



Evaluating a Transition to Government Ownership of Schistosomiasis and Soil-Transmitted Helminth Control Programs in Four Districts in Nigeria

The Carter Center and the Health Campaign Effectiveness Program at The Task Force for Global Health

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Key Messages

- “Mainstreaming,” or the integration of health campaigns into the primary health care system, has long been of interest to supporters of schistosomiasis and soil-transmitted helminth programs.
- The Carter Center evaluated a pilot of mainstreaming in four districts of Nigeria using a mixed methods approach. Qualitative findings showed marked skepticism before mainstreaming and low expectations of success, as measured by treatment coverage in school-age children.
- In this study, treatment coverage was evaluated prior to (2021) and after (2022) mainstreaming, which itself followed an extensive planning period.
- Treatment coverage of mebendazole (for soil-transmitted helminths) decreased from 80.9% (95% CI, 76.3% - 84.9%) to 75.9% (95% CI, 71.6% - 79.7%), but this change was not statistically significant ($P= 0.093$).
- Praziquantel coverage (for schistosomiasis) decreased from 72.5% (95% CI, 62.7% - 89.6%) to 55.4% (95% CI, 46.9% - 63.5%; $P= 0.007$), possibly due to an unstable supply chain and different targeting strategies.
- Participants identified drug logistics management as the most important need for continued support by international partners and were united in their desire for a gradual transition to mainstreamed interventions.
- The results suggest that government-led approaches for soil-transmitted helminths and schistosomiasis can sustain similar performance as partner-led programs if distribution logistics are properly accounted for.

Introduction

Schistosomiasis and soil-transmitted helminths are devastating parasitic diseases widespread in Nigeria, home to the largest number of people in the world in need of treatment for schistosomiasis (>26 million) [1], and the fourth-largest number of children in need of treatment for soil-transmitted helminthiases (>46 million) [2]. Schistosomiasis, also known as bilharziasis or “snail fever,” is a waterborne parasitic infection that damages internal organs. These organisms cause adverse health effects and stunting of growth. School-age children (ages 5 through 14) often carry the largest burden of these infections [3].

The World Health Organization currently aims to reduce high-intensity schistosomiasis and soil-transmitted helminth infections by providing praziquantel and albendazole/mebendazole, respectively, to school-age children. Programs aim to treat at least 75% of this age group [4]. Although mass drug administration (MDA) can reduce infection and morbidity, it rarely eliminates transmission on its own and must be continued long term to sustain disease control [5]. The Carter Center has assisted the Nigerian Ministry of Health with schistosomiasis since 1999 and soil-transmitted helminth control since 2013. Medicines are primarily delivered through schools. Many agencies advocate “mainstreaming” these programs—that is, phasing out external support and transferring program implementation to each endemic country’s primary health care system. This is particularly important in areas where the Neglected Tropical Disease (NTD) program is adjusting its scope. For example, trachoma, lymphatic filariasis, and onchocerciasis are NTDs that also rely on MDA, but they are focused on some version of “elimination”—the goal is for MDA to stop after prevalence falls below a certain point. In contrast, schistosomiasis and soil-transmitted helminths are “control” programs, meaning some level of intervention will always be needed (in the absence of radical improvements to hygiene and infrastructure) to suppress disease. Governments, partners, and donors alike are looking for ways to sustain coverage without relying on the traditional MDA campaigns that are hallmarks of other NTD programs. Yet there is limited evidence on whether schistosomiasis and soil-transmitted helminths treatment targets can be maintained after mainstreaming to the primary health care system.

The purpose of this study was to evaluate the transition of schistosomiasis and soil-transmitted helminth MDA programs to the primary health care system or routine health services in select districts in Nigeria. Study results will inform transition plans in other districts facing a similar future.

The overarching research question for this project was: “What is the impact of mainstreaming on the deworming program in four districts in Nigeria?” The question was addressed through three objectives:

- *Objective 1:* Transition schistosomiasis and soil-transmitted helminth treatment programs to the primary health care system or routine health services in select districts currently supported by The Carter Center.
- *Objective 2:* Evaluate the effects of transitioning the program to full government ownership by comparing treatment coverage among the target population before and after the transition to the primary health care system or routine health services to evaluate the success of the transition, supplementing the results with qualitative data.

- *Objective 3:* Develop recommendations based on study findings to inform schistosomiasis and soil-transmitted helminths transition plans for other districts and states in Nigeria.

Methods

The Carter Center selected four districts (local government areas, or LGAs) in four states: Ughelli South in Delta State, Egor in Edo State, Wamba in Nasarawa State, and Bassa in Plateau State. The Carter Center conducted transition planning with the ministries of health, ministries of education, the Primary Health Care Development Agency, and the State Universal Basic Education Boards, as well as other partners such as the immunization program.

The last Carter Center-assisted round of treatment for schistosomiasis and soil-transmitted helminths occurred in the study districts in 2021. Over the following months, The Carter Center worked with partners through extensive meetings to plan for the transition, identifying roles and responsibilities, potential barriers, and clarifying timelines for subsequent MDA. It was decided that The Carter Center would support delivery of MDA medicines to health centers, but not support training or any other aspects of MDA in 2022. All planning and execution were handled by primary health care services, school administrators, or a combination thereof.

In-depth interviews and focus groups with personnel positioned throughout the health system (“key informants”) were conducted at multiple time points by trained local facilitators to add context and clarity to the mechanics and effects of mainstreaming, as well as to articulate what barriers exist to fully independent government management of its NTD programs. All participants were chosen purposively for their expertise and insight on the health system and health programs in schools. Community members were asked to participate in a few focus groups as well. Interviews and focus groups were clustered around the timing of the two MDAs (July 2021 and 2022) but also occurred throughout the study. These interviews were transcribed and analyzed using qualitative analysis software MAXQDA 2022 (VERBI, Berlin, Germany). We conducted a content analysis and looked for themes that could be used to inform the mainstreaming process as well as for recommendations for future efforts.

MDA coverage among school-age children was measured within one month after each treatment round through household surveys. Coverage was defined as the proportion of eligible (appropriately aged) children who reported taking medicine. For each survey, a random sample of 30 communities was drawn from each LGA using population proportionate to estimated size sampling. Households were then sampled systematically (approximately every 1.96 households in the chosen neighborhood, or “cluster”), and all children were interviewed [6]. We aimed to reach a sample size of 1,435 children in each LGA; this was determined using an expected coverage rate of 70%, an alpha error and precision of 5%, and a non-response rate of 10%. We assumed a design effect of 4 to account for the high clustering effect of MDA, and an average household size of 4.4. We also collected demographic and asset information from the selected households to better describe the sample.

The key outcome of interest was mebendazole coverage; mebendazole is the drug of choice for soil-transmitted helminths and all children in the sample were eligible to receive it. Praziquantel, the drug used to treat schistosomiasis, was offered in specific, endemic wards, and was thus part of the survey for a subset of respondents. Praziquantel supply has been less consistent than

mebendazole in Nigeria in recent years, leading to frequent shortages that are often addressed through obtaining leftover medicines from a neighboring school or LGA. This can be exacerbated by complicated quantification practices at the state and federal Ministry of Health. While The Carter Center worked to ensure that medicines were available in the study LGAs, we did not conduct an audit to ensure the quantities matched what was expected.

We analyzed coverage with STATA version 15 (StataCorp, College Station, TX), using procedures appropriate for complex survey designs.

The study was approved by the state review boards in Nigeria and deemed non-research by the Emory Institutional Review Board. Verbal informed assent (for children) and consent (from parents/guardians) was considered sufficient for participants following an explanation of the study and their rights as respondents. Survey data were captured electronically using the ODK Collect app.

Results

Mainstreaming Approach Across the Four LGAs

Each LGA chose a slightly different approach to mainstreaming, which was discussed and decided during planning meetings hosted by The Carter Center. The earliest focus groups helped ground these discussions in realistic options. Bassa and Wamba LGAs relied on parent–teacher associations to support transportation reimbursement for teachers. These reimbursements allow teachers to retrieve medicines from health centers and return them to their schools. Previously trained teachers, mobilized by the State Universal Basic Education Board, led activities with support from community volunteers to reach unenrolled children. Proposals for future financial support by the district governments are currently under review.

In Ughelli South, the Primary Health Care Development Agency funded training for a limited number of teachers and health workers. Egor relied on teachers and coordinated with health workers in the immunization program to reach children, either during outreach visits to vaccinate children or by using health workers to relay medicines to schools. Funding from the government was provided to all teachers at both public and private schools to cover transportation costs. Transportation reimbursements and per diems serve to ensure attention to and participation in MDA activities, while training maintains capacity among staff. In a country where government salaries may go unpaid for months, such allowances supplement incomes and are perceived to be vital to the success of the MDA. These funds have historically been provided by The Carter Center to cover training, supervision, and various reporting activities. No funds were provided in 2022.

More details on the specifics of mainstreaming are available as an appendix.

Findings of Key Informant Interviews and Focus Groups

We conducted 56 key informant interviews and 9 focus group discussions at the beginning of the project to understand local people’s attitudes toward future mainstreaming. We found that most informants had little-to-no faith in the government’s capability to successfully manage the program, but a minority thought mainstreaming *should* happen because they could not depend on The Carter Center forever. As key informants stated:

The Carter Center has served the people, so if it feels it is time to take a rest from the NTD program in Nigeria, it is fine. The government will need to wake up to its responsibility of continuing the fight against the NTDs. —Government/LGA director

Government taking ownership of the program is the natural way to go if the program must be sustained. However, there are a lot of concerns. The concern is in the readiness of the government to take over the responsibilities. The government has solely relied on TCC [The Carter Center] for the technical and other support, and the sudden transition will cause a lot of undesirable changes. —Director, state health care board

Funding, personnel, and drug acquisition/distribution were projected to suffer the most. One key informant who shared this sentiment said:

When the government takes over, the financial aspect of the program will suffer terribly, mass drugs administration will not be conducted on schedule and the government may not show commitment towards the program. —School headmaster

Informants pleaded for The Carter Center to stay and support the program, continuing to provide funds, drugs, and training and very gradually release ownership.

An additional 22 key informant interviews and 14 focus group discussions were held after the 2021 (Carter Center-led) MDA, but before the 2022 (mainstreamed) MDA. Most informants had no faith in the government, claiming that the program would not be supported currently or in the future, while a few were confident in the government's ability to run the program, referencing the funds already allocated to NTDs. Some informants called for the program to be integrated into other health programs, specifically the ones that already target school-age children. One stated:

Taking over the de-worming program by the government is not bad because the government is well informed and due to the age criteria of children whom these drugs are administered to correlates with the free under 5 health care programs run by the government, it will be easy to incorporate/integrate this program with another one, there is already a state community health scheme standing by and financial resources /funds that will make sure these programs are run efficiently. —State health director

The need for NTD advocacy was emphasized by informants in this round of data collection – requesting that The Carter Center advocates to the government about the importance of the program, the improvements in health outcomes already achieved, as well as the need to continue MDA to further suppress the diseases.

[The Carter Center] should pay an advocacy visit to the governor himself, make him know the importance of these diseases though they are neglected; ... let him know that the Edo state indigenes are suffering from [these NTDs], let him see the priority of continuing the program. —Health worker

In addition to government advocacy, informants wanted The Carter Center to continue training program staff so they are left with competent personnel. Sensitization of communities to the program was also commonly seen as a priority. Because mistrust in government is so prominent, many informants hope to see the implementation of firm monitoring and evaluation so that funds and resources are appropriately allocated. It was suggested that The Carter Center at least remain involved with the program to supervise in this way.

Effective monitoring will help to keep track of the medicines and prevent them from getting into the wrong hands as some greedy individuals might remove the labels on the containers and sell them in the market. —Community member

Many also agree that The Carter Center should bring in other stakeholders for support. The desire for a gradual release of ownership is still called for and most informants remain opposed to mainstreaming the program.

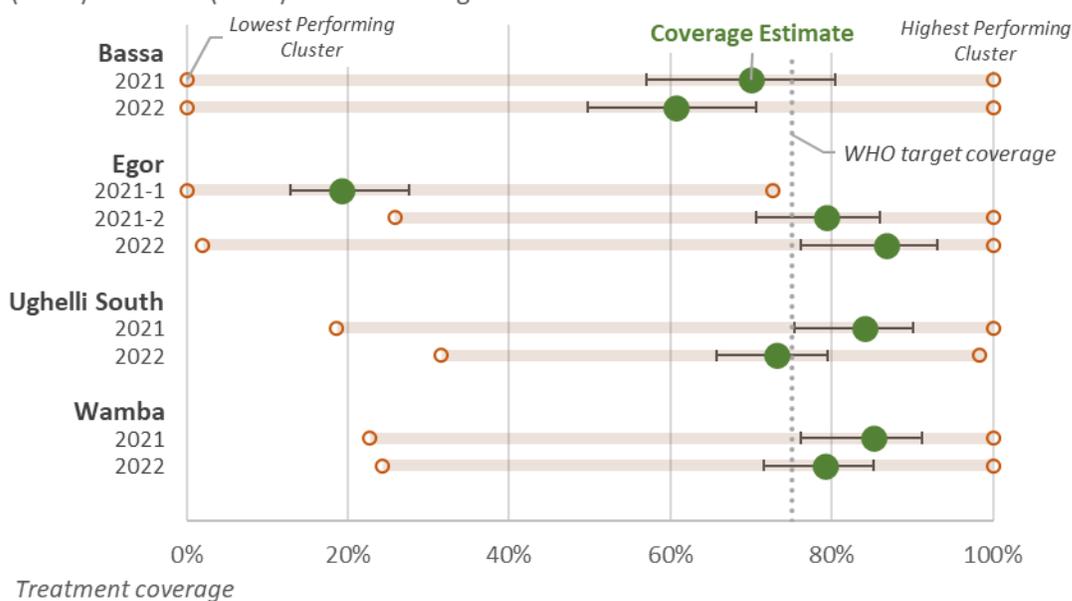
Impact of Mainstreaming on MDA Coverage Among School-Age Children

MDA coverage surveys conducted pre- (2021) and post- (2022) mainstreaming in the study districts enrolled a total of 11,901 school-age children (ages 5 through 14) across the two surveys. They came from 6,175 households in 227 communities, and 48.6% of children were female. Four communities could not be reached due to insecurity in Wamba district and were not replaced. Five communities could not be reached in Ughelli South district due to flooding but were replaced, and the selection probabilities were adjusted accordingly. The samples were drawn independently for each survey using the same procedures. In Egor district, MDA had not been fully implemented when the 2021 survey was conducted, so a second survey was conducted following MDA completion. These strata are shown as Egor-1 and Egor-2. Only the estimate from the Egor-2 survey is used when comparing the outcomes before and after the transition.

District-specific mean **mebendazole** MDA treatment coverage ranged from 70% to 85% in 2021,* and 61% and 87% in 2022 (Figure 1). Apart from Ughelli South, none of the changes in coverage from before and after that transition were statistically significant. Coverage in Ughelli South decreased by 11 percentage points from 84% to 73% ($P<0.05$). Figure 1 shows the coverage estimated through the surveys, their 95% confidence intervals, and the range of coverage levels observed.

* Egor-1 is shown for reference, but not used in comparisons.

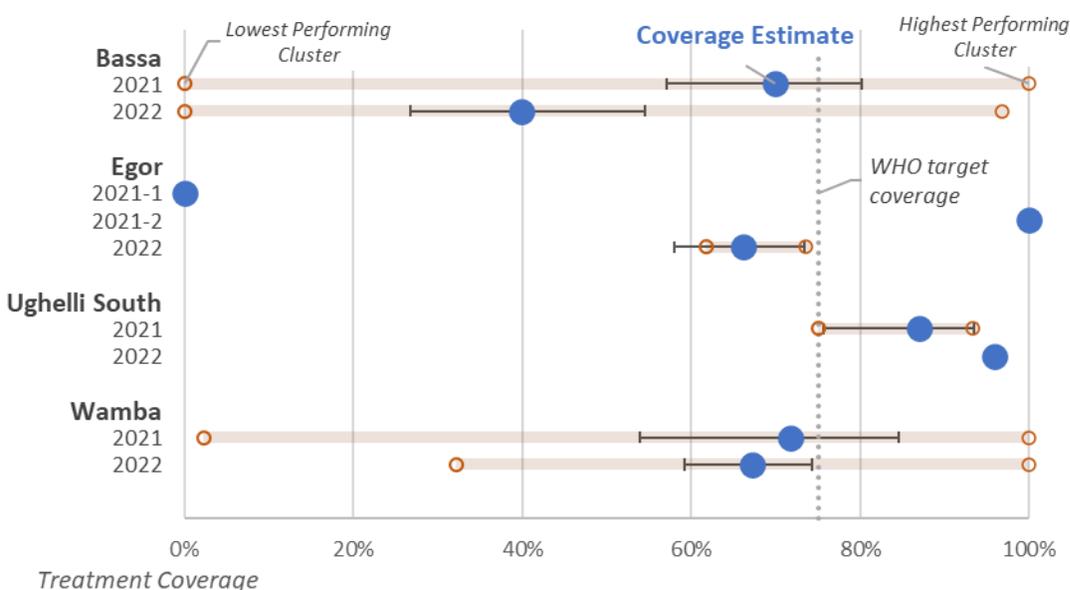
Figure 1: Estimates of **mebendazole** coverage, with 95% confidence intervals, among school-aged children in four districts of Nigeria, before (2021) and after (2022) mainstreaming



A total of 5,014 school-age children (42% of the sample) were eligible for praziquantel MDA.[†] Mean district-level **praziquantel** MDA coverage in the 2021 survey ranged from 70.0% to 100%, and from 40.0% to 95.9% in 2022 (Figure 2). The differences in coverage were statistically significant in all LGAs except Wamba. Coverage appeared to increase in Ughelli South by 9 percentage points, whereas it seemed to decrease in Egor by 33 and in Bassa by 30 percentage points ($P < 0.05$). Praziquantel supply is especially prone to disruption in Nigeria, which may explain some of these results. Results in Ughelli South and Egor should be interpreted with caution due to the extremely small (<3) number of eligible clusters.

[†] Only one community in each sample was eligible for praziquantel in 2021 in Egor and in 2022 in Ughelli South.

Figure 2: Estimates of praziquantel coverage, with 95% confidence intervals, among school-aged children in four districts of Nigeria, before (2021) and after (2022) mainstreaming



Access issues were the main drivers of coverage. Of those offered, 98.2% of respondents took mebendazole and 99.1% took praziquantel. Well over half of the children who were asked why they were not offered mebendazole listed absence or lack of MDA occurring as their explanation. The majority of children offered both medicines took both (82.8%). Access at the village level drove coverage rates, which is indicative of upstream logistics issues. Wamba and Bassa offered an insightful contrast in this regard. All but 1 of the 17 eligible villages in Wamba’s 2021 sample received at least some praziquantel, while all of the 15 eligible in 2022 did so. All of Bassa LGA was endemic for schistosomiasis and eligible for praziquantel. In 2021, 2 of 30 villages (6.7%) did not offer any praziquantel, while 10 of 30 (33.3%) did so in 2022.

The 2022 survey documented from whom children received MDA. Most school-age children in Bassa (68%), Ughelli South (92%), and Wamba (73%) received mebendazole from teachers, while 62% of children in Egor received it from health workers. The patterns were even more pronounced for praziquantel: 81%, 100%, 85% of children received it from teachers in the three LGAs, and 94% received it from health workers in Egor. Community volunteers were not used in Egor or Ughelli South but administered mebendazole to 14% of children in Bassa and 22% in Wamba; 15% of children in these LGAs received praziquantel in this manner.

Coverage was comparable across genders. Replacement villages performed similarly to other villages in Ughelli South in 2022 (73% in both surveys); however, we cannot know the coverage rates in areas that were unreachable.

The results tentatively demonstrate that, with some exceptions, MDA coverage is comparable immediately after mainstreaming and the transition to full government ownership in absence of upstream supply chain issues. Personnel were generally able to adapt to the withdrawal of NGO support as long as medicines were available and institutional memory persisted. Key questions

moving forward are how long this (lack of) effect lasts and what actions are needed to sustain performance.

Promising Practices

- In long-standing programs, seek clarity on how an international NGO's support is and is not relied upon at each level of implementation and by different kinds of staff. Document the existing practices, procedures, and enabling factors to delineate which elements can be transitioned.
- Begin planning for transitions early, preferably at least four years beforehand. Give programs time to try out new procedures, schedules, and divisions of responsibility.
- On the training of campaign workers, consider that it may only be necessary to train *new* teachers on MDA, with periodic refreshers every few years, rather than annual mass trainings.
- Consider whether the health system may also benefit from rethinking its supply chain at the periphery, delivering medicines to health posts or schools instead of asking teachers to retrieve them from a central town.
- Memoranda of understanding between players may help significantly.
- Conduct extensive advocacy and sensitization so all parties are prepared for the transition.
- Utilize new and existing partnerships to supplement the government's efforts rather than fully funding program elements.

Lessons Learned

- Country-based staff and partners may view international NGOs as being wholly responsible for a campaign when the international NGO may view their role as offering technical assistance; different perspectives are important to appreciate early on in a transition of campaign ownership/ mainstreaming.
- Through participatory exercises in the focus groups, we identified points in the MDA process that are particularly prone to failure and need greater attention to be successful in maintaining access to treatment.
- Access to treatment is the main barrier to good coverage of a campaign, especially when being mainstreamed to country ownership.

Implications for Policy, Practice, and Future Research

This study raises several future research questions. Namely, what kinds of training strategies and supply chains can support MDA coverage with minimal-to-no support from NGOs? Where are NGOs filling a gap in a health campaign, and where are they augmenting it? What relationships need to be nurtured within host countries' systems to support success under full ownership? Finally, it is clear that mainstreaming is possible in this context, but it is fragile. More time should be taken to unhitch NGO support from existing NTD programs so that they can be seamlessly integrated into the primary health care system.

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