Uganda Coverage Survey 2014

Contents

[Associated spreadsheet: Uganda Coverage Survey 2014 Results 2015-02-09.xlsx]

[Associated protocol: ICOSA 2014 UG Coverage survey protocol.doc]

1   Executive Summary

The Uganda Ministry of Health's (MoH) programme for Neglected Tropical Disease control and elimination has expanded treatment of schistosomiasis to areas of the country identified with low endemicity, or less than 20% prevalence of infection. In April 2014, the MoH agreed to an independent post mass drug administration (MDA) coverage survey to be conducted in these areas to assess the number of school-age children (SAC) who swallowed the drug during the February – April school-based MDA campaign and to determine reasons, if any, for not taking the drugs provided.

An independent treatment coverage survey is essential at the beginning of a programme, to ensure that prompt corrective action is taken where sub-optimal coverage is found. Treatment coverage is a key indicator of the performance of a MDA programme. In Uganda the survey used the sub-county which was the implementation unit as the primary sampling unit, these were stratified by the partners of the programme who supported schistosomiasis MDA. In each of the 13 sub-counties randomly selected for the survey, 12 villages were surveyed per sub-county with 10 households selected in each village and a total of 5,570 SAC interviewed. The survey was carried out over a four week period.

Reported coverage, from school registers reported up to district level, across the 30 districts was an average of 85% (range 38% to 99%). There are several issues with this data which question its accuracy. In sharp contrast, the overall validated coverage was 36% (range 7.7% - 86.4%), with only one sub-county achieving above the WHO target of 75% coverage in SAC. When coverage was disaggregated by school attendance, there was a significantly difference between those attending school and the non–attending SAC (37.1% and 3.2%, respectively). The survey revealed that there was a difference in the coverage achieved where treatment in a sub-county was supported by a different partner, however, there are several possible justifications for these results.

The strengthening of social mobilisation activities and building on the existing word of mouth strategies to ensure greater awareness of the MDA distribution are required for future treatment campaigns. Those who did not receive treatment commonly had not heard about the programme or because the drug distributor did not come. Other reasons for individuals not taking or receicing treatment, which werev not within the scope of the coverage survey are discussed and future investigations recommeneded.

This survey has highlighted several implementation issues in the low endemic sub-counties which need to be addressed in future MDA campaigns. Social mobilisation, health education campaigns and identifying additional platforms in which to reach the SAC (attending and non-attending) will need to be developed and piloted under the national control programme to ensure high levels of treatment coverage are achieved and previous reductions in schistosomiasis are maintained.

2   Background to the coverage survey

In February 2013 a mapping survey (*S:\..\..\Uganda Mapping final report.doc*) took place in 30 districts in Uganda identified with low endemicity (below 20% prevalence of schistosomiasis) which had either received six rounds or more rounds of PCT or had never received treatment through the national NTD control programme. With support from the ICOSA programme, the Uganda MoH conducted its 1st mass drug administration (MDA) of praziquantel (PZQ) to school-age children (SAC) at sub-county level. The MDA was originally planned to be conducted in November/December 2013 in 127 identified low endemic sub-counties across the 30 districts. However the first round of MDA was conducted in only the schools that had been mapped across the 30 districts, leading to a second round of MDA conducted in February – April 2014, wherein the remainder of the schools within the 127 sub-counties were targeted for treatment. The MDA distribution method was solely school-based and administered by teachers with the non-attending school SAC anticipated to receive their treatment from the nearby schools.

It is particularly important to carry out an independent treatment coverage survey at the beginning of a programme, to ensure that prompt corrective action is taken where sub-optimal coverage is found. Treatment coverage, that is, the proportion of the target population that actually ingested the drug in question, is a key indicator of the performance of a MDA programme. For PZQ, the target population was school-age children (SAC), including both school-attending and non-attending children. In light of this, an independent and external drug coverage survey was carried out in April 2014 out in 12 randomly selected sub-counties.

NOTE: Albendazole (ALB) was also distributed in some of the 30 districts under different partners, however ICOSA programme did not support its procurement, distribution or data collection in 2013/2014. The difference and lack of clarity surrounding the ALB distribution timelines as well as the implementation and reporting mechanisms across each districts by the various individual partners (none of which was ICOSA), makes any ALB coverage result difficult to be compared across districts. As a result, ALB coverage will not be covered in this ICOSA performance report.

2.1   Reported coverage from MDA

The reported coverage across the 30 districts was 85% (75% is the target level coverage for PZQ in line with WHO guidelines).

The table below shows the treatment report as submitted to SCI from the central level Ugandan MoH:

Table 1: Reported coverage of 2013/2014 MDA from the Central Level, MoH

District	Nº S/c covered	Nº schools in endemic areas	Nº schools covered	Total pop registered	Eligible pop	Nº of pupils treated	Nº of non-enrolled SAC treated	Reported Coverage (%)
Budaka	5			14,467	14,467	11,141		77%
Bulambuli	1	18	18	5,847	5,396	5,228	302	97%
Butaleja	2	183	24	12,342	12,209	7,938		65%
Dokolo	8	64	54	31,905	31,905	26,917		84%
Ibanda	2	32	22	6,063	5,527	5,203		94%
Iganga	4		20	13,637	13,637	12,860		94%
Isingiro	3	78	44	14,679	14,056	13,714	1,749	98%
Kaliro	6	166	166			39,985		
Kalungu	2	104	104	48,448	42,948	16,126		38%
Kamuli	6	151	33	17,921	17,921	12,374		69%
Katakwi	4			13,832	13,832	7,799		56%
Kiruhura	6	158	96	23,114	21,840	21,327	513	98%
Kumi	3	64	64	38,467	38,617	27,505		71%
Kween	2	17	10	2,826	2,826	2,356		83%
Lamwo	5	18	36	14,648	14,648	10,701	7,585	73%
Lira	1			35,282	27,087	8,488		31%
Luuka	8	95	80	54,288	54,288	34,411		63%
Manafwa	4	27	21	10,586	10,451	9,627		92%
Maracha	7	63	61	59,633	58,941	51,136		87%
Mbale	1	11	7	3,936	3,773	3,429		91%
Mubende	4	46	53	21,188	20,437	19,411	978	95%
Nakasongola	8	183	183	56,788	56,788	51,185	4,491	90%

Namutumba							
Ngora	4	89	89	47,157	47,157	38,707	8,456	82%
Pallisa	8	118	118	49,584	49,090	44,197	2,264	90%
Rakai	8	63	63	16,852	16,833	15,663		93%
Rukungiri	1	34	17	7,214	7,164	6,082	73	85%
Sironko	1	13	8	4,884	4,884	4,383		90%
Soroti	1	22	22	10,565	10,323	7,578	237	73%
Tororo	19	552	552	149,336	112,000	104,127		93%
Overall total	128	2,203	1,799	785,489	729,045	**619,598**	26,648	85%

*Reported coverage = No of pupils treated/eligible population

There are a number of important issues that bias the reported coverage:

1) The population registered (and henceforth the coverage calculations) only includes SAC who attend schools whose teachers came for the training exercise. Additionally the SAC tend to be registered on the same day of treatment. As a result the denominator is most times not a true number of the total eligible population of SAC.
2) Even though there is some data on the number of the non-enrolled SAC that were treated, there is no record of how many non-enrolled SAC where eligible for treatment in the first place. As a consequence, there is no reliable denominator on which to calculate an estimate of treatment coverage in non-attending SAC.
3) The districts aggregated the reports to district level instead of reporting at sub-county level which was the implementation unit for this ICOSA supported MDA. Attempts to recover the disaggregated reports at sub-county level was difficult despite each level of administration being required to maintain a copy of their reports at all times.

3   Coverage survey data collection methods

3.1   Selection of coverage survey sites

In Uganda, the uppermost sampling unit for the survey was the implementation unit, which is the sub-county. The coverage survey was conducted before receipt of the reported coverage, and therefore, the sub-counties were not stratified according to coverage level. MDA of PZQ across the 30 ICOSA districts were supported by the two partner organisations, SCI (ICOSA programme) and RTI (ENVISION programme), responsible for supporting SCH treatment in the country. ICOSA supported delivery in 80 sub-counties and ENVISION in 47. Since the drug delivery may vary between the programmes, and thus potentially affect coverage, it was decided that stratification would be by the partner programme who supported the delivery of the MDA by the MoH i.e. ICOSA and ENVISION.

Resultantly, 13 sub-counties (across 11 districts) were randomly selected **(see Table 2)** from the two strata outlined. 12 villages were surveyed per sub-county with 10 households containing SAC were interviewed in each village **(see (S:\..\..\ COSA 2014 UG Coverage survey protocol.doc for details of selection**).

Table 2: Selected sub-counties (by Partner) for the 2014 validated coverage survey and history of treatment

District	Sub-county	Partner	Treated prior to 2014
Kamuli	Bugulumbya	ICOSA	Y
Lamwo	Paloga	ICOSA	Y
Mubende	Kassanda	ICOSA	Y
Pallisa	Olok	ICOSA	Y
Pallisa	Butebo	ICOSA	Y
Budaka	Katira	ENVISION	N
Tororo	Mukuju	ENVISION	N
Kiruhura	Nyakashashara	ICOSA	N
Mbale	Bufumbo	ICOSA	N
Rakai	Kyebe	ICOSA	Y
Iganga	Namalemba	ENVISION	N
Iganga	Buyanga	ENVISION	N
Namutumba	Nsinze	ENVISION	N

3.2 Field methodology

Twenty people with previous experience in conducting household based surveys were recruited for this study. Preference was given to those who had experience with either data collection using phones or who owned smart phones.

One full day was spent in the Kampala, where the SCI Programme Manager trained the 5 survey teams (3 enumerators and 1 supervisor) on the ICOSA coverage survey protocol. The 2nd day consisted of the teams learning how to perform the data collection using mobile phones, using the Epicollect+ platform **(see training materials for further details.)**The 3rd day consisted of a mock field survey in Kigo town (Wakiso district) in a few selected villages to practice the data collection, household selection procedures and to test the questionnaire.

Following this training, 5 survey teams, of 4 persons each, set off to their group of designated sub-counties to conduct the survey. The teams would make a courtesy call at the district and sub-county offices, however, the officials could not travel with the survey teams due to the independence required for this survey. Instead the survey team would hire a local authority who acted as a guide at each village level after ascertaining that they were not involved in the MDA process. Within each pre-selected village, the team selected a total of 10 households (**see selection strategy in protocol)**, with each enumerator conducting the interview in 3 households and the supervisor in 1 household. Each interviewer was responsible for entering the data simultaneously for each household interview.

The entire survey was completed in 28 days (15 – 28 days). On average, each team surveyed two villages per day and subsequently completed a sub-county in 6 days. The variability in days depended on the number of sub-counties allocated to each team. The survey was also done during the school

holidays to ensure that all children, both school enrolled and non-enrolled could be captured in the household.

3.3 Ethical considerations

There were no ethical complications for these surveys as no biological samples or names will be collected.

Consent: The village leader was notified about the study prior to the survey team's arrival by the team leader, survey coordinator, or through other channels. Upon arrival in the village, the village leader was identified, and the survey was explained to the appropriate people together with obtaining permission to perform the survey in the village.

Additionally, consent from the designated household head was sought before the team entered the house to interview (see protocol).

4 Data cleaning

The data were provided to SCI in four files detailing information collected at the level of the sub-county, village, household and finally child interviews. The quality of the data were broadly good but there were some issues when merging the different data files together. It appears that more than one person had inputted details for the individual villages, such as population numbers, and these variables were not always consistent within the same villages. We created a single dataset with one observation for each village and the correct details and then used this for all observations within each village. In future we suggest that village details be filled in by one person in each village and the details can be appended to all records during data cleaning.

5 Results

Validated therapeutic coverage rates were calculated using the following formula:

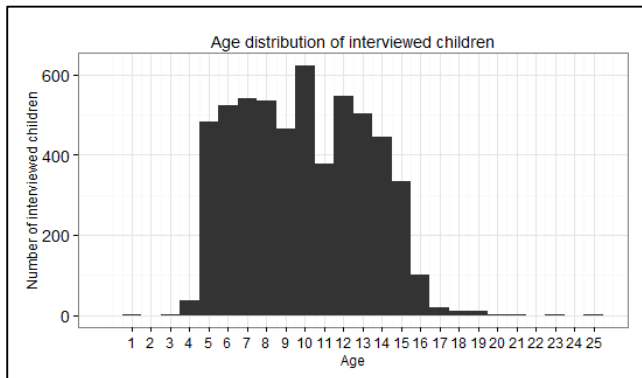$$\frac{Number\ of\ children\ that\ swallowed\ the\ drug}{Total\ number\ of\ children\ interviewed}$$

Note that children who were unsure of whether they took the drug, or where no answer was given, were classified as not having taken the drug for the purposes of assessing coverage.

See **Appendix II** for full details of the statistical methodology.

5.1 Data description and sample sizes

Summary	
Number of sub-counties surveyed	13
Mean number of villages surveyed per district	11.9
Mean number of households surveyed per village	10.2
Number of child interviews	5,570

5.1.1   Age distribution of interviewed children

The vast majority of children (5,480 out of 5,570 = 98.4%) were within the ages of 5 and 16. There were 4 children where age was not recorded and 86 children who were recorded as being outside the range of 5 - 16. We elected to keep these children in the analysis as it is feasible that these ages may have been an error in data entry and we felt that it was most important to keep the maximum amount of data possible.

5.2   Validated coverage rates

The overall validated coverage across 13 sub-counties came to 36%.

When broken down by sub-county, the coverage rates ranged from (7.7% - 86.4%), with only one sub-county achieving above the WHO target 75% coverage.

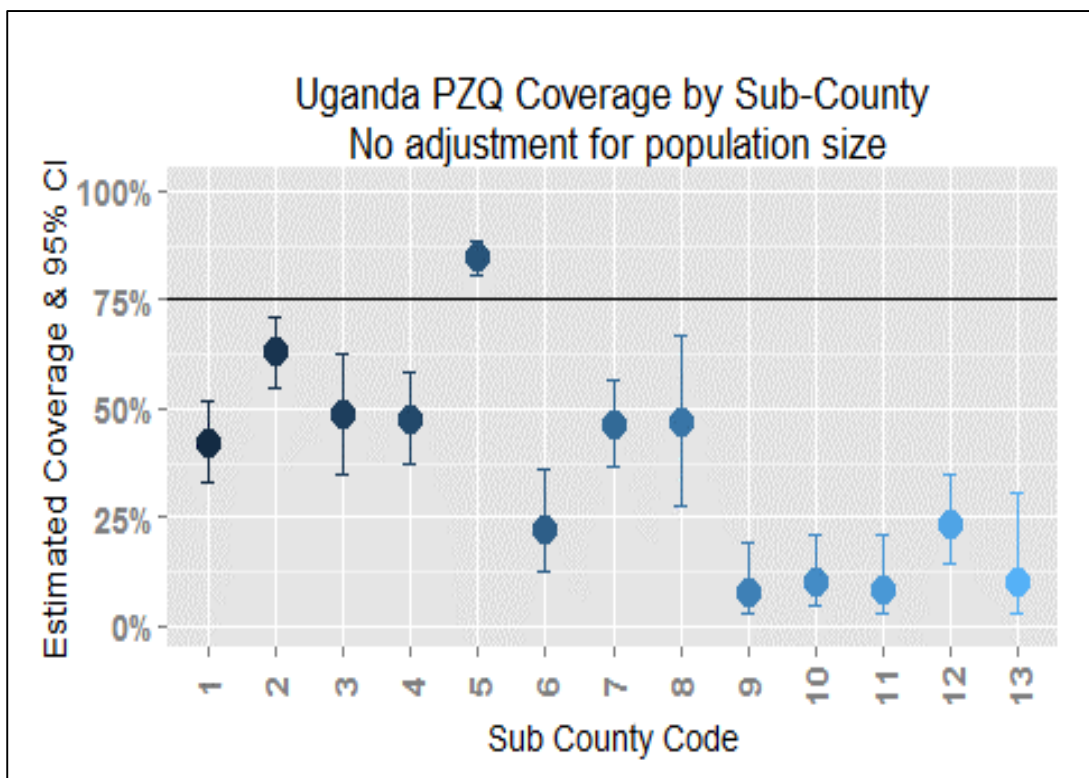**Figure 1: Uganda PZQ coverage by sub-county (%)**

Table 3: Uganda PZQ coverage by subcounty (%)

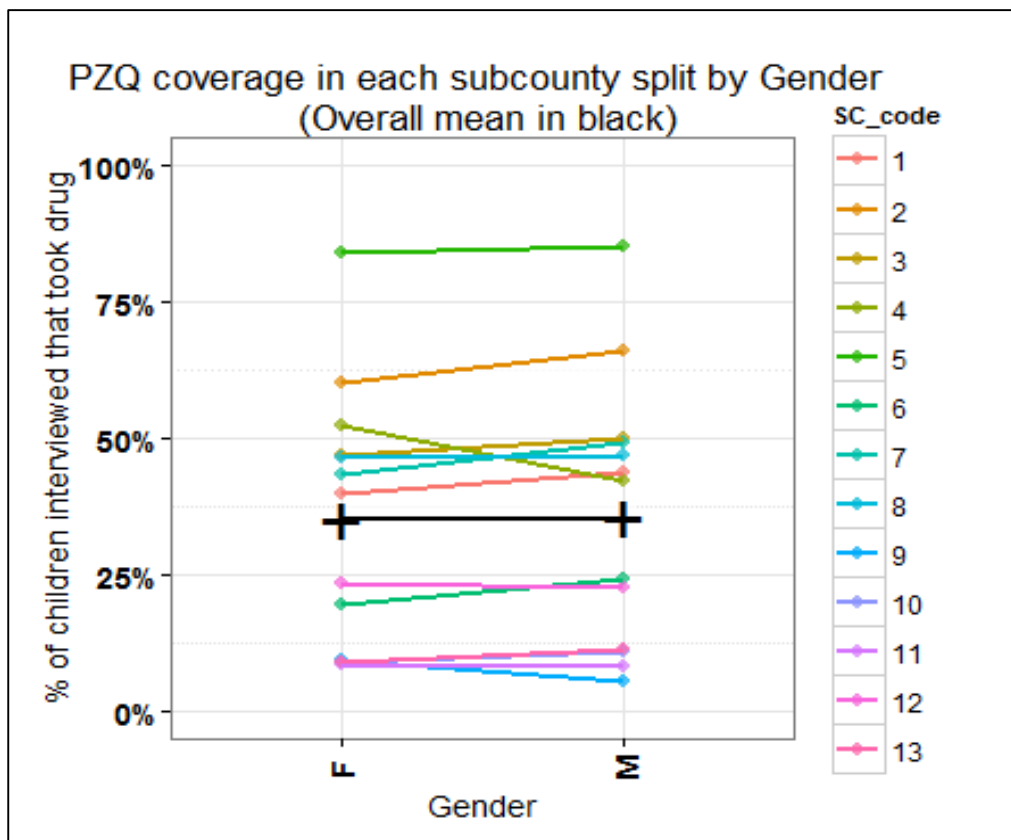| Code	Subcounty	Coverage
1	Kassanda	42.1%
2	Paloga	63.6%
3	Nyakashashara	48.7%
4	Kyebe	47.7%
5	Bufumbo	86.4%
6	Nsinze	22.1%
7	Butebo	46.3%
8	Olok	47.0%
9	Katira	7.7%
10	Buyanga	10.4%
11	Namalemba	11.8%
12	Bugulumbya	24.1%
13	Mukuju	10.4%

5.2.1.1 Coverage & gender

The overall coverage disaggregated by gender did not vary significantly between the two genders (p=0.780) **(Table 4).**

Table 4: Uganda PZQ validated coverage by gender

Gender	Coverage
F	35.7%
M	36.2%

There was no significant difference either between the genders within the sub-counties (Figure 2). The female percentage coverage ranged from 9.5% - 85.8% while the male percentage coverage ranged from 5.6% to 87%. Females had a higher coverage than the males in 5 out of 13 districts surveyed with the biggest difference in percentage points between the genders lying in Kyebe district, one of these districts. In Kyebe district, the percentage of females who swallowed a PZQ pill (52.6%) differed from that of males (42.5%) by 10 percentage points.
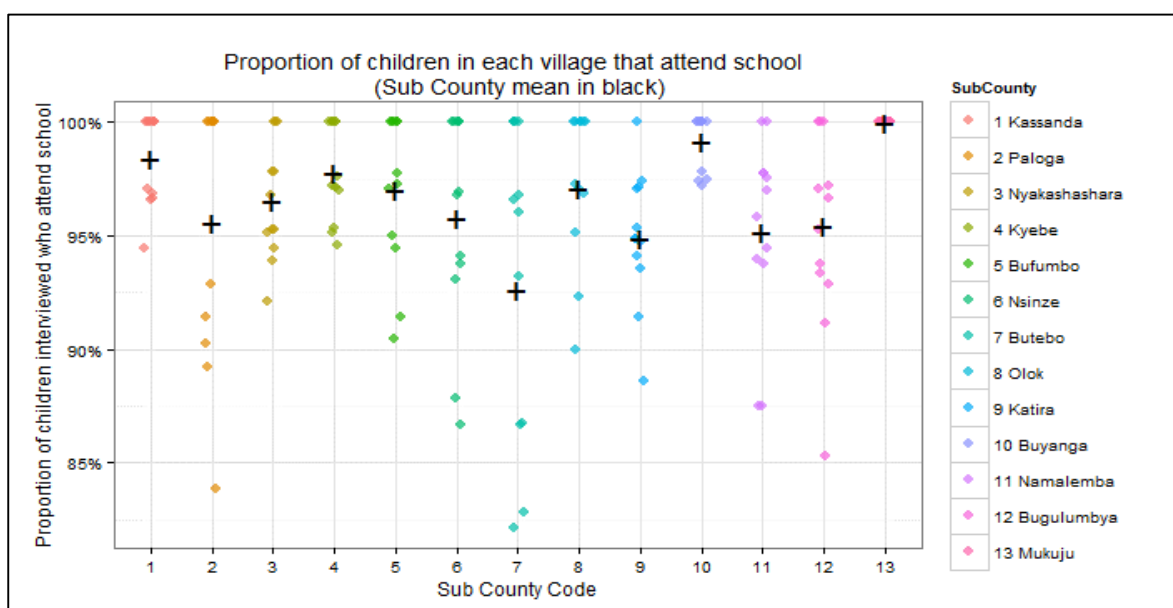
Figure 2: PZQ coverage in each subcounty split by Gender

5.2.1.2 Coverage & school attendance

School attendance in the sample population was high with an average reported attendance of 96.5% (92.6% -100%) across all sub-counties.

Figure 3: Proportion of children in each village that attend school

When disaggregated by school attendance, the coverage between non attending and attending SAC significantly differed from each other (p<0.001), with only 3.2% of the non–attending SAC interviewed having swallowed a pill compared to 37.1% of the attending SAC.

Table 6: Overall PZQ validated coverage survey by school attending status of the children, Uganda.

School attending status	Coverage
Non-Attending	3.2%
Attending	37.1%

Within the sub-counties, the coverage among non-attending SAC ranged from 0.0% to 23.3%, with 9 out of the 13 the sub-counties (69.2%) reporting not reaching any non-attending SAC. Bufumbo sub-county which had the highest coverage overall (86.4%), only managed to reach 7.7% of the non-attending SAC compared to 88.8% of its attending SAC.

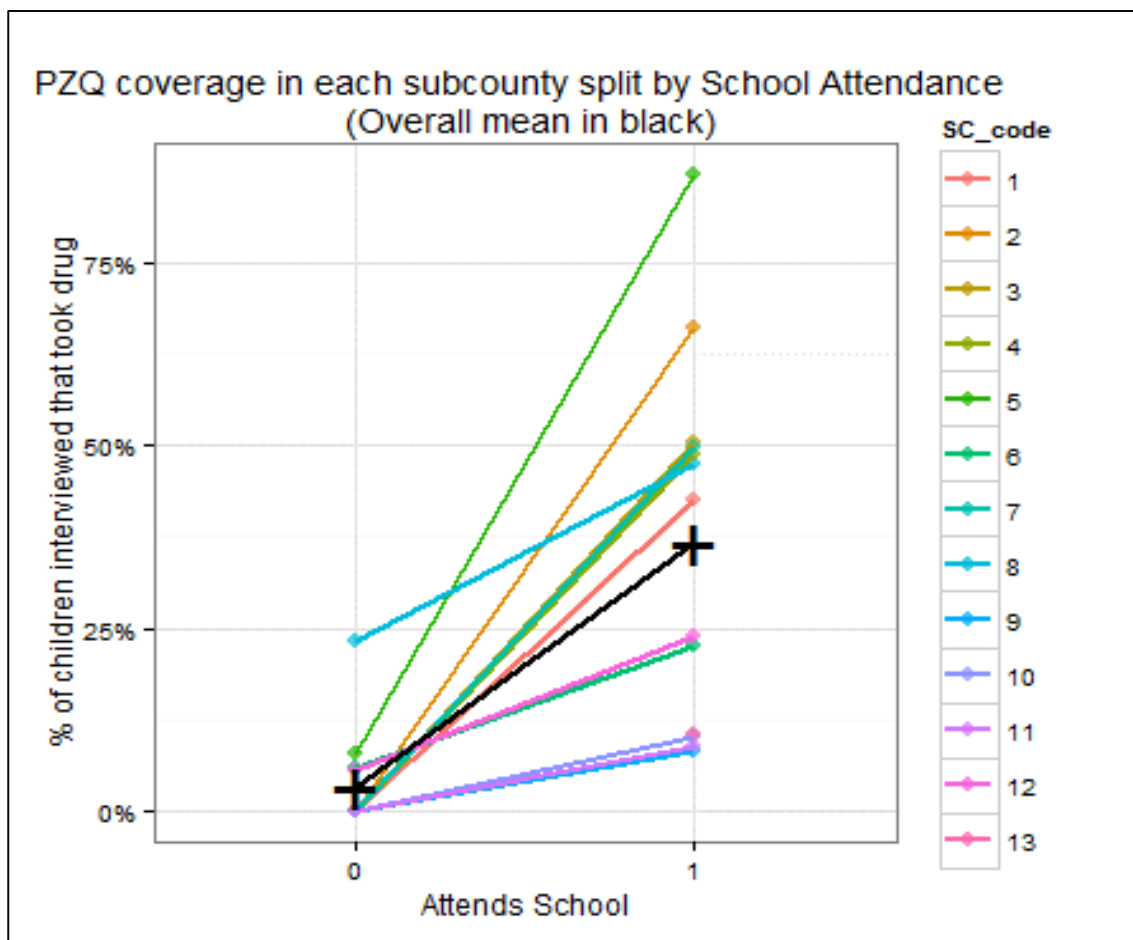**Figure 4: PZQ Coverage in each subcounty split by school attendance**

Table 7: PZQ validated coverage survey by school attending status of the children, by sub-county

Sub-county Code	Sub-county	N attending SAC	N non-attending SAC	Coverage in attending SAC	Coverage in non-attending SAC
1	Kassanda	371	6	42.6%	0.0%
2	Paloga	386	18	66.1%	0.0%
3	Nyakashashara	444	16	50.5%	0.0%
4	Kyebe	435	10	48.7%	0.0%
5	Bufumbo	426	13	87.1%	7.7%
6	Nsinze	388	17	22.7%	5.9%
7	Butebo	377	30	49.9%	0.0%
8	Olok	445	13	47.6%	23.1%
9	Katira	436	23	8.0%	0.0%
10	Buyanga	463	4	10.2%	0.0%
11	Namalemba	435	22	9.0%	0.0%
12	Bugulumbya	401	19	23.9%	5.3%
13	Mukuju	369	0	10.3%	n/a

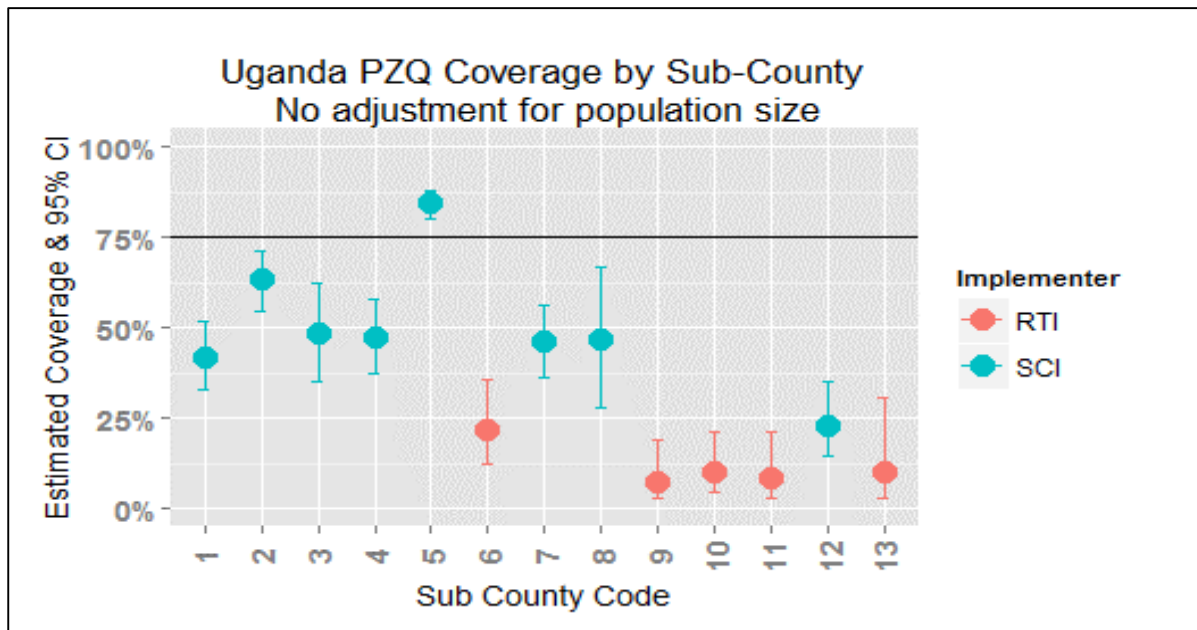### 5.2.1.3   Coverage & partner and history of treatment

When separated by partner, the highest performing districts were supported by ICOSA while the lowest performing districts were supported by ENVISION. The lowest performing ICOSA district, Bugulumbya (24.1%) reported a higher coverage than the highest performing ENVISION district, Nsinze (22.1%).

Out of the 7 districts that were low performing, 5 had never been treated for schistosomiasis before, due to their low endemicity, although Bufumbo district, despite not having been treated before, had the highest overall validated coverage results.

Table 8: Subcounty level PZQ coverage, by Partner and treatment history.

Coverage	Sub-county	Partner	Treated Before
86.40%	Bufumbo	ICOSA	N
63.60%	Paloga	ICOSA	Y
48.70%	Nyakashashara	ICOSA	N
47.70%	Kyebe	ICOSA	Y
47.00%	Olok	ICOSA	Y
46.30%	Butebo	ICOSA	Y
42.10%	Kassanda	ICOSA	Y
24.10%	Bugulumbya	ICOSA	Y
22.10%	Nsinze	ENVISION	N
11.80%	Namalemba	ENVISION	N
10.40%	Buyanga	ENVISION	N
10.40%	Mukuju	ENVISION	N
7.70%	Katira	ENVISION	N

Figure 5: Subcounty level PZQ Coverage, by Partner

5.3 Awareness of drug distribution

Overall awareness of the drug distribution was low with a little over half of both the parents and children being aware of the drug distribution. Among both parents and children, the highest level of awareness came from Bufumbo subcounty, which also had the highest overall coverage in all subcounties. Of the parents interviewed, 54.2% (27.7% - 93.7%) were aware of the distribution. Majority of those who were aware of the distribution, were aware both when and where this drug distribution would take place.

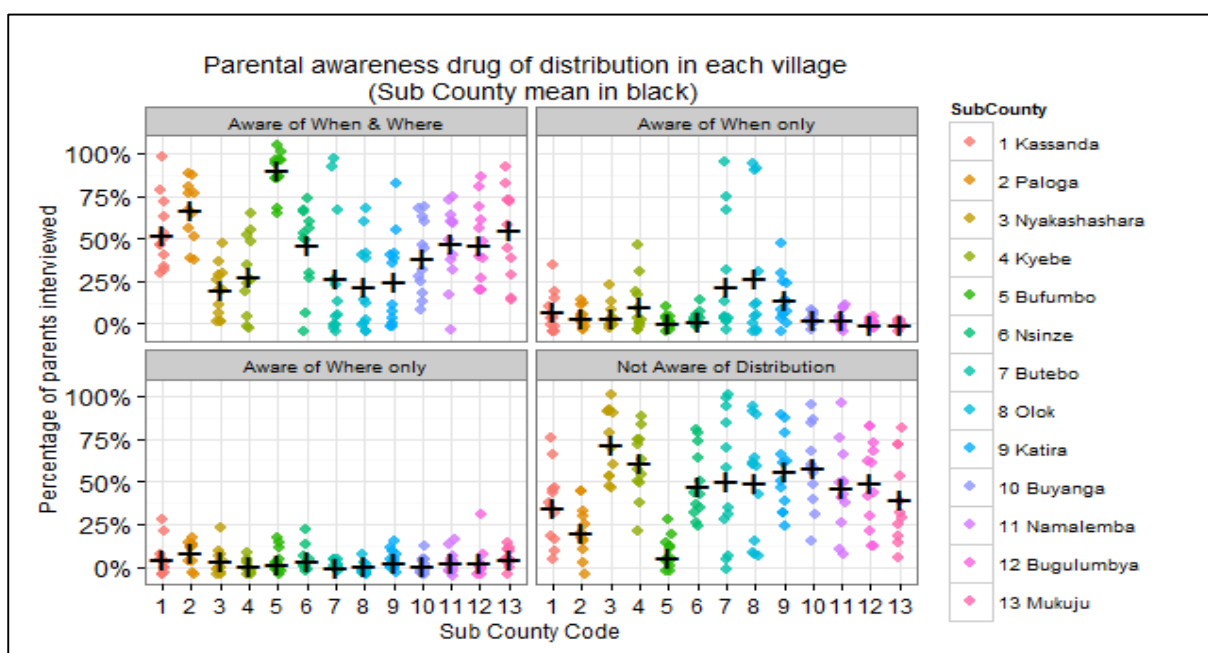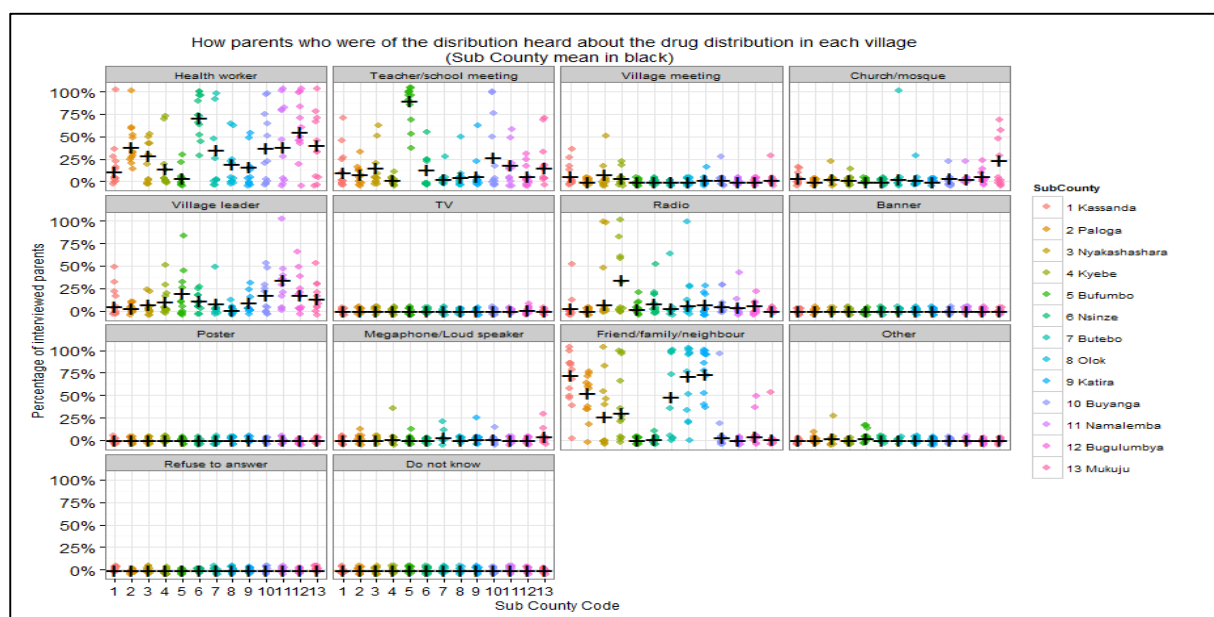**Figure 6: Parental awareness of drug distribution in each village**

Table 9: Overall and subcounty level of parental awareness of drug distribution

SC_code	SC_name	Aware of When & Where	Aware of When only	Aware of Where only	Not Aware of Distribution
1	Kassanda	52.3%	7.5%	4.7%	35.5%
2	Paloga	66.9%	3.8%	8.5%	20.8%
3	Nyakashashara	20.0%	3.8%	3.8%	72.3%
4	Kyebe	27.8%	10.3%	0.8%	61.1%
5	Bufumbo	90.6%	0.8%	2.3%	6.3%
6	Nsinze	46.6%	1.7%	3.4%	48.3%
7	Butebo	27.3%	22.3%	0.0%	50.4%
8	Olok	22.7%	26.9%	0.8%	49.6%
9	Katira	25.6%	14.9%	3.3%	56.2%
10	Buyanga	38.5%	2.5%	0.8%	58.2%
11	Namalemba	47.5%	2.5%	3.3%	46.7%
12	Bugulumbya	46.7%	0.0%	3.3%	50.0%
13	Mukuju	55.5%	0.0%	4.5%	40.0%
Overall		43.7%	7.5%	3.1%	45.8%

On average the majority of these parents heard about the distribution via the health workers and word of mouth defined as a friend/family/ neighbour. There was, however, variation at the village level of how parents heard about the drug distribution with up to 100% of the interviewees knowing about the drug distribution in some villages from health workers, teacher/school meeting, church/mosque, village leaders, radios and family/friend/neighbour.

Figure 7: How parents who were aware of the distribution heard about the drug distribution by subcounty

In the case of the SAC, 57.4% (37.4% - 88.0%) of them were aware of the drug distribution with majority being aware of when and when the distribution was to take place.

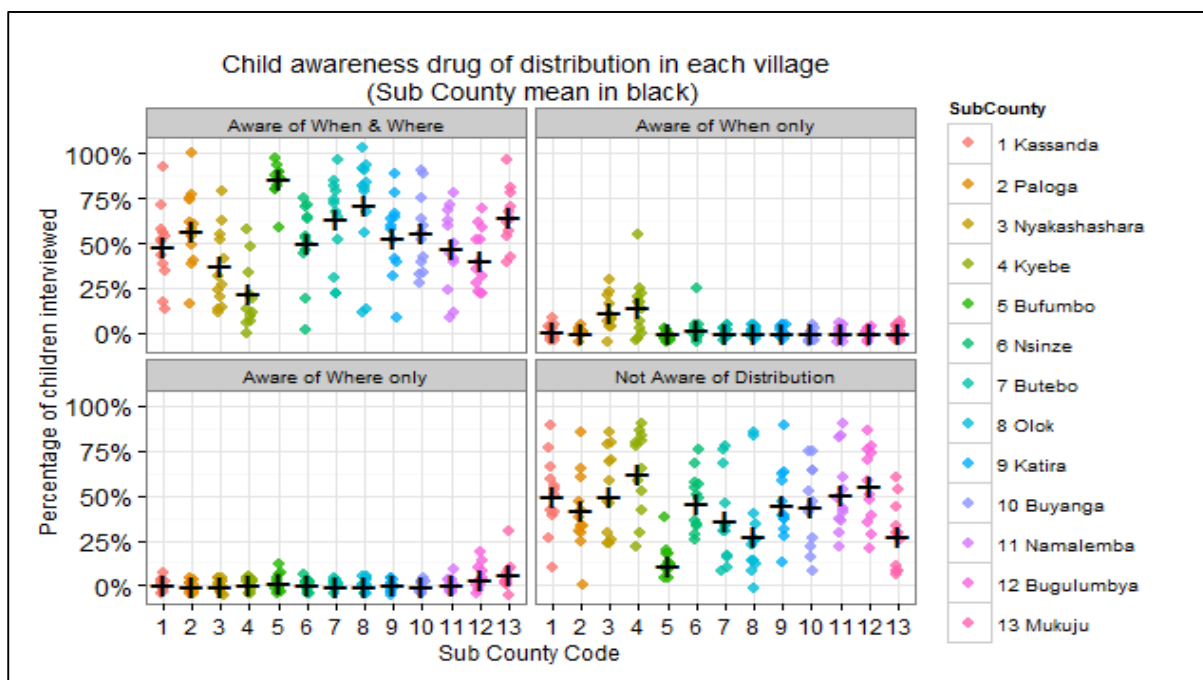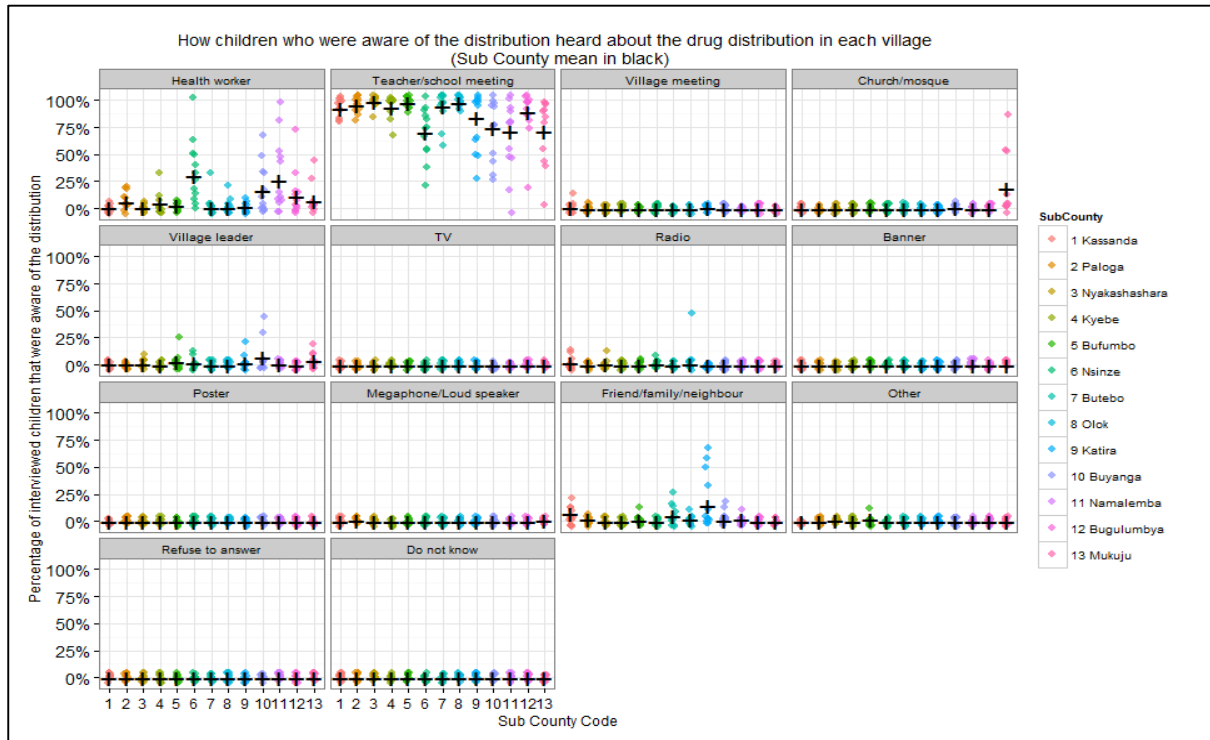**Figure 8: SAC awareness of drug distribution in each village**

Table 10: Overall and subcounty level of SAC awareness of drug distribution

SC_code	SC_name	Aware of When & Where	Aware of When only	Aware of Where only	Not Aware of Distribution
1	Kassanda	48.3%	1.3%	0.5%	49.9%
2	Paloga	57.6%	0.0%	0.3%	42.1%
3	Nyakashashara	37.6%	12.0%	0.2%	50.2%
4	Kyebe	22.1%	14.9%	0.5%	62.6%
5	Bufumbo	86.2%	0.0%	1.8%	12.0%
6	Nsinze	50.6%	2.5%	0.5%	46.4%
7	Butebo	63.8%	0.0%	0.0%	36.2%
8	Olok	72.2%	0.0%	0.0%	27.8%
9	Katira	53.7%	0.4%	0.4%	45.5%
10	Buyanga	56.1%	0.0%	0.0%	43.9%
11	Namalemba	47.8%	0.2%	0.9%	51.1%
12	Bugulumbya	40.4%	0.2%	3.8%	55.5%
13	Mukuju	65.0%	0.6%	6.5%	28.0%
Overall		53.7%	2.6%	1.1%	42.6%

When disaggregated by school attendance, 84.82% of the non attending SAC interviewed had no knowledge of the distribution compared to the school attending SAC 41.4% had no knowledge.

The majority of the SAC heard from the teacher/school meeting about the distribution. Other sources of information included health workers, village leaders and word of mouth (friend/family/ neighbours).

Figure 9: How SAC who were aware of the distribution heard about the drug distribution by subcounty
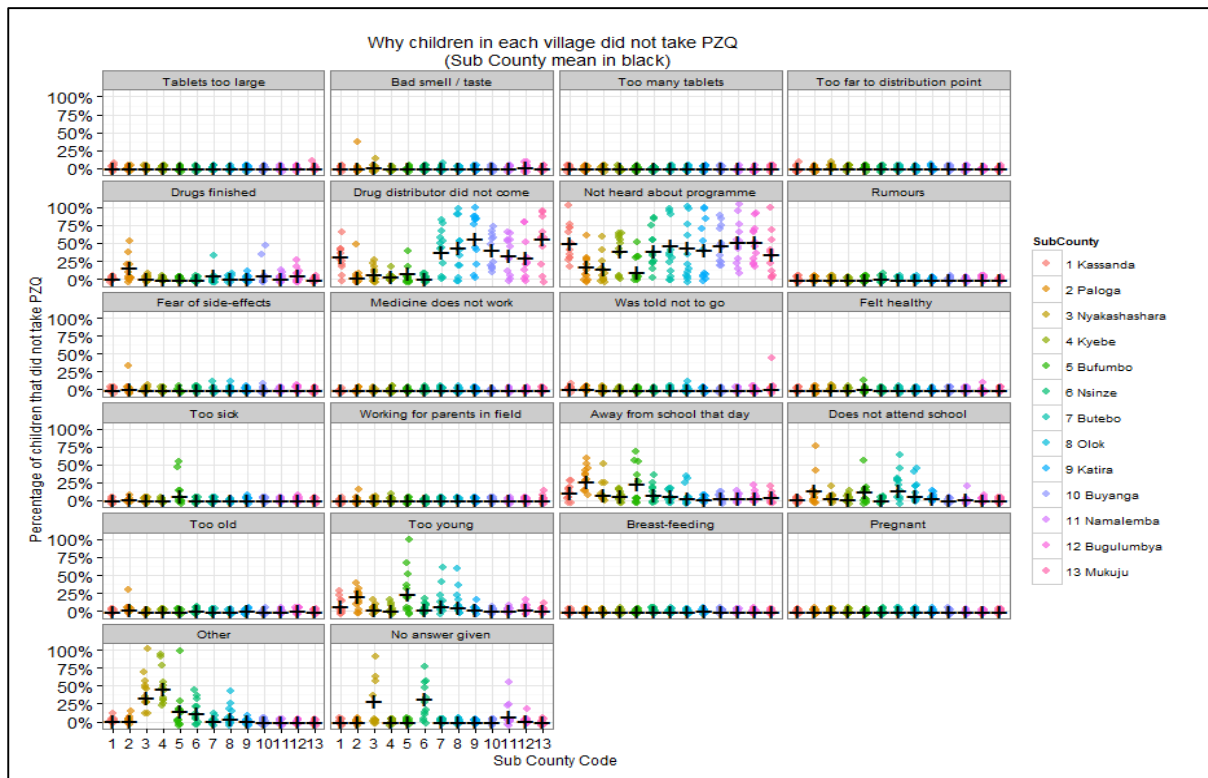

When disaggregated by attendance, while majority of the school attending SAC heard about the information from the teacher, most of the non-attending SAC heard about the information from via word of mouth by a friend/family/neighbour. The second most common source of communication was through the health workers.
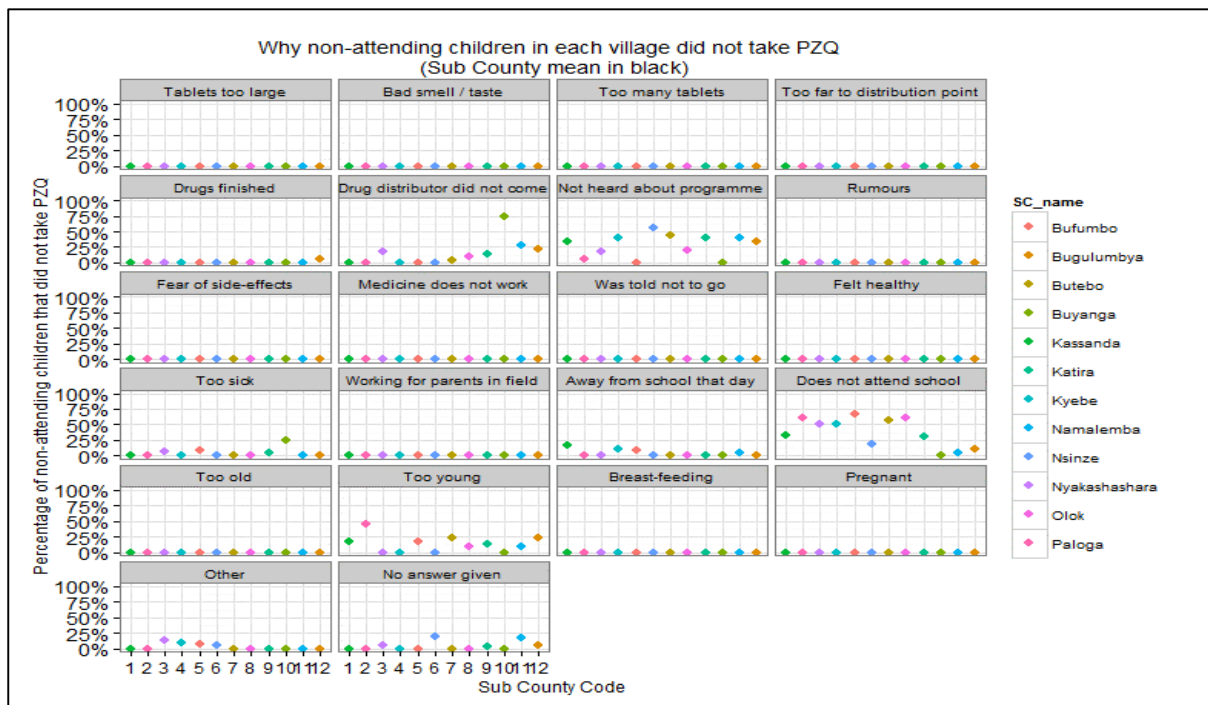
5.3.1   Specified reasons for not taking the drugs

Overall, the most common reasons for the SAC not taking the tablets were 1) they did not hear about the programme and 2) the drug distributor did not come (**see figure 10**). Other reasons given included being too young, away from school on the day of the distribution and that they do not attend school. In some villages, the drugs got finished and there was a concern about the bad smell/taste.

Figure 10: Why SAC in each village did not take PZQ by sub-county

Why children in each village did not take PZQ
(Sub County mean in black)

Some children (37.8%) thought their non-attending status was a reason as to why they did not take PZQ **(see Figure 11).**

Figure 11: Why SAC in each village did not take PZQ by sub-county

Why non-attending children in each village did not take PZQ
(Sub County mean in black)

5.4 Discussion

5.4.1 Overall Coverage results

An independent and external drug coverage survey was carried out in April 2014 in 13 randomly selected sub-counties in Uganda. This was carried out following the completion of the country's 1st mass drug administration at sub-county level (127 subcounties across 30 districts) that took place in two phases; Round 1- November/December 2013 and Round 2 in February to April 2014. 13 sub-counties (across 11 districts) were randomly selected **(see Table 2)** from the two strata (by partner; ICOSA and ENVISION) outlined. 12 villages were surveyed per sub-county with 10 households containing SAC interviewed in each village.

The overall validated coverage across 13 sub-counties came to 36% (7.7% - 86.4%), with only one sub-county achieving above the WHO target 75% coverage **(Figure 1, Table 3).** Both the overall coverage and subcounty level coverage disaggregated by gender did not vary significantly between the two genders **(Figure 2, Table 4).** When disaggregated by school attendance, the coverage between non attending and attending SAC significantly differed from each other (p<0.001), with only 3.2% of the non–attending SAC interviewed having swallowed a pill compared to 37.1% of the attending SAC **(Figure 4, Table 6 & 7).** When stratified by partner, the highest performing districts were supported by ICOSA while the lowest performing districts were supported by ENVISION **(Table 8).**

Overall awareness of the drug distribution was low with a little over half of both the parents (54.2%) and SAC (57.4%) being aware of the drug distribution **(Figure 6 & 8, Table 9 & 10)**. On average the majority of these parents heard about the distribution via the health workers and word of mouth defined as a friend/family/ neighbour **(Figure 7)** while the majority of the SAC heard from the teacher/school meeting **(Figure 9).** However, the information source varied by school attendance status where majority of the school attending SAC heard about the information from the teacher and most of the non-attending SAC heard about the information from via word of mouth by a friend/family/neighbour.

Overall, the most common reasons for the SAC not taking the tablets were 1) they did not hear about the programme and 2) the drug distributor did not come (**Figure 10**). Other reasons given included being too young, away from school on the day of the distribution and that they do not attend school. In some villages, the drugs got finished and there was a concern about the bad smell/taste.

Due to the nature of schistosomiasis, low prevalence and infection intensity areas could be met with a low/absent perception of risk of infection (due to low symptomatic morbidity) by the population which in turn could affect coverage. Leaders from the highest level in the district to the lowest level (school teachers) might not be incentivised to actively participate in advocacy, sensitisation or social mobilisation activities. Without this support, the right information as well as the drug supply chain tend to also suffer, which affects coverage.

Prevalence is low across these areas for one of two reasons: 1) These are areas that have had several rounds of treatment over 6 or more years 2) These are areas with naturally low transmission in the first place and hence naturally low prevalence.

In the areas that are low prevalence due to repeated rounds of treatment, the central level, MoH has suggested that a major part of the reason for this low coverage is treatment fatigue, wherein the population becomes less motivated to go for treatment every year. This could be an unintended consequence of a long running treatment program that successfully reduces community prevalence and intensity to levels where few cases of morbidity are observed. This inevitably reduces the disease perception risk for all and thus reduces the incentive of the community to participate in the treatment programme.

The areas with the naturally low transmission had never been treated before the ICOSA programme. Historically, the MoH NTD programme (largely financially supported by ENVISION) treated only schistosomiasis endemic districts that were above 20% prevalence (as determined by Kato-Katz microscopy technique). With the movement towards elimination as a public health problem, where feasible, the ICOSA programme embarked on treating these low endemic districts for the first time. It is suggested that the low coverage in these particular districts could be because of the regular issues associated with the implementation of a new treatment programme in an area particularly in a low endemic area e.g. time to gain acceptance in the community, low perception of disease and its risk, inexperience of teachers distributing drugs etc.

As the coverage survey is not designed to it capture perceptions of risk of infection and behaviours with effect treatment uptake, it was not possible to ascertain whether these might be issues from the questionnaires. A more in-depth survey in form of a Knowledge, Attitudes and Practices (KAP) survey and/or focus discussion groups should be carried out to get a better picture of all the relevant players' perceptions, knowledge and attitudes of the disease, its risk and the treatment programme.

5.4.2 Coverage and School attendance

The ICOSA programme currently supports MDA solely through the school based system. This means that the PZQ is administered by teachers in schools. Recognising that not all SAC attend school, the ICOSA programme invests in community social mobilisation and advocacy activities that are particularly targeted to the non-attending school based population such as hiring vehicles with loud speakers/megaphones that move around the villages announcing treatment days. Advocacy and sensitisation meetings are also held with community leaders in the hope that they will pass the word around the community during community events that the MDA activities are open to all children regardless of school enrolment status.

According to the approved district budgets, these activities were part of the line items on the budget and sufficient funds were sent to the district to support their implementation as part of the pre-MDA preparations for each of the subcounties. It might be possible that the activities were not actually carried out in all the subcounties and so the SAC and parents did not have a chance to hear about them. However, the district level reports (and financial accountabilty spending) that are submitted to the central level do not contain this level of detail and so it will be necessary to go down to the subcounty records to verify if this could have been the case.

However, the central level staff were not surprised by the low coverage result of the non attending SAC. It was pointed out that the very reasons the children do not come to school in the first place, are likely to be the very reasons they will not come for treatment. In areas such as these with very high levels of school enrolment, issues of stigma from fellow classmates, child labour during the day etc. play a huge role in why these same children do not come on the day of treatment. It was suggested

that in addition to school based distribution, a few days of community distribution are added on, where drugs are distributed in the communities by a community medicine distributor (CMD) over the weekend. This could potentially also help capture any SAC that might not have attended school that week. This combination of strategies takes place in other ICOSA countries such as Malawi, Mozambique and Cote d'Ivoire and could also be extended to Uganda.

A pilot study comparing the coverage post-MDA in areas with only school based distribution vs community and school based distribution has been approved to be carried out in Uganda in 2016 . This is anticipated to take place in approximately 8 subcounties and it is hypothesised that both the overall coverage and the non-attending SAC coverage will be higher in those areas where a combination of strategies are used compared to those where only school based distribution is used.

It is important, particularly in elimination settings that the hard to reach groups such as the non-enrolled SAC are specifically targeted. There remains the assumption that the non-enrolled SAC might be at higher risk of SCH infection than their enrolled SAC counterparts, particularly those that are working in rice fields, tending to animals, fishing or household activities such as washing by water sources. Failure to reach the non-enrolled SAC results in persistent pockets of infection which facilitate the continued transmission in the community, making elimination goals a challenge to reach.

Reaching the maximum number of non-enrolled SAC however requires the accurate baseline quantification of this population. Currently in Uganda there is no accurate data collection method that is able to produce the true figures of exactly how many need treatment and how many the programme is missing out each year. In Uganda, as the registration is conducted in schools by teachers, the non-attending are not counted in this number, and thus are never factored into the reported coverage. This bias explains why the reported coverage tends to be quite high. Census figures which tend to be an overestimate of the actual population, do not disaggregate the enrolled from the non-enrolled SAC. It is therefore important for more effort to be put in setting up data collection methods that will accurately get this information before treatment.

5.4.3 Coverage and partner

ENVISION treated in low endemic districts that had never qualified for schistosomiasis treatment before the 2013 MDA camapaign and so the low coverage results could be due to the implementation of a new treatment programme in a low prevalence area. Additionally, in the ENVISION districts, PZQ was administered 1-2 weeks after the first round of community MDA with ivermectin which could also have affected the coverage in these areas as people are less likely to come back and take the second drug, distributors would be less eager/enthusiastic, or might simply assume it is the same drug as administered the earlier weeks and so might be less likely to take the treatment.

The districts supported by ICOSA had no other NTDs to be treated at that time point and so all efforts for MDA were invested in just the PZQ school distribution. This could be another reason for the higher coverage in the ICOSA supported districts compared to those supported through ENVISION. It is important to note however that two of the top three highest performing districts had never been treated before and were supported through ICOSA. This could suggest other differences in the distribution mechanisms of different partner organisations that need to be investigated further.

5.4.4 Awareness of distribution

There doesn't appear to be a clear relationship between treatment coverage and whether or not the parents/adult knew when and where the distribution took place. This makes it difficult to determine the influence the parents have on whether or not their children get treated. Not surprisingly, majority of the school attending children heard about the drugs from the teachers in the schools as these were the major group that were trained and encouraged to pass on the information. The current tools such as radio, village meetings, megaphones/loudspeakers, used to spread information on to the SAC (or their parents) in the community who are not in school to go and get treated though heavily invested in by the ICOSA programme, are not reaching the target population.

It is essential that a further evaluation of these tools is conducted to determine their effectiveness in passing on information to the target population.

Even though IEC materials were not mentioned as a common source of information, this does not necessarily mean they were not applied. All teachers were provided with IEC materials in form of pictorial posters to use as part of their teaching materials. It is assumed that these teachers who were reported as the most popular source of information about the distribution used these posters during the sessions and so the IEC materials served as an indirect tool and not stand alone.

5.4.5 Specified reasons for not taking the drugs

Majority of the reasons given by children not taking the drugs point towards a failure in the supply chain leading to inaccessibility (drug distributor not coming) and poor flow of information at all levels (no one hearing about the programme, non-attending children thinking the drug was only for school going children). The reasons did not center on issues surrounding the drug or the perception of the treatment programme by the receipients.

This could possibly point to majority of the kinks in coverage arising from levels higher than that recipients. However, the interviews/responses were only limited to the recipients' perspective, and deliberately excluded those who took part in the MDA. Therefore, it is not possible to get a full picture of what might have happened at each level of the drug distribution process.

5.5 Conclusion

Overall validated coverage in Uganda was low, with a significantly big discrepancy between attending and non attending school age children. There was also a discrepancy between which partner supported MDA activities in a sub-county. Overall coverage is likely to have been low due to ever exisiting low risk perceptions in communities of low prevalence. However as this cannot be inferred/ascertained from the reponses in the questionannire and it is suggested that a more in depth survey in form of a KAP survey or focus discussion groups is carried out to get a better picture of all the relevant players' perceptions, knowledge and attitudes of the disease, its risk and the treatment programme.

To increase the coverage among non attending SAC, community drug distribution in addition to regular school drug distribution will be piloted in 2017. It is hypothesised that the reasons the SAC do not come to school in the first place are probably the very reasons they would not come to school for treatment. With the combination of strategies, it is is hypothesised that both the overall coverage and the non-attending coverage will be higher in those areas compared to those where only school based distribution is used. In the absence of accurate figures around non attending SAC, it is not clear how

much of this population is being missed by the programme. More effort is needed on data collection to quantify non attending children.

Majority of the methods used to pass on information about the drug distribution (when and where) were not reaching the target population and/or community members. It will be important to first of all to determine if these activities were indeed carried out in each of the subcounties as per the approved budge. In light of the significant investment the programme put towards these materials it is essential that a further evaluation of these tools is conducted to determine their effectiveness in passing on information to the target population.

6   Appendix I: Associated documentation

6.1   Historical documentation
Provide locations and links

6.2   Data cleaning and analysis files
Folder   all   files   are   in: \\fi--didef2\sci\SCI   -   post   3   June   2011\Current programmes\DFID\ICOSA\COUNTRIES\Uganda\M&E\Performance\Coverage Survey\2014 Coverage Survey\Data

Raw data: Raw data\Epicollect_data 28Jul14\Uganda_cov2014_Child_interview.csv

Raw data\Epicollect_data 28Jul14\Uganda_cov2014_Sub_County.csv

Raw data\Epicollect_data 28Jul14\Uganda_cov2014_Household.csv

Raw data\Epicollect_data 28Jul14\Uganda_cov2014_Village.csv

Data cleaning notes: Cleaning data\Notes from cleaning uganda coverage survey data 2014-11-26.xlsx

Data cleaning code: Cleaning data\1_UgandaCoverage2014_cleaning_protocol_and_logistics.R

Cleaning data\2_UgandaCoverage2014_cleaning_subcounty.R

Cleaning data\3_UgandaCoverage2014_cleaning_village.R

Cleaning data\4_UgandaCoverage2014_cleaning_household.R

Cleaning data\5_UgandaCoverage2014_cleaning_child.R

Cleaning data\6_UgandaCoverage2014_cleaning_merging.R

Data analysis code: Data analysis\1 Initial analyses of Uganda coverage survey 2014 2014-12-02.R

Data analysis\2 Further analyses of Uganda coverage survey 2014 2015-02-05.R

6.3   Other documentation

7   Appendix II: Statistical methodology
Validated coverage rate in each sub-county was calculated using the 'survey' package in R. Each sub-county was analysed separately using the 'logit' method to account for the binary structure of the data, and a term for village and household to account for clustering at these levels.

We approached the calculation of validated coverage in two ways:

1. Firstly, we made no adjustment for the proportion of villages sampled in each sub-county, the proportion of households sampled in each village or the proportion of children sampled in each household.
2. We then re-ran the analysis adjusting for these three factors and both methods are presented above. The adjustments are expected to change both the validated coverage estimate (primarily because large villages will contribute more towards the calculation than smaller villages) and the confidence intervals associated with the validated coverage estimate.

The association of coverage with gender, school attendance and implementer was assessed using a binomial mixed model, with random effects of village and households and fixed effects of sub-county (as a factor) and either gender, whether or not the interviewed child attended school or implementer. The significance of the specific effect was determined by using log-likelihood ratio tests on models with and without the specific effect term. The graphs show the raw mean coverage in each sub-county and overall.