Malawi ICOSA Performance Monitoring Coverage Survey Report, 2012

Contents

Background

Malawi has undertaken preventive chemotherapy treatment (PCT) for schistosomiasis and soil transmitted helminths (STH) using praziquantel (PZQ) and albendazole (ALB) respectively. PCT was undertaken in 28 districts in 2012; in ten districts this was the first PCT round in the other 18 districts treatment had been carried out with limited coverage due to lack of PZQ and funds. The intention of the campaign was to treat enrolled and non-enrolled school age children (SAC). In three districts in 2012, adults, as well as SAC, had been treated as a pilot. Due to adverse reactions, including a fatality (later shown not to be associated with the PCT), in SAC created media coverage which subsequently discouraged people to take the tablets.

Reported Coverage Rates

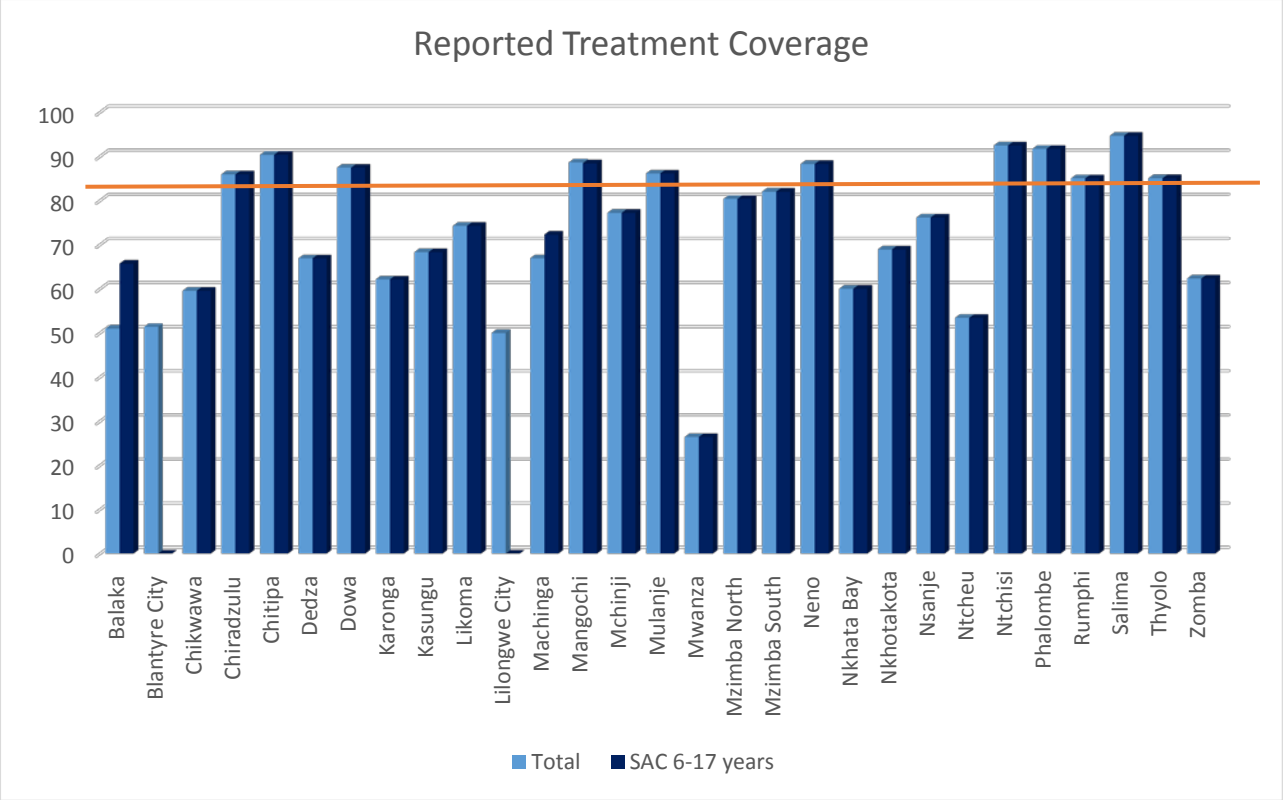
On completion of the mass drug administration (MDA) campaign data on treatment numbers and coverage rates for each district in Malawi were provided in district reports gathered by the central team and presentations prepared for the annual review meeting that took place in July 2013. There was wide variation in how treatment numbers and coverage rates were reported by each district. While some districts provided data by village or by school, other districts provided data at the district level only. Although most districts did break down data by drug type, age group, school enrolment and gender, this was not done uniformly across districts, meaning different aspects of the data were available for different districts. When data was broken down into these groups, the definitions of the categories were either not explicitly stated or differed between districts. This was a particular problem for SAC, which is defined by the WHO as 5 – 14 year olds, but was not uniformly defined by districts (defined with different age brackets or defined as children attending primary school).

As the data was not reported in a systematic way and raw data not provided, it was not possible to independently verify the reported coverage rates provided by districts. Reported coverage was therefore taken as the figures provided in district reports or, when these were not available, from the powerpoint presentations. Table 1 shows the coverage reported by each district. Where they were provided, coverage rates are shown broken down by drug and by gender. When it was not explicitly stated which drug the coverage rate was for, the figure was placed in the “Unclear” category. Where coverage was broken down by age group, the values given for SAC were put into the table and have been highlighted. In some districts more than one value was given for coverage – values with this discrepancy have been highlighted in the table.

Table 1: Coverage reported by each district. Total coverage rates for SAC from reports are presented with M (male) and F (female) rates in brackets where available.

Reported coverage				
Region	**District**	**ALB**	**PZQ**	**Unclear/Joint reporting**
Northern	Chitipa	82% (M=81%; F=84%)	82% (M=81%; F=84%)	-
	Karonga	-	-	62%
	Nkhata Bay	-	-	61% (M=60%; F=63%)
	Rumphi	-	-	85% (M=84%; F=87%)
	Mzimba South	-	-	82%
	Mzimba North	-	-	82%
	Likoma	-	-	74% (M=70%; F=77%)
Central	Kasungu	-	-	68%
	Nkhotakota	-	-	69%/70%/72%*
	Ntchisi	93%	93%	-
	Dowa	99% (M=99%; F=99%)	89%(M=89%; F=88%)	-
	Salima	90%	95%	-
	Lilongwe	-	-	49%
	Mchinji	78%	78%	-
	Dedza	68% (M=68%; F=68%)	70% (M=70%; F=70%)	-
	Ntcheu	-	-	53%
Southern	Mangochi	-	-	88%^
	Machinga	-	-	72%^
	Zomba	61%	62%	
	Chiradzulu	-	-	86%
	Blantyre	-	-	51%
	Mwanza	-	-	27%
	Thyolo	Not given	85%	
	Mulanje	-	-	86% (M=93%; F=88%)
	Phalombe	92%	92%	-
	Chikwawa	-	-	60%
	Nsanje	55%	76%	-
	Balaka	Not given	66%^	-
	Neno	-	-	83%/89%*

* Indicates values for which more than one coverage rate was reported. ^ Indicates districts in which coverage was provided broken down by age groups.



There was a large variation in the coverage rates reported by different districts. Reported coverage ranged from 27% in Mwanza to 88% in Mangochi for combined treatments. Where data for ALB and PZQ coverage were reported separately, the values tended to be very similar, the exception to this being Nsanje. Where coverage was reported by gender the values were also very similar.

It is important to note that the equation used to calculate coverage was not explicitly given in reports from most districts. It is clear that districts did not all use the same numerators or denominators to calculate their coverage. There was no single source of SAC population data which also raised issues when determining what the coverage was and the eligible population.

From these reports a number of problems with the MDA were raised which included fear of side effects from the tablets, particularly following the mass hysteria and death in Blantyre and Rumphi respectively and may explain some of the geographic heterogeneity seen. Furthermore most districts reported that MDA occurred after standard 8 students had finished exams and left school, and due to having inadequate resources for drug distribution.

Reported coverage in Mulanje and Mangochi

Two districts Mulanje and Mangochi were chosen as areas to examine in greater detail their reported versus actual validated coverage. These districts were chosen as two of the three districts which had also piloted community treatment. A summary of findings from their MDA reports is discussed below with Table 2 showing detailed information on reported coverage of the MDA from Mulanje and Mangochi districts.

Overall coverage

Mangochi recorded an overall coverage of 88%. It was not explicitly stated whether this was for ALB or PZQ.

Mulanje reported an overall coverage rate of 86%. It was not specified whether this was for PZQ or ALB. This figure seems to have been calculated using pupils registered for the MDA rather than total school enrolment, which inflated the coverage rate several percentage points, as they are registered the day before treatment and more likely to turn up on the day. There were also discrepancies in the calculation of the coverage rates, as the total coverage rate is lower than both the male and female coverage rates.

SAC coverage by gender was not provided for Mangochi. For Mulanje, SAC coverage was given by gender, although it was not clear whether this was for ALB or PZQ. The male SAC reported coverage (93%) with females SAC reported coverage slightly lower at (88%).

Non enrolled SAC coverage was reported at 71% for Mangochi and 36% for Mulanje, however, school attendance data was not reported by the districts.

Table 2: Detailed information on coverage reported by Mangochi and Mulanje districts.

	Mangochi	Mulanje
No. schools	258	177
Enrolment (total)	299,385	175,273
Boys	-	85,823
Girls	-	89,450
Pupils registered (total)	-	169741~
Boys	-	82,369
Girls	-	87,006
Treated (total)	264,808	146,408~
Boys	109,464	76,502
Girls	155,344	76,742
ALB received	-	206,577*~
ALB used	-	145,820*
ALB left over	-	66,069*
PZQ received	928,095	410,569*~
PZQ used	863,531	352,945*
PZQ left over	64,564	57,940*
Coverage (total)	1	86%~
Male	-	1
Female	-	1
Denominator for coverage	Enrolment	Pupils registered
Definintion of SAC	6-17 years	-
Non enrolled SAC treated?	yes	yes
Non enrolled targeted	20,000	-
Non-enrolled SAC treated (total)	14,322	842
Boys	-	389
Girls	-	453
Non-enrolled coverage	1	0
Adults treated?	Yes	-
Number adults treated	4,011	-
PZQ used out of school	-	1,272
ALB used out of school	-	842

* Indicates values which were reported differently in different reports. ~Indicates discrepancies in which a reported total is impossible if the group totals reported are accurate.

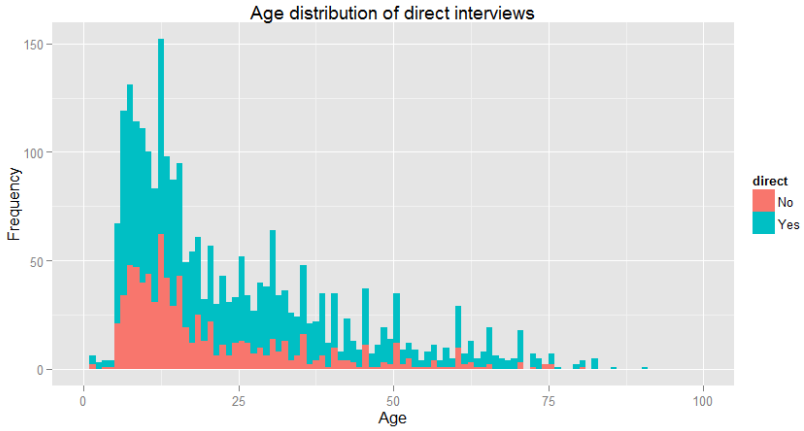
Methods

Survey Design and implementation

The coverage survey was carried out in October 2012, during term time. Two districts were purposively selected for survey: Mangochi and Mulanje, with 40 clusters (villages) selected in Mangochi, and 25 in Mulanje respectively, using systematic PPS selection which involves selecting clusters with probability proportionate to size. In each village, ten households were randomly selected for survey. This survey design (with villages selected PPS, and a fixed number of households subsequently selected in each village), ensures a self-weighting design. All eligible individuals resident in the selected households were interviewed about whether they had received PZQ and/or ALB in the last treatment round. Eligible individuals included all school-age children (aged 5 to 14) children and all adult females not in the first trimester of pregnancy during the PCT, and all adult males living in the house at the time of the PCT. The ten interviewed households were randomly selected from the village register where possible, or if this was unavailable via a random walk / transect of the village. Where household members were absent or unable to answer for themselves, senior household members were allowed to answer on their behalf. Not all answers on drug coverage were obtained directly, with 63% of SAC household members and 73% of adult household members giving direct interviews (Figure 1).

Of the 65 villages that were planned for survey, 57 were finally visited, including all 25 of the planned villages in Mulanje, but only 32/40 of the planned villages in Mangochi. For analysis purposes, it was assumed these villages were missing at random in Mangochi, though the reason they were not surveyed is unknown. Although data were double-entered on an Access database originally, the second data entry was lost due to a computer hard drive failure and so only single entered data was available.

Figure 1: Age distribution of participants who were directly interviewed or had answers provided by other household members



Survey analysis

Survey data were cleaned in R (version 3.0.2) by the SCI Biostatistician before being analysed using the R package *survey* (Lumley, 2012). SAC were defined as between the ages of 5 and 14 years inclusive, and adults as 15 years or older. Validated therapeutic coverage rates were calculated for SAC, using the following formula:

$$\frac{Number\ of\ SAC\ that\ swallowed\ the\ drug}{Total\ number\ of\ SAC\ that\ answered\ (yes\ or\ no)\ as\ to\ whether\ they\ swallowed\ the\ drug}$$

For adults, since the target group for treatment was poorly defined during the campaign, therapeutic coverage rates (under the precise WHO definition ref) could not be calculated. Therefore, for adults we simply calculated the proportion of adults who reported taking a particular drug in the last treatment round. For all estimates of coverage, or the proportion treated, Wald-type confidence intervals were calculated, which accounted for clustering of responses at two hierarchical levels: household and village.

Results

Sample size

Achieved sample sizes for the final survey are shown in Table 3.

Table 3: Sample sizes for the coverage survey in two districts of Malawi, 2012.

	Mangochi		Mulanje	
	All	**SAC**	**All**	**SAC**
Number of villages surveyed	32	32	25	25
Number of households surveyed	308	261	247	209
Mean number of households surveyed per village	9.62	8.16	9.88	8.36
Number of interviews attempted	1392	580	1156	482
Number of yes/no answers obtained in person (PZQ)	966	366	768	295
Number of yes/no answers obtained in person (ALB)	960	365	749	285
Number of proxy yes/no answers obtained (PZQ)	403	211	378	185
Number of proxy yes/no answers obtained (ALB)	399	210	358	176

Validated coverage in school-age children

In SAC, overall therapeutic coverage rate in the survey was 75.6% (95% CI: 68.5%, 82.7%) for PZQ, and lower at 55.7% for ALB (95% CI: 48.2%, 63.2%). Thus the overall ICOSA target coverage rate of 75% among SAC was apparently achieved for PZQ in these districts, though not for ALB. There were significant differences in coverage by district, with coverage for both drugs higher in Mulanje than Mangochi (Table 2). Gender differences in coverage were minimal in both districts (Table 2). Nevertheless, there was a very large effect of school attendance, with children attending school approximately 4-6 times more likely to receive both PZQ and ALB, in both districts (Table 2, Figure 2). Reported school attendance rates were high among SAC (91% overall, 87% in Mangochi and 95% in Mulanje; Figure 3), such that school-attending children drove the overall coverage patterns. Estimates of SAC coverage rates did not differ dramatically depending on whether a SAC household member answered the question directly or not (Figure 4).

Table 3: PZQ and ALB validated coverage rates among school age children in Malawi according to district, gender and school attendance.

Coverage rates in SAC by sub-groups		PZQ		ALB	
		Coverage	95% CI	Coverage	95% CI
District					
Mangochi		63.6%	51.31%, 75.90%	32.5%	21.03%, 44.01%
Mulanje		90.0%	85.76%, 94.24%	84.6%	78.04%, 91.16%
Gender					
Female		73.0%	64.48%, 81.42%	55.1%	46.35%, 63.94%
Male		78.2%	71.43%, 84.96%	56.2%	48.81%, 63.67%
School attendance					
Not attending		22.2%	17.10%, 27.24%	18.0%	13.29%, 22.74%
Attending		81.8%	75.58%, 88.10%	58.9%	51.47%, 66.43%
Gender by district					
Mangochi	Female	57.4%	43.39%, 71.40%	29.3%	17.36%, 41.30%
	Male	69.6%	57.97%, 81.28%	35.6%	23.49%, 47.74%
Mulanje	Female	91.3%	86.99%, 95.58%	86.6%	79.95%, 93.33%
	Male	88.7%	83.79%, 93.62%	82.5%	75.72%, 89.35%
School attendance by district					
Mangochi	Not attending	12.3%	0.61%, 24.04%	8.2%	1.87%, 14.57%
	Attending	71.2%	59.03%, 83.32%	36.1%	23.87%, 48.39%
Mulanje	Not attending	22.7%	4.49%, 40.97%	19.0%	1.37%, 36.72%
	Attending	93.2%	89.57%, 96.89%	87.7%	81.36%, 94.09%

Treatment rates in adults

Overall the proportion of adults that had been treated with either PZQ or ALB ranged from 14% to 30% depending on the district and drug (Table 3). As seen among SAC, treatment rates were generally lower for ALB than PZQ, and Mulanje had higher treatment rates than Mangochi. Similar to SAC, gender differences in adult treatment rates were minimal in both districts surveyed.

Figure 2: Coverage in school-age children in Malawi by school attendance and district

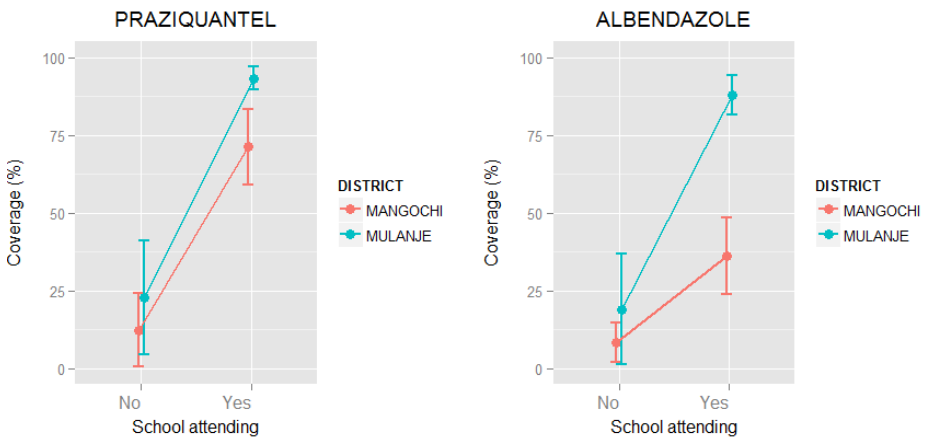


Figure 3: Histogram illustrating the proportion of respondents of different ages that said they attended school.

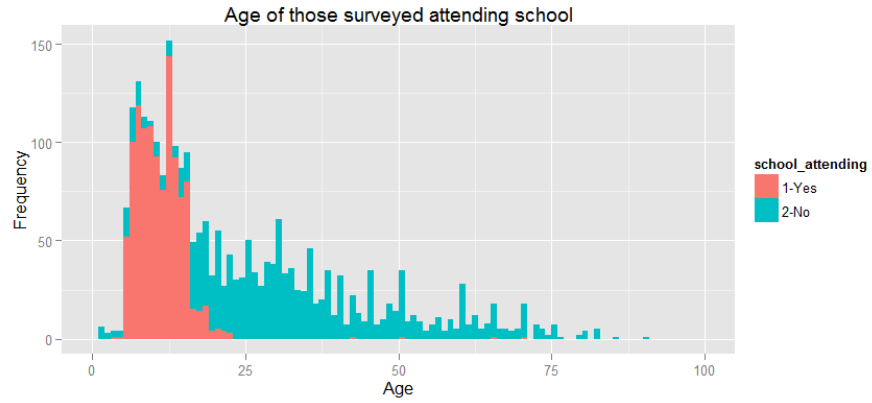


Figure 4: Coverage in school-age children in Malawi by whether the respondent was directly interviewed or not and district

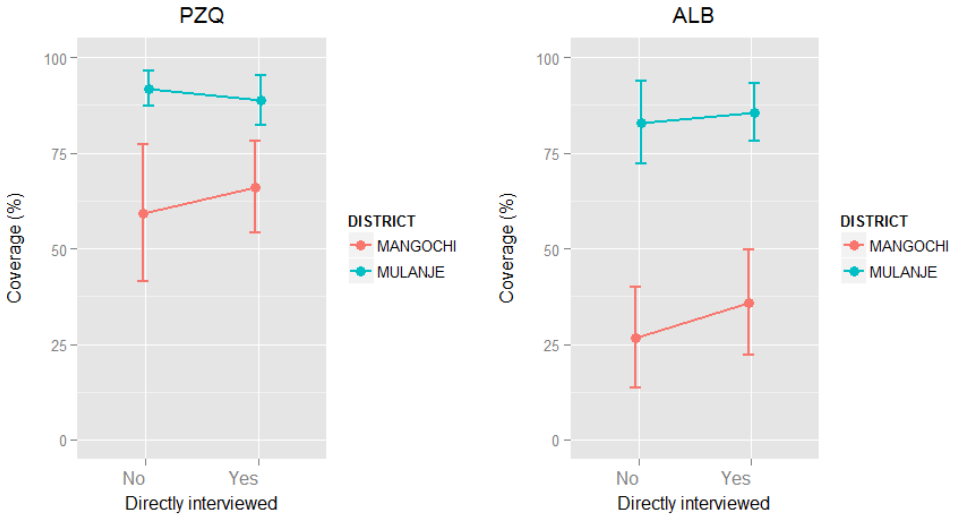


Table 4: PZQ and ALB treatment rates among adults in Malawi according to district and gender

Treatment rates in adults		PZQ		ALB	
		Proportion treated	95% CI	Proportion treated	95% CI
District					
Mangochi		25.0%	3.67%, 17.77%	14.0%	7.31%, 20.67%
Mulanje		33.3%	3.21%, 27.00%	30.3%	23.89%, 36.74%
Gender					
Female		28.0%	22.67%, 33.30%	20.5%	15.47%, 25.52%
Male		29.8%	24.69%, 34.81%	22.5%	17.37%, 27.53%
Gender by district					
Mangochi	Female	24.8%	17.22%, 32.41%	13.4%	6.41%, 20.33%
	Male	25.2%	17.90%, 32.51%	14.7%	7.79%, 21.65%
Mulanje	Female	31.5%	24.00%, 38.90%	28.5%	21.18%, 35.73%
	Male	35.7%	29.30%, 42.18%	32.8%	26.26%, 39.41%

Geographic variation in validated SAC coverage within districts

SAC coverage for both PZQ and ALB varied between 0 and 100% among villages where at least 10 SAC were surveyed. All villages where there was zero coverage for either PZQ or ALB were in Mangochi (Figure 5). Five villages in Mangochi had 0% SAC coverage for PZQ: Chilonga, Mikundi, Mlamba, Mselema and Namalweso. These same five villages also reported 0% coverage for ALB, alongside a further five surveyed villages in Mangochi (Chamba, Chapola, Kabuthu, Kwiputi and Liwiga). There was a positive correlation among villages in coverage rates for PZQ and ALB among SAC (Figure 6), although ALB coverage was more variable, presumably because of known limitations in supply of this drug. Figures 7 and 8 indicate the position of primary schools attended by children from villages surveyed here, colour coded by the village-level coverage. These figures show that in areas surrounding the lake in Mangochi there was lower coverage compared to the south of the district. Poor coverage appears to show some spatial clustering, potentially suggesting small-scale variation in drug availability, training quality or involvement in the campaign.

Figure 5: Variation across villages in therapeutic coverage for PZQ and ALB among school-age children

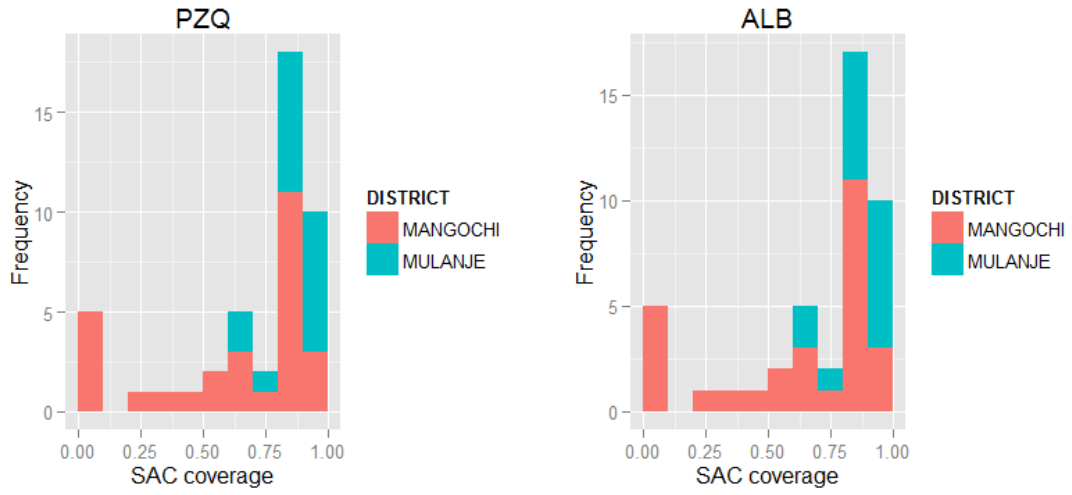
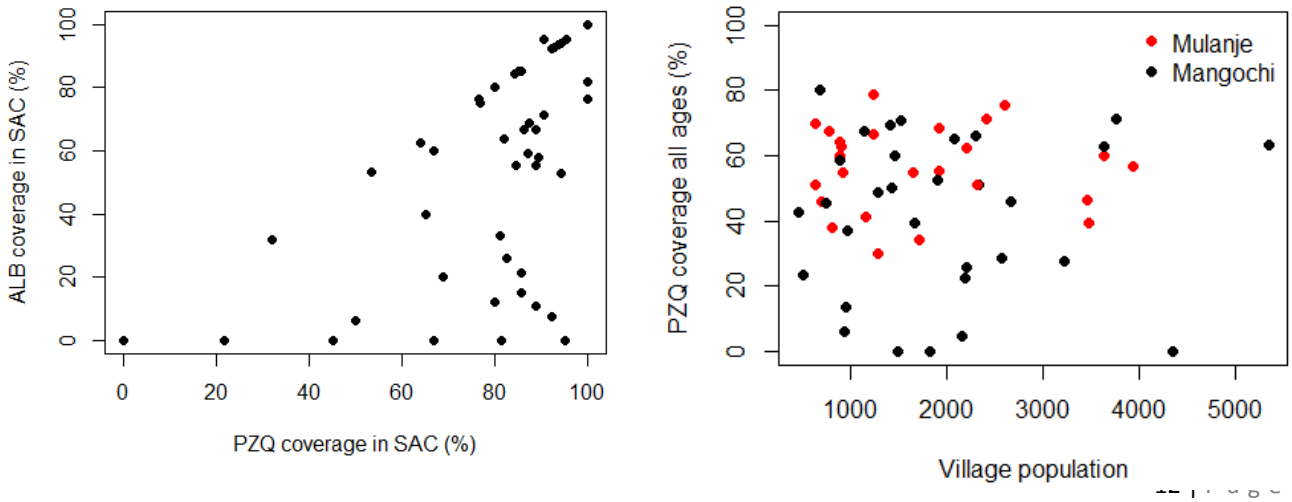


Figure 6: Positive correlation among villages in validated coverage of SAC for PZQ and ALB, and no correlation between village population and coverage.



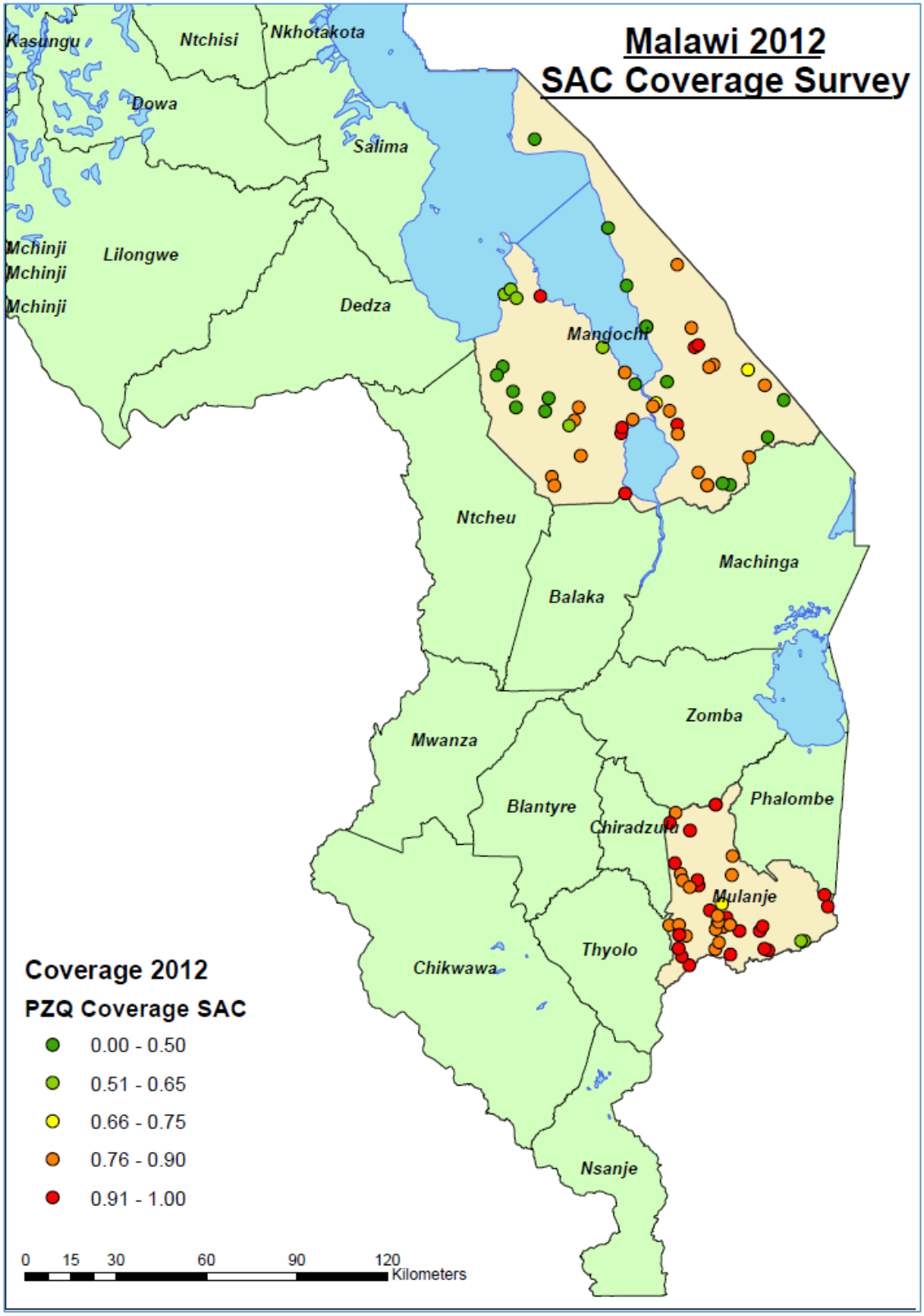
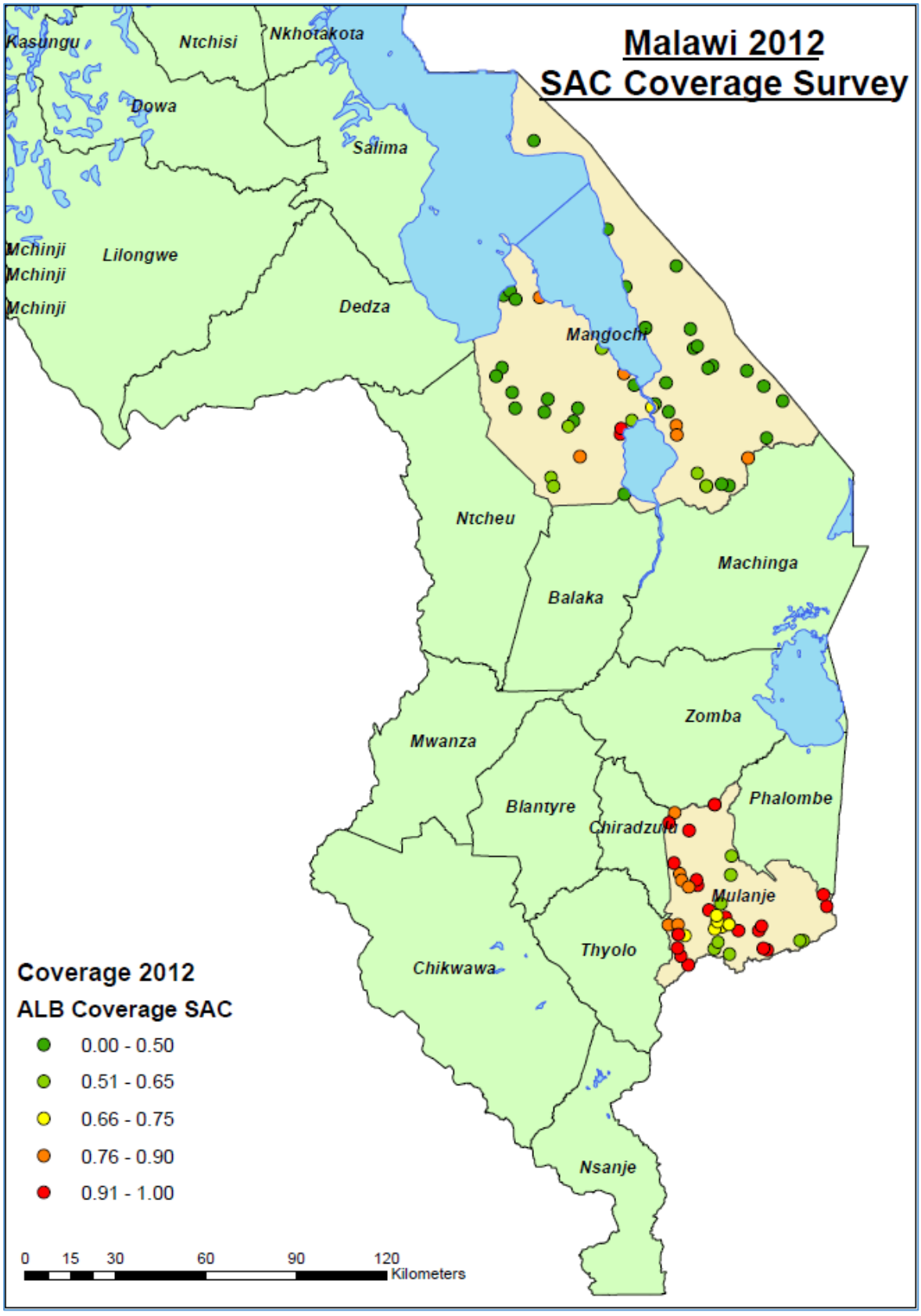


Figure 7: Map of schools in Mangochi and Mulanje whose children attend villages visited during the coverage survey. Schools are colour-coded according to PZQ coverage in the associated village.

Figure 8: Map of schools in Mangochi and Mulanje whose children attend villages visited during the coverage survey. Schools are colour-coded according to ALB coverage in the associated village.



Analysis of reasons for not taking drugs

Among those who responded they had not taken a particular drug, 1293 and 2548 gave a reason for PZQ and ALB respectively. Since very few respondents gave multiple reasons for having not taken a particular drug (1.7% and 0.6% of those that did not take PZQ and ALB respectively), only the primary reason is analysed here.

For PZQ, among those that gave a reason for not taking the drug, the most common reason was, that they had not heard about the program (Figure 8). This reason was far more common in Mangochi than Mulanje (Figure 9). "Other" was also given as the reason by almost a quarter of those who did not take PZQ, though this reason was not further specified. Absence during the campaign (sometimes due to work), was also given as a reason for not taking PZQ by around 10-17% of respondents in the two districts. Lack of a drug distributor was given as a reason by around 10% of individuals in total, from 13 villages in Mulanje. None of these villages had zero coverage. The two villages with the highest proportion of individuals giving this reason were Mponda and Mambiya. However, coverage rates in Mambiya were >90% for PZQ, and were 60% for Mponda. Therefore, it is possible that a particular school or subset of individuals were missed in these locations, though the location did receive a drug delivery overall. The reasons given for not taking PZQ were similar for both SAC and adults (Figure 10), though children who did not take PZQ were slightly more likely to cite as a reason that they had not heard about the program, compared to adults. Fear of side effects or rumours was rarely given as a reason for having not taken PZQ (Figure 9, 10), though this response was a little more common among SAC than adults (Figure 10). It is also noteworthy that fear of side effects or rumours was a more common reason for not taking ALB than PZQ in Mulanje.

Figure 9: Histogram of reasons given among respondents for having not taken PZQ

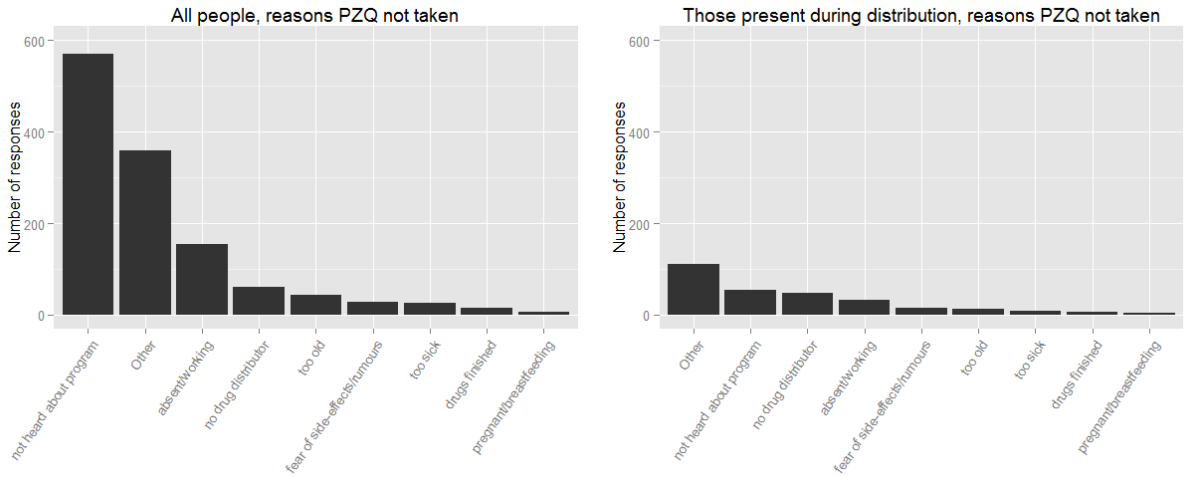


Figure 10: Reasons given by respondents who did not take either PZQ or ALB by district

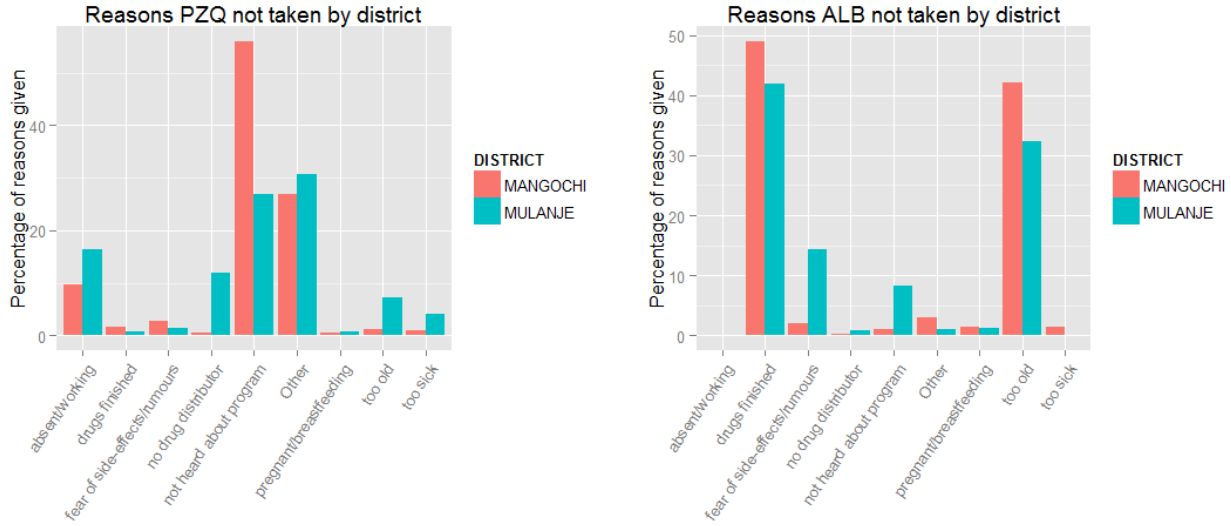
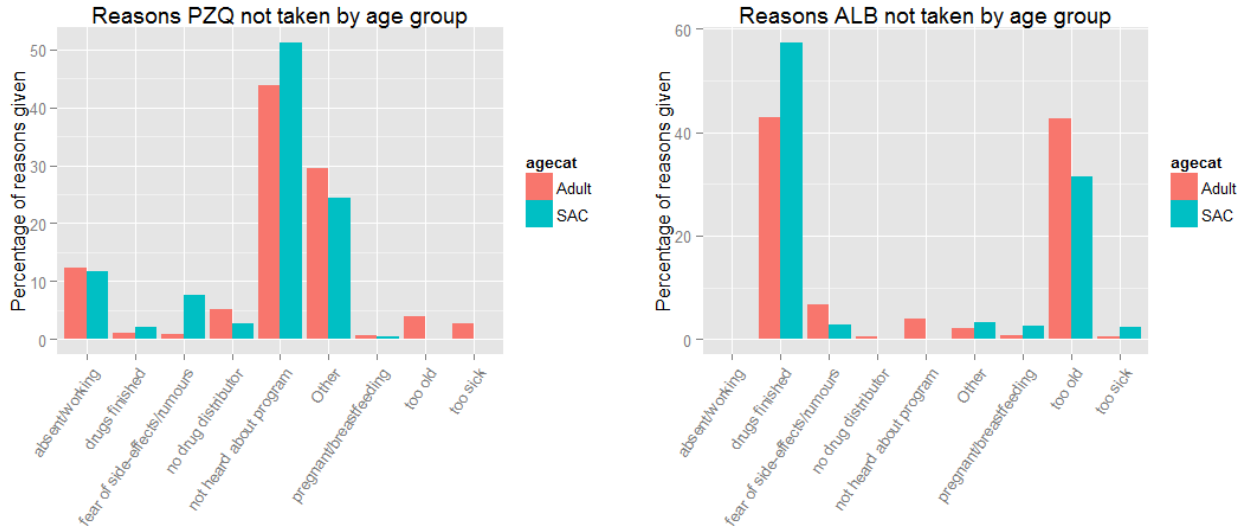


Figure 11: Reasons given by respondents who did not take either PZQ or ALB by age group



For ALB, the most common reason was different to that given for PZQ. For ALB, the most common reason given for having not taken ALB in both districts was that the drugs were finished, followed by being too old (Figure 9). Reasons for having not taken ALB were similar among SAC and adults, though children were more likely to say drugs were finished and less likely to say they were too old to receive ALB (Figure 11). However, those responding they were too old for ALB treatment came from the entire age range (Figure 12). One possible reason could be that distribution was sometimes combined with the child health days and the distributors only distributed to pre-school-aged children. Reasons for not taking either drug were not appreciably different depending on whether the household member was interviewed directly or indirectly (Figure 13).

Figure 12: Histogram of the age of respondents saying they were "too old" to have received ALB.

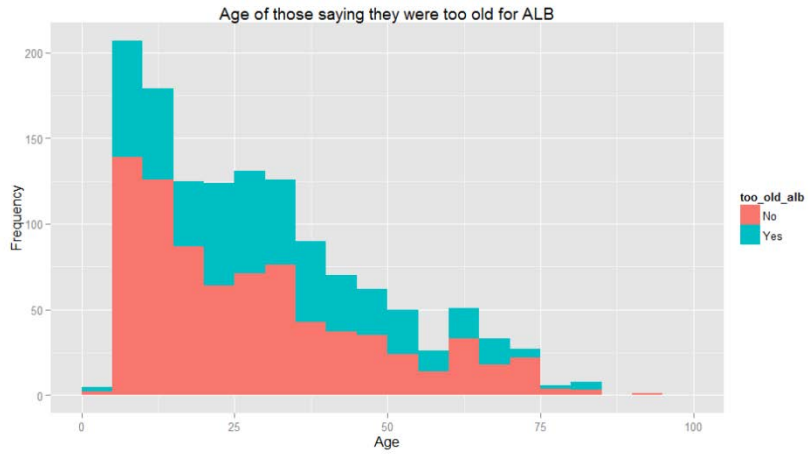
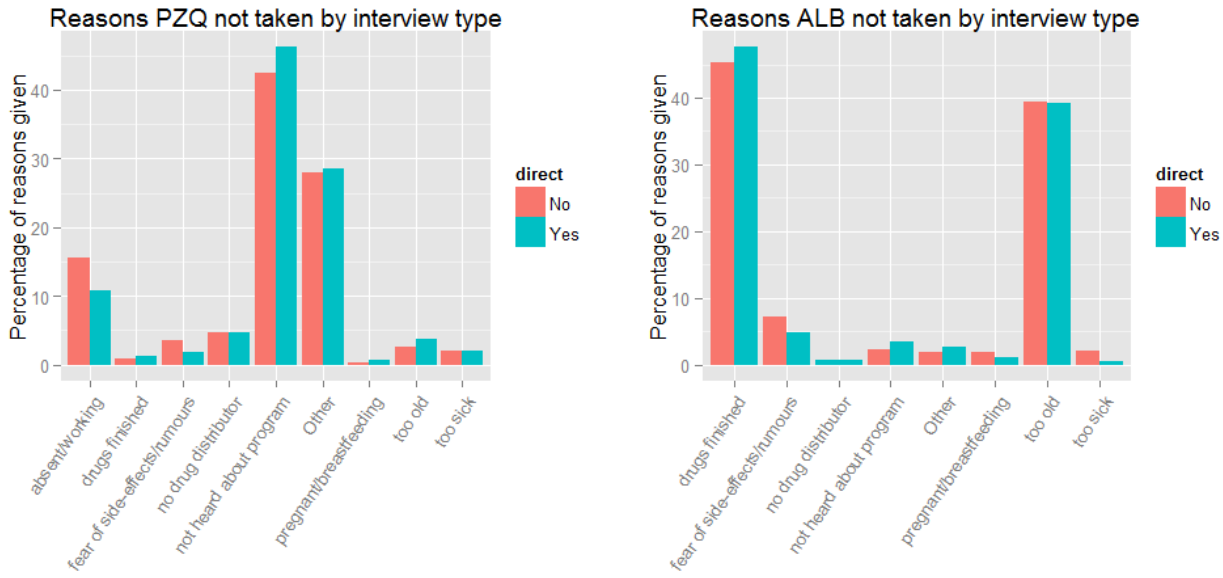


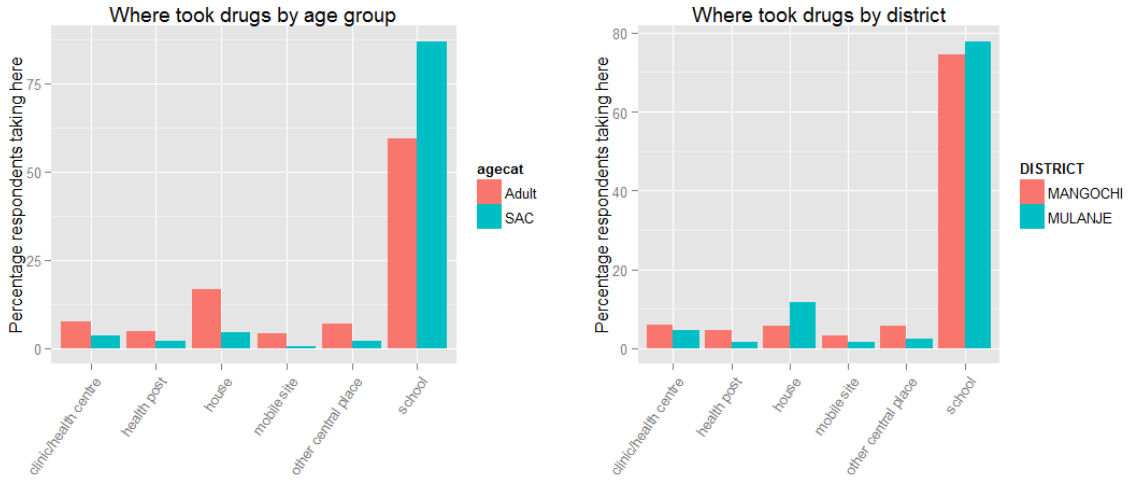
Figure 13: Reasons given by respondents for not taking PZQ or ALB according to whether they were directly interviewed or not



Where the drugs were taken

A question was asked of individuals where they took drugs, though this was not broken down into PZQ and ALB. The vast majority of respondents, including both SAC and adults, reported taking both PZQ and ALB in schools, with some reporting having taken them at home, at a health centre or other central place (Figure 14). This reflects well the known distribution method of school-based treatment, with some local treatment in the communities, particularly for adults.

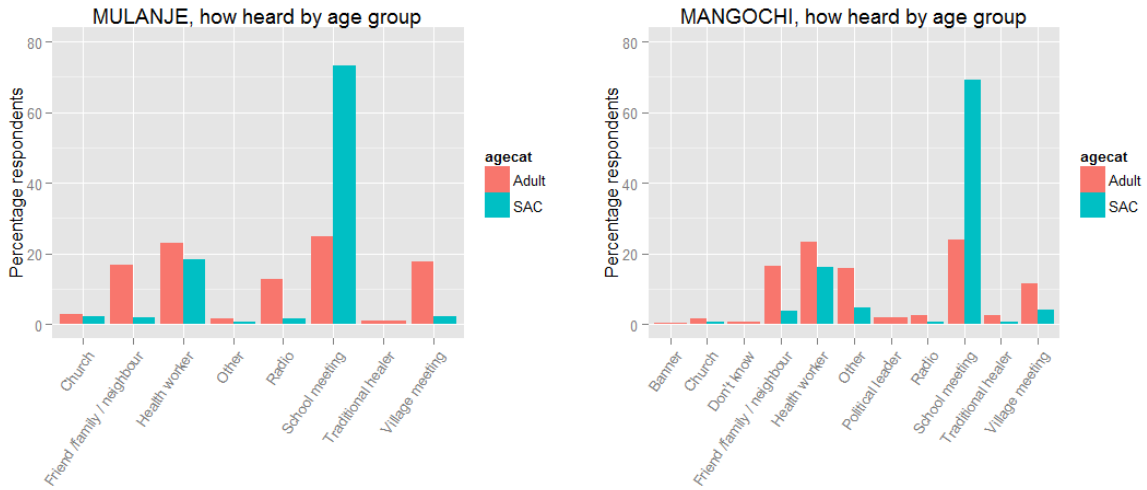
Figure 14: Percentage of respondents that reported taking PZQ/ALB at a particular location



Information channels prior to drug distribution

Participants were asked how they had heard about the drug distribution, but this question was not broken down by drug. The most common response for this question was through a school meeting (Figure 15). However, whereas SAC were much more likely to have heard via a school meeting, adults reported knowing about the campaign through other means, including health workers, village meetings, and from friends, family or neighbours (Figure 15). In Mulanje, just over 10% of respondents said they heard about the distribution through a radio broadcast, whereas the radio broadcast appears not to have been a major information channel for the campaign in Mangochi. Overall, communication via local meetings (schools or villages) seems to have been the major means by which residents heard about the distribution, with adults also hearing via other some other routes. The vast majority of SAC responded that they heard about the distribution though school meetings, with few reporting having heard about the distribution indirectly through a relative or nearby adult. This lack of other channels of communication to SAC other than through schools could be one reason why coverage was so low among non-school-attending SAC.

Figure 15: Proportion of respondents giving different channels of information for the distribution



Reported vs validated coverage

Overall coverage

Mangochi district recorded an overall coverage of 88%. It was not explicitly stated whether this was for ALB or PZQ. This coverage rate lies above the upper limit of the 95% confidence intervals found by the validated coverage survey for both PZQ (51.31% - 75.90%) and ALB (21.03% - 44.01%).

Mulanje reported an overall coverage rate of 86%. It was not specified whether this was for PZQ or ALB. This figure seems to have been calculated using pupils registered for the MDA rather than total school enrolment, which inflated the coverage rate several percentage points. There were also discrepancies in the calculation of the coverage rates, as the total coverage rate is lower than both the male and female coverage rates. Nevertheless, reported coverage rates fall within the 95% confidence limits of survey coverage for both PZQ (85.76% - 94.24%) and ALB (78.04% - 91.16%).

SAC coverage by gender

Coverage was not provided by gender in the Mangochi district report.

For Mulanje, SAC coverage was given by gender, although it was not clear whether this was for ALB or PZQ. The male SAC reported coverage (93%) did fall within the 95% confidence interval found during the survey for PZQ (83.79% - 93.62%) but not for ALB (75.72% - 89.35%). The female SAC reported coverage (88%) fell within the confidence interval for both PZQ (86.99%-95.58%) and ALB (79.95%-93.33%). As was found in the coverage survey, reported differences in coverage by gender were minimal.

Non-enrolled SAC

The coverage value of 71% for non-enrolled SAC in Mangochi was much higher than the survey results for those not attending school, both for PZQ (0.61% - 24.04%) and ALB (1.87% - 14.57%).

The coverage value of 36% for non-enrolled SAC in Mulanje was just within the upper confidence limits for both PZQ (4.49% - 40.97%) and ALB (1.37% - 36.72%).

Adults

Of the two districts, only Mangochi reported treating adults. The total figure reported was composed of 878 farmers and 3,133 fishermen.

The survey results, however, showed that adults had been treated in both districts, and that the proportion of adults treated was higher in Mulanje than Mangochi. The analysis of the survey results defined SAC and adults by the WHO definition of 5 – 14 years old and 15 or more years old respectively (reference). In Mangochi, SAC were defined as children aged 6 – 17 years old. No definition of SAC was provided for Mulanje. The impact of these factors on the results has not been investigated.

Geographic variation

The survey found a number of villages in Mangochi in which coverage was 0%. The report for Mangochi did not provide data broken down by village, and there was no mention of villages in which distributions had not happened.

Discussion

Reliability of reported coverage

The way in which coverage was reported by different districts varied widely. From the results of the survey conducted in two districts, it seems that the quality of the reported coverage also varied.

The coverage rates reported for Mangochi all fell well above the boundaries calculated in the survey. Coverage rates reported for Mulanje were more reliable and, on the whole, fell within the 95% confidence limits of coverage survey. Even so, the data reported for Mulanje themselves contained discrepancies – several figures seemed to have been summed wrongly, figures were quoted differently in the report and in the presentation, and calculations performed were not clearly explained. In general the figures reported were always higher than what has been validated with the coverage survey.

Without raw data, details of how calculations were performed and variability in the format of reports it is difficult to generalise about the quality of reported coverage rates for districts.

Due to the inconsistencies in reporting format and figures used we cannot at this stage in the program rely on the districts reported coverage as an accurate reflection of therapeutic coverage in the country, and further efforts for standardisation in reporting coverage at the district level are required.

Due to the lack of registers in country, timing of intervention, missing Standard 8 students, and lack of training material for the distributors, very high coverage rates are particularly unreliable. These figures may have been inflated by inappropriate choice of denominator, lack of consistent reporting formats or lack of knowledge of the program within the reporting data officer.

Where districts have provided detailed raw data to back up their coverage rates (as with Mulanje but not Mangochi) it is likely these rates are more reliable, since we are able to compare the rates.

It is clear from the report that there are many discrepancies between the reported coverage from districts and what is true for those areas. Individual reports clarify some situations but there are many that are still unexplained.

Factors contributing to low coverage

Major factors that have contributed to low coverage or unusual effects are covered below with explanations or hypothesised situations.

Lower coverage for ALB

Ordering of ALB is carried out by the Ministry Of Health Programme Manager for Lymphatic Filariasis (LF) Elimination. Previously the ALB had been used for the LF program and stocks had not been replenished in time for the SCH campaign which contributed to the low ALB coverage. Treatments were also carried out in conjunction with the child health days which may have caused confusion with who was eligible for treatment and prioritising the younger children.

Furthermore due to the complexities of distributing PZQ compared to ALB there may have been more focus during the training and distribution on reporting and dispensing PZQ. The lack of registers meant Health Service Assistants (HSAs) had to created their own treatment registers and, therefore, the reporting methods were different for each school or community.

School-attendance effect

There were reports that the HSAs and teachers were trying to treat all students in one day at a school and the *per diem*, or stipend, was not enough to also carry out a separate treatment in the communities to reach non-enrolled. It was also not made a priority to reach non-enrolled children during this campaign and training on how to reach them was not made clear.

Lack of gender effect

The balance of primary attendance is very equal in Malawi there is not a gender bias with school attendance that is seen in other countries.

District differences in coverage

The Mangochi District Health Officer (DHO) has since been removed from the responsibility of the SCH control programme due to the lack of interest and failing to cascade adequate training. Poor training in turn meant that the HSAs were not sensitising the communities, receiving drugs and therefore missing villages completely. Reports from interested partners reported that many villages around the Lake in Mangochi received no treatments at all during the 2012 campaign.

In contrast the Mulanje DHO is very active in his role and supervises his staff very effectively which could account for the higher coverage reported in Mulanje. The effects from other districts are very dependent on how active the DHO's are and how effective they are at mobilising the district teams.

Terrain also has a great impact on the success of treatment as many areas are very difficult to reach in Malawi, however if the DHO is organised this should not be a problem.

The side-effects incident in Blantyre and death in Rumphi had a large effect on districts and with many district reports stating that after the incidence many families refused to participate.

Most effective method of advertising campaign

From the reports it appears that the majority of people who heard about the campaign did so through the community meetings and sensitisation sessions held at the schools. This highlights the importance of adequate training and time to be able to carry out exceptional sensitisation as well as having stakeholders and distributors who are motivated.

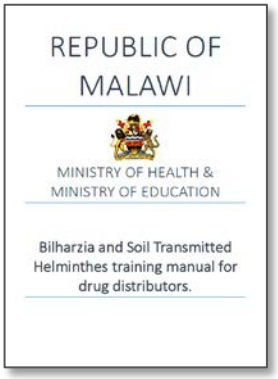
Learning from 2012

Learnings from the 2012 treatment Malawi has resulted in a number of measures being implemented to ensure that high coverage and reliable figures are presented. Registers that were not available have been produced and contain information on the child's height, age, name and date of receiving treatment or reasons for missing. This register can be used for 4 rounds of treatment and can be easily updated on an electronic database yearly.

Figure 16. Program manager Samuel Jemu with the new registers created for 2014 MDA

The distributors were also provided with a wooden dose pole and training manual which were distributed at the training. Schools and HSAs that report that they did not receive these manuals will highlight areas where distribution and training did not occur in a timely manner. It contains guidelines on how to carry out the treatment, record any information as well as information to sensitise the villages.

Figure 17. Child being measured for treatment with new dose pole and training booklet for HSA and teachers.



The number of HSAs and teachers trained was based on the school enrolment in 2014 rather than number of schools which had been done previously and therefore there should be adequate numbers to carry out the treatment in large schools. The training was carried out well in advance of the treatment with treatments taking place before exams. Additional funding for extra days in the communities was also made available to ensure that non-enrolled children and at risk adults will be captured.

Figure 18. HSA sensitising the community on the treatment scheduled.

Each district has attended a training session on how to fill out the coverage reports required. These reports although long can be easily filled out and capture the required information. They have been amended from the 2012 reports and even if only the first page is completed it will be done in a consistent manner. They have also been provided with a template excel database equations already in place that they will be required to fill out and send to the central data officer who will compile the information for reporting. This raw data will allow us to independently verify the coverage and make corrections to the denominator if needed.

Many issues were raised during the 2012 treatments in Malawi, however despite this the country succeeded in carrying out a very successful country wide treatment. The experiences gained in the 2012 treatment have allowed better preparation and equipment for forthcoming treatment campaigns. A follow on coverage survey will be carried out this year to determine if the improvements in equipment, training, timing and funds has improved the countries coverage and move them one step forwards in eliminating the problems endured by schistosomiasis.