

# HIV and AIDS financing in South Africa: sustainability and fiscal space

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South Africa has the largest number of persons living with HIV and on antiretroviral treatment (ART) in the world. In December 2015, 3.26 million South Africans were on ART, with this figure scaling up by approximately 400 000 persons per annum. To sustain increasing ART roll-out an additional R1–1.5 billion above inflation has been allocated annually over recent years, while R8.9 billion of the Comprehensive HIV and AIDS Conditional Grant is budgeted for the ART programme in 2015/16.

The roll-out may need to expand more rapidly, as South Africa has amended the treatment threshold to a CD4 cell count of 500 cells/mm<sup>3</sup> and aims to reach the Joint United Nations Programme on HIV/AIDS 90-90-90 targets, effectively a form of test-and-treat, and to expand various prevention interventions.

HIV and AIDS treatment accounts for a significant and growing share of limited health budgets over the medium term through the current period of fiscal constraint. These pressures will be aggravated by other competing demands such as the 2015 wage agreement. Simultaneously in terms of bilateral agreements, funding is declining from donors such as the United States President's Emergency Plan for AIDS Relief.

This chapter analyses these questions using the results of the recent HIV and tuberculosis investment case, which includes the most recent national costing, cost-effectiveness and allocative efficiency modelling of the epidemic, while on the funding side it includes fiscal and budgetary information from recent national budgets, including Budget 2016.

Overall, the analysis suggests that introducing the HIV 90-90-90 targets will be hard to achieve, but that they are likely to be affordable and cost-effective, provided that this is done in a phased way and that annual increments to Government AIDS budgets are sustained. The HIV Investment Case has shown that the most cost-effective set of interventions can still massively affect outcomes such as mortality and HIV incidence. If Government spends more now on the most cost-effective interventions, the impact over 20 years will be greater, resulting in improvements in outcomes along with reductions in total spending in the long run.

Overall, the analysis suggests that introducing the HIV 90-90-90 targets will be hard to achieve, but that they are likely to be affordable and cost-effective, provided that this is done in a phased way and that annual increments to Government AIDS budgets are sustained.

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## Introduction

Globally, South Africa has the largest number of persons living with HIV and AIDS and on antiretroviral treatment (ART). Even though South Africa is an upper middle-income country, it has continued to receive significant funding support from the Global Fund to Fight AIDS, Tuberculosis and Malaria (GFATM) and the United States President's Emergency Plan for AIDS Relief (PEPFAR), given its high disease burden. With 6.4–6.8 million South Africans being HIV-infected and 3.26 million persons on ART<sup>a</sup> in December 2015, scale-up of the treatment programme by 400 000–600 000 persons per annum has necessitated that an additional R1–1.5 billion above inflation be allocated annually over recent years. R8.9 billion of the Comprehensive HIV and AIDS Conditional Grant is budgeted for the ART programme in 2015/16, which comprises 61% of the total health sector HIV and AIDS budget. However, the programme may need to expand even more rapidly, given South Africa's increased treatment threshold, namely a CD4 cell count of 500 cells/mm<sup>3</sup>, and its aim to reach the UNAIDS 90-90-90 targets.<sup>b,1</sup>

The issue of fiscal sustainability refers to the ability of countries to afford and continue to implement programmes using domestic funding in the short, medium and long term, without jeopardising their national fiscal position. In the field of public health, sustainability (which has both fiscal and programmatic dimensions) has been defined as the capacity to maintain programme services at a level that will provide ongoing prevention and treatment for a health problem after termination of major financial, managerial and technical assistance from an external donor.<sup>2</sup> An entire service may be continued under its original or an alternative organisational structure, parts of the service may be continued, or there may be a transfer of some or all services to local service providers.<sup>2</sup> Sustainability does not imply either that a service continues within its original organisational structure or that no changes are made in the service. Sustainability is closely linked to the concept of fiscal space, which refers to the additional spending that countries might be able to afford without jeopardising their fiscal position and unduly burdening future generations with debt.<sup>3,4</sup>

While South Africa has increasing national spending needs, funding is simultaneously declining from major donors such as PEPFAR and GFATM. Furthermore, the South African Government has announced that it will adhere to a fiscal spending ceiling, as previously budgeted, given fiscal constraints arising from, inter alia: low economic growth, the weakening Rand, a high fiscal deficit, and lower credit ratings that have increased the cost of national borrowing.

The annual additional costs of ART expansion consume a significant portion of the available funds in the existing national health budget, which faces considerable limitations in a period of overall fiscal constraint. In the 2012/13 *South African Health Review*, Venter<sup>5</sup> examined various potential challenges pertaining to the expansion of the South African ART programme. While noting that South Africa is a unique case in that it has both a high HIV burden and the ability to fund its ART programme mainly from the national fiscus, concerns were raised about the long-term affordability of the programme

unless cost-saving measures such as task-shifting are implemented.<sup>5</sup> This chapter looks closely at this potential challenge by analysing the fiscal space and sustainability of expanding the national HIV and AIDS programme.

The objectives of this chapter are to describe the following:

- Cost implications over time of scenarios studied in the recent national HIV investment case, including the 90-90-90 scenario and enhanced prevention interventions
- Affordability in terms of fiscal space, government health spending and total spending
  - Trends in public health spending and budgets, and to what extent health spending growth projections allow for increasing HIV and AIDS spending, also in the light of future NHI financing reforms
  - Trends in total government expenditure and revenue and the health sector's share of these:
    - These trends in the context of fiscal space and overall macro-economic indicators such as the national gross domestic product (GDP) growth and government debt;
    - Macro-economic indicators benchmarked against other upper middle-income countries.
- Sustainability of HIV and AIDS funding in light of:
  - declining donor funding and ultimately full reliance on domestic sources; and
  - financial as well as programmatic aspects of sustainability.

### HIV and TB Investment Cases

In 2013, the South African National Department of Health (NDoH) and the South African National AIDS Council (SANAC) initiated national HIV and Tuberculosis (TB) Investment Cases, the findings of which were released in 2015. Underpinning this work is the investment approach first suggested by the UN General Assembly High Level Meeting on HIV and AIDS in 2011<sup>6,7</sup> which has been embedded in South Africa's National Strategic Plan for HIV, TB and Sexually Transmitted Infections (STIs) (2012–2016).<sup>8</sup> The GFATM defines an HIV investment case as a document that:

makes the case for optimized HIV investments. At its core is a description of returns on investment in a country's optimized HIV response over the long term (typically 10+ years). It summarises the state of the HIV and AIDS epidemic and the response, describes the prioritized interventions, populations, and geographic areas to be implemented to achieve the greatest impact over the long term and the resources required. It also outlines the main access, delivery, quality and efficiency issues to be addressed to improve HIV and AIDS services and describes what will be done to address these issues. It includes an analysis of, and plan for, realistic and more sustainable financing of the HIV and AIDS response, including increases in domestic financing where relevant.<sup>9</sup>

The South African HIV Investment Case borrows elements of the investment framework, such as the consideration of biomedical and behavioural interventions alongside strategic enablers of the HIV response and development synergies, implementation of which often falls into the remit of government departments other than Health. In

a National Department of Health Annual Report, 2014/15; 3.26 million people remaining on ART in quarter 3 performance report, December 2015.

b 90% of all people living with HIV will be diagnosed, 90% of all people diagnosed as HIV-positive will be on ART, and 90% of all people on ART will be virally suppressed.

the case of HIV, the South African Investment Case added a category of technical efficiency<sup>c</sup> (TE) factors, which work to improve the efficiency of single interventions (whereas enablers and synergies often aim at improving the efficiency or uptake across a number of interventions). Furthermore, the South African HIV Investment Case placed the optimisation of allocative efficiency<sup>d</sup> at the heart of the exercise by pioneering a novel optimisation methodology that allows for consideration of the combined impact of a large number of interventions, TE factors, and enablers on the programme's effectiveness and cost.

Separate but interrelated investment cases were developed for TB and HIV. This chapter focuses on the results and recommendations of the HIV Investment Case only; the results of the TB Investment Case as well as further details regarding the methods and evidence review and synthesis process of the investment case overall can be found elsewhere.<sup>8,10</sup>

## Methodology

The aim of the South African HIV Investment Case was to establish the most cost-effective mix of interventions against HIV for South Africa over the next 20 years (from 2014/15 to 2034/35), with the aim of improving the allocative efficiency of HIV funding. Cost-effectiveness was measured as cost per life year saved by the entire programme of interventions, incremental to a baseline of current coverage with all interventions constant over 20 years. In order to assess the comparative merits of a range of interventions, several different scenarios for HIV were constructed (Table 1), based on the currently available budget envelope for the current mid-term expenditure framework (MTEF) timeframe (i.e. covering the three financial years from 2016/17 to 2018/19) and a custom-built optimisation routine.<sup>11</sup> Costs were modelled in real 2014/15 Rands over a 20-year period. A further 90-90-90 scenario was also constructed, but in the final iteration this was so similar to the constrained optimisation scenario that it is not reported on separately here.

Table 1: List of scenarios analysed under the HIV investment case

Scenario	Description
Baseline	The baseline for the incremental analysis. This scenario keeps the coverage of all interventions and technical efficiency factors constant at current (2014) coverage levels throughout the 20-year projection period.
Unconstrained optimisation	Using a custom-built optimisation routine that considers the cost-effectiveness of each intervention and iteratively adds the most cost-effective intervention to a rolling baseline, this scenario scales up interventions without regard to a funding envelope.
Constrained optimisation	This scenario repeats the optimisation routine but stops once the total cost of the package of interventions exceeds the combined available budget for the HIV programme (i.e. from the South African Government, PEPFAR, and the GFATM) in any of the years from 2015/16 to 2017/18.

c Technical efficiency in the context of this analysis refers to the maximisation of output (for example, HIV tests done) given a set level of inputs (for example, healthcare staff).

d Allocative efficiency in the context of this analysis refers to the maximisation of a socially desirable output (for example, life years saved) given a set level of funding.

The process of identifying interventions to be included into the Investment Case started with stakeholder consultation workshops attended by over 250 participants representing government, academia, civil society, non-governmental organisations and the healthcare profession. Based on the outputs from stakeholder consultation workshops, the evidence collected went through several rounds of scrutiny, using a standardised grading system – first by members of the Investment Case Task Team who reviewed the evidence for each intervention under one of 10 programme areas, then by members of the economics and modelling sub-working group. In short, interventions had to have strong evidence demonstrating their effectiveness, and be compatible with existing model architecture in order to be included. Table 2 lists the interventions, technical efficiency factors and critical enablers that passed successive rounds of scrutiny and were included in the HIV Investment Case for testing within the optimisation model.

The model computed the incremental cost-effectiveness ratio (ICER) for each intervention and scenario, using cost per life year saved. A total of 50 combinations of interventions and coverage levels were modelled and ranked using the ICER. Subsequently, the most cost-effective option was added onto the baseline scenario. This process was repeated iteratively until the budgetary constraint was reached (in the constrained optimisation scenario). The full list of options was defined as the unconstrained optimisation scenario.

An established epidemiological model projected the HIV epidemic in South Africa under each of the four scenarios. The Thembisa model, a dynamic model of the South African HIV epidemic maintained by the Centre for Infectious Disease Epidemiology and Research at the University of Cape Town,<sup>12</sup> produced the number of HIV infections averted and the number of life years saved over 20 years under each scenario. Thembisa was chosen over other models used in applying the investment framework internationally, such as Spectrum or Optima, as it provides a better fit to the past and current HIV epidemic in South Africa.

### Affordability and sustainability

The cost implications arising from the Investment Case were assessed with reference to domestic fiscal and budgetary trends over the medium term. Current funding levels as estimated by the South African National Treasury are summarised. In addition, the fiscal situation and projections for the country are outlined, based on National Treasury documentation<sup>13</sup> and estimates. Provincial spending estimates for 2015/16 are drawn from Vulindlela on 5 April 2016.

The possibility of higher revenue and funding for the health sector is explored in the context of the recently published NHI White Paper. South Africa's overall spending and revenue are compared with other upper middle income countries as a benchmark, using data from the International Monetary Fund (IMF).<sup>14</sup> Fiscal sustainability and space was assessed using various indicators including deficit to GDP ratio; debt-to-GDP ratio and interest payments as a proportion of total spending and as a share of GDP. The potential of Government to take over donor funding progressively was assessed with respect to potential for government spending increases for HIV and AIDS. Options to achieve greater technical and allocative efficiency in the HIV and AIDS response are also presented.

Table 2: Interventions, technical efficiency (TE) factors and enablers included in the main analysis for the HIV investment case

Programme area	Intervention/ technical efficiency (TE) factor/ enabler	Impact represented in model
<b>1. Interventions</b>		
Care and treatment	Cotrimoxazole	ART uptake
	ART at current guidelines	ART uptake in children and eligible adults (CD4 <500)
	Universal test and treat	ART uptake in children and all HIV-positive adults HIV Counselling and Testing (HCT) uptake
Medical male circumcision (MMC)	General population MMC	MMC uptake in highly sexually active men
	Early infant male circumcision (EIMC)	EIMC uptake
Comprehensive condom programming	Condom availability	Condom use
	Male and female condom education	Condom use
Key population interventions	Pre-exposure prophylaxis (PrEP) for sex workers	PrEP uptake for sex workers
Prevention of mother-to-child transmission of HIV (PMTCT)	PMTCT (triple ART initiation in pregnant women)	ART uptake in pregnant women
	Infant testing at birth	Uptake of infant testing at birth
	Infant testing at 6 weeks	Uptake of infant testing at 6 weeks
HIV counselling and testing (HCT)	General population HCT	HCT uptake
	Testing of pregnant women	HCT uptake in pregnant women
	Testing of adolescents	HCT uptake in adolescents
Social and behaviour change communication (SBCC)	SBCC campaign 1 <sup>e</sup>	HCT uptake in adolescents Multiple sexual partners
	SBCC campaign 2	Condom use
	SBCC campaign 3	Condom use HCT uptake MMC uptake
Other biomedical prevention	PrEP for discordant couples	PrEP uptake
	PrEP for adolescents	PrEP uptake for adolescents
<b>2. Technical efficiency (TE) factors</b>		
ART	GP down-referral	Mortality on ART Infectiousness on ART ART retention
	Home-based ART	ART cost
	Community-based adherence supporters	Mortality on ART Infectiousness on ART ART retention
	Adherence clubs	Mortality on ART Infectiousness on ART ART retention ART cost
	Point-of-care CD4 testing	ART uptake
HIV Counselling and Testing (HCT)	Provider-initiated HCT	HCT uptake
	Mobile HCT	
	Home-based HCT	
	Workplace HCT	
	HCT invitations to pregnancy partners	
<b>3. Critical enablers</b>		
	Gender-based-violence intervention, e.g. SASA! <sup>f</sup>	Multiple sexual partners
	Life skills and vocational training for adolescent girls	Condom use in adolescents
	Risk reduction for alcohol and substance users	Condom use
	Risk reduction for substance users	Condom use
	School-based HIV/STI risk reduction	Multiple sexual partners Condom use
	Teacher support	Multiple sexual partners
	Parental monitoring	Multiple sexual partners Condom use in adolescents
	School feeding	Condom use in adolescents
	Positive parenting	Multiple sexual partners
	Supporting adolescent orphan girls to stay in school	Age of sexual debut
	State-provided child-focused cash transfers	Age disparate sex

<sup>e</sup> A number of organisations responsible for SBCC campaigns were involved in a government tender submission process at the time of analysis, so we anonymised the campaigns in order not to influence the tender process.

<sup>f</sup> SASA! is a community mobilisation intervention to prevent violence and reduce HIV-risk behaviours piloted in Uganda.

## Key findings

Resources for South Africa's HIV response have increased significantly over the last 10 years, and major progress has been made in reducing new infections and keeping people alive. The HIV allocations made by the South African government have grown from R1.2 billion in 2004/5<sup>15</sup> to R17.5 billion in 2016/17, representing a more than 14-fold growth in nominal public spending. However, there are still many ways in which the HIV response can be optimised in order to ensure that the country meets its national and international commitments and targets, and puts its substantial HIV investments to best use. This chapter focuses on health sector costs; more detail on costs for other sectors such as education and social services has been or will be presented elsewhere.<sup>10</sup>

Overall, scaling up condom availability and medical male circumcision (MMC) were the most cost-effective options – the model in fact suggests that they were cost-saving overall, since both of them prevent significant numbers of new infections, which translate into savings in treatment costs (Table 3). In terms of cost-effectiveness, these two options were followed closely by ART at current guideline price (with an eligibility threshold of 500 CD4 cells/mm<sup>3</sup> and prevention of mother-to-child HIV transmission (PMTCT) coverage of women not on lifelong ART. The currently available budget left space for additional interventions under the 'constrained optimisation' scenario – including infant testing at six weeks; improving linkage to care and escalating initiation under a policy of universal 'test and treat' (UTT); and scaling up a mass-media campaign aimed at social and behaviour change (with a broadcast message of increasing HIV counselling and testing (HCT) among adolescents and reducing multiple sexual partners (MSP)). The constrained optimisation scenario almost allowed the country to reach the 90-90-90 targets by 2021, although progress towards the second target was only 88% (percentage of diagnosed HIV-positive people initiated on ART) instead of 90%. Moreover, although UTT is an expensive programme, it must be seen in the light of the long-term cost-saving stemming from the number of HIV cases averted.

The remaining interventions were not affordable under the current budget and are therefore only included in the 'unconstrained optimisation' scenario, in addition to the package of interventions in the 'constrained optimisation' scenario. This included the scaling-up of two additional different mass-media campaigns aimed at social and behaviour change (and both increased condom usage and self-efficacy,<sup>9</sup> HCT among the general population and MMC), and increasing HIV testing in the general population as well as among female sex workers to 90%. The least cost-effective options (once all the others have been scaled up) were interventions targeting infants (such as birth testing and, in particular, early infant male circumcision, the benefits of which fall mainly beyond the 20-year projection period); further increasing HIV testing in adolescents once 90% testing coverage of the general population has been reached; and PrEP for both sex workers and young women.

Table 3: Incremental cost-effectiveness of interventions and intervention packages per scenario

Rank	ICER/(cost/LYS)*	Scenario	
Condom provision	Cost-saving	Constrained optimisation	Unconstrained optimisation
Male medical circumcision	Cost-saving		
ART at current guidelines	R1 201		
PMTCT	R1 474		
Infant testing at 6 weeks	R2 683		
Universal treatment	R2 760		
SBCC campaign 1 (HCT, reduction MSP)	R7 847		
SBCC campaign 2 (condoms)	Cost-saving	Unconstrained optimisation	
General population HCT	R13 358		
SBCC campaign 3 (condoms, HCT, MMC)	R19 692		
HCT for sex workers	R28 727		
Infant testing at birth	R31 638		
PrEP for sex workers	R107 165		
HCT for adolescents	R219 417		
PrEP for young women	R286 581	Unconstrained optimisation	
Early infant male circumcision	R988 614 783		

\* ICER (cost/LYS) = Incremental cost-effectiveness ratio as cost per life year saved

Source: Authors' calculations. See also references 10 and 11.

As a result of UTT being included in all scenarios other than the baseline scenario, the total number of patients on ART (the main cost driver of the country's HIV programme) did not differ much among the scenarios. From a starting point of 3.3 million people on treatment at the end of 2015 in the public sector (or 3.6 in both the private and public sectors), the baseline scenario, in which ART is offered only to people with CD4 cell counts <500 CD4 cells/mm<sup>3</sup>, scales up ART dramatically and continuously over 20 years, to a total of 7.2 million by 2035 (Figure 1 overleaf). As a result of reduced HIV transmission under UTT, all other scenarios flatten out after about 10 years, at levels around 6.5 million patients on ART.

Table 4 provides projections of the total number of patients remaining on ART, new patients starting ART, condoms being used, MMCs, and HIV tests for each scenario over the current Medium-term Expenditure Framework (MTEF) (i.e. from 2016/17 to 2018/19). While some programmes such as condom provision and MMC were scaled up similarly under all scenarios, the coverage for other programmes such as HCT differed dramatically among the scenarios. A further 90-90-90 scenario was also constructed but was removed here because of its close similarities to the constrained optimisation scenario.

9 Condom self-efficacy is defined as one's belief in one's ability to be able to use a condom.

Figure 1: Total number of patients on ART, including private sector<sup>8,16</sup>

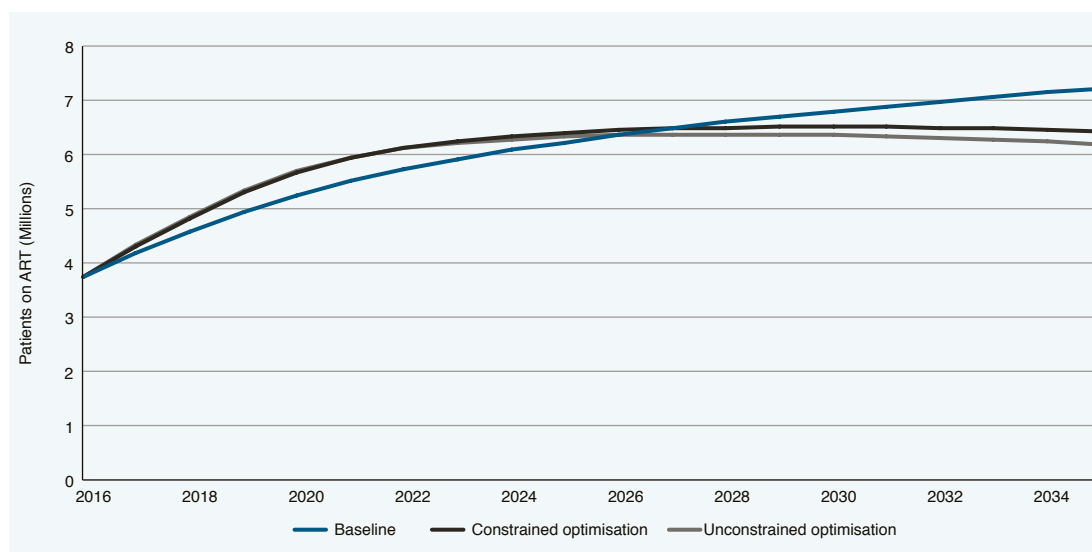


Table 4: Selected coverage data by scenario for South Africa's HIV and AIDS programme, 2016/17–2018/19 (public and private health sector)

Year	Baseline	Constrained optimisation	Unconstrained optimisation
Total remaining on ART			
2016/17	4 184 854	4 315 322	4 323 917
2017/18	4 580 194	4 809 905	4 838 683
2018/19	4 936 373	5 307 556	5 349 098
New patients starting ART			
2016/17	525 802	661 688	670 599
2017/18	501 313	609 192	630 500
2018/19	462 014	613 831	627 901
Number of condoms in circulation			
2016/17	337 308 240	481 541 212	470 949 722
2017/18	341 080 893	485 688 017	475 133 498
2018/19	346 113 637	491 680 366	481 562 685
Number of medical male circumcisions			
2016/17	285 233	509 308	529 086
2017/18	274 317	531 432	553 930
2018/19	265 146	540 445	564 655
Number of HIV tests			
2016/17	11 077 811	11 596 035	18 592 290
2017/18	11 214 877	15 432 238	28 002 021
2018/19	11 328 301	16 440 258	31 510 815

Source: Authors' calculations. See also references 10 and 11.

The different intervention packages included in the scenarios result in different costs of the overall HIV and AIDS programme (Figure 2). Of particular note is that the cost of the South African HIV and AIDS programme is projected to continue to increase year-on-year under each of the scenarios, including the baseline scenario in which no additional interventions are scaled up and all existing interventions remain at baseline coverage. Across all scenarios, the cost of the ART component of the Care and Treatment programme area was

by far the largest contributor to the cost of the entire HIV and AIDS programme, with between 56% and 77% of total cost – mirroring findings from previous expenditure analyses of the South African HIV and AIDS programme.<sup>17</sup>

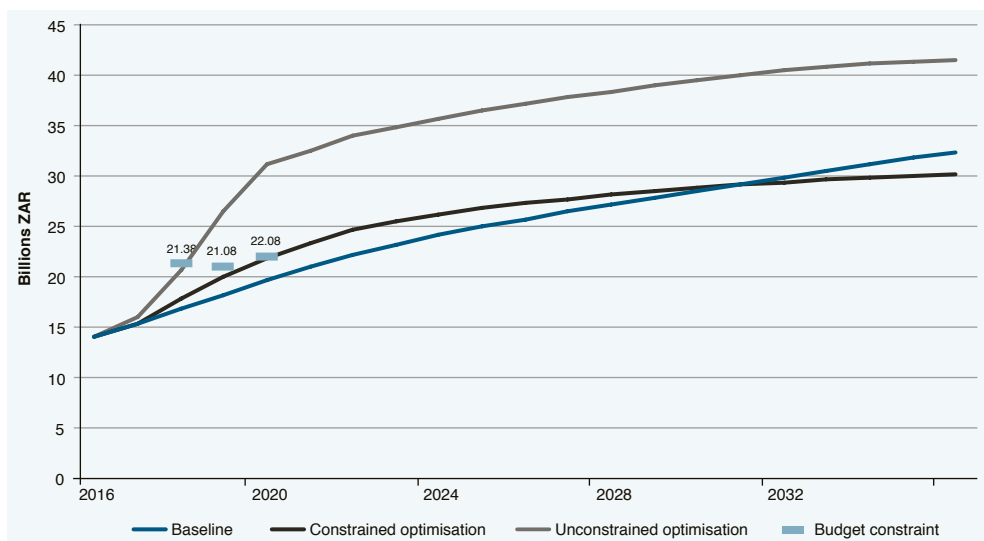
In both the baseline and the constrained optimisation scenarios, the cost of the programme correlated with the growing number of people on ART, while the unconstrained optimisation scenario is much more expensive than all other scenarios, with costs substantially higher than the currently available budget from the three main funders: South African Government, PEPFAR and GFATM. In the unconstrained optimisation scenario, costs do not decrease below baseline levels but instead almost triple over 20 years, owing to the scale-up of less cost-effective interventions in the second half of the ranked list in Table 3. In contrast, the constrained optimisation scenario becomes less expensive than the baseline scenario by 2027 and the constrained optimisation scenario by 2030, with increased savings over baseline every year thereafter. In short, the model continues to suggest that more aggressive earlier intervention will decrease costs in the long term. If Government chooses to spend more later, it will spend more in total. If Government spends more now, the impact on health outcomes over 20 years will be greater, but this will also result in reductions in total spending over the long run.

### Outcomes

Figure 3 shows the projected HIV incidence, prevalence and number of AIDS deaths under each scenario. From an incidence of 0.70% in 2015/16 in the baseline scenario, incidence continued to decrease at a constant pace until 2019, then stabilised at 0.47–0.42% over the remaining 15 years. In both optimisation scenarios, incidence continued to drop dramatically throughout the projection period, to 0.15% in the constrained and 0.12% in the unconstrained optimisation scenario, respectively, by 2035. All scenarios will reduce incidence by at least half over 20 years when compared with the baseline scenario, to between 0.12% and 0.17% by 2034/35. Of note is that none of the scenarios managed to reduce incidence

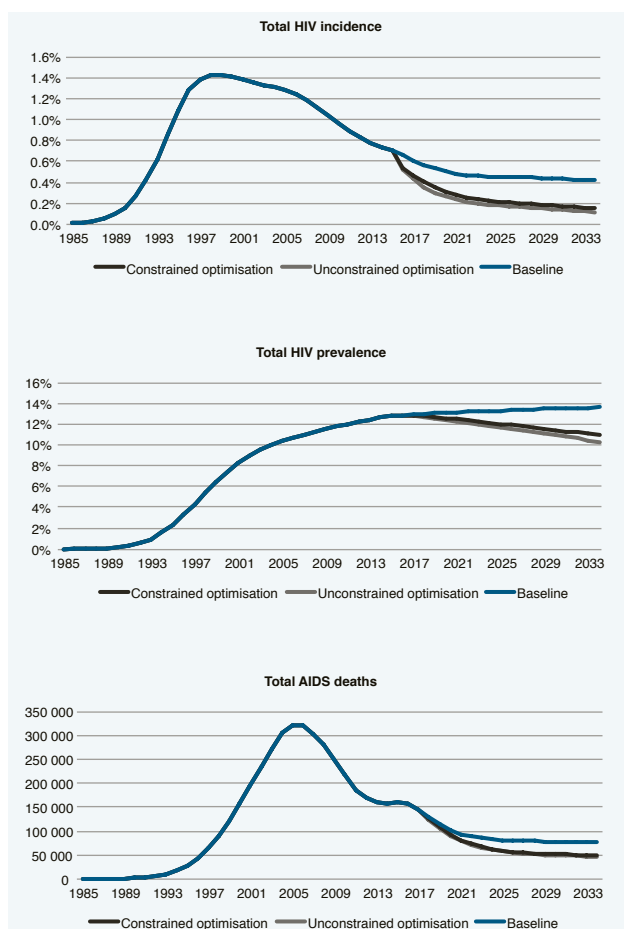
<sup>h</sup> The actual number of condoms assumed to be used to protect sex acts in the model are a fraction of this number, about 29%.

Figure 2: Total cost of the National HIV/AIDS programme in South Africa, by scenario\*



\* Even though the cost of inpatient care per patient on or off ART was included in the calculation of incremental cost-effectiveness, it is excluded here as this cost is borne by the general hospital budget, not the HIV/AIDS budget.  
 \* Expressed in real 2014/15 prices.

Figure 3: HIV incidence, prevalence and total AIDS deaths, by scenario



to below 0.1%, the level proposed by Granich et al.<sup>18</sup> as necessary for ‘virtual elimination’ of HIV – even though both scenarios came close.

Total AIDS deaths followed a similar pattern, with a decline in all scenarios from the 2015/16 level of 160 065 deaths per year with the largest decrease, to 47 421 deaths per year in 2034/35. In both the unconstrained optimisation, and constrained optimisation scenario deaths fell to 49 831 per year.

As a result of the changes in both incidence and mortality, prevalence continued to increase from the 2015/16 level of 12.9% in the baseline scenario to a maximum of 13.6% in 2034/35, and to decline in all other scenarios to between 10.8% in the constrained and 10.1% in the unconstrained optimisation. Increasing ART coverage is likely to have played a significant role in this, as the ART scale-up options contributed the greatest number of life years saved in the respective scenarios.

Cost-effectiveness

In terms of total life years saved over the baseline, the unconstrained optimisation scenario was more effective than the constrained optimisation scenario, but comes at a higher price (Table 5). While both scenarios increase life years saved by 20–22% compared with the baseline over 20 years, the unconstrained optimisation scenario increases costs by 31%, in contrast to the marginal cost differences of 1.14% in the constrained optimisation scenario. As a result, the constrained optimisation scenario is much more cost-effective, at an incremental cost-effectiveness ratio of R442 per life-year saved (compared to R10 963 for the unconstrained optimisation scenario).

Table 5: Summary of cost, outcomes and cost-effectiveness over 20 years, by scenario

Cost/Outcome	Baseline	Constrained optimisation	Unconstrained optimisation
Total life years lost due to AIDS	79 983 916	64 266 044	62 674 622
Life years saved	-	15 717 872	17 309 294
Change in baseline	-	-20%	-22%
Total cost (R, billions)	610	617	799
Incremental cost (R, billions)	-	6.95	189.76
Change in baseline	-	1.14%	31.12%
Incremental cost per life year saved	-	R442	R10 963

The investment case was limited to data available by January 2015 (with limited updates thereafter), and will be subjected to updates and adaptations in the next rounds.

### Affordability and fiscal space

Although the investment case findings clearly show the most cost-effective option, these still require significant additional funding in the medium term, while the SA Government faces real revenue constraints that may limit its ability to implement the most cost-effective option. The South African Budget 2016 encompassed further weakening of the fiscal position, requiring an increase in tax rates and expenditure reductions in order to stabilise the national deficit.<sup>19</sup> In reducing expenditure, Government has made efforts to protect funding for the social service delivery sectors such as health, basic education and social development. This is shown in Table 6,

Table 6: Consolidated national budget 2016, R million\*

Function	Revised estimate 2015/16	Medium-term estimates			Percentage of total MTEF allocation	Average annual MTEF growth
		2016/17	2017/18	2018/19		
Basic education	213 676	228 803	245 414	264 969	17.6%	7.4%
Health	159 377	168 393	183 629	198 556	13.1%	7.6%
Defence, public order and safety	171 522	181 519	192 444	203 644	13.7%	5.9%
Defence and state security	49 900	52 344	54 063	56 373	3.9%	4.1%
Police services	82 648	87 508	94 095	100 225	6.7%	6.6%
Law courts and prisons	38 974	41 667	44 285	47 047	3.2%	6.5%
Post-school education and training	64 158	68 715	74 715	80 493	5.3%	7.9%
Economic affairs	187 796	211 962	217 965	231 091	15.7%	7.2%
Industrial development and trade	29 550	31 844	31 938	35 314	2.4%	6.1%
Employment, labour affairs and social security funds	65 915	73 127	75 270	77 358	5.4%	5.5%
Economic infrastructure and network regulation	73 613	87 105	90 493	97 460	6.5%	9.8%
Science, technology, innovation and the environment	18 718	19 886	20 263	20 959	1.5%	3.8%
Human settlements and municipal infrastructure	178 233	182 631	199 821	216 215	14.2%	6.7%
Agriculture, rural development and land reform	25 249	26 417	27 744	29 147	2.0%	4.9%
General public services <sup>2</sup>	97 450	73 652	77 770	82 611	5.6%	-5.4%
Executive and legislative organs	12 485	13 378	13 988	14 768	1.0%	5.8%
General public administration and fiscal affairs	67 802	41 597	44 701	46 491	3.2%	-11.8%
Home affairs	7 247	7 391	7 052	8 935	0.6%	7.2%
External affairs and foreign aid	9 916	11 286	12 029	12 417	0.8%	7.8%
Social protection	154 353	167 479	180 634	194 945	12.9%	8.1%
Allocated by function	1 251 815	1 309 571	1 400 135	1 501 671	100.0%	6.3%
Debt-service costs	129 111	147 720	161 927	178 556		11.4%
Contingency reserve	-	6 000	10 000	15 000		
Consolidated expenditure	1 380 926	1 463 291	1 572 062	1 695 227		7.1%

\* Numbers stated in this table are in nominal terms (i.e. not adjusted for inflation).

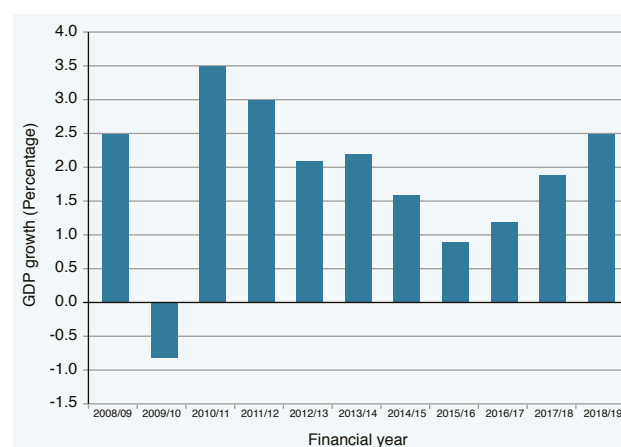
Source: National Treasury, 2011.<sup>19</sup>

sourced from the Budget Review.<sup>11</sup> Worth noting is also that debt-service cost is the fastest-growing expenditure item in the budget, increasing at an annual average of 11.4%.

### Economic growth

National revenue growth is highly dependent on economic growth, which has declined annually over the past five years to 2015/16 (Figure 4), and has only exceeded 3% in one year, in the low growth decade following the global recession of 2008. Lower economic growth is leading to lower increases in Government budgets. Growth is projected to increase slightly over the next three years but may not reach 3% in this Medium-term Expenditure Framework.

Figure 4: South Africa's annual GDP growth



Source: Compiled by the authors based on Budget Reviews 2011–2016.<sup>13,19,20,25</sup>



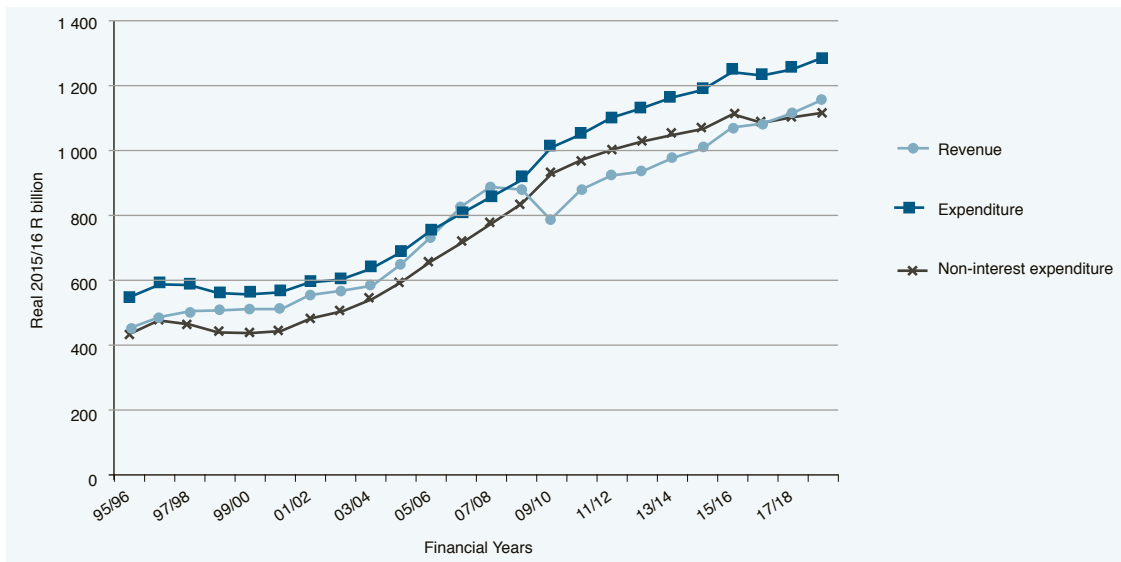
Health spending is in turn highly dependent on economic growth. Based on current GDP and existing ratios of expenditure, the authors estimate that an average of 1% growth in GDP would generate a R1.5 billion real increase in public health spending annually, 2% would generate R3 billion, 3% R4.5 billion, etc. (based on  $GDP \times \% \text{ growth in GDP} \times \text{non-interest expenditure} / GDP \times \text{health spending} / \text{non-interest expenditure}$ ; in this case for 2016/17, a 1% increase in GDP would generate a R11.6 billion increase in non-interest expenditure, of which R1.5 billion might be for health services.)

The fact that the actual increases in health budgets seen in Figure 4 are lower than this arises from the revenue growth being largely used to reduce the deficit and pay for higher interest rates.

**Fiscal policy: national revenue and public spending**

When the global economic recession reached South Africa in 2008, growth slowed and, as can be seen in Figure 5, national revenue decreased markedly by 2010/11, but national expenditure levels were largely maintained as part of a counter-cyclical fiscal stance

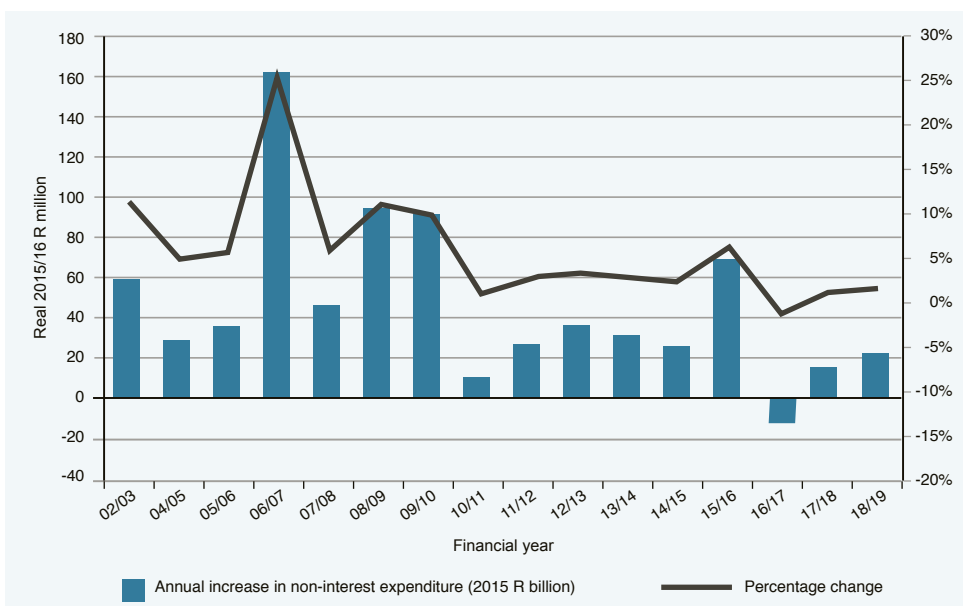
Figure 5: Total government revenue and expenditure, 1995/96–2018/19\*



Source: Compiled by the authors based on Budget Reviews 2011–2016.<sup>13,19,20,25</sup>

\* Adjusted for inflation, expressed in real 2015/16 prices Rand billion

Figure 6: Real annual increase in total government spending (non-interest\*; Rand billion)



Source: Compiled by the authors based on Budget Reviews 2011–2016.<sup>13,19,20,25</sup>

\* Non-interest rather than total expenditure is used because it better reflects spending on government services rather than debt payments which vary; a wider selection of information is available in the Budget Reviews.

that was intended to protect social spending.<sup>20</sup> Figure 5 shows a sharp decline in the revenue line from 2009/10, after which the expenditure line far exceeded the revenue line. The lower revenue line, higher deficit (gap between revenue and expenditure lines) and higher total expenditure line, partially due to higher interest costs, all reflect limited fiscal space (despite national spending exceeding one trillion Rand). Nevertheless, some of the increase seen in non-interest spending, which funds services, reflects increased allocations provided to the HIV and AIDS Investment Case in Budget 2016.

Figure 6 shows year-on-year real spending growth in non-interest expenditure in the main budget. Growth in total government spending was strong in the six years before the 2008 economic recession, but has been followed by considerably lower spending growth since 2010/11. There is no real total year-on-year spending growth anticipated in 2016/17, with some recovery into 2017/18, with an average total spending growth (non-interest) of R8.5 billion per annum across government over the next three financial years. Note that if the health sector were to receive 10–15% (15% is the Abuja Declaration target) of R8.5 billion non-interest spending growth, this would amount to an increase of R850 million to R1.3 billion.

Fiscal space can be increased by increasing revenue or decreasing expenditure. Both of these have been done in Budget 2016. National revenue will reach 26.9% of GDP on the main budget in the medium term, and consolidated national revenue (including social security funds and public entities) will reach 30.5% of GDP. In both Budget 2015 and Budget 2016, various tax rates have been increased (personal, fuel levy, excise taxes on alcohol and cigarettes) and some new forms of taxation have been announced (e.g. tax on sugar-sweetened beverages).<sup>19</sup>

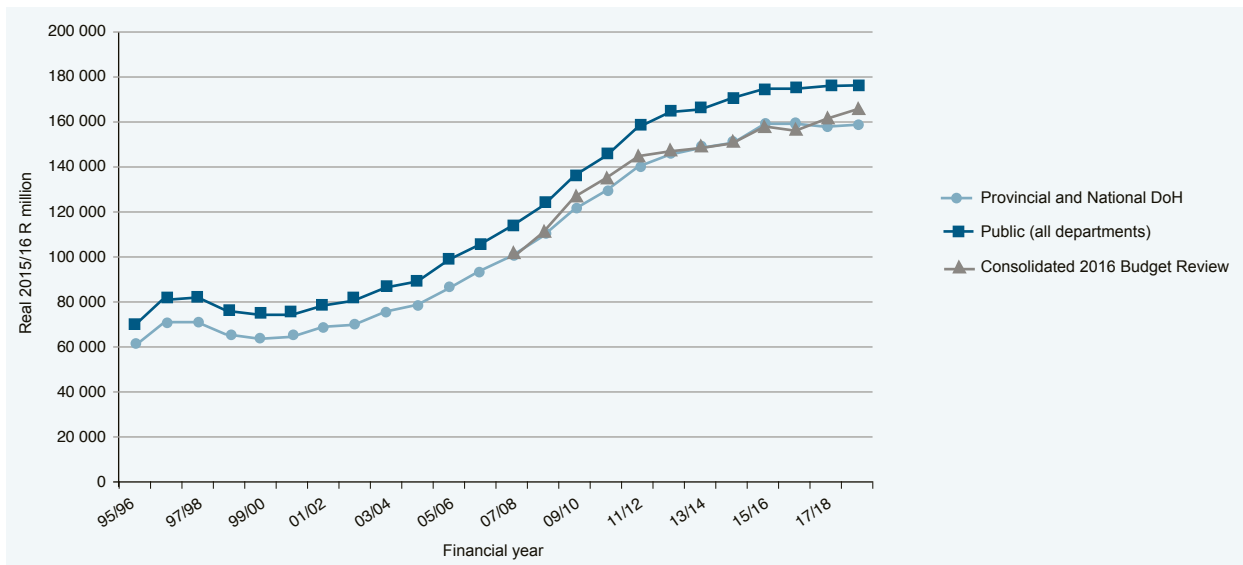
Table 7 compares South Africa's total public expenditure and revenue with a basket of income comparable to upper middle-income (UMIC) countries.<sup>21</sup> South Africa's spending is comparable to the median, but several comparator countries have slightly higher revenue and expenditure (e.g. Brazil, Argentina, Botswana and Turkey). Note that increasing fiscal space does not necessarily imply that spending would be allocated to health or to HIV specifically.

Table 7: General government revenue, expenditure and deficit as a percentage of GDP

Countries	Expenditure as % of GDP			Revenue as % of GDP			Deficit as % of GDP		
	2008	2010	2012	2008	2010	2012	2008	2010	2012
Turkmenistan	10.9	14.1	14.7	20.9	16.1	21.0	10.0	2.0	6.4
Costa Rica	16.1	19.0	18.3	15.9	13.6	13.7	-0.3	-5.4	-4.6
Peru	18.8	20.3	19.6	21.3	20.2	21.7	2.6	-0.1	2.1
Dominican Republic	19.3	16.5	20.7	15.9	13.6	14.0	-3.4	-2.8	-6.8
Kazakhstan	27.1	22.5	22.4	28.3	23.9	26.9	1.2	1.5	4.5
Mauritius	23.8	25.1	23.3	21.0	21.9	21.4	-2.8	-3.2	-1.8
China	20.4	22.8	24.8	19.7	21.3	22.6	-0.7	-1.5	-2.2
Thailand	21.2	23.2	24.9	21.4	22.4	23.1	0.1	-0.8	-1.8
Panama	25.7	27.1	26.6	26.1	25.2	25.1	0.4	-1.9	-1.5
Mexico	25.6	26.7	27.2	24.7	22.4	23.5	-1.0	-4.3	-3.7
Gabon	18.7	22.8	27.4	29.6	25.4	29.0	10.9	2.7	1.5
Colombia	26.6	29.4	28.3	26.4	26.1	28.4	-0.3	-3.3	0.1
Malaysia	28.2	27.8	29.5	24.6	23.1	25.9	-3.6	-4.7	-3.6
Jamaica	38.6	33.2	29.9	27.5	26.8	25.8	-11.1	6.3	-4.1
Lebanon	34.7	29.7	31.3	24.7	22.2	22.6	-10.0	-7.6	-8.7
South Africa	30.1	32.4	32.6	29.6	27.5	28.3	-0.5	-4.9	-4.3
Namibia	26.8	32.7	34.0	31.0	28.1	32.7	4.2	-4.6	-1.3
Bulgaria	35.2	36.7	34.4	38.0	32.7	34.0	2.9	-4.0	-0.5
Romania	37.0	38.6	35.4	32.2	32.2	32.9	-4.8	-6.4	-2.5
Botswana	46.9	39.9	35.7	39.4	32.5	35.9	-7.5	-7.5	0.2
Turkey	34.5	36.7	36.3	31.8	33.3	34.5	-2.7	-3.4	-1.8
Azerbaijan	31.1	31.7	36.7	51.1	45.7	40.5	20.0	14.0	3.8
Belarus	48.8	42.1	38.9	50.7	41.6	40.5	1.9	-0.5	1.7
Venezuela	34.9	31.6	40.0	31.4	21.2	23.4	-3.5	-10.4	-16.6
Ecuador	34.5	34.6	40.4	35.1	33.3	39.5	0.6	-1.3	-0.9
Brazil	38.3	39.9	40.4	36.7	37.1	37.7	-1.6	-2.8	-2.8
Iraq	57.3	49.6	43.3	56.4	45.4	47.4	-0.9	-4.2	4.1
Argentina	37.9	38.5	44.3	34.3	37.2	40.3	-3.6	-1.4	-4.0
Hungary	49.2	49.9	48.9	45.5	45.6	46.9	-3.7	-4.4	-2.0
Serbia	44.8	46.4	49.3	42.8	42.5	42.1	-2.0	-3.9	-7.2
Median SA comparator	30.6	31.6	31.9	29.6	26.5	28.3	-1.0	-5.2	-3.6
Medium upper middle income	34.2	32.0	33.9	30.3	27.8	29.5	-3.9	-4.2	-4.4

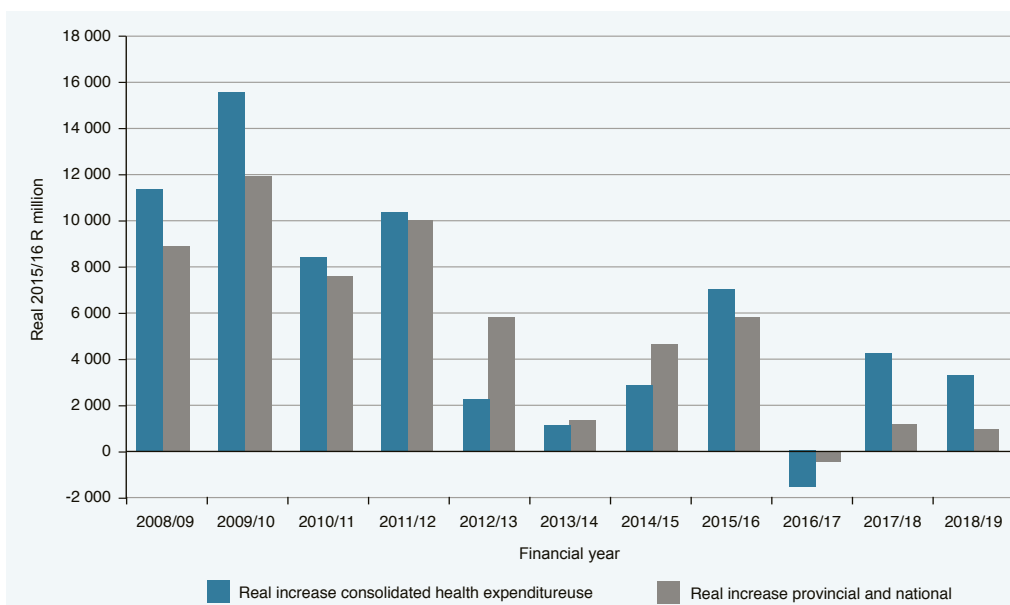
Source: International Monetary Fund, 2014.<sup>14</sup>

Figure 7: Public health expenditure trend (real Rand million 2015/16 prices)



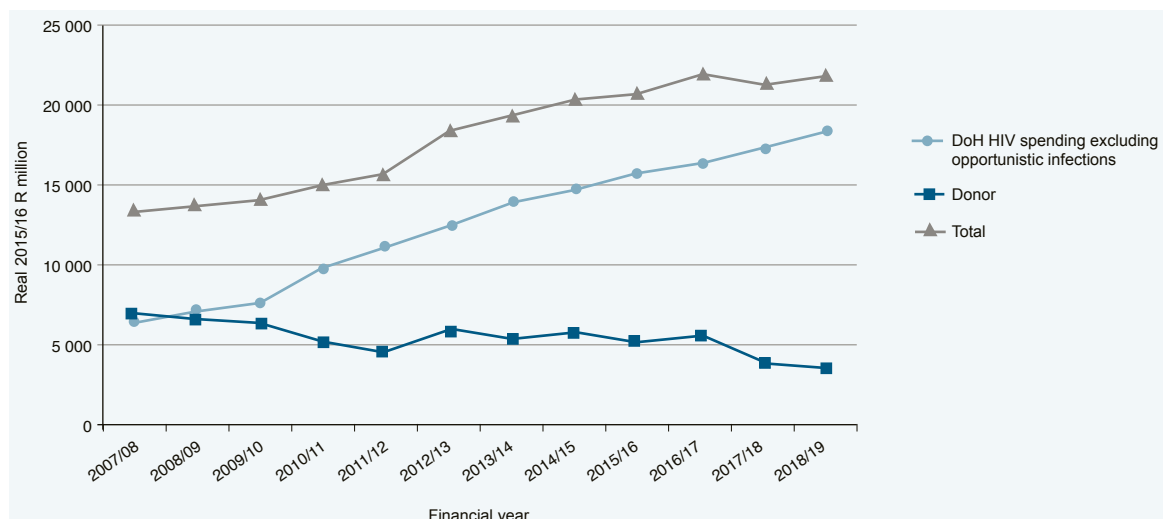
Source: Compiled by the authors.

Figure 8: Health spending annual growth – two projections (real Rand million 2015/16 prices)



Source: Compiled by the authors based on Budget Reviews 2011–2016, Estimates of National Expenditure 2010–2016, and Estimates of Provincial Revenue and Expenditure 2010–2016.<sup>13,19,20,25</sup>

Figure 9: Government and donor funding for HIV/AIDS-dedicated programmes (R billion real 2014/15 prices)\*



Source: Compiled by the authors based on Estimates of National Expenditure 2010–2016, Estimates of Provincial Revenue and Expenditure 2010–2016, and the Partnership Framework Implementation Plan agreement with PEPFAR.

\* The declining trend of donor spending reflects the bilateral Partnership Framework Implementation Plan agreement with PEPFAR which envisaged a funding decline from US\$450 million to US\$250 million over five years. However, in practice, donor funding is likely to be higher in Rand terms because of currency depreciation and additional funding from PEPFAR and GFATM for targeted HIV interventions.

\* Funding to treat opportunistic infections in general health services is excluded here to make the numbers more comparable to the cost estimates shown in the investment case.

### Health budget trends

Health's share of the budget is currently 13.1% (Table 5) and not far from the 15% called for in the Abuja Declaration. Figure 7 shows trends in public health spending, expressed in real Rand 2015/16 prices, and using three different spending measures. The simplest measure is the sum of health spending by provincial and the national Departments of Health; the consolidated measure is used in the Budget Review and incorporates public entities such as the South African Medical Research Council (MRC) and National Health Laboratory Service (NHLS); the 'public all departments' estimate is the widest and incorporates health spending in the Departments of Defence and Correctional Services, among others. All these measures show that real growth was quite strong until 2011/12 (exceeding 5% per annum), but slowed substantially from 2012/13 and especially in the recent years, when it started to level off in real terms. At the time of writing, provincial budgets had not yet been gazetted for Budget 2016. The consolidated estimate shows somewhat stronger growth going forward than do the other two estimates, because its methodology assumes that provincial surpluses will be allocated out over time.

Figure 8 presents year-on-year real increases in health budgets using two projections of forward growth. The lower projection covers only provinces and the National Department of Health, and is based on estimates provided by provinces earlier in the budget process, which will change when final provincial 2016 budgets are published. Whereas health expenditure increased by an average R10 billion per annum in real terms for the four years to 2012/13, spending is projected to slow over the medium term. This lower estimate of growth projects 0.4% or an average of R627 million per annum increase over the medium term. The higher estimate, based on consolidated expenditure, estimates real growth of 1.3% per annum or averaging R2.0 billion per annum over the medium term. This higher estimate includes assumptions about provincial surpluses

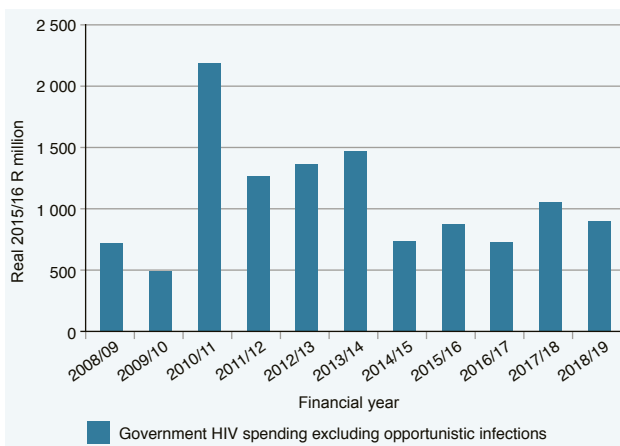
being distributed out to health departments. These estimates draw on in-year preliminary provincial projections for 2015/16 which may overestimate the year's spending outcome. Nevertheless, both estimates suggest a considerable slowdown in health expenditure in 2016/17, which will need to be managed, and partial recovery in 2017/18 and 2018/19. Published provincial numbers from all nine provinces for Budget 2016 will be available from May 2016.

### HIV and AIDS spending and funding

Government spending on HIV and AIDS has tripled in real terms since 2007/08, as shown in Figure 9, while donor funding is projected to decline in terms of the bilateral agreement with PEPFAR.<sup>22</sup> In practice, however, the donor funding trajectory may be more positive in the short term, given the strong US Dollar and additional allocations from PEPFAR and the GFATM for specific programmes.

Annual real growth in government expenditure on HIV and AIDS (Figure 10) is expected to average R913 million per annum over the medium term. This represents a significant commitment by government, noting the revenue constraint and that total real government non-interest expenditure growth across all departments is anticipated to average R8.5 billion per annum over the MTEF (Figure 6) and between R627 million and R2.0 billion per annum for health services overall (Figure 8).

Figure 10: Annual real growth in government HIV and AIDS spending on dedicated programmes R billion



Source: Compiled by the authors based on Estimates of National Expenditure 2010–2016 and Estimates of Provincial Revenue and Expenditure 2010–2016.

It is clear that HIV and AIDS takes up a considerable share of limited budgetary space for health, particularly in the 2016/17 year. However, ART is not the only item for which spending growth is required – wage pressures are substantial in the South African context in terms of the 2015 wage agreement which covers three years exceeding inflation by several percentages. Primary health care volumes of patients are increasing and there are backlogs in improving conditions of health facilities, all of which require additional resources.

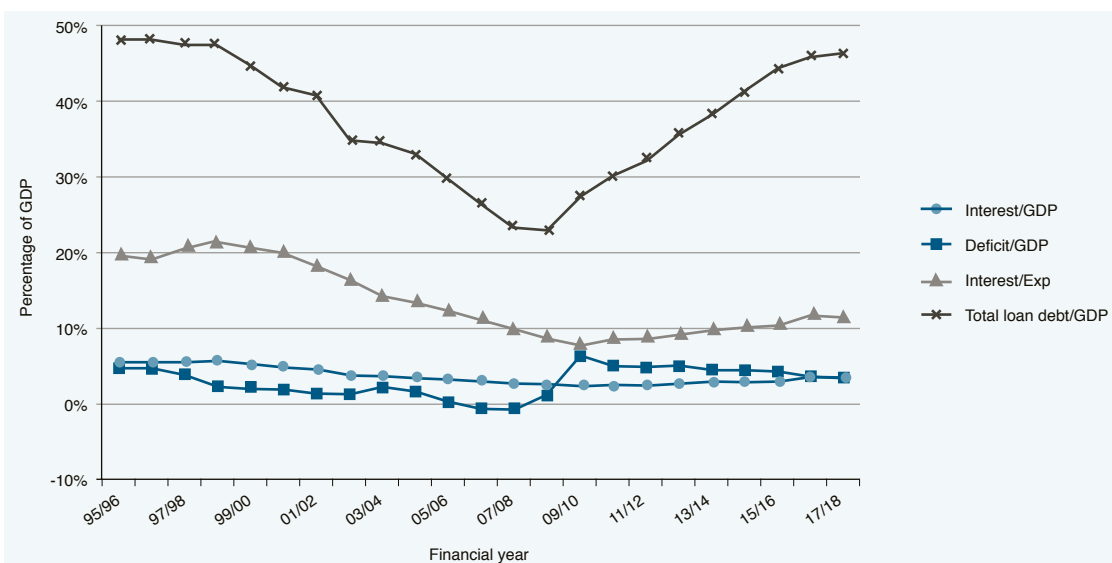
### Sustainability and government debt

Fiscal space in South Africa is currently limited by the low economic growth and high deficit circumstances. The level of government debt and deficits is an important sign of fiscal sustainability. Figure 11 shows four indicators of debt sustainability. The net debt-to-GDP ratio

has been rising and will reach 46.2% by 2018/19. While this in itself is still lower than is the case in several developed countries, South Africa pays higher interest rates, and as interest as a proportion of total government spending increases to 11.7% in 2016/17, it could soon overtake health expenditure. Government’s interest payments as a proportion of GDP will now reach 3.5%, higher than the upper limit of 3% of GDP recommended by the Organisation for Economic Co-operation and Development (OECD). The annual deficit (i.e. the amount by which expenditure exceeds revenue) reached its peak at 6.4% of GDP in 2009/10 and is projected at 4.3% in 2015/16,<sup>19</sup> higher than the upper limit recommended, for example, in the European Union (EU) where it is 3%.<sup>23</sup> Annual debt payments are projected to rise from R88 billion in 2012/13 to R179 billion in 2018/19.<sup>19</sup>

Rising debt-to-GDP ratio, interest payments and high deficits are considered to be indicators of risk in the ability of governments to make debt payments and are of concern to Government.<sup>24</sup> These have led to two sovereign ratings downgrades (i.e. independent scorings of the risk of governments defaulting on debt payments), which have in turn led to higher borrowing costs. To reduce fiscal risk, the Government increased taxes (personal income, fuel levy, excise taxes and others) in Budget 2015<sup>25</sup> and Budget 2016, and imposed spending ceilings, spending cuts (R25 billion in personnel cuts across the whole-of-government Budget 2016) and undertook reprioritisation to fund new priorities, such as the zero-increase in tuition fees and increased student financial aid at higher education institutions. Despite these efforts, the indicators of debt sustainability in South Africa appear to imply that fiscal space for increased health, and specifically HIV and AIDS spending, is likely to be further constrained.

Figure 11: Indicators of debt sustainability in South Africa\*



Source: Compiled by the authors based on Budget Reviews 2011–2016.<sup>13,19,20,25</sup>

\* The increase in interest payments/GDP ratio from 2.3% of GDP to 3.5% of GDP is somewhat lower than the increase of net loan debt from 22% to 46% of GDP, because interest rates – although rising – are lower than in 2008/09, but could be at risk of rising further; debt payments take up 11.7% of the budget in 2016/17.

## Potential to raise additional revenue through NHI

Should funds not be sufficient for the 90-90-90 scenario, additional funding may become available over time through new financing mechanisms through NHI or through other mechanisms to raise national revenue. The recently published White Paper on NHI<sup>26</sup> suggests that public funding for health services will rise by approximately 2% of GDP over 15 years, from 4% of GDP to 6.2% of GDP, mainly through increased taxation. This could, in the long term, raise sufficient funding to fully fund the 90-90-90 scenario and for complete donor sustainability. However, NHI will take several years to be fully functioning and to generate the revenues anticipated, particularly in the fiscal climate portrayed in Budget 2016.<sup>19</sup>

## Technical and allocative efficiency

Achieving high levels of technical and allocative efficiency is critical to sustainability, especially in a constrained fiscal environment. Substantial savings have been achieved through a well-researched and negotiated procurement process resulting in South Africa achieving among the lowest prices for ARVs globally, which, together with the shift to nurse-based treatment, has substantially lowered the unit costs of ART. There may be potential for even greater efficiencies through measures such as adherence clubs and the Central Chronic Medicine Delivery and Dispensing programme which will facilitate less-frequent facility visits, integration of services and operations at scale. However, an increasing proportion of patients requiring second-line treatment and several years of decreasing prices may herald a lower limit on unit costs for ART treatment being approached after many years of reducing costs. Nonetheless, through improved chronic medicine delivery and dispensing, integration and other forms of efficiency savings and rationalisation, it is likely that future reforms could achieve greater technical efficiency and value for money in health service delivery platforms and for the HIV programme as well.<sup>27,28</sup>

## Discussion

The analysis undertaken suggests that while the 90-90-90 strategy is hard to achieve, it is likely to be affordable and has indeed already been partially funded in Budget 2016.<sup>19</sup> However, the precise costs of the scenario in the short to medium term will vary depending on the pace of scale-up of the most cost-effective interventions such as condoms, circumcision, ART and other interventions shown in the upper half of Table 3. Too rapid a scale-up might be unfeasible, particularly given human resource constraints, whereas if scale-up is too slow, the scenario may revert closer to the baseline scenario and reduction in the rates of new infection and deaths may be inadequate.

Both Budget 2016 and Budget 2015 reflect a message of fiscal constraint and reduced fiscal space. Government has tried to create some fiscal space by increasing taxation and reducing expenditure (e.g. R25 billion in personnel savings). Some of these funds have been used to fund and reprioritise funds towards the HIV and TB Investment Cases in Budget 2016.<sup>19</sup> Additional funds of approximately R1.8 billion were allocated towards these over three years in Budget 2016, despite the tight fiscal position.<sup>29</sup> These funds were allocated because the Investment Case showed that substantial

further improvements in health outcomes could be achieved through the constrained optimisation scenario, noting that HIV and TB still contribute massively to the national burden of disease.

The budget process appears to have been proactive in considering and at least partially funding the proposed recommendations of the HIV and AIDS Investment Case; this forms a good basis for the adoption of the 90-90-90 strategy and progressive implementation of the HIV Investment Case.

However, there will be various hurdles to overcome, such as managing the increase in health personnel costs due to the 2015 wage agreement, which is expected to result in an 7.4% annual growth in wages across government.<sup>19</sup> In addition, there will be a need to reconcile rising HIV and AIDS budgets with the personnel hiring limitations announced across government as part of the fiscal constraint in Budget 2016 – a specific exclusion for HIV and AIDS-related personnel may be required to address this. If this is not achieved, there may be funds available, but not sufficient human resources to implement the 90-90-90 strategy, noting also that South Africa has a significantly lower number of doctors than do most income-comparable upper middle-income countries.<sup>30</sup> More contracting with private general practitioners as well as public clinics, as envisaged in the NHI policy, might also assist.<sup>19</sup> Rising HIV and AIDS budgets in the context of low growth in health budgets represents somewhat of a dilemma, but may still be worthwhile given the high proportion which HIV and AIDS contributes to the overall burden of disease.

Achieving allocative and technical efficiency is important given the fiscal and other resource constraints. Comparing the Investment Case scenarios (see Figures 1–3), the constrained optimisation scenario compares favourably with the unconstrained optimisation scenario for outcomes such as incidence, prevalence and lives saved, but is cheaper in the long term and should therefore be considered the most cost-effective option for Government. Although the Investment Case suggests a degree of allocative efficiency at baseline, several key prevention interventions are still at low coverage rates (e.g. MMC, condoms and the sex worker programmes have only recently expanded coverage, and an adherence strategy including adherence clubs and a chronic medicines dispensing programme is yet to be rolled out), and the 2012 South African National HIV Prevalence, Incidence and Behaviour Survey suggests that safe sexual behaviour is not being maintained.<sup>31</sup>

Within the constrained optimisation scenario, various sub-options could be developed to ascertain how rapidly ART, condom, circumcision and other targets might be raised. If the 90-90-90 targets are to be met, universal testing and treatment must be progressively rolled out, increasing testing to over 12 million tests per year for the foreseeable future, using a wider range of testing modalities to detect a larger proportion of infected persons (home-based testing, mobile testing, provider-initiated counselling and testing, etc.), and initiating a larger number of people on ART per year.

Depending on the speed with which the UTT programme is rolled out and whether donor funding does in fact decline (as specified in the Partnership Framework Implementation Plan (PFIP)) or is actually maintained, there may still be budgetary shortfalls to implement the strategy. However, the research suggests that Budget 2016 already contributes towards implementation of the strategy, and the

experience of previous CD4 count threshold changes has been that they tend to lead to progressive and gradual rather than sudden, large increases in uptake.

The constrained optimisation scenario involves an optimal allocative distribution that focuses funds on the most cost-effective interventions. Implementing this will not necessarily be easy, as there are always calls (in some cases potentially justifiably) to implement a range of less cost-effective or proven interventions. Part of this dilemma arises from the difficulty of proving effectiveness, particularly for a potentially large set of enabling interventions. This is one of the methodological limitations of this Investment Case analysis. Many of these other interventions make sense from other perspectives, but do not meet the very rigorous criteria used here. As more interventions are added and government and donor funds are used for additional interventions and purposes, the scenario moves closer to the more expensive unconstrained optimisation approach, with higher costs and a requirement for further additional funding. In addition, the costed model assumes that the current high degree of technical efficiency in terms of medicine prices and staff distribution can be sustained, and it is possible that the country may face changing cost pressures, e.g. increasing medicine prices following currency depreciation.

Scaling up HIV and AIDS services at a time of fiscal constraint will be difficult. Confronting these kinds of challenges is consistent with the experience of health services in many OECD countries (e.g. Ireland, Greece, England) which have been through a period of fiscal constraint during the 2008 global recession and have introduced a wide and varied set of efforts to control costs, achieve technical efficiency gains and source cheaper input costs. South Africa faces the added high quadruple burden of disease,<sup>32</sup> an escalating HIV and AIDS response, and less advanced health services.

Affordability will also depend on the degree to which donor funding will have to be replaced. In the context described here, where increases in HIV and AIDS funding already comprise a significant share of total annual health budget increases, it is likely that simultaneous full replacement of donor funding will be difficult. Full domestic sustainability, in the sense of fully replacing donor funding, will become easier once economic growth becomes stronger or once the number of persons on ART levels off (as is projected for around 2026 in both optimisation scenarios). In this context, simultaneous replacement of donor funds is likely to imply greater scrutiny of the merit of the services to be absorbed into the public service. However, it is worth noting that the entire level of donor funding for health is relatively small (0.11% of GDP). Even if donor funding had to be replaced in its entirety, this does not imply a huge fiscal pressure. Complete replacement is not envisaged at the present time, with substantial PEPFAR and GFATM allocations continuing through the medium term, noting the importance of the South African contribution to ending AIDS globally. Practical experience of the sustainability transition in South Africa within the first one to two years of reducing PEPFAR funds has shown the complexity of handing over responsibility for a complex set of services and non-governmental organisations (NGOs) widely distributed throughout the country. This practical experience suggests that sustainability transitions should be carefully planned and managed. Fiscal sustainability has in several cases proven to be considerably simpler than programmatic transition of services.

NHI (and other related potential financing reforms) could potentially increase public health spending from 4% to approximately 6.2% of GDP over a 15-year period<sup>26</sup> (as envisaged in the NHI White Paper assuming economic growth of 3.5%), once additional revenue sources have been put into place. NHI would have the effect both of raising additional revenue and increasing the health sector's share of the budget above the current 13.1% and closer to the 15% called for in the Abuja Declaration.

## Conclusions

The national budget, reflected in Budget 2016, is under fiscal constraint and has limited fiscal space. Attempts have been made to create fiscal space by increasing taxation and reducing national spending. Some of the additional funds sourced from the contingency reserve and through reprioritisation have been allocated to the HIV investment case, including the UTT strategy, given its apparent cost-effectiveness and ability to make a substantial impact on national health outcomes.

However, for the 90-90-90 strategy to work, its human resource requirements will have to be addressed in a climate where restrictions on post-filling have been reported in several provinces. The annual additional costs of ART expansion consume a significant portion of the available additional funds in the national health budget, which faces considerable limitations. The rising short-term costs of the HIV programme (ART being the largest contributor to HIV and AIDS spending, accounting for between 56% and 77% of total cost), together with ever-rising personnel costs resulting from the 2015 wage agreement, imply pressure on the rest of the health service with a likely continued focus on efficiency savings and more cost-efficient service platforms.

Given these pressures, the transition plan for donor-funding programmes will require scrutiny to make best use of limited and declining donor funding. However, the level of donor funding in South Africa is relatively small and compensating for the decline would not incur huge fiscal pressure. Despite the PFIP, the two largest donors, PEPFAR and GFATM, have committed to supporting HIV and AIDS service delivery in South Africa with substantial allocations in the medium term. Over the past few years, Government has worked closely with PEPFAR on the PFIP transition. It is evident that transition planning and sustainability – both fiscal and programmatic – is a difficult process that requires close collaboration with all relevant stakeholders, including the NGO sector.

Given the constrained fiscal climate, it is important to achieve high levels of technical and allocative efficiency in the delivery of HIV and AIDS services. The programme has already reached fairly high levels of technical and allocative efficiency (e.g. substantial savings in ARV procurement, and nurse-initiated management of ART) with real unit costs dropping substantially. It is important for Government and the private sector to continue to achieve greater efficiencies and value for money in HIV and AIDS service delivery and other parts of the health service as an integral part of financing reforms.

In summary, the total cost of the national HIV and AIDS programme will increase, notwithstanding the mix of interventions chosen, because of South Africa's generalised epidemic and Government's pre-existing commitment to fund lifelong ART to existing patients.

In the context of the current fiscal constraints, it is in the hands of Government to decide when total costs should start to decrease – bearing in mind that spending more now will lead to a decrease in total spend.

## Recommendations

The following recommendations arise from the research:

- A move towards universal UTT, and by implication, the 90-90-90 targets, appears to be affordable, if hard to reach, with the increased HIV prevention and treatment funding allocation in the 2016 Budget assuming that the historical pattern of growing HIV and AIDS budgets will continue over the medium to long term. Therefore, the constrained optimisation scenario should be implemented, which will entail implementation of UTT, and scale-up of interventions that have been identified as highly cost-effective, such as MMC and condom distribution. However, it is uncertain whether some of the highly cost-effective interventions can be logistically and practically scaled up even faster.
- The HIV investment case findings underscore the importance of investing more now in HIV and AIDS to reduce overall spending and to achieve greater impact over the next 20 years. In the context of NHI and declining donor funding, it is recommended that Government also intensify its efforts to control costs and safeguard and further expand technical and allocative efficiencies in programme delivery, such as through community-level testing and adherence clubs.
- NHI is likely to increase fiscal space to the benefit of health services including HIV and AIDS. It has the potential to fully address sustainability in the longer term, including phasing down of donor funding. Therefore, the NHI reforms should be supported, particularly the proposals to raise additional revenue to fund NHI. Given the difficult fiscal space over the medium term, development partners should be cautious about unplanned reductions in donor funding without having a transition plan that is closely co-ordinated with the SA Government.
- The investment case methodology has been useful in determining the most cost-effective interventions and budget requirements to combat the HIV and AIDS epidemic in South Africa. Together with the TB Investment Case, it was used in the 2016 budget process to successfully secure additional funding for the HIV and AIDS and TB programmes. The application of this approach may provide useful lessons for other health programmes.

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