Ethiopia 1st Follow-Up Impact Survey 2016
Recommendations Report

SCI Schistosomiasis Control Initiative
Imperial College London

1 Background

This reports reviews the impact survey which was conducted in Ethiopia, in November 2016 and in May 2017 following 1 round of mass preventive chemotherapy (PC) for schistosomiasis (SCH) and soil-transmitted helminths (STH). There were 146 schools in 9 regions that were surveyed over these two data collection periods. From the original baseline schools there are 29 schools remaining that fall in areas receiving biennial treatment as per WHO guidelines therefore they were not within the inclusion crieteria for survey.

This report provides outcomes from the analysis comparing the baseline to follow-up 1 (FU1) data in the same sentinel schools. Key findings are presented with recommendations for the national programme. The key survey methods challenges and deviations from protocol are highlighted. Results at national level are shown and provide overall prevelance, prevelance of heavy infection and intensity of both species of SCH and all three species of STH. Finally prevalence and intensity data are disaggregated by region and then by gender. Conclusions are drawn with recommendations for the programme and future survey methods.

2 Methods

The impact survey methods are detailed in the protocol:
https://imperiallondon.sharepoint.com/:w:/s/fom/schisto/EQxzkjPJs2FFle20nBxW3YsBOHnfUTH7WgrytnK2wp5EZQ?e=3pzXq5
Data were collected by teams in each district under the supervision of Ethiopian Public Health Institute (EPHI) and then entered, from paper to an Excel database, centrally at the EPHI main office in Addis Ababa. Data cleaning and anaylsis were completed at SCI London by the Monitoring, Evaluation and Research team and the report has been compiled by the SCI Technical Assistance team in Ethiopia with assistance from SCI London.

2.1 Ethical approval

Ethical approval was granted by the EPHI (Ethiopia) as well as by Imperial College Research Committee ICREC_8_2_2.
https://imperiallondon.sharepoint.com/:b:/s/fom/schisto/EU7_F1MG6HlJs27jHOgqxRwBQ8bP9MCJ724aIMR7MVR2QQ?e=RwRY88

3 Key findings

3.1 Programmatic recommendations

Table 1: Key Observations and programmatic actions from the impact survey

Finding or observation	Interpretation	Programmatic action
Schistosoma mansoni prevalence decreased from baseline in the majority of schools.	PC is reaching target populations in these areas and having an impact on infection.	FMoH to maintain these gains in control.
Increase in prevalence of *S. mansoni* (42 out of 146 schools) and heavy intensity infection (5 out of 146 schools) despite overall reduction in both.	Increases in prevalence and intensity from school level information could be due to low treatment coverage in particular schools, poor sanitation or other environmental factors.	FMoH to review the reported coverage in all the sentinel site schools and monitor those that are having continually higher prevalence. FMoH and SCI to continue to monitor any changes, particularly any increase in heavy intensity in all age groups. Coverage evaluation survey will purposively select the districts that have the sentinel sites for triangulation of data and to inform the programmatic actions.
Increase in prevalence of *S. mansoni* was the largest in Amhara region (2% prevalence at baseline to 11% at FU1)	4 schools out of 17 tested had a large increase (71%, 28%, 29%, 32%) which will have skewed the data to the right.	Coverage evaluation survey will purposively select the districts that have the sentinel sites for triangulation of data and to inform the programmatic actions.
S. haematobium prevalence decreased from baseline in the majority of schools.	PC is reaching target population in these areas and having an impact on infection.	FMoH to maintain these gains in control.

Finding or observation	Interpretation	Programmatic action
Prevalence decreased in hookworm and *Ascaris lumbricoides.*	PC is reaching target population in these areas and having an impact on infection.	FMoH to maintain these gains in control.
Overall prevalence of STH has reduced, however, results show that there was an increase in T. trichiura of 28.57%.	As there was very small, or no, prevalence of heavy infection of any STH species at baseline there has been no change detected by the survey and is likely that there are no, or few cases of heavy infections.	FMoH to continue to deliver MDA to control the public health burden of disease.
For each STH species, the overall intensity has increased.	The majority of these are light intensities of infection.	FMoH to continue to deliver MDA to control the public health burden of disease.
The region called SNNPR had an increase in prevalence of 'Any STH' from 25% at baseline to 39% at Year 1 Follow up	The regional reported coverage for the STH in November 2015 and April 2016 were both 74%, below the target for a control programme.	FMoH to improve the coverage of MDA, by increasing update and complience through social mobilisation.

3.2 Survey Recommendations

Table 2: Observations and corrective measures for the survey process itself

Finding or observation	What to look for	Corrective action
Data required extensive cleaning.	School ID's were substantially inconsistent between the current data (schools with multiple "unique" ID's) and with baseline data. There were sufficient other identification fields (school name, kebele, woreda and GPS coordinates) to allow for identification so this did not effect the results, but was time consuming to cross validate and correct.	Additional training on identity numbers for each school before next survey. Use of phone based surveys should eliminate the need to manually enter identifying information.
Large numbers of results had to be excluded from the analysis due to being outside of the protocol parameters. From a sample of 18,466 children surveyed, 7,091 were removed due to being outside the protocol requirements of age range (9 to 12 years) to be tested, leaving 11,375. The children below 7 years of age may not have been included in the MDA, and thus had to be excluded. Other age-groups were not included in previous surveys therefore would not enable a like for like comparison.	The exclusion of out-of-protocol pupils meant there were inconsistent numbers of pupils available for analysis per region (average pupils per school per region ranged from 27 to 89). Although this lower range is sufficient for monitoring changes in prevalence it results in lower precision in some regions (Afar - 27 pupils tested per school and Somali – 48 pupils tested per school) and reduces the power to test for diaggregated gender differences in these regions.	Before and during next survey: ▪ Review the training tools to ensure the information emphasises adhering to protocol. ▪ Training will include the pre and post test to ensure the data collectors have the required understanding of the protocol. ▪ Stronger supervision during data collection to ensure the protocol is adhered to and identify deviations in real time, correcting immediately through feedback.

		▪ Ensure the sample sizes stated in the protocol are being achieved during the survey by real time supervision and corrective action. ▪ Use online platform and mobile data collection which allows online, real time supervision.
Children in two schools (149 children in total) only provided one stool sample on one day, instead of two on two days for diagnosing infection.	There was a holiday and the data collectors could not follow up on the children for the second sample.	Better planning for the data collection.

Following a review of survey process and quality which took place between the EPHI team who delivered training, supervison and data entry, FMOH and SCI. corrective actions were discussed collectively and extensive plans to adapt the training were actioned. The key action points were, going forward, to deliver the training to smaller groups and increase the uptake of information as well as developing a one/two page guide for data collectors on the protocol for field-use. The time the data collection can take place is very restricited by other activities, in particular by the access to vehicles. The annual plan for data collection will now be ensure surveys do not overlap and the vehicles will be available at the appropriate times. Mobile data collection will also be instigated to eliminate central data entry and errors created through that process, allow real-time monitoring of data collection and improve data cleaning.

4 Results

4.1 National Level Results

Table 3. Results for SCH species

Percentiles = 25th, 50th (median), 75th percentiles of prevalence across all schools; RFB = reduction from baseline

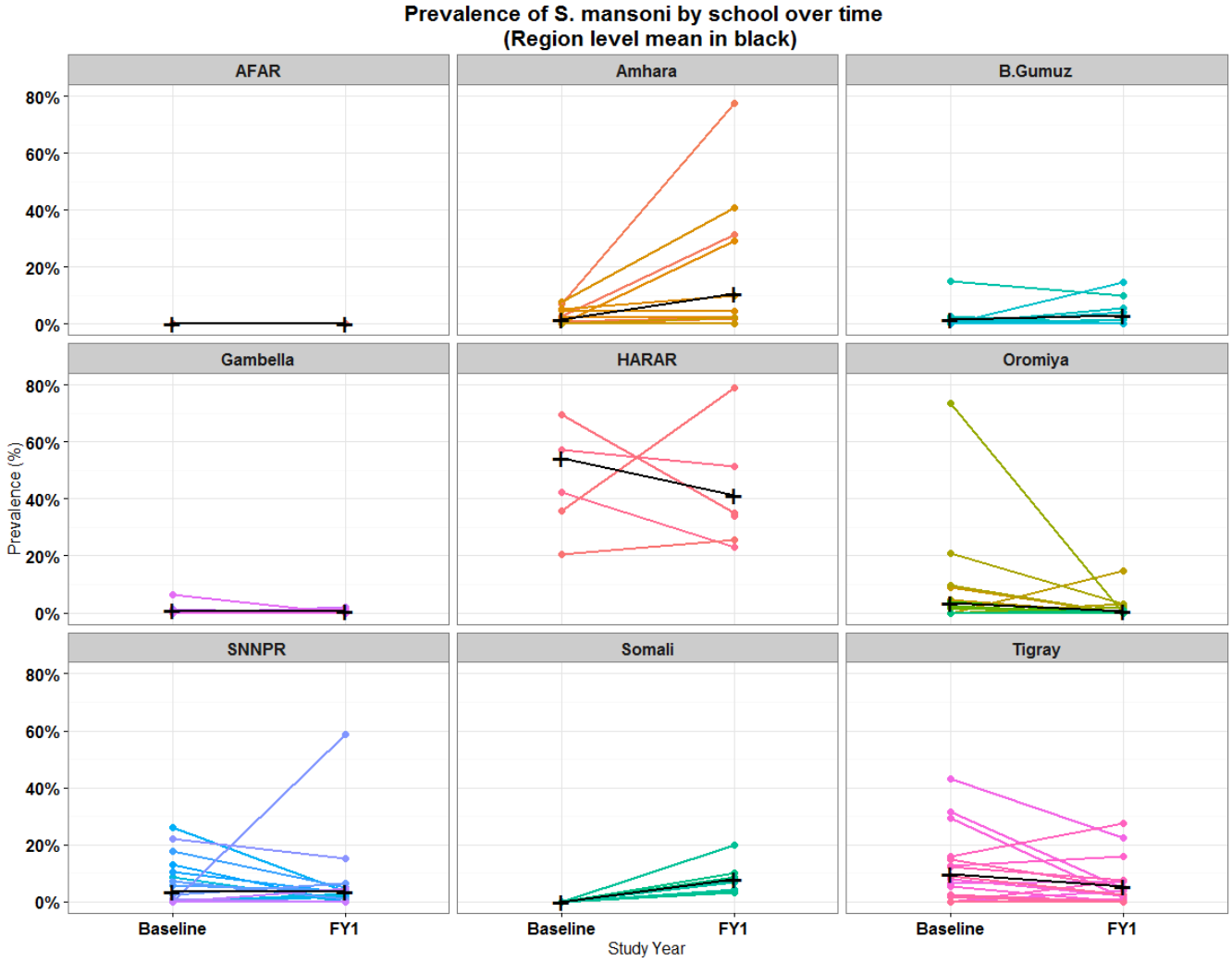
	Characteristics			Prevalence			Prevalence of heavy infections			Mean Intensity (epg / ep10ml)		
	Year	No. Schools	No. Pupils	Prevalence	Percentiles	% RFB	Prevalence	Percentiles	% RFB	Mean Intensity (epg / ep10ml)	Percentiles	% RFB
S. mansoni	baseline	146	16,610	5.63%	0%	n/a	0.59%	0.0%	n/a	10.4	0	n/a
					0%			0.0%			0	
					4.39%			0.00			2.56	
	FU1	146	11,375	5.46%	0%	3.02%	0.23%	0.0%,	61.02%	5.54	0	46.7%
					0%			0.0%			0	
					3.89%			0%			1.88	
S. haematobium	baseline	18	1,986	3.40%	0.0%	n/a	0.16%	0.0%	n/a	0.54	0.0	n/a
					0.0%			0.0%			0.0	
					2.30%			0.00%			0.05	
	FU1	18	1,024	0.12%	0.0%	96.47%	0.00%	0.0%	100.00%	0.007	0.0	98.7%
					0.0%			0.0%			0.0	
					0.00%			0.00%			0	

Table 4. Results for STH by any and by species

BL = baseline; Percentiles = 25th, 50th (median), 75th percentiles of prevalence across all schools; RFB = reduction from baseline

Infection	Characteristics			Prevelance			Prevalence of heavy infections			Mean Intensity (epg)		
	Year	No. Schools	No. Pupils	Prevalence	Percentiles	% RFB	Prevalence	Percentiles	% RFB	Mean Intensity (epg / ep10ml)	Percentiles	% RFB
Any STH	BL	146	16,610	16.77%	2.8% 9.5% 24.50%	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	FU1	146	11,375	16.30%	0.3% 9.8% 24.10%	2.80%	n/a	n/a	n/a	n/a	n/a	n/a
Ascaris lumbricoides	BL	146	16,610	10.90%	0.76% 3.79% 14.10%	n/a	0.00%	0.0%, 0.0%, 0.00%	n/a	188.1	0.18 6.42 84.5	n/a
	FU1	146	11,375	10.00%	0% 3.04% 14.30%	8.26%	0%	0.0%, 0.0%, 0.00%	n/a	205.4	0 2.65 103.1	-9.2%
Hookworm	BL	146	16,610	6.00%	0% 1.6% 5.40%	n/a	0.01%	0.0%, 0.0%, 0.00%	n/a	11.16	0 0.7 7.7	n/a
	FU1	146	11,375	5.72%	0% 1.3% 5.90%	4.67%	0.01%	0.0%, 0.0%, 0.00%	n/a	21.28	0 0.46 6.81	-90.7%
Trichuris trichuria	BL	146	16,610	4.20%	0.0% 0.0% 3.20%	n/a	0.00%	0.0%, 0.0%, 0.00%	n/a	8.29	0.0 0.0, 3.23	n/a
	FU1	146	11,375	5.40%	0.0% 0.0% 0.02%	-28.57%	0.00%	0.0%, 0.0%, 0.00%	n/a	20.57	0.0 0.0 1.08	-148.1%

Figure 2. Regional results for *S. mansoni* a) prevalence and b) intensity by schools (colured lines) and showing regional mean (black line). The number of lines in the graph are variable due to the varying number of sentinel sites in that region.



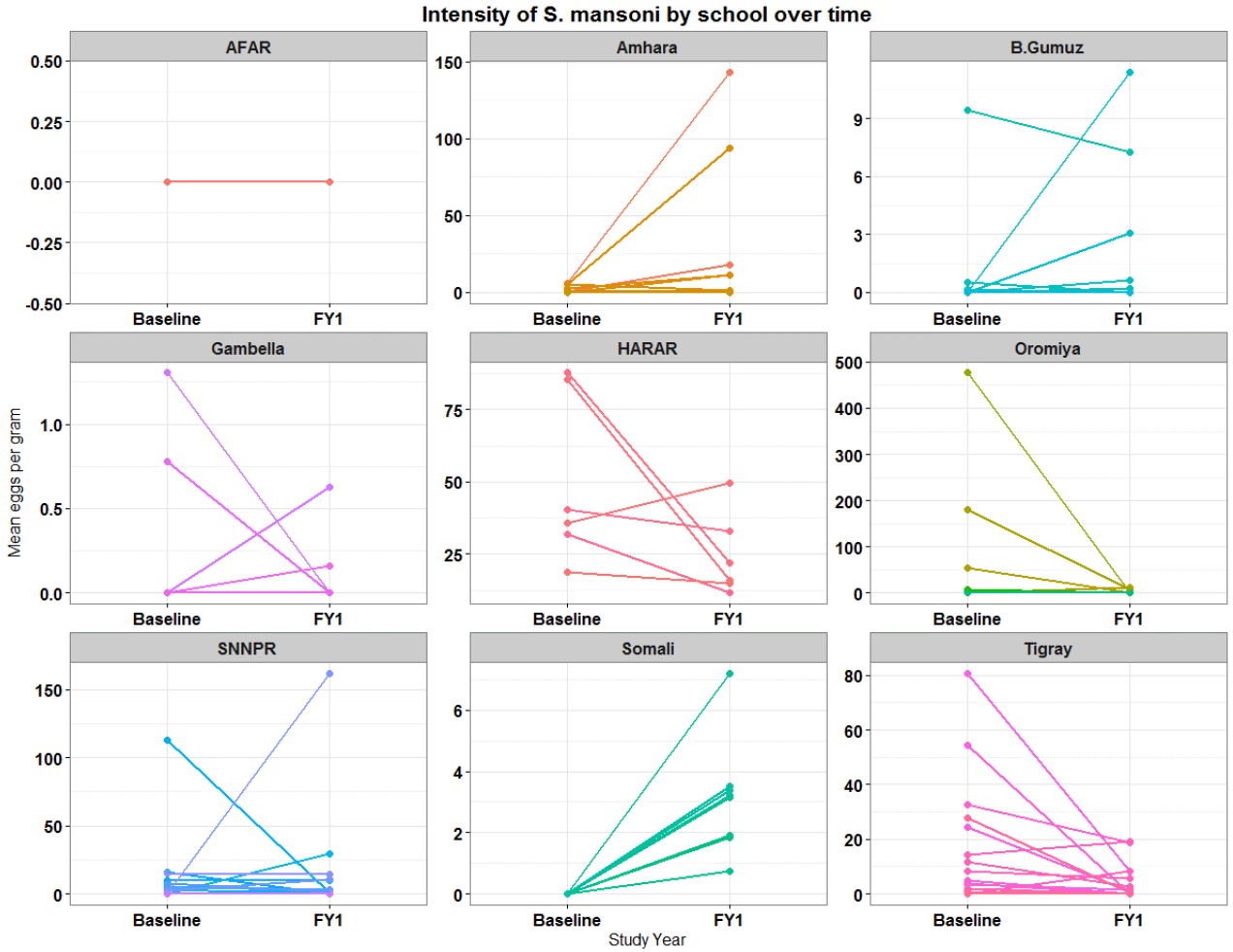

Intensity of S. mansoni by school over time
AFAR
Amhara
B.Gumuz
Gambella
HARAR
Oromiya
SNNPR
Somali
Tigray
Baseline
FY1
Mean eggs per gram
Study Year

Figure 3. Regional results for *S. haematobium* a) prevalence and b) intensity by schools (colured lines) and showing regional mean (black line). The number of lines in the graph are variable due to the varying number of sentinel sites in that region.

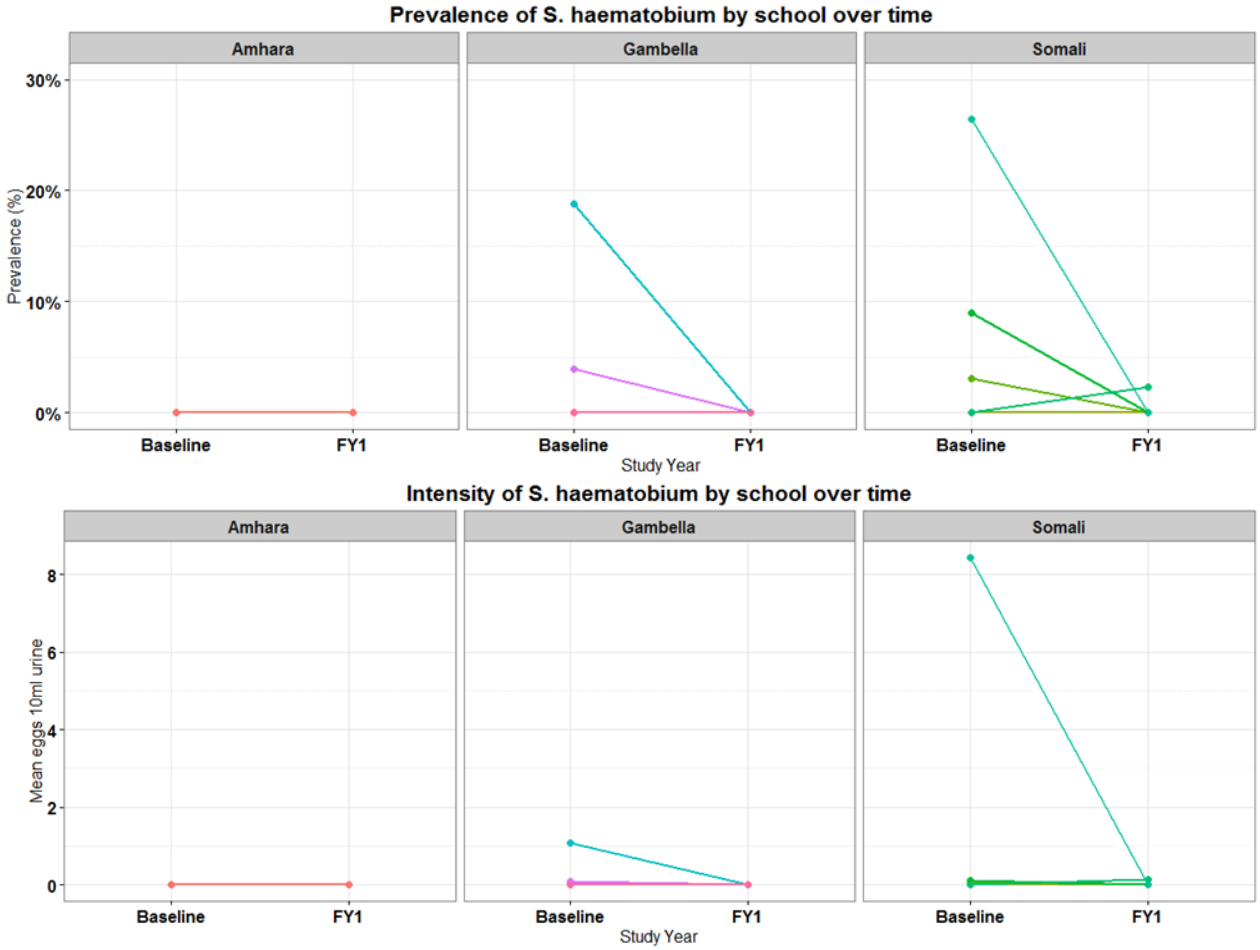
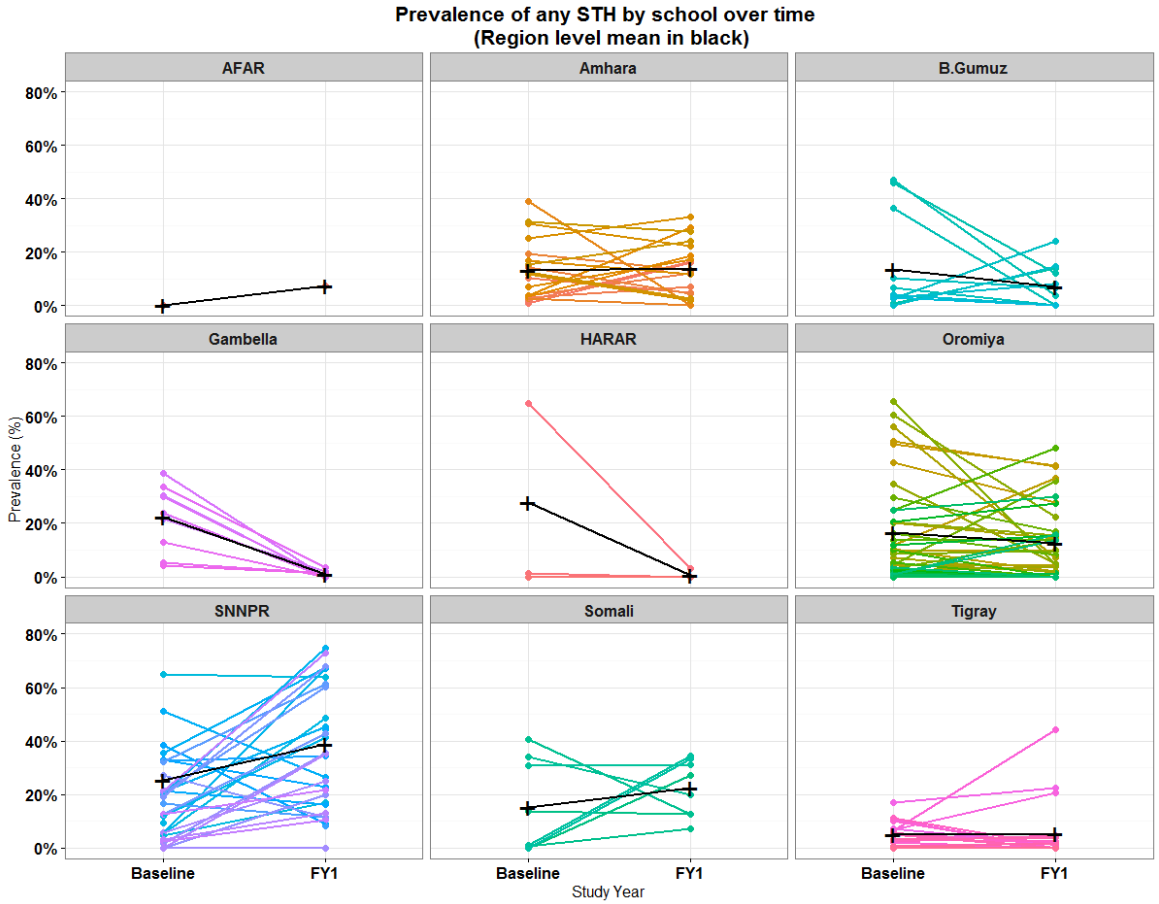


Figure 5. Regional results for any STH species prevalence by schools (colured lines) and showing regional mean (black line). The number of lines in the graph are variable due to the varying number of sentinel sites in that region.



4.2 Results disaggregated by gender

Table 5. Impact survey results by gender

Infection	Year	No. Schools	No. Girls	No. Boys	Prevalence Girls	Prevalence Boys	Prevalence of heavy intensity Girls	Prevalence of heavy intensity Boys	Mean Intensity (epg / ep10ml) Girls	Mean Intensity (epg / ep10ml) Boys
S. mansoni	baseline	146	8155	8754	4.0%	4.9%	0.8%	0.7%	10.6	10.6
	FU1	146	5590	5783	5.6%	6.6%	0.2%	0.4%	5.3	7.4
S. haematobium	baseline	18	1007	972	2.8%	2.5%	0.1%	0.0%	0.4	0.1
	FU1	18	519	604	0.4%	0.0%	0.0%	0.0%	0.0	0.1
Any STH	baseline	146	8155	8754	16.3%	17.7%	n/a	n/a	n/a	n/a
	FU1	146	5590	5783	16.7%	16.3%	n/a	n/a	n/a	n/a
A. lumbricoides	baseline	146	8155	8754	10.8%	11.6%	0.0%	0.0%	209.2	219.4
	FU1	146	5590	5783	9.9%	10.2%	0.0%	0.0%	212.8	221.5
Hookworm	baseline	146	8155	8754	5.1%	5.8%	0.0%	0.0%	10.4	13.6
	FU1	146	5590	5783	5.6%	6.1%	0.0%	0.0%	24.7	18.9
T. trichiura	baseline	146	8155	8754	4.2%	4.7%	0.0%	0.0%	8.9	9.7
	FU1	146	5590	5783	5.5%	5.5%	0.0%	0.0%	17.1	22.2