ORIGINAL ARTICLE

# Lessons Learnt From the Implementation of Mass Drug Administration for Schistosomiasis and Soil-Transmitted Helminths in Lusaka Province, Zambia

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**ABSTRACT:**

***Background:*** Zambia is endemic for four of the global Preventive Chemotherapy Neglected Tropical Diseases (PC-NTD) targeted for elimination and control, namely schistosomiasis, trachoma, lymphatic filariasis (LF) and soil transmitted helminths (STH). These diseases are associated with disfigurement, reduced productivity, reduced cognitive potential and hence affect the economic development of the households, communities and the country. They largely affect communities with socio-economic challenges, limited access to safe and clean water and lacking sanitary facilities. These diseases are preventable with chemotherapy being amenable to integrated community and school based mass drug administration coupled with PHASE strategies. This study explores lessons learnt from the implementation of mass drug administration for Schistosomiasis and Soil-transmitted helminths in Lusaka, Zambia.

***Methodology****:* Lusaka province was targeted by Ministry of Community development, Mother and Child Health as the area for implementation of mass drug administration for Schistosomiasis and Soil-transmitted helminths using identified 666 health service delivery posts as drug distribution points in selected districts. A total of 2,208,617 people were targeted to be dispensed with Praziquantel, while 773,016 were targeted to be dispensed with Mebendazole in Lusaka only. These medicines were given to all children and adults considered to be at high risk of Schistosomiasis and Soil Transmitted Helminths respectively. Specific targets to be met were set.

***Results:*** Luangwa, Chongwe and Shibuyunji districts surpassed their targets beyond 100%. Chirundu, Kafue and Rufunsa districts surpassed the 75% target. Lusaka district managed a coverage of 24% and this brought the overall provincial coverage to 41%. This was below the set target of 75%.

***Conclusion:*** The exercise revealed that implementation of MDA with high coverage is feasible. This needs to be improved in areas not meeting the set targets.

## INTRODUCTION

According to WHO 2002 estimates, Neglected Tropical Diseases (NTDs) mainly comprising soil-transmitted helminths, schistosomiasis, lymphatic filariasis, onchocerciasis and trachoma are responsible for approximately 5% of the global disease burden attributable to infectious diseases resulting in disability and morbidity of the affected population.[1] Over 200 million people are infected with schistosomiasis worldwide resulting in about 200,000 deaths annually in sub-Saharan Africa.[2]

Children are often heavily infected and may suffer severe morbidity later in their adulthood if not treated.[3,4] Morbidity is usually as a result of trapped Schistosoma eggs principally in the liver, bladder and kidneys among other organs. The consequences of chronic untreated

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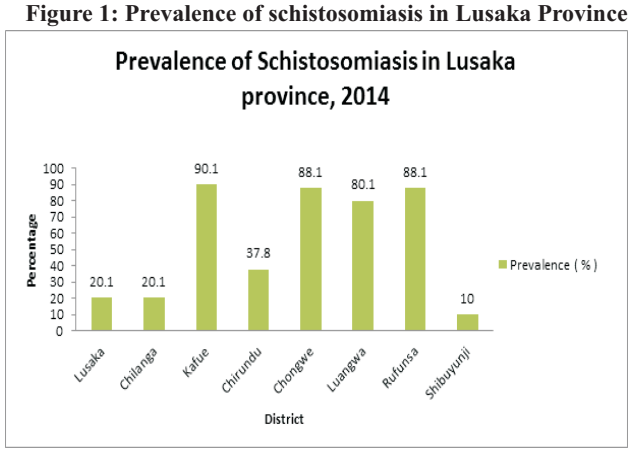
schistosomiasis include anaemia and growth retardation especially in children. In older people untreated *Schistosoma mansoni* infections are associated with hepatosplenomegaly, portal hypertension, ascites and life threatening variceal bleeding.[5,6,7] For *S. haematobium*, complications such as nephropathy and urogenital cancers have been reported.[8,9] Evidence also suggests that schistosomiasis in reproductive organs can facilitate the transmission of Human immunodeficiency virus (HIV).[10] The negative impact of this disease on the livelihood of affected people cannot be overemphasized as it has been shown to considerably affect productivity.[11]

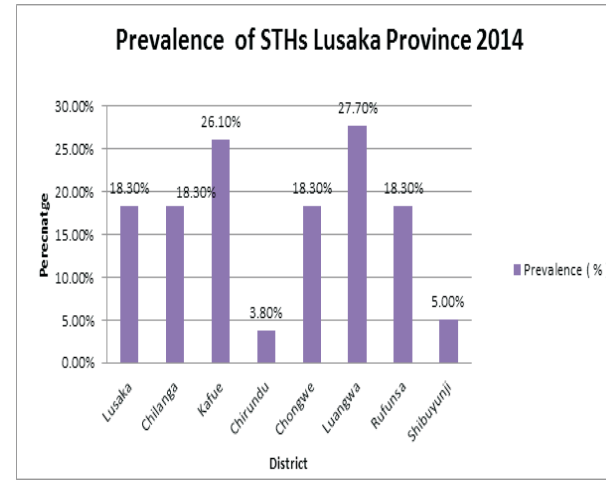
**Figure 1: Prevalence of schistosomiasis in Lusaka Province**




Information gathered from various mapping surveys indicate that soil- transmitted helminths (STHs) are prevalent in most parts of Zambia especially where sanitation is poor and clean water supply is not adequate. STHs commonly found in Zambia include hookworm, *Ascaris lumbricoides* and *Trichuris trichiura*. Hookworm has a wide distribution being prevalent in all the 72 'old' districts of the country. However, only 5 'old' districts have prevalence above 50% and are thus classified under the high risk category. On the other hand, all the districts are non-endemic for trichuriasis as they are below the 20% threshold.

A Mass Drug Administration (MDA) campaign for elimination and control of Schistosomiasis in all the eight (8) districts of Lusaka Province and for Soil Transmitted Helminths in Lusaka District was conducted in the period 26th – 31st January 2015. This study explores lessons learnt from Implementation of mass drug administration for Schistosomiasis and STH in Lusaka, Zambia

**Figure 2: Prevalence of soil-transmitted helminths in Lusaka Province**




## METHODOLOGY

Lusaka province with an estimated population of 2,760,770 comprising a total of eight districts namely, Chilanga, Chirundu, Chongwe, Kafue, Luangwa, Lusaka, Rufunsa and Shibuyunji was targeted for implementation of the first ever round of school and community-based MDA. A total of 666 health service delivery posts were identified as drug distribution points in all the eight districts. A total of 2,208,617 people were targeted to be dispensed with Praziquantel while 773,016 were targeted to be dispensed with Mebendazole in Lusaka only. These drugs were given to all children and adults considered to be at high risk of Schistosomiasis and Soil Transmitted Helminths respectively.

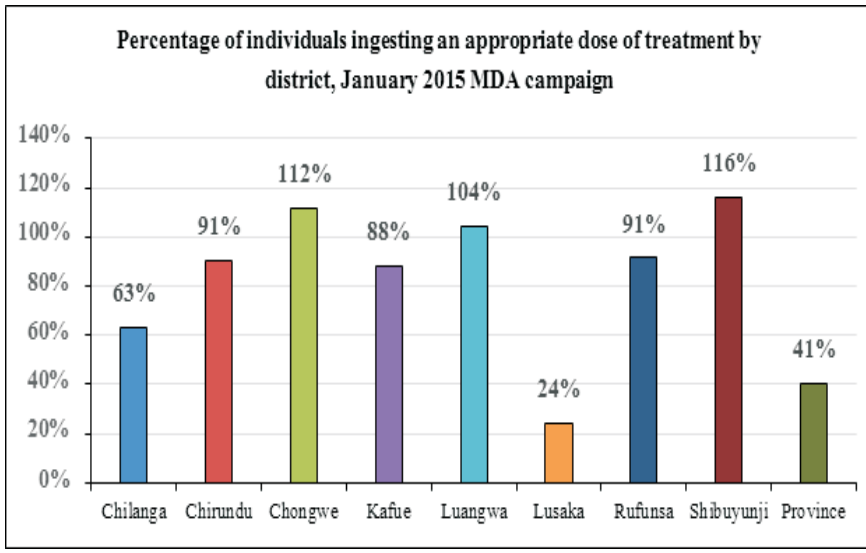
In particular 2,200,000 treatments of Praziquantel for the elimination and control of Schistosomiasis and 571,000 treatments of Mebendazole were distributed to the eligible population. Health Care Workers, Teachers and Community Health Workers were trained in the control of Schistosomiasis and STH through mass drug administration campaigns.

## RESULTS

Figure 3 shows the coverage per district. Luangwa, Chongwe, and Shibuyunji districts surpassed their targets beyond 100%. Chirundu, Kafue and Rufunsa districts surpassed the 75% set target.

Lusaka district managed a coverage of only 24% and this brought down the overall provincial coverage to 41%. This was well below the target of 80%.

**Figure 3: Implementation coverage for MDA in Lusaka Province**




## DISCUSSION

Implementation of preventive chemotherapy interventions with high coverage will ensure that by 2020 the WHO goals for the five targeted PC NTDs are reached.[12] However, a large proportion of funds for implementation of MDA in low-middle income countries are contributed by donors and very little from domestic sources despite the fact that a number of people requiring preventive chemotherapy are in these countries. As most countries are moving towards middle income bracket there is need to deliberately start to increase allocation of funds from domestic resources towards universal coverage of NTDs.[13]

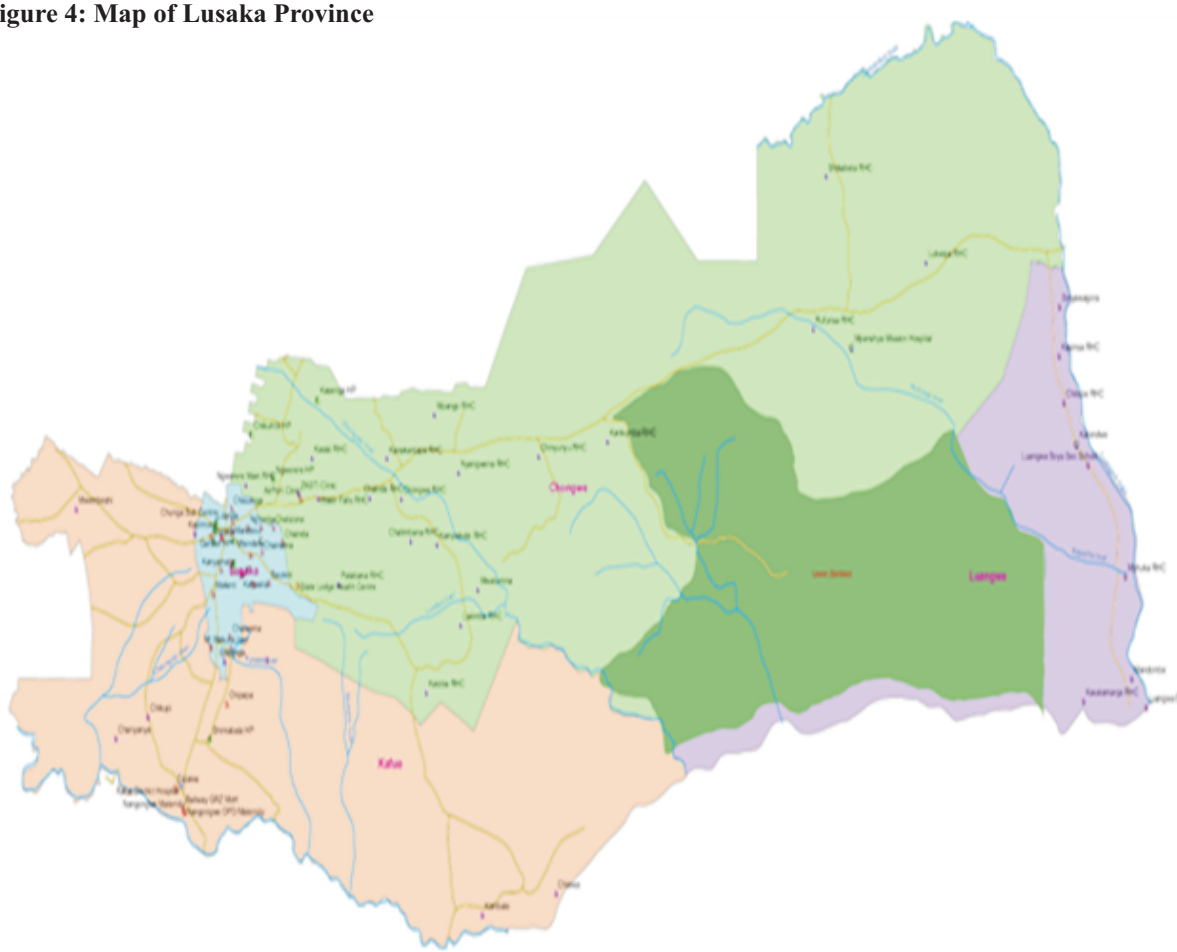
World Health Assembly resolution WHA54.19 adopted in 2001 WHO urges Member States to treat at least 75% of school-aged children at risk of morbidity for STH and schistosomiasis by 2020 taking advantage of availability of funding and donated drugs.[14]

Zambia is endemic for four of the global Preventive Chemotherapy Neglected Tropical Diseases targeted for elimination and control, namely schistosomiasis, trachoma, lymphatic filariasis (LF) and soil transmitted helminths (STH). Schistosomiasis (bilharzia) is endemic in almost all the 72 'old' districts of Zambia. It is estimated that close to 2 million people in Zambia have bilharziasis. The main Schistosoma infecting species in Zambia are *Schistosoma haematobium* and *Schistosoma mansoni*. According to national NTD mapping surveys, *S. haematobium* is endemic in 69 districts while *S. mansoni* is prevalent in 49 districts. The prevalence of *S. haematobium* is as high as 90% in Kafue district and for *S. mansoni* the highest recorded was 24% in Mwinilunga district. Only two districts, Chilubi and Ndola are non- endemic for both *S. haematobium* and *S.mansoni*. Co-endemicity of *S. haematobium* and *S. mansoni* was recorded in 46 of the 72 districts surveyed.

Lusaka Province is located in the central part of Zambia. The province shares boundaries with Central province in the north and west, Southern province in the southwest, Eastern province in the northeast and countries Mozambique and Zimbabwe in the southeast. There are eight districts in Lusaka Province namely Chilanga, Chirundu, Chongwe, Kafue, Luangwa, Lusaka, Rufunsa and Shibuyunji. The province has an annual population growth rate of 4.9% according to the 2010 census report and that 77% of its population lies in Lusaka District. Lusaka is also the capital city of Zambia and the population of Lusaka Province is estimated at 2,760,770.

Parasitic worms are among the most common cause of chronic infection in humans; in developing countries it is more common to be infected than not.[15] Infection thrives and persists in communities in need of better housing, clean water, appropriate sanitation, and better access to health care, education and increased personal earnings.[16, 17] This is a common feature prevalent in most parts of Zambia. STHs commonly found in Zambia include hookworm, *Ascaris lumbricoides* and *Trichuris trichiura*. Hookworm has a wide distribution being prevalent in all

**Figure 4: Map of Lusaka Province**



the 72 'old' districts of the country. However, only 5 old districts have prevalence above 50% and are thus classified under the high risk category. On the other hand, all the districts are non-endemic for trichuriasis as they are below the 20% threshold.

As a result of the situation highlighted above there was need to conduct MDA for schistosomiasis and soil transmitted helminthiasis in Lusaka province.

Transmission of ascariasis and trichuriasis is through consumption of contaminated food and water. However, hookworms are mainly transmitted by penetrating through exposed skin. Heavy infections are associated with anaemia, growth retardation including cognitive impairment especially in children. In severe cases, intestinal obstruction as well as organ perforation have also been documented.[18] Hookworm has been shown to significantly contribute to anaemia in pregnant women and is associated with foetal complications such as preterm delivery, low birth weight and increased infant mortality.[19] Interventions such as deworming are associated with improvement in cognitive ability, reduction in anaemia and reduced complications associated with anaemia in pregnancy.[19]

The actual implementation of MDA activity started from the 26th to 31st January 2015. All the districts had conducted the following activities prior to the implementation; training of health care workers, School Teachers and Community Drug Distributors (CDDs), held stakeholders' meetings at all levels and distributed logistics to all the health point deliveries sites.

The districts had all trained the required personnel in their correct numbers except for Lusaka. The trainings were held in such a way that the health workers were trained first, who in turn trained their Community Drug Distributors (CDDs) in the facilities. However, the selected teachers were then trained separately. Lusaka district did not train the teachers from all the schools due to constraints with financial resources.

Generally all districts engaged their stakeholders at all levels from community to traditional leadership and line departments. The traditional leadership in the rural areas particularly played an important role in reducing the resistance to MDA intervention by the communities. They embraced the program which resulted in boosting of their outcomes. This was not the case with Lusaka district that never held a meeting with their stakeholders. The district officials attributed this to the fact that they have many stakeholders and engaging all in a short period was not feasible.

All districts carried out social mobilization by way of door to door campaigns, public address system, announcements in churches, drama performance in public places and radio broadcasts. The rural districts were quite visible in their social mobilization but this was not the case with Lusaka district. Media that is, radio or television was not used to their full potential as the adverts they placed were rarely heard. This could have resulted in many people not being reached by the programme in Lusaka district. Similar experience of some districts reporting lower coverage that others were also documented by Parker and Allen which were associated with inadequate social mobilization and health education.[20]

The success of any health program depends on the availability of sustained adequate resources. Therefore, increased recognition by endemic countries with incorporation of NTD strategies into national health plans, budget and poverty reduction strategies will ensure sustainable financing.[21] Integrated control of NTD at national level requires substantial resources to achieve coverage of community-based MDA as was observed during implementation in Lusaka Province.[22] Minimal resources were allocated to MDA with major funding for this intervention being provided by cooperating partners. This raises the question of sustainability of the programme in the absence of external financial support.

## CONCLUSION

The exercise revealed that implementation of MDA with high coverage is feasible despite not reaching the desired 75% coverage. Engagement of the stakeholders, adequate publicity of the activities and adequate numbers of trained personnel could have resulted in the better coverage recorded.

Government and other healthcare stakeholders will also need to increase funding for country NTD programmes as they work to improving water quality and sanitation.

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### Competing interest

The authors declare that they have no competing interests.

## REFERENCES

1. Smits HL. Prospects for the control of neglected tropical diseases by mass drug administration. *Expert Rev. Anti Infect. Ther*, 7(1), 37 – 56 (2009)
2. Sesay S, Paye J, Bah MS, MacCarthy FM, Conteh A, *et al*. *Schistosoma mansoni* infection after three years of mass drug administration in Sierra Leone. *Parasite and vectors* 2014, **7**:14
3. Chipeta MG, Ngwira B, Kazembe LN. Analysis of *Schistosomiasis haematobium* Infection Prevalence and Intensity in Chikhwawa, Malawi: An Application

of a Two Part Model. *PLOS Neglected Tropical Diseases*, 2013; 7(3): e2131

4. Chomba C, Mutale S. Factors Characterising High Prevalence Rates of Urinary Schistosomiasis in Mufumbwe District, North Western Province of Zambia. *Global Journal of Biology, Agriculture and Health Sciences*, 2014; 3(2):86-95.
5. Payne L, Kelly P, Sianongo S, Baboo KS, Lubeya M, Muloshi C. Hepatosplenic schistosomiasis. *Lancet* 2010; 376: 1645-1650.
6. Payne L, Turner-Moss E, Mutengo M, Asombang AW, Kelly P. Prevalence of schistosome antibodies with hepatosplenic signs and symptoms among patients from Kaoma, Western Province, Zambia. *BMC Research Notes,* 2013; 6:344
7. Chipeta J, Mwansa J, Kachimba JS. Schistosomiasis disease burden in Zambian children: time for affirmative action is now. *Medical Journal of Zambia*, 2009; 36(1).
8. Mutengo MM, Mudenda V, Mwansa JC, Kaonga K, Sianongo S, Wamulume HI, *et al*. Presence of schistosomiasis in genital biopsies from patients at the University Teaching Hospital in Lusaka, Zambia. *Medical Journal of Zambia*, 2009; 36(1).
9. Bhagwandeen SB. Schistosomiasis and carcinoma of the bladder in Zambia. *S. Afr. Med. J.*, 1976; 50**:**1616.
10. Kjetland EF, Leutscher PDC, Ndhlovu PD. A review of female genital schistosomiasis. *Trends in Parasitology*, 2012; 28(2)**:**58–65.
11. King CH, Dangerfield-Cha, M. The unacknowledged impact of chronic schistosomiasis. *Chronic Illn,* 2008; 4; 65.
12. World Health Organization, Accelerating work to overcome the global impact of Neglected Tropical Diseases; a roadmap for implementation, pp1, WHO/HTM/NTD/2012.1
13. World Health Organization, Third report on Neglected Tropical Diseases, Investing to overcome the global impact of Neglected Tropical Diseases. Chapter 2, page 12, WHO/HTM/NTD/2015.1
14. World Health Organization, First report on Neglected Tropical Diseases, Working to overcome impact of Neglected Tropical Diseases, pp vi-vii, WHO/HTM/NTD/2011.315. Awasthi S, Bundy DAP, Savioli L. Helminth infections. *British Medical Journal,* 2003; 327:431-433. (2003).
16. Crompton DW. How much human helminthiasis is there in the world? *Journal of Parasitology*, 1999; 85:397-403.
17. Uneke C, Eze K , Oyibo P, Azu N, Ali E. Soil-Transmitted Helminth Infection In School Children In South-Eastern Nigeria: The Public Health Implication. *The Internet Journal of Third World Medicine*, 2006; 4(1).
18. World Health Organization, Prevention and control of schistosomiasis and soil-transmitted helminthiasis. Report of a WHO Expert Committee. 2002: 6.
19. Melku M, Addis Z, Alem M, Enawgaw B. Prevalence and predictors of maternal anaemia during pregnancy in Gondar, Northwest Ethiopia: An Institutional Based Cross-Sectional Study. *Anemia,* 2014; http://dx.doi.org/10.1155/2014/108593
20. Moses J. Bockarie, Louise A. Kelly-Hope, Maria Rebollo, David H. Molyneux. Preventive chemotherapy as a strategy for elimination of neglected parasitic diseases: endgame challenges. *Philos Trans R Soc Lond B Biol Sci.*, 2013; 368(1623): 20120144
21. Hortez PJ, Molyneaux DH, Fenwick A, Kumresan J, Sachs SE, Sachs JD, *et al*. Control of Neglected Tropical Diseases. *N Engl Med*, 2007; 357;10.
22. Parker M, Allen T. Does mass drug administration for the integrated treatment of neglected tropical diseases really work? Assessing evidence for the control of schistosomiasis and soil-transmitted helminths in Uganda. *Health Research Policy and Systems*, 2011; 9:3.