



The Kingdom of Swaziland

The Swaziland HIV Investment Case

'A Fast-Track Programme towards an AIDS-free Swaziland'



Foreword

“Swaziland aims to become one of the first African countries with a generalised epidemic to attain an AIDS-free generation. All that is required is commitment, persistence and doing what we know works in our context. Although some additional resources will be required from both the domestic and external front, investing in Swaziland’s evidence-based HIV response game changers provide an opportunity for partners to become part of the winning team that accomplishes an AIDS-free generation. It is possible, now in our lifetime!”



The presentation of the Swaziland HIV Investment Case (SHIC) is a demonstrated commitment by the Government of the Kingdom of Swaziland to work towards His Majesty King Mswati III’s vision of attaining an AIDS-free Swaziland by 2022. An objective that is in line with the national vision to attain ‘First World Status’ by 2022. For the Kingdom, managing, containing and ending AIDS is the most critical obligation, in recognition that HIV is the largest single catastrophe that the Swazi society has ever witnessed and suffered. Having witnessed over 50,000 AIDS-related deaths, with 200,000 Swazi citizens living with HIV, and almost half of children under 18 years either orphaned or vulnerable, AIDS is an epidemiological and economic challenge for the country.

The message of ending AIDS signals that we are now ready to confront the various socio-economic complexities of the disease. In short, we are looking at HIV investments in a business sense; and for Swaziland this should not be complex as our efforts so far have borne results. We have, for instance, virtually eliminated mother to child transmission of HIV among infants under 2 months, expanded care and support to OVC in the communities, and transitioned the epidemic into a manageable chronic illness. However, these efforts have not been enough to turn the tide as new infections continue to outpace new enrolments into treatment and young women remain the most HIV-prone group as well as the fiscal pressure of the response that is rising continuously.

The SHIC calls for a re-doubling of our efforts. It proposes tested critical game changers in five extended National Multisectoral HIV and AIDS Framework (eNSF) programme areas that hold the potential to deliver the maximum possible impacts on HIV in Swaziland. The SHIC also calls for bridging the traditional dichotomy between HIV treatment and prevention, making tough financial decisions using an investment approach, the re-engagement of communities, strengthening service delivery systems and developing cost-effective and financially viable HIV response options.

The SHIC demonstrates that the end of AIDS is not just a pipedream but is within our grasp. Implementing these game changers comes with a huge initial financial investment that requires national commitment and global partnership. I therefore I call all our esteemed development partners to support Swaziland’s HIV Investment programme. Investing in Swaziland’s HIV Investment programme far outweighs current investments, and most importantly the cost of the status quo. I look forward to the returns in terms of lives saved, new infections averted and a reduction in future spending. It is possible, now in our lifetime! Let us therefore join hands and end AIDS in Swaziland by 2022, 2030 and beyond.

Dr. Barnabas Sibusiso Dlamini
Prime Minister
Kingdom of Swaziland

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I wish to echo the words of His Excellency the Right Honourable Prime Minister for Swaziland, Dr. Barnabas Sibusiso Dlamini that partners –local and international- must support the implementation of the Swaziland HIV Investment programme and I am convinced that their successful implementation will lead us to fast-track the path of ending AIDS by 2022.

Mr. Khanya Mabuza

Executive Director

National Emergency Response Council for HIV/AIDS (NERCHA)

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Abbreviations and Acronyms

AIDS	Acquired Immune Deficiency Syndrome
ANC	Antenatal Care
ART	Antiretroviral Therapy
ARVs	Antiretroviral Drugs
ASI	Accelerated Saturation Initiative
DALY	Disability Adjusted Life Year
EIMC	Early Infant Male Circumcision
EMTCT	Elimination of Mother To Child Transmission
eNSF	The Extended National Multisectoral HIV and AIDS Framework
FP	Family Planning
GFATM	Global Fund to fight AIDS, TB and Malaria
HIV	Human Immunodeficiency Virus
HMIS	Health Management Information System
HTC	HIV Testing and Counselling
ICF	Intensified Case Finding
MC	Male Circumcision
MDR-TB	Multi-Drug Resistant Tuberculosis
MNCH	Maternal, Neonatal and Child Health
MTCT	Mother To Child Transmission
NARTIS	Nurse led ART Initiation in Swaziland
OVC	Orphaned or Vulnerable Children
PEPFAR	President's Emergency Plan for AIDS Relief
PHU	Public Health Unit
PIHTC	Provider Initiated HIV Testing and Counselling
PLHIV	People Living with HIV
PMTCT	Prevention of Mother To Child Transmission
RUP	Rural Urban Population Projection Programme
SACU	Southern African Customs Union
SBCC	Social and Behaviour Change Communication
SHIC	Swaziland HIV Investment Case
SHIMS	Swaziland HIV Incidence Measurement Survey
SOP	Standard Operating Procedure
SRH	Sexual and Reproductive Health
STI	Sexually Transmitted Infection
TasP	Treatment as Prevention
TB	Tuberculosis
VMMC	Voluntary Medical Male Circumcision
XDR-TB	Extensively Drug Resistant Tuberculosis

Summary and Key Messages:

Swaziland, a relatively small country with a population of just above one million people, has a very high HIV prevalence of 26% (1 in every 4 adults aged 15 – 49 year old) with an incidence of 2.4% and high (80%) rates of TB/HIV co-infection. New HIV infections are likely among young women aged 18-24, older women aged 35-39 years and men aged 30-34 and accordingly, women have higher HIV prevalence than men (31% compared to 20%). Almost 1 in every 2 children (45%) below the age of 18 is either orphaned or vulnerable.

Swaziland has made significant progress in reducing HIV incidence and AIDS-related mortality by more than 25% and 35% respectively in the last 10 years. Some 101, 730 (87%) of the 117, 044 eligible people- also translated as 49% of all people living with HIV- are now accessing treatment, with Government financing virtually all ARVs stocks. Transmission of HIV from mother to child at 6 – 8 weeks has been reduced to 2% as over 80% of pregnant women access prevention of mother to child transmission (PMTCT) services. HIV prevalence among young people has been substantially reduced by 54% and 20% among young men and women aged 20-24 respectively.

Strategic Areas for Impact

The long term fiscal liability of the HIV disease burden in Swaziland and the limited global resources for the HIV response present a need for smart investments in interventions that will maximise impact, benefits and efficiencies. The eNSF 2014-2018 is Swaziland’s blue print to reduce annual HIV incidence by half, to avert a quarter of AIDS deaths, and to alleviate the socio-economic impacts of HIV as well as improving the efficiency and effectiveness of the national response by 2018. It is also a pathway towards the grander national vision of attaining *An AIDS-free Swaziland by 2022*, which is also aligned to the global objective of ending AIDS by 2030.

The Swaziland HIV Investment Case (SHIC) prioritises **five** eNSF programmes as the most worthwhile to significantly avert new HIV infections and reduce AIDS deaths, and recommends the implementation of suggested game-changers, in order to make savings in both lives and money in the long run.

The five SHIC programmes are:

1. Accelerated Scale-up of antiretroviral therapy (ART) for People Living with HIV



ART will improve the health of PLHIV and avert new HIV infections through suppressed infectivity of PLHIV. An estimated average 10,000 deaths per year have been averted, since its introduction in 2003. Its feedback to prevention is quite possible as 85% of PLHIV on ART are virally suppressed.

The SHIC proposes the adoption of the Universal Access to HIV Treatment (‘test and treat’) and intensify HIV diagnosis and retention in care. Modeling exercises show that this will avert 81% new infections in children aged 0 to 14 years, and 43% in people over 15 years during 2014-2030. AIDS deaths among children will also reduce by 91%, but deaths among those older 15 years will not be greatly affected since a majority of adults are already on lifelong treatment.

ART also offers long term cost savings in would-be spending on those infections averted and real economic returns in the form of increased labour productivity, subdued costs of orphan care and deferred medical care for opportunistic infections for those on early treatment.

**2. Scale up
Voluntary
Medical Male
Circumcision
(VMMC)**



On the individual level, MC offers 60% efficacy against the acquisition of HIV and other sexually transmitted diseases for the uninfected heterosexual male.

Modeled programme projections show that 5 male circumcisions are required to avert 1 new HIV infection in Swaziland. The SHIC suggests that by circumcising 85% of males aged 10-34 and institutionalising male circumcision into health services, Swaziland will avert 34% of new HIV infections during 2014-2030 and save an estimated \$20 million in the same time period due to fewer new infections and reduced long-term demand for MC.

The VMMC program is also most cost-effective at just \$30-\$250 per infection averted and over the longer term horizon institutionalised neonatal MC presents highest financial and societal benefits and offers a scope for market saturation through a reducing future demand for MC.

**3. Innovative HIV
Prevention approaches
for girls and young
women**

In Swaziland young women between the ages 18-24 are the most at risk to acquiring HIV indicating that their early sexual encounters are particularly risky.

The SHIC proposes the use of innovative approaches to encourage positive behaviours, build self-esteem and mitigate structural risk factors that exacerbate their vulnerability, including transforming gender relations.

This will avert an estimated 12% new infections in 2022 and 1% on a year to year basis thereafter. The programme also offers consequential benefits for prevention of mother to child programme outcomes.



**4. Elimination of
mother to child
Transmission of HIV
(EMTCT)**



Swaziland is doing well in reducing the vertical transmission of HIV from mother to child, which is currently at 3% of infants under 8 weeks. Yet transmission still occurs in 10% older children aged 12 months. Maternal mortality also remains stagnant at 320/100,000 from 589/100,000 in 2007.

The SHIC promotes the roll out of option B+ to all pregnant HIV positive women, the intensification of family planning, exploring gender dynamics, improved infant feeding and strengthening the longitudinal follow up of mother-baby pairs until cessation of breastfeeding up to 5 years.

This will avert 89% infections in exposed children and 36% in the general population. These approaches will also lead to substantial improvements in maternal and child survival outcomes. Maternal mortality, from which 60% is among HIV positive women, will reduce from the current 320/100,000 to 100/100,000 and similarly infant mortality from 79/1,000 live births to 20/1,000 in 2030.

5. Intensifying TB/HIV co-infection diagnosis and treatment



80% of TB patients are also co-infected with HIV and TB is responsible for over a quarter of all deaths among people living with HIV. Men carry a higher burden of TB and 11% of all incident TB cases are among children under 14 years.

The integration of TB and HIV services, early screening and diagnosis of both diseases, the implementation of 'test and treat' for all PLHIV and ensuring that all co-infected patients are on dual treatment will avert 49% of deaths among PLHIV, reduce incident TB among PLHIV by 53% and reduce the overall co-infection rate.

On the financial front, cost savings will be observed owing to reduced average mortality among co-infected patients and a reduced overall cost of TB management as fewer PLHIV get TB.

Table 1 below shows that the combined effects of implementation of all 5 programmes will lead to:

- 78% reduction in new infections
 - 76% reduction in new infections among individuals aged 15+
 - 94% reduction in new infections among individuals aged 0 to 14
- 29% reduction in AIDS deaths among PLHIV
 - 19% reduction in AIDS deaths among individuals aged 15+
 - 94% reduction in AIDS deaths among individuals aged 0 to 14
- The combined programmes (including the enhanced viral suppression) which reduce new infections are very cost-effective in preventing both new infections (\$898 per infection averted) and AIDS deaths (\$4631 per AIDS-death averted).
- Long term savings of implementing game changers amount to one third of the projected fiscal burden of HIV without the upscale.
- Additional multiplier effects include preventing an estimated 50,000 children from being orphaned and future burden of the welfare support system, because of the dominant role of HIV/AIDS as a cause of orphanhood

Return on Investment

The estimated total cost of the Investment Case is \$1, 902 million over the period 2014-2030 and \$857 million between 2014 and 2022.¹ This is 9% less than the cost of the baseline scenario which offers fewer infections and AIDS deaths averted. In order to maximize the impact of the investment programme, the following efficiency measures need to be put in place to sustain the implementation of the above programmes;

- Sustain the 40% contribution to total financial resources for HIV by domestic sources.
- Integrate and mainstream HIV into health and development programmes.
- Expand task shifting of HIV service provision.
- Strengthen procurement and supply management systems.
- Strengthen community systems to deliver HIV services at local level.
- Reduce overall programme support costs.

¹ Please note that all cost figures are not discounted but represent nominal money, which does not have inflation adjustment.

Table 1: The combined impact and cost of the 5 SHIC Strategic Areas, 2014- 2030, Swaziland

Strategic Area	Progress Indicator	Baseline (Source, year)	Game Changers to achieve impact	Estimated Coverage using Game Changers		Total Financial cost of achieving impact by 2030
				2020	2030	
1. Accelerated Scale-up of antiretroviral therapy (ART) for People Living with HIV	People living with HIV who know their serological status	63% (SHIMS, 2011)	⚡ Strengthen community based testing	90%	95%	\$ 1,396 million (13% increase compared to baseline)
	People living with HIV who know their status and are initiated in antiretroviral therapy	49% (HIV Estimates, SHIMS & HMIS, 2014)	⚡ Universal access to treatment	90%	95%	
	Viral load suppression among people on antiretroviral therapy	85% (SHIMS, 2011)	⚡ Improve adherence and retention in care	90%	95%	
2. Scale up of Voluntary Medical Male Circumcision (VMMC)	Voluntary medical male circumcision prevalence 15-49 <ul style="list-style-type: none"> • 10-34 years • Neonates 	25% (MICS, 2014)	⚡ Target young men aged 10-34	70%	85%	\$ 1,247 million (1% increase compared to baseline)
		-	⚡ Target neonates	25%	45%	
		-	⚡ Integrate MC in health services	-	-	
3. Innovative HIV Prevention approaches for girls and young women	Young women aged 15-24 years who have comprehensive knowledge about HIV and reject major misconceptions about HIV transmission	49.1% (MICS, 2014)	⚡ Economic empowerment	80%	90%	\$ 1,231 million (0.5% decrease compared to baseline)

	Young women aged 15-24 who have sex with a partner 10 years or more older than themselves	14.5% (MICS, 2014)	<ul style="list-style-type: none"> ⚡ Transform gender roles ⚡ Innovative SBC 	8%	5%	
4. Elimination of mother to child Transmission of HIV (EMTCT)	Pregnant mothers living with HIV receiving antiretroviral therapy	84% (HMIS, 2013)		95%	>95%	\$ 1,214 million (2% decrease compared to baseline)
	Unmet need for family planning- national	15.2% (MICS, 2014)	<ul style="list-style-type: none"> ⚡ Option B+ ⚡ Family Planning 	10%	5%	
	Among PLHIV	65% (ANC, 2010)	<ul style="list-style-type: none"> ⚡ Improved infant feeding 	40%	20%	
	Exclusive breastfeeding of infants under 6 months	63.8% (MICS, 2014)		70%	95%	
	Infants under 1 year living with HIV receiving antiretroviral therapy	32% (HMIS, 2013)		90%	>90%	
5. Intensification of TB/HIV co-infection diagnosis and treatment	National incident TB rate	1349 per 100,000 people (National TB Programme Annual report, 2013)	<ul style="list-style-type: none"> ⚡ Intensify case finding^c ⚡ ‘Test and Treat’ HIV and TB 	700/100,000	70/100,000	\$ 653 million (% increase compared to baseline)
	Co-infected patients that receive treatment for both TB and HIV	80% (National TB Programme Annual report, 2013)	<ul style="list-style-type: none"> ⚡ Service integration 	90%	95%	

	Overall Expected Impact	
	2022	2030
HEALTH IMPACTS		
Total infections averted	70%	78.1%
Adult infections averted	68.2%	75.7%
Child infections averted	82.2%	94.2%
Total AIDS-related deaths averted	15.7%	28.6%
Adult deaths averted	6.2%	19.1%
Child deaths averted	81%	93.8%
RETURN ON INVESTMENT		
Percentage increase in program costs relative to 2014	63.6%	78.9%
Percentage average year-on-year increase in program costs	8%	4%
Cost per infections averted	\$1,477	\$898
Cost per HIV-related death averted	\$9,079	\$4,631

1. Introduction to the Country Context

Swaziland is a small landlocked country situated in southern Africa. It has a surface area of 17,364 square kilometres, and is bordered almost entirely by South Africa, except for a small border with Mozambique to the east. The 2007 Population Census estimated the population of Swaziland to be 1,018,449 people, of whom 481,428 are males (47%), and 537,021 females (53%). The population is evenly distributed across the four regions of Hhohho, Lubombo, Manzini and Shiselweni, though the Manzini Region has a slightly higher population compared to the other three regions (Figure 1). 79% of the population live in rural areas and 52% of the population is under the age of 20. In 2007 the total fertility rate was 3.95 children per woman, leading to an average population growth rate of 1.1% per annum. Life expectancy at birth is 49 for men and 51 for women.

Figure 1: Map of Swaziland

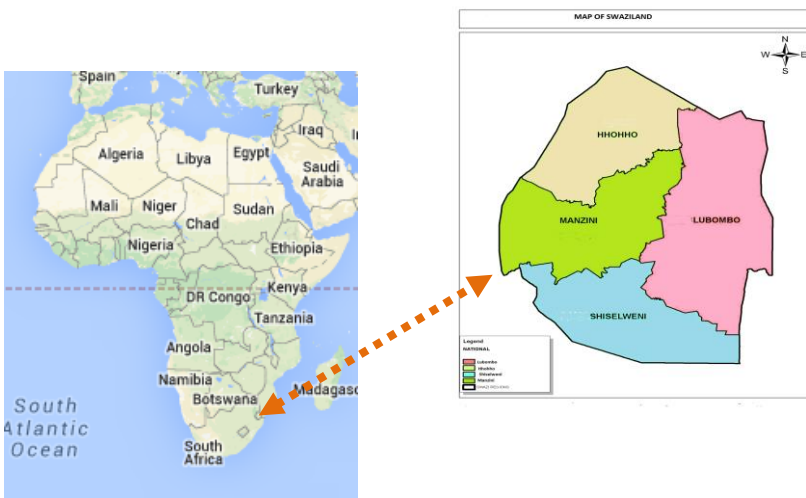
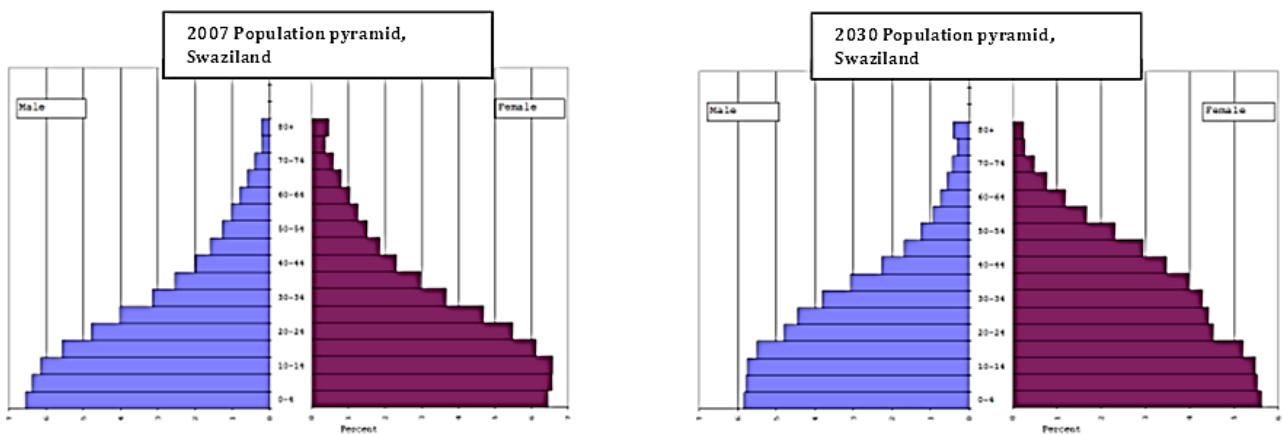


Figure 2 shows the shape of the population pyramid for Swaziland in 2007 and its projected structure in 2030. The results indicate that the population will increase from 1,020,102 in 2007 to 1,303,090 in 2030, while the population growth rate would decrease from 1.1% to 0.8%. The contributors to the changing structure are a reduction in the fertility rate and the AIDS epidemic which has had a significant impact on mortality, affecting both life expectancy at birth and the age-sex pattern of mortality. UN estimates show that AIDS mortality has lowered the projected 2015 population by nearly 18% compared to what it would have been without AIDS.

Figure 2: Pyramid structure of the Swaziland population in 2007 and 2030



Source: Swaziland Population Projections, 2007-2030

HIV in Swaziland

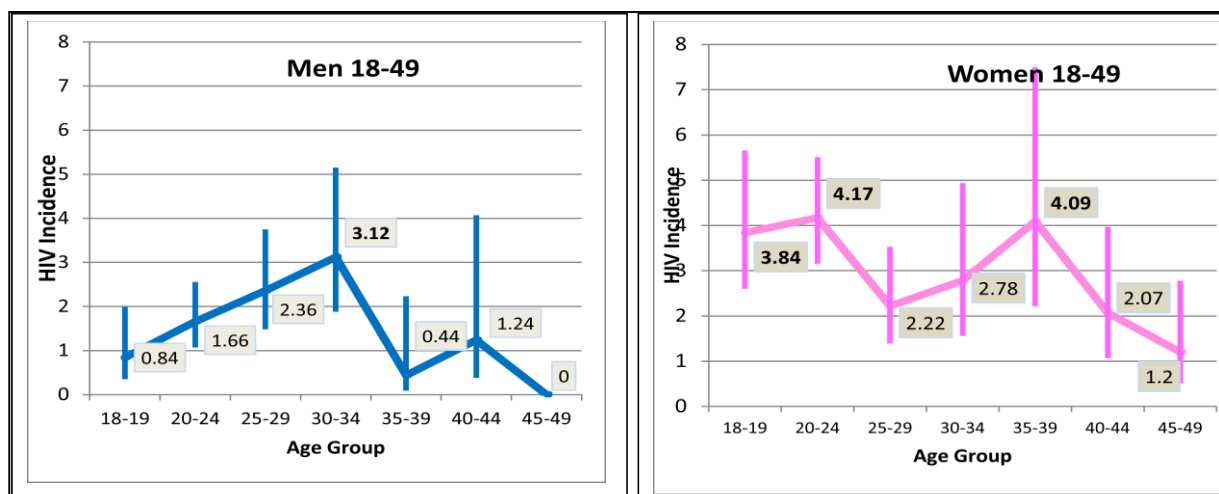
Since the discovery of the first case of HIV in 1986, Swaziland currently has one of the highest HIV prevalence proportions in the world at 26% and an estimated HIV incidence rate of 2.48%. The country also faces a dual epidemic of HIV and TB, with people living with HIV having a between 20-37% chance of contracting tuberculosis. Eighty percent of patients diagnosed with TB also have HIV and TB is responsible for over 25% of deaths among people living with HIV. Women and girls are disproportionately affected by HIV, not only do they have a higher risk of susceptibility to infection due to a combination of biological, social and structural factors, but they also shoulder larger burdens of care and support. On the other hand, men carry a slightly heavier burden of TB than women and 11% of all incident TB cases are among children under 14 years of age.

This has had a huge impact on the economy, health and development of the population. Swaziland has some of the lowest life expectancy rates in the world (average 50 years) though this has improved from a low of 38 years in the late 1990s (UNDP 2013). One in every four children has lost one or both parents, and 45% of children under the age of 18 are classified as OVC.

HIV incidence is 2.38% in the age group 18 – 49, for men it is 1.7% and for women 3.1%. Figure 3 shows that incidence peaks at 3.12% amongst men aged 30-34 and there are three peaks for women at 3.8% in 18-19 year olds, 4.2% in 20-24 year olds and 4.1% in 30-35 year olds. Although high, on average HIV incidence has been on a downward trend since the early 2000s. Early predictions estimated that, at worst, HIV incidence in the country would peak at 8% in the mid- to late- 2000s before it could begin to fall. However, it peaked earlier in 1997 at 4.9% (UNAIDS and NERCHA, Preliminary Outputs of the Swaziland HIV Estimates and Projection 2013).

Factors that propel the spread of HIV have been identified as: high average viral load among people living with HIV (only 35% of PLHIV are virally suppressed); low and inconsistent condom use; gender inequality; multiple and concurrent sexual partners; early sexual debut; intergenerational sex; gender-based violence; low levels of HIV Testing and Counselling (HTC); HIV stigma and discrimination; sex work; and men who have sex with men (NERCHA, The Extended National Multisectoral HIV and AIDS Framework 2014-2018 2014).

Figure 3: HIV Incidence among men and women aged 18-49, Swaziland



Source: Swaziland Incidence Measurement Survey Study (2011)

Swaziland has made significant progress in addressing HIV. HIV prevalence among young people aged 15-24 has reduced drastically for both sexes. Amongst those aged 20-24, a 54% reduction is observed among males and 20% for females. Peak prevalence among age groups in both sexes has shifted to older persons; to those aged 30-

34 from those aged 25-29 among females and to those aged 35-39 from 30-34 year olds among males. Data for pregnant women shows a similar trend.

Antiretroviral therapy (ART) for people living with HIV was introduced free-to-user in 2003 and a year later, 6,299 people had been enrolled. However at that time, no children under 14 years were enrolled. Ten years later in 2013, over 100,000 people (85% of those in need) were receiving ART and 84% of positive pregnant mothers were receiving PMTCT services. This has resulted in increased life expectancy, which had fallen from 60 years in 1970s to 38 years in the late 1990s to 49 years. The current annual death rate among PLHIV is 6,700 (UNAIDS and NERCHA, Preliminary Outputs of the Swaziland HIV Estimates and Projection 2013), which is far below the global AIDS Projections estimation that without ART, AIDS deaths would rise as high as 25,000 per year. Orphanhood due to AIDS has also subdued as more PLHIV live longer.

At only 2%, the vertical transmission of HIV from mother to child has been virtually eliminated among infants aged 6-8 weeks. However, some work still needs to be done as infection is highest among older infants.

Economic Growth, Fiscal Impact of HIV and Response Expenditure trends

HIV/AIDS together with persistent poor economic performance have reversed some of the developmental gains of the 1980s and early 1990s, especially those related to health outcomes and income distribution. Growth moderated to an average of around 3.7% in the 1990s and further dropped to just 2.3% over the 2000s. Recently, Swaziland experienced a severe fiscal crisis, which dented growth even further to 1.3% in 2011. In 2013, nominal GDP per capita stood at \$3,691.31 placing Swaziland amongst the lower middle-income countries².

Proximate causes of the growth slowdown can be traced back to lagging performance of exports and investment. Those proximate causes can be attributed to a variety of influence, including HIV/AIDS epidemics, the ending of economic sanctions against South Africa, heightened competition from neighbouring countries to attract investment and slow implementation of reforms. In particular, the magnitude of the HIV and AIDS epidemic has resulted in a significant drop of labour productivity due to absenteeism and loss of lives. However, more recently companies seem to be better able to cope with the epidemic setting up in-house clinics and adjusting workloads accordingly, thus recovering some of the productivity losses. The epidemic also increased fiscal costs for containment and mitigation of the disease thus reducing the fiscal space. It is estimated that the negative relationship between HIV and growth has cost the country annual GDP growth losses of between 1- 2.8% (Muwanga 2004).

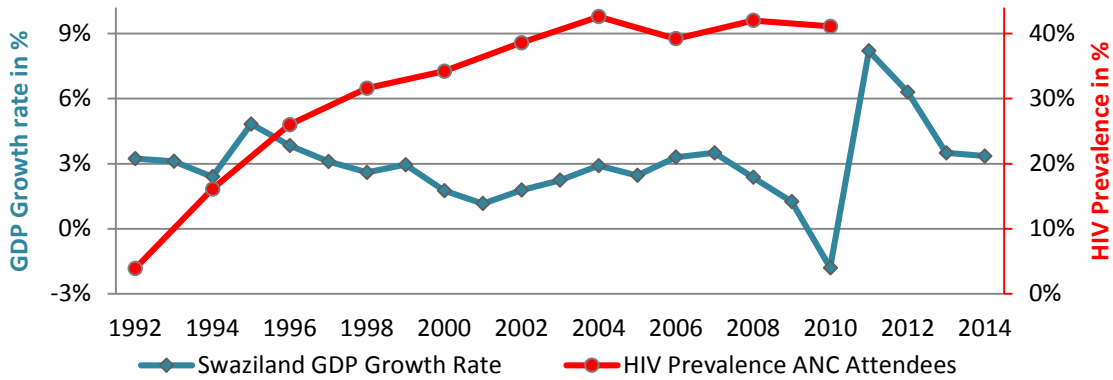
Although Swaziland is classified as a middle-income country, high levels of unemployment contribute towards persistent poverty levels. It is estimated that 63% of the total population live below the poverty line and unemployment stands at 28.5%. Once discouraged workers are accounted for the unemployment rate rises to 40.7%. The most recent labour force survey suggests that market outcomes have not improved between 2007 and 2010. Youth, women, and the least educated have been particularly affected by unemployment spells; those same groups are also the most vulnerable to HIV acquisition.

The economy is particularly affected by developments in public finance, which in turn is influenced by receipts from the Southern African Customs Union (SACU), which account for about 50% of total government revenue. The government's pro-cyclical spending patterns have contributed to transfer the volatility of SACU receipts to public spending, and ultimately to the real economy. Expenditure growth has been mostly driven by the continuous increase of recurrent expenditure, in particular the wage bill. Containment and mitigation of HIV/AIDS has also significantly contributed towards an increase in expenditure through the hiring of more public health staff and the

² The World Bank defines a lower-middle income country as a country with a nominal GDP per capita between \$1,036 and \$4,085.

purchase of drugs. The global economic crisis of 2010 caused SACU revenue to drop by approximately 70%, which induced a deficit of 10.4% of GDP in Swaziland’s budget for 2011.

Figure 4: GDP growth rate and HIV prevalence among Antenatal Care attendees, Swaziland



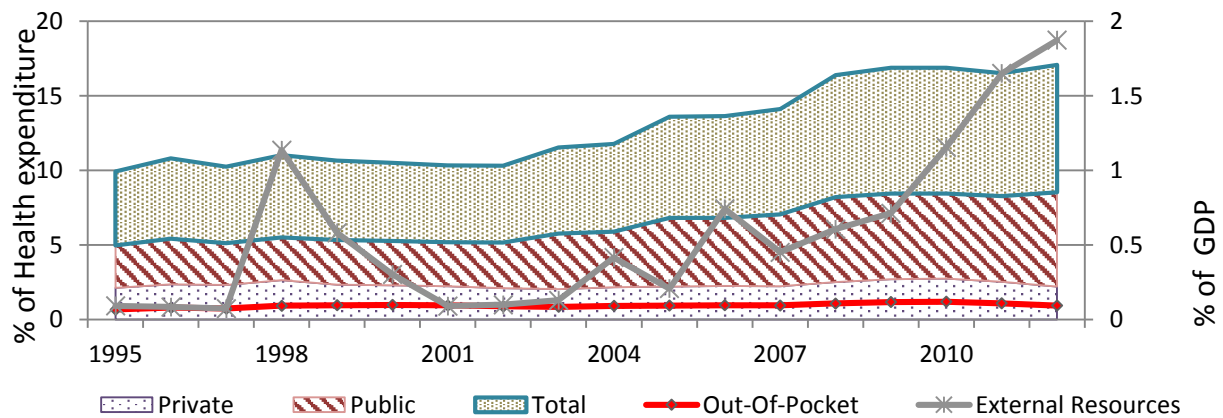
Source: Central Bank of Swaziland; HIV Sentinel Sero Surveillance Reports

Spending in public health in Swaziland is amongst the highest for countries with similar level of economic development.³ Between 1995 and 2011, public health spending increased from approximately 7% of government spending (4.8% of GDP) to 15% of the total budget (9% of GDP). With HIV spending being estimated as \$61 per capita, it is conceivable that much of this increase reflects the cost of the national response to HIV/AIDS, as most of the HIV and AIDS-related health services are delivered through the public sector. A major expenditure item is the procurement of ARV drugs, which the government has fully supported since 2010.

Approximately 65% of healthcare funds come from Government, accounting for approximately 2% of GDP, while additional funding comes from development partners, the private sector and individuals.

On the other hand, recorded private expenditure on health has declined; between 2001 and 2010 health expenditure as a percentage of total household expenditure declined from 4.2% to 2.8% (CSO).⁴ In terms of GDP, household expenditure has remained roughly constant throughout the same period as a result of the relative increase of private consumption in terms of GDP.

Figure 5: Public health by source of financing 1995-2012, Swaziland



³ The only countries with a similar level of GDP per capita featuring higher public health spending are four island economies (Micronesia, Marshall Islands, Samoa, and Tuvalu).

⁴ Swaziland Household Income and Expenditure Survey (2010) which shows that more households do not access healthcare when ill and most common among households in lowest income quintile.

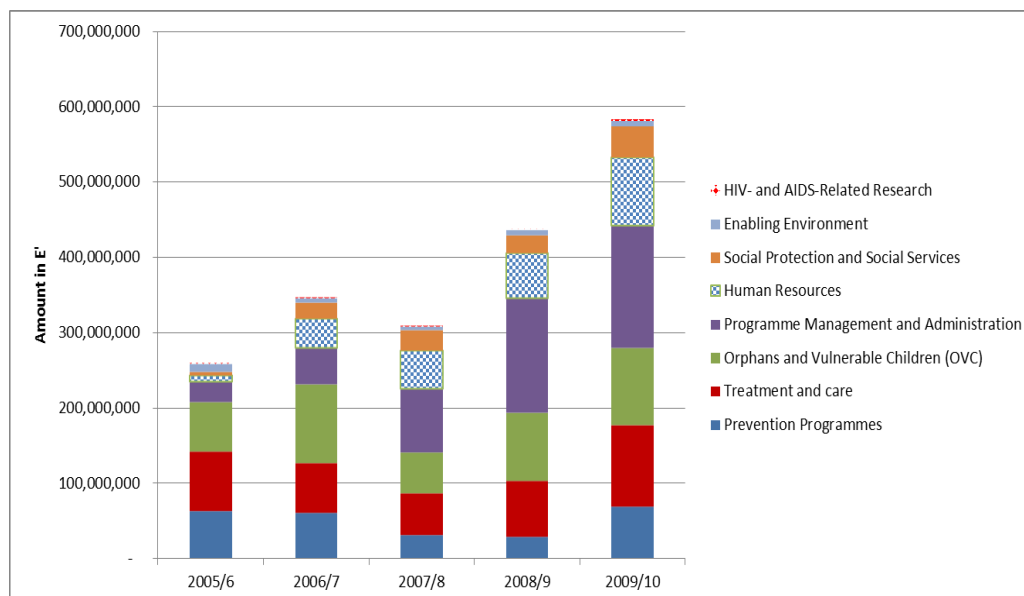
Source: WHO (2014)

Other HIV related costs include expenditures towards mitigating the social impact of HIV/AIDS, namely keeping OVC in school, social welfare grants and community support services (KaGogo Social Centres and Neighbourhood Care Points). Another notable development is the increasing role of external support, which has increased from about 2% of total health spending (about \$1 million) in 2002 to \$60 million (19% of total health spending) in 2011, largely on account of external off-budget HIV/AIDS programme support.

The Government of Swaziland has demonstrated a commitment to support social sectors of health including HIV, social welfare and education. In the financial year 2011/2, the government went through a liquidity crisis and implemented funding cuts in other sectors, but funding for these sectors was maintained. Although this is a positive sign for response sustainability, concerns about a deflection of resources from more productive sectors that could spur economic activity cannot be ignored. Moreover, the country's projected GDP growth rates offer limited potential for increased health spending.

The country has seen a huge increase in funding support for HIV and AIDS and as shown in figure 6 and table 2, national spending on HIV/AIDS-related activity has increased from \$40.3 million in 2005/06 to \$74.8 million in 2009/10 (NERCHA and UNAIDS 2008 & 2011). Even though the domestic contribution to HIV is increasing (40% in the financial year 2009/10), the HIV response is largely supported through external resources, with the Global Fund to Fight AIDS, TB and Malaria (GFATM) and the United States President's Emergency Plan for AIDS Relief (PEPFAR) being the two largest external sources. \$149 million has been disbursed from GFATM for HIV since 2003 when the country received its first grant. A further US \$80 million has been made available to cover the three diseases during 2014-2017. Given the disease burden, it is expected that HIV will receive a bigger portion. Since 2004, PEPFAR has disbursed over US\$185 million for HIV in Swaziland. The National Operational Plan shows that PEPFAR will provide a further \$52 million to cover 2014-2016.

Figure 6: HIV Expenditure in FY2005/6-2009/10, Swaziland



Source: National AIDS Spending Assessment (NASA)

The greatest portion of HIV expenditure is spent on HIV treatment and care, programme management and administrative strengthening, and OVC, while less than 30% is jointly spent on prevention, social protection and research. Expenditure patterns reveal that over the years spending on HIV prevention, treatment and care, and OVC is rather stagnant, whereas programme management and human resources expenses have ballooned. For

example, in the financial year 2009/10, recorded HIV prevention spending accounted for only 12% of total spending, treatment 19%, against a 44% combined portion on programme management and human resources.

Public funding predominantly caters for human resources, OVC, programme management and administrative strengthening and HIV treatment and care. The private sector has shifted its funding portfolio from largely supporting OVC, HIV prevention and programme management to HIV treatment and prevention. In addition to this, international sources have shifted their expenditure from HIV treatment to Programme Management and HIV prevention, as the Government of Swaziland has been the main funding source of ARVs since 2010.

Advocacy pleas for continued funding for the HIV response will also no longer be sufficient without parallel demands for increased efficiency in their use. Improving efficiency is about preventing more new infections and saving more lives by doing the right things for the right populations, as well as delivering quality services at the lowest cost. The World Health Organisation (WHO) estimates that between 20%–40% of all resources spent on health are wasted through leakages, inefficient combinations of interventions, and sub-optimal use of medicines and human resources.

Table 2: HIV and AIDS related Expenditure 2005/06-2009/10, Swaziland

Table 1. Swaziland: HIV/AIDS-Related Expenditures, 2005/06-2009/10					
	2005/06	2006/07	2007/08	2008/09	2009/10
	(US\$ million, unless stated otherwise)				
Total	40.3	49.5	43.5	49.4	74.8
Prevention	9.6	8.6	4.3	3.1	8.6
Treatment and Care	12.5	9.4	7.7	8.4	14.0
Orphans and Vulnerable Children	10.3	15.0	7.7	10.3	13.1
o/w: Financed from domestic sources	6.6	10.3	4.9	8.6	12.2
Human Capital	1.2	5.5	7.1	6.8	11.6
Social Protection, Enabling Environment	2.4	4.0	4.6	3.5	6.3
Management, Coordination, Support	4.3	7.1	12.1	17.3	21.1
By source of financing					
Public domestic sources	11.5	19.6	14.5	20.7	29.6
External sources	28.8	29.9	28.6	27.0	43.1
Multilateral and Bilateral	25.5	23.2	24.7	23.5	37.9
o/w: GFATM	19.7	15.5	15.5	7.5	18.4
o/w: U.S. Government	1.1	1.9	3.7	9.8	13.3
o/w: World Food Program	2.0	2.5	3.5	2.7	2.9
International NGOs	3.3	6.7	3.8	3.5	4.5
Private businesses	0.0	0.0	0.5	1.6	2.0
Total spending (percent of GDP)	1.6	1.8	1.4	1.8	2.3
o/w: Public domestic sources	0.4	0.7	0.5	0.8	0.9
Memorandum items:					
GDP	2,594	2,680	3,031	2,701	3,273
Public health expenditures (percent of GDP)	3.6	4.1	3.8	4.2	4.5

Sources: NERCHA and UNAIDS (2008) and NERCHA (2012) for HIV/AIDS spending, IMF (2013) for GDP, and WHO (2013) for public health spending.

2. The Swaziland HIV Investment Case- A background

Premised on the national objective of attaining *an AIDS-free Swaziland by 2022*, the SHIC presents an economic, scientific and calculated rationale for investing in five HIV interventions, targeting populations and anticipating positive health and economic outcomes. The SHIC provides new opportunities to explore options for innovative service delivery, to identify specific steps to enhance equity and inclusiveness for key populations, to use available evidence to better understand the health and economic benefits of timely, smart HIV investments and to eliminate inefficiency. In addition to helping with resource allocation and financing decisions, the SHIC will serve as an advocacy instrument for dialogue with national and external partners.

The SHIC presents that, for the first time, there is a real chance to significantly reduce new HIV infections and avert deaths in Swaziland. However, this requires increased attention to be placed on prioritising interventions with proven effectiveness, which can result in the best patient and population-level outcomes.

The eNSF 2014-2018 prioritises eleven programmes that were selected based on the country context and effectiveness using the investment approach. The SHIC builds from the eNSF⁵ and proposes that maximum effort is placed on five specific interventions, because they present the highest potential in delivering maximum returns in order to meet the country's HIV response objective of reducing cost per unit of output. These are:


1. Accelerated Scale-up of antiretroviral therapy (ART) for People Living with HIV
2. Scale up Voluntary Medical Male Circumcision (VMMC)
3. Innovative HIV Prevention approaches for girls and young women
4. Elimination of mother to child Transmission of HIV (EMTCT)
5. Intensifying TB/HIV co-infection diagnosis and treatment.

The current status of SHIC programmes





All five key programmes recommended for innovative expansion are on-going in the national strategic efforts to halt the spread of HIV, reverse its impact in Swazi society and attain an AIDS-free Swaziland by 2022.

Table 3 shows the status of programmes in 2013 as a baseline position before the *treatment effect*, which are the recommended innovative, effective and efficient measures that can enable these interventions to yield maximum impact in drastically reducing the spread of new infections and reducing AIDS deaths.

Table 3: Status of SHIC programmes in 2013

HIV Strategic Area for Impact	Successes	Challenges	Game-Changers
 <p>Accelerated Scale-up of ART for People Living with HIV</p>	Over 50% PLHIV are alive and actively on ART	<ul style="list-style-type: none"> ○ Current testing strategies not reaching all PLHIV ○ Low treatment coverage among PLHIV under 15 ○ Late initiation, low adherence and retention 	<ul style="list-style-type: none"> 🚫 Strengthen community based testing strategies 🚫 Universal access to ART 🚫 Improve adherence and retention in care

⁵ The 5 SHIC programmes are not new and can be found in national HIV strategic efforts. The difference is in the SHIC recommended transformative methods which appear as strategies in the eNSF. In essence the SHIC tested those for impact.

	Scale-up of Voluntary Medical Male Circumcision (VMMC)	19% of men aged 15-49 are circumcised, from 7% in 2007	<ul style="list-style-type: none"> ○ Low uptake of VMMC services ○ Weak focus on demand-side barriers ○ High average unit cost per male circumcision 	<ul style="list-style-type: none"> ✘ Target young men aged 10-30 ✘ Target neonates ✘ Integrate MC in general health services
	Innovative HIV Prevention approaches for girls and young women	HIV prevalence among young women aged 15-24 is 23% HIV prevalence among <u>pregnant</u> young women aged 15-24 is 20%	<ul style="list-style-type: none"> ○ High HIV incidence rate ○ Early sexual debut, ○ Intergenerational sex ○ Coerced sex (anecdotal) ○ Low comprehensive knowledge about HIV prevention ○ Economic vulnerabilities 	<ul style="list-style-type: none"> ✘ Economic empowerment ✘ Transform gender relations ✘ Innovative SBC
	Elimination of Mother to Child transmission of HIV (EMTCT)	2% of children born to HIV positive mothers were infected at 6-8 weeks old. 86% of HIV positive pregnant women receive ARV to reduce MTCT	<ul style="list-style-type: none"> ○ High unmet need for family planning ○ High maternal sero-conversion at labour and delivery ○ High infant sero-conversion post-8-weeks ○ High maternal mortality rate 	<ul style="list-style-type: none"> ✘ Option B+ ✘ Family Planning ✘ Improved infant feeding
	Intensification of TB/HIV co-infection diagnosis and treatment	Over 90% of TB patients are tested for HIV. 66% of TB/HIV co-infected patients receiving treatment for both & TB treatment success rate is 73%	<ul style="list-style-type: none"> ○ High rate of co-infection ○ Low TB/HIV treatment rate ○ High Multi-Drug Resistant TB (MDR-TB) and Extensively Drug Resistant TB (XDR-TB) in PLHIV 	<ul style="list-style-type: none"> ✘ Intensify case finding ✘ 'Test and Treat' HIV and TB ✘ Service integration

The SHIC recommends that Swaziland must increase funding substantially for these programmes in the short term in order to achieve rapid scale-up and attain longer term savings as programme benefits outweigh the costs.

The analysis presented in the SHIC will attempt to answer three key questions in each of the five programmes:

1. What are the evidence-informed transformative methods (the 'game changers') that will achieve the maximum impact in meeting the HIV objectives of reducing HIV incidence and reducing AIDS deaths?
2. What is the estimated impact of Game Changers on new infections, HIV mortality and do they offer any economic returns to investment?
3. How can available and additional financial resources be used effectively, optimally and efficiently to ensure that these key interventions can be scaled up and sustained to achieve maximum impact?

Methodology:

The SHIC has been developed through a national process, building on the eNSF and informed by:

1. Programme Review Analyses of the set and scale of interventions that can significantly avert infections and save lives. (MoH 2013).
2. The global indicative targets for ending AIDS and closing the gap (also called the 90:90:90 targets) are used as benchmark for desirable impact

3. Analysis of the fiscal implications of HIV/AIDS programmes for sustainability (World Bank, Fiscal Consequences and Sustainability of Swaziland's HIV/AIDS Program).
4. The mid-term assessment of the NSF 2009-2014 (NERCHA 2011).
5. The global indicative targets for ending AIDS and closing the gap (also called the 90:90:90 targets), used as benchmark for desirable impact (UNAIDS 2014).
6. Use of mathematical models to estimate impact of implemented the selected SHIC Programme game changers (NERCHA 2011)
7. Consultation with National and International Stakeholders.
8. Independent and external peer review process.

Major assumptions and limitations

The findings of this study are primarily based on mathematical modeling which have limitations that are shared by all dynamical models of the HIV epidemic. Therefore, the projected results are subject to the validity of many assumptions and model parameters. The following are selected assumptions and limitations;

1. The primary purpose and use of the selected mathematical models- GOALS, Optima (formerly known as Prevtool), Male Circumcision's Decision Makers Program Planning Tool (DMPPT) and HIV/AIDS Resource Needs Model- was to project population-level epidemiological outcomes from individual-level inputs. Selected variables analysed were a) Change in HIV incidence between 2014 and 2030; b) Number of new HIV infections averted, annually up to 2030; c) Number of AIDS-related deaths averted, annually up to 2030; d) Cost of intervention; e) Cost savings per new infection averted, annually up to 2030; and f) Cost savings per AIDS-related death averted, annually up to 2030.
2. Populations analysed vary and are discussed within each strategic area but the impact of game changing intervention is generalised for the all people in Swaziland.
3. Impact modelling in each strategic area is restricted to the selected game changing intervention and results are *ceteris paribus* of other interventions. The combined treatment effects are discussed in Section 3.
4. All costs are nominal money which is not discounted for inflation.
5. The models do not include the impact of behavioural change interventions and explicit demand-creation mechanisms for programmes, and as such cannot be used to directly estimate the cost and impact of the effort required to achieve the ambitious programmatic targets.
6. The study assumes all interventions begin in year 2015.

Strategic Area 1: Accelerated Scale-up of antiretroviral therapy (ART) for People Living with HIV

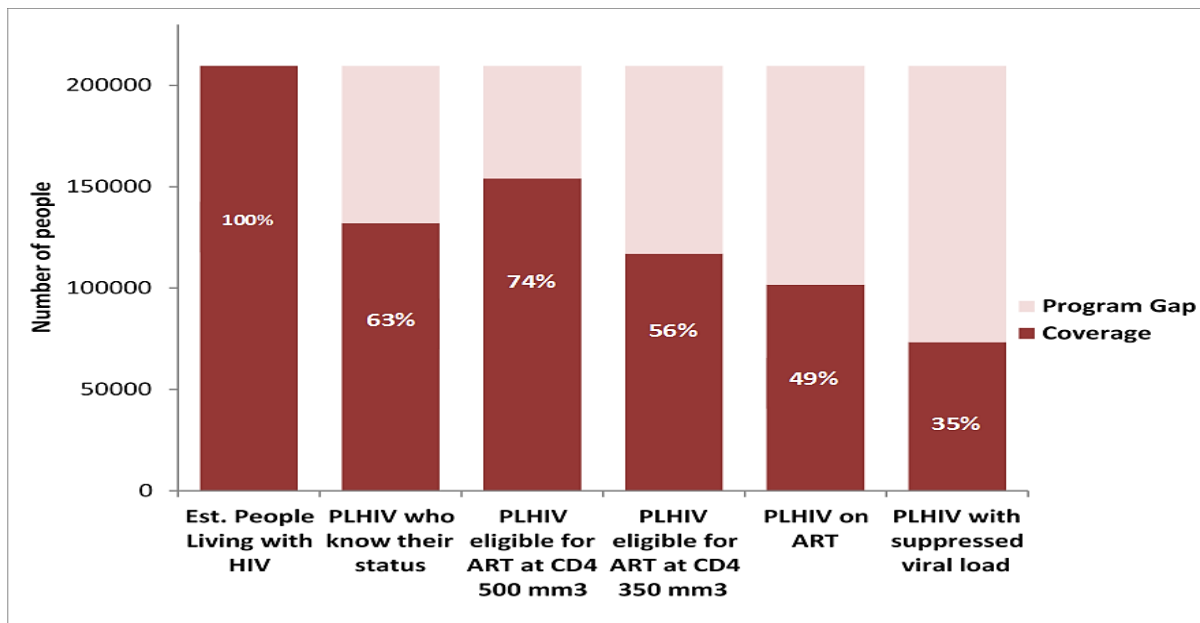


Scaling up ART is the most effective intervention to reduce the disease burden and AIDS deaths. ART also limits transmission of the virus through reducing the viral load - the biggest single risk factor in onward transmission of HIV. Starting treatment early keeps people healthy and productive, contributing to the economy.

Swaziland introduced ART in 2003 and since then the country has developed a comprehensive and robust treatment programme reaching a majority of eligible people. ART is provided for free to patients based on the national eligibility criteria of CD4 \leq 350 cells/mm³ and will be expanded to CD4 \leq 500 cells/mm³ in 2015.

Figure 7 shows the HIV treatment cascade for Swaziland in 2013, wherein it is estimated that there were 209,593 people living with HIV. From those only 63% are aware of their HIV+ status. At current eligibility thresholds of CD4 count \leq 350 cells/mm³, 117,044 (56%) PLHIV are eligible for ART and 87% of those are currently on ART. However, when considering all people living with HIV, this translates to only 49% receiving treatment. Studies have shown that there is a high risk of transmission at viral loads greater than 50,000 copies/ml³. In Swaziland, the average viral load among PLHIV is very high at 94,644 ml³ and only 35% of PLHIV are virally suppressed. Viral suppression is highest among PLHIV who are currently on ART at 85% while 12% of PLHIV who are not on ART are virally suppressed. Men have higher viral loads than women.

Figure 7: HIV Treatment cascade in 2013, Swaziland



Sources: HIV Estimates and Projections, SHIMS (2011) and ART programme data (2013)

In June 2013, Swaziland adopted the 2013 World Health Organisation (WHO) HIV Treatment guidelines which recommend expanding the ART eligibility threshold to CD4 \leq 500 cells/mm³, as well as providing treatment for selected populations regardless of CD4 and WHO staging. Since 2010, the government has taken over the financing of ARVs. Furthermore, the introduction of competitive drug pricing and streamlined procurement have contributed to an overall cost reduction of 27% for ARVs. In light of the progress, Swaziland is prepared to evaluate the next ‘game changes’ that will close the gap in treatment provision.

Guided by the treatment cascade in figure 7 above, the following game changers should be implemented in order to maximise impact of the ART programme;

- I. Expand HIV testing models and strengthen community based HIV testing strategies
- II. Offer universal access to treatment
- III. Improve the linkage and enrolment into care, and adherence and retention on treatment

I. Strengthening community based HIV testing strategies

Improving HIV Testing and Counselling (HTC) and strengthening referral and linkages from HTC to care is a critical entry step to reach maximum benefits of the HIV treatment. In the context of the HIV investment case, HTC is a critical enabler to identify HIV positive clients and refer them to appropriate care. With 63% of PLHIV knowing their HIV status, there are an estimated 77,549 HIV positive people who are unaware of their status.

If the country is aiming to reduce the high number of PLHIV who remain undiagnosed as well as increase timely enrolment in care, the following evidence based strategies of expanding HIV testing options should be implemented;

- a) Expansion and further integration of provider initiated HTC
- b) Scale up community testing approaches such as Fast Track
- c) Piloting of new testing platforms including self-testing

HTC services are available under the client and provider initiated approaches in most health care facilities, at free-standing HTC/Voluntary Testing and Counselling sites; and in communities, through mobile outreach and home-based care services. The country introduced Provider initiated HTC (PIHTC), where HIV testing is integrated as part of routine basic health care examinations, in 2009. This has led to an over 150% increase in the number of tests performed, from 134,179 to 336,497 tests at the end of 2013, resulting in more people knowing their status. The PIHTC model which is responsible for 60% of all tests has also contributed to reductions in HIV stigma and fear of testing, as reported by one female adult PLHIV residing the Shiselweni region who stated “*this is better than the former system of referring suspected patients to a stand-alone voluntary counselling and testing room, wherein the send-off signalled to the people in the queue that you had AIDS.*” [WHO, Update of HIV Treatment Guidelines 2010]. In order to sustain the remarkable uptake, the PIHTC approach must be further integrated into all health service delivery points.

Innovative community testing strategies that have been piloted in Swaziland have demonstrated success in engaging communities to increase testing uptake. “Fast track” is one such approach that is used internationally in various settings to tackle concrete challenges with measurable outcomes in a short timeframe. “The Fast Track” model is a community-centred effort whereby community based testing strategies such as door-to-door and home based testing are used to target populations that are difficult to reach, such as males, adolescents and other most at risk populations. In 2013 the country Swaziland piloted the door-to-door and home based testing strategies and plans to expand nationally. The pilot resulted in a 173% testing rate among targeted persons and a 292% increase in testing was observed among men and adolescents.

Supplying over-the-counter HIV self-test kits or self-testing is another innovative approach with potential to increase HTC trends. It also presents the opportunity to diagnose and enrol sub-populations who are not adequately reached by existing service delivery modalities, including men who have lower health seeking behaviours, working professionals with little time to visit HIV testing sites, key populations who experience barriers to accessing health care and people living in remote communities where health care is not readily available, as well as people who want the additional convenience of privacy. Although this has not been tried in

Swaziland, a series of studies on the acceptability of self-testing among men who have sex with men, general population and prisoners have proved that this is an acceptable model and it indeed offers an opportunity to test persons who had never tested. For example the study on the feasibility of self-testing in Blantyre, Malawi achieved 76% and 67% testing of women and men respectively in the study population; of which 44% men and 43% women were testing for the first time and three-quarters of testers had not tested in the previous year. From those, 78% were linked to HIV care and 25% started ART (MoH 2010). During 2015 and 2016, Swaziland will pilot self-testing for suitability, acceptability and appropriate linkage to care. Further research needs to be done regarding concerns about its absence of professional counselling, partner notification, and other negative societal externalities such as gender based violence and risk heightening and regarding its cost-effectiveness. Self-testing is currently the most expensive HTC model with costs per test kit between \$25 and \$40. Possible mitigation could be cost subsidization. However, any subsidization should be closely evaluated to ensure that more cost-effective strategies are not being overlooked.

II. Universal access to treatment

HIV transmission potential in Swaziland is generally high since a majority of PLHIV have very high viral loads and only 35% are virally suppressed. Viral load is highest amongst those who do not know their status and those who know their HIV status but are not enrolled in care, with a majority of these being men. Transmission potential is also heightened by the high rate of sero-discordancy among 28% of stable heterosexual couples.

The “universal access to ART approach” is a strategy where ART is provided to all PLHIV upon discovery of their HIV+ status regardless of CD4 cell count or WHO staging. This is also called the treatment as prevention (TasP) initiative which is supported by evidence that when an HIV positive person is taking effective ART, in time s/he can have an undetectable viral load and when free from STIs, s/he has negligible risk of transmitting the HI virus to HIV negative sexual partners. An HPTN052 study found that effective ART can reduce viral load and contribute to the prevention of as much as 96% new infections, when supported with combination prevention, i.e. biomedical and behavioural interventions. The study found that the benefits of early treatment go beyond the preventative and tend to decrease the chance of HIV-related clinical events by 41%. (M. Cohen 2011). Other research shows that the likelihood of AIDS-related deaths is lower for patients who enrol at higher CD4 thresholds. In fact, the country reflected an increase in survival rates of PLHIV at 12 months of ART initiation as eligibility thresholds were increased, from 77% survival in 2008 (at eligibility threshold $CD4 < 200$ cells/mm³) to 91% in 2013 (at eligibility threshold $CD4 < 350$ cells/mm³). It can be expected that this will continue as ART is provided to healthier PLHIV under the universal access scenario.

Implementing universal access to treatment in order to accelerate the reduction in HIV incidence and improve the lives and livelihoods of PLHIV is a reasonable strategy for Swaziland as already 85% of PLHIV who are on ART are virally suppressed. The country is currently running pilot projects for TasP in the Shiselweni and Hhohho regions since in 2012 and comparison studies are underway. The projects offers universal access to ART to all HIV positive non-pregnant adults under the test and treat platform at selected health facilities. The findings will be used to evaluate the feasibility, affordability, scalability, acceptability, as well as clinical outcomes of this treatment approach.

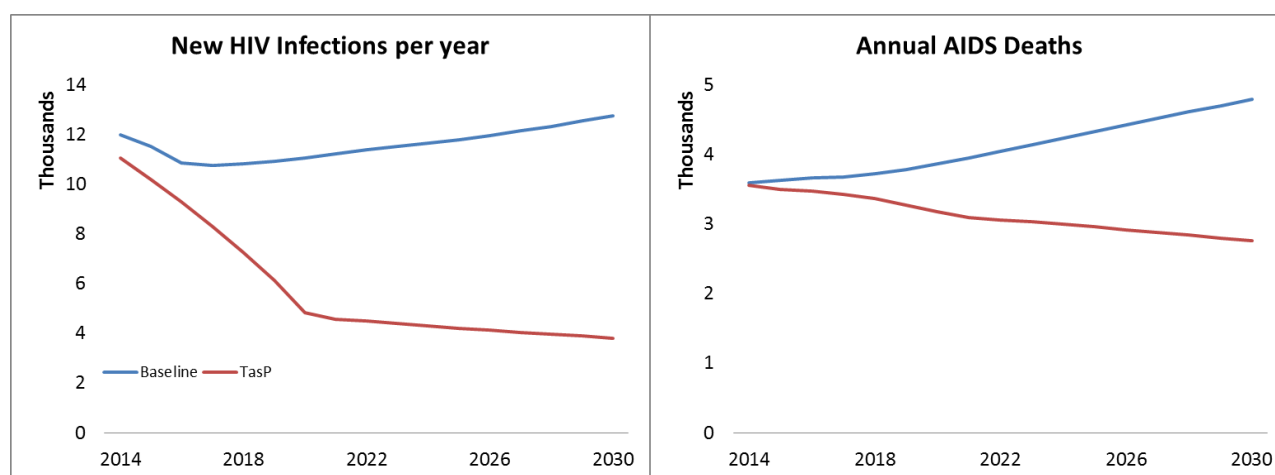
Impact Results for universal access to ART

Figure 8 demonstrates that new infections can be reduced by 46% and 48% in 2022 and 2030 respectively, relative to 2014 (start of proposed scale-up) under the universal access to ART scenario. Child new infections will be reduced by 74% and 81% in 2022 and 2030, respectively. While 42% and 43% adults infections can be averted in 2022 and 2030, respectively. The impact will be greater if viral suppression can be achieved for almost all patients, under which reduction in infectiousness would be closer to the 92-96% impact range, as was

demonstrated in clinical trials. AIDS death among children will reduce by 74% in 2022 and 91% in 2030. The programme will avert only 1% deaths amongst older PLHIV since a majority of adults are already on lifelong treatment and universal access implies that treatment will be provided to patients who have higher CD4 counts and at relatively low risk to AIDS-related mortality. Impact is likely to be affected by treatment adherence and retention in care as well as by treatment effects on the quality of life for PLHIV.

Relative to the 2014 baseline, the introduction of universal access to treatment will increase programme costs by 9% in 2030 (US \$96 versus US \$88). However, it is projected that the investment will result in cost savings from the year 2035 onwards, due to lower aggregate demand for ART as fewer people get infected and a natural attrition of PLHIV through death. It can be expected that savings will be greater since the economies of scale for providing treatment to a larger population have not been factored into the current unit cost of ARVs to be in line with global efforts to reduce treatment costs which envision that volume production of ARVs will reduce treatment costs per patient from \$570 in 2010 to \$150 in 2020 [e. a. Schwartlander 2011]. It should be expected that these will lead to cost savings even sooner than 2035 as projected.

Figure 8: Impact of universal access to HIV treatment on HIV infections and AIDS-related deaths



Source: Avenir Health, SHIC Model Outputs, 2015

III. Improve linkage and enrolment into care, and adherence and retention on treatment

Improving the linkage and enrolment in care, treatment adherence and retention is critical for achieving maximum health impacts through the ART programme. Linkage and enrolment in care is a key step in the early cascade of HIV care and treatment. A recent review of HIV testing and ART programme data found that less than 40% of newly diagnosed HIV positive clients are enrolled in HIV care (pre-ART and ART) within two years of their diagnosis. As a consequence, the median CD4 count at initiation is 236 cells/mm³ and worse for men at 178 cells/mm³. There is also a weak retention of children who were identified as HIV positive through the maternal, neonatal and child health programme, after completion of immunisation booster doses at 2 years. They are usually lost until they come back at year 5 or identified by retest through the PIHTC programme when ill.

In order to improve linkage and enrolment in care, the national referral system must be broadly and effectively implemented across all health facilities along with the essential health care package. Additional efforts are required should ensure that health facilities are properly equipped to receive referrals and trace cases of failure to link or defaulting. Also, community testing programs must be aligned to the broader national referral system. The ongoing community linkage pilot projects will evaluate effective strategies for improving linkages from community testing programs to health facilities.

The introduction of the nurse led ART initiation (NARTIS) since 2010, has supported a successful decentralisation of HIV services to the primary health care level. This has reduced barriers to accessing care and treatment by bringing HIV services closer to communities. Without NARTIS, the country would not meet service demand that is generated by treatment eligibility expansion. Furthermore, the salaries for nurses which are more than three times lower than those of doctors, present significant financial benefits as the number of NARTIS accredited nurses continues to increase. This will improve the quality of care and allow doctors additional capacity to care for more complicated HIV cases.

Once a person starts HIV treatment, it is essential that they adhere to their treatment and are retained in care. Adherence includes taking all medication at the right time and exactly as prescribed and ensuring that there is no interaction with other drugs. Research has shown that adherence below 95% is associated with increases in viral load and drug resistance. Adherence and retention in care is therefore extremely important not only for improving the survival rates of PLHIV, but for reducing new infections and for cost efficiency considerations since moving a patient to a stronger regime has higher cost implications. Programme data reveals that annually an average of 9% of patients enrolled in care are lost to follow up. A study on lost to follow up showed that 12% of the patients had restarted at other sites, 37% had died and 51% were just untraceable (MoH 2010).

Patient tracing programs must be strengthened in conjunction with treatment scale-up efforts. A local study also found an association between the ‘user friendliness’ of services and access and retention in care. Distance to clinic services and associated transport costs, long queuing times and competing demands, such as the need to work, have all been associated with poor adherence to treatment and patients leaving care. The decentralization of ART services a through community ART refill program for more stable clients is a considerable model for long term retention. The purpose of community refill strategies are two-fold: first, to bring care closer to the people in the community, thereby reducing transportation and time cost burdens on the client and second, to reduce the burden on the health care system, allowing it to care for more critical cases. The country is currently evaluating several community refill models and the evidence from these pilots will be used to determine the most effective model for national scale-up.

Involving PLHIV is another more effective measure to promote adherence and retention. Local expert client programs, when combined with mobile phone reminders and active follow up, have resulted in a successful uptake of HIV treatment and improved treatment adherence. The combination of these strategies have led to an over 90% retention rate for PLHIV six months after initiation - a rare achievement in the Southern African region (CHAI 2013). In addition to community support, national strategies to reduce HIV-related stigma and discrimination must be strengthened to improve treatment literacy as well as knowledge on the importance of treatment support and adherence.

Summary

The successful implementation of universal access to treatment, with improved linkages and retention in care will increase the number of PLHIV who are virally suppressed from 35% to 73% in 2020 and 85% in 2030. This will reduce the number of new infections and AIDS deaths. However, for the forgoing to hold, HIV diagnosis among PLHIV which is currently at 63% must increase to 90% in 2020 and at least 90% PLHIV retained on treatment.

This would equate to an averted 66,850 new HIV infections between 2014 and 2030 and 14,475 fewer AIDS deaths in the same time period. However, the true size of benefits depends on the size of externalities, which are determined by the partners and children who did not become infected and the outcome of lives saved in terms of disability adjusted life years (DALYs).⁶ It can be expected that the treatment bill will increase substantially

⁶ Studies on DALYs estimate that treatment side effects greatly reduce the quality of life for PLHIV.

between 2014 and 2030 to \$96.4 million due to universal access. The country will, however, realise savings in the long term from those infections averted and gain real economic returns in the form of increased labour productivity, lower demand for medical care to treat opportunistic infections as well as a reduced burden to care for orphan care as parents survive.

It is recommended that the universal access initiative immediately finds and enrolls sub-populations with higher prevalence, including female sex workers (70% HIV prevalence), young women and girls aged 20-24 (31%), female factory workers (50%) and male cane cutters (47%) and TB/HIV co-infected patients (80%). Patient outcomes will be significantly improved if the health system is supported to reinforce the national referral system in the treatment cascade, scale up tracking mechanisms for PLHIV on ART including viral load monitoring, create an efficient procurement and supply of drugs and related commodities, capacity building for health workers and establish quality monitoring systems to measure patient health outcomes.

Strategic Area 2: Scale up Voluntary Medical Male Circumcision (VMMC)

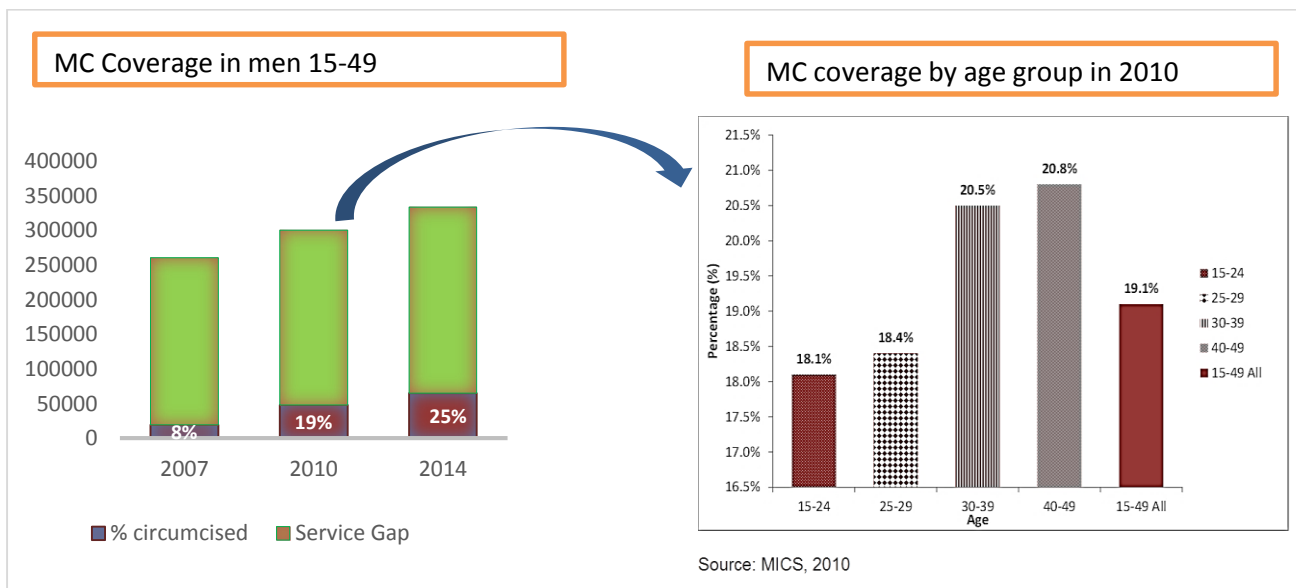
Proven to reduce the chances of contracting HIV by up to 60% in heterosexual males, medical male circumcision is the most cost-effective HIV prevention intervention and has potential for cumulative impact on the population level.

At an individual level, Voluntary Medical Male Circumcision (VMMC) provides 60% direct protection for acquiring HIV from heterosexual transmission in men (M.Westercamp. R. Bailey 2010). In addition to decreasing men’s risk of acquiring HIV, MC also provides indirect protection to women by reducing the occurrence of ulcerative STIs such as the human papilloma virus (HPV), which causes cervical cancer, bacterial vaginosis and trichomonas in female partners of circumcised men.



The prevalence of male circumcision prevalence in males aged 15-49 has increased from 8% in 2007, to 19% in 2010 and 25% in 2014 as shown in figures 9 and 10. The large MC Service gap, which is the total number of males aged 15-49 in Swaziland and those who are circumcised, shows that the current levels of MC have not been sufficient to result in major reductions in the HIV incidence. However, the gap presents an opportunity to make an immediate impact in new infections through higher volume circumcisions within a short period. This opportunity is also supported by the significantly lower HIV prevalence in circumcised men (16.4%) than in uncircumcised men (25%).

Figure 9: Male circumcision coverage among men aged 15-49 years in Swaziland and Figure 10: MC coverage by age, Swaziland, 2010



Modelled programme projections predict that Swaziland needs 13 individual circumcisions by HIV negative men are required to avert 1 new HIV infection. In order to attain population level impact, the SHIC suggests that the MC programme should target age groups that will yield highest results based on their population size, HIV prevalence rate and current and future sexual lifespan.

Based on the impact maximisation criterion, the following interventions should be prioritised by the male circumcision programme:

- I. Intensify male circumcision among young men aged 10-34

- II. Accelerate early infant male circumcision (EIMC)
- III. Integrate MC in general health services provided in facilities

I. Intensify MC among young men aged 10-34

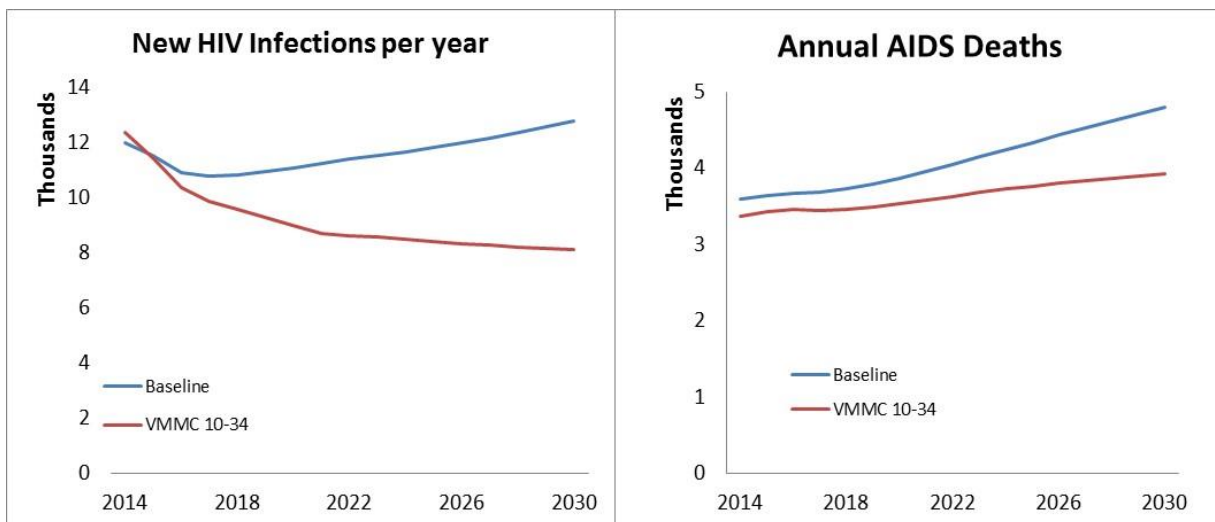
Young men aged 10-34 constitute 51% of the total population of men in 2014 (SPP 2012) and have low HIV prevalence, which ranges from as low as 1.9% in those aged 10-14 and to as high as 44% in 30-34 year olds (UNICEF 2007). Prevalence has reduced to 0.7% and 37% among those aged 18-19 and 30-34 respectively (SHIMS 2012). This proposition makes the case for intensifying male circumcision in this population more sensible. Nevertheless, the primary focus should be the 10-29 years group, with a secondary focus on 30-34 year-olds from whom new infections are most likely to occur.

In order to stimulate demand the following strategies should be used: community based -Inkhundla- targeting to maximize the impact on priority age groups, scale up outreach and mobile service delivery models; and accelerate social and behaviour change strategies through reproductive health services, sports, schools, workplaces, word of mouth peer-to-peer promotion and role models. Peer-to-peer promotion has also been shown to be not only beneficial in persuading cohorts to take up VMMC, but is also effective in dispelling myths and misconceptions. For older men who are harder to reach, the country should introduce modern technologies such as the non-surgical and less painful PrePex device which is known to increase the willingness to take MC services amongst older men following the Zimbabwe and Rwanda examples where this approach contributed immensely in escalating MC numbers.

Impact Results for intensifying MC among young men aged 10-34

The country will avert 43,034 (35%) population level new infections during 2014-2030 by circumcising 70% of males aged 10-34 by 2020 and increasing to 85% by 2030. This will also result in slightly fewer AIDS-related deaths, as shown in figure 11 below. The investment also comes with a low (\$252) average cost per population level infection averted which is comparable to the \$130 cost of providing one MC for individual protection. It can be expected that the introduction of PrePex, a non-surgical alternative which currently costs about \$20 per device, will lower the unit cost of providing MC.

Figure 11: Impact of intensifying VMMC for young men aged 10-34, Swaziland



Source: Avenir Health, 2015, modelling the impacts of SHIC game changers

II. Accelerate early infant male circumcision (EIMC)

Early infant male circumcision (EIMC), which is medical circumcision in the first eight weeks of life, helps in protecting neonates and children from future risk of acquiring HIV and other STIs when they become sexually active. An evaluation of current evidence indicates that the health benefits of newborn male circumcision outweigh the risks and the justify access to this procedure. Specific benefits include, prevention of urinary tract infections and penile cancer, as well as transmission of some sexually transmitted infections including HIV. Moreover, it has several advantages over adult circumcision such being a simpler procedure with no suturing required, has a faster healing period, has lower rate of adverse events (AE) and less expensive.

Local acceptance of EMIC is generally high. A study (P Jarrett 2014) on knowledge and attitudes of expectant mothers at the Good Shepherd Mission Hospital revealed a majority of mothers as wishing to have their son circumcised, with the preferred age varying from early infancy to adolescence. Similarly, a study among urban men found that three-quarters of the men interviewed were willing to have their son circumcised (Tsela S 2006). Reasons were mentioned both for and against circumcision included religious and cultural beliefs and that more family members are consulted when making the decision to circumcise a child. Other studies identify the main concerns as pain, loss of cultural identity and complications.

In order to accelerate EIMC, it is important that the programme design responds to local needs and beliefs. As a result, the following strategies should be prioritised; a) create client demand for EIMC services through multiple means both at community and facility levels, including a wide distribution of culturally sensitive information materials on early infant circumcision. Information dissemination should target men, who are the fathers and particularly influential in the decision to circumcise. Community outreach using community-based teams to reach multiple generations of families, including those who do not regularly access hospital services. b) EMIC services should be scaled up in existing service delivery sites and further decentralised to lower level facilities that offer maternal, neonatal and child health (MNCH) services.

HIV benefits of neonatal male circumcision will not be realised within the investment period (2014-2022) when the target population will be 8 years and not sexually active. Its impact will begin to yield in 2030 where 12% new infections will be averted when some of the boys begin sexual activity at age 16. EMIC is therefore a long term sustainability plan for HIV prevention rather than for immediate benefit. Although, the low return on investment makes EMIC financially non-viable programme within the 2014-2022/30 investment period, EMIC offers the highest financial and societal benefits in the long term by reducing future aggregate demand for MC.

III. Integration of MC to general health services in facilities

Even though VMMC offers excellent value for money in settings where heterosexual contact is the main mode of transmission and low levels of MC, the country has the highest unit cost of providing VMMC in the Southern African region at \$130 per VMMC performed, compared to \$77 in Zambia and \$88 in Zimbabwe. The current modalities of providing MC as a standalone intervention and through community outreach are some of the reasons for the high cost.⁷ Only medical doctors are authorised to perform male circumcision, therefore male circumcision surgery is available only in hospitals, clinics and private surgeries where doctors operate, at 45 out of the 252 health facilities in the country. A majority of those offer MC for adults only with the private sector taking the lead in the provision of MC to infants and children. As a result less than 20% of male circumcisions are carried out in government facilities, creating a barrier for those willing to take up MC.

⁷ Other reasons include the high cost of community mobilisation to promote the acceptability of MC.

The SHIC makes a case for the intensification of the integration of VMMC into the package of services offered at major health facilities including all facilities with maternity services. EIMC should be integrated with existing maternal and child health services for healthy term infants. In 2013, Tanzania offered EIMC as an integrated model, alongside vaccinations, family planning, and well-baby care in pilot sites and recorded major increases in infant circumcision in those sites (H. Mziray 2013).

An integrated approach for VMMC scale-up should ensure the provision of a comprehensive service package that includes reproductive health services, sexuality and gender inequalities, adolescent and MNCH services; HIV testing and counselling; condom promotion and management of STIs and TB screening. However, the integration of MC in health facilities will require a policy change to allow for task shifting, i.e. empowerment of nurse clinicians to be able to conduct VMMC surgery.

The impact of the integrated approach for VMMC and institutionalising EIMC will be an increase in access to MC, especially for rural communities and a reduction in the unit cost of providing MC as a result of efficiency gains as structural costs and HR will be shared within the framework of an integrated approach. The introduction of task shifting will result in a further reduction of HR costs as procedures are conducted by less expensive nurses.

Summary

Intensifying VMMC for males aged 10-34, accelerating EIMC and integrating MC in general health facilities will avert (41,823) 34% new infections in adults and children in 2030. This will also have a slight impact on AIDS deaths. The investment will cost an extra \$10 million (1% increase compared to baseline scenario) between 2014 and 2030. It is projected that from 2023 onwards, the annual costs under the intensified MC for 10-34 year olds scenario (70% MC coverage in 2018 and 85% in 2030) will be less than the baseline scenario due to the decreasing number of men requiring circumcision and savings due to HIV infections averted.

The acceleration of EIMC and its integration into routine MNCH will provide further cost-savings due to the reduction in future demand for circumcisions in adolescent males. This will require enhanced coordination with other service providers and key players at national and decentralized levels including those addressing gender and sexuality.

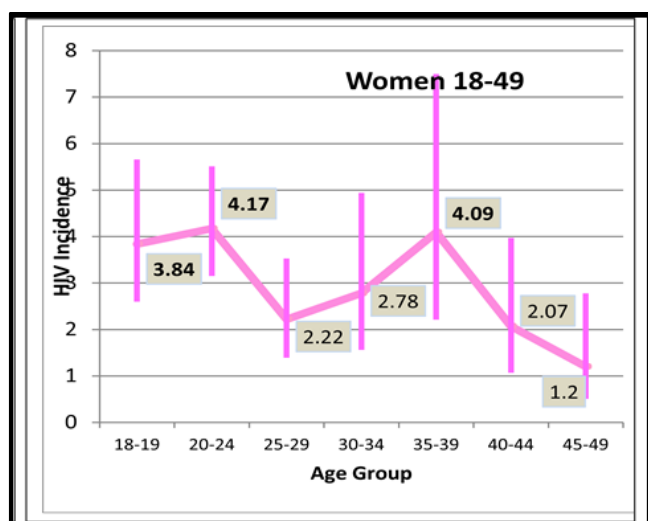
Strategic Area 3: Innovative HIV Prevention approaches for girls and young women

Innovative, inclusive and integrated HIV prevention approaches for girls and young women are critical to reducing their risk to acquiring HIV. Intensifying targeted programmes for infected and affected girls and young women as well as increasing social protection and safety nets will empower them to protect themselves and alleviate pressures that increase their vulnerability and risk taking behaviours.



Men and women, girls and boys are affected by HIV and AIDS differently. Adolescent girls and young women in Swaziland are the most at risk of acquiring HIV and more likely to get infected at an early age. As shown in figure 12 below peak HIV incidence is among young women, aged 18-19 at 3.8%, 20-24 at 4.2% and older women aged 35-39 at 4.1% (SHIMS 2011). Consequently, HIV prevalence in females aged 15-24 is almost three times higher than that of same aged males. Factors that make girls and young women more susceptible to HIV include early sexual debut which is between the ages 15 -17, high intergenerational sex (with older men) with almost 10% of young women's first sexual act

Figure 12: HIV Incidence rate among women 18-49, Swaziland 2011



Source: Swaziland Incidence Measurement Survey Study (2011)

being with a man 10 or more years older than them, vulnerability to rape, high (38%) rates of casual sex without protection (71%) and low comprehensive knowledge about HIV risk factors which has reduced from 59% in 2010 to 49%. Structural factors such as unequal economic opportunities, gender inequality and poverty exacerbate young women's vulnerability.

Girls and young women are less likely to be able to negotiate condom use and more likely to be subjected to non-consensual sex. It is estimated that 1 in 4 females experience physical violence as a child, and 9% have been forced to have sex by age 18 and 2 in 3 females experience some form of sexual violence in their lifetime. (UNICEF 2007). The study also found that sexual violence is most commonly perpetrated by boyfriends, husbands, men and boys from the victims' neighbourhoods and male relatives.

Whilst there have been many HIV prevention interventions implemented in the country, very few have focused on the vulnerability of girls and young women. Therefore, for the country to make maximum impact in preventing new infections among girls and young women, the primary focus should be on effective combination prevention approaches that address both structural and behavioural factors that are root causes of HIV transmission among girls and young women, and promote activities that improve their socio-cultural status and wellbeing as well as protect their rights. As a result, the following game changers are proposed:

- I. Economic empowerment of girls and young women
- II. Transformation of gender roles and relations
- III. Intensify innovative social and behaviour change communication

I. Economic Empowerment of girls and young women

Multitude socio-cultural and economic factors increase girls and young women's vulnerability to HIV. Young women and girls are raised in communities where they are not treated as equal. The prevailing concept of femininity dictates that women should be ignorant about sex and passive in sexual interactions. They cannot choose at what age or (sometimes) who to marry, when to have sex, how to protect themselves and how many children to have. Like in many African cultures, there is local general tolerance for multiple sexual partnerships, including extra-marital sex for men. This has resulted to a situation where relationships do not protect women. This is worse for Swaziland where 28% of stable monogamous couples are sero-discordant, high intergenerational sex and early marriage. Four percent of girls aged 15-19 are currently married and 33% of those are married to a spouse who is 10 or more years older. According to the Ethnographic Study (2011) young women do not consider sexual relationships with older men as particularly risky. Childbearing starts very early, as 14% of girls aged 15-19 (1% before the age 15) and 22% of young women aged 20-24 are mothers (MICS 2010, 2014). Adolescent girls and young women are often prevented from seeking services and making decisions about their reproductive health needs. Moreover, it is believed that HIV infected girls and young women are subjected to more HIV stigma and discrimination than males. These factors limit the ability of women and girls to protect themselves and to access information and services.

Economic dependency, lack of assets, and lack of protection against abuse and exploitation exacerbate the vulnerability of young women to HIV. Women have limited and unequal employment prospects, and unemployment is higher among young women who end up being engaged in low paying jobs. These pressures contribute to high risk behaviour including long term multiple and concurrent partnerships, frequency of intergenerational sex and vices like sex work and transactional sex. In urban settings, cohabitation and temporary sexual relationships are common because young women need support for basic items like food, shelter and clothing. This combination drives both their risk and vulnerability to HIV.

The investment case recommends improving the economic power and agency of young women as an innovative game-changing HIV prevention effort for reducing their vulnerability to HIV. Economic empowerment of girl and young women addresses poverty an underlying cause of HIV vulnerability for young women. Effective measures should be emphasised include; a) use of structural approaches, and b) increase social protection and response mechanisms.

There is good evidence that structural approaches like education, cash transfers, vouchers, micro-finance, internship programmes and food and nutrition support can reduce the economic vulnerability to HIV infections faced by girls and young women. Success is highest when these efforts are combined with a gender and HIV empowerment curriculum. The large investment in human capital development by the Government of Swaziland through the free primary education, orphaned and vulnerable children schools grants and subsidised healthcare have contributed to a reduction in economic vulnerability of girls and young women and should be sustained. A higher education level in females is strongly correlated with delayed sexual debut, late age of marriage and childbirth as well as a greater future earning potential. The Swaziland Behavioural Sentinel Surveillance among young people, cane cutters and factory workers (BSS 2010) confirmed that education was a protective factor against HIV as early sexual debut and HIV prevalence was lower in young people who were in school than their age mates who were out of school. The benefit increased with higher levels of education.

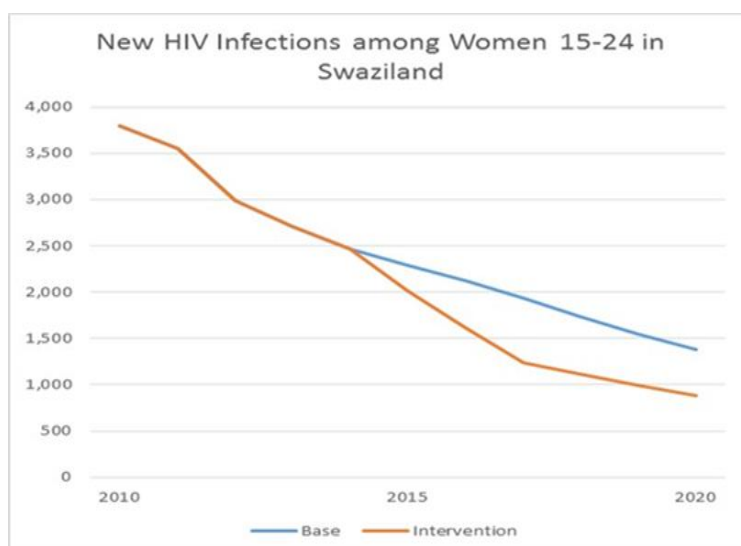
The Swaziland National Youth Empowerment Fund can be complemented by introducing a national volunteering and internship programme for young people in general. This will reduce youth unemployment and if hosted within the HIV response, support the design of HIV prevention and care programmes that appeal to youth

audiences. Evidence of impact of youth volunteering or internship programmes that are supported by a minimum wage show that these are a source of skills development especially out-of-school and unemployed girls and boys, build their self-confidence and reduce their vulnerability to transactional sex and leisure sex.

Social grants, cash transfers and stipends that are combined with behaviour change incentives are emerging as an innovative method to economically empower adolescent girls and young women while promoting good behaviour. (Conditional) cash support can have a ripple effect on averting new HIV infections, as seen in a pilot cash transfer project for adolescent girls (aged 13 to 22) in Malawi which not only had powerful impact on improving their school attendance and retention, but also demonstrated that girls whose families received monthly cash transfers had a significantly lower HIV infection rate than the control group. The study evaluation concluded that cash transfers conferred a 60% reduction in HIV risk for the participants (Baird J 2013). Other studies show an impact of conditional cash transfers on keeping young girls at school with ripple results on STI reduction in rural Tanzania and on HIV prevention in Lesotho.

Impact Results for the economic empowerment of girls and young women

Figure 13: Impact of cash transfer for young women, Swaziland



Source: Avenir Health, (2015) modelling the Impacts of SHIC Game changers

As shown in figure 13 on the left, modeling results for offering cash incentives to 80% of young women aged 15-24 reveal that within a wider social protection framework cash incentives will avert 30% new infections among young women and girls by 2022. It can be expected this effect will replicate to a population level effect, although it will not be as great as among young women.

In 2015- 2017, the country will pilot the conditional cash transfer project in order to evaluate its impact on behavioural and new infections. Its main thrust will be to disrupt economic dependency that contributes to a number of high risk behaviour like intergenerational sex, transactional sex and early sexual debut.

II. Transform gender roles and relations

Young women's roles in households and communities varies greatly, as do the social, economic, political, legal and environmental contexts that they live in. Yet relatively few programs explore the intersection of various kinds of vulnerability faced by girls, or the role of girls within their households and communities. *Transforming gender roles and relations* between men and women is a socially inclusive method of addressing the vulnerability of girls and women by influencing intermediate factors such as gender attitudes at individual, household and community levels.

The high prevalence of intergenerational heterosexual partnerships among young women necessitate their HIV prevention efforts also invest in changing sexual risk perceptions and behaviours of their male counterparts, who

according to cultural dictate are major decision makers with regards to sex. The investment case calls for the exploration of social influences on gender norms with efforts to loosen social strictures on sexuality. Quick wins include; increasing in men's participation in gender equality, reproductive health and HIV prevention efforts. Strategies for change emphasise that men must be change agents, participants in reform and allies in striving for gender equality and justice. The impact of greater men's involvement will not only improve men's knowledge on HIV, health and gender equality but also widen the scope for decision making and safer sex negotiation for young women. Evidence from the Men as Partners (MAP) programme in South Africa which worked with men to promote gender equality, end domestic and sexual violence, and reduce the spread of HIV showed 71% of MAP participants believed that women should have the same rights as men whereas only 25% of men in the control group felt this way. The Stepping Stones approach, which is centred on community involvement in planning prevention approaches, also demonstrates higher male acceptability of HIV prevention efforts and leads to better health outcomes in males and their partners.

The current high levels of sexual violence among girls and young women necessitate that HIV prevention approaches intensify efforts to reduce gender-based violence including domestic violence and coerced sex. Strategies to reduce GBV and strengthen child protection include awareness raising, improving the criminal justice system, and victim support. Mass campaigns to stigmatize GBV with an enabling environment to support these interventions should be enhanced. Families and communities need to be sensitised to report and refer GBV cases. On the policy level and not exclusively, the finalisation of the Sexual Offence and Domestic Violence Bill and the implementation of the Child Protection and Child Welfare Act will support these interventions. Current efforts to mitigate exposure to HIV through rape by duty barriers –legal, law enforcement, health care, psychosocial support- must be sustained.

III. Intensify innovative social and behaviour change communication

The reduction in comprehensive knowledge about HIV transmission, risk mitigation and HIV services among young people as revealed by the MICS studies in 2010 and 2014 raise concerns about the HIV response's ability to create an enabling environment for positive behaviours. While almost all young people have heard about HIV and AIDS, comprehensive knowledge about HIV among women aged 15-24 has reduced from 58% in 2010 to 49% and is slightly lower than that of same aged males (51%). This means that current strategies, campaigns and other communication methods aimed at providing the population with comprehensive knowledge on HIV prevention, adoption of positive individual behaviours and health seeking are not able to influence the adoption and maintenance of positive behaviours.

Even though social and behaviour change communication (SBC) is a priority intervention, a review of HIV expenditure trends show that it's funding is on a gradual decline. The NASA 2011 revealed that HIV prevention accounted for only 12% of total HIV response spending. This is also a result of other programmes mainstreaming SBC within their main activities and a low donor appetite to invest in SBC interventions whose effectiveness is not immediate and difficult to measure. Existing local HIV communication platforms are limited to mass media through radio, newspaper and television, billboards and campaigns, community social mobilization and peer support programmes. While these are plenty, they are often presented in generic formats for the general public and offer limited specificity on typical risks encountered by sub-populations including girls and women. The investment case therefore proposes the inclusion of modern innovative methods to deliver SBC and in a disaggregated manner.

Innovative SBC for girls and young women should contain the right balance of content, scale and intensity that will promote accurate individual knowledge, stimulate individual motivation to avoid risky behaviour and

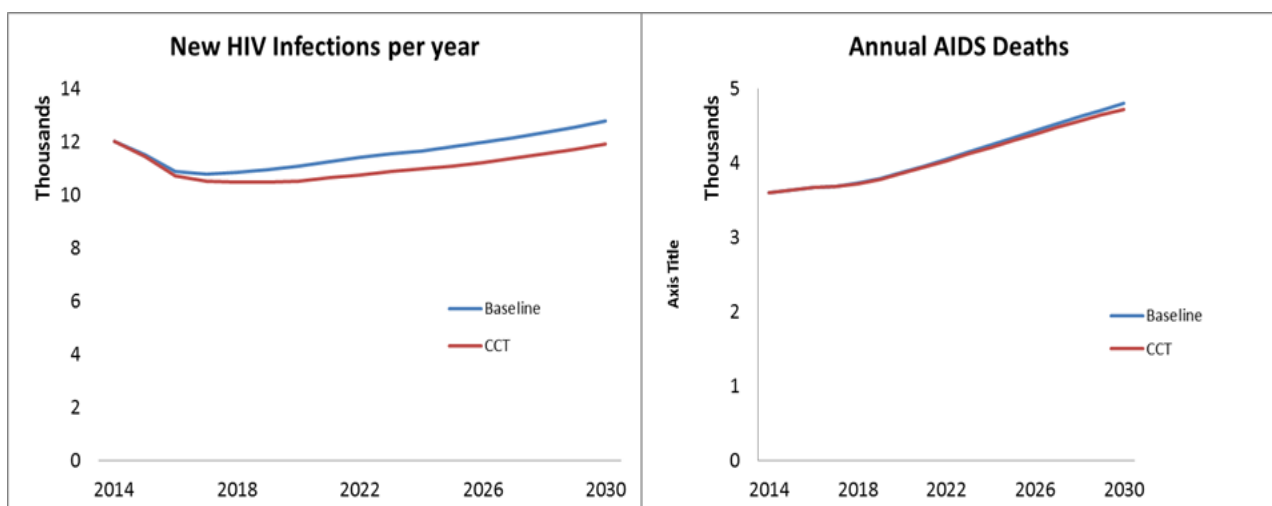
encourage them to access HIV services. A comprehensive SBC package for girls and young women must typically include confidence building to foster self-efficacy for condom use and negotiation, HIV risk perception, gender relationships and prevention of Gender Based Violence, leadership and economic empowerment, Sexually transmitted infections (STI) screening and treatment, sexual and reproductive health and access to HIV care and treatment services. Evidence shows that these targeted women-empowering SBC approaches will lead to more sustained behavioural change.

SBC approaches should include social media platforms to communicate HIV information to young people. Recent research shows that young people spend most of their free time consuming media, watching TV, listening to music, surfing the Web, social networking, and playing video games. For most teens, screen time is on their mobile phones and according to the SA Social Media Landscape 2015 research study teens use their cell phones to text an average of 80 times a day. Access to social media is also high in Swaziland as nine in ten households own at least one cell phone (SHIES 2010) and 56% of young women aged 15-24 use the internet (MICS 2014). Sharing HIV information using social media platforms guarantees a wider captive audience and is a dynamic approach for interpersonal communication which can be extended to international sharing platforms. This also offers a real time opportunity to quash oncoming HIV myths and misconceptions as well as HIV stigma and discrimination. Other benefits include reduced SBC costs by using a cheaper approach and providing a more responsive HIV response. It can be expected that this will support programme uptake in HIV testing and treatment and improve the general health seeking behaviours among girls and their partners.

Summary

Linking HIV prevention with the empowerment of young women and the involvement of men including intensifying comprehensive knowledge about HIV can stop the tide of the HIV. The scale up of conditional cash transfer within the framework of social protection will reduce new HIV infections by 12% and avoid 500 AIDS deaths by 2022. The investment will also net financial savings of \$5 million between 2014 and 2030, compared to the baseline. Moreover, any infections averted among young people represent a saving because younger PLHIV would stay longer on ART, due to their remaining lifespan.

Figure 14: Impact of targeted HIV prevention programmes for girls and young women, Swaziland



Source: Avenir Health, (2015) modelling the Impacts of SHIC game changers

Investing in these game changers will have exponential returns on reducing vulnerable and risky sex among girls and young women. Involving men and boys in programmes aimed at reducing the vulnerability of women and

girls will also promote their own health seeking behaviours and help achieve the country to achieve its gender goals, benefitting society broadly. Other approaches to capitalize on these efforts is to provide integrated empowerment strategies that include SRH information and services — including family planning, mother and child health care and to empower girls and young women who are living with HIV to access HIV treatment and support. This will have consequential benefits for the prevention of mother to child programme, wherein lesser women of reproductive ages have HIV (success of PMTCT Prong I- Primary prevention of HIV infections among women of reproductive ages), leading to savings from would-be expenditure on PMTCT.

Strategic Area 4: The elimination of mother to child Transmission of HIV (EMTCT)

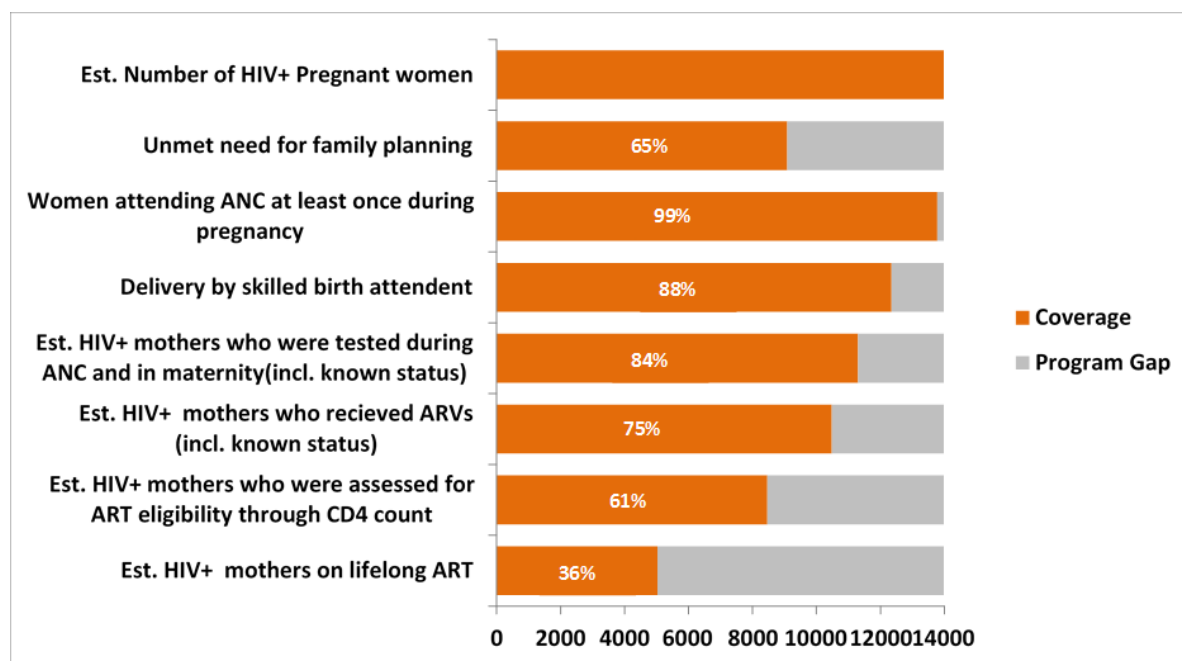
At a transmission rate of 3%, Swaziland has virtually eliminated the vertical transmission of HIV from an infected mother to their infants under 8 weeks. However, the great task is to reduce transmission among older children, where transmission is greatest at 10%.



The PMTCT programme was introduced in 2003 to minimise HIV transmission from HIV positive mothers to their exposed infants and maximise care for mothers and children who are infected. When the programme began the number of new infant infections from mother to child in pregnancy and delivery was estimated to 33%, slightly below 4,000 per annum. Nowadays, infant HIV infections from mother to child have been reduced to only 3% of exposed infants who are under 8 weeks old. The programme is fully integrated into ANC services and provided in 89% of the Antenatal Care-maternity and infant - (ANC) 183 health facilities and also serves as an entry point for full ART services for the mothers’ family.

From an estimated 34, 091 deliveries, 13,980 (41%) deliveries were from HIV+ mothers. Almost all (99%) HIV positive pregnant women attended at least one ANC visit and 88% of deliveries attended by skilled personnel. Almost all (95%) of pregnant women attending ANC were tested for HIV status and 11,305 were found to be HIV positive (including those presenting with already known HIV positive status). 10, 479 (93%) of those diagnosed HIV+ were given an ARV prophylactic regime and 48% received lifelong ART for their own health. However, looking at coverage in reaching all estimated HIV positive pregnant women which includes those who do not complete ANC visits or deliver at health facilities reveals that lesser (84%) HIV positive women were tested, 75% received ARVs and only 36% received lifelong ART. Figure 15 shows the PMTCT service coverage cascade for all estimated HIV+ women in 2013.

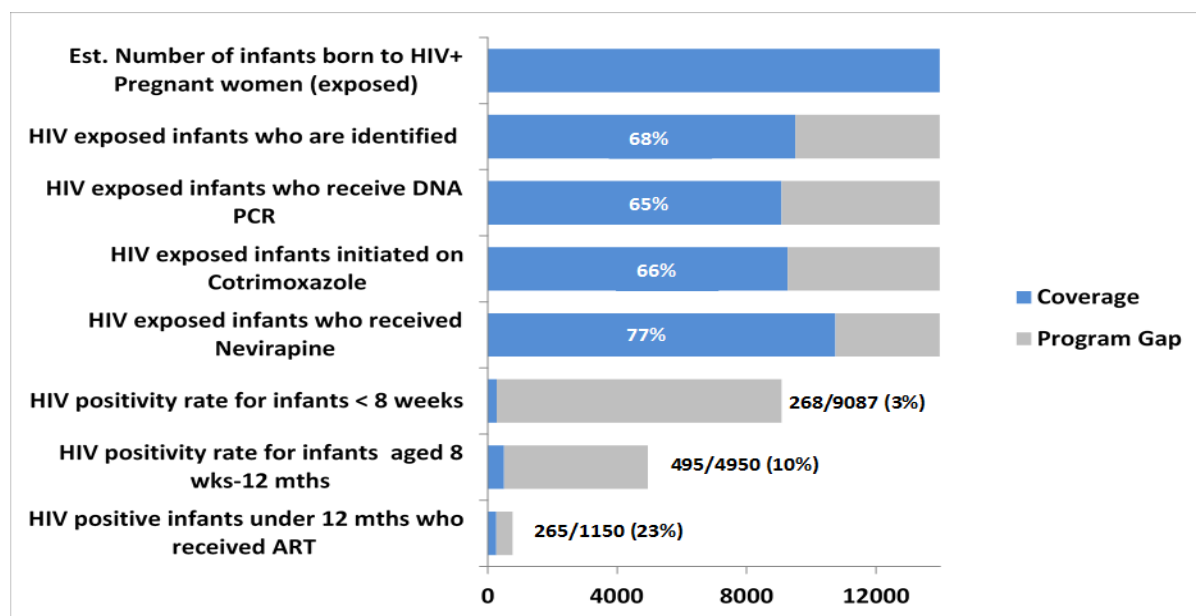
Figure 15: PMTCT Cascade for HIV Positive Pregnant Women in 2013, Swaziland



Sources: Swaziland Population Projections (2007-2030), HIV Sentinel surveillance among pregnant women (2010), MICS (2014) & PMTCT programme data (2013)

Figure 16 depicts the PMTCT service cascade for an estimated 13, 980 HIV exposed infants in 2013. 9510 (68%) of the estimated number of exposed infants were identified. A total of 9087 received early infant diagnosis for HIV through DNA PCR, among whom 3% (268/9087) reacted HIV positive. HIV infectivity, which increases with child's age was 10% among children aged 8 weeks up to 12 months is even higher for those aged 12-18 months. Nevirapine prophylaxis (NVP), which national PMTCT guidelines recommend to be given to all exposed infants for up to 6 weeks post-delivery or until cessation of breastfeeding was given to 95% of HIV exposed infants that were seen at health facilities received NVP.

Figure 16: PMTCT cascade for HIV exposed infants in 2013, Swaziland



Sources: HIV Estimates and Projections 2014 and PMTCT programme data (2013)

Having virtually eliminated MTCT among infants under 8 weeks, the country can eliminate mother to child HIV transmission in older children by prioritising areas that have a higher service gap as revealed in the mother and infant cascades above. For mothers, the high unmet need for family planning among HIV+ women and low continuum care are critical gaps, with the low rate receiving ART for own health posing a threat to the mother's health as revealed in very high maternal mortality rates (320 per 100,000 population), from whom 60% are from HIV+ mothers. For exposed infants, investments must focus on finding all exposed infants and preventing the high sero-conversion of older infants, which is the foremost threat for this near successful programme. Focus must also be emphasised in the continuation of care for HIV+ infants from whom less than a quarter of those identified are on ART. It is also this reason that ART coverage for children under 15 years is low at 54%.⁸ The following game-changers are therefore recommended for the elimination of MTCT and improving the health status of HIV+ families;

- I. Roll out Test and Treat (PMTCT Option B+) to all HIV positive mothers
- II. Intensify family planning for PLHIV
- III. Improve infant feeding practices

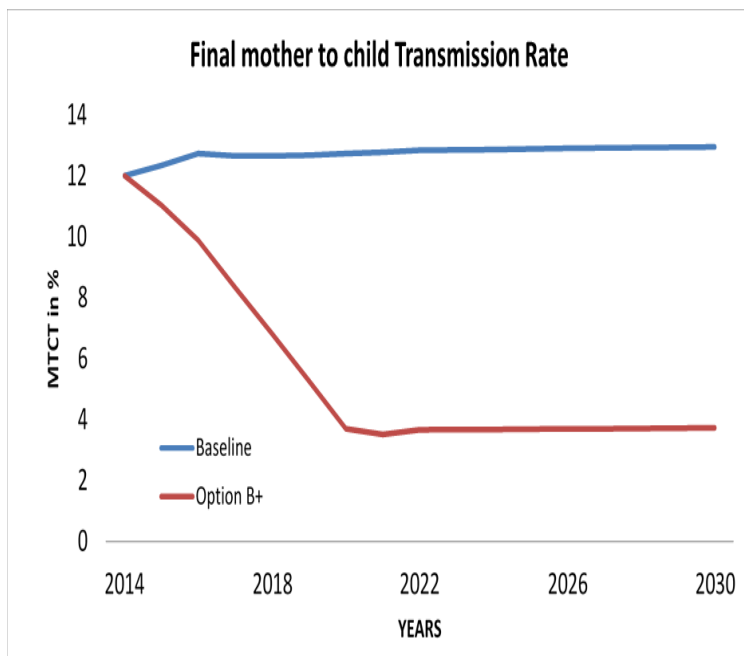
⁸ This is because infection through MTCT accounts for over 90% of all new infections in children under 15 years. HIV treatment guidelines state that all identified HIV+ children between 0-14 should be offered ART upon positive diagnosis.

I. Roll out Option B+ for all HIV positive mothers

PMTCT Option B+ is a test and treat approach for which all HIV+ pregnant women are put on lifelong ART regardless of eligibility. Option B+ has many HIV prevention and care benefits, namely, it keeps the mother healthy, has higher PMTCT success outcomes, prevents transmission for all future pregnancies, and reduced infection for the mother’s HIV negative partner. The high (28%) sero-discordancy rate among stable heterosexual couples and the high number of women presenting to ANC with a known HIV positive status makes this initiative a critical game changer. Moreover, its benefit is already seen in the lower (1%) transmission rate for infants whose mothers who are on ART for own health, which is better than 3.2% transmission from mothers who received AZT plus intrapartum dose in pregnancy and worst (10.9%) for infants whose mothers are not in any PMTCT regimen.

Impact Results for rolling out PMTCT Option B+

Figure 17: Impact results for rolling out Option B+



Source: Avenir Health, (2015) modeling the Impacts of SHIC game changers

Rolling out Option B+ to all pregnant women will reduce the mother to child transmission of HIV by 81% for all exposed infants up to 18 months by 2030 as demonstrated in Figure 17 on the left. This will make an immediate impact in as early as 2015, demonstrating its great efficacy in eliminating mother to child transmission of HIV.

Investing in Option B+ will increase programme costs by 12% over the investment period 2014-2030, but measured against its prevention benefits, Option B+ is a strategic option. Moreover, its HIV preventative benefits go beyond preventing transmission in infants but extends to women’s male partner, if he is HIV negative. Option B+ will also improve the general health status of HIV+ mothers and contribute to reducing maternal mortality for PLHIV. Focus must also be paid to enrol, as well, their HIV+ infants and HIV+ partners.

II. Intensify family planning for PLHIV

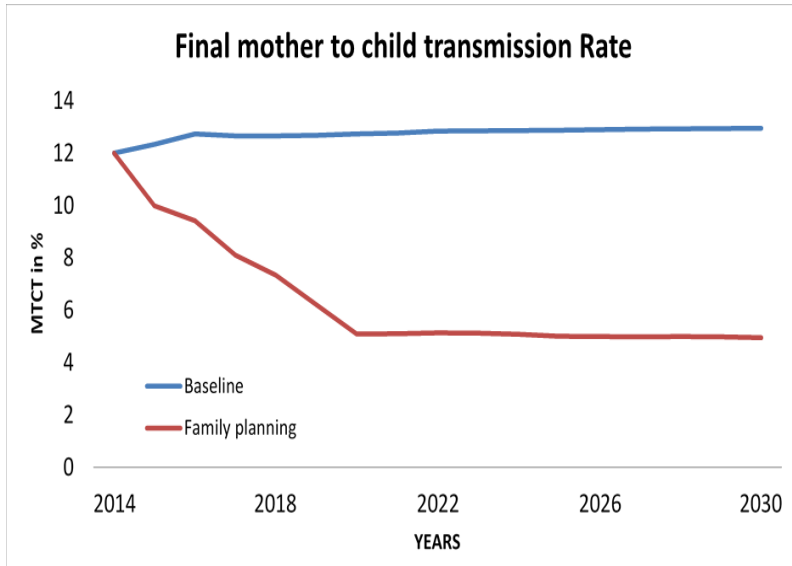
The high unmet need for family planning as gathered from ANC data in 2010, wherein 65% of pregnant women aged 15-49 who presented with a known HIV status and were on ART for own health reported to not wanting to fall pregnant with the current pregnancy, demonstrates a dismal failure of PMTCT Prong II- prevention of unwanted pregnancies among HIV positive women. Unwanted pregnancy for PLHIV is higher than that of the general population of women aged 15-49 or those pregnant but HIV negative, which are 15% and 60% respectively.⁹ The integration of SRH services, and in particular family planning for PLHIV can reduce the number of mother to child transmissions of HIV and the number of AIDS by just the simple prevention of

⁹ The figures represent a general family planning gap for all women irrespective of HIV status.

unintended pregnancies. Entry points for intensifying family planning provision for PLHIV are the pre-ART and ART programmes.

Impact Results for rolling out PMTCT Option B+

Figure 18: Impact results for intensifying family planning for HIV+ women



Source: Avenir Health, (2015) modeling the Impacts of SHIC game changers

The incremental reduction in unmet need for family planning among PLHIV from 65% to 10% in 2022 and 5% in 2030 will reduce 62% infections through mother to child over the investment period.

The low annual cost of family planning in Swaziland (\$20 per woman) makes family planning the most feasible and cost-effective intervention for reducing new infections in children. With this intervention PLHIV are also better off by not having unwanted children, reflected by the high service demand.

The long term benefits of family planning expand to the development sector, by reducing the number of orphaned and vulnerable children.

III. Improved infant feeding practices

Efforts aimed at controlling the high sero-conversion of exposed infants as they get older need focus on risk factors that expose infants to infection. The sero-conversion of mothers from HIV negative to HIV positive during pregnancy, labour and delivery as well as when lactating and a generally high rate of mixed feeding are some of the risk factors in Swaziland. The investment case proposes that improving infant feeding practices among exposed infants, together with HIV prevention initiatives for the general population, can reduce the risk of HIV infection for children who are breastfed.

The WHO recommends exclusively breastfeeding in first 6 months of birth as an appropriate feeding method for HIV positive mothers, HIV uninfected and of unknown HIV status, and thereafter introduce appropriate complementary foods whilst continuing breastfeeding for the first 12 months of life. (WHO, Updated HIV treatment Guidelines, PMTCT 2010). The benefits gained from breastfeeding far outweigh the risks, since breastfeeding that is complemented with Option B+ has little the risk of infection measured against evidence that children who are not breastfed are up to six times more likely to die from diarrhoea, malnutrition or pneumonia.

The country implements the WHO recommendations. However, without the extensive roll out of Option B+, breastfeeding by HIV+ mothers poses an infection threat because only 64% of children under 6 months are exclusively breastfed, with the median duration of exclusive breastfeeding being only 2 months (MICS 2014). Given the current status of exclusive breastfeeding trends, it is therefore important that HIV positive mothers are not offered the breastfeeding option as the only feeding choice but further informed of the related benefits and drawbacks versus alternative feeding practices which are available. Asserting parents with information gives them an opportunity to make an informed decision about their child’s HIV risks and they must be supported in their decision by making available acceptable, feasible, affordable, sustainable and safe replacement feeding options. Modeled results for MTCT rates in mothers who do not breastfeed at all show an 89% reduction in new infections.

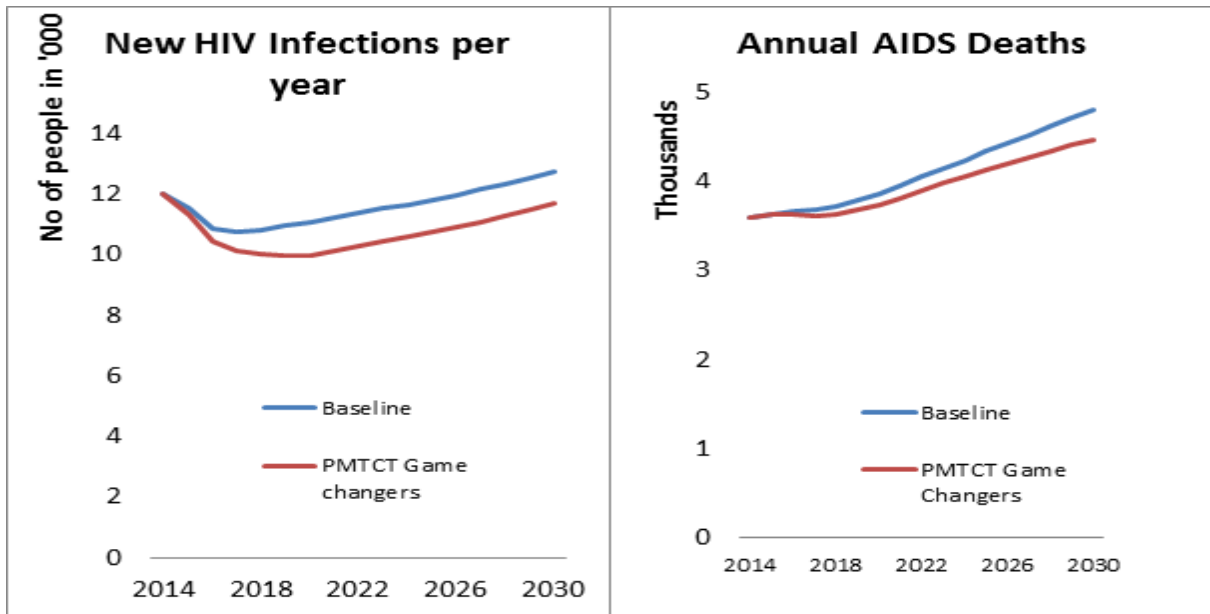
Moreover, the high availability to potable water to 82% of households in Swaziland reduces any counter threat of child deaths due to waterborne illnesses.

Summary

Achieving gains in this near successful programme requires slight but definite changes in programme focus, which is currently slanted towards finding and providing ARV prophylaxis to HIV+ positive mothers. Indeed the current coverage of 84% mothers receiving prophylaxis has resulted in the elimination of 97% infants’ infections. In order to eliminate mother to child infections in older children, new investments are required to roll out Option B+ and empower parents to make good choices for their infants as well as themselves.

Rolling out Option B+ to mothers and their infants, in combination with the reduction in unmet need for family planning and improved feeding practices will reduce 14, 868 (89%) infections among exposed children. This will have a population effect resulting in a 36% reduction in new infections that is attributed to the aversion of infections in sero-discordant couples and their future children and reduction in maternal and infant mortality, shown in figure 19 below. Another externality will be a reduced burden of care for society as there will be fewer unplanned pregnancies for which there should be an anticipated drop in the future cost of the programme and OVC social support programme. This although makes the investment a viable and cost-effective policy option.

Figure 19: Impact of combined PMTCT Game Changers



Source: Avenir Health, (2015) modeling the Impacts of SHIC game changers

Additionally, to gain maximum outcomes, the investment must be supported by gender male involvement programmes, strengthen the health system to find HIV+ pregnant women who are not currently accessing PMTCT services, follow up mother-baby pairs until cessation of breastfeeding and up to 5 years, and implement the Children’s Protection and Welfare Act 2012 that gives the right to children to access to medical services.

Strategic Area 5: Intensifying TB/HIV co-infection diagnosis and treatment

Intensifying coordinated TB and HIV prevention and treatment efforts in Swaziland, which is at the epicentre of a dual HIV and TB epidemic, can ensure that all persons who have TB or HIV are identified early and enrolled in appropriate care.

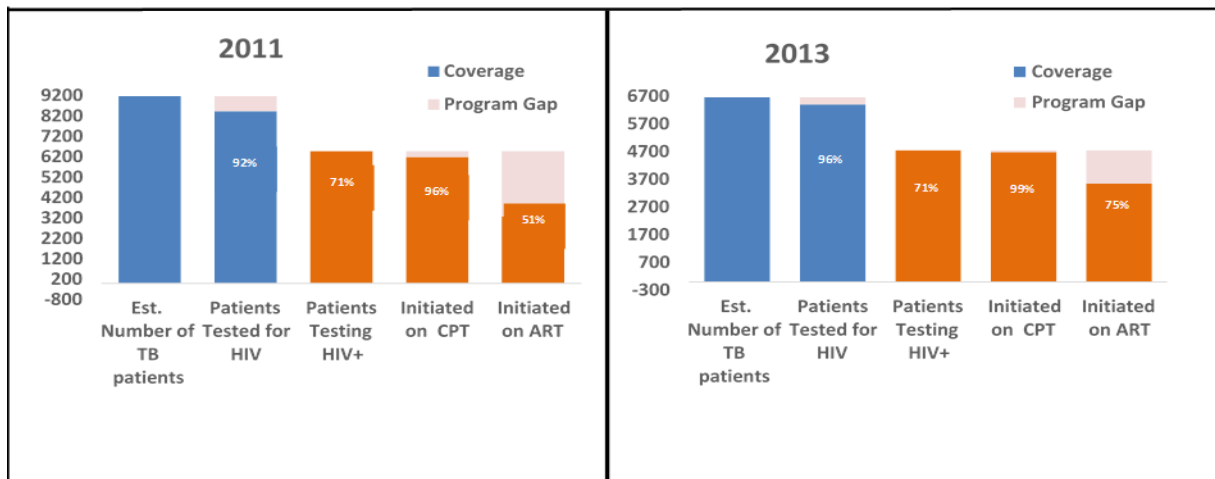


Swaziland has the highest per capita burden of Tuberculosis (TB) in the world, with an estimated TB incidence of 1,349 per 100,000 population. TB prevalence is estimated as 907 per 100,000 population and TB-related mortality (excluding HIV) approximately 63 per 100,000 population. The TB/HIV co-infection rate among incident TB patients is very high between 70-80% and TB is the leading cause of death for HIV+ persons (MoH 2013). Worsening the situation is the increasing number of drug resistant TB (MDR-TB) cases in the country, which is 8% among new TB cases and 34% among previously treated TB cases, three times higher than the regional average of 12-13% (Drug Resistance Survey Report 2009). The advancement of the TB burden is strongly influenced by the spread of HIV, which reflected a corresponding increase in the 1990s as the HIV epidemic escalated. The risk of developing TB is 20-30 times greater for a person living with HIV than those who are not HIV infected.

The country adopted a TB/HIV integrated service delivery model in 2006. All TB/HIV co-infected patients are initiated on CPT and since 2008, all HIV positive TB patients are initiated on ART regardless of their CD4 cell count within 8 weeks of initiating TB treatment. The country has adopted the 3 I's (Intensified case finding, Isoniazid Preventive Therapy and TB Infection Prevention) as part of the TB/HIV collaborative strategy to reduce the burden of TB amongst PLHIV. TB and HIV services have been decentralised and integrated at different levels to provide a 'one-stop shop' approach to improve adherence to both treatments and synchronize drug pick-ups for co-infected patients.

As seen in the service cascades for 2011 and 2013 in figure 20 below, the country has made significant progress in responding to the dual epidemic, with over 90% of TB patients testing for HIV. On average, 70% of adults and 48% children are co-infected with HIV. From those, 51% adults and 79% children were also enrolled on ART in 2011 and increased to 75% in 2013, which is a remarkable improvement from only 35% adults and 50% children receiving dual treatment in 2010. TB treatment success rate among co-infected patients has increased from 68% in 2009 to 76% in 2013.

Figure 20: TB/HIV co-infection service cascade, 2011 & 2013, Swaziland



Source: NTBC Annual reports 2011, 2013

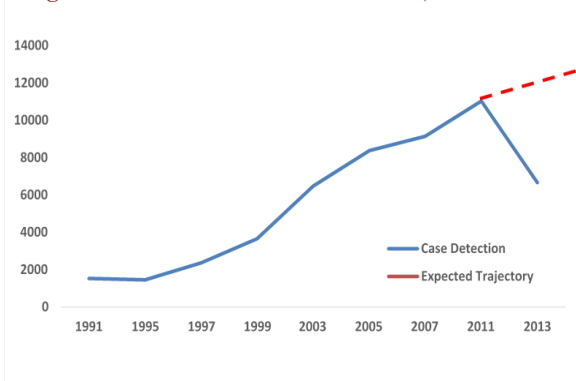
HIV diagnosis among TB patients is very high and regular TB screening among PLHIV which is gaining momentum, has increased ten-fold since 2010 from under 20,000 to 294,000 in 2012. The improved uptake of TB and ART co-treatment has contributed to a reduction in AIDS mortality from 18% to 9% (Zachariah R 2011). However, despite these achievements, TB infection rates among PLHIV remain high, TB case finding, especially among PLHIV is weak and not all co-infected patients receive treatment for both. The occurrence of MDR and XDR TB has also become a major barriers to achieving successful control of TB and avert AIDS deaths.

The implementation of the following game changing innovations will achieve the maximum outcomes in the health outcomes for TB/HIV co-infected patients:

- I. Intensified case finding of TB and HIV
- II. Universal access to co-treatment
- III. Accelerate service integration for universal access to prevention, treatment and case management

I. Intensified case finding for TB and HIV

Figure 21: TB Case Notification trends, Swaziland



Source: Swaziland Epi Assessment Report, 2014

The country is experiencing a decline in TB cases notified from a peak of 11,032 in 2009, to 9,138 and 6,665 in 2011 and 2013 respectively as shown in figure 21. This might be translated as a reduction in incident TB but according to the WHO, local trends in notification over the last 5 years suggest a TB case detection gap of about 50%.¹⁰

Additionally, it is expected that at least 30% of notified cases should be among children in high disease burden countries. However, only 10% of notified TB cases are children. This suggests a service

¹⁰ This is based on that TB trends should conform to HIV prevalence

gap since the programme is missing a lot of undetected cases. Currently, all TB intensified case finding is restricted to health facilities, resulting in missed opportunities for cases that do not present at health facilities. It is recognised that undiagnosed TB is common among HIV-positive individuals yet TB screening in PLHIV is only provided at Pre-ART and ART sites, excluding undiagnosed PLHIV. Moreover, analysis of routine data from HIV care settings reveal uptake of IPT amongst PLHIV as very low at 5%. The slower pace of TB screening and IPT for all PLHIV exacerbates the gap and exposes PLHIV to not only multi drug resistant TB (MDR) and extensively drug resistant TB (XDR) but also premature TB induced AIDS death.

Therefore, intensified case finding should be the primary focus of the co-infection programme. TB screening and HIV diagnosis should be strengthened in health care setting as well as in communities. In healthcare settings, all patients visiting outpatient departments (OPDs), inpatients, and paediatric specific service points should integrate TB screening in routine basic health checks. As well as target the general population, TB case finding should pay particular focus to populations at risk to acquiring either HIV or TB, including health care workers, PLHIV, TB contacts, inmates, and people in congregate settings such as mine workers and factory workers. TB case finding and HIV diagnosis in children should be through contact tracing, by following the index case of parents or family members who are HIV positive or undergoing TB treatment.

HIV diagnosis should continue to be scaled up through provider initiated HIV Testing in health facilities as well as mainstreamed in the innovative community testing approaches discussed in the HIV treatment chapter. Intensified case finding which tends to focus on people living with HIV, should also focus on people who are HIV-negative. Studies find that health seeking behaviour for people with suspected TB is very low and that a significant number of them is HIV-negative, thus more likely smear-positive (and infectious). They also tend to survive longer and therefore spread more TB.

Door-to-door and TB reverse contact tracing should be prioritised in under-served and hard to reach areas, in TB and HIV geographic hot-spots and among TB and HIV most at risk populations. Community health care workers (Rural Health Motivators) who have been capacitated to screen for TB, should be equipped to provide onsite TB screening and HIV diagnosis. The TB labs should be supported to facilitate timely diagnosis of TB cases through decentralisation and strengthening specimen referral and sample transportation. The country should scale up the implementation of new innovative molecular TB diagnostics such as X-pert MTB/RIF as an initial diagnostic test for susceptible and DR-TB presumptive cases. This will improve the diagnosis of TB in patients with advanced immunosuppression.

Intensified case finding will result in the early detection and uptake of dual treatment for TB and HIV treatment or for either disease. This will have a role in preventing the spread of TB within the community and reduced TB induced AIDS deaths.

II. Universal access to HIV treatment

The provision of high quality uninterrupted treatment for TB and HIV is very critical to reduce the burden of TB and enhance health outcomes of infected patients. The universal access to ART for HIV+ positive people will reduce PLHIV's chances of getting TB and improve survival rates of TB/HIV co-infected people, especially since TB is the highest cause for mortality among co-infected patients.

The use of ART among HIV positive individuals has been shown to reduce the risk of acquiring TB by up to 28% (Zachariah R 2011). The TB programme is successful in offering co-treatment to almost all detected patients. However, some patients are lost in the linkage to care service referrals in both TB and HIV programme. Patients are lost from TB screening, HIV diagnosis, and from positive diagnosis to co-treatment. A problem that is common even within single disease. The high rate of multidrug resistance TB strains among previously treated TB cases is evidence of a poor adherence and weak retention in care. Together, this poses a threat to patient outcomes and has cost implications of treating more complicated patients.

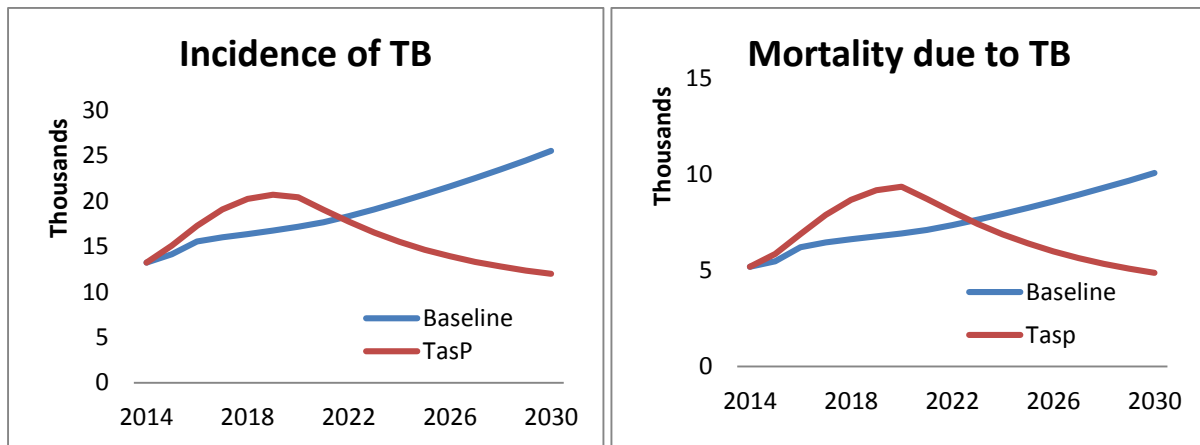
The TB programme, which is able to test almost all patients who are newly diagnosed with TB needs to intensify the scale up ART provision to co-infected TB patients, from current 75% to 90% by 2022. This can be done by investing in a telephonic reminder system and through expert clients who are former TB patients. These have been used in HIV care to improve retention and adherence for patients on lifelong treatment. Expert clients promote retention and adherence through sharing experiences of living with the disease, providing peer support and follow-up new treatment initiates and link newly diagnosed patients to care and support services.

Specific initiatives for the HIV programme include the scale up of TB screening and service expansion to include TB specimen collection for suspected TB cases and offer Isoniazid Preventive Therapy (IPT) to all PLHIV for at least 6 months up to 36 months. HIV should The universal provision of ART to all PLHIV should be intensified as studies find that more favourable health outcomes can be achieved in offering ART. The use of community based models has higher success. The TB care package should therefore leverage on ongoing universal ART pilot projects (MaXART, Option B+, Test and Treat selected populations) to improve access, uptake and retention in co-treatment. The new initiative of providing ART in communities should integrate TB screening, diagnosis and management of those on dual treatment. In an effort to further reduce TB mortality, the roll out of IPT provision should be accelerated to all health care settings.

TB/HIV Impact Results for rolling out universal access to HIV treatment

Shown in figure 22, the accelerated implementation of universal access to ART (TasP) will lead to a 53% reduction in the incidence of TB among PLHIV and avert 117,531 (52.9%) AIDS deaths between 2014 and 2030. Due to high TB/HIV coinfection, providing ART to all PLHIV irrespective of eligibility will improve the TB treatment success rate, currently at 76%, as the majority of TB patients will receive treatment for their primary condition, HIV.

Figure 22: Impact of TasP on new TB infections and TB Mortality in PLHIV



Source: Avenir Health, Modeling Impact of SHIC game changers 2015

Providing universal access to HIV treatment is also cost effective for the TB programme since it significantly reduces future costs for TB treatment as incident TB is reduced. The 53% reduction in new TB cases among PLHIV translates into a 70% financial saving for the TB programme in the long term. Long term savings are expected to be even higher as ART lessens the rate of MDR and XDR TB, which is more costly to manage. It is expected that the risk of recurring TB will reduce by 50%. Favourable outcomes are seen when both TB and HIV are treated concurrently.

III. Accelerate TB and HIV service integration

The high TB/HIV co-infection rates present an urgent need to strengthen the integration of prevention, treatment and support services for TB and HIV. Although significant improvements have been made towards TB/HIV complementarity, service integration remains a challenge as the number of TB initiation sites do not match HIV initiating sites. Out of the 145 health facilities providing HIV treatment, only 107 also provide TB treatment. TB treatment facilities are more centralized and pose an access risk for patients who prefer to initiate at a more peripheral sites. This does not affect treatment initiation only, but also leads to high patient defaulter rates.

TB/HIV treatment services at health facility which are provided through the 'one-stop shop' strategy should be rolled out to more health facilities and decentralized to community level. One stop sites should also cover hard to reach areas and areas with high dual disease burden. However, the roll out should include infection control measures. Healthcare workers should be trained to manage dual disease, including effective administration of IPT as a routine standard of care in all health facilities. Integrated service provision must not be restricted to the two programmes but extend to the maternal and child health (MNCH), sexually transmitted infections (STI) and non-communicable diseases (NCD) programmes.

Community involvement in TB/HIV integration remains low and it is also recommended that all community based TB screening and HIV diagnosis mechanisms should be synchronised. Community systems for coordinated TB case finding and HIV testing must be expanded to include onsite TB diagnosis, which will expedite treatment initiation for co-infected persons. Community healthcare workers who include RHMs, TB and HIV treatment supporters and PHIV support groups should be capacitated to provide basic services for both TB and HIV, including referral. In addition, PLHIV

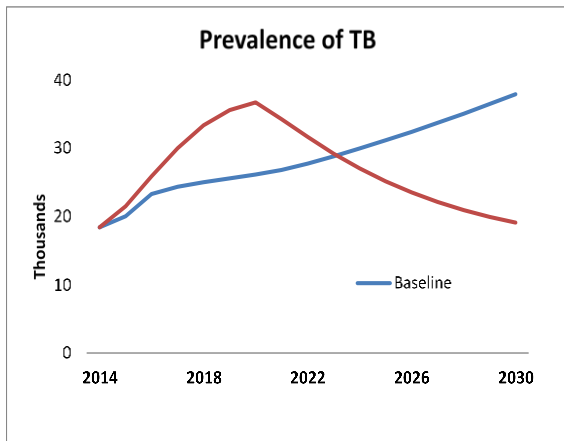
should be provided with comprehensive education to enhance service uptake, adherence and compliance.

Patient’s management systems in TB and HIV must be synchronised. Priority areas include the TB and HIV patient appointments reminder and the defaulter tracing systems which can be integrated to support both HIV and TB patients. One of the main benefits of this will be the reduction in programme costs and will offer convenience for co-infected clients. Another important outcome of this will be enhanced case retention and adherence and retention in treatment, which will result in higher TB and HIV treatment outcomes. Health management tools for TB and HIV surveillance should be also integrated.

Summary

Early detection of TB and HIV, including timely provision of ART and TB treatment will improve TB treatment success rates, reduce early death for co-infected PLHIV. Acceleration and implementation of investment case game changers will reduce will reduce TB incidence among PLHIV by 48%, TB mortality by 48% and increase TB case notification by 50%.

Figure 23: TB Prevalence in co-infected PLHIV



Source: Avenir Health, (2015) modelling the Impacts of SHIC Game changers

The combined impact of implementing all the game changers will lead to a 47% decline in TB prevalence, as shown in figure 23.

The investment is estimated to be \$1,921 by 2030, which is 55% higher than baseline cost. These cost have not factored in cost sharing with the ART programme, which would ordinarily take up the purchase of ARVs which included co-infected patient. The investment will lead to long term savings from averted TB cases, reduced medical (hospitalisation, intensive care) costs for the treatment of opportunistic infections in PLHIV. The return on these investments include significant

reductions in long term disease burden costs, increased productivity and reduction in numbers of orphaned and vulnerable children. Service integration between TB and HIV services will help minimise programme administration costs by cost sharing. Further strengthening of the health system will maximise impacts.

3. The combined impact of all 5 SHIC interventions

Discussions in the previous chapters have shown how each game changer can have a positive effect on new infections and AIDS deaths even when implemented on its own. The highest benefits, however, will be observed when all recommended game changers are implemented simultaneously, a feature that is more reflective of the real life environment.

Table 4 shows that the aggregated combination of all the game changers will avert 65%, 70% and 78% new infections in 2020, 2022 and 2030, respectively. It can be seen that HIV incidence reduction between the baseline period 2014 and 2020 is not as great as in the longer-term in 2030 where impact is higher especially among children (94% infections averted). Investment benefits will continue to be even after 2030. In fact, the indicative results of an incidence reduction of 78% by 2030 are an underestimate of impact since selected behavioural interventions, i.e. empowerment programmes for girls and young women and behavioural change impacts could not be evaluated within the model. In terms of AIDS death, the simultaneous implementation of game changers will avert 11%, 16% and 29% AIDS related deaths in 2020, 2022 and 2030, respectively, a benefit to be enjoyed mostly by children, from whom over 94% AIDS deaths will be averted.

The combined programmes, including the enhanced viral suppression, are very cost-effective in preventing both new infections (\$900 per infection averted) and AIDS deaths (\$4600). Programme costs are anticipated to increase from US\$ 50.7 million in 2014 to US\$ 81.9 million and US\$ 90.7 million in 2020 and 2030, respectively. However, the yearly average cost increases reduce with time, from 12% in first year of implementation of game changers in 2015, to only 1% in 2030. In similar tandem, the cost per new infection and AIDS-deaths averted decreases over time relative to the baseline scenario. As shown in table 4, the year 2020 is a tipping point for our investment after which costs become minimal to programme benefits as demonstrated in the reducing cost per infections or AIDS-deaths averted measured against infections and deaths averted. It is expected that positive economies of scale to providing large-scale treatment services to a larger number of people, drive down treatment cost and reduce also due to reducing infections. In time, the combination of this and natural attrition through deaths of PLHIV will reduce the overall cost of the response in Swaziland.

Table 4: Combined Impact of SHIC game changers in 2020 & 2030

	Baseline (2014)	2015	2020	2022	2030	2014-2030
Total Infections averted		9.9%	64.7%	70.0%	78.1%	
Adult (15+) infections averted		9.6%	62.6%	68.2%	75.7%	
Child (0-14) infections averted		12.4%	78.4%	82.2%	94.2%	
Total AIDS-related deaths averted		-0.6%	11.3%	15.7%	28.6%	
Adult (15+) AIDS-related deaths averted		-1.6%	2.1%	6.2%	19.1%	
Child (0-14) AIDS-related deaths averted		6.1%	74.3%	81.0%	93.8%	
Program Costs under baseline scenario	US\$ 50.7 million	US\$ 56.1 million	US\$ 69.8 million	US\$ 73.4 million	US\$ 88.2 million	US\$ 1,237
Program Costs with game changers		US\$ 56.5 million	US\$ 81.9 million	US\$ 83.0 million	US\$ 90.7 million	US\$ 1,331 million

Percentage increase in programme costs relative to 2014- game changers		11.5%	61%	64%	79%	
Percentage average year-on-year increase in program costs- game changers		11.5%	6.5%	1.2%	1%	
Cost per infections averted		\$1,135	\$1800	\$1,248	\$250	\$898
Cost per HIV-related death averted		\$1,763	\$13,800	\$7,943	\$1,050	\$4,631

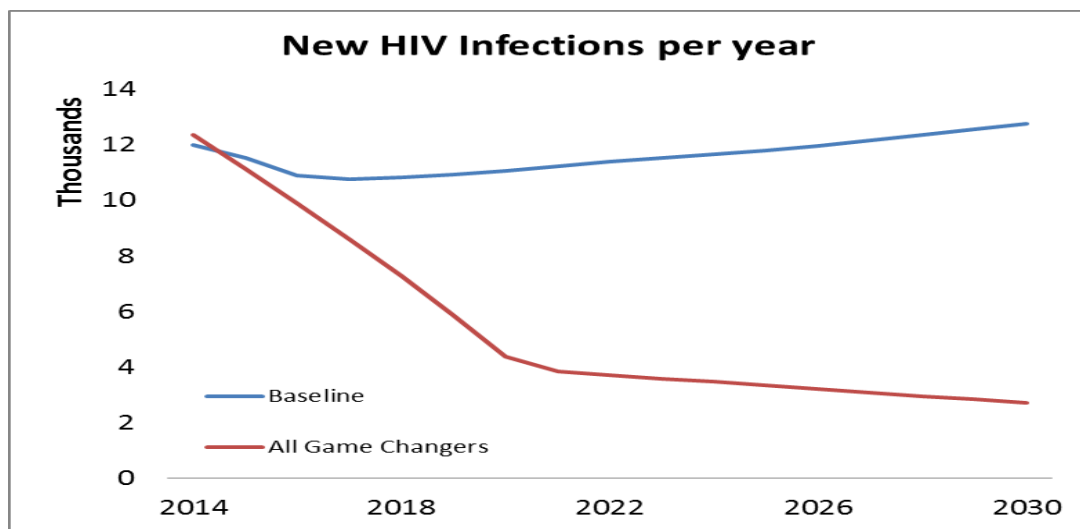
Source: Avenir Health, (2015), modelling the Impacts of SHIC Game changers

1. New infections

By implementing all the game changers recommended in the SHIC, the HIV incidence will be rapidly reduced, reaching a 78% reduction from the baseline in 2030. See Figure 24 below which shows the difference between the new infections by comparing the business as usual approach (the “baseline”) with the projected impact of SHIC implementation.

The most dramatic effects on new infections come from the scaling up of ART. But these results are not as large as it might be expected because ART coverage is already high in Swaziland, so increasing coverage will largely reach those with the highest CD4 counts who are less likely to transmit and less likely to die. However, starting them on ART now, prevents them from progressing to lower CD4 counts with higher transmission and mortality rates. But this effect is long term. The VMMC program for adults also has a significant effect on new infections. The intensification of family planning and safer infant feeding practices offer highest results for reducing infections from mother to child.

Figure 24: Impact of ALL game changers on new HIV infections per year



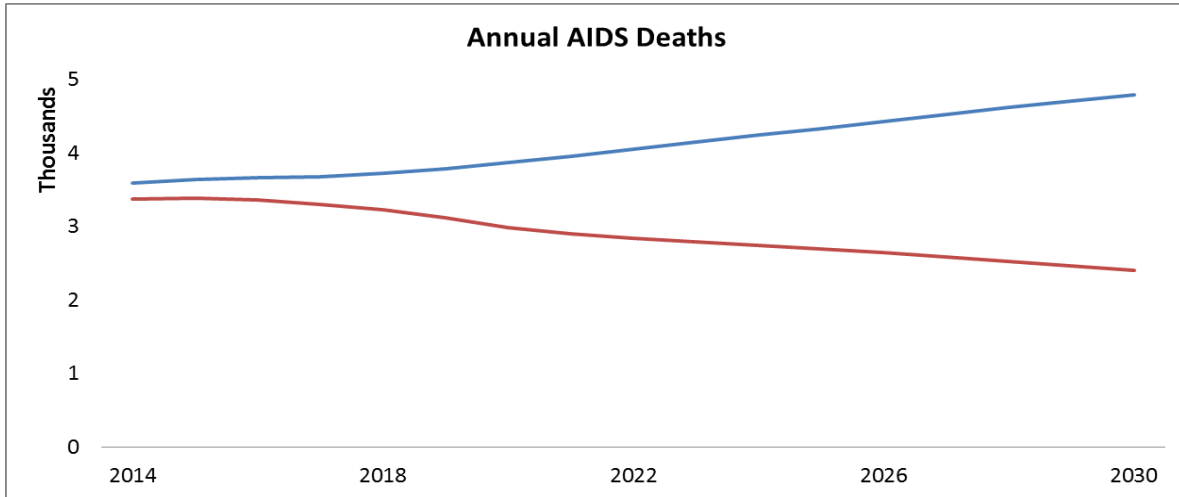
Source: Futures Institute

2. AIDS Deaths

The impact of rolling out universal treatment to all PLHIV, Option B+, male circumcision, women and girls’ empowerment and improved HIV/TB co-infection management will lead to a reduction in AIDS deaths, albeit at a slower pace than in the past. The game changers on AIDS deaths as shown in Figure 25 below, shows that AIDS deaths to decrease modestly in adults. HIV+ Children will have higher

survival as 94% AIDS related deaths will be averted. The impact on adult mortality will be substantially less than child mortality since adults already have high ART coverage, at 90% need: receive, than children at 65%. But generally the lower deaths averted outcomes are also because treatment is provided to persons who are at relatively low risk to AIDS-related mortality.¹¹

Figure 25: SHIC Impact on Annual AIDS Deaths



Source: Avenir Health, (2015) modelling the Impacts of SHIC Game changers

3. Returns on investment

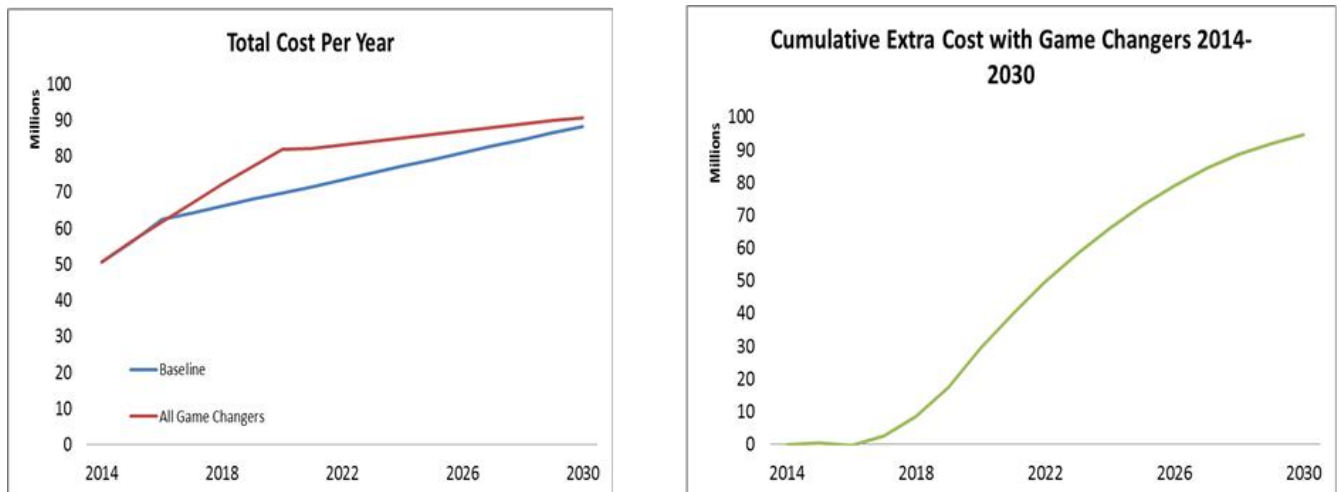
The estimated total cost of the Investment Case is \$1, 902 million over the period 2014-2030 and \$857 million between 2014 and 2022.¹² This is 9% less than the cost of the baseline scenario in 2030 which offers fewer infections and AIDS deaths averted. Although the total cost of implementing all the game changers is \$94 million (7.6%) higher than the 2014 amount, figure 26 demonstrates how the costs start to increase much more slowly after 2020 under the SHIC scenario due to the reductions in HIV incidence. The cost of the baseline scenario will continue to rise beyond 2030, overtaking the cost under the SHIC scenario.

The VMMC program is the most cost-effective at just \$30-\$250 per infection averted. The neonatal circumcision program will make VMMC more viable since it offers market saturation in future demand for MC at current prices.

¹¹¹¹ Low risk to AIDS mortality is assumed for those PLHIV with high average CD4 counts. Where ART is not primarily provided for own health.

¹² Please note that all cost figures are not discounted but represent nominal money, which does not have inflation adjustment.

Figure 26: Total Cost of Baseline and game changers, 2014-2030



Source: Avenir Health, (2015) modelling the Impacts of SHIC Game changers

The strengthening of family planning for HIV+ women for the PMTCT programme is also cost effective since fewer births among PLHIV imply lesser treatment costs for HIV+ children.

In addition, five efficiency-enhancing strategies should be implemented to strengthen the impact and cost effectiveness of fast track game changers. These are;

1. Service integration - to improve service delivery modalities, geographical targeting and reduce cost per service delivery.
2. Health System Strengthening- for ensuring the readiness and availability of health systems and to improve the quality of service.
3. Demand generation- because some game changers imply providing services to other populations who otherwise do not need the service at the time, i.e. universal ART, Early infant male circumcision, strategies to create demand need to be enhanced.
4. Assessing and recommending strategies for household costs of HIV.
5. Improved and vigorous HIV surveillance- continuous assessment of the cascades, inclusion of lower level service indicators and conducting outcomes monitoring and evaluations.

Bridging the gap – a review of innovative financing mechanisms

Despite the exceptionally high commitment of the government of Swaziland to address its HIV epidemic, and the efficiency measures outlined in this investment case, and in the light of the fluctuating national economy, the World Bank's fiscal space analysis concluded that Swaziland cannot sustain the HIV response without external support (World Bank 2012). Over the next twenty years resources needed are over three times the GDP of the country.

The country has in place a national steering committee on social security that is reviewing the feasibility of HIV cost recovery through introducing a national health insurance, which could potentially reduce the resource gap and enhance the sustainability of the HIV response.

The private sector is an under-tapped area that could provide funding, and cost saving efficiencies for the HIV response as part of their corporate social responsibility in Swaziland. However, this option

needs further analysis to better assess the feasibility for bringing in additional resources and enabling cost sharing opportunities.

Other innovative income streams are being researched and trialled in other countries, include airline/visa/fuel levies, sin taxes on alcohol or tobacco, lotteries, etc. However, most are not suitable as Swaziland's economy is in transition, but the country should regularly assess feasibility when the economy strengthens.

4. Conclusions

When it comes to the HIV response, Swaziland is exceptional in many ways; there is high Political Will to end AIDS, high level of commitment to investment thinking and the country is not afraid of bold action and bold commitments to get bold results. The Swaziland Government funds approximately 40% of the HIV response in the country, meaning that Swaziland is less reliant on donor funding than many other countries in the region. Additionally, strategies and interventions are underway to strengthen the efficiency, effectiveness and sustainability of the HIV response.

Swaziland has already demonstrated that it can transform the HIV response into becoming smarter, more effective, more efficient, and cost effective. The eNSF provides this and a route map to attain maximum results while ensuring cost effectiveness and efficiency. The Swaziland HIV Investment Case, builds on the eNSF by demonstrating how smart, substantial investment is required in 5 eNSF Strategic Interventions in the medium term in order to realise long-term gains and returns on investment. The results of whom present a real case for the possibility of an AIDS-free Swaziland. The indicative results of an incidence reduction of 78% by 2030 are an underestimate of the impact since the selected game changers will not be implemented in isolation, but will be complemented by other eNSF programmes that are not studied in this paper.

The Swaziland HIV Investment Case shows clearly that Swaziland is well positioned to attain an AIDS-free generation. All that is required is some additional external resources to bridge the funding gap. Investing in Swaziland's evidence-based HIV response provides an opportunity for partners to become part of the winning team that accomplishes an AIDS free generation - a major accomplishment in the world's most severe HIV epidemic.

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