

Knowledge Brief

Health, Nutrition and Population Global Practice

NTDS AND DEWORMING AFRICA INITIATIVE (DAI): MADAGASCAR

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February 2018



KEY MESSAGES:

- Madagascar's multi-sectoral efforts have helped to reduce the burden of Neglected Tropical Diseases (NTD), which has declined from 5,975 disability adjusted life years (DALYs) per 100,000 people in 1990 to 2,423 in 2016.
- The World Bank (WB) has financed more than US\$4 million towards NTD control activities in the country since 2013 through the IDA financed PAUSENS project, (P131945). The WHO provided technical support. Both, the WB and the WHO are the primary development partners engaged in NTD control and elimination efforts in Madagascar.
- In 2016, all preschool-age children (100 percent coverage), and nearly nine out of 10 school-age children at-risk of infection with soil transmitted helminths (STH) (87 percent coverage) were dewormed. However, an estimated 29 million people still require preventive chemotherapy (PC) for at least one neglected tropical disease (NTD).
- The annual loss in economic productivity attributed to NTDs in Madagascar is estimated at US\$29 million, which is equivalent to 0.29 percent of its annual GDP.
- Schistosomiasis, lymphatic filariasis and STH, together represent 65 percent of total NCDs in the country. These diseases can be controlled by mass drug administration (MDA) with an annual investment of US\$7 million.

Country Context

Population (2016)	24.24MM
Annual GDP per capita (2016)	420 USD
HDI Madagascar (2015)	0.512
HDI Africa	0.523

Neglected Tropical Diseases are a group of 18 parasitic, viral and bacterial infections¹ that are endemic to 47 countries in Africa. These diseases, negatively impact the world's poorest and most vulnerable. The diseases can cause disabilities that may in turn have a detrimental impact on a country's economic

productivity. This brief provides an overview of the burden of NTDs in Madagascar, and opportunities to integrate prevention and control activities in active World Bank projects.

Five diseases, namely Lymphatic Filariasis, Onchocerciasis, Schistosomiasis, Soil transmitted Helminths, and trachoma account for almost all the burden of NTDs (90 percent) in the country. These can be prevented, controlled, and where possible, eliminated with preventive chemotherapy (PC) through MDA.

MDA, a safe and effective treatment against NTDs, has been delivered in more than 7 billion treatments to people in need globally². In 2012, the London Declaration on NTDs reaffirmed

¹ NTDs include Buruli ulcer, Chagas disease, dengue and chikungunya, dracunculiasis (guinea-worm), echinococcosis, foodborne trematodiasis, human African trypanosomiasis (sleeping sickness), leishmaniasis, leprosy (Hansen's disease), lymphatic filariasis (LF; elephantiasis), mycetoma, chromoblastomycosis and other deep mycoses, onchocerciasis (river blindness), rabies, scabies and other ectoparasites, schistosomiasis (bilharzia), soil-transmitted helminths

(STH; collectively comprised of hookworm, roundworm, and whipworm), snakebite envenoming, taeniasis/cysticercosis, trachoma, and yaws.

² Fitzpatrick, et al. 2016. Benchmarking the cost per person of mass treatment for selected neglected tropical diseases: an approach based on literature review and meta-regression with web-based software application. PLOS NTDs. <https://doi.org/10.1371/journal.pntd.0005037>

the global commitment of governments, development partners and the private sector to lift over one billion people from the heavy burden that NTDs place on their lives. Thirteen pharmaceutical companies committed to donating medicines free of charge for 10 of the most prevalent NTDs through 2020, including the five amenable to MDA. Their commitment has led to a massive increase in the delivery of treatment to those affected.

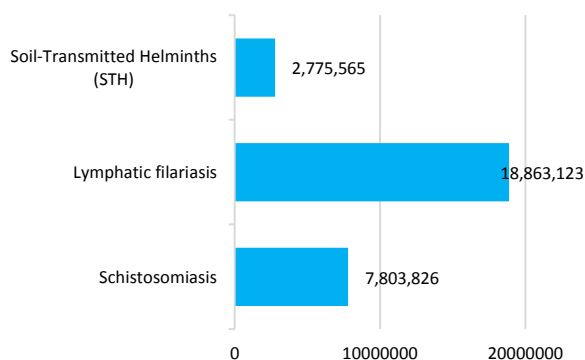
Deworming is a public health and education intervention that targets schistosomiasis and STH. Periodic deworming for schistosomiasis and STH among children with heavy infections can lead to gains in weight and height, reduction in school absenteeism, improved cognition, and improved future earnings. Furthermore, deworming significantly reduces the worm burden in pregnant women.

The World Bank has taken a strategic approach to control schistosomiasis and STH through deworming activities during the IDA 18 period (FY18-20), with the aim to achieve the WHO target of 75 percent coverage among at-risk school-age children (SAC) (5 to 14 years old) by 2020.

BURDEN OF NTDs IN MADAGASCAR

Madagascar's NTD burden has seen a significant decline from 5,975 in 1990 to 2,423 DALYs per 100,000 people in 2015 (Figure 2).

Figure 1: Population requiring PC in Madagascar in 2016 (WHO)

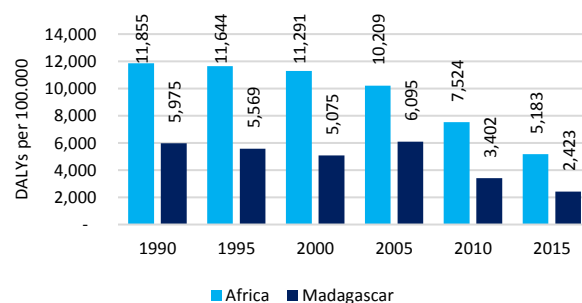


In spite of this, in 2016, more than 29 million people required PC for 1 or more NTDs in Madagascar (Figure 1). LF, schistosomiasis³, and STH collectively represent 65.5 percent of the NTD burden in Madagascar.

Schistosomiasis is the most common NTD in Madagascar (Figure 3). Schistosomiasis affects 95 out of 111 districts of

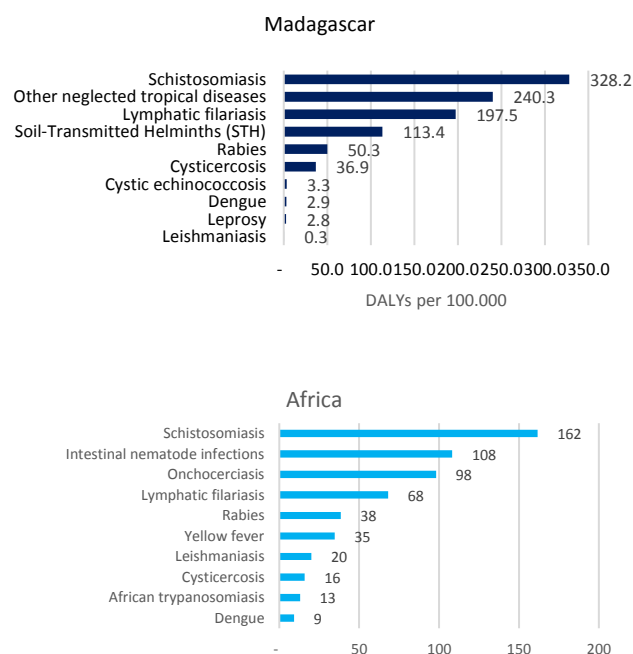
Madagascar, with an estimated prevalence rate of 31 percent. Additionally, more than 5 million Malagasy people are estimated to be infected, with a further 7 million at risk for the disease, making schistosomiasis a public health concern in the country.

Figure 2: Burden of NTDs in DALYs for Madagascar against Regional Averages, 1990-2015 (DALYs per 100,000)



Schistosomiasis accounts for 328 DALYs per 100,000, and represents 0.72 percent of the total burden of disease in Madagascar (Figure 3).

Figure 3: Principal NTDs in Madagascar and Africa 2015 (DALYs per 100,000)



ECONOMIC COSTS OF NTDs IN MADAGASCAR

The lost economic productivity due to NTDs in Madagascar is estimated at US\$29 million per annum⁴, which is equivalent to

³ Two forms of schistosomiasis are endemic to Madagascar. The first, intestinal schistosomiasis (*S. mansoni*), is endemic in the southern and eastern parts of the country. The second form, urinary schistosomiasis (*S. haematobium*), is endemic in the northern and western regions of the country.

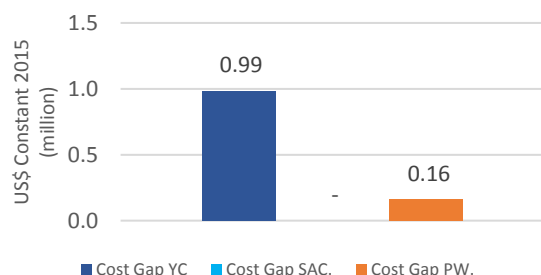
⁴ The human capital approach was used to calculate the annual economic cost of NTDs. This entails equating the present value of a human life to the discounted market value of the output produced by an individual over an expected lifetime as a proxy for future productivity. This value

0.29 percent of its annual GDP. Schistosomiasis and STH, both of which can be controlled by MDA, collectively represent an annual economic cost of US\$7 million. The treatment of schistosomiasis and STH in Madagascar would significantly reduce the annual loss of productivity and increase GDP incrementally by 0.07 percent each year. MDA is a cost-effective solution for treating PC-NTDs, with an estimated delivery cost per person per year of US\$0.10 to US\$0.50 (WHO 2015).

We estimated the gap in treatment coverage for three populations: young children (12-23 months), school-age children (5-14 years) and pregnant women. The coverage gap is the difference between the WHO target or reaching 75 percent of the at-risk population and the national coverage for STH treatment. In Madagascar, there are approximately 1.56 million young children and 0.35 million pregnant women who are not receiving treatment.

The estimated cost of delivery to meet the current treatment target is US\$ 0.99 million for young children and US\$ 0.16 million for pregnant women per year, totaling US\$ 1.1 million for one year. The treatment coverage for SAC exceeds the WHO target (87.2 percent), indicating that there is no coverage gap for this population (Figure 4).

Figure 4: Estimated Cost to Meet the Current Gap in Drug Delivery to Young Children, School-Age Children, and Pregnant Women in Madagascar, 2016



The cost of scaling up drug delivery to this same population from 2017 to 2020 is estimated to be US\$ 4.2 million for young children and US\$ 1.5 million for pregnant women. This cost estimate includes the delivery of anti-helminth drugs for 6.7 million young people and 0.55 million pregnant women during this period to deworm 75 percent of these populations at-risk.

GOVERNMENT LED INITIATIVES TO CONTROL AND ERADICATION OF NTDs

The Government of Madagascar has significantly reduced the burden of schistosomiasis and STH since 2012 (Figure 4). However, a substantial proportion of the population remains without access to treatment for schistosomiasis and LF. In

2016, only 21.7 percent of the 3.5 million SAC at risk for schistosomiasis and 44.0 percent of the 18.8 million adults at risk for LF received treatment. It is important to sustain and build upon the gains achieved to reduce the infections, prevalence and intensity of these diseases.

Figure 5: Estimated Cost to Scale Delivery of Anti-Helminth Drugs to Young Children and Pregnant Women, 2016 – 2020

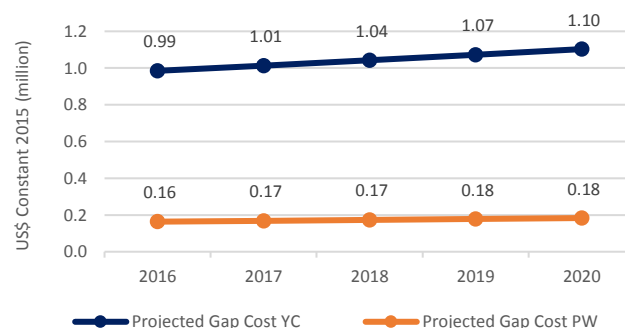
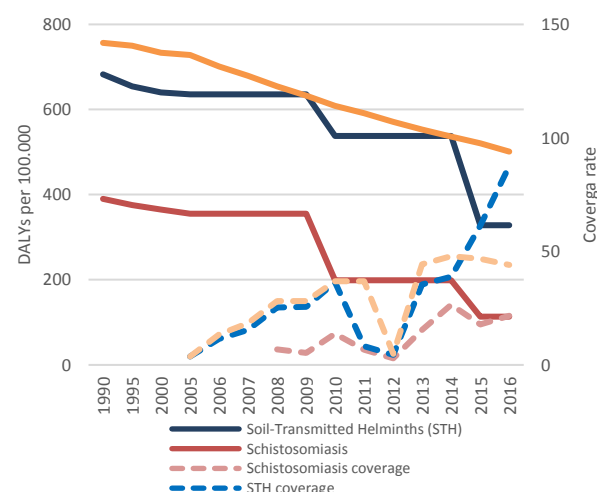


Figure 6: Evolution and Coverage of Deworming in Madagascar and Infection with Schistosomiasis, STH and LF 1990-2015



The Government uses several service delivery platforms to deliver NTD medicines to at-risk populations, including (i) independent NTD campaigns and (ii) Maternal and Child Health Weeks (MCHWs).

Independent NTD Campaigns: MDA campaigns include community-based distribution of drugs to all populations at-risk for PC-NTDs, as well as school-based deworming.

Community-Based Distribution: Community-based agents provide MDA to populations at-risk for lymphatic filariasis, schistosomiasis, STH, and trachoma.

School-Based Deworming: In Madagascar, the Ministry of Public Health (MOH), the National Nutrition Office (NNO), and

is multiplied by the number of DALYs⁴ caused by the disease and discounted by the annual productivity loss for each NTD (Lenk 2016).

the Ministry of Education (MOE) collaborate to deliver deworming treatment to SAC through schools. The MOH organizes the school-based deworming and transfers drugs from its warehouse to regional level school authorities, who then distribute the medicines to schools. The MOH also trains teachers to deliver deworming medicines. The MOE ensures regional administrators and directors are prepared to oversee the campaign and raises awareness at the community level around when deworming days are scheduled. Teachers deliver deworming tablets to children in schools under supervision by primary health care providers. The NNO prepares and distributes light snacks to children before deworming drugs are distributed.

Maternal and Child Health Weeks: MCHWs provide immunization, vitamin A, as well as deworming for young children (12-23 months), preschool-age children (24-59 months), and women of reproductive age.

Key bottle-necks in Madagascar's NTD program include (i) insufficient financing of existing programs (e.g. MCHWs), and (ii) low quality or absent census data to identify at-risk populations. A lack of complete or updated census data on SAC negatively impacts the organization and logistics of school-based deworming activities.

WBG COUNTRY LEVEL PROJECTS TO DELIVER NTD AND DEWORMING TREATMENT

The World Bank has supported a range of NTD control activities in Madagascar since 2013, with a total investment of USD 6 million for NTD-related activities.

Projects: Approved Project: The Government will begin implementation of the IDA financed Improving Nutrition Outcomes using the Multiphase Programmatic Approach Program (P160848) in 2018. The project will finance a package of NTD interventions to be delivered at the community level in areas that are endemic for at least one of the five PC-NTDs. The project has budgeted US\$3 million for MDA through community based drug distribution and provides financing (US\$450,000 total, for five years) to fully fund the Government's leprosy elimination action plan. A school-level NTD package will be financed under the new IDA/GPE Basic Education Support Project (P160442).

Closed Project: The WB supported deworming activities in the country through the Emergency Support to Critical

tablet (400mg) to preschool-age children and one tablet of mebendazole (500mg) to SAC. The project strengthened the Government's capacities for implementing the NTD Plan 2012-2016, particularly through MDA (community-based, door-to-door, and school-based delivery) in 24 districts of five of the poorest regions in the South of Madagascar. The project was financed by an IDA loan of US\$ 4 million for NTD-related activities, and was further supported by drug donations from the pharmaceutical industry, distributed by the WHO.

Analytical work: In preparation for the first phase of the US\$200 million Improving Nutrition Outcomes using the Multiphase Approach project in Madagascar, the World Bank, with financing from the Bill and Melinda Gates Foundation, conducted a detailed analysis of NTD and deworming activities in Madagascar, and reviewed the effectiveness and feasibility of current and novel treatment modalities.

PARTNERS ON THE GROUND

Currently, the World Bank is the only financial partner engaged in NTD control and elimination efforts in Madagascar. The World Food Program is independently supporting deworming activities as part of its school feeding activities in select southern districts, and urban areas in Antananarivo, Tamatave, and Tulear. The WHO provides technical support.

References

De Neve J-W et al. 2018. Health, wealth, and education gains of investing in neglected tropical disease control in Madagascar: an extended cost-effectiveness analysis. Forthcoming.

Institute for Health Metrics and Evaluation (IHME). 2016. **GBD Compare Data Visualization.** Seattle, WA: IHME, University of Washington. Available from <http://vizhub.healthdata.org/gbd-compare>. (Accessed September 2017).

International Monetary Fund. 2003. Poverty Reduction Strategy Paper. Accessed: <https://www.imf.org/en/Publications/CR/Issues/2016/12/30/Madagascar-Poverty-Reduction-Strategy-Paper-16936>.

Lenk EJ, Redekop WK, Luyendijk M, Rijnsburger AJ, Severens JL. 2016. Productivity Loss Related to Neglected Tropical Diseases Eligible for Preventive Chemotherapy: A Systematic Literature Review. *PLoS Negl Trop Dis* 10(2): e0004397.

WHO. 2015. Investing to overcome the global impact of neglected tropical diseases [Internet]. [cited 19 Jun 2015]. Available: http://www.who.int/neglected_diseases/9789241564861/en/

WHO PCT Databank. 2016. **PCT Databank:** A Tool for Planning, Implementation and Monitoring of Integrated Preventive Chemotherapy for Control of Neglected Tropical Diseases (NTD).

WHO. 2017. Crossing the Billion. Preventive chemotherapy for neglected tropical diseases: Lymphatic filariasis, onchocerciasis, schistosomiasis, soil-transmitted helminthiasis's and trachoma. Geneva: World Health Organization. Available: http://www.who.int/neglected_diseases/resources/9789240696471/en/

The Health, Nutrition and Population Knowledge Briefs of the World Bank are a quick reference on the essentials of specific HNP-related topics summarizing new findings and information. These may highlight an issue and key interventions proven to be effective in improving health, or information on this topic. go to: www.worldbank.org/health. Education, Health and Nutrition Services Project (P131945)

Three rounds of MDA were implemented from 2013 to 2015, through a multisector approach between the MOH, MOE, and the NNO. The MDA campaigns distributed one albendazole

WHO. 2017. Neglected tropical diseases. [cited 28 September 2017]. Available: http://www.who.int/neglected_diseases/diseases/en/

WHO. 2017. Preventive chemotherapy to Control Soil-transmitted Helminth infections in At-risk population groups [cited 28 September 2017]. Available: <http://www.who.int/nutrition/publications/guidelines/deworming/en/>