



**MINISTRY OF
EDUCATION**

**MINISTRY OF
HEALTH**



**NATIONAL SCHOOL BASED
DEWORMING PROGRAMME (NSBDP)**

Treatment Results 2020 / 2021



Overview of the National School-Based Deworming Programme

The National School-Based Deworming Programme is a long-standing, inter-ministerial, government-led initiative that has successfully provided annual deworming treatments to millions of at-risk children for parasitic worm infection for nine consecutive years. In 2012, the Ministry of Health and Ministry of Education together set out to treat at least 5.5 million children per year for soil-transmitted helminths and have achieved beyond their target year after year. The programme maintains its goal of eliminating parasitic worm infection as a public health problem and is on its way to achieving the World Health Organisation's 2030 disease targets as set within the *WHO road map for neglected tropical diseases 2021–2030*.

Parasitic worms pose a serious threat to children's long-term health, education, and productivity. In Kenya, over six million children aged 2-14 years are currently living in areas at risk of parasitic worm infection, including soil-transmitted helminthiasis and schistosomiasis, and require annual



deworming treatment. Twenty-seven counties across Nyanza, Western, Rift Valley, Coast, North Eastern, Eastern, and Central regions are endemic for soil-transmitted helminthiasis, with 15 of the total 27 co-endemic for schistosomiasis.

Treating children through schools provides the greatest opportunity to reach a high proportion of the at-risk population while minimizing costs using existing infrastructure. School-based deworming effectively reaches over 80% of the target population, children aged 2-14 regardless of school enrolment, in all at-risk geographies in the country. Trained and trusted primary school teachers administer deworming medicines annually.

The Division of Adolescent and School Health (DASH) within the Ministry of Health, Kenya Medical Research Institute (KEMRI), and the School Health, Nutrition and Meals Unit within the Ministry of Education lead, coordinate, and monitor the National School-Based Deworming Programme at the national level, with technical support from Deworm the World Initiative at Evidence Action. Detailed planning and programme implementation is conducted at the county level with personnel from the two ministries playing a joint leadership role to ensure that the programme is implemented in every school within the targeted treatment areas.



Impact of Deworming: New Evidence

Rigorous evidence shows that mass deworming is a cost-effective solution that transforms the lives of children over the short and long term. Deworming treatment leads to significant weight gains and allows more energy to be focused on child growth and development. A study in Uganda, for example, found that deworming treatment increased child weight by 10% for children who received treatment twice per year, and by 5% for children who received treatment annually. School-based mass deworming has also shown to reduce school absenteeism more cost-effectively than alternative ways of boosting school attendance. In Kenya, school-based mass deworming reduced school absenteeism by 25% for those in treatment schools. Furthermore, deworming has spill over effects for untreated school-age and preschool children. In Kenya, young sibling of those treated, as well as children who lived nearby treatment schools but were too young to be dewormed, showed gains in cognitive development equal to half a year of schooling when evaluated ten years later.

The impact of deworming on children goes beyond health and education outcomes. A new landmark study published in 2021 by a team of economists, led by Edward Miguel and Nobel laureate Michael Kremer, offers new evidence of the long-term benefits of school-based deworming. According to the study, which followed a group of Kenyan students every 5 years over a 20-year period, receiving two to three additional years of deworming increased their income by 13% and consumption by 14% decades after treatment. An extra two to three years of deworming treatments in school also significantly increased odds (by 9%) of working outside of agriculture and in urban areas, which presents more opportunity for jobs that largely pay better and offer more opportunity for growth. The study also calculates that the investment in deworming Kenya's children has so far had a 37% annualised rate of return.



¹Alderman, H., Konde-Lule, J., Sebuliba, I., Bundy, D., & Hall, A. (2006). Effect on weight gain of routinely giving albendazole to preschool children during child health days in Uganda: cluster randomised controlled trial. BMJ. 333:122.

²Miguel, E. & Kremer, M. (2004). Worms: Identifying impacts on education and health in the presence of treatment externalities. Econometrica, 72:159-217

³Ozier, O. (2016). Exploiting Externalities to Estimate the Long-Term Effects of Early Childhood Deworming. World Bank- Development Research Group

⁴Hamory, J., Miguel, E., Walker, M., Kremer, M., & Baird, S. (2020). Twenty Year Economic Impacts of Deworming. University of California, Berkeley.



NATIONAL SCHOOL BASED DEWORMING PROGRAMME

Year 9(2020-2021) National Programme Results

County	Sub County	PSAC + SAC (STH)			PSAC (STH)		SAC (STH)	
		% Treated	Targeted	Dewormed	Targeted	Dewormed	Targeted	Dewormed
Bomet 306,206 (92%)	Bomet Central	96%	44,210	42,473	12,022	9,472	32,189	33,001
	Bomet East	88%	60,067	52,916	16,312	11,888	43,755	41,028
	Chepalungu	94%	82,014	76,702	21,696	17,954	60,318	58,748
	Konoin	93%	54,695	51,135	14,516	11,720	40,179	39,415
	Sotik	91%	90,926	82,980	26,723	21,046	64,204	61,934
Bungoma 637,620 (97%)	Bumula	100%	88,167	88,433	20,704	21,666	67,463	66,767
	Bungoma Central	97%	66,386	64,417	16,743	16,090	49,643	48,327
	Bungoma East	96%	47,058	45,278	10,499	10,567	36,559	34,711
	Bungoma North	102%	48,685	49,455	11,574	11,453	37,112	38,002
	Bungoma South	93%	98,658	91,624	24,125	20,145	74,533	71,479
	Bungoma West	100%	51,050	51,238	12,347	12,808	38,703	38,430
	Cheptais	98%	59,400	58,005	16,342	15,832	43,058	42,173
	Kimili Bungoma	93%	63,476	58,838	16,484	14,078	46,992	44,760
	Mt Elgon	92%	36,901	33,777	9,783	8,306	27,118	25,471
	Tongaren	100%	39,634	39,682	10,044	10,317	29,590	29,365
Busia 297,536 (84%)	Webuye West	93%	60,984	56,873	19,744	15,145	41,240	41,728
	Bunyala	85%	33,352	28,244	10,353	6,066	22,999	22,178
	Busia	87%	54,672	47,617	12,664	9,230	42,008	38,387
	Butala	97%	57,045	55,320	13,392	12,142	43,653	43,178
	Nambale	92%	43,909	40,371	10,313	8,546	33,596	31,825
	Samia	94%	40,573	38,254	9,569	8,128	31,004	30,126
Homabay 431,584 (92%)	Teso North	83%	53,527	44,255	14,433	10,252	39,094	34,003
	Teso South	60%	72,545	43,475	19,962	11,415	52,583	32,060
	Homa Bay	85%	48,969	41,596	13,574	10,285	35,395	31,311
	Mbita	90%	51,414	46,258	14,434	11,899	36,980	34,359
	Ndhiwa	96%	90,768	87,049	23,224	23,891	67,544	63,158
	Rachuonyo East	98%	48,339	47,131	10,878	11,568	37,461	35,563
	Rachuonyo North	88%	72,185	63,213	13,868	15,171	58,317	48,042
	Rachuonyo South	97%	51,079	49,517	11,976	12,604	39,103	36,913
	Rangwe	96%	49,470	47,353	11,473	11,435	37,997	35,918
	Suba	90%	54,947	49,467	16,132	14,550	38,815	34,917
Kakamega 728,662 (84%)	Butere	84%	71,157	59,873	24,670	14,618	46,487	45,255
	Kakamega Central (Lurambi)	78%	75,400	59,143	26,999	14,800	48,401	44,343
	Kakamega East (Shinyalu)	88%	74,210	65,141	21,500	13,999	52,710	51,142
	Kakamega North (Malava)	81%	118,171	95,758	46,022	24,929	72,149	70,829
	Kakamega South (Ikolomani)	86%	49,865	42,855	16,266	10,440	33,599	32,415
	Khwiseri	86%	47,567	40,958	15,260	9,991	32,307	30,967
	Likuyani	90%	67,437	60,432	22,308	13,864	45,129	46,568
	Lugari	82%	56,295	46,345	19,825	11,199	36,470	35,146
	Matete	80%	37,766	30,247	12,323	7,433	25,443	22,814
	Matungu	85%	81,966	69,986	29,292	18,229	52,674	51,757
	Mumias East	86%	54,138	46,653	18,128	11,699	36,010	34,954
	Mumias West	83%	57,219	47,315	20,310	10,832	36,909	36,483
	Navakholo	81%	79,426	63,956	30,093	15,843	49,333	48,113
Kericho 300,962 (96%)	Belgut	99%	42,928	42,359	10,163	9,350	32,765	33,009
	Buret	96%	68,797	66,362	17,555	15,721	51,242	50,641
	Kericho	102%	53,456	54,755	14,550	13,754	38,906	41,001
	Kipkelion East	92%	51,103	46,832	13,581	11,543	37,522	35,289
	Kipkelion West	90%	49,140	44,399	14,360	11,046	34,780	33,353
	Soin / Sigowet	94%	49,152	46,255	11,941	10,737	37,211	35,518
Kilifi 442,910 (79%)	Chonyi	78%	26,292	20,491	5,426	4,045	20,867	16,446
	Ganze	80%	69,003	54,923	14,085	9,930	54,918	44,993
	Kaloleni	80%	84,295	67,584	21,712	14,007	62,583	53,577
	Kauma	77%	10,065	7,758	1,955	1,209	8,110	6,549
	Kilifi North	80%	54,838	43,723	10,475	7,917	44,363	35,806
	Kilifi South	75%	76,844	57,600	14,944	12,246	61,900	45,354
	Magarini	80%	85,856	69,101	18,048	12,257	67,808	56,844
	Malindi	78%	108,404	85,045	20,966	14,430	87,438	70,615
	Rabai	82%	44,917	36,685	10,224	6,929	34,694	29,756
	Etago	77%	34,748	26,656	7,519	6,339	27,229	20,317
Kisii 459,631 (98%)	Gucha	105%	31,631	33,176	6,819	8,678	24,812	24,498
	Gucha South	97%	31,618	30,690	5,569	6,633	26,048	24,057
	Kenyenya	104%	51,062	52,933	10,916	13,736	40,146	39,197
	Kisii Central	95%	76,474	72,360	18,568	18,456	57,906	53,904
	Kisii South	98%	53,971	52,979	11,221	12,931	42,750	40,048
	Kitutu Central	101%	39,209	39,508	7,189	8,381	32,020	31,127
	Marani	100%	40,413	40,595	8,607	10,496	31,806	30,099
	Masaba South	99%	39,810	39,305	8,159	9,174	31,651	30,131
	Nyamache	100%	47,644	47,624	9,737	11,292	37,907	36,332
	Sameta	99%	24,115	23,805	4,870	5,303	19,245	18,502



NATIONAL SCHOOL BASED DEWORMING PROGRAMME

Year 9(2020-2021) National Programme Results

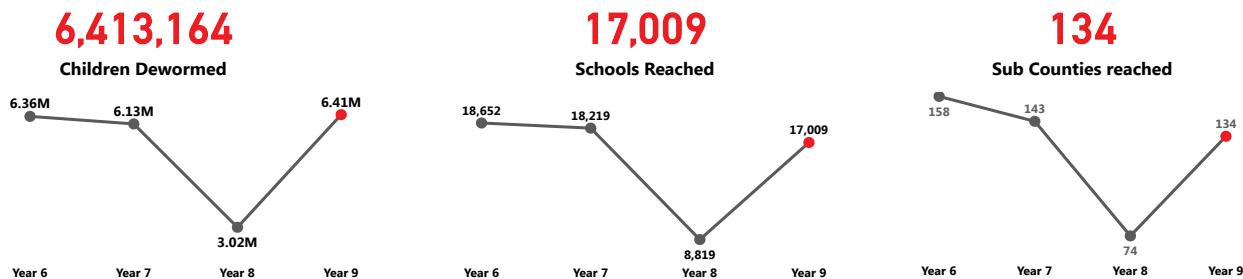
County	Sub County	PSAC + SAC (STH)			PSAC (STH)		SAC (STH)	
		% Treated	Targeted	Dewormed	Targeted	Dewormed	Targeted	Dewormed
Kisumu 352,613 (82%)	Kisumu Central	77%	75,709	58,405	24,240	11,917	51,469	46,488
	Kisumu East	79%	50,749	40,170	16,929	9,390	33,820	30,780
	Kisumu West	81%	63,693	51,578	17,956	11,717	45,737	39,861
	Muhoroni	86%	62,418	53,643	17,998	12,234	44,420	41,409
	Nyakach	88%	61,771	54,061	16,532	12,319	45,239	41,742
	Nyando	83%	64,469	53,251	18,691	11,558	45,778	41,693
Kwale 216,978 (77%)	Seme	84%	49,614	41,505	12,820	8,486	36,794	33,019
	Kinango	64%	43,705	28,068	11,256	3,707	32,449	24,361
	Kwale/Matuga	77%	71,797	55,160	18,986	10,554	52,811	44,606
	Lunga Lunga	80%	42,584	34,193	9,532	7,586	33,052	26,607
	Msambweni	87%	55,151	47,730	12,139	10,403	43,012	37,327
Lamu 40,013 (94%)	Samburu	74%	70,304	51,827	16,746	4,351	53,558	47,476
	Lamu Central	73%	14,909	10,956	3,525	2,629	11,384	8,327
	Lamu East	89%	7,198	6,381	1,551	1,390	5,647	4,991
Migori 453,857 (93%)	Lamu West	86%	26,294	22,676	6,880	5,444	19,414	17,232
	Awendo	88%	59,988	52,719	18,878	15,634	41,110	37,085
	Kuria East	48%	33,939	16,316	9,315	4,188	24,624	12,128
	Kuria West	127%	47,887	60,955	12,658	15,970	35,229	44,985
	Mabera	92%	36,784	33,823	8,621	7,705	28,163	26,118
	Ntimaru	168%	9,862	16,581	2,297	3,843	7,565	12,738
	Nyatike	87%	76,231	66,074	22,854	17,673	53,377	48,401
	Rongo	91%	56,054	51,044	16,049	13,155	40,005	37,889
	Suna East	94%	53,065	49,872	13,979	12,670	39,086	37,202
	Suna West	93%	61,817	57,766	17,889	15,673	43,928	42,093
Mombasa 247,642 (56%)	Uriri	89%	54,467	48,707	13,942	11,834	40,525	36,873
	Changamwe	54%	47,861	25,776	11,718	6,869	36,143	18,907
	Jomvu	66%	56,139	36,977	13,928	9,657	42,211	27,320
	Kisauni	45%	132,011	59,351	22,798	15,404	109,213	43,947
	Likoni	60%	84,981	51,069	20,921	12,784	64,060	38,285
	Mvita	65%	45,675	29,821	7,918	6,317	37,757	23,504
Nandi 140,352 (103%)	Nyali	59%	75,682	44,648	15,008	10,656	60,674	33,992
	Nandi East	110%	36,972	40,693	8,855	10,298	28,117	30,395
	Nandi South	99%	58,140	57,593	13,397	13,492	44,743	44,101
Narok 134,220 (82%)	Tinderet	102%	41,169	42,066	9,022	9,824	32,147	32,242
	Trans Mara East	83%	62,580	51,903	15,014	11,158	47,566	40,745
Nyamira 196,471 (102%)	Trans Mara West	82%	100,249	82,317	27,774	19,931	72,475	62,386
	Borabu	94%	24,935	23,525	4,824	5,002	20,110	18,523
	Manga	116%	27,921	32,528	6,685	8,681	21,236	23,847
	Masaba North	93%	34,428	31,870	7,453	7,692	26,975	24,178
	Nyamira North	112%	49,838	55,799	13,826	13,630	36,011	42,169
	Nyamira South	96%	55,177	52,749	11,775	12,512	43,402	40,237
Siaya 290,875 (80%)	Bondo	84%	75,421	63,654	24,111	14,625	51,310	49,029
	Gem	89%	68,208	60,744	17,710	12,503	50,497	48,241
	Rarieda	87%	58,960	51,381	16,469	11,161	42,491	40,220
	Siaya	43%	70,064	30,318	20,504	7,156	49,559	23,162
	Ugenya	96%	49,596	47,510	11,294	9,959	38,302	37,551
	Ugunja	92%	40,673	37,268	11,033	8,138	29,640	29,130
Taita Taveta 87,487 (91%)	Mwatate	100%	23,790	23,685	5,796	5,237	17,994	18,448
	Taita	88%	14,480	12,814	3,769	2,910	10,711	9,904
	Taveta	87%	26,451	23,000	6,490	4,573	19,960	18,427
	Voi	89%	31,381	27,988	7,806	6,340	23,574	21,648
Tana River 74,756 (64%)	Bura/Tana North	66%	33,558	22,244	8,303	5,389	25,255	16,855
	Tana Delta	68%	43,691	29,726	9,123	7,053	34,568	22,673
Trans Nzoia 355,041 (82%)	Tana River	(58%)	39,569	22,786	10,367	5,551	29,202	17,235
	Endebess	79%	51,526	40,731	17,661	9,363	33,865	31,368
	Kiminini	84%	98,704	82,878	34,410	20,819	64,295	62,059
	Kwanza	84%	85,609	71,581	27,695	18,396	57,914	53,185
	Trans Nzoia East / Cherengany	(82%)	97,522	79,567	27,695	19,802	69,827	59,765
Vihiga 217,748 (87%)	Trans Nzoia West / Saboti	83%	97,115	80,284	34,764	21,254	62,351	59,030
	Emuhaya	82%	43,073	35,190	14,946	8,665	28,128	26,525
	Hamisi	89%	70,923	62,816	21,548	14,218	49,375	48,598
	Luanda	90%	42,203	37,948	13,121	9,656	29,082	28,292
	Sabatia	88%	54,592	48,137	17,348	11,121	37,244	37,016
	Vihiga	87%	38,510	33,657	12,284	7,914	26,226	25,743
	Total	(85%)	7,509,210	6,413,164	2,002,029	1,507,825	5,507,182	4,905,339



NATIONAL SCHOOL BASED DEWORMING PROGRAMME

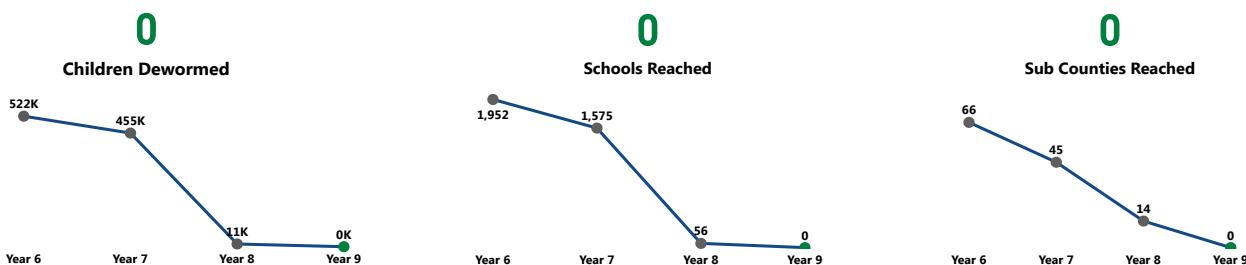
Year 9(2020-2021) National Programme Results

SOIL-TRANSMITTED HELMINTHS (STH) TREATMENT SUMMARY



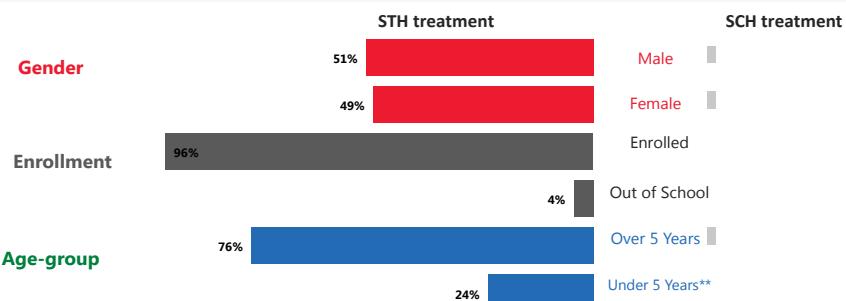
In year 8 no. of children dewormed was significantly lower due to the mandated closure of schools brought on by the COVID-19 pandemic

SCHISTOSOMIASIS (SCH) TREATMENT SUMMARY

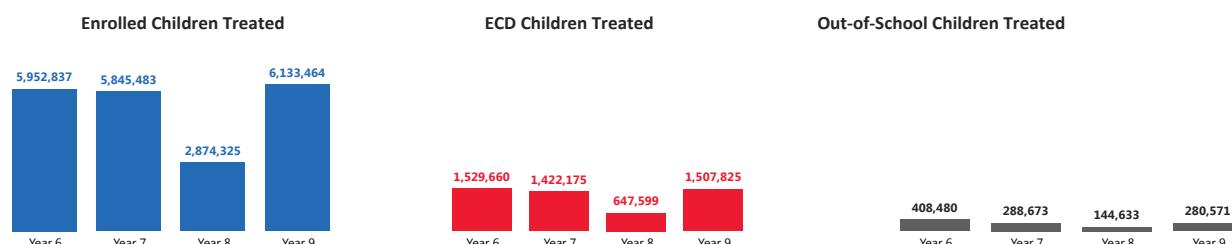


In Year 9, NSBDP did not treat schistosomiasis due to drug procurement challenges.

COMPARISON OF TREATMENTS BY GENDER, AGE GROUP AND ENROLMENT STATUS



TREATMENT TRENDS FOR SOIL TRANSMITTED HELMINTHS



FY 2019/2020

County	Children treated for STH
Bomet	306,206
Bungoma	637,620
Kakamega	728,662
Kericho	300,962
Nandi	140,352
Trans Nzoia	355,041
Vihiga	217,748
Total	2,686,591

FY 2020/2021

County	Children treated for STH
Busia	297,536
Homabay	431,584
Kisii	459,631
Kisumu	352,613
Migori	453,857
Narok	134,220
Nyamira	196,471
Siaya	290,875
Mombasa	247,642
Taita Taveta	87,487
Tana River	74,756
Kilifi	442,910
Kwale	216,978
Lamu	40,013
Total	3,726,573

One of the main challenges experienced with regard to treatment in Y9 was the change in the school calendar due to the COVID-19 pandemic. The first seven counties were treated in FY 2020/2021 in the month of March 2021 which was the rescheduled second term of the 2020 school year. The remaining 14 counties were treated in FY 2021/2022 in the month of September 2021 which was the rescheduled first term of the 2021 school year.



Implementing the National School-Based Deworming Programme: The Cascade

The National School-Based Deworming Programme uses a cascade implementation model that efficiently and cost-effectively delivers training, deworming medicine, and programme material from the national-level to schools. The cascade brings together personnel from the Ministry of Education and Ministry of Health for collaborative leadership in planning, training, implementation, and monitoring of programme activities at all levels.

County Sensitization and Planning Meetings

County Directors of Education and Health convene yearly sensitisation and planning meetings in preparation of annual mass deworming. This allows the programme to gain buy-in and build partnerships with county-level leaders.

Sub County Trainings

Master trainers, nominated personnel from the Ministry of Education and Ministry of Health in implementing counties, are responsible for training of sub-county and zone/ward-level personnel on managing and implementing the programme. Community Health Extension Workers (CHEWs) / Community Health Assistants (CHAs) also attend this training to support community mobilisation and management of any potential serious adverse events (SAEs).

Teacher Trainings

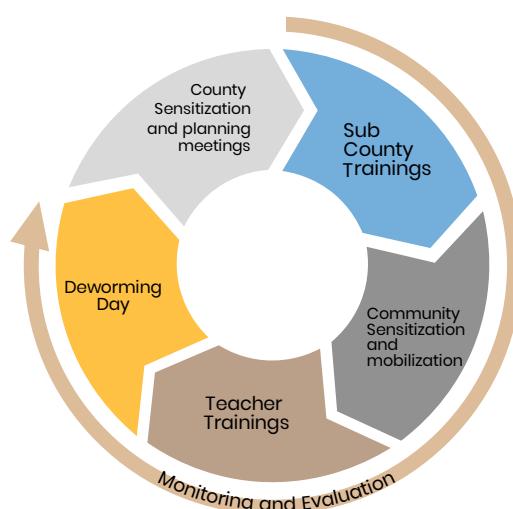
Teachers are critical to the programme's success as they administer deworming medicines in schools. Head teachers and health teachers are trained to sensitise children and the community, administer deworming medicines, and properly fill and submit reporting forms after Deworming Day.

Community Sensitisation and Mobilisation

Before Deworming Day, health workers and teachers share key messages with children, parents, and local leaders, encouraging community members to bring their children for deworming. Posters are put up in schools and in strategic community locations to emphasise the importance of deworming, how to prevent infections, and the date and location of treatment. The key messages are also disseminated through local radio stations.

Deworming Day

On designated County Deworming Days, teachers administer deworming medicines to children aged 2-14 years in public and private primary schools, in nearby Early Childhood Development (ECD) centres, and to children from the community who are out-of-school. Teachers complete treatment forms to record the number of children treated. Ministry of Health personnel visit schools to monitor drug administration and manage any serious adverse events that might occur.





Programme Monitoring & Evaluation

The Kenya Medical Research Institute (KEMRI) is the national body responsible for carrying out human health research in Kenya and is a key partner in the programme. Through its renowned international experts in soil-transmitted helminthiasis and schistosomiasis research, KEMRI provides support in mapping, parasitological analysis, implementation research and impact evaluation. Results from this work are useful in making fundamental decisions on treatment targeting, thus helping the programme maintain its evidence-based targeting approach.

Impact Assessments & Research

Since the inception of the program KEMRI's Eastern and Southern Africa Centre of International Parasite Control (ESACIPAC) has conducted repeat representative cross-sectional surveys assessing prevalence and intensity of soil-transmitted helminthiasis (hookworm, whipworm, and roundworm) and schistosome infections (*Schistosoma mansoni* and *Schistosoma haematobium*) in school-age children. Results from this work guide programme decisions, demonstrate the impact of the programme, and help the National School-Based Deworming Programme maintain its evidence-based approach.

Following four successful large-scale surveys of soil-transmitted helminthiasis (STH) and schistosomiasis, in Year 9 of the programme, KEMRI conducted an in-depth secondary analysis using previous survey data (Y1-Y6). The studies were designed to; observe trends in prevalence and intensity across the lifespan of the programme, differentiate prevalence between PSAC and SAC, identify correlations between changes in treatment coverage and STH infection, identify WASH and behaviour correlates with helminth infection, and observe correlations with country-level and risk of infection.

Soil-transmitted helminthiasis (STH) and *S. haematobium* have experienced substantial reductions in prevalence over the course of the programme while *S. mansoni* has remained low. Prevalence surveys have been conducted at baseline (2012), midline (2015), endline (2017), and follow-up (2018) estimating the overall prevalence of any STH to shift from 33.6%, 18.6%, 15.2%, and to 12.9% over the course of the programme. *S. haematobium* has been estimated at 18.0%, 7.9%, 3.9%, and 0.3% while *S. mansoni* 2.4%, 1.7%, 2.0% and 0.2% over the same time periods.

After six rounds of MDA, prevalence of STH has significantly declined among both PSAC and SAC, however prevalence of moderate and heavy intensity infections for both classes of parasite are yet to decrease below 2%, the point at which they are no longer considered a public health problem. The programme has been highly effective, contributing to a reduction of 60.0% in the total number of people infected with any STH and of 97.9% for *S. haematobium*. Inter-region and inter-county heterogeneity in infection levels have been seen as shown in table 1.



Table 1: Number of schools (children) examined, undifferentiated STH pre-treatment prevalence % (95%CI), and relative reductions % (95%CI), and relative reductions % (Walid test: Z-statistic, p-value) by county for preschool (PSAC) and school (SAC) aged group of children in 20 counties in Kenya

County	Number of schools (children) examined	Undifferentiated STH pre-treatment prevalence % (95%CI)						Relative Reduction (Year 1 – Year 6)		
		Year 1	Year 3	Year 5	Year 6	Year 1	Year 3	Year 5	Year 6	RRI% (Walid test, p-value)
PSAC Group										
Bomet	11 (88)	9 (99)	11 (139)	5 (39)	46.6 (30.5-70.1)	31.3 (18.1-54.1)	20.9 (14.6-29.8)	20.5 (13.8-30.4)	56.0 (Z=-3.11, p=0.002)*	
Bungoma	9 (93)	10 (102)	10 (138)	5 (60)	54.8 (43.5-69.2)	20.6 (12.8-33.1)	15.9 (10.0-25.3)	8.5 (1.9-37.4)	84.5 (Z=-2.56, p=0.011)*	
Busia	17 (118)	17 (111)	18 (268)	5 (28)	33.1 (22.2-49.2)	26.1 (19.4-35.3)	17.7 (11.4-27.4)	28.6 (10.8-75.5)	13.6 (Z=-0.33, p=0.738)	
Garissa	_ns	_ns	5 (20)	_ns	_ns	_ns	_ns	0	_ns	
Homa Bay	24 (422)	23 (211)	21 (121)	3 (7)	23.9 (18.2-31.5)	17.5 (11.5-26.7)	8.3 (4.0-16.9)	57.1 (24.7-73.2)	Increase(38.8%, p=0.031)**	
Kakamega	19 (177)	18 (175)	19 (254)	5 (42)	44.1 (34.1-56.9)	17.7 (9.2-34.2)	14.9 (9.7-22.7)	26.8 (12.4-58.0)	39.1 (Z=-1.32, p=0.187)	
Kericho	12 (161)	10 (96)	12 (166)	5 (37)	38.5 (29.3-50.6)	24.0 (15.6-36.8)	28.5 (19.7-41.3)	21.6 (18.4-25.4)	4.3 (9 (Z=-3.95, p=0.001)*	
Kilifi	3 (25)	2 (5)	2 (13)	5 (57)	28.0 (18.6-42.1)	20.0 (8.2-32.6)	0	1.8 (0.3-10.7)	93.7 (Z=-2.58, p=0.010)*	
Kisii	11 (101)	12 (85)	12 (117)	5 (70)	46.5 (36.9-58.6)	34.1 (28.5-40.8)	26.5 (18.8-37.4)	36.2 (24.2-54.3)	22.1 (Z=-1.32, p=0.186)	
Kisumu	10 (181)	10 (89)	9 (76)	5 (14)	21.5 (14.9-31.1)	2.2 (0.7-7.3)	2.6 (0.6-12.2)	7.1 (1.2-41.4)	66.8 (Z=-1.34, p=0.181)	
Kitui	_ns	_ns	5 (29)	_ns	_ns	_ns	0	0	_ns	
Kwale	9 (98)	10 (52)	10 (191)	5 (33)	25.5 (15.7-41.4)	7.7 (3.4-17.3)	6.4 (3.9-10.3)	12.1 (7.0-21.1)	52.5 (Z=-2.60, p=0.009)*	
Makueni	_ns	_ns	4 (12)	_ns	_ns	_ns	0	0	_ns	
Migori	8 (127)	8 (83)	8 (78)	5 (66)	18.9 (12.8-27.8)	1.2 (0.2-8.1)	3.9 (0.7-21.9)	4.5 (2.5-8.2)	75.9 (Z=-3.64, p=0.001)*	
Mombasa	3 (41)	2 (19)	3 (42)	5 (33)	14.6 (3.7-58.6)	10.5 (7.7-14.3)	0	3.0 (0.5-17.6)	79.3 (Z=-1.53, p=0.127)	
Narok	10 (99)	7 (75)	9 (83)	5 (61)	55.6 (43.5-70.9)	36.0 (21.1-61.3)	45.8 (31.2-67.2)	37.7 (19.2-74.1)	32.1 (Z=-1.19, p=0.235)	
Nyamira	9 (101)	9 (67)	9 (99)	4 (63)	38.6 (27.9-53.4)	29.9 (19.8-45.0)	30.3 (23.1-39.8)	45.2 (35.4-57.6)	Increase(17.0%, p=0.338)	
Taita Taveta	3 (32)	3 (32)	3 (34)	5 (72)	9.4 (2.0-42.3)	0	2.9 (0.3-33.4)	0	100 (Z=-3.03, p=0.002)*	
Vihiga	8 (85)	8 (65)	8 (151)	5 (31)	47.1 (39.8-55.6)	27.7 (20.3-37.7)	41.5 (26.3-65.4)	29.0 (16.9-49.8)	38.3 (Z=-1.73, p=0.084)	
Wajir	_ns	_ns	3 (7)	_ns	_ns	_ns	0	0	_ns	
Overall	166 (1949)	159 (1366)	164 (1992)	94 (781)	33.7 (30.4-37.4)	20.2 (17.1-23.9)	19.0 (15.9-22.6)	17.9 (13.4-23.9)	46.9 (Z=-4.44, p=0.001)*	
SAC Group										
Bomet	12 (117)	12 (1185)	12 (1132)	5 (499)	29.1 (19.7-42.9)	22.8 (15.0-34.6)	17.7 (11.0-28.5)	24.2 (16.6-35.2)	16.7 (Z=-0.71, p=0.476)	
Bungoma	10 (921)	10 (920)	10 (895)	5 (456)	48.6 (41.4-57.2)	9.1 (7.2-11.5)	6.1 (3.9-9.6)	4.7 (2.5-8.8)	90.3 (Z=-8.16, p=0.001)*	
Busia	18 (1757)	18 (1780)	18 (1641)	5 (497)	36.3 (31.6-41.6)	26.0 (19.3-35.0)	16.8 (12.1-23.4)	23.4 (9.0-61.0)	35.5 (Z=-1.04, p=0.297)	
Garissa	_ns	_ns	5 (177)	_ns	_ns	_ns	0	0	_ns	
Homa Bay	24 (2100)	24 (2238)	23 (2300)	5 (527)	31.2 (25.6-38.2)	16.3 (11.4-23.4)	11.7 (7.6-18.0)	22.6 (17.7-28.9)	27.6 (Z=-2.27, p=0.023)*	
Kakamega	20 (1885)	20 (1869)	20 (1801)	5 (490)	29.7 (24.3-36.4)	15.6 (10.9-22.5)	9.1 (5.9-14.0)	23.8 (17.3-32.8)	19.8 (Z=-1.26, p=0.206)	
Kericho	12 (1107)	12 (1189)	12 (1094)	5 (498)	28.1 (20.1-39.3)	16.1 (10.9-22.5)	20.0 (13.3-30.1)	16.8 (13.2-21.4)	40.3 (Z=-2.87, p=0.004)*	
Kilifi	3 (279)	3 (282)	3 (280)	5 (444)	33.3 (31.1-35.7)	5.0 (3.3-7.4)	2.2 (1.4-3.4)	5.3 (1.4-19.6)	84.2 (Z=-2.78, p=0.005)*	
Kisii	12 (1178)	12 (1171)	12 (1141)	5 (456)	46.9 (40.6-54.1)	25.6 (19.5-33.6)	23.6 (17.7-31.4)	19.6 (12.4-31.1)	58.1 (Z=-4.86, p=0.001)*	
Kisumu	10 (887)	10 (927)	10 (984)	5 (524)	16.6 (11.9-23.2)	5.0 (3.3-7.4)	4.1 (2.8-6.1)	3.1 (1.2-7.8)	81.5 (Z=-3.68, p=0.001)*	
Kitui	_ns	_ns	5 (509)	_ns	_ns	_ns	0	0.4 (0.1-1.3)	_ns	
Kwale	10 (912)	10 (917)	10 (813)	5 (485)	29.5 (22.3-39.1)	16.0 (10.1-25.3)	4.4 (2.7-7.1)	5.9 (3.4-10.3)	79.9 (Z=-5.80, p=0.001)*	
Makueni	_ns	_ns	5 (510)	_ns	_ns	_ns	0	0.6 (0.2-2.1)	_ns	
Migori	8 (718)	8 (773)	8 (736)	5 (467)	23.0 (18.3-28.9)	2.2 (1.5-3.3)	1.9 (1.0-3.7)	2.2 (1.1-4.3)	90.6 (Z=-6.38, p=0.001)*	
Mombasa	3 (279)	3 (281)	3 (265)	5 (485)	20.8 (10.4-41.5)	2.5 (0.9-7.1)	1.8 (0.2-17.7)	2.2 (0.7-6.4)	89.4 (Z=-3.57, p=0.001)*	
Narok	10 (932)	10 (968)	10 (951)	5 (442)	53.0 (47.4-59.2)	40.2 (33.1-48.8)	43.3 (36.2-51.7)	23.1 (16.9-31.6)	56.4 (Z=-6.31, p=0.001)*	
Nyamira	10 (965)	10 (1000)	10 (956)	5 (448)	30.8 (23.1-41.0)	18.5 (13.6-25.1)	16.4 (12.1-22.2)	19.7 (10.6-36.7)	35.9 (Z=-2.22, p=0.027)*	
Taita Taveta	3 (285)	3 (281)	3 (281)	5 (417)	2.1 (0.7-5.9)	0	0	0.2 (0.1-7)	88.6 (Z=-1.87, p=0.061)	
Vihiga	8 (752)	8 (749)	8 (703)	5 (500)	50.5 (43.4-58.8)	36.7 (27.0-50.0)	31.0 (19.3-49.7)	30.8 (19.1-49.7)	39.0 (Z=-2.36, p=0.018)*	
Wajir	_ns	_ns	5 (105)	_ns	_ns	_ns	0	0	_ns	
Overall	173 (16134)	173 (16258)	172 (15973)	100 (8936)	33.6 (31.2-36.1)	18.4 (16.2-20.9)	14.7 (12.6-17.1)	12.5 (10.0-15.6)	62.6 (Z=-9.52, p=0.001)*	

^{ns} Indicates counties which had not had routine parasitological monitoring, hence, surveys were not conducted in these counties during Year 1, Year 3 and Year 5 assessments.

* Indicates statistically significant reductions since Year 1 (noting that this could be a reflection of sampling technique, and noting also that oftentimes reductions have not been sustained).

** Indicates statistically significant increase in prevalence since Year 1.

Data Source: Infection prevalence data are collected and compiled by the Kenya Medical Research Institute (KEMRI), who conducts the monitoring and evaluation of the national school based deworming program.



Coverage-prevalence change point analysis has explored minimum treatment coverage required to sustain reductions in STH prevalence as shown in Figure 1. It has been observed that for program-wide reduction of any STH in both PSAC and SAC, a minimum treatment coverage of 82% is required, differing from the current WHO recommendation of 75%.

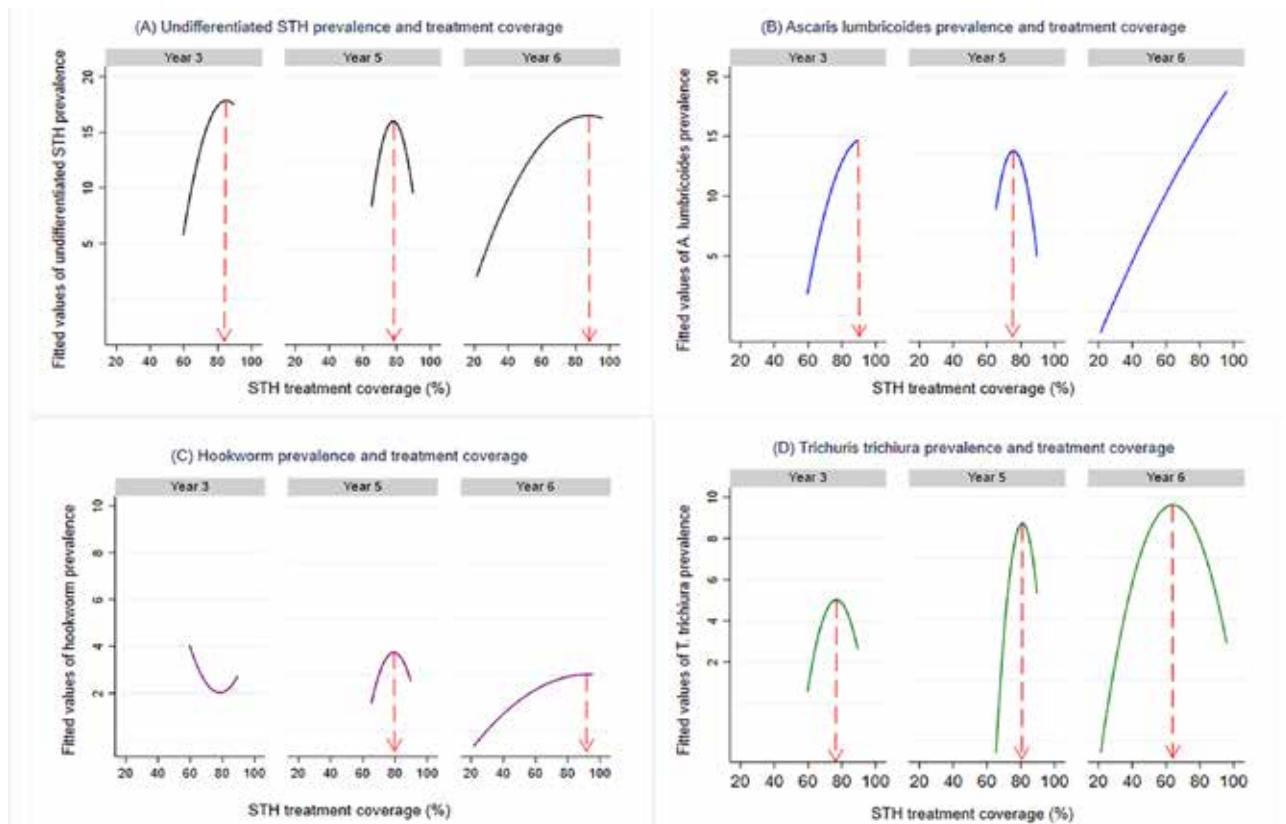


Figure 1: Non-linear relationship between STH infections prevalence (A: Any STH, B: Ascaris lumbricoides, C: Hookworm, and D: Trichuris trichiura) and treatment coverage for year 1, year 3 and year 6 survey time points among the general children population (both PSAC and SAC combined) in Kenya. Note that Year 1 was not displayed since there was no previous year treatment coverage to compare with the baseline prevalence.

Finally significant correlates with risk of STH infection have been shown to include not wearing shoes, [adjusted odds ratio (aOR) = 1.36 (95%CI: 1.09–1.69); p = 0.007]; high number of household members [aOR = 1.21 (95%CI: 1.04–1.41); p = 0.015]; and school absenteeism of more than two days [aOR = 1.33 (95%CI: 1.01–1.80); p = 0.045]. Further, children below five years had up to four times higher odds of getting STH infections [aOR = 4.68 (95%CI: 1.49–14.73); p = 0.008]. However, no significant factors were identified for schistosomiasis, probably due to low prevalence levels affecting performance of statistical analysis.

Process Monitoring & Coverage Validation

Process monitoring tracks programme activities to make sure they are being done according to plan. It is an extremely effective way of identifying challenges and potential blockages for programme managers. Once challenges are identified, programmatic changes can be made to strengthen inputs prior to the following round of deworming for higher quality outputs. Process monitoring also helps to address challenges in real-time.

Following WHO guidelines, coverage validation surveys are conducted in communities to validate reported coverage rates and check the accuracy of the system for recording and reporting treatment coverage data.

The National School-Based Deworming Programme contracts an independent monitoring firm to conduct



both process monitoring and coverage validation surveys before, during, and after deworming.

Process monitoring is conducted during the training cascade to assess the quality of training as well as on Deworming Day to monitor the implementation of deworming. Table X below showcases the Key Program Indicators tracked through this process and the results for each indicator in Year 9 of the programme.

Coverage validation surveys were conducted within 6 weeks of deworming treatment within four randomly selected counties – Bomet, Bungoma, Busia and Kilifi – to evaluate the program reach and coverage. Overall, 84% of children were offered the chance to swallow the drug (program reach) in Bomet, 83% in Bungoma, and 77% for both Busia and Kilifi, and 84% of the surveyed individuals ingested the drug (surveyed coverage) in Bomet, 83% in Bungoma, and 77% for both Busia and Kilifi. The surveyed coverage in all counties was above the WHO coverage threshold of 75%, indicating a successful round of deworming.

Table X. Key Performance Indicators from Y9 PMCV Report

	Current Round	Previous Round ²
Target schools represented at teacher training	91%	95%
Target schools with adequate drugs during deworming	91%	92%
Target school utilizing at least one awareness activity or material	88%	87%
Community members who report seeing or hearing about deworming through IEC deworming materials or word of mouth this year	77%	75%
Target schools distributing tablets on deworming day	89%	95%
Enrolled children present in school on deworming day	91%	94%
Targeted children who report receiving unprogrammed deworming in the last six months	24%	20%
Target population validated as swallowing deworming tablets on deworming day based on Coverage Validation	80%³	83%

Year 9 Programme Successes

Despite the COVID-19 pandemic, there was increased treatment coverage from the previous year over and above the consistent high coverage treatment of school-age children for STH. There was also a shift away from WHO donation to full drug procurement through KEMSA and increased national inter-ministerial coordination with NTD partners.

Lessons Learned & Way Forward

There is a need to procure Praziquantel for SCH treatment moving forward to ensure that children do not miss out on treatment in any given year. There should also be more focus on increasing access to treatment of out-of-school children and pre-school age children as well as accessing hard to reach areas. Consideration should likewise be made toward a mixed platform approach i.e school -based and community-based deworming with continued coordination among partners. There is also a need to work towards better reporting systems, data management and programme ownership.



Evidence
Action