

# NONCOMMUNICABLE DISEASES

## THE PAYOFFS OF INVESTING EARLY IN PREVENTION EFFORTS

### *Brief*

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## Introduction

Until recently, the primary focus of Botswana’s health agenda (as with many of its neighbors) has been on infectious disease control—particularly HIV, since the country has one of the highest prevalence rates in the world (22% of adults ages 15–49 are HIV positive).<sup>1</sup> Noncommunicable diseases (NCDs) were not a priority on the global health spectrum, but rising affluence and urbanization have contributed to increases in NCDs in the last decade. In Botswana, NCDs are estimated to account for 31 percent of all deaths.<sup>2</sup> The most common NCDs include cardiovascular disease, hypertension, cancer, chronic obstructive pulmonary diseases, and diabetes.

In 2006,<sup>3</sup> cardiovascular disease (CVD) was the fourth leading cause of mortality in Botswana (11%), with respiratory illnesses and cancers at 13 percent and 5 percent, respectively. Incidence of HIV-related NCDs like Kaposi’s sarcoma and cervical cancer have seen a significant increase in the last two decades.<sup>4</sup> Cancers of the digestive tract and lymphatic/ endocrine systems in men have also increased over the same period.<sup>5</sup>

In recognition of these challenges, and with the overall emphasis shifting from care and treatment to prevention of these diseases, the USAID- and

PEPFAR-funded Health Policy Project (HPP) provided technical assistance and programmatic support to the government of Botswana to analyze the resource implications of this shift for CVD, type II diabetes, and kidney disease.

While incidences of CVD and diabetes are increasing in Botswana, early detection and prevention efforts can help decrease the burden and costs to the health system. Research shows that increased physical activity and improved nutrition can lead to a 58 percent relative reduction in the incidence of diabetes.<sup>6</sup> The risk factors for both illnesses are well-known, and early detection can help patients access care before systemic complications arise, thereby reducing future treatment costs. Diabetes and high blood pressure also contribute to kidney disease. Although a national prevalence rate for kidney disease (a chronic and progressive disease) in Botswana is unknown, the national nephrology program estimates that 70 percent of its patients are diabetic and hypertensive. The costs of the kidney program are highest at end stages (stages 4–5). Most renal patients present themselves to health providers at these late stages due to limited public awareness of the effects of kidney disease, inequitable distribution

**Research Question:** What cost savings can be realized by scaling up screening and follow-up care for those at risk of CVD, diabetes, and renal failure?

**Methodology:** To answer the research question, HPP estimated the costs associated with increasing the number of patients with low absolute risk of CVD and diabetes (10–20%) who undergo screening and follow-up care.

**Cost Data:** The costs of screening and preventive services and details on regimens for CVD and diabetes were obtained from Ministry of Health program managers, clinical staff, and technical experts. Drug prices were obtained from the Central Medical Stores, which manages the supply chain for all drugs and supplies in Botswana.

of services nationally, and lack of screening for kidney disease across the country. At these late stages, patients are either referred to the private sector or sent abroad for renal failure treatment—at an enormous expense to the government. These referrals contribute to increased costs, but not necessarily to improved outcomes. For many of these patients, increased screening and preventive interventions could increase early detection, reducing the likelihood of progressing toward renal failure.

## Scenarios

The study team analyzed two scenarios to assess potential cost savings. One scenario reflects the slow scale-up of screening and follow-up care for those at risk of CVD and diabetes—from 5 percent in 2013 to 20 percent in 2018. The second scenario models the scale-up at an accelerated pace—from 5 percent in 2013 to 70 percent in 2018 (Table 1).

## Results

The results indicate that costs for CVD/diabetes preventive interventions would increase from US\$8 million to US\$20 million between 2013 and 2018 (Table 2) and costs for treatment would decrease from US\$251 million to US\$175 million (Table 3). An investment of around US\$12 million in preventive services over three years could lead to approximately US\$76 million in savings for the treatment of CVD and diabetes. This is an overall savings of 25 percent, inclusive of prevention and treatment over the same time period (Figure 1, pg. 4).

An increase in the coverage rates for CVD/diabetes screening and follow-up (Table 4, pg. 4) could also result in a decrease in the number of renal patients. This reduction (or mitigation of complicated renal cases) would lead to savings of around US\$20 million in treatment costs when comparing the slow scale-up (US\$63 million) to the rapid scale-up (US\$43 million), and a potential savings of approximately 32 percent in treatment costs for nephrology cases (Figure 2, pg. 5).

## Conclusion

The fact that NCDs do not yet constitute the highest burden of morbidity and mortality in Botswana presents a great opportunity for the Ministry of Health to increase investments in prevention. As the results of this study demonstrate, an investment of approximately US\$20 million in prevention could result in potential savings of around US\$84 million related to the treatment of CVD, diabetes, and renal patients. Prevention efforts such as increasing physical activity, promoting healthier eating habits, and early screening could contribute to a decrease in the number of CVD and type II diabetes patients—thereby resulting in a reduction in the number of renal patients. (Please see page 5 for a list of recommendations to accompany increased investments in prevention.)

Table 1: Percentage Scale-up over Five Years\*

Scenario 1 Coverage: CVD & Diabetes	2013	2014	2015	2016	2017	2018
Screening for risk of CVD/diabetes	5%	8.75%	12.5%	16.25%	20%	20%
Follow-up care for those at low risk of CVD/diabetes (absolute risk: 1–20%)	5%	8.75%	12.5%	16.25%	20%	20%
Scenario 2† Coverage: CVD & Diabetes	2013	2014	2015	2016	2017	2018
Screening for risk of CVD/diabetes	5%	8.75%	12.5%	50%	60%	70%
Follow-up care for those at low risk of CVD/diabetes (absolute risk: 10–20%)	5%	8.75%	12.5%	50%	60%	70%

\* It is important to note that 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.

† This scenario assumes a decrease of 50 percent in the number of cases requiring treatment for CVD and diabetes from 2013–2018 if screening and follow-up coverages for CVD/diabetes increase.

Table 2: CVD/Diabetes Prevention Interventions Cost Comparison 2013–2018 (in US\$ millions)\*

Prevention Interventions for CVD & Diabetes†	Scenario 1: 2013–2018	Scenario 2: 2013–2018
Screening** for risk of CVD/diabetes	\$6.71	\$17.21
Follow-up†† care for those at low risk of CVD/diabetes (absolute risk: 10–20%)	\$1.21	\$3.06
<b>Total</b>	<b>\$7.92</b>	<b>\$20.27</b>

\* Model inputs are based on data obtained from programs. Results are dependent on specific inputs on targets, coverages, and populations in need (PIN). Changes in these variables will affect future forecasts.

† Data on PIN and disease prevalence are not available for many diseases.

\*\* Screening includes a blood glucose level test, cholesterol test, urine analysis, and urine sugar analysis.

†† Follow-up includes a blood glucose level test, cholesterol test, urine analysis, and urine sugar analysis.

Table 3: CVD/Diabetes Treatment Interventions Cost Comparison 2013–2018 (in US\$ millions)\*

Treatment Interventions for CVD/Diabetes†	Scenario 1	Scenario 2
Treatment for those with very high cholesterol but low absolute risk of CVD/diabetes (< 20%)	\$23.42	\$15.32
Treatment for those with high blood pressure but low absolute risk of CVD/diabetes (< 20%)	\$20.58	\$13.46
Treatment for those with absolute risk of CVD/diabetes (20–30%)	\$4.35	\$2.83
Treatment for those with high absolute risk of CVD/diabetes (>30%)	\$2.78	\$1.82
Treatment for type II diabetes	\$200.61	\$142.30
<b>Total</b>	<b>\$251.74</b>	<b>\$175.73</b>

\* Model inputs are based on data obtained from programs. Results are dependent on specific inputs on targets, coverages, and PIN. Changes in these variables will affect future forecasts.

† Data on PIN and disease prevalence are not available for many diseases.

Table 4: Nephrology Intervention Cost Comparison 2013–2018 (in US\$ millions)\*,†

Nephrology**	Scenario 1††	Scenario 2***
Chronic kidney disease (stages 1–4) (stage 4 preparation for renal replacement therapy)	\$10.37	\$7.09
End-stage renal disease (stage 5)	\$25.34	\$17.33
Catheter-related infections	\$0.58	\$0.40
Reinsertion of catheter (peritoneal dialysis or Hemo) for blocked/non-functioning catheters	\$26.59	\$18.19
<b>Total</b>	<b>\$62.88</b>	<b>\$43.01</b>

\* Model inputs are based on data obtained from programs. Results are dependent on specific inputs on targets, coverages, and PIN. Changes in these variables will affect future forecasts.

† Data on PIN and disease prevalence are not available for many diseases.

\*\* Based on Princess Marina patient case workload only. Data on national prevalence of renal disease are not available.

†† No change in the number of renal cases from 2013–2018.

\*\*\* This scenario assumes a decrease of 50 percent in the number of renal disease cases for years 2016–2018 if the screening and follow-up of CVD/diabetes is performed as described in this scenario.

Figure 1: Cost Reduction for CVD and Diabetes Interventions: Scenario 1 vs Scenario 2 (US\$ millions)

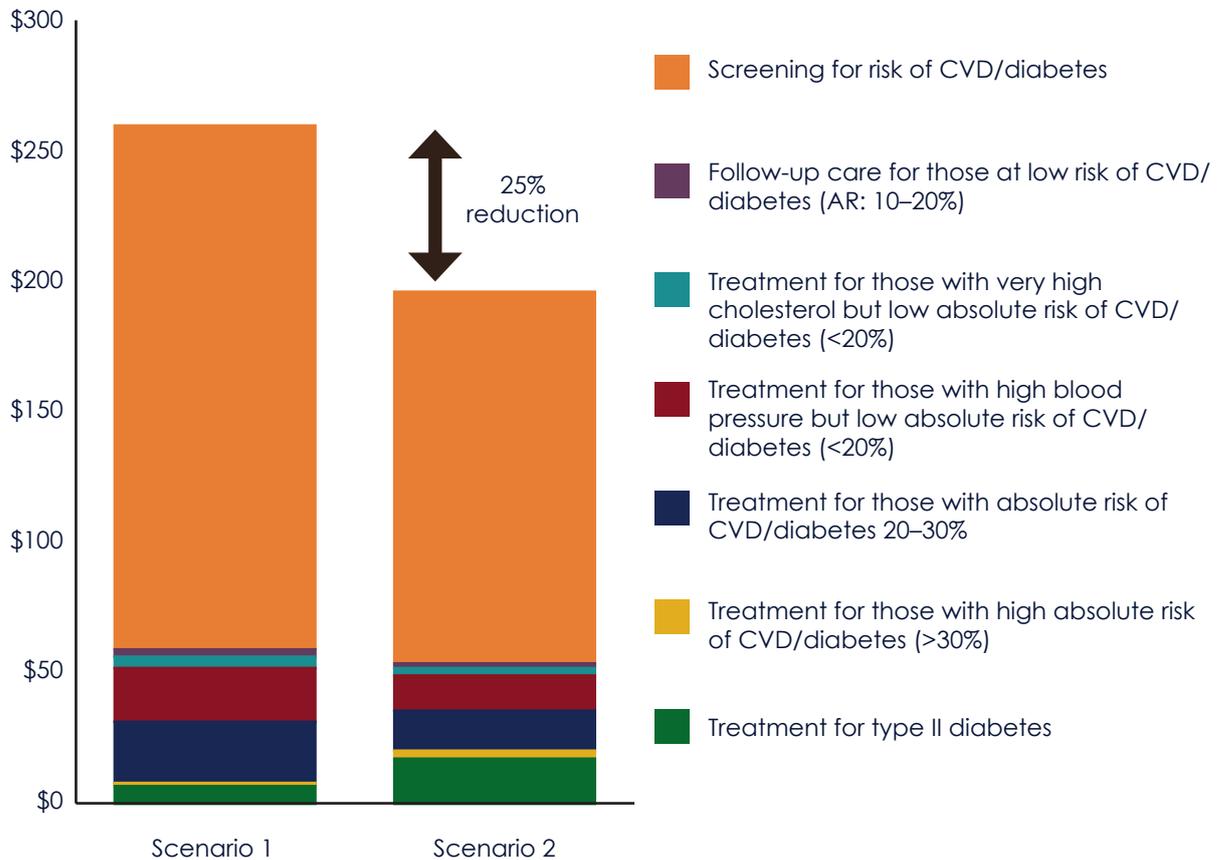
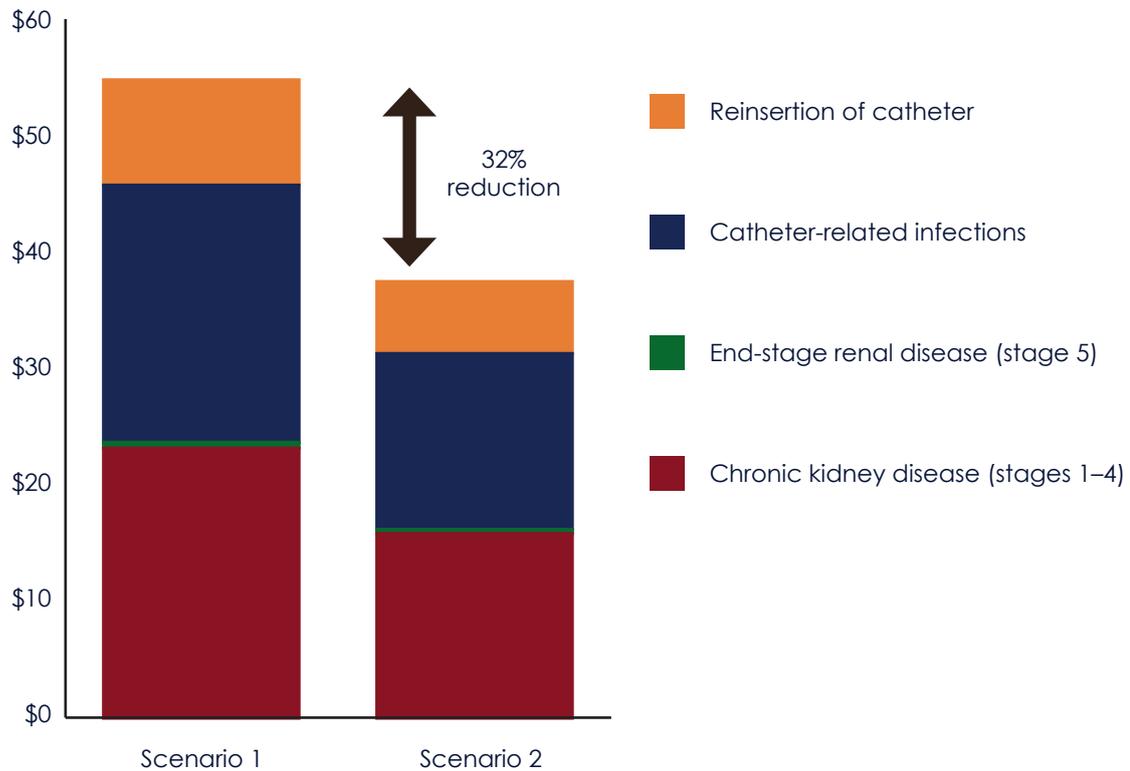


Figure 2: Cost Reduction for Nephrology Interventions (US\$ millions)



## Recommendations

While the study findings warrant further investments to reduce future costs and NCD incidence, additional investments alone will not solve many of the problems associated with the NCD burden. As such, the following steps should also be considered:

- Increase cooperation between private and public food distributors to augment healthier food options while simultaneously improving the infrastructure necessary to get fresh and high-quality produce to the final consumers at reasonable prices. The government of Botswana could also introduce policies to subsidize healthy food products to encourage increased consumption.
- Create more safe and green areas to encourage more people to undertake leisure activities and exercise. One example is the recently installed outdoor exercise equipment in Gaborone.
- Increase community-based health promotion activities and campaigns on the benefits of healthy lifestyles and good nutritional practices/menus. These campaigns can educate the general public on healthy nutrition, including tips on buying and preparing well-balanced meals at home, in schools, and in the public food catering industry. Currently, there are limited widespread campaigns to encourage healthy lifestyle practices such as good nutrition, reduction of excessive alcohol intake, exercise, etc.
- Improve cooperation among MOH departments (nutrition, child health, etc.) and across different ministries (e.g., Ministry of Agriculture and Ministry of Local Government) to address healthier food alternatives and physical activity.
- Scale up the nutritionist cadre to ensure that nutrition consultation is integrated across all health services as a core component, and not just offered to patients who have nutrition-related issues.
- Increase emphasis on urban farming (i.e., back yard and community gardens) to support national campaigns promoting selection of healthy food choices and good nutrition.
- Adopt kidney disease screening within the standard protocol for HIV patients, given the large percentage of HIV-positive patients with kidney disease.

Greater emphasis on screening and interventions focused on healthier food choices and increased physical activity should help decrease the resources required for CVD, type II diabetes, and kidney disease. The complexities inherent with such an undertaking are certainly beyond the scope of this costing exercise; however, the recommendations illustrated above can pave the way for more comprehensive discussions on this theme that can lead to positive health outcomes and lower expenditures in the future.

## Notes

<sup>1</sup> UNAIDS. 2014. *The Gap Report*. Geneva, Switzerland: UNAIDS.

<sup>2</sup> WHO Regional Office for Africa. n.d. "Comprehensive Analytical Profile: Botswana." Brazzaville, Congo: WHO

Regional Office for Africa. Available at [http://www.who.int/profiles\\_information/index.php/Botswana:Index](http://www.who.int/profiles_information/index.php/Botswana:Index).

<sup>3</sup> Government of Botswana, Ministry of Health. 2011. *The Revised National Health Policy Towards a Healthier Botswana*. Gaborone, Botswana: Government of Botswana.

<sup>4</sup> Government of Botswana, Ministry of Health. 2009. *National Health Service Situation Analysis Report*. Gaborone, Botswana: Government of Botswana.

<sup>5</sup> Ibid.

<sup>6</sup> American Diabetes Association & National Institute of Diabetes and Digestive and Kidney Diseases. 2004. "Prevention or Delay of Type 2 Diabetes." *Diabetes Care* 27 (Supplement 1).

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