



## FINANCING ARV TREATMENT IN BOTSWANA

### *Brief*

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## Introduction

From 1990 to 2000, life expectancy in Botswana decreased from 65 years to 47 years, largely due to HIV. The country still has one of the highest HIV prevalence rates in the world—22 percent of adults ages 15–49 have HIV (UNAIDS, 2014)—however, as a result of Botswana’s response, which has evolved into one of the world’s model HIV programs, life expectancy increased to 64 years in 2013 (WHO, 2015). Despite this progress, and given the country’s low population (2 million), high prevalence of HIV continues to impose a significant burden on Botswana’s health system and its financing (WPA, 2015).

The Botswana national antiretroviral (ARV) treatment program currently supports approximately 270,000 patients. Even maintaining the country’s current treatment coverage for people living with HIV (PLHIV) with a CD4 count  $\leq 350$  cells/mm<sup>3</sup> will result in increases in HIV incidence and AIDS-related mortality by 2030. Therefore, to make further gains against HIV, Botswana

needs to revisit its ARV treatment eligibility criteria and refocus its HIV prevention efforts.

The World Health Organization’s (WHO) 2013 guidelines on HIV treatment recommend initiation of ARV treatment in all HIV-positive individuals with a CD4 count  $\leq 500$  cells/mm<sup>3</sup>, regardless of WHO clinical stage (WHO, 2013). Further, data from the latest clinical trials show that offering immediate ARV treatment regardless of CD4 count more than doubles an individual’s prospects of staying healthy by preventing transmission. The 2015 Vancouver Consensus (following the 2015 International AIDS Society conference) strongly urged countries and donors to implement the test and treat model, providing immediate access to antiretroviral treatment to all people living with HIV (IASC, 2015). In September 2015, WHO released the recommendation that all HIV-positive individuals should begin ARV treatment as soon as possible (WHO, 2015).

Increasing eligibility for treatment necessitates reallocation of resources and strategic investment to prepare the healthcare system and ensure access to treatment. This policy will increase the number of patients needing treatment in the near term, which will put stress on human resources for health, facilities, and the supply chain.

Recognizing these challenges, the USAID- and PEPFAR-funded Health Policy Project (HPP) provided technical assistance and programmatic support to the government of Botswana to address its ongoing efforts to restructure the health sector. Using the OneHealth Tool, HPP analyzed the costs of implementing the WHO 2013 recommendations and the test and treat model in 2016.

## Research Questions

What would be the costs per year of raising the eligibility for treatment from a CD4 count of 350 cells/mm<sup>3</sup> to test and treat (between 2016 and 2021)?

What would be the increase in numbers of PLHIV on treatment as a result of this scale-up in ARV treatment?

## Methodology

To answer these questions, HPP estimated the costs associated with implementing the test and treat strategy, while also considering treating patients once they reach CD4 counts  $\leq 500$  cells/mm<sup>3</sup> as an alternative.

## Cost Data

The costs of HIV-related services and details on regimens for all PLHIV were obtained from Ministry of Health (MOH) program managers, staff, and technical experts. Drug prices were obtained from Central Medical Stores, which manages the supply chain for all drugs and supplies in Botswana.

## Scenarios

The HPP team analyzed five scenarios to show the variation in cost and additional numbers of HIV-positive patients on treatment for different treatment policies (see Table 1).<sup>1</sup> One scenario reflects the continuation of the current policy of treatment for PLHIV with a CD4 count  $\leq 350$  cells/mm<sup>3</sup>. The ARV coverage rates used in this analysis, as seen in Table 1, are directly reflective of the official government of Botswana AIDS Impact Model (AIM) file (2013–2020), indicating the scale-up goals. The coverage rate for 2021 was estimated based on the current scale-up rate. The second set of scenarios models scale-up of treatment services for those with a CD4 count  $\leq 500$  cells/mm<sup>3</sup> at a gradual or rapid pace. The gradual coverage rates model an even scale-up in the number of additional people on treatment each year. The final set of scenarios models treatment scale-up by increasing eligibility from a CD4 count of  $\leq 350$  cells/mm<sup>3</sup> to a test and treat

Table 1. ARV coverage options modeled by scenario<sup>2</sup>

Scenario	ARV coverage—Males		ARV coverage—Females	
	2016	2021	2016	2021
CD4 $\leq 350$ - Baseline	93%	95%	100%	100%
CD4 $\leq 500$ - Gradual	85%	95%	88%	100%
CD4 $\leq 500$ - Immediate	93%	95%	100%	100%
Test & Treat - Gradual	70%	95%	75%	100%
Test & Treat - Immediate	93%	95%	100%	100%

Table 2. Additional adults (15+ years old) on ARV treatment compared to the base scenario

	2016	2017	2018	2019	2020	2021
Test & Treat - Gradual	7,705	20,048	32,586	47,082	63,407	81,312
Test & Treat - Immediate	104,080	100,086	95,089	91,092	87,894	85,334
CD4 $\leq$ 500 - Gradual	12,181	15,049	18,560	23,481	29,853	38,038
CD4 $\leq$ 500 - Immediate	50,538	49,332	47,680	46,323	45,220	44,351

model in 2016. The ARV coverage rates are the same as the baseline scale-up from the government's AIM file.

All these scenarios assume that starting in 2015 and 2013, respectively, pregnant women and people co-infected with tuberculosis receive treatment regardless of CD4 count, based on current policy.

Estimates of the number of people receiving ARV treatment under each of the five scenarios were projected using AIM, a part of the Spectrum System of Policy Models. AIM projects the consequences of the HIV epidemic, including the number of people living with HIV, new infections, and AIDS-related deaths by age and sex.

The OneHealth Tool is a tool for medium-term strategic planning in the health sector at the national level. HPP used OneHealth to estimate the HIV/AIDS drug and program costs. OneHealth is integrated within the Spectrum suite of models, which includes demographic projections derived from United Nations Population Division estimates. It estimates the costs by disease program as well as the added health system costs needed to achieve program objectives.

## Analysis

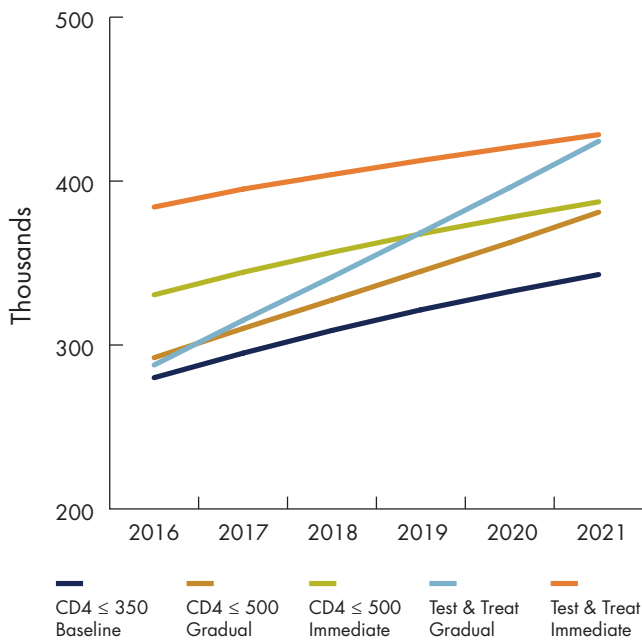
### Scale-up in number of PLHIV on treatment

Based on AIM, in the base scenario, 271,747 people were in need of ARVs in 2015, which increases to 349,308 people in 2021. The ARV treatment cost of implementing the base scenario is US\$94.6 million from 2016 to 2021. Implementing a treatment policy of CD4 count  $\leq$  500 cells/mm<sup>3</sup>, or test and offer, will increase both the number of PLHIV on treatment and concomitant cost.

Modeling a gradual scale-up to a CD4 count  $\leq$  500 cells/mm<sup>3</sup> target adds 12,181 additional adults on ARV treatment in 2016 and 38,038 in 2021, compared to the base scenario. The rapid scale-up estimates an additional 50,000 adults will receive treatment in 2016 and 44,000 in 2021.

Full and immediate implementation of the test and treat model will put approximately 428,000 PLHIV on treatment in 2021—over 40,000 more than a full scale-up to CD4 count  $\leq$  500 cells/mm<sup>3</sup> and 80,000 more than under the current policy.

Figure 2. PLHIV receiving treatment by scenario



## Increased Drug and Supply Costs

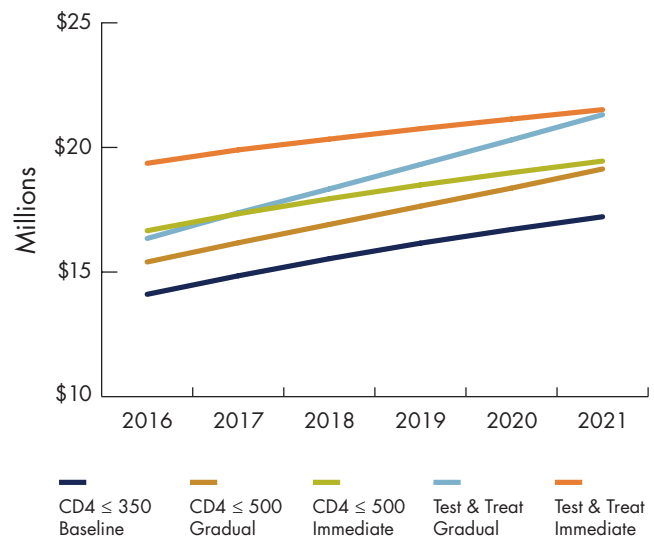
Assuming an immediate scale-up to the CD4  $\leq 500$  cells/mm<sup>3</sup> target in 2016, total adult ARV drug costs would increase from US\$13.3 million in 2015 to US\$19.5 million in 2021.<sup>3</sup> If there is an immediate scale-up to a test and treat model, the ARV treatment costs alone would increase to US\$21.5 million in 2021.

When compared to the base scenario, a gradual scale-up to the CD4 count  $\leq 500$  cells/mm<sup>3</sup> target will cost approximately US\$9 million more in ARV treatment between 2016 and 2021 than if the eligibility remained at CD4 count  $\leq 350$  cells/mm<sup>3</sup>. A gradual approach to the test and treat model, covering the same percentage of PLHIV on treatment by 2021 (100% of females and 95.4% of males), will cost US\$18.4 million more than the baseline scenario—almost double that of a gradual scale-up of CD4  $\leq 500$  cells/mm<sup>3</sup> (see Table 3).

The immediate scale-up to CD4 count  $\leq 500$  cells/mm<sup>3</sup> and test and treat cost 5 percent and 10 percent more, respectively, than the gradual approach.

ARV drug costs in Botswana are comparable to those in neighboring South Africa (see Table 4). On average, first-line ARV drugs are more expensive in Botswana than in South Africa, however, second-line ARV drug prices are comparable. According to the WHO’s global price reporting mechanism,<sup>4</sup> Botswana procures the same adult HIV treatment regimens from several manufacturers and pays between US\$32 and US\$508 per patient per year, depending on the source. Part of the price difference depends on the manufacturer (generic vs. originator), and it is possible that the two countries have different pricing negotiation mechanisms. Based on this comparison, it appears that first-line ARVs may be more expensive for Botswana.

Figure 3. Total cost of ARV drugs and supplies by scenario



## Conclusion

While expanding ARV eligibility to patients with CD4 counts  $\leq 500$  cells/mm<sup>3</sup> or to a test and treat strategy is necessary to sustain reductions in HIV incidence, this change needs to be carefully balanced with availability of resources.<sup>5</sup>

Depending on the size of the scale-up, additional ARV drug costs per year could exceed US\$5 million,

Table 3. Additional ARV drug costs compared to the base scenario, in US\$ millions

	CD4 $\leq$ 500 cells/mm <sup>3</sup>		Test and Treat	
	Gradual	Immediate	Gradual	Immediate
Adult ARV costs	\$9.05	\$14.29	\$18.41	\$28.43

Table 4. Cost of ARV drugs per patient per year comparison, in US\$

	Botswana	South Africa
First-line Adult ARV drugs	\$155.23	\$101.48
Second-line Adult ARV drugs	\$260.17	\$258.10

particularly in the start-up year (2016 in this example). A more gradual scale-up of ARV treatment, as modeled, would provide a more consistent scale-up per year and avoid a large investment in the initial start-up year.

Concomitant strengthening of the healthcare system, such as planning for additional human resources, is essential to support the expected increase in patient flow. Strategic planning in consultation with stakeholders and development partners to model the scale-up and its implementation and monitoring should be prioritized. The implementation of the test and treat model should be implemented in coordination with a new information, education, and communication campaign, which educates the general public on the benefits of knowing one's HIV status and immediately accessing treatment. Both a strong communication strategy and collaboration among HIV and AIDS stakeholders are needed for effective implementation of a test and treat policy.

## References

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## Notes

- 1 The scenarios outlined here model a dramatic scale-up for screening and follow-up care. Resource limitations, prioritization, and effective implementation would dictate actual scale-up and resultant savings.
- 2 Ibid.
- 3 All costs are in 2013 U.S. dollars.
- 4 See <http://apps.who.int/hiv/amds/price/hdd/>.
- 5 The scenarios outlined here model a dramatic scale-up for screening and follow-up care. Resource limitations, prioritization, and effective implementation would dictate actual scale-up and resultant savings.

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