Madagascar 1st Follow-Up Impact Survey 2017 Recommendations Report

Ministère de la Santé Publique

SCI Schistosomiasis Control Initiative

Imperial College London

1 Programmatic recommendations

This reports reviews the 1st follow-up (FU1) impact survey which was conducted in Madagascar in November 2017 following two rounds (December 2015 and February 2017) of mass preventive chemotherapy (PC) for schistosomiasis (SCH) and soil-transmitted helminthiasis (STH). The following programmatic recommendations are:

Table 1: Observations and corrective actions for the national programme from the impact survey outcomes

Finding or observation	Interpretation	Programmatic action
Schistosoma mansoni prevalence decreased from baseline overall by 1.4%. In the majority (22/28) of schools prevalence was low and decreasing with the exceptions of the following schools where the *S. mansoni* prevalence increased: Tsiroanomanaidy (district)/ Bezavona (school) from 22.9% to 40.9% Ampanihy/Ambatomanambahitse from 0% to 10% Benenitra/Berevo Bekily from 3.4% to 19.6% Betioky/Soaserana from 0% to 5.9% Morombe/Maroanaka from 0% to 1.3% Betioky/Andohasatra from 0% to 1.3% In the majority (26/28) of schools no *S. mansoni* heavy infections could be identified. The only exception was again school Benenitra/Berevo Bekily where prevalence of heavy infections rose from 0% to 3.4% and school Sakaraha/Mitia where it dropped from 33.3% to 12.2%.	PC is reaching the target population and reducing infection. Reported coverage information from 2017 has shown an average of 83.5% SAC being treated. In a small number of schools sanitation and/or treatment is still insufficient.	Continue to provide Ministry of Health (MoH) and Ministry of Education (MoE) with logistical, technical and financial support from SCI. MoH, MoE, SCI and other NTD partners in country to ensure regular monitoring and evaluation to improve efficiency and effectiveness of the programme. The World Bank (WB) will be funding two projects in specific regions as of July 2018 for a period of five years (2018-2022) to maintain these gains. This includes treatment of non-enrolled SAC, and enrolled SAC attending private and religious schools, which will be led by the MoH for SCH, STH and LF in a number of districts.

The prevalence of *S. haematobium* infections and heavy intensity infection decreased overall. However, there is significant heterogeneity between schools. In many schools prevalence is still high following two rounds of MDA.	Heterogeneity in school prevalence, following treatment may be due to low treatment coverage in those schools, poor sanitation or other environmental factors.	Review reported treatment coverage in all the sentinel site schools and monitor those that are having 2+ years of increasing prevalence Continue to monitor any changes, particularly any increase in heavy intensity in all age groups.
The prevalence of STH infection is generally low, however it increased slightly. This was mostly due to a small number of schools where the increase of prevalence was more than 5%: • Fenoarivobe/Miandrarivo II: from 3.1% to 53.7% • Miarinarivo/Antambiazina: from 1.3% to 25.6% • Befandriana Nord/Ankiakabe: from 25.6% to 47.1% • Befandriana nord/Anoalakely: from 22.5% to 76.0% • Mitsinjo/Morafeno: from 0% to 7.1%	In a small number of schools treatment coverage and/or good sanitation are still insufficient.	Review coverage and enrolment data in these schools – ensure the program is conducting information, education and communication (IEC) campaigns to ensure SAC are being educated as well as treated. Check programme information on drug logistics and supplies, as well as quality of cascaded training to determine if these the correct programme components were in place in these areas.
Although the evidence is not statistically significant there are indications that prevalence of schistosomiasis infections are higher among non-attending school-age children (SAC).	Evidence suggests that infection rates are higher in non-attending school age children. More research is needed to support this finding	Increase sample size of non-attending SAC in future surveys to examine the significance of school attendance on prevalence of infection.

2 Methods

All methods are described in the associated protocol (located here):
https://imperiallondon.sharepoint.com/:w:/r/sites/fom/schisto/_layouts/15/Doc.aspx?sourcedoc=%7BA90DDA37-924F-4D43-BE46-DF45C70F631E%7D&file=MDG_First%20year%20follow-up_Impact_Survey_Protocol_2017_EN.docx

2.1 Field methods

- In September 2017, a two day training session took place in Antananarivo between SCI Programme Advisor (PA), the national SCH coordinator and the team conducting the survey.
- The data were collected on phones and uploaded to the server when an internet connection was available. It were checked by a biostatistician at SCI for correctness of the sampling numbers and inconsistencies in the data as it was uploaded to the server.

2.2 Deviations from protocol

- The sentinel sites Communautaire Ekelelahy and Ambohibengy could not be revisited (due to school closure and fire in village). Both schools were not replaced.
- The number of attending SAC and non-attending SAC sampled were much lower than required.

2.3 Ethical approval

Ethical approval was granted by the National Ethics Committee of Madagascar (located here):
https://imperiallondon.sharepoint.com/sites/fom/schisto/mer/2_Country_M&E/MDG/Impact/FY_1718/1_Protocol_&_pre-survey/MDG-ethical%20approval%20sentinel%20sites%202017-FR.pdf?csf=1&e=R0Sxdx

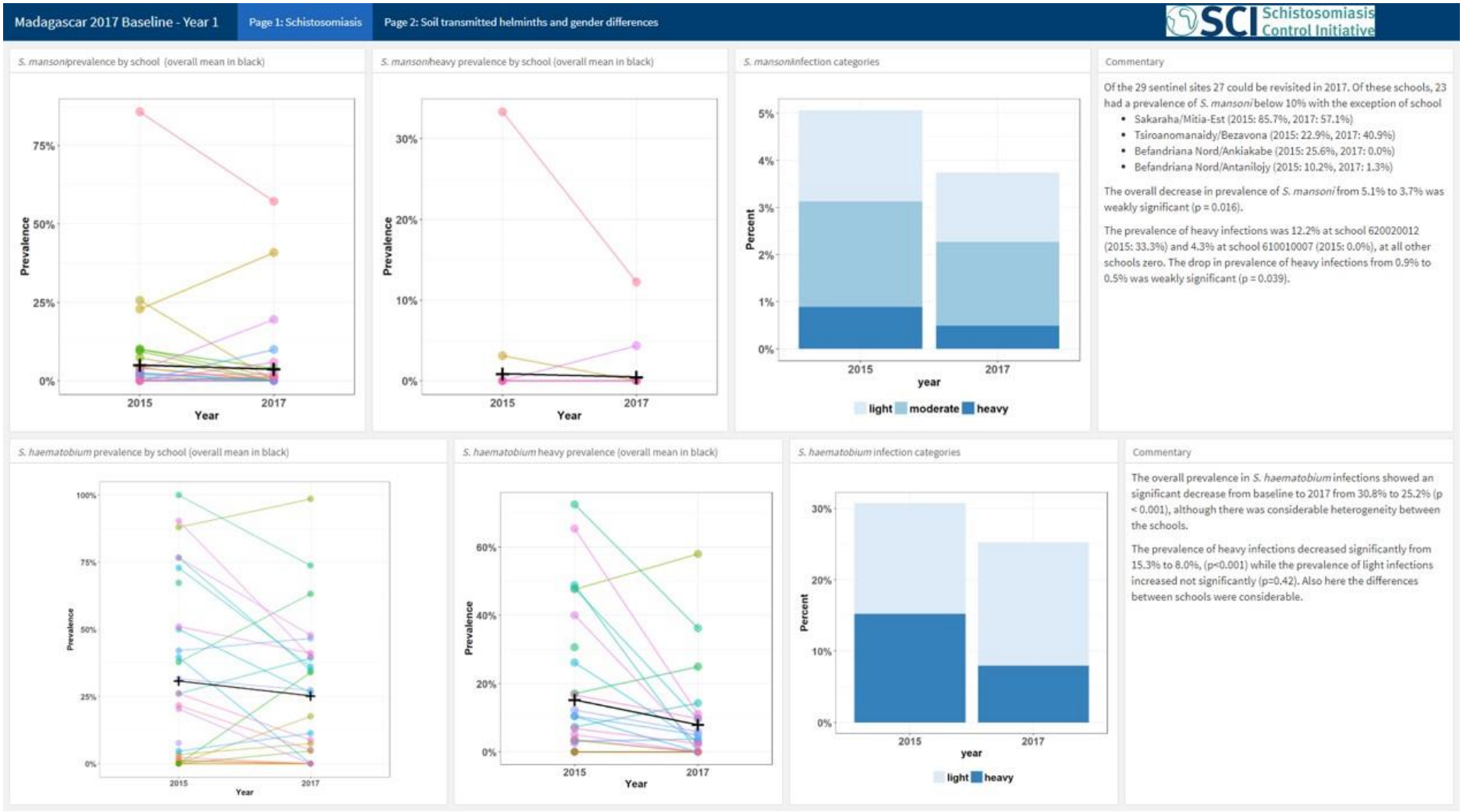
3 Survey Recommendations

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

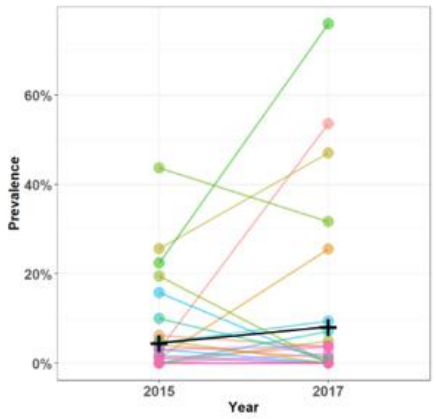
Finding or observation	Interpretation	Corrective action
Recruitment numbers of attending SAC and non-attending SAC were much lower than required by sample size calculations.	Fewer children per school recorded than expected.	Additional training on how to meet sampling target of SACs per school.
The schools Communautaire Ekelelahy and Ambohibengy could not be revisited in 2017. No replacement was chosen for these sentinel sites.	When a school cannot be visited and is replaced by a different school the next year the exact relationship of these two schools should be recorded, i.e. the exact GPS coordinates of both schools as well as a short description how they are related to each other (for example: “5 miles down the road from the baseline school”). This helps us to assess whether the two schools can be treated as identical or valid but separate schools.	Additional training and column in the school form to record any deviations

4 Results

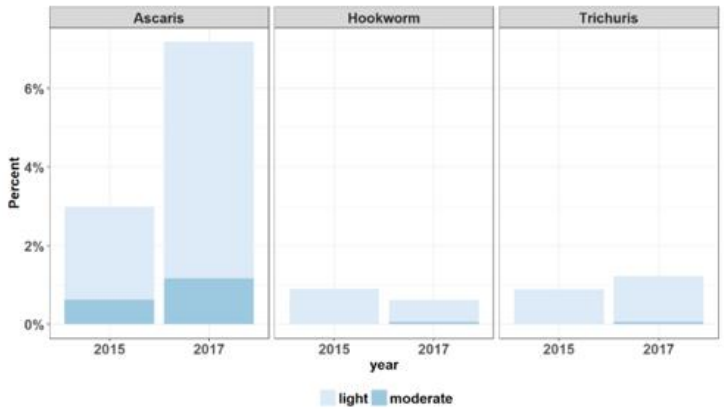
4.1 Dashboard



Any STH prevalence (overall mean in black)



Infection categories



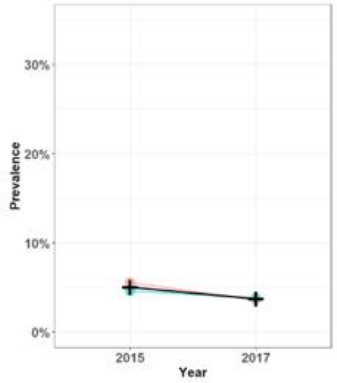
Commentary

Prevalence of any STH infections was generally low. Only at 8 schools it was above 5% but there with a notable maximum of 76% at school Anoalakely in the Befandriana Nord district.

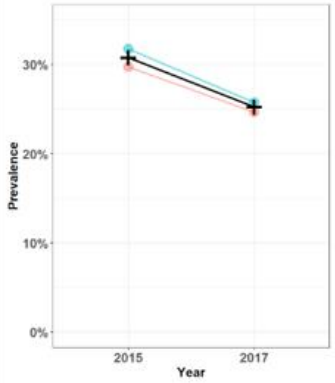
The majority of the STH infections were infections with *A. lumbricoides* the prevalence of which rose significantly from 3.0% to 7.2% (p<0.001) between 2015 and 2017. The changes in prevalence of Hookworm infections (2015: 0.9%, 2017: 0.6%) and infections of *T. trichiura* (2015: 0.9%, 2017: 1.2%) were both not significant (p=0.17 and p=0.34 respectively).

There were no heavy STH infections in 2015 and 2017.

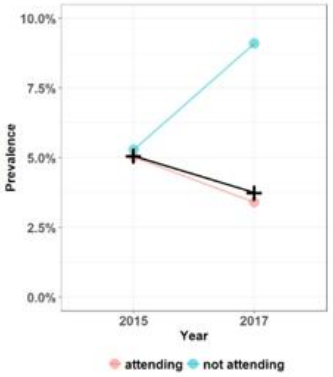
Prevalence of *S. mansoni* by gender



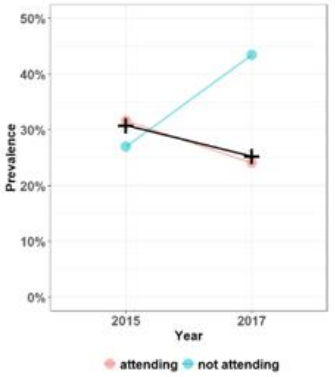
Prevalence of *S. haematobium* by gender



Prevalence of *S. mansoni* by school attendance



Prevalence of *S. haematobium* by school attendance



Commentary

Neither for the prevalence of *S.mansoni* infections nor for the prevalence of *S.haematobium* infections gender was significant (p = 0.87 and p=0.57 respectively).

Even though the school attendance seems to have a decisive influence, models show no significant impact of attendance on the prevalence of Schistosomiasis (*S.mans.* p=0.08, *S. haem.* p=0.53). This lack of significance might be due to a very low sample size of not attending children of n=99 in 2017 and hence a low precision of the prevalence estimates in non attending SACs.

Overall key outputs:

Key outputs	S. mansoni	S. haematobium	Any STH
Prevalence (%)	-1.32%	-5.54%	+3.62%
Prev. heavy inf. (%)	-0.4%	-7.28%	-
Mean epg/epcl	-6.27	-40.09	-

4.2 Results tables

Table 3. Impact survey results

Prev. = Prevalence; % RBF = % reduction from baseline; † = prevalence percentiles (25th, 50th (median), 75th) across all schools; p-value = p-value of difference from baseline; Mean inten. = Mean intensity (epg / ep10ml); †† = Mean intensity percentiles across all schools

Infection	Characteristics			Prevalence				Prevalence of heavy infections				Mean Intensity (epg / ep10ml)			
	Year	No. Schools	No. Pupils	Prev.	†	% RBF	p-value	Prev.	†	% RBF	p-value	Mean inten.	††	% RBF	Year
S. mansoni	baseline	29	1915	5.1%	0.0% 0.0% 4.2%			0.9%	0.0% 0.0% 0.0%			14.31	0.00 0.00 8.25		
	FU1	27	1630	3.7%	0.0% 0.0% 1.7%	-1.3%	0.016	0.5%	0.0% 0.0% 0.0%	-0.4%	0.039	8.05	0.00 0.00 5.39	-6.27	n/a*
S. haematobium	baseline	29	1926	30.8%	1.3% 26.0% 51.0%		n/a	15.3%	0.0% 6.8% 26.2%			62.33	0.024 14.22 79.38		
	FU1	27	1628	25.2%	0.0% 17.6% 39.6%	-5.5%	<0.001	8.0%	0.0% 0.0% 7.8%	-7.3%	<0.001	22.24	0 3.61 14.86	-40.09	< 0.001
Any STH	baseline	29	1894	4.5%	0.0% 1.3% 5.2%	n/a	n/a								
	FU1	27	1630	8.2%	0.0% 1.2% 6.1%	+3.6%	n/a*								

Infection	Characteristics			Prevalence				Prevalence of heavy infections				Mean Intensity (epg / ep10ml)			
	Year	No. Schools	No. Pupils	Prev.	†	% RBF	p-value	Prev.	†	% RBF	p-value	Mean inten.	††	% RBF	Year
A. lumbricoides	baseline	29	1913	3.0%	0.0% 0.0% 3.1%				0.0% 0.0% 0.0%			116.42	0.00 0.00 47.63		
	FU1	27	1630	7.2%	0.0% 0.0% 3.1%	+4.2%	<0.001	0.0%	0.0% 0.0% 0.0%	-0.7%	n/a*	220.68	0.00 0.00 17.70	+104.26	0.41
Hookworm	baseline	29	1894	0.9%	0.0% 0.0% 0.0%			0.0%	0.0% 0.0% 0.0%			2.29	0.00 0.00 0.00		
	FU1	27	1630	0.6%	0.0% 0.0% 0.6%	-0.3%	0.17	0.0%	0% 0% 0%	0.0%		3.70	0.00 0.00 0.071	+1.41	n/a*
T. trichuria	baseline	29	1913	0.9%	0.0% 0.0% 1.6%			0.0%	0% 0% 0%			0.96	0.00 0.00 1.20		
	FU1	27	1630	1.2%	0.0% 0.0% 0.0%	+0.3%	0.34	0.0%	0% 0% 0%	0.0%		4.23	0.00 0.00 0.00	+3.27	n/a*

* Model did not converge

Table 4. Impact survey results by sex

Infection	Year	No. Schools	No. Girls	No. Boys	Prevalence Girls	Prevalence Boys	Prevalence of heavy infections Girls	Prevalence of heavy infections Boys	Mean Intensity (epg / ep10ml) Girls	Mean Intensity (epg / ep10ml) Boys
S. mansoni	baseline	29	1016	899	4.6%	5.6%	0.9%	0.9%	11.21	17.82
	FU1	27	887	743	3.8%	3.6%	0.6%	0.4%	9.42	6.41
S. haematobium	baseline	29	1021	905	31.7%	29.7%	14.9%	15.7%	51.90	74.09
	FU1	27	886	742	25.7%	24.7%	8.0%	8.0%	16.75	28.79
Any STH	baseline	29	1001	893	4.7%	4.4%				
	FU1	27	887	743	7.2%	9.3%				
A. lumbricoides	baseline	29	1014	899	3.2%	2.8%	0.9%	0.6%	137.47	92.68
	FU1	27	887	743	6.4%	8.1%	0.0%	0.0%	159.85	293.31
Hookworm	baseline	29	1001	893	0.7%	1.1%	0.0%	0.0%	1.13	3.59
	FU1	27	887	743	0.6%	0.7%	0.0%	0.0%	5.50	1.54
T. trichiura	baseline	29	1014	899	1.2%	0.6%	0.0%	0.0%	1.21	0.68
	FU1	27	887	743	1.2%	1.2%	0.0%	0.0%	6.13	1.96

Calculation of p-values of differences between sexes incorporated clustering at the school level. Statistical methodology is available from SCI on request.

4.3 Pdf of dashboard

Available at
https://imperiallondon.sharepoint.com/:b:/r/sites/fom/schisto/mer/2_Country_M%26E/MDG/Impact/FY_1718/3_Reports/MDG_Impact2017_BaselineFU1_dashboard.pdf