."
- The project contributed to the implementation of new practices, including transporting women in labour to CSComs. However, it was also concluded that the Emergency Transport system was poorly funded and did not work well.

Evidence from CHW End-line Survey Report

Almost all CHWs have household visits and community sessions on maternal health at least once per month where, among other things, they discuss delivery preparation, delivery at a health facility, and transport to the health facility.

Evidence from Emergency Transport Report

Overall, the Emergency Transport System functioned well (contrary to qualitative report). The project facilitated the development of 189 ET systems, covering 189 villages, or more. Some ETS existed before the project so by 2020 there were 249 ETS in place in the project districts. The referencing time improved with the establishment of ETS. 93% of referenced cases arrive at the CSCom with an hour (28% before ETS), and the number of references appear to have doubled to nearly 600 (69% women) in last six months prior to survey.

Project staff report that the ETS was used to transport women in labour to CSComs, although there is no data on how frequently this happened. Note that in the CHW report, most said that transportation to the health facility is a major issue in their community.

Evidence from Radio Report

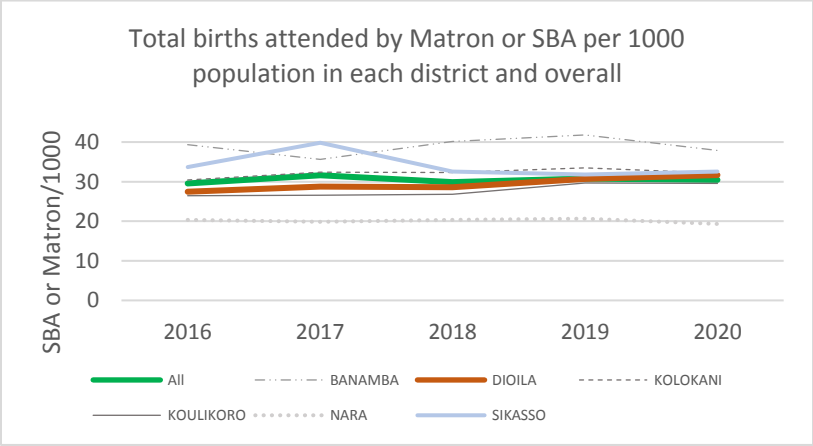
The messages were carefully developed and pilot tested before airing. More messages were broadcast than originally planned due to the strong relationships with community health promotion and the radio stations. Two-thirds of project communities were covered by broadcasts. In uncovered communities volunteers helped share the messages through their phones. Birth planning, assisted childbirth, birth at CSComs, birth registration, and danger signs in pregnant women were among the topics in the radio messages. There were about 380 hours of total broadcast time shared on all the topics. It is unclear how much was devoted any one topic.

Summary

At baseline, SBAs attended 44% of births and Matrons attended 39%. During the course of the project, the sum of births attended by SBA or matrons is almost constant in each district (see figure below). It suggests that where SBA increased, it was usually through redirecting births from matrons to CSComs. If that means that they redirected births from less skilled to more skilled attendants (perhaps through the Emergency Transport System) then it is a positive change. Additionally, as the matrons were also given

training through the project, maintaining the same number of births attended by SBAs or matrons is also a positive change, as it indicates the quality of care at the typical birth has improved.
Dioila had a different pattern of change. It is more rural than the other districts, and has a rural maternity home in ever village, totalling about half of the maternity homes in the project area. In Dioila, more effort was focused on the matron births than elsewhere, inspiring more community confidence in the matrons. This confidence, combined with the closer proximity of maternity homes, the lower cost of the maternity homes, and husbands more often approving birth in maternity homes and not travelling to CSComs, lead to Dioila having a greater increase in matron attended births. Given the extensive training matrons receive, this is a positive change. However, the overall near constant level of SBA or matron attended births (29.5 in 2016, 30.4 in 2020) may indicate that the number of births at home did not decrease, and this may be a focus point for future work.

Whatever the nature of the changes, an improvement in the birth experience may be reflected in the small increase in the use of GATPA. However, there is no estimate of how many facility-based births used GATPA at baseline, and therefore whether further increase is needed is not clear. Early initiation of breastfeeding was 55% at baseline and increased by 9% during the project, so there remains scope for improvement in the birth experience.



.

Conclusion

The rate of births with skilled birth attendants or matrons may not have changed over the course of the project, but the level of skill of those attendants improved so that a higher quality of birth experience for most women is likely, and a concomitant decrease in perinatal and maternal mortality should be expected.

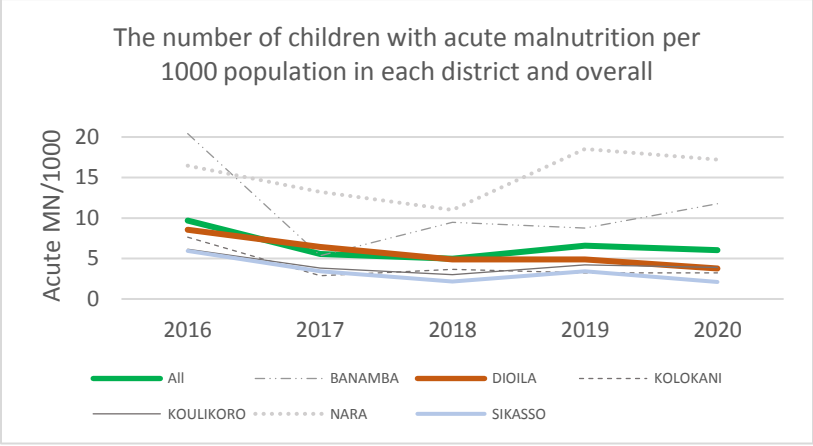
Appendix 5. Child health and nutrition

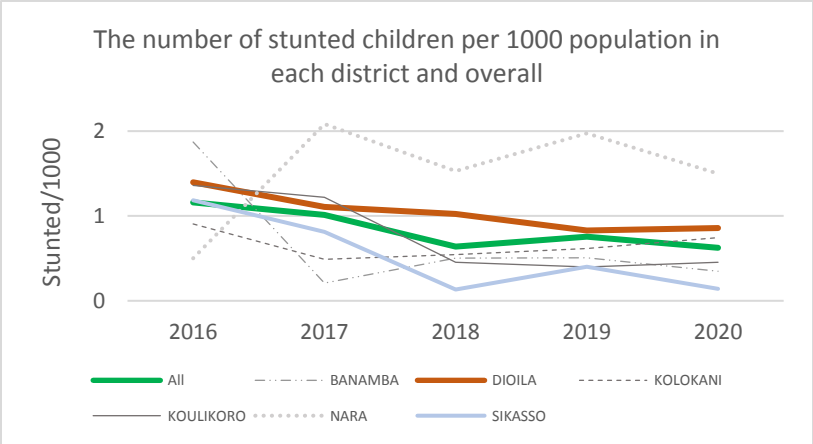
Summary of conditions in 2016, from the Baseline report

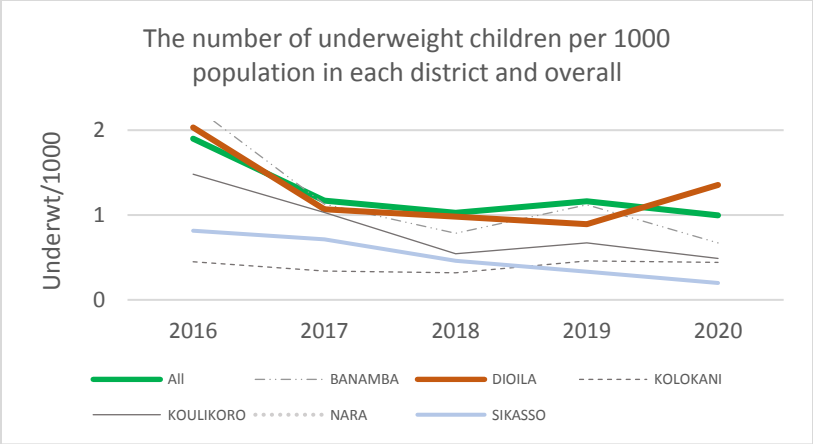
At baseline 55% of mothers reported that the child was breastfed within one hour of birth, but very few (4%) reported exclusive breast feeding for 6 months. Stunting levels were high (32%), wasting was moderate (9%) and underweight was high (25%). 76% of children had received measles vaccine and 77% had three DPT doses. Diarrhea was common (12% in last two weeks) and their treatment with ORS (22%), Zinc (7%) or ORS+Zinc (3%) was uncommon. 6% had acute respiratory infection and 19% had fever in the previous two weeks. Neonatal mortality, infant mortality and under five mortality were 42, 62 and 80/1000 live births, respectively.

Evidence from HMIS

The key HMIS child health and nutrition indicators used were acute malnutrition (low arm circumference), stunting (low height for age) and underweight (low weight for age). The number of children were summed over each district and divided by the district population in each year. Overall, the number of malnourished children decreased from 2016 to 2020. Nara and Banamba, and to a lesser extent, Kolokani had erratic trends with a roller coaster patten in the number of children impacted. The other three districts improved steadily from 2016 to 2020.







Evidence from Qualitative Report

- The project contributed to the implementation of new practices by CHWs and SEC staff, including:
  - Using rapid diagnostic tests for malaria, and treating a positive test appropriately, which could lead to reduced illness and improved child growth.
  - Measuring mid-upper-arm circumference for rapid nutrition assessment
  - Tracking children's vaccinations
  - Using individual care sheet for a sick child
  - Using timer measure respiratory rate[5] for pneumonia diagnosis
- "The radio messages and stories contributed to raise awareness and change attitudes and behaviour. For example, according to the local SEC actors, because of the radio messages women were better responding to nutritional issues of their children, … families were more likely to take their sick children to health centres, …and taboos around harmful effects of vaccination were reduced."
- "In some circumstances, women were willing to take a sick child to the medical facility or to seek health care for herself, without the authority of her husband or with the presence of another male family member. An increased recognition within the community that maternal and newborn deaths were preventable placed pressures on families to seek health care from the health facility."
- "Overall, the CSCOM actors shared that health facility utilization among women and girls had increased. Increased utilization was described by improved consultations rates for prenatal and postnatal care, family planning, vaccination, and child malnutrition."
- "Parents were noted to have increased openness to receive nutritional supplements for the children and to have tests taken, whereas before they were hesitant and mistrustful of the health facility interventions."
- Trainings were reported to be helpful and lead to improved practices. "Among the CHWs several themes were particularly appreciated:
  - Screening for malnutrition (edema, Shakir strips, weight to height ratio)
  - Recognizing the difference between a cough and a cold (pneumonia)
  - Initiating and tracking vaccinations
  - Treatment of simple malaria
  - Knowing the required number of ANC and PNC visits

[5] The report said to measure pulse, but that is probably a mistranslation, as it is the respiratory rate that should be counted for pneumonia diagnosis

- Understanding how gender equality and family planning relate to community development"

Evidence from Endline Report

- From Radar survey, diarrhea was usually correct diagnosed (84%) but not correctly treated (26%)
- From Radar survey, malaria was usually correct diagnosed (92%) and correctly treated (80%)
- From Radar survey, ARI was usually correct diagnosed (85%), while pneumonia was less often correctly diagnosed (52%). Amoxicillin was usually available.
- At baseline 54% of children with suspected pneumonia were taken to a health care provider. Estimated that 21% of cases were managed by CHWs.
- There was a decrease in malnourished children seen at CSComs and CSRefs, perhaps because they were seen treated in communities.

Evidence from CHW End-line Survey Report

- Almost all CHWs discuss nutrition and Exclusive Breastfeeding at least once per month.
- Almost all the CHWs discuss diarrhea, malaria, pneumonia, malnutrition, diet, quickly seeking care for ill children, proper administration of meds, and ORS preparation. The discussions are mostly with women, but often with men and sometimes with boys and girls too. Women and girls were most interested in the topics, men a little less so.
- About two-thirds of CHWs discussed exclusive breast feeding and danger signs of illness in children. About 2/3rds of CHWs identified most danger signs. Only 65% of CHWs identified unconscious children as a danger sign, which seems unreasonably low.
- About 75% of CHWs report they have the necessary meds and equipment

Evidence from Emergency Transport Report

Overall, the Emergency Transport System functioned well (contrary to qualitative report). The project facilitated the development of 189 ET systems, covering 189 villages, or more. Some ETS existed before the project so by 2020 there were 249 ETS in place in the project districts. The referencing time improved with the establishment of ETS. 93% of referenced cases arrive at the CSCom with an hour (28% before ETS), and the number of references appear to have doubled to nearly 600 (69% women) in last six months prior to survey.

The specific benefit of the ETS to child health is not discussed in this report, but project staff report that it was used to transport acutely ill children to receive medical help.

Evidence from Radio Report

The messages were carefully developed and pilot tested before airing. More messages were broadcast than originally planned due to the strong relationships with community health promotion and the radio stations. Two-thirds of project communities were covered by broadcasts. In uncovered communities volunteers helped share the messages through their phones.

Vaccination, malaria prevention, hygiene, and malnutrition were among the topics in the radio messages. There were about 380 hours of total broadcast time shared on all the topics. It is unclear how much was devoted any one topic.

Evidence from Supervision Assessment in iCCM

- 98% of CHWs received training re: sick children

- ~100% of CHWs had pneumonia and malaria meds, fewer had meds for diarrhea, cough and cold
- Assessment of sick children by CHWs:
    - 95% measured MUAC, 75% did so correctly
    - 90% did rapid test of malaria when appropriate, 98% took temperature and 89% classified temperature correctly
    - 93% measured respiratory rate when appropriate, 55% measured as accurately as gold standard.
    - Correct classification of illness: malaria 92%; cough/cold 87%; diarrhea 84%; malnutrition 76%, pneumonia 52%, All 65%
    - Correct treatment diagnosis and treatment of illness: pneumonia 13%, cough/cold 64%, malaria 24 to 81%, diarrhea 27% to 49%. Overall correct diagnosis, medication and dosage: 40%

Certainly, there is room for improvement, but there is no indication of how wrong the mistreatments were. For example, a wrong dosage of the right medicine for the right illness could still be helpful. Presumably more than 40% of ill children benefited from CHWs treatment.
Furthermore, the rate of improper treatment was documented in 2018, and afterwards, the project directed substantial effort to provide appropriate training to the CHWs and it is expected that by project end, treatment had improved.

Summary
Improving child health was a focus of the project, and there was much effort on training and equipping CHWs to deal with child illness. While there is still scope for improvement in the CHWs management of illness, the mid-project recognition of the problem of incorrect treatment would have had a positive impact and it is probable that the project efforts did contribute to child health in the districts. Improved management of childhood illness would be expected to lead to improved anthropometric status, as shown in the HMIS data. It may be that the levels of stunting, wasting and underweight in the community did not reduce as much as it appears in the HMIS data, but rather fewer malnourished hildren reported to the CSComs, as they were more often diagnosed and treated in the communities by the CHWs, particularly before it became a severe problem. It is likely that the project contributed to improved child health.

Conclusion
The HMIS data indicate a slow but steady improvement in child growth status during the project, with stunting falling to approximately half of 2016 levels, exceeding the project goal of 20% improvement. The growth indicators integrate many factors in a child's life, including diet, hygiene, illness and medical treatment, only some of which were a focus of the project. The activities reported on focus on management of childhood illnesses. A child who has received timely and appropriate treatment for illnesses throughout their childhood will, on average, be taller and heavier than a child who has not, as long as other aspects of the child's life are healthy. For example, we do not have any information on food security during the project years. A child who receives appropriate treatment for illness, but has an inadequate diet, will continue to be stunted and underweight. But the project did address the topic of child illness, and while there is still scope for improvement, the efforts probably led to improved child health as reflected in child growth.

Appendix 6. Family Planning

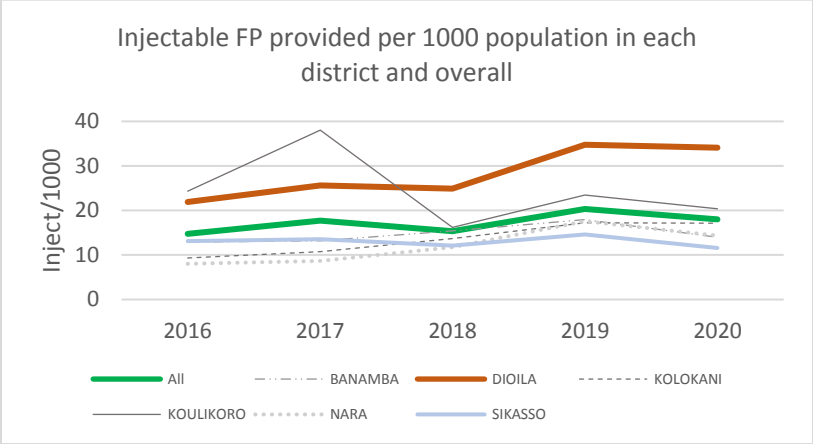
Summary of conditions in 2016, from the Baseline report

At baseline 22% of not pregnant women used contraception, and 18% had unmet contraception needs. Therefore, it can be estimated that 60% of not pregnant women in Mali do not want contraceptives, as the norm is to have many children starting at a young age. Of those using contraception, injectables (41%), implants (28%) and pills (20%) were common.

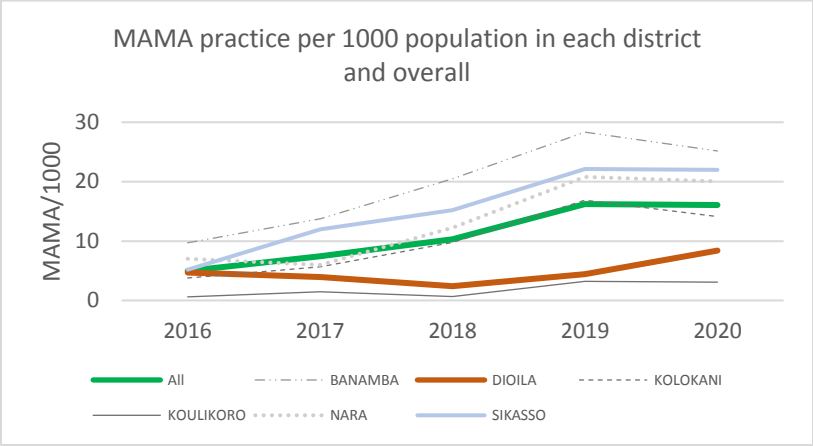
Evidence from HMIS

There are data from the HMIS on various family planning indicators, but some of them (such as surgical sterilization) occur in too few instances to analyse any trends. There are six methods presented here. The methods operate on different time scales (e.g., permanent for surgical, years for IUDs, months for injections, and condoms needing regular re-supply), have different accessibility (e.g. IUDs can only be provided at the CSRefs, contraceptive pills and injections can be provided by CHWs, male condoms are available in health centres and commercially), and require different levels of male partner involvement (e.g., permission from husbands would usually be required for a women to travel to get an IUD, whereas an injectable contraceptive can be discreetly self-administered without the husband knowing). Therefore, each form of contraception is considered separately, below, ordered from the most used in 2020, to the least used.

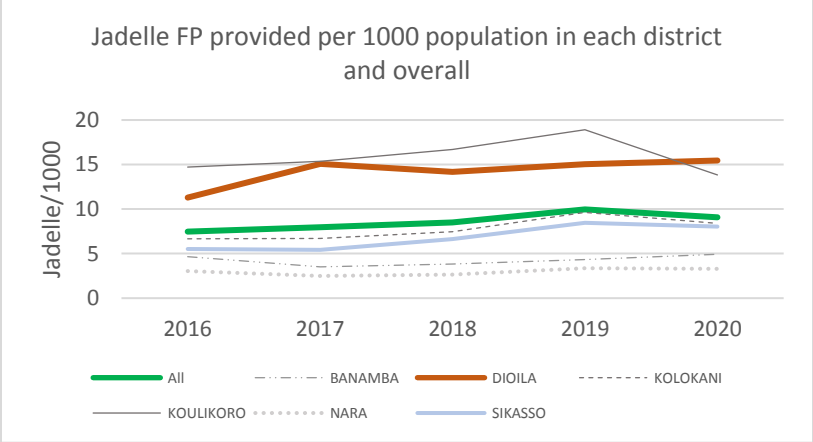
Injectables, which are preferred by many women and supplied by CHWs increased by about 22%, which translates to an additional ~12,000 women in the project area using injectables in 2020 versus 2016.



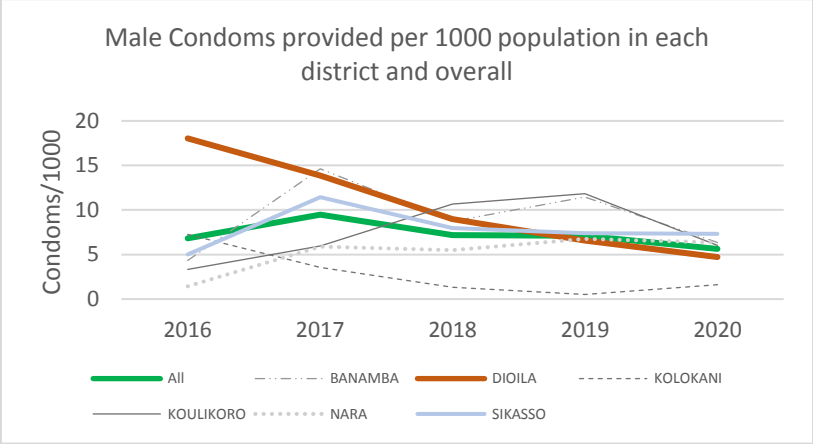
The practice of MAMA (lactational amenorrhea as a birth control method) more than doubled overall. MAMA is reportedly promoted at all births and so this would have contributed to its increase. However, women know of its limited effectiveness and many who used MAMA would have also used another form of contraception.



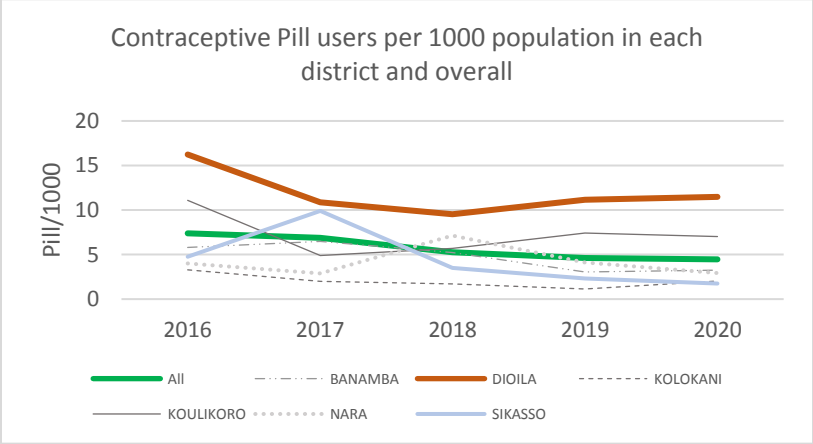
Jadelle implants, which are a preferred method for women, as it lasts for up to five years, increased by 22% during the project so that an additional ~7,000 women received implants in 2020 vs 2016.



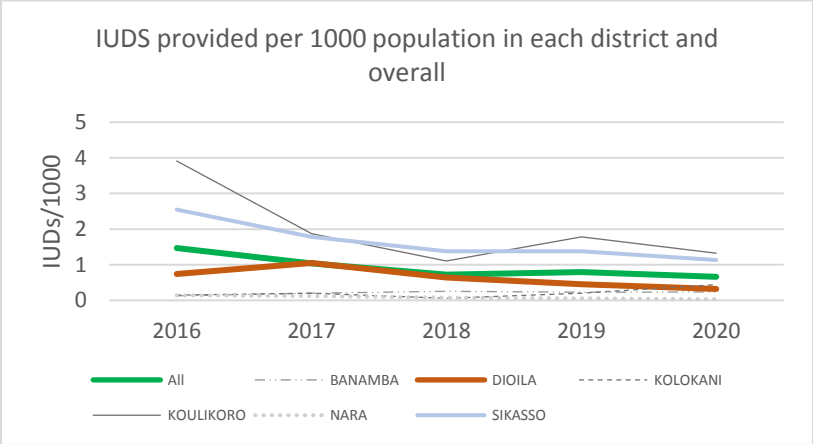
Condom use was highly variable between districts and overall dropped by 2% from 2016 levels, but the implications for family planning are unclear. We do not have information on how many condoms would have been provided per person, or how long they would last, if there were other sources of condoms not reported in the HMIS data, or if they were used as the only form of contraception.



The use of Contraceptive Pills, which were distributed by CHWs, was variable between districts but with an overall decrease of about 40%, so that approximately 4,500 fewer women using the pill at project initiation and end.



IUDs decreased to about half of 2016 levels by 2020. The reason for this is unclear, as IUDs are one of the preferred methods of contraception. While it is true that women often need to go to CSRefs for IUDs (because they are not available in all CSComs), which are often 40km or more from their home, this should be no more difficult in 2020 than it was in 2016. However, the starting point was so low that the overall impact of the decrease is minor. The 2016 level of 1 per 1,000 population approximately 2000 women were provided IUDs in 2016, and this would have decreased to about 1,000 in 2020.



Evidence from Qualitative Report

- The CHWs learned better how to communicate about family planning, for example learning that it is best not done in group settings
- Health Centre staff consistently reported an increase in Family Planning consultations, especially in young girls and women.

Evidence from Endline Report

The was no increase in the total number of Family Planning consultations by CHWs. Volunteers reached many men and women, but little progress was made.

Evidence from CHW End-line Survey Report

Almost all CHWs provide Family Planning services, with weekly household visits, and community sessions. CHWs conducted more than 28,000 family planning consultations and distributed more than 72,000 items of modern contraception. Most discuss unwanted pregnancies and delaying first pregnancies, Family Planning rights, STDs, and men supporting women's Family Planning decisions. Most talked to women and adolescent girls regularly, and less often, but still at least quarterly, with men, boys and grandmothers/mothers in law. They report that the women were very interested, and men and boys were somewhat interested in discussing Family Planning. Most would also talk to community leaders and religious leaders about Family Planning.

Evidence from Radio Report

The messages were carefully developed and pilot tested before airing. More messages were broadcast than originally planned due to the strong relationships with community health promotion and the radio stations. Two-thirds of project communities were covered by broadcasts. In uncovered communities

volunteers helped share the messages through their phones. There were about ~39 different topics in the radio messages. It is difficult to tell from the available reports, but family planning appeared to receive less attention than other topics.

Evidence from Engaging Men Report

The reach of these activities was too limited (8 villages) to have an impact that would show up at the project level, or HMIS level. Significant numbers were reached by the project (e.g., through training, radio broadcasts, or by religious leaders), although there is no assessment of what being "reached" means, but given the Covid context, it was not possible to determine if those reached had a change in attitudes or behaviours

Summary

At baseline 22% of non-pregnant women were using contraception; 18% had unmet needs for contraception. In order to determine overall changes in contraceptive use, the “couple-years of protection” (CYP) was calculated using different conversion factors for each form of contraception[6]. CYP increased from 96,469 at baseline to 142,482 at endline, an increase of almost 50%. The increase of two highly effective and popular methods increased (injections, implants), which offset the decrease in less common methods (contraceptive pill, male condom, IUDs).

There was some contradictory evidence, such as the Endline report documenting no increase in Family Planning consultations, but the Qualitative report and the CHW endline report documenting important changes and contributions.

Conclusion

Changing family planning rates is inherently difficult, particularly in the project setting where starting to have children at a young age, and having large families is strongly encouraged and ingrained in the culture. The project’s efforts to improver gender relations and women’s decision making in the family (which has not been considered in these evidence reviews), may have helped to create an environment where an increasing number of families can benefit from family planning.

Contraceptive use and unmet needs in the project area are similar to the rates throughout sub-Saharan Africa[7]. Increase in contraceptive use of 1% per year is common in other settings in sub-Saharan Africa, but can be as high as 3%, such as in neighbouring Burkina Faso[8]. There was an increase of approximately 10% per year in CYP, greatly exceeding project goals and expectations.

[6] https://www.usaid.gov/global-health/health-areas/family-planning/couple-years-protection-cyp

[7] https://pubmed.ncbi.nlm.nih.gov/29081552

[8] https://www.thelancet.com/journals/langlo/article/PIIS2214-109X(19)30199-8/fulltext

Appendix 7. HMIS Data

Average number per 1000 population in each district from 2016 to 2020, and % change

District	2016	2017	2018	2019	2020	% change 2016 to 2020
ANC4						
All	11.4	10.5	12.2	14.8	14.0	22%
Banamba	12.7	14.2	17.6	18.8	16.2	27%
Dioila	15.7	16.0	16.1	20.9	23.0	47%
Kolokani	10.0	10.3	11.8	14.0	13.3	33%
Koulikoro	11.8	6.8	7.5	8.9	10.5	-11%
Nara	10.6	9.4	13.9	13.6	10.6	0%
Sikasso	9.7	8.6	9.9	13.9	12.0	24%
ANCeffective						
All	10.4	9.8	11.4	13.9	13.7	32%
Banamba	12.1	14.1	17.3	17.1	15.2	26%
Dioila	13.6	15.2	15.6	19.9	23.5	73%
Kolokani	7.4	9.3	10.6	12.8	13.2	77%
Koulikoro	10.3	6.2	6.5	8.9	9.8	-5%
Nara	8.2	8.8	12.5	13.7	10.5	29%
Sikasso	10.7	7.9	9.1	12.4	11.5	8%
NewReg						
All	36.0	36.5	37.8	37.9	37.5	4%
Banamba	50.0	50.9	52.6	52.1	50.0	0%
Dioila	31.7	32.8	31.6	34.0	36.6	16%
Kolokani	36.7	35.3	38.9	38.6	36.8	0%
Koulikoro	32.5	31.5	32.6	33.7	34.0	5%
Nara	36.0	36.4	40.0	37.9	36.0	0%
Sikasso	35.5	37.0	37.4	37.1	36.8	4%
TotalANC						
All	80.6	83.8	88.5	89.4	87.8	9%
Banamba	110.7	121.7	125.8	117.2	118.8	7%
Dioila	81.6	87.4	87.1	92.9	96.0	18%
Kolokani	78.0	82.8	92.8	93.9	87.9	13%
Koulikoro	79.5	75.7	76.5	77.5	77.9	-2%
Nara	79.1	82.7	88.7	85.2	80.0	1%
Sikasso	73.2	74.8	80.8	84.0	82.1	12%

District	2016	2017	2018	2019	2020	% change 2016 to 2020
BF30min						
All	26.6	30.0	28.9	29.8	29.0	9%
Banamba	39.3	35.4	38.6	40.6	36.0	-8%
Dioila	23.9	28.0	27.5	29.5	30.3	27%
Kolokani	28.6	29.3	31.8	32.4	30.4	6%
Koulikoro	19.7	25.1	26.4	28.0	27.6	40%
Nara	18.8	17.0	18.1	19.4	18.3	-3%
Sikasso	30.6	38.7	31.7	31.4	31.6	4%
GATPA						
All	26.5	29.3	28.3	29.5	29.5	11%
Banamba	37.9	34.2	38.0	41.1	37.7	-1%
Dioila	23.3	26.2	26.4	27.8	29.4	26%
Kolokani	28.6	29.7	31.5	32.4	31.3	9%
Koulikoro	24.6	24.3	25.1	28.0	29.0	18%
Nara	18.2	16.4	18.1	19.0	18.2	0%
Sikasso	29.1	38.2	31.4	31.5	32.1	10%
LiveBirth						
All	29.4	31.7	30.8	31.4	31.1	6%
Banamba	41.4	36.9	41.2	42.5	38.9	-6%
Dioila	25.6	28.2	28.5	30.4	31.3	22%
Kolokani	31.6	30.7	32.5	33.2	31.6	0%
Koulikoro	25.4	26.3	28.2	29.3	28.8	13%
Nara	21.5	19.9	20.2	20.5	19.7	-8%
Sikasso	32.6	41.1	34.8	34.0	35.1	8%
MatronBirth						
All	15.1	13.8	12.1	11.7	10.7	-29%
Banamba	24.4	17.4	21.0	21.8	18.9	-23%
Dioila	14.7	14.6	14.8	15.6	16.6	14%
Kolokani	16.9	18.8	17.6	17.0	14.2	-16%
Koulikoro	12.3	9.1	8.9	10.0	8.3	-32%
Nara	12.0	10.2	9.0	8.6	6.8	-43%
Sikasso	14.4	13.7	8.0	6.1	6.2	-57%
PNC						
All	20.0	23.5	24.2	26.7	26.9	35%
Banamba	24.1	28.1	30.3	31.1	31.4	30%
Dioila	26.5	27.9	27.6	29.2	29.8	12%
Kolokani	20.4	21.0	22.9	24.5	25.5	25%
Koulikoro	16.9	19.6	21.3	23.9	25.2	49%
Nara	17.4	16.1	17.2	19.1	17.3	-1%
Sikasso	17.4	26.4	25.9	30.1	30.4	74%

District	2016	2017	2018	2019	2020	% change 2016 to 2020
SBA						
All	14.4	17.8	17.8	19.1	19.7	36%
Banamba	14.9	18.2	19.2	20.0	19.0	28%
Dioila	12.8	14.2	13.8	15.1	15.0	17%
Kolokani	13.5	13.6	14.7	16.4	18.0	33%
Koulikoro	14.2	17.5	17.9	19.6	21.3	50%
Nara	8.4	9.6	11.4	12.0	12.5	50%
Sikasso	19.3	26.1	24.5	25.7	26.3	37%
LBW						
All	1.8	1.4	1.7	1.5	1.6	-13%
Banamba	1.6	1.6	3.4	1.1	1.2	-26%
Dioila	1.2	0.7	0.9	1.2	1.9	57%
Kolokani	1.4	1.6	1.3	1.1	1.5	8%
Koulikoro	0.7	1.3	1.2	1.3	0.9	35%
Nara	0.9	1.0	1.8	1.2	1.2	35%
Sikasso	3.5	2.1	2.2	2.1	2.0	-41%
AcuteMN						
All	9.7	5.6	5.0	6.6	6.0	-38%
Banamba	20.4	5.3	9.5	8.8	11.7	-43%
Dioila	8.5	6.4	4.9	4.9	3.8	-56%
Kolokani	7.6	2.9	3.7	3.2	3.2	-58%
Koulikoro	6.1	3.8	3.0	4.2	3.9	-37%
Nara	16.5	13.2	11.0	18.5	17.2	5%
Sikasso	5.9	3.4	2.1	3.4	2.1	-65%
Screened						
All	111.6	70.4	81.4	95.7	156.5	40%
Banamba	59.6	39.1	194.2	176.3	407.1	583%
Dioila	338.4	166.6	174.6	140.6	191.5	-43%
Kolokani	39.2	23.0	20.4	40.9	172.1	339%
Koulikoro	37.6	38.3	49.3	41.5	123.6	228%
Nara	152.0	83.5	79.3	197.5	207.0	36%
Sikasso	45.7	56.7	39.0	44.9	41.3	-10%
Stunted						
All	1.2	1.0	0.6	0.8	0.6	-46%
Banamba	1.9	0.2	0.5	0.5	0.4	-81%
Dioila	1.4	1.1	1.0	0.8	0.9	-39%
Kolokani	0.9	0.5	0.5	0.6	0.7	-18%
Koulikoro	1.4	1.2	0.5	0.4	0.5	-67%
Nara	0.5	2.1	1.5	2.0	1.5	199%
Sikasso	1.2	0.8	0.1	0.4	0.1	-88%

District	2016	2017	2018	2019	2020	% change 2016 to 2020
UnderWt						
All	1.9	1.2	1.0	1.2	1.0	-48%
Banamba	2.3	1.1	0.8	1.1	0.7	-71%
Dioila	2.0	1.1	1.0	0.9	1.4	-33%
Kolokani	0.5	0.3	0.3	0.5	0.4	-2%
Koulikoro	1.5	1.0	0.5	0.7	0.5	-67%
Nara	5.3	3.1	3.4	4.2	3.3	-37%
Sikasso	0.8	0.7	0.5	0.3	0.2	-76%
DIU						
All	1.5	1.0	0.7	0.8	0.7	-55%
Banamba	0.1	0.2	0.3	0.2	0.2	84%
Dioila	0.7	1.0	0.6	0.5	0.3	-57%
Kolokani	0.1	0.2	0.1	0.2	0.4	196%
Koulikoro	3.9	1.9	1.1	1.8	1.3	-66%
Nara	0.1	0.1	0.1	0.1	0.0	-75%
Sikasso	2.5	1.8	1.4	1.4	1.1	-56%
Inject						
All	14.8	17.7	15.3	20.3	18.0	22%
Banamba	12.9	13.2	15.4	18.0	14.0	8%
Dioila	21.9	25.6	24.9	34.8	34.1	56%
Kolokani	9.3	10.8	13.7	17.2	17.1	84%
Koulikoro	24.3	38.0	16.2	23.4	20.4	-16%
Nara	8.0	8.7	11.8	17.6	14.3	78%
Sikasso	13.1	13.5	12.1	14.6	11.6	-12%
Jadelle						
All	7.5	8.0	8.5	10.0	9.1	22%
Banamba	4.7	3.5	3.8	4.3	4.9	6%
Dioila	11.3	15.1	14.2	15.0	15.5	37%
Kolokani	6.7	6.7	7.4	9.6	8.4	26%
Koulikoro	14.7	15.4	16.7	18.9	13.8	-6%
Nara	3.0	2.5	2.6	3.4	3.3	8%
Sikasso	5.5	5.4	6.7	8.5	8.0	46%

District	2016	2017	2018	2019	2020	% change 2016 to 2020
MaleCondom						
All	6.8	9.5	7.2	7.1	5.6	-17%
Banamba	4.3	14.6	8.7	11.5	6.4	47%
Dioila	18.0	13.8	9.0	6.6	4.7	-74%
Kolokani	7.3	3.6	1.3	0.5	1.6	-78%
Koulikoro	3.3	6.0	10.7	11.8	6.0	82%
Nara	1.4	5.9	5.5	6.8	6.4	343%
Sikasso	5.0	11.4	8.0	7.4	7.3	47%
MAMA						
All	5.0	7.5	10.3	16.2	16.0	223%
Banamba	9.7	13.8	20.5	28.3	25.1	159%
Dioila	4.7	3.9	2.4	4.4	8.4	79%
Kolokani	3.8	5.7	9.8	16.9	14.1	275%
Koulikoro	0.6	1.4	0.7	3.2	3.1	412%
Nara	7.0	6.0	12.2	20.8	20.0	187%
Sikasso	5.2	12.0	15.2	22.1	22.0	325%
Pill						
All	7.4	6.9	5.3	4.6	4.5	-40%
Banamba	5.8	6.5	5.2	3.0	3.2	-44%
Dioila	16.2	10.9	9.5	11.2	11.5	-29%
Kolokani	3.3	2.0	1.7	1.1	2.0	-38%
Koulikoro	11.1	4.9	5.7	7.4	7.0	-37%
Nara	4.0	2.9	7.1	4.1	2.9	-27%
Sikasso	4.8	9.9	3.5	2.3	1.7	-63%