CAMEROON GIVEWELL PROJECT

Treatment Coverage Survey for Mass Drug Administration for Schistosomiasis and Soil-Transmitted Helminths

TECHNICAL REPORT

Regions	Health Districts
Adamaoua	Djohong and Ngaoundere Urbain
East	Bertoua and Betare Oya
Far North	Hina and Maroua 2
North	Bibemi and Touboro
West	Foumbot and Malentouen

May, 2020

Table of Contents

List of Acronyms

CDDs- Community drug distributors
HD - Health district
IEC-Information, Education and Communication
lb – lower bound
MBZ – Mebendazole
MDA – Mass Drug Administration
N - sample size
Pt - point estimate
SAC – School aged children
SCH - Schistosomiasis
STH - Soil transmitted helminthiasis
TCS - Treatment coverage survey
ub - upper bound
WHO - World Health Organisation

1. INTRODUCTION

The GiveWell Wishlist 3 deworming project was implemented in five regions of the country (Adamaoua, East, Far North, North and West). This involved the deworming of school-aged children (5-14 yrs) for schistosomiasis (SCH) and soil-transmitted helminths (STH) using Mebendazole and Praziquantel tablets. Mebendazole were administered 1 tablet per child whilst praziquantel was administered according to the height to a maximum of 5 tablets through direct observation treatment (DOT).

The distribution strategy followed WHO recommended guidelines for SCH/STH mass drug administration (MDA) and was done in both schools and communities using school teachers and community drug distributors to reach both enrolled and non-enrolled school aged children (SAC) respectively.

The campaign effectively took place in September/October 2019 with sensitization and mobilization activities followed by MDA. Reporting and data collection were carried out immediately after MDA in both schools and communities. Copies of school reports were sent to Inspectorates of Basic and secondary education for primary schools and secondary schools respectively, whilst community reports were collated by health area teams and submitted to health districts. Final campaign data was collected in December 2019 after the regional appraisal meetings.

Sixty-four (64) health districts (HDs) were involve in the deworming campaign; Adamaoua (9 HDs), East (14 HDs), Far North (24 HDs), North (12 HDs) and West (5 HDs). A total of 2,550,279 children were treated for STH and 1,994,140 for SCH giving an overall treatment number of 4,544,419 with a programme coverage of 85% STH and 71% SCH.

Table 1: Summary of reported programme coverages by health district

Region	Health District	Estimated Population 5-14 yrs	Total Treated - SCH	Total Treated – STH	SCH Coverage	STH Coverage
Far North	Hina	41,909	20,189	37,479	48.17%	89.43%
	Maroua 2	58,274	40,400	40,412	69.33%	69.35%
North	Bibemi	49,229	37,093	44,142	75.3%	89.7%
	Touboro	92,955	68,384	84,773	73.57%	91.20%

Adamaoua	D'johong	22,620	20,399	15,947	90.18%	70.50%
	Ngaoundere Urban	54,577	48,277	47,920	88.46%	87.80%
East	Bertoua	78,582	60,611	55,957	77.13%	71.21%
	Betare-Oya	36,481	27,505	27,440	75.40%	75.22%
West	Malantouen	52872	39,432	39,616	80.3%	80.6%
	Kekem	16,624	12,069	14,867	72.60%	89.43%

As recommended Sightsavers' quality standards, post MDA coverage surveys are routinely conducted following WHO guidelines to validate reported/administrative coverage. It's in this context that the present TCS was conducted in the 5 regions supported by funding from GiveWell.

1.1 General objective:

To validate reported coverage of the recently ended deworming MDA campaign against SCH/STH in two randomly selected health districts of five regions (Adamaoua, East, Far North, North and West).

1.2 Specific objectives were to:

- Assess the reliability of the reporting system for school-based and community-based MDA for SAC;
- Inform whether school teachers and CDDs distributed the drugs in schools and communities surveyed;
- Identify reasons for non-participation (or non-treatment) by drug distributed, sex, age, and geographic location/region;
- Determine if there are any differences in being offered drugs and swallowing by sex, age;
- Identify the methods for awareness of the MDA campaign in communities.

2. Methodology

2.1. Study area and timing of the survey

TCS was implemented in ten randomly selected health districts of five regions at different intervals. Training of surveyors and regional supervisors took place at the Regional Delegations of Public Health in the five regions (Adamaoua, East, Far North, North and West) and was facilitated by both Sightsavers-CCO and MOH staff. The trainings lasted for three days from January 16th – 18th 2020, for the first three regions (East, Far North and West) and January 28th – 30th 2020 in the two remaining regions (Adamaoua and North). These trainings were followed immediately by field data collection that was concluded on February 7th, 2020as shown in table 2 below. One hundred and twenty five (125) surveyors were trained for a period of 3 days but twenty five were eliminated because they fell short of meeting the training expectations after failing the screening interview and pre-test at the close of day one of the training. The survey was eventually conducted by 100 surveyors (20 surveyors for each region and 10 per health district), working in pairs.

Recall bias was mitigated by:

- Showing samples of praziquantel and mebendazole tablets/boxes to each survey respondent during questionnaire administration;
- Guiding respondents on major events that occurred during MDA to enhance their recall of when MDA was delivered.
- Participants were recorded as treated when they admitted swallowing the drugs in the presence of a teacher or community distributor.

Table 2: Number of surveyors trained and retained for TCS implementation.

Region	Surveyors Trained	Surveyors Retained	TCS implementation
Adamaoua	25	20	16-25/01/2020
East	25	20	16-25/01/2020
Far North	25	20	16-25/01/2020
North	25	20	28/01-07/02/2020
West	25	20	28/01-07/02/2020

Total	125	100	

2.4 Sampling

The survey followed a two-stage cluster sampling methodology based on WHO recommended guidelines for coverage surveys. It was powered to determine coverage at the district for the targeted age group: 5-14 years for schistosomiasis/STH. The sample size was determined using the WHO Coverage Survey Builder, version 2.11. Details regarding the sampling and selection methodology are available in the WHO manual.

The following parameters were used in the survey builder:

2019 inflated population based

Estimated coverage of 64%

Precision of +/- 5%

95% confidence level or z score of 1.96

Design effect[1] of 4

Non-response of 10%

Average eligibility of target group per household - 2.1

A total of 1,574 respondents were needed per district, divided across 30 villages (clusters) in 25 households per village. Questions were asked to all eligible respondents (SAC 5-14 years old) and guardians in all households visited. Households were randomly selected at community level using segmentation and list A or B generated by the coverage survey builder. Districts and villages selected were chosen randomly.

2.5 Data collection method and procedure

English or French questionnaire forms were completed for each household selected and administered on Android phones using the CommCare survey platform depending on which language the household was comfortable with. Data was downloaded by Sightsavers, cleaned and analyzed.

2.6 Data analysis

Data were cleaned and analyzed using Stata 15.1 (StataCorp, College Station, TX). Estimates were adjusted for the number of clusters to account for the survey

methodology. No weights were provided as the sample selection was considered self-weighting.

3. RESULTS

3.1 Summary of survey

A total of 18,541 eligible individuals were enumerated in 7,701 households with 5-14 year old residents. However, there were 494 households without survey target age and 24 households refused to participate. An additional 161 households were marked as absent. Therefore, the total number of households included in the analysis was 7,022 (7701-161-24-494). The distribution by district and region is presented in Table 5.

Table 5: Summary of surveyed individuals and households by District and Region

District	Total households visited	Households with no SAC	Households Refused	Eligible population for SCH/STH
Bertoua	800	1	3	1911
Betare – Oya	786	0	0	1643
Sub Total East	**1586**	**1**	**3**	**3554**
Bibemi	760	50	2	2111
Touboro	758	71	1	2033
Sub Total North	**1518**	**121**	**3**	**4144**
Djohong	751	30	1	1867
Ngaoundere Urban	750	28	1	1780
Sub Total Adamaoua	**1501**	**58**	**2**	**3647**
Hina	750	44	1	1951
Maroua -2	759	78	2	1847
Sub Total Far North	**1509**	**122**	**3**	**3798**
Kekem	801	149	9	1531
Malantouen	786	43	4	1867
Sub Total West	**1587**	**192**	**13**	**3398**
Grand Total	**7701**	**494**	**24**	**18541**

3.1 Sex Distribution

Males were more likely to be survey respondents in each of the surveyed health districts in six of the ten surveyed districts (Bertoua, Batare-Oya, Bibemi, Djohong, Hina and Malantouen) as shown in figure 1 below.

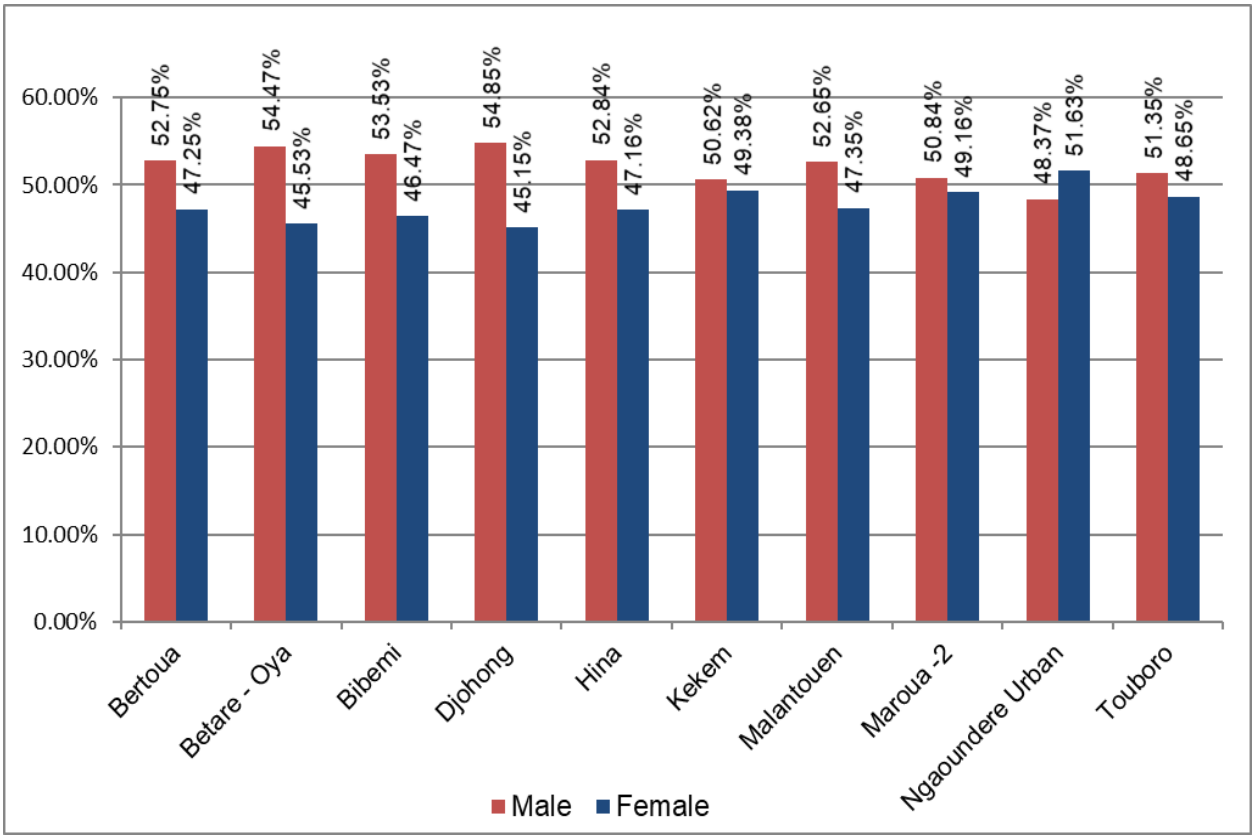

Figure 1: Sex distribution of respondents, by district

Sex distribution of respondents, by district

3.2 Age distribution of the survey respondents

The distribution of reported age is shown in Figure 2. Age was skewed younger in most health districts.

Figure 2: Age distribution of the survey respondents

3.3 Distribution of school enrolment status by district

School enrolment was greatest in the West region (Kekem – 99.48% and Malantouen- 98.93%) and least in the North (Bibemi-74.85%) and Far North (Hina- 70.78%). See Figure 3.

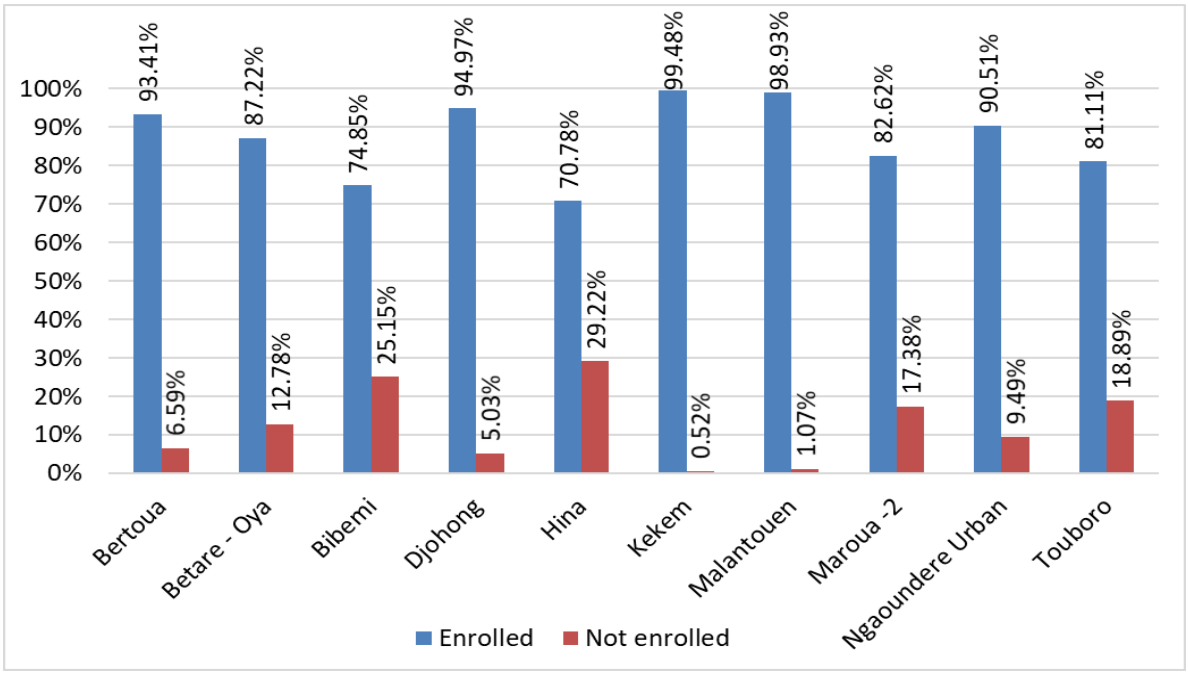

Figure 3: Distribution of school enrolment status among children surveyed, by district

3.4. Distribution of school enrolment status by sex

Males were likely to be enrolled than females in each district. However, in Kekem and Malantouen of the West region, and Djohong and Ngaoundere Urbain in the Adamaoua region, there was little disparity in enrolment status by sex. See Figure 4

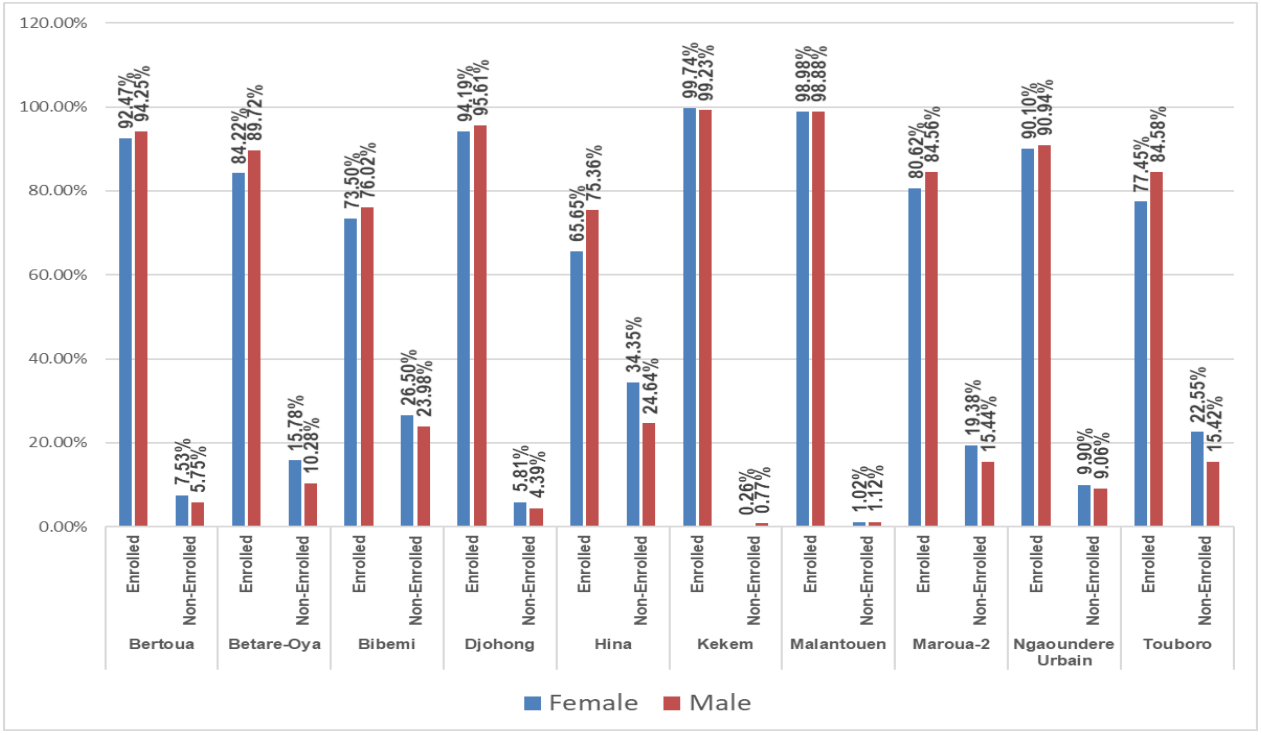

Figure 4: Distribution of school enrolment status among children surveyed, by district and sex

3.5 Survey Respondents-Proxy Status

Regarding who responded to the inquiries about treatment, at least 70% of all responses were self-provided with the highest being Djohong (98.82%) and Ngaoundere Urbain (99.21%) health districts in the Adamaoua region and the lowest being Bibemi (14.83%) in the North Region where the majority of respondents were caretakers because of absence of self-respondent.

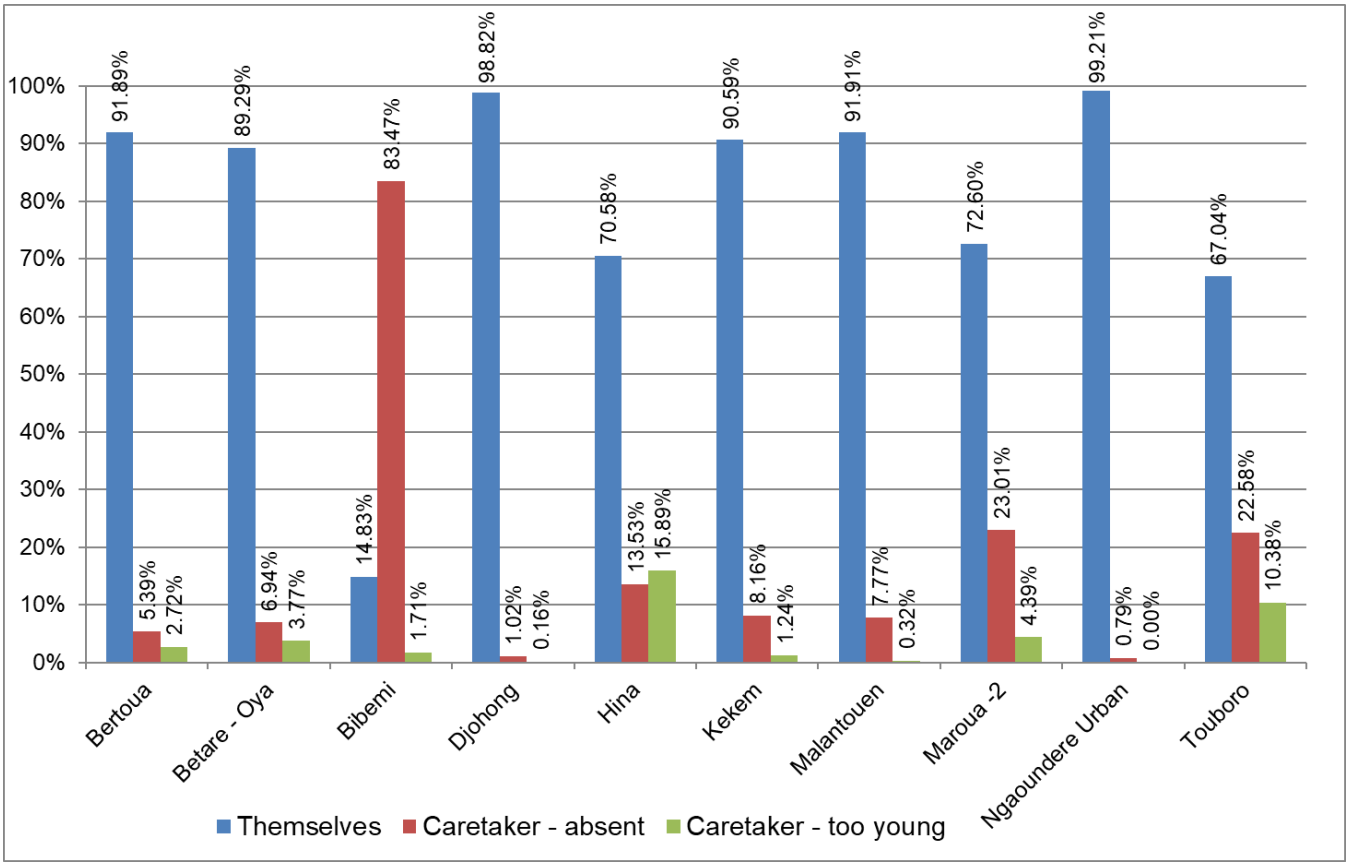

Figure 5: Survey Respondents-Proxy Status

3.6 SCH Survey Coverage, by District

Praziquantel drug coverage for the survey (point estimate, Pt) ranged from 35.85% to 88.53%, with the highest coverage observed in Hina health district (88.53%) of the Far North Region and the lowest coverage reported in Betare-Oye health district (35.85%) of the East Region. There was no significant difference between treated and not treated among the surveyed districts ($p>0.05$) except in the East region (Bertoua and Betare-Oya) where the difference was statistically significant ($p=0.000$).

When considering the 95% confidence interval, Bertoua, Betare-Oya, Bibemi, Djohong, Ngaoundere Urbain and Touboro all have their lower bounds (lb) below 75% with all upper bounds (ub) exceeding 75% for all districts except for Bertoua (74.30%) and Betare-Oya (44.84%). Hina, Kekem, Malantouen and Maroua-2 health districts all exceeded 75% in both lower and upper bounds (See table 6).

Table 6: SCH Survey Coverage, by District

	Treated with Praziquantel				Not treated			
District	**n**	**Pt**	*lb*	*ub*	**n**	**Pt**	*lb*	*Ub*
Bertoua	1293	**67.66%**	*61.02%*	*74.30%*	618	**32.34%**	*25.70%*	*38.98%*
Betare - Oya	589	**35.85%**	*26.86%*	*44.84%*	1054	**64.15%**	*55.16%*	*73.14%*
Bibemi	1707	**80.86%**	*74.96%*	*86.77%*	404	**19.14%**	*13.23%*	*25.04%*
Djohong	1507	**80.72%**	*74.47%*	*86.96%*	360	**19.28%**	*13.04%*	*25.53%*
Hina	1733	**88.83%**	*83.47%*	*94.18%*	218	**11.17%**	*5.82%*	*16.53%*
Kekem	1274	**83.21%**	*75.48%*	*90.95%*	257	**16.79%**	*9.05%*	*24.52%*
Malantouen	1597	**85.54%**	*79.36%*	*91.71%*	270	**14.46%**	*8.29%*	*20.64%*
Maroua -2	1636	**88.58%**	*81.29%*	*95.86%*	211	**11.42%**	*4.14%*	*18.71%*
Ngaoundere Urban	1324	**74.38%**	*67.93%*	*80.84%*	456	**25.62%**	*19.16%*	*32.07%*
Touboro	1625	**79.93%**	*73.97%*	*85.89%*	408	**20.07%**	*14.11%*	*26.03%*

3.7 STH Survey Coverage, by District

STH coverage ranged from 43.46% in Betare-Oya to 91.32% in Malantouen health district. When considering the 95% confidence interval, Bertoua, Betare-Oya, Djohong and Ngaoundere Urbain all have their lower bounds (lb) below 75% with all upper bounds (ub) exceeding 75% for all districts except for Bertoua (65.27%) and Betare-Oya (54.45%). Bibemi, Hina, Kekem, Malantouen, Maroua-2 and Touboro health districts all exceeded 75% in both lower and upper bounds (see table 7).

Table 7: STH Survey Coverage, by District

	Treated with MBZ/ALB				Not treated			
District	**n**	**Pt**	*lb*	*ub*	**n**	**Pt**	*lb*	*Ub*
Bertoua	1073	**56.15%**	*47.03%*	*65.27%*	838	**43.85%**	*34.73%*	*52.97%*
Betare - Oya	714	**43.46%**	*32.46%*	*54.45%*	929	**56.54%**	*45.55%*	*67.54%*
Bibemi	1810	**85.74%**	*79.55%*	*91.94%*	301	**14.26%**	*8.06%*	*20.45%*
Djohong	1312	**70.27%**	*61.50%*	*79.04%*	555	**29.73%**	*20.96%*	*38.50%*
Hina	1668	**85.49%**	*79.68%*	*91.31%*	283	**14.51%**	*8.69%*	*20.32%*
Kekem	1369	**89.42%**	*84.37%*	*94.46%*	162	**10.58%**	*5.54%*	*15.63%*
Malantouen	1705	**91.32%**	*85.70%*	*96.95%*	162	**8.68%**	*3.05%*	*14.30%*
Maroua -2	1629	**88.20%**	*81.44%*	*94.95%*	218	**11.80%**	*5.05%*	*18.56%*
Ngaoundere Urban	1306	**73.37%**	*66.08%*	*80.66%*	474	**26.63%**	*19.34%*	*33.92%*
Touboro	1725	**84.85%**	*79.38%*	*90.32%*	308	**15.15%**	*9.68%*	*20.62%*

3.8 Enrolment status among those treated

Figure 6 presents the enrolment status among those treated. The vast majority of those treated were enrolled with Kekem having 100% of all treated children being enrolled. However, treatment of kids not enrolled was highest in Hina (25.14%).

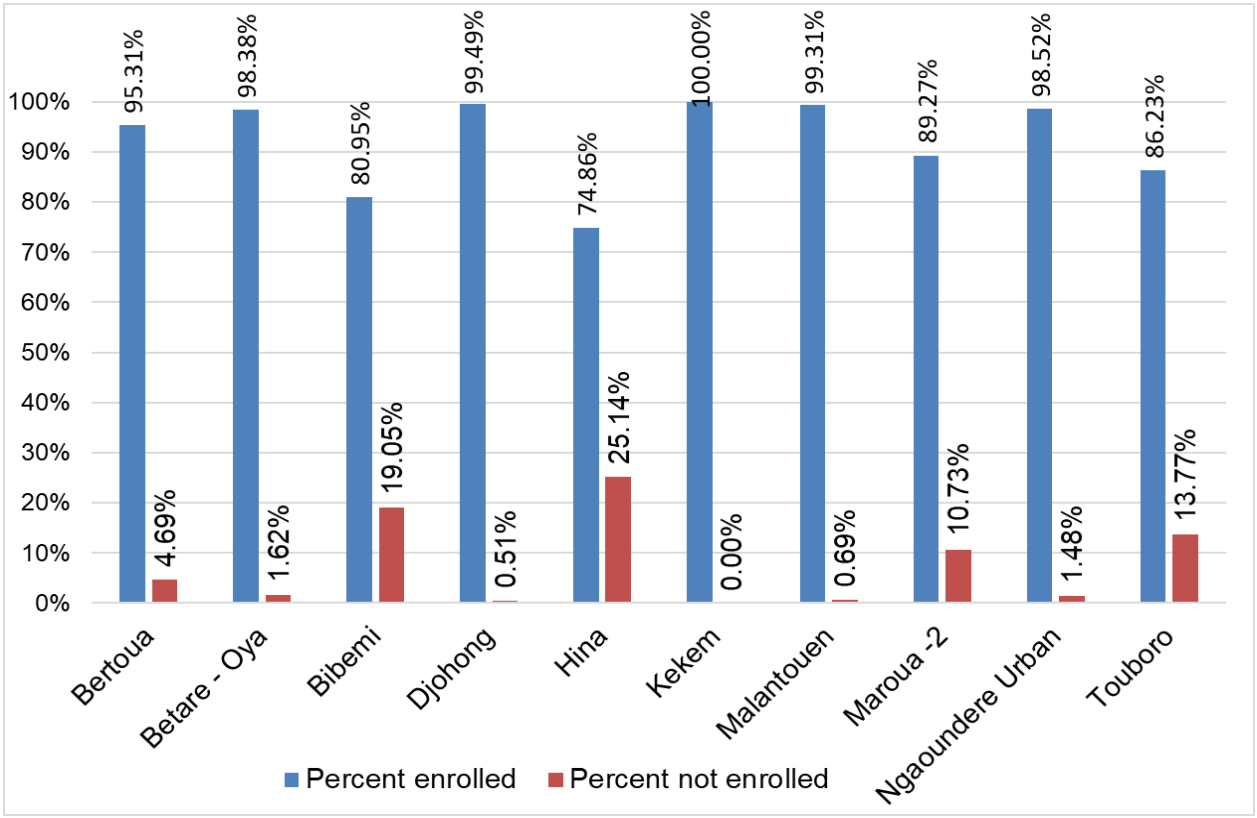

Figure 6: Enrolment status among those treated

3.9 Integrated Survey Coverage by health district

Table 8 presents the results by district for the integrated treatment survey coverage of SCH and STH, which were administered at the same time. In Bertoua, Betare-Oya, Djohong and Ngaoundere Urbain the percentage reported during the survey being treated with both medications was less than 75% while Maroua-2 had the highest treatment for both medications (87.93%). The survey coverages of praziquantel and mebendazole taken separately accounted for partial treatments. The single drug coverages for praziquantel only was highest in Bertoua (15.23%) and lowest in Touboro (0.20%) whilst singe drug coverage for mebendazole was highest in Betare-Oya (16.74%) and lowest in Maroua -2 (0.27%). When considering not treated the highest was Betare-Oya (47.41%) and lowest in Malantouen (7.02%).

Table 8: Integrated Survey Coverage by health district

	Treated with PZQ+MBZ/ALB				Treated with PZQ only				Treated with MBZ/ALB only				Not treated at all			
District	**n**	**Pt**	*lb*	*ub*	**n**	**Pt**	*lb*	*ub*	**n**	**Pt**	*lb*	*ub*	**n**	**Pt**	*lb*	*ub*
Bertoua	1002	**52.43%**	*42.38%*	*62.49%*	291	**15.23%**	*8.16%*	*22.29%*	71	**3.72%**	*2.17%*	*5.26%*	547	**28.62%**	*22.92%*	*34.32%*
Betare - Oya	439	**26.72%**	*18.26%*	*35.18%*	150	**9.13%**	*2.27%*	*15.99%*	275	**16.74%**	*8.32%*	*25.15%*	779	**47.41%**	*35.27%*	*59.56%*
Bibemi	1674	**79.30%**	*73.08%*	*85.52%*	33	**1.56%**	*- 0.76%*	*3.89%*	136	**6.44%**	*1.54%*	*11.35%*	268	**12.70%**	*7.00%*	*18.39%*
Djohong	1249	**66.90%**	*57.59%*	*76.20%*	258	**13.82%**	*8.11%*	*19.53%*	63	**3.37%**	*1.63%*	*5.12%*	297	**15.91%**	*9.83%*	*21.98%*
Hina	1583	**81.14%**	*75.06%*	*87.22%*	150	**7.69%**	*2.89%*	*12.49%*	85	**4.36%**	*0.23%*	*8.48%*	133	**6.82%**	*2.59%*	*11.04%*
Kekem	1235	**80.67%**	*71.40%*	*89.94%*	39	**2.55%**	*0.30%*	*4.80%*	134	**8.75%**	*1.79%*	*15.72%*	123	**8.03%**	*3.63%*	*12.43%*
Malantouen	1566	**83.88%**	*77.09%*	*90.67%*	31	**1.66%**	*0.35%*	*2.97%*	139	**7.45%**	*3.97%*	*10.92%*	131	**7.02%**	*1.60%*	*12.43%*
Maroua -2	1624	**87.93%**	*80.75%*	*95.10%*	12	**0.65%**	*- 0.08%*	*1.38%*	5	**0.27%**	*- 0.25%*	*0.79%*	206	**11.15%**	*4.28%*	*18.02%*
Ngaoundere Urban	1278	**71.80%**	*64.56%*	*79.03%*	46	**2.58%**	*0.69%*	*4.48%*	28	**1.57%**	*0.54%*	*2.60%*	428	**24.04%**	*17.54%*	*30.55%*
Touboro	1621	**79.73%**	*73.79%*	*85.68%*	4	**0.20%**	*0.02%*	*0.37%*	104	**5.12%**	*1.89%*	*8.34%*	304	**14.95%**	*9.48%*	*20.43%*

3.9 Where treatment was received among those treated

Among the children treated, a vast majority were treated in schools with Kekem having 100% treatment within the school premises. Treatment at home exceeded 25.99% in Bibemi and highest in Hina with 31.67%. There was a significant difference between treatment in schools and at home in all health districts (p=0.000) except Kekem that had 100% treatment taking place in schools.

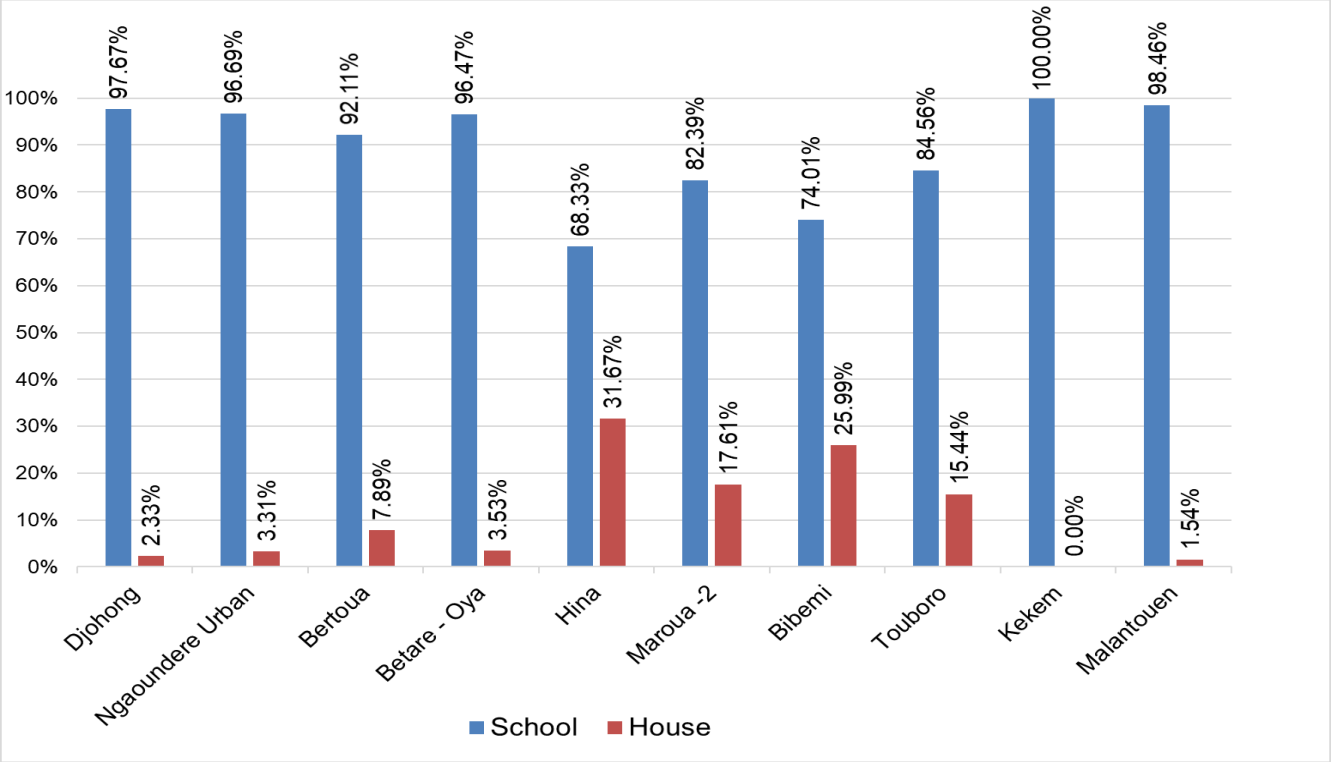

Figure 7: Where treatment was received among those treated

4.0 Treatment by sex

Treatment differed by sex in all districts with males more likely to be treated than females. The differences were only statistically significant in Hina (praziquantel, p=0.003 and Mebendazole p= 0.002) and Touboro (praziquantel, p=0.009 and Mebendazole p= 0.003). The only exception was Kekem, where females were more likely to be treated. See Figures 8 and 9 below.

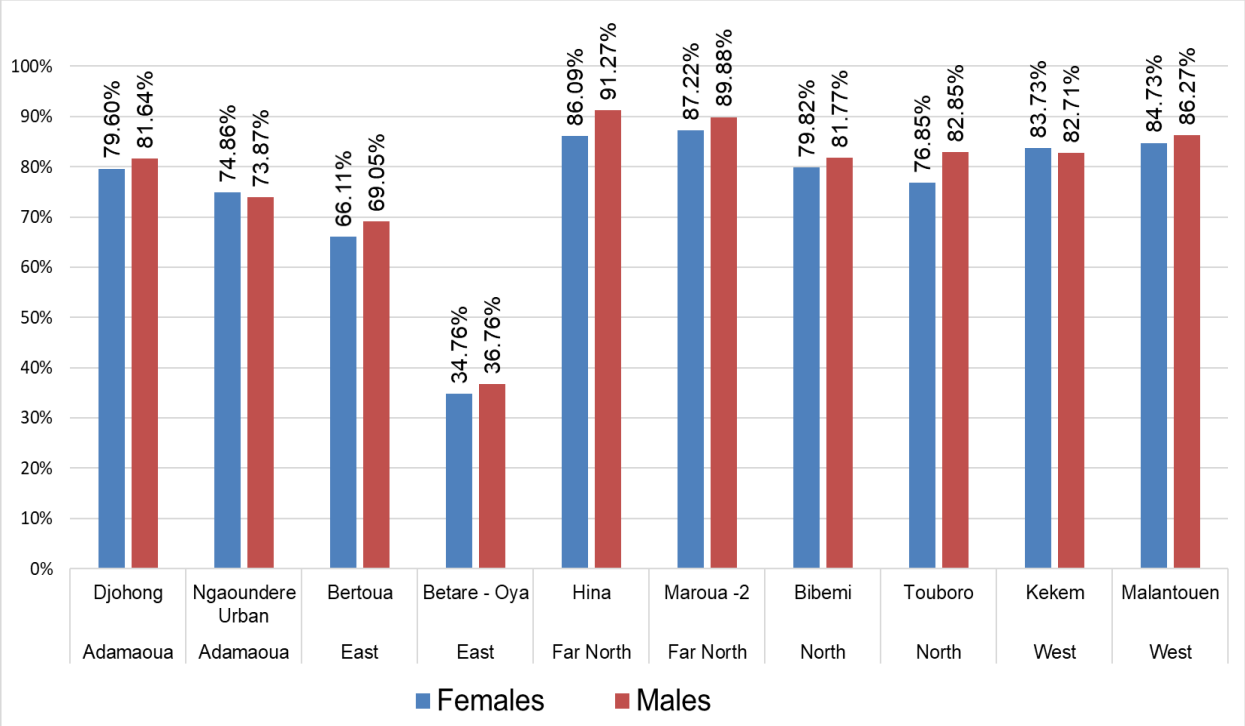

Figure 8: Praziquantel Treatment by Sex by District

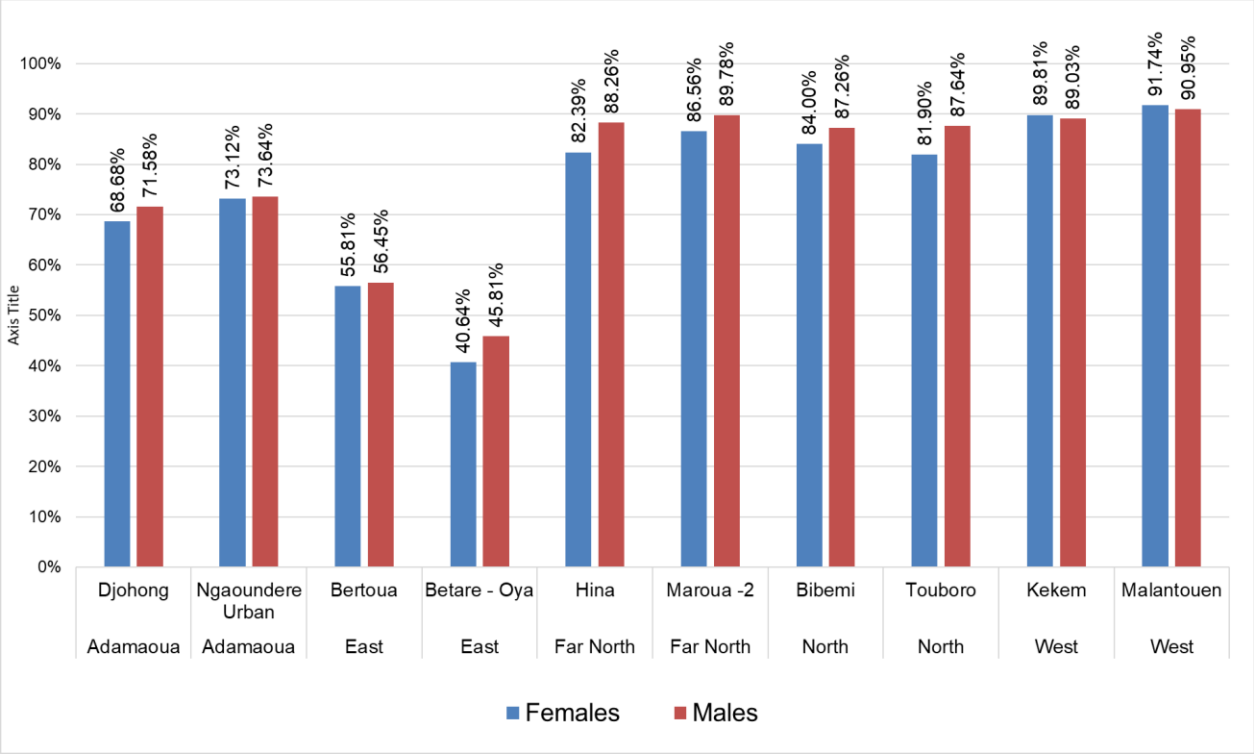

Figure 9: Mebendazole treatment by Sex by District

4.1 Reported versus Surveyed Coverage – SCH/STH

Table 9 and Figure 10 present the reported and surveyed program coverage for SCH. Among the ten sampled health districts, only two; Bibemi (75.30%) and Malantouen (80.30%) had their reported coverages within the confident interval of the surveyed coverage (74.96% - 86.77% and 79.36% - 91.71%) respectively. Four health districts Bertoua, Betare-Oya, Djohong and Ngaoundere Urbain had their reported coverages above the survey values, whilst; Hina, Kekem, Maroua-2 and Touboro had reported coverages below the surveyed coverage and did not fall within the confidence interval.

Table 9: Reported versus Surveyed Program Coverage - SCH

	Reported coverage	Surveyed coverage		
District	**Pt**	**Pt**	*lb*	*Ub*
Bertoua	**77.13%**	**67.66%**	*61.02%*	*74.30%*
Betare - Oya	**75.40%**	**35.85%**	*26.86%*	*44.84%*
Bibemi	**75.30%**	**80.86%**	*74.96%*	*86.77%*
Djohong	**90.18%**	**80.72%**	*74.47%*	*86.96%*
Hina	**48.17%**	**88.83%**	*83.47%*	*94.18%*
Kekem	**72.60%**	**83.21%**	*75.48%*	*90.95%*
Malantouen	**80.30%**	**85.54%**	*79.36%*	*91.71%*
Maroua -2	**69.33%**	**88.58%**	*81.29%*	*95.86%*
Ngaoundere Urban	**88.46%**	**74.38%**	*67.93%*	*80.84%*
Touboro	**73.57%**	**79.93%**	*73.97%*	*85.89%*

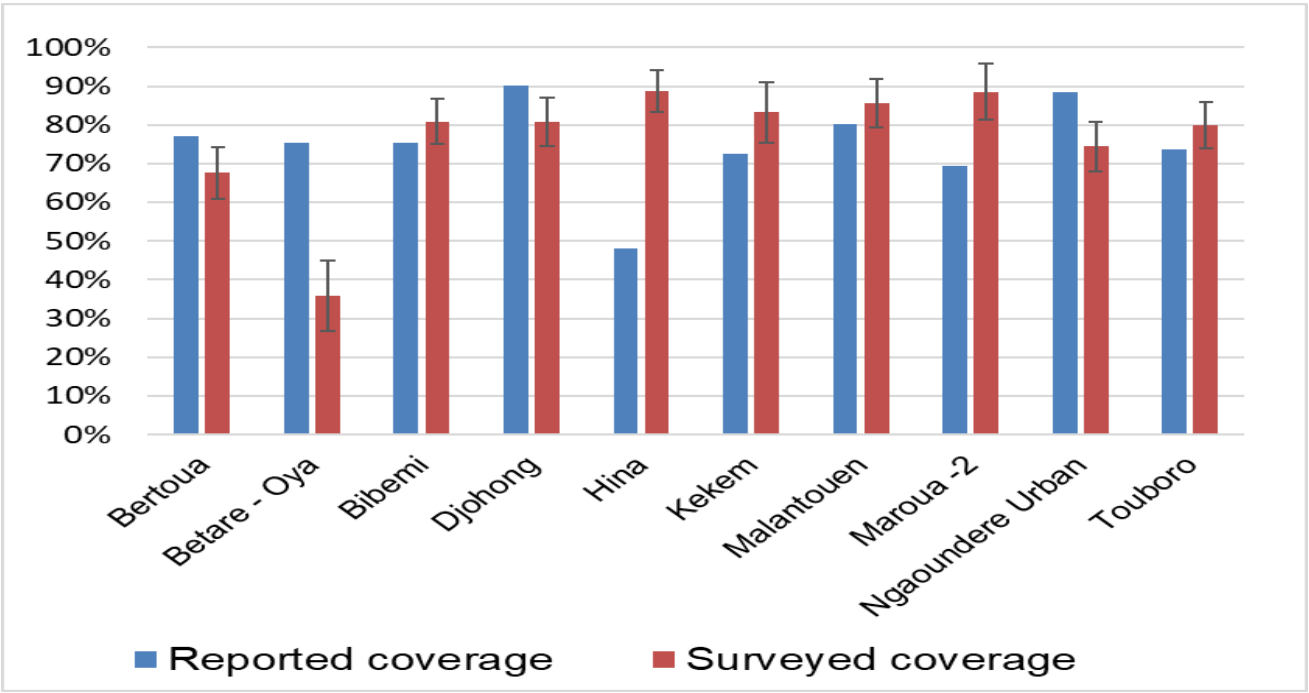

Figure 10: Reported versus Surveyed Program Coverage – SCH

Regarding STH, results were similar to SCH as shown in table 10 and figure 11. Four health districts Bibemi (89.70%), Djohong (70.50%), Hina (89.43%) and Kekem (89.43%) had their reported coverage within the confident interval of the surveyed coverage. The other health districts had their reported coverages outside the confident interval of the survey coverage.

Table 10: Reported versus Surveyed Program Coverage - STH

District	Reported coverage	Surveyed coverage		
	Pt	**Pt**	*lb*	*ub*
Bertoua	**71.21%**	**56.15%**	*47.03%*	*65.27%*
Betare - Oya	**75.22%**	**43.46%**	*32.46%*	*54.45%*
Bibemi	**89.70%**	**85.74%**	*79.55%*	*91.94%*
Djohong	**70.50%**	**70.27%**	*61.50%*	*79.04%*
Hina	**89.43%**	**85.49%**	*79.68%*	*91.31%*
Kekem	**89.43%**	**89.42%**	*84.37%*	*94.46%*
Malantouen	**80.60%**	**91.32%**	*85.70%*	*96.95%*
Maroua -2	**69.35%**	**88.20%**	*81.44%*	*94.95%*
Ngaoundere Urban	**87.80%**	**73.37%**	*66.08%*	*80.66%*
Touboro	**91.20%**	**84.85%**	*79.38%*	*90.32%*

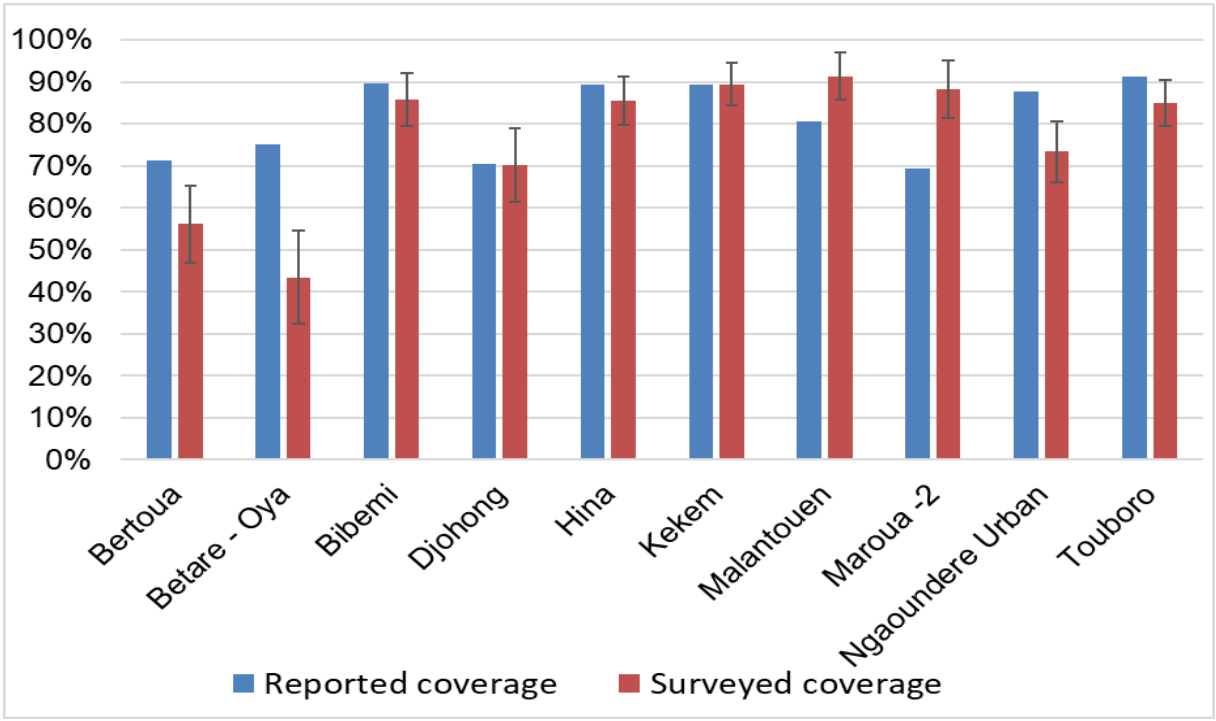

Figure 11: Reported versus Surveyed Program Coverage – STH

4.2 Summary of treatment validation SCH/STH

Table 9 presents a summary of the treatment validation. A district was considered validated if the reported coverage was within the point estimate or within the confidence interval of the survey coverage values. SCH coverage validation was achieved only for Bibemi and Malantouen, whilst for STH; Bibemi, Djohong, Hina and Kekem had their reported coverages validated.

Table 11: Summary of Treatment Validation

District	Reported vs Survey - SCH	Survey WHO Threshold-SCH	Reported vs Survey - STH	Survey WHO Treshold-STH
Bertoua	Not validated, over-reported	No	Not validated, over-reported	No
Betare - Oya	Not validated, over-reported	No	Not validated, over-reported	No
Bibemi	**Validated**	**Yes**	**Validated**	**Yes**
Djohong	Not validated, over-reported	**Yes**	**Validated**	No
Hina	Not validated, under-reported	**Yes**	**Validated**	**Yes**
Kekem	Not validated, under-reported	**Yes**	**Validated**	**Yes**
Malantouen	**Validated**	**Yes**	Not validated, under-reported	**Yes**
Maroua -2	Not validated, under-reported	**Yes**	Not validated, under-reported	**Yes**
Ngaoundere Urban	Not validated, over-reported	No	Not validated, over-reported	No
Touboro	Not validated, under-reported	**Yes**	Not validated, over-reported	**Yes**

4.3 Reasons for not taking treatment/swallowing drugs, among those present for the campaign

Most SAC who did not receive treatment stated they were present during MDA campaign. However, three main reasons were responsible for them not taking the medication with the first reason being “fear to have side effects”, followed by “did not know/trust the teacher/CDD” and finally “Drug distribution did not happen”.

For fear to have side effects, Betare-Oya reported the highest number (75.47%) and Bibemi had no reported case (0%). On the second reason “did not know/trust the teacher/CDD”, Hina (50%) and Bertoua (47.37%) reported the highest number with Bibemi and Kekem having zero percent. Finally for the last reason “drug distribution did not happen”, the highest respond came from Bibemi (50%) and the lowest from Touboro (0.0%).

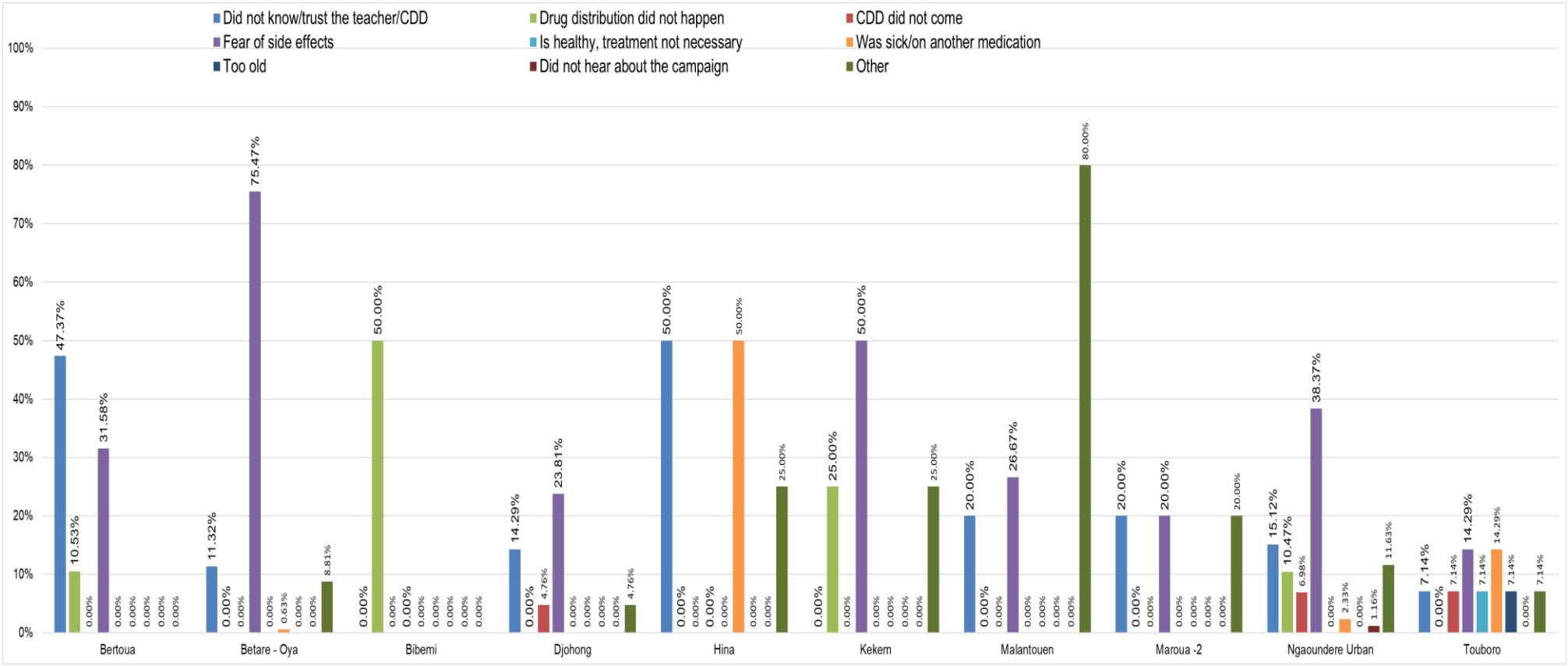

Figure 12: Reasons for not taking treatment/swallowing drugs, among those present for the campaign

4.4 Enrolment status of those not treated

Following figure 13 below, the greatest number of children not treated were school enrolled, but absent on the day of MDA. The highest was reported in Kekem (100%) followed by Djohong (99.49%) and Malantouen (99.31%). Hina health district had the lowest percentage (74.86%).

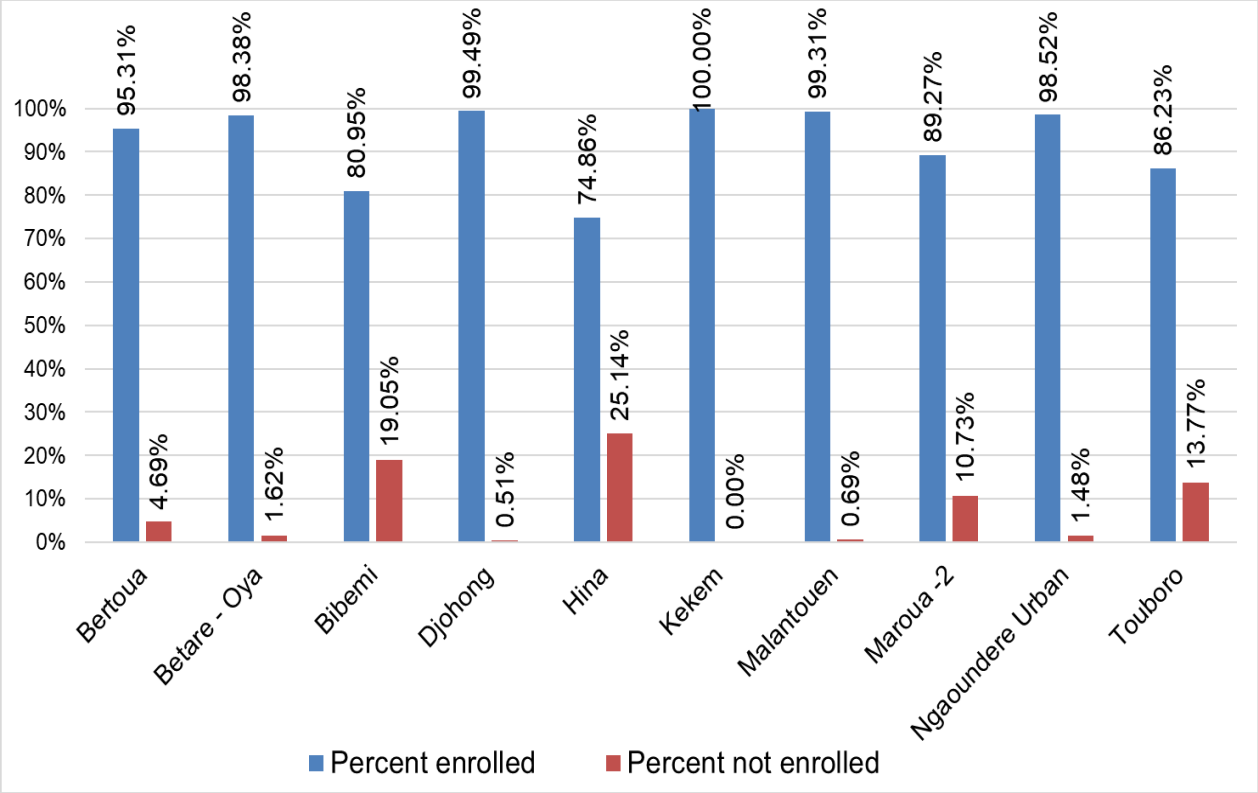

Figure 13: Percent enrolment status of those not treated

4.5. Side effects reported by Region

Analysis of side effects was done per region as shown in figure 14. The most frequent side effect was stomach ache (n-637) with the highest reported cases from the West (43.89%) and lowest from East (18.62%). This was followed by vomiting (n-611) with Adamoua (35.85%) reporting the highest number of cases and Far North (22.14%) having the least cases. Finally, headache (n-571) was third recorded side effect with the highest number of reported from the Adamaoua region (40%) and the lowest from the North (17.22%).

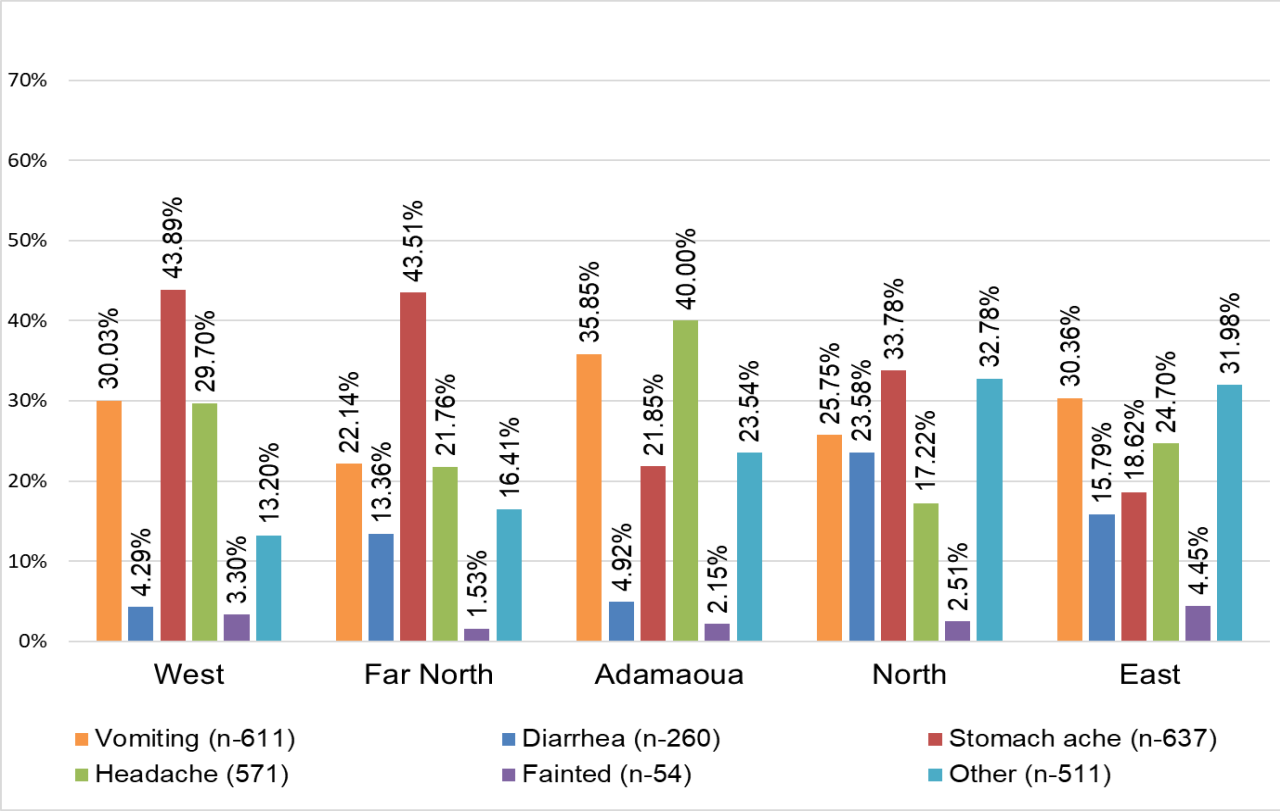

Figure 14: Type of side effects reported among regions

4.6 Reported methods of sensitization by district among those treated

Among the sources of information cited by the children surveyed, teacher was reported the most often at (n-13031), followed by a CDDs (n-2157), child (n-528), community leader (135) and family (118). Notably, other forms of mass sensitization were used with minimal reporting from; health centre (43), friends/neighbour (12), radio (4) and public address system (3) as presented in figure 15.

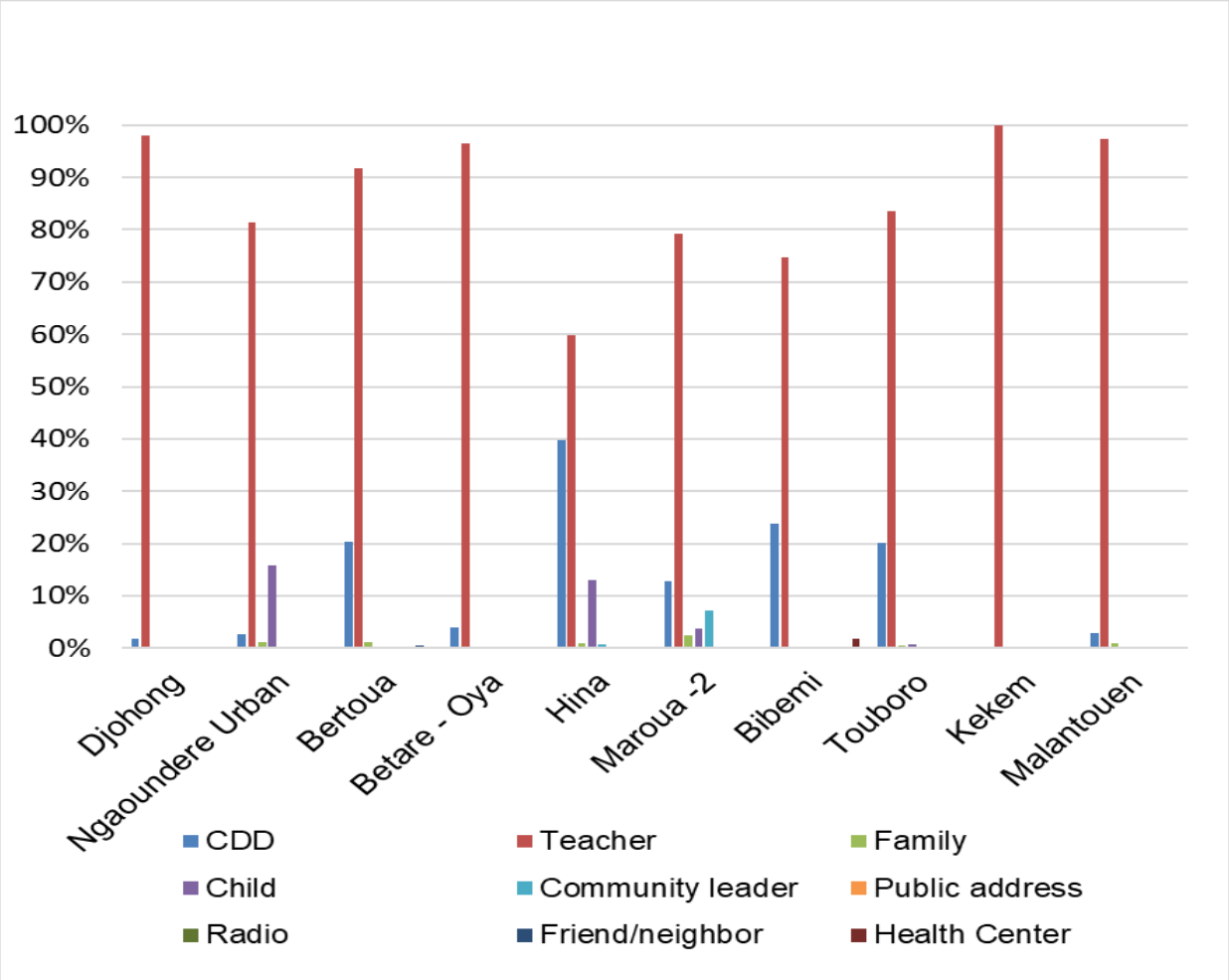

Figure 15: Reported methods of sensitization by district among those treated

5.0 Discussion

This survey was implemented in ten health districts of five regions for schistosomiasis and soil-transmitted helminth MDA. Results were validated for Bibemi, Djohong, Hina and Kekem for STH treatment and Bibemi and Malentouen for SCH. Bibemi was the only health district where reported coverages were validated by the survey for both SCH and STH. In Bertoua, Betare-Oya and Ngaoundere Urbain, there was significant over-reporting of treatment coverage by 9 to 39 percentage points. This might generally be related to issues of denominator. The denominator used for the calculation of treatment coverage was based on the 2005 national census projection, using a standard population growth of 2.6%. However, this does not take into consideration the actual population dynamics occurring in the health districts in real time like in the West region with the influx of internally displaced persons from the South West and North West regions, in the East region with refugees from the Central African Republic and the northern regions with the Boko haram insurgences and Nomad migratory populations. In addition to this, issues of data quality and duplication of treatment figures might also be responsible for the over reporting especially in Betare-Oya health district that had a difference of over 30 percent for both SCH and STH. Also, under reporting was recorded in Maroua-2 and Hina for both SCH and STH and Touboro for SCH. This might be due to incomplete reporting of treatment data from schools and communities because of accessibility issues.

Despite the above, seven districts; Bibemi, Hina, Kekem, Malantouen, Maroua -2 and Touboro had survey coverages that exceeded the WHO recommended minimum treatment threshold of 75% for both diseases, while for Djohong, only SCH exceeded 75%. Conversely, for Bertoua, Betare-Oya and Ngaoundere Urbain the survey results were below the WHO recommended threshold for both diseases. This might be due to the tight duration of the campaign because of the expiration of praziquantel tablets, which did not allow enough time for health districts to conduct catch up distribution in schools and communities. Also, the inability of some district teams, especially Betare-Oya health district to properly manage rumors and prevent refusals for fear of side effects played on the poor coverage since the district was receiving praziquantel for the first time.

Figure 7 above shows a vast majority of treatments were provided in schools ranging from 68.33% in Hina to 100.0% in Kekem. However, treatment at home exceeded 31% in Hina, 25% in Bibemi, 17% in Maroua-2 and 15% in Touboro. This was consistent with MoH reports that revealed the treatment of at least 19% of school-aged children in communities. In line with plans to ensure no one was left behind, hybrid platforms were adopted to systematically reach non-enrolled and enrolled SAC. This helped to mitigate inequality to MDA access.

Most individuals who were not offered medication stated they were present during MDA, These kids were missed at the time of home visit by CDDs and catch-up campaigns were not conducted in schools by teachers nor revisits done by community volunteers. However, their main reason for not taking the medications was “fear to have side effects” as shown in figure 9. This accounted for the low survey coverage in Betare-Oya health district where a good majority of SAC reported fear of side effect as their main reason for not being treated.

Concerns over response bias were minimal and the likelihood of taking treatment was associated with self-reporting. At least 77% of all responses were self-provided except in Bibemi health district where 83% of responses were given by caretakers SAC were absent during data collection as shown in figure 5. This was probably attributed to the timing of household visits by surveyors since the survey was implemented during school period. It is likely that surveyors either visited selected households when SAC were still in school or out of home and revisits were not done.

The primary mode of sensitization was the teacher or CDD and to a lesser majority, child and community leaders. This observation is all the more important as information, education and communication (IEC) materials produced were provided to teachers and CDDs means to foster health promotion for behavior change in favor of MDA compliance. Overall, individuals noting side effects were minimal approximately 13% of SAC, the primary being stomachache (27%), vomiting (26%) and headache (24%) with the lead cause noted as not eating before taking the medications.

6 Challenges and Mitigation Measures

S/N	Challenges	Mitigation measures
1	Security issues with some selected communities for the survey.	Due to insecurity in some of the pre-selected communities, new areas were selected to implement the survey. This was the case with Malewa Kadey (a community bordering Central African Republic) in Betare-Oya health district was replaced by Gounte. Yayoue community could not be located on the GPS because it was created by Nomads who are always migratory (this was not associated with the functionality of the phone or Commcare platform). However, the district team and locals confirmed the name of the community.
2	The required 25 households could not be sampled in some of the selected communities.	In Ngaoundere Urbain health district; • Hore-Rep community (a nomad community) from Beka Hossere health area had just 12 households. The remaining households were completed in Toumbouroum a neighbouring community. • Bondjon community of Yves Plumey health area also had a similar issue with just 17 households present. This gap was completed in Koma a neighbouring community.
3	Non-compliance to treatment was noted in some urban communities sampled.	During the survey, it was realized that parents encouraged their children not to take the medications in some schools leading to refusals. This was the case in Bamyanga-Marza health area of Ngaoundere Urbain health district where less than 50% of children were treated within the five communities sampled. A privately own primary school in this area Perseverance primary school was noted for this where most of the children not treated attended this school.
4	Some communities were not treated because of the absence of a school and no community distributor was trained.	In Djohong health district, Wantamo Bui Wasande community of Batoua Godole health area was not treated with neither praziquantel nor mebendazole. Among the 43 children sampled, non-received the drugs. Following this results, our investigation showed that the community lacked a school and no community distributor was trained for community distribution. This was noted for follow-up during MDA resumption.
5	Intermittent telephone network coverage in most of the rural	Network coverage was a challenge as some communities in Betare-Oya (East), Djohong

	communities sampled.	(Adamaoua), Touboro (North) and Hina (Far North) had very limited network coverage. In some instances, the CommCare application could not be launched because of the absence of internet. Teams had to locate network coverage before launching the application and ensured they synchronization was done once they were within network coverage.

7 Conclusion

The survey findings revealed that, the September 2019 MDA coverage was validated only for Bibemi for both diseases, for Malantouen for SCH and for Djohong, Hina and Kekem for STH. However, the survey was not validated for Bertoua, Betare-Oya and Ngaoundere Urbain due to significant over-reporting and for Maroua-2 and Touboro due to under reporting. This concludes that, the reported coverages of Bibemi and to a greater extend Malantouen, Djohong, and Kekem were accurate and that the reporting systems in these health districts are effective. The results equally concluded that Maroua -2 and Touboro districts were meeting the required minimum WHO treatment threshold of ≥75%, despite the non-validation of their reported programme coverages.

8 Recommendations

- MoH should institutionalize catch-up campaigns to ensure MDA is delivery to kids that were missed either in the communities or in schools;
- Sightsavers should conduct DQAs in Hina, Betare-Oya, Maroua-2 and Ngoundere Urbain with double digit disparity between reported and surveyed coverage;
- The National SCH/STH Programme should ensure MDA medications have at least a 6 months expiration date before being sent to the field for distribution. This aspect greatly affected the quality of the campaign as field actors had to rush with MDA to meet up with praziquantel expiry date.
- MoH and Sightsavers should capitalize on district and regional data review/ appraisal meetings to enhance the skills/competences of field actors on data collection, reporting and analysis during the campaign and the possible incorporation of campaign data into DHIS2.

- MoH should ensure at least one CDD is trained per community especially in hard to reach communities, to optimize programme reach to all SAC, especially to the non-enrolled in such operational areas during MDA.
- MoH and Sightsavers should brainstorm on the best approach to address the fear of side effects recorded in the East region apart from the general SOCMOB. Operational research can be conducted in some selected communities of the region to better understand and tackle this challenge.
- MoH should intensify social mobilization approaches before and during MDA, to include existing community based social mobilization channels (churches, social mobilisers, town criers, community-based organizations and community radios) for awareness raising during subsequent campaigns especially for marginalized populations like refugees in the East or far North regions.
- With the addition of two new regions under wishlist 4, Sightsavers' Country Office in Cameroon should consider including purchase of additional smart phones in their budget during the 2020/21 treatment cycle, to facilitate survey implementation across seven regions.

Appendix

Names of Central level supervisors

REGIONS	NAME OF SUPERVISORS
WEST	Serge Akongo (Sightsavers)
	Mohamed Anouar Al Sadat (MoH)
EAST AND ADAMAOUA	Ndelle Makoge (Sightsavers)
	Dr Beyina Ayissi (MoH)
FAR NORTH	Ibrahim Mallam Sali (Sighsavers)
	Jules Patrick Evenga (Sightsavers)
	Dr Simplice Notoum Kaptue (MoH)
NORTH	Jules Patrick Evenga (Sightsavers)
	Dr Simplice Notoum Kaptue (MoH)

Names of Surveyors per region

SN	Adamaoua	East	Far North	North	West
1	Onana Sabine Carine	OUSMAN DEKE	MPELE BENOIT	Gaelle	Nkounkwen Alain Delombard
2	GUEBOLLA ELIAS	MAMANE MBIDA	ABDOULAYE YAOUBA	Ebong	MOHAMED NSANGOU
3	Marie Michelle	ETOUNGOU EDJIMBI	MBOU TADZO PAVEL	Ganava	MOUNDEN ZOUNKA
4	NGARFATTA ROSE	SUBEPIE OBAMA	MONDOH YOHANG ANASTASIE	Woude	MOUNVERA ABDEL AZIZ
5	GIMPEI SENPI ARLETTE	KANA CHRISTELLE	EKASSI DENIS	Malama	NGUENANG FLORE
6	HASSAN MUSSA	PENAMBOU TETAN	SEINI ABBA	Ngomna	PEKA MAYOU INRAHIM
7	AMOUGOU AMOUGOU PAUL	DJIDA OUSSOUMANOU	OUSMA-ILA Aboubakar	Bienette	YOUNO MBOUEMBOUE
8	Ongomube Marlyse	SIANDJEU GASTON	HAWA DAMA Octavie	Aissatou	MOUNTABEME SEIDINA
9	Tchedele Didier	ATANGANA VALERY	DJEUDONG KENFACK	Menwa	Mefire Tapon Aichetou (Bafoussam)
10	HOUSSEINI MOUSSA	EBONE CHARLES	TIVE TODIYA	Hynary	Ngapna Zounkifilou (Yaounde)
11	WANDJI LILIANE FLAVIE	ZOLLO RENE	ADOUM YAYA RICARDO	Saidou	MEFIRE MAYOU
12	Mohamadou Laminou Baba	ENYALI ARNAUD	DJAMILA OUMAROU	Alahamdou	TOUPOU JOUNEDOU
13	MOHAMADOU BADAMASSI HALILOU	MAYI THERESE	DIEUDONNE WELEME	Emile	BOUBA ABDOULLAHI
14	Meali Cherif	ESSOUOM ALPHONSE	ABBIGA BIENVENU	Kody	SONE SANDRA
15	Mbedo Carlo	MENKABA CLAUDE	MOUSSA MANGA HANIEL	Boubakary II	Nsangou Nomagni Albert Soulemane (Dchang)
16	KONG ANITA	BINON RACHEL	GHANSEH IDIRISU	Nouhou	KOBOU DELICE

17	IDRISSOU MEYALI	WOULAMAYO JONAS	MOUHAMED MOUSTAPHA	Dibrila	Matagnigni Nyayou Paul Alain (Malentouen)
18	Hadj Alima Abba	GUY CHASTEL	NZINKOU ZOUADA JOELLE CAROLE	Gaspard	Djietcheu Deutou Collette (Kekem)
19	MOHAMADOU MAOULOUDOU	SOKO DENIS	APSOUKA DAMBA	Annette	NDAMOU ISMAELA
20	Abdel Nasser Mohamed	MOUANYOUL SAMUEL	EDONG MARIE NOËL KOSSIONO	Elisabeth	WEGUE INGRID