

**Treatment Coverage Survey for Mass Drug Administration for Lymphatic Filariasis,
Onchocerciasis and Schistosomiasis in the Health Zones of Angumu and Nyarambe, Ituri
Nord, Democratic Republic of the Congo**

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1. Introduction

In Ituri Nord, Democratic Republic of the Congo (DRC), Sightsavers partners with United Front Against River Blindness (UFAR) and the Ministry of Health (MoH), with funds donated by USAID Match and GiveWell, to support MDA in 13 health zones according to disease endemicity. The project aims to reduce the prevalence and intensity of infection by targeting at school-age children through MDA with praziquantel for SCH and ivermectin and albendazole for LF/OV.

The treatments for second year in the three-year health zone health intervention project were carried out from December 2017 to March 2018 after delays in receipt of drugs from WHO. Ivermectin and praziquantel were administered by measuring an individual's height against a calibrated stick with dosage ranging from one to four tablets of praziquantel and ivermectin and one tablet of albendazole. Praziquantel is primarily provided at schools and focal points in the community; whereas ivermectin is provided house to house. Treatment with both drugs was recorded in treatment records and tallied at health centers for central reporting.

Appendix One summarizes the reported coverages and treatment data for the surveyed health zones.

Table 1: Summary of Reported Coverages by Health Zone

Health Zone	OV Epidemiologic Coverage	LF Epidemiologic Coverage	OV Program Coverage	LF Program Coverage	SCH Program Coverage
Angumu	81.3	79.6	100.2	98.1	98.0
Nyarambe	NA	82.2	NA	97.1	85.7

2. Objectives

- Validate the coverage reported by the MoH
- Determine reasons for non-treatment uptake
- Determine the main sources of information used during MDA
- Make recommendations to improve the next MDA

3. Methodology

a. Study site

The survey was conducted in two health zones, Angumu and Nyarambe, from March 17-24, 2018. A three-day training with field practical was conducted prior to field deployment. The purpose of the study was explained to each household head and child and verbal consent was obtained.

b. Sampling

The survey followed a two-stage cluster sampling methodology based on WHO recommended guidelines for coverage surveys. The survey was powered to determine coverage at the health zone for each target group: 1) 5 years and greater for oncho/LF and 2) 5-14 years for schistosomiasis. The sample size was determined using the [WHO Coverage Survey Builder, version 2.5](#). Details regarding the sampling and selection methodology are available in the WHO manual.

The following parameters were used in the survey builder:

- 2017 inflated population based on 2016 oncho/LF MDA data
- Estimated coverage of 50%
- Precision of +/- 5%
- 95% confidence level or z score of 1.96
- Design effect of 4
- Non-response of 15%
- Average household size of 5.5 based on DHS survey data
- Average number of children aged 5-14 years of 2 per household.

A total of 1,808 individuals was needed per health zone, which were divided across 30 villages (clusters). Schistosomiasis questions were asked to all eligible respondents in all households visited. OV/LF questions were only asked to eligible respondents in houses marked for OV/LF sampling. In each cluster, the following number of households were targeted for sampling according to the disease specific sampling interval:

- Oncho/LF – 12 households
- Schistosomiasis – 30 households

Households were randomly selected at community level using segmentation.

c. Data collection method and procedure

A French language questionnaire was designed using the CommCare survey software application and administered to each household in appropriate local language. Mobile phones were used to capture the responses for various questions or each individual and were automatically uploaded into a web-based database. A total of 18 surveyors collected data working in pairs.

d. Data analysis

Data were cleaned and analyzed using Stata 15.0 (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.

4. Results

a. Survey Respondents

A total of 5,323 individuals were enumerated in 1,400 households. The distribution by health zone is presented in Table 1.

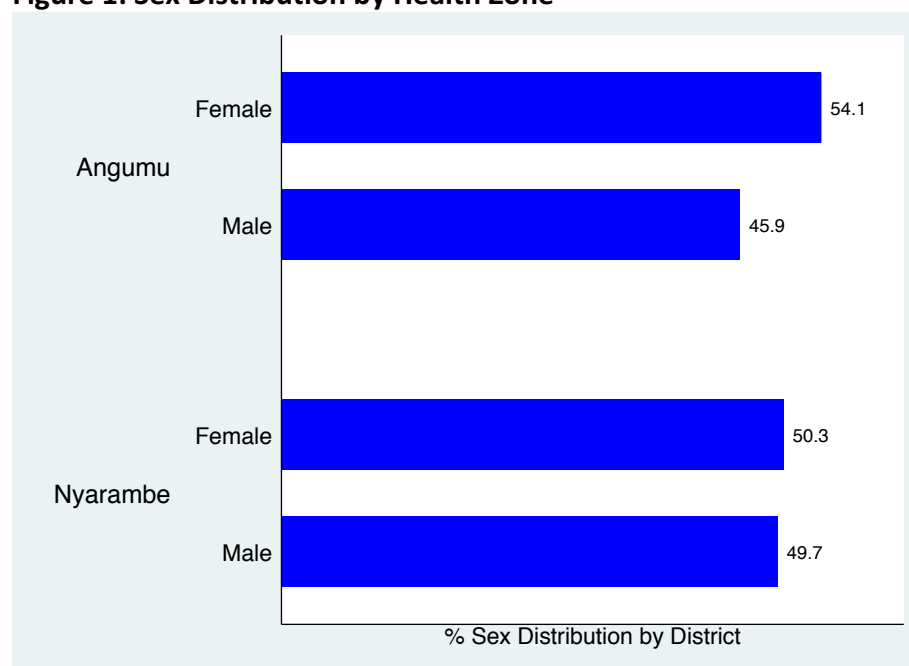
Table 1: Surveyed Individuals and Households by Health Zone

District	Total HH	HH Dropped	Enumerated Individuals	HH for SCH	HH for LF/SCH	Eligible Pop for SCH	Total Pop for OV/LF Analysis
Angumu	895	121	2,536	466	308	1564	925
Nyarambe	731	105	2,787	397	229	1038	982
Total	1,626	226	5,323	863	537	2,602	1,907

Data entry errors reduced the sample size by 226 households without clear justification. Further, 289 eligible respondents were not asked LF or OV questions likely due to surveyor error in administering the questionnaire, the majority of which were in Angumu and SAC.

Figure 1 presents the sex distribution at the health zone level. Females were more likely to be survey respondents in each health zone; however, the difference was only significant in Angumu.

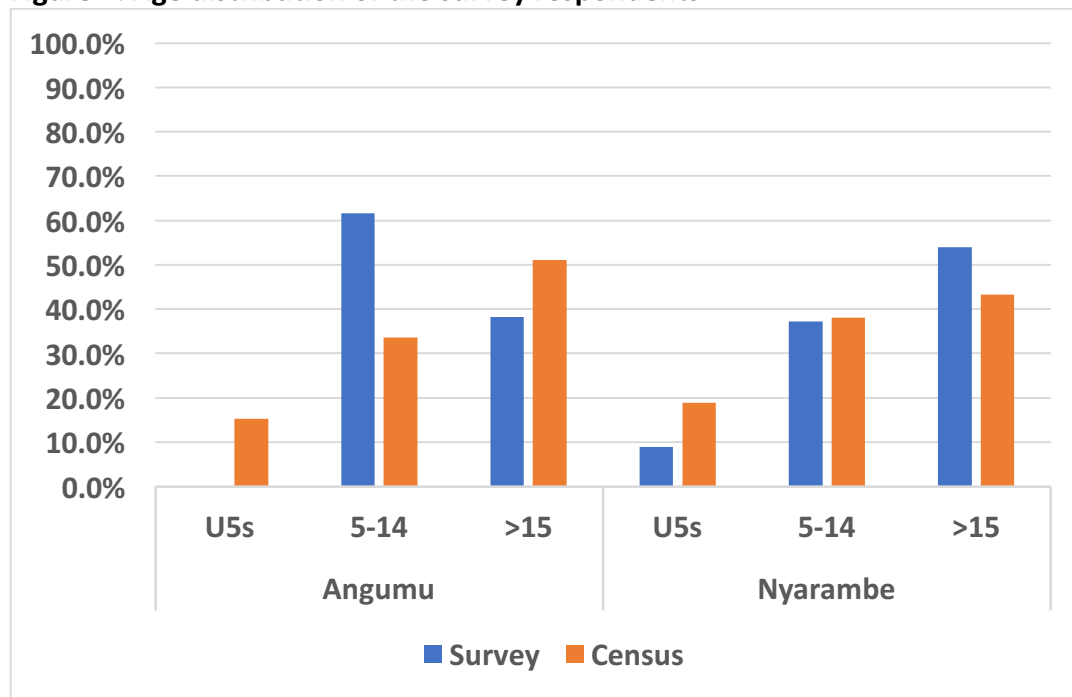
Figure 1: Sex Distribution by Health Zone



(Angumu n=2535; Nyarambe n=2787)

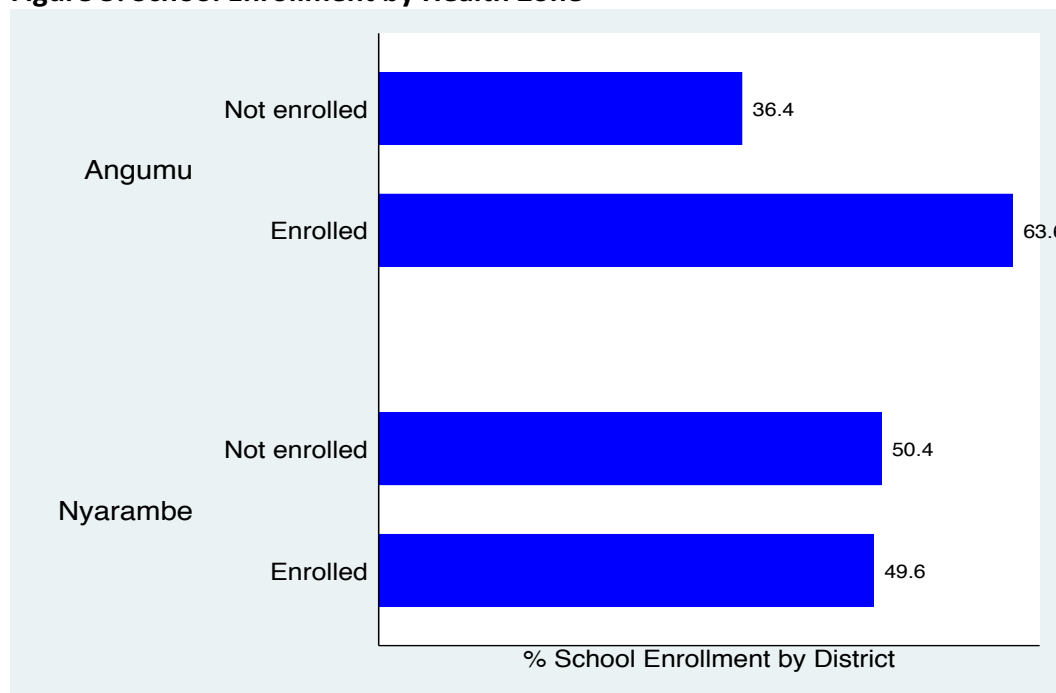
The distribution of reported age is shown in Figure 2. In Angumu, surveyors did not record children under 5, or erroneously lumped them with 5-14 years. This error prevents the calculation of epidemiologic coverage for Angumu as the accurate total survey population is unknown. In Nyarambe, survey versus national census estimates of population distribution were comparable but with more adults than under 5s being noted in the survey.

Figure 2: Age distribution of the survey respondents



With respect to school enrollment, a greater proportion of SAC were enrolled in Angumu than Nyarambe at 63.6% versus 49.6%. See Figure 3. Males were likely to be enrolled than females in each district. In Angumu, the odds of a male being enrolled compared to a female were 1.61 (95 CI 1.22-2.13, $p=0.001$). The difference in Nyarambe was not statistically significant.

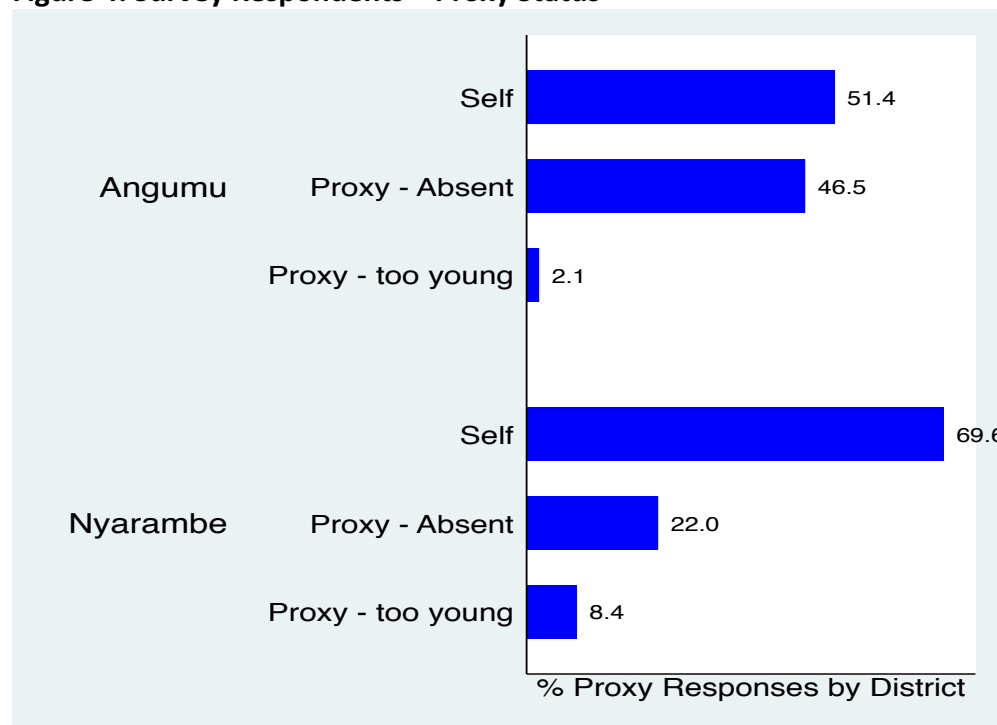
Figure 3: School Enrollment by Health Zone



(Angumu n=1564; Nyarambe n=1038)

Regarding who responded to the inquiries about treatment, 60% of all responses were self-provided though this differed by health zone. Figure 4 presents the difference by health zone, where more responses were provided on behalf someone who was absent in Angumu during the survey.

Figure 4: Survey Respondents – Proxy Status



(Angumu n=2533; Nyarambe n=2786)

b. Treatment Coverage - SCH

Table 2 presents the results by health zone for the surveyed coverage of SCH. Overall 78.0% of respondents reported taking both medications, which were provided at the same time, per protocol. Partial ingestion of the combined therapy was noted in each health zone. A greater percentage of respondents in Angumu than Nyarambe reported not taking any medication at 15.5%. Overall, 12.2% of respondents did not take any medication.

Table 2: Survey Coverages by Medication and Health Zone

	Angumu % (95% CI)	Nyarambe % (95% CI)	Total % (95% CI)
PZQ	84.5 (77.1, 89.8)	91.6 (83.0, 96.1)	87.8 (82.8, 91.6)
None	15.5 (10.2, 22.9)	8.4 (3.9, 17.0)	12.2 (8.4, 17.2)
n	1564	1038	2602

*adjusted for number of enumeration units and surveyed households

Table 3 presents where respondents reported receiving treatment. More respondents reported receiving treatment in schools in Angumu than in Nyarambe. This corresponds with the level of enrollment in each health zone presented in Figure 3.

Table 3: Survey Coverage by Place of Treatment

	Angumu		Nyarambe		Total	
	n	% (95% CI)	n	% (95% CI)	n	% (95% CI)
School	914	66.9 (60.2, 71.7)	387	42.8 (32.2, 54.1)	1301	54.7 (47.8, 61.3)
Home	420	33.6 (28.1, 39.6)	543	54.9 (42.9, 66.3)	963	44.1 (37.3, 51.1)
Health facility	4	0.2 (0.1, 0.7)	22	2.3 (0.7, 7.2)	26	1.2 (0.4, 3.6)

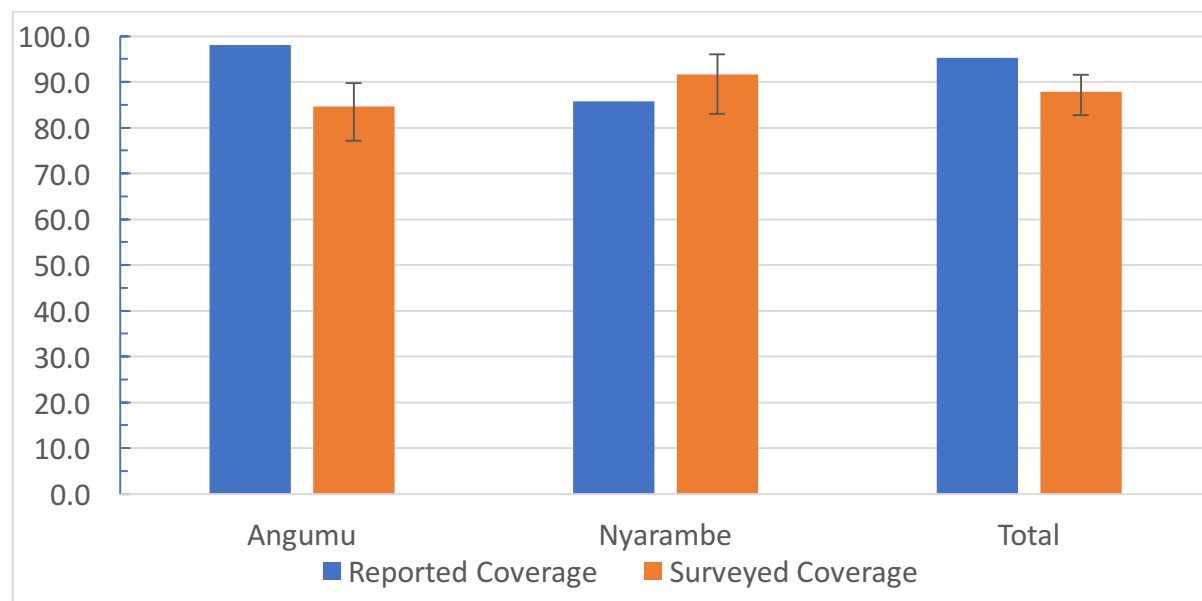
However, these results are discordant with the reported data from the MoH. The MoH reported that 35.6% and 60.2% of individuals received praziquantel in schools in Angumu and Nyarambe, respectively. This is opposite of what survey respondents stated.

Overall, treatment differences between males and females were not statistically significant.

c. Reported versus Surveyed Coverage - SCH

A comparison between the reported and surveyed program coverage indicates that there were slight differences. In Angumu, reported coverage was 13.5 percentage points greater than surveyed coverage and outside the bounds of survey estimate confidence limits. With respect to Nyarambe, reported coverage was less than surveyed coverage but within the confidence limits of the estimate. Notwithstanding these differences, each survey result exceeded the recommended WHO standard of 75% for SAC. See Figure 6.

Figure 5: Reported versus Surveyed Program Coverage – SCH



d. Reasons for not taking treatment - SCH

Most individuals who did not receive treatment stated that they were present in the community during the MDA campaign but not reached by a CDD or teacher. Upon probing, 25.3% of non-recipients were absent during the campaign. Many individuals did not recall or provided inconsistent responses. Nearly all individuals who received treatment took the

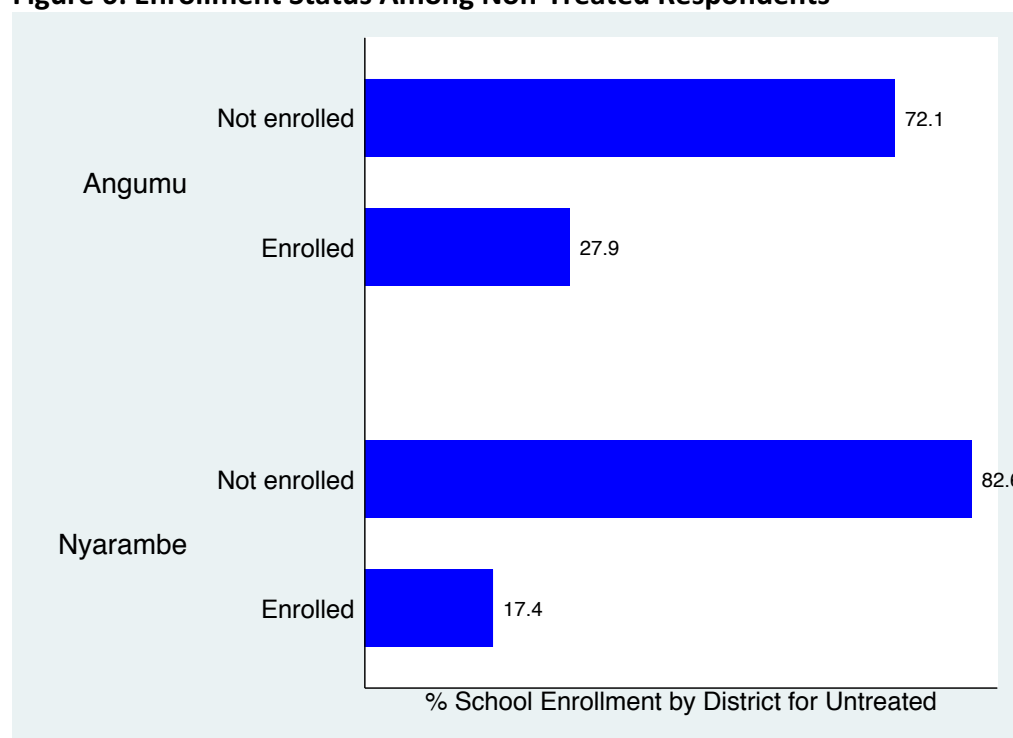
medication yielding a 99% adherence rate to treatment. Table 4 presents the reasons for SCH non-treatment including non-adherence.

Table 4: Reasons for non-treatment by health zone - SCH

Reason	Total	Obs	Angumu	Nyarambe
Was not offered meds but present during campaign	44.2	138	76.1	23.9
Was not offered meds but absent during campaign	25.3	79	37.7	19.6
CDD did not come	0.3	1	0.7	0.0
Fear Side Effects	0.6	2	1.4	0.0
Didn't know/trust CDD	1.0	3	0.7	1.4
Was absent	1.0	3	2.2	0.0
Don't know/remember	27.6	86	45.7	16.7
Total	100.0	312	100.0	100.0

Respondents were less likely to be treated if they were not enrolled in school as shown in Figure 6.

Figure 6: Enrollment Status Among Non-Treated Respondents



e. Sensitization Methods - SCH

Among the sources of information cited by the children surveyed, teacher was reported the most often with 49.7%, as shown in Table 5, followed by CDD. Notably, other forms of mass sensitization and use of community leaders were minimally reported.

Table 5: Reported methods of sensitization by health zone - SCH

Method	All Districts		By District	
	Percent	Obs	Angumu	Nyarambe
Teacher	49.7	1244	69.5	30.5
CDD	41.5	1038	47.5	52.5
Family	4.9	122	8.2	91.8
Public Announcements	1.1	28	39.3	60.7
Health Center	1.0	24	33.3	66.7
Friend/Neighbor	0.9	23	4.3	95.7
Radio	0.4	10	60.0	40.0
Community leaders	0.2	5	40.0	60.0
Place of worship	0.2	5	20.0	80.0
Did not hear	0.2	4	25.0	75.0
Poster	0.0	1	0.0	100.0

*multiple responses allowed

f. Treatment Coverage – OV/LF

Data entry errors resulted in 13.2% of eligible respondents not being asked the OV or LF questions, nearly all SAC. These entries were excluded from calculations of treatment coverage. Individuals who indicated taking either IVM or ALB but not both were considered partially treated. All villages visited by survey teams had respondents who received MDA; therefore geographic coverage was 100%

Table 6 summarizes surveyed coverage results for OV/LF. As noted above, no children under 5 were enumerated in Angumu, it is not possible to calculate epidemiologic coverage for the health zone. Further, there is little difference in program and epidemiologic coverage due to the small number of children under 5 noted in Nyarambe (n=97). The enumeration of households was discordant with national census estimates.

Table 6: Survey Treatment Coverage Results by Health Zone – OV/LF

Health Zone	Programmatic % (95% CI)	Epidemiologic % (95% CI)
Nyarambe		
IVM + ALB	84.4 (74.6, 90.9)	75.6 (64.4, 84.1)
IVM or ALB	0.3 (0.1, 1.4)	0.3 (0.1, 1.2)
No Meds	15.2 (8.8, 25.2)	24.1 (15.6, 35.4)
Angumu		
IVM + ALB	75.6 (66.5, 82.9)	--
IVM or ALB	1.3 (0.6, 2.9)	--
No Meds	23.1 (16.1, 31.9)	--

The epidemiologic coverage for Nyarambe exceeded the WHO recommended threshold of 65% for LF. With respect to Angumu, the programmatic coverage (those eligible to receive

the medication used as the denominator) did not meet WHO recommendations for OV, which is 80%, and it is possible if the enumeration was performed correctly, that the epidemiologic coverage would not meet the 65% target for LF.

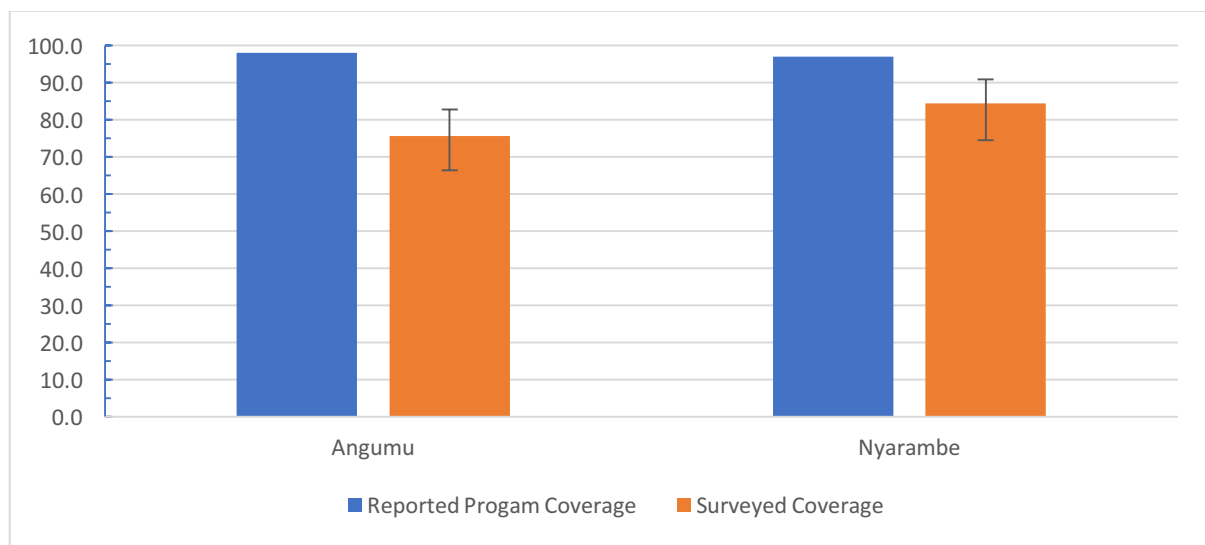
There was no difference in treatment uptake by sex or age.

g. Reported versus Surveyed Coverage – OV/LF

A comparison between the reported and surveyed program coverage indicates that the results were discrepant and do not confirm reported MoH data in Angumu and Nyarambe. In Angumu, reported program coverage was 29.8% greater than the surveyed program coverage and outside the bounds of confidence of the survey estimate. In Nyarambe, the difference was 15.8% and coverage and outside the bounds of confidence of the survey estimate. See Figure 7.

However, with respect to epidemiologic coverage in Nyarambe, the difference was minimal at 79.6% reported to 75.6% surveyed and within the confidence limits, and can be considered validated. Neither estimate met the WHO threshold for OV epidemiologic coverage. In Angumu, the epidemiologic coverage would be 67.5% if the proportion of reported under 5 children reported in Nyarambe was used to impute a revised denominator for Angumu.

Figure 7: Reported versus Surveyed Program Coverage (Eligible Pop)



h. Reasons for not taking treatment – OV/LF

The majority of eligible individuals who did not receive treatment stated that they were present in the community during the MDA campaign but not reached by a CDD. Upon probing, 34.6% of non-recipients were absent during the campaign. Many individuals did not recall or provided inconsistent responses. Nearly all individuals who received treatment took the medication yielding a 99% adherence rate to treatment. Table 7 presents the reasons for SCH non-treatment including non-adherence.

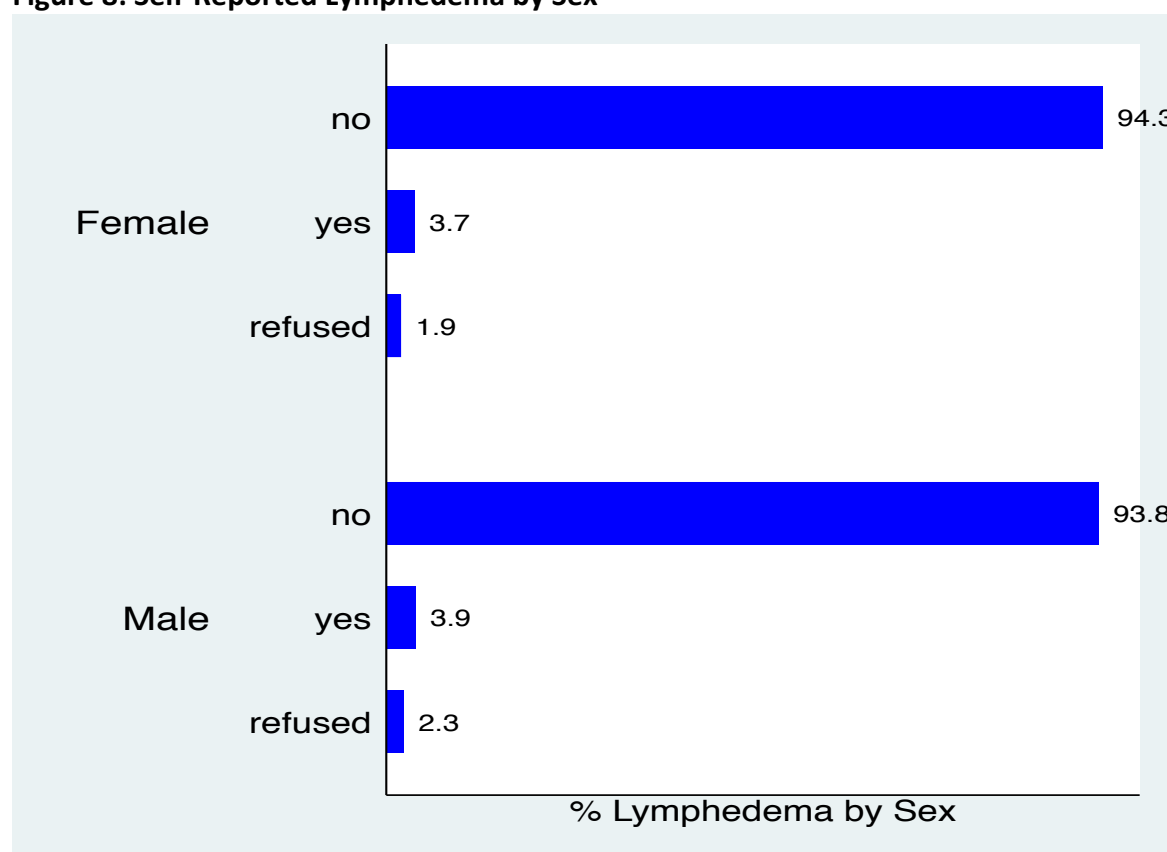
Table 7: Reasons for non-treatment by health zone – OV/LF

Reason	Total	Number
Was not offered meds but present during campaign	54.8	171
Was not offered meds but absent during campaign	34.6	108
CDD did not come	1.3	4
Fear Side Effects	0.6	2
Didn't know/trust CDD	0.3	1
Underage	0.3	1
Pregnant/Breastfeeding	0.6	2
Was absent	1.6	5
Don't know/remember	17.9	56
Total	100.0	350

i. LF Morbidity

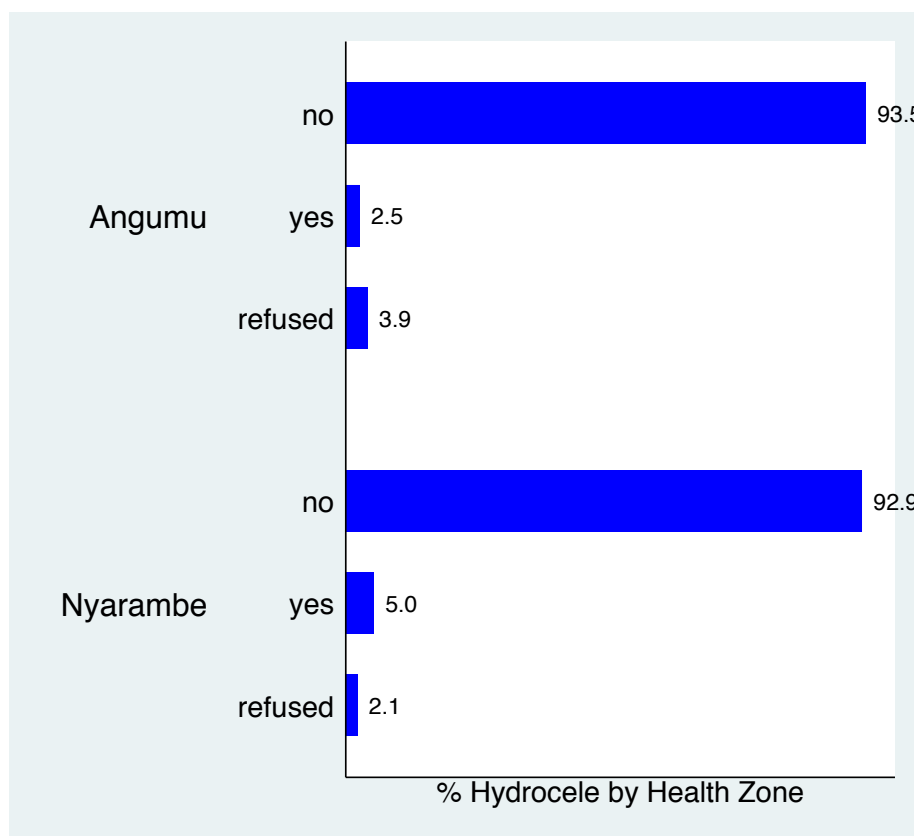
Questions regarding hydrocele and lymphedema were posed to individuals greater than 15 years old. Results are presented in figures 8 and 9 below.

Figure 8: Self-Reported Lymphedema by Sex



(n males=517, n females=668)

Figure 9: Self-Reported Hydrocele by Health Zone



(n males=517)

j. Sensitization Methods – OV/LF

Among the sources of information cited by the children surveyed, teacher was reported the most often with 49.7%, as shown in Table 5, followed by CDD. Notably, other forms of mass sensitization and use of community leaders were minimally reported.

Table 8: Reported Sensitization Methods by Health Zone – OV/LF

Method	%	Obs	Angumu	Nyarambe
CDD	58.6%	958	509	449
Teacher	21.7%	355	175	180
Family	8.3%	135	14	121
Public Announcement	3.1%	50	18	32
Health Center	2.7%	44	14	30
Friend/Neighbor	2.4%	39	2	37
Radio	1.9%	31	18	13
Community Leader	0.9%	14	7	7
Did not hear	0.3%	5	2	3
Worship	0.2%	4	0	4

5. Discussion

This survey confirmed that the MDA for schistosomiasis in the health zones of Angumu and Nyarambe exceeded the recommended coverage threshold for SAC of 75%. However, the results in each health zone were discordant. In Angumu, reported coverage (98.0%) exceeded survey coverage (84.7%) and was not validated by the survey. In Nyarambe, the survey results (91.6%) were greater than the reported coverage (85.7%), after correcting a reporting error in the national program worksheets, and is considered validated by the survey.

Further, the survey found additional anomalies in reported SCH data. The channel of treatment delivery was opposite of what was reported by the MoH. The MoH reported that 35.6% and 60.2% of individuals received praziquantel in schools in Angumu and Nyarambe, respectively, whereas the survey found 66.9% and 42.8%, respectively. Among those who did not receive treatment, most were not enrolled in schools.

With respect to LF, the data entry errors prevent confirmation of the reported epidemiologic coverage in Angumu. In Nyarambe, the reported epidemiologic coverage (79.6%) was greater than surveyed (75.6%) but within the confidence limits of the estimate and can be considered validated. If program coverage (eligible population only) is used as a proxy in Angumu, the reported coverage (98.1%) was not validated by the survey (75.6%). The epidemiologic coverage would only be less if all ages were enumerated. Notwithstanding, each survey estimate exceeded the WHO recommended threshold of 65% for LF MDA. However, in Angumu, which is co-endemic with OV, the recommended threshold of 80% would not have been met, which suggests over-reporting of OV MDA coverage by the national program.

The survey here demonstrated discrepancies in population age distribution between the survey and reported headcounts. Because the national MoH program uses headcounts for the denominators in reporting coverage, it is difficult to assess the accuracy of population estimates since no national census has been conducted in DRC in decades.

6. Limitations

Integrated coverage survey sampling may have created additional challenges for survey teams in these rural areas of Ituri Nord. Many surveyors had never used advanced mobile phones before and were participating in a coverage survey for the first time. Supervision was challenging as no Sightsavers staff could travel in the region due to security concerns.

Coverage surveys should be simplified in this region to focus on one treatment only and should consider the use of paper forms where there is no network access. Data entry errors were noted too late to be corrected - many of the targeted areas were completed before data could be uploaded to the system due to lack of mobile networks.

Data entry errors prevented calculation of epidemiologic coverage in Angumu as no under 5s were noted in the datasets. Overall the number of children under 5 enumerated was low and not comparable to MoH records, while the number school-age children greatly exceeded national estimates in Angumu.

7. Conclusion

This survey highlights data accuracy issues in reported data from the national NTD program. While recommended standards for WHO treatment coverage were met for schistosomiasis and lymphatic filariasis, there were discrepancies in reported and survey coverage, particularly in Angumu health zone. It is important that data quality improves in Angumu as it is adjacent to Nyarambe, which shares a border with Uganda. The results in Nyarambe are encouraging and suggest that many people are receiving ivermectin, albendazole and praziquantel irrespective of discrepancies with nationally reported data.

8. Recommendations

- TCS conducted in Ituri require an additional day of training to ensure comprehension of the survey methodology.
- A copy of this report should be shared with the national NTD program in Uganda to highlight LF MDA coverage in the border region.
- Focal data reporting checks should be conducted in random aire de sante to verify reported treatment data for school and community based MDA.
- The district data managers should be trained on data recording and analysis.
- Surveyors should be selected after appropriate screening, a week before during the next survey.
- Reserve communities should be selected, to facilitate substitution during subsequent TCS.

Appendix One – Reported Treatment and Coverage Data by MoH

Health Zone	Census Pop	<5 yrs	5-14 yrs	>15 yrs	OV Treated M	OV Treated F	LF Treated M	LF Treated F	OV Epi Cvg	OV Prg Cvg	LF Epi Cvg	LF Prg Cvg	SCH Comm - M	SCH Comm - F	SCH - Schools	SCH Prg Cvg
Angumu	175,143	32,973	66,489	75,681	65,860	76,567	64,366	75,039	81.3%	100.2%	79.6%	98.1%	19,725	20,289	25,132	98.0%
Nyarambe	224,037	34,192	75,253	114,592	-	-	86,687	97,571	-	-	82.2%	97.1%	12,162	13,522	38,802	85.7%