REPUBLIC OF SOUTH AFRICA

MILLENNIUM DEVELOPMENT GOALS

Combat HIV/AIDS, malaria and other diseases

2015

The South Africa I know, the home I understand

Millennium Development Goals 6: Combat HIV/AIDS, malaria and other diseases 2015 / Statistics South Africa

Published by Statistics South Africa, Private Bag X44, Pretoria 0001

Stats SA Library Cataloguing-in-Publication (CIP) Data

Millennium Development Goals 6: Combat HIV/AIDS, malaria and other diseases / Statistics South Africa, Pretoria: Statistics South Africa, 2015

45pp

ISBN: 978-0-621-43867-3

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ACRONYMS

AIDS	Acquired Immune Deficiency Syndrome
ART	Antiretroviral Therapy
AZT	Zidovudine
CFR	Case Fatality Rate
CD4	Cluster of Differentiation 4
DOTS	Directly Observed Therapy Short-course
DR	Drug Resistant
DHIS	District Health Information System
DoH	Department of Health
DTDs	Demonstration and Training Districts
HAST	HIV/AIDS, Sexually Transmitted Infections and Tuberculosis
HDACC	Health Data Advisory and Co-ordination Committee
HIV	Human Immunodeficiency Virus
HSRC	Human Sciences Research Council
IPT	Isoniazid Preventive Therapy
MDGs	Millennium Development Goals
MDR-TB	Multi-Drug Resistant Tuberculosis
MRC	Medical Research Council
MSM	Men who have Sex with Men
MTCT	Mother-to-Child Transmission
MTDP	Medium Term Development Plan
NDoH	National Department of Health
NHI	National Health Insurance
NIMART	Nurse-Initiated Management of Anti-Retroviral Treatment
NSP	National Strategic Plan for HIV/AIDS, STIs and Tuberculosis
NTP	National Tuberculosis Programme
PMTCT	Prevention of Mother-to-Child Transmission (of HIV/AIDS)
PLHIV	People Living with HIV
PWID	People Who Inject Drugs
SABSSM	South African HIV/AIDS, Behavioural Risks, Sero-status, and Mass Media Impact Survey
SACEMA	South African Centre for Epidemiological Modelling and Analysis
SADC	Southern African Development Community
SANAC	South African National AIDS Council
SANHANES	South African National Health and Nutrition Examination Survey
SAPMCTE	South African Prevention of Mother-to-Child Transmission Evaluation
Stats SA	Statistics South Africa
SW	Sex Worker
TB	Tuberculosis
TST	Tuberculin Skin Test
UNAIDS	Joint United Nations AIDS Programme
WHO	World Health Organisation
XDR-TB	Extreme Drug Resistant Tuberculosis

EXECUTIVE SUMMARY

Target 6a: **To halt by 2015 and begin to reverse the spread of HIV and AIDS**

Although South Africa had more people living with HIV (PLHIV) (estimated at 6.4 million in 2012) than any other country by 2015, the country has made substantial progress in halting and beginning to reverse the spread of HIV/AIDS. By 2012, HIV prevalence had increased to 12.2% among the general population and to 18.8% among people aged 15–49 years. This increase is not a failure of the national HIV/AIDS response, but the success of the ART programme, which reduced the mortality from HIV/AIDS and allows PLHIV to live a lot longer.

Considerable progress has been made in reducing new infections among children aged 0–14 years, with a 79% decline from an estimated 78 000 infections in 2004 to 16 000 in 2013. Among children aged 0–4 years, HIV prevalence declined from 3.7% in 2008 to 1.7% in 2012, while among children aged 2–14 years, the decline was from 5.6% in 2002 to 2.4% in 2012. This is attributable to the accelerated prevention of mother-to-child transmission (PMTCT) programme for the elimination of MTCT (eMTCT).

In the age group 15–24 years, a prevalence of 7.1% was measured in 2012, indicating a decline of 18% since 2008. Although antenatal HIV prevalence has stabilised around 29.5% from 2007 to 2012, HIV prevalence among pregnant women aged 15–24 years was 19.3%, which is lower than the MDG 2015 target of 22.8%.

The incidence rate of HIV infections among adults (15–49 years), decreased considerably from 2.4% in 2001 to 1.4% in 2011, and a further decrease was recorded from 1.8% in 2008 to 1.5% in 2012. HIV incidence was highest among young women between the ages 15–24 at 2.8%; and a 2012 survey estimated that one-quarter of all new HIV infections occurred among young women between the ages 15–24 years.

There is conflicting evidence about condom use in South Africa. The third National HIV Communication Survey reports that one of the most remarkable changes in HIV prevention behaviour in South Africa over the last 20 years has been the dramatic increase in condom use at first sex. From 1992 to 2012, condom use at first sex increased from 18% to 66% – a 48 percentage points increase during this 20-year period. However, the HSRC (2012) data show that condom use at last sex declined among people aged 15–24 years by approximately 17.7 percentage points from 2008 to 2012. It also declined by approximately 8 percentage points among people aged 25–49 years.

The 2012 National HIV Communication Survey (NCS) found that there has been a large increase in the number of South Africans ever tested for HIV, with 2.6 million more people reporting to have been tested than three years before. It was found that 10.7 million people were tested for HIV in the past 12 months, representing 64.3% of South Africans who were eligible for testing. This ratio was higher than the 2015 target of 49.1%.

There is also conflicting evidence about comprehensive correct knowledge of HIV/AIDS. While the third National HIV Communication Survey in South Africa suggests that knowledge of HIV prevention methods was as high as 87% in 2008, the HSRC (2012) data showed a considerable decline; that only 24.2% of young women and men aged 15–24 years could correctly identify ways of preventing the sexual transmission of HIV, and were able to reject major misconceptions about HIV transmission (Shisana et al., 2014).

***Target 6b*: To achieve by 2010 universal access to treatment for HIV and AIDS for all those who need it**

By 2010, South Africa had made significant progress in achieving universal access to treatment for HIV/AIDS for all those who need it. The proportion of eligible adults and children receiving antiretroviral therapy (ART) leapt from 58.3% in 2010 to 75.2% in 2011, and ART coverage for HIV-positive pregnant women also leapt from 87.3% to 99%. In 2013, 2.3 million South Africans were on antiretroviral treatment, making it the largest programme in the world. At this rate of progress, South Africa is on course to achieve the National Strategic Plan for HIV/AIDS, STIs and Tuberculosis (NSP) 2016 target of initiating at least 80% of eligible patients on ART. Despite this achievement, with an accelerated uptake of 65.5% (2012) and a substantial reduction of 48% in AIDS-related mortality (2013), the 2010 MDG target of 100% was not achieved.

***Target 6c*: To halt by 2015 and begin to reverse the incidence of malaria and TB**

South Africa has progressed to halt and begin to reverse the incidence of malaria. The total number of reported malaria cases decreased markedly, and malaria-related mortality decreased by 80% from 2000 to 2013. South Africa is now one of the few countries in Africa that are ready for malaria elimination. However, this will rely heavily on cross-border collaboration with neighbouring countries where malaria remains highly endemic.

TB prevalence increased by 75% between 1990 and 2010 in South Africa. Although the country had a huge TB burden with the incidence of 860/100 000 population in 2013, there was a 10% decline in the TB burden from 2011.

While the TB treatment success rate has increased from 70% in 2005 to almost 80% in 2011, and then decreased slightly to 76.1% in 2012, this was still below the global target of 85%. However, the defaulter rate has decreased from 10% to 7.6% during the same period. The TB epidemic in South Africa is compounded by high levels of multidrug-resistant tuberculosis (MDR-TB), with an estimated 5 000 confirmed MDR-TB cases among new pulmonary TB cases in 2011. The number of MDR-TB and XDR-TB cases in South Africa has increased substantially, with 15 419 and 1 596 cases, respectively, diagnosed in 2012. The treatment success rate for adult MDR-TB and XDR-TB remained low at 45% and 14%, respectively, in 2010.

Although TB remains the number one leading cause of death among South Africans (8.8% of all deaths), the death rate associated with TB decreased from 97 to 76 deaths per 100 000 population from 2000 to 2013.

Just over half (56.7%) of TB patients are co-infected with HIV in South Africa. The percentage of HIV-TB co-infected patients who have been placed on ART has increased from the baseline of 26.4% in 2009 to 65.5% in 2013, but is short of the target of 85%.

Status at a glance

The status at a glance (in the table below) shows that South Africa reported on 12 MDG and domesticated indicators, achieving six and not achieving four by 2015. Of the eight (8) MDG indicators that South Africa reported on, four (50%) were achieved and four (50%) were not achieved. The four MDG indicators that have been achieved are HIV prevalence among population aged 15–24 years, ratio of school attendance of orphans to school attendance of non-orphans aged 10–14 years, incidence and death rates associated with malaria, and death rates associated with tuberculosis.

The four MDG indicators that were not achieved are condom use at last high-risk sex, proportion of the population aged 15–24 years with comprehensive correct knowledge of HIV/AIDS, proportion of the population with advanced HIV infection with access to antiretroviral drugs, and proportion of tuberculosis cases detected and cured under directly observed treatment short-course (DOTS).

Of the four domesticated indicators reported on, two (50%) were achieved ahead of their 2016 MDG target date – HIV prevalence among pregnant women aged 15–24 years, and percentage of people that received an HIV test in the past 12 months and know their status, while two (50%) domesticated indicators that are due for review after 2016 are HIV prevalence in men and women aged 15–49 years, and percentage of TB-HIV co-infected patients who have been placed on ART.

STATUS AT A GLANCE

Table 1: Summary of Goal 6 indicators, current status and target achievability

GOAL 6: COMBAT HIV/AIDS, MALARIA AND OTHER DISEASES (TUBERCULOSIS)						
Indicators		**1994 baseline (or closest year)**	**Current status 2015 (or nearest year)**	**2015 target**	**Target achievability**	**Indicator type**
6.1	HIV prevalence among population aged 15–24 years	9.3% *(2002)*	7.1% *(2012/3)*	8.7%	**Achieved**	**MDG**
	HIV prevalence among pregnant women aged 15–24 years	22.8% *(2002)*	21.7% *(2012)*	22.8%	**Achieved**	**Domesticated**
	HIV prevalence in men and women aged 15–49	15.6% *(2002)*	18.8% *(2012)*	15.6%	**Due in NSP 2016**	**Domesticated**
	Percentage of people that received an HIV test in the past 12 months and know their status	11.9% *(2005)*	66.2% (605.391) *(2012/4)*	49.1%	**Achieved**	**Domesticated**
6.2	Condom use at last high-risk sex	27.3% *(2002)*	58.4% *(2012/3)*	75.9%	**Not achieved**	**MDG**
6.3	Proportion of population aged 15–24 years with comprehensive correct knowledge of HIV/AIDS	56% *(2002)*	24.2% (2012)	80%	**Post-2015 Agenda**	**MDG**
6.4	Ratio of school attendance of orphans to non-orphans aged 10–14 years	1:1 *(2002)*	1:1 *(2012)*	1:1	**Achieved**	**MDG**
6.5	Proportion of population with advanced HIV infection with access to antiretroviral drugs	13.9% *(2005)*	65.5% (2012)	≈100	**Post-2015 Agenda**	**MDG**
6.6	Incidence of malaria	64 600 *(2000)*	8 851 *(2013)*	< 64 600	**Achieved**	**MDG**
	Death rates associated with malaria	*2.0*/100 000 (2002)	*0.6*/100 000 (2013)	< 2.0/100 000		
6.9	Incidence of TB	253/100 000 *(2004)*	860/100 000 (2013)	< 253/100 000	**Post-2015 Agenda**	**MDG**
	• Prevalence of TB	134 000 *(2004)*	530 000 (2012)	< 134 000		
	• Death rates associated with TB per 100 000 population	147/100 000 *(2002)*	76/100 000 (2013)	< 147/100 000	**Achieved**	
6.10	Proportion of TB cases detected and cured under DOTS	65.5% (2004)	90% (2012/3)	≈100	**Not achieved**	**MDG**
	% TB-HIV co-infected patients who have been placed on ART	26.4% (2009)	65.5% (2013)	85%	**Due in NSP 2016**	**Domesticated**

1. INTRODUCTION

At the end of 2013, 35 million people were living with HIV. That same year, some 2.1 million people became newly infected. Close to 12 million people in low- and middle-income countries were receiving antiretroviral therapy at the end of 2013. More than two-thirds of new HIV infections are in sub-Saharan Africa (WHO, 2014).

Around the world, 3.2 billion people are at risk of contracting malaria. In 2013, an estimated 198 million cases occurred, and the disease killed approximately 584 000 people – most of them children under five in Africa. On average, malaria kills a child every minute. In a 2007 resolution, the World Health Assembly called for a 75% reduction in the global malaria burden by 2015 (WHO, 2014).

There were an estimated 9 million new cases of TB in 2013 (including 1.1 million cases among people with HIV) and an estimated 1.5 million deaths (including 360 000 people with HIV), making this disease one of the world's biggest infectious killers. The world is on track to reach the MDG target of reversing TB incidence by 2015. However, incidence is falling very slowly (WHO, 2014).

Globally, and especially in South Africa, HIV/AIDS and tuberculosis are major public health threats that cause substantial morbidity, mortality, negative socio-economic impact, and human suffering (Vitoria et al., 2009).

The Millennium Development Goal (MDG) 6 of combating the spread of HIV and AIDS, malaria and other diseases (including TB) has three targets and ten indicators.

Target 6a: To halt by 2015 and begin to reverse the spread of HIV and AIDS. The indicators for monitoring progress in this target are HIV prevalence among the population aged 15–24 years, condom use at last high-risk sex, proportion of the population aged 15–24 years with correct knowledge of HIV and AIDS and the ratio of school attendance of orphans to school attendance of non-orphans aged 10–14 years.

Target 6b: To achieve by 2010 universal access to treatment for HIV and AIDS for all those who need it. The indicator for monitoring progress in this regard is the proportion of the population with advanced HIV infection with access to antiretroviral drugs.

Target 6c: To halt by 2015 and begin to reverse the incidence of malaria and other major diseases. The three indicators that we are reporting on are incidence and death rates associated with malaria, incidence, prevalence and death rates associated with tuberculosis, and the proportion of tuberculosis cases detected and cured under directly observed treatment short-course (DOTS). Due to lack of data, South Africa is not reporting on two malaria indicators – number of cases of children under 5 years of age with fever who are treated with appropriate anti-malarial drugs (6.7) and number of households sprayed with insecticide (6.8).

Although this report is about progress towards achieving the MDG goals, it must be borne in mind that, as part of its response to HIV/AIDS and TB, South Africa had committed itself to five of the 2016 targets of the National Strategic Plan (NSP) for HIV, STIs, and TB 2012–2016 and three of the 2015 targets of the United Nations General Assembly Political Declaration on HIV and AIDS.

The five 2016 targets of the NSP are:

1. Reduce new HIV infections by at least 50%, using combination prevention approaches;
2. Initiate at least 80% of eligible patients on antiretroviral treatment (ART), with 70% alive and on treatment five years after initiation;
3. Reduce the number of new TB infections, as well as the number of TB deaths by 50%. This translates to a TB mortality reduction to 25/100 000 by 2016;
4. Ensure an enabling and accessible legal framework that protects and promotes human rights in order to support implementation of the NSP; and
5. Reduce the self-reported stigma and discrimination related to HIV and TB by 50% by 2016 (SANAC, 2012).

The three 2015 targets of the 2011 United Nations General Assembly Political Declaration on HIV and AIDS that South Africa committed itself to are:

1. Reduce sexual transmission of HIV by 50%, by 2015;
2. Reduce transmission of HIV among PWID by 50%, by 2015; and
3. Eliminate new HIV infections among children by 2015 (RSA, 2014).

The overall aim of this report was to examine progress and trends in achieving MDG Goal 6 – combating the spread of HIV and AIDS, TB, malaria and other diseases in South Africa.
Specifically the report:

- examined South Africa's progress in meeting the Millennium Development Goal targets in combating the spread of HIV/AIDS, TB and malaria;
- reviewed key challenges to the achievement of MDGs in South Africa with particular reference to combating the spread of HIV and AIDS, TB and malaria; and
- identified possible strategies to fast-track the achievement of the MDGs with particular reference to combating the spread of HIV/AIDS, malaria and TB.

2. DATA SOURCES AND LIMITATIONS

Data sources for this review included the latest and most reputable reports and publications on HIV/AIDS, TB and malaria in South Africa, and included the latest data from the Department of Health on the three diseases. The Human Sciences Research Council (HSRC) to date has carried out four population-based HIV prevalence surveys in South Africa – in 2002, 2005, 2008 and 2012.

Table 2: Summary of MDG 6 targets, indicators and South African data sources

UN MDG indicators (generic)	Data sources
Target 6a: Halt and begin to reverse the spread of HIV/AIDS 6.1 HIV prevalence among population aged 15–24 years 6.2 Condom use at last high-risk sex 6.3 Proportion of population aged 15–24 years with comprehensive correct knowledge of HIV/AIDS 6.4 Ratio of school attendance of orphans to school attendance of non-orphans aged 10–14 years Percentage of people that received an HIV test in the past 12 months and know their status (Domestic target)	***Official Reports***: MDG 2010, 2013 Stats SA: Mid-year population estimates, 2014 ***Surveys/data source***: South African National HIV Prevalence, Incidence and Behaviour Survey (2002, 2005, 2008, 2012) National HIV Communication Surveys in South Africa District Health Information System (DHIS), 2014 South African National Health and Nutrition Examination Survey (SANHANES), 2012 South African National AIDS Council (SANAC), 2014
Target 6b: Achieve, by 2010, universal access to treatment for HIV/AIDS for all those who need it 6.5 Proportion of population with advanced HIV infection with access to antiretroviral drugs	***Official Reports***: MDG 2010, 2013 ***Surveys/data source***: South African National HIV Prevalence, Incidence and Behaviour Survey, 2012 District Health Information System (DHIS) National Department of Health
Target 6c: Halt and begin to reverse the incidence of malaria and other major diseases 6.6 Incidence and death rates associated with malaria 6.9 Incidence, prevalence and death rates associated with tuberculosis 6.10 Proportion of tuberculosis cases detected and cured under DOTS % TB-HIV co-infected patients who have been placed on ART (Domestic target)	***Official Reports***: MDG 2010, 2013 ***Surveys/data source:*** World Malaria Report, 2014 Electronic TB Register Malaria Database DHIS, 2014

Data presented in this section of the report are based on HSRC surveys, the annual HIV sero-prevalence antenatal surveys of the Department of Health (DOH) that have been conducted since 1990 and data from the District Health Information System (DHIS), National HIV Communication Surveys conducted in South Africa, SANAC mid-term and other reports, Stats SA's mid-year population estimates, HIV/AIDS reports from SACEMA, the University of Cape Town, UNAIDS and the latest reports submitted to or received from the World Health Organisation, the World Malaria Report and the World TB reports.

Although South Africa is still to conduct a nation-wide TB prevalence survey, notification data, as captured in the Department of Health's TB hard-copy and electronic registers, provide useful proxies to estimate the burden of TB in the country.

Table 2 provides a summary of MDG 6 targets, indicators and South African data sources that were used for this report.

3. MDG 6 TARGETS AND PROGRESS

Target 6a: Halt and begin to reverse the spread of HIV and AIDS

3.1 HIV INCIDENCE AND PREVALENCE AMONG THE GENERAL POPULATION

3.1.1 HIV prevalence

HIV prevalence reflects the number of people that are HIV positive in the population out of the total population at a given point in time. National population-based surveys that include HIV testing are considered to be the best approach for measuring HIV prevalence at a country level (SANAC, 2014).

HIV prevalence by age

The fourth South African National HIV Prevalence, Incidence and Behaviour Survey estimated that the proportion of South Africans infected with HIV has increased from 10.6% in 2008 to 12.2% in 2012 (Shisana et al., 2012). This estimate is significantly higher than the 2008 national estimate of 10.6% (9.8-11.6: 95% CI). The total number of infected South Africans during this year was 6.4 million; 1.2 million more than in 2008. This increase is not a failure of the programme, but the success of the ART programme, which reduced the mortality from HIV/AIDS and allows PLHIV to live a lot longer.

Table 3 shows trends in HIV prevalence by age from 2002 to 2012. Among children aged 2–14 years, HIV prevalence declined from 5.6% in 2002 to 2.4% in 2012. These declines reflect the success of the scale-up of South Africa's prevention of mother-to-child transmission (PMTCT) programme.

MDG Indicator 6.1: HIV prevalence among the population aged 15–24 years

Trends in HIV prevalence among persons aged 15–24 years are a good proxy indicator of the course of new infections in the population. The evidence from population-based HIV prevalence surveys in South Africa (Table 3) appears to suggest that the spread of HIV among persons aged 15–24 years, overall has declined from 10.3% in 2005 to 7.1% in 2012, dipping below the MDG 2015 target of 8.7%.

Domestcated: HIV prevalence among men and women aged 15–49

Among the reproductive age population (15–49), increases in HIV prevalence from 15.6% in 2002 to 18.8% in 2012 have been observed (Table 3). According to modelling, (UNAIDS Spectrum 2013), the estimated HIV prevalence among persons aged 15–49 years in South Africa in 2012 was 17.9% (17.3%–18.4%), which is slightly lower than the 18.8% found in the HSRC survey (RSA, 2014). Both statistics are above the 2015 target of 15.6%. The increase in HIV prevalence is presumably as a result of the effects of increased ART access and coverage and increased lifespan among the HIV-infected. These could be the effects of the largest ART programme in the world.

Table 3: Trends in HIV prevalence by age, 2002–2012

Age group	2002	2005	2008	2012
2–14	5.6	3.3	2.5	2.4
15–24	9.3	10.3	8.7	7.1
25+	15.5	15.6	16.8	19.9
15–49	15.6	16.2	16.9	18.8
2+	11.4	10.8	10.9	12.6

MDG 2015 Target = 8.7%

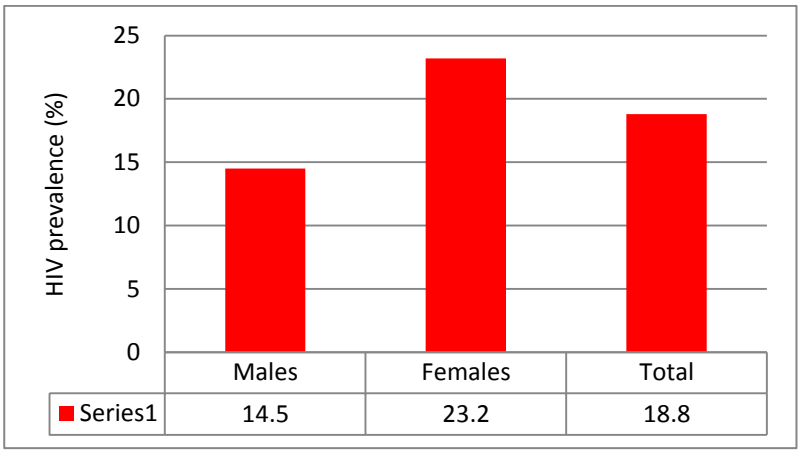
2015 Target = 15.6%

Source: South African National HIV Prevalence, Incidence and Behaviour Survey (Shisana et al., 2014)

HIV prevalence by sex

Figure 1 shows substantial difference in HIV prevalence by sex among adults aged 15–49 years in South Africa in 2012. The total HIV prevalence among people aged 15–49 years was 18.8% in 2012, with 23.2% among females and 14.5% among males. HIV prevalence was highest (36%) among females aged 30–34 in 2012 and among 25–29-year-olds (at 32.7%) in 2008. These differences illustrate the higher biological and social vulnerability to HIV among females in comparison to males.

Figure 1: HIV prevalence by sex (15–49 years), South Africa, 2012



Source: South African National HIV Prevalence, Incidence and Behaviour Survey (2014)

The main risk factors for HIV acquisition in South Africa include early sexual debut, multiple sexual partnerships, perception of risk to HIV and low levels of accurate knowledge about HIV/AIDS. One-tenth (10.7%) of respondents aged 15–24 reported having had sex for the first time before their 15th birthday. Most respondents aged 15 and older (76.5%) believed they were at a low risk of getting infected with HIV. Yet about one in ten who believed they were at low risk for acquiring HIV infection were already infected with HIV but didn't know it. Knowledge of how HIV is transmitted and prevented declined from 30.3% in 2008 to 26.8% in 2012 (Shisana et al., 2014).

HIV prevalence among pregnant women

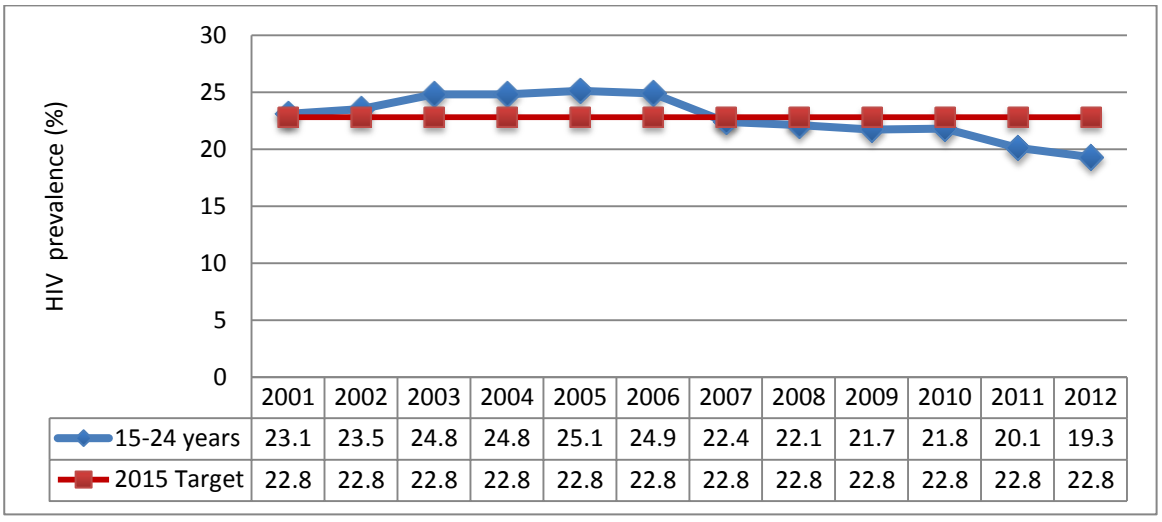
The 2012 national antenatal HIV prevalence survey findings show stable prevalence levels among pregnant women (15–49 years) at 29.5% in 2011 and 2012, and this relatively flat pattern has been observed since 2004.

Domesticated: HIV prevalence among pregnant women aged 15–24 years

This survey shows stable or declining prevalence among 15–24-year-old pregnant women, which is proxy for incidence amongst high-risk groups. This is at odds with the HSRC incidence increase in 2012, and should be noted. In 2012, HIV prevalence among 15–24-year-old pregnant women was 19.3%. HIV prevalence among pregnant women in this age group has declined from 21.8 % in 2010 to 20.1% in 2011 and to 19.3% in 2012 – a 2.5 percentage points decline from 2010 to 2012 (Figure 2). HIV prevalence was highest among pregnant women in KwaZulu-Natal at 33.5% in 2001 and 37.4% in 2011, but was the lowest in the Western Cape with 8.6% in 2001 and 18.2% in 2011.

The population prevalence has increased significantly, indicating that one-size-fits-all interventions do not work as compared to high-risk populations where the prevalence has been constant for 10 years. The latter may be due to the special attention provided to pregnant women at antenatal care services with HCT and PMTCT programmes.

Figure 2: HIV prevalence trends among 15–24-year-old pregnant women, South Africa, 2001–2012

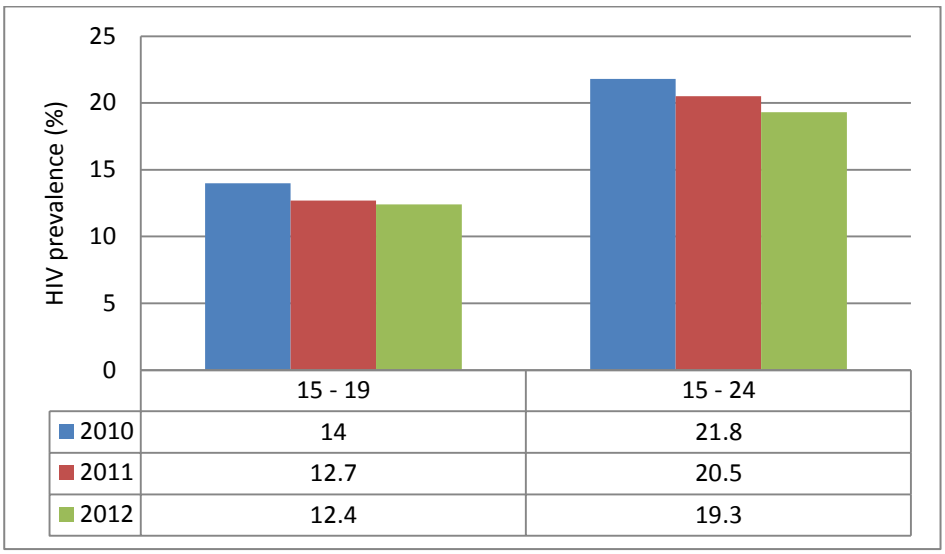


	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
15-24 years	23.1	23.5	24.8	24.8	25.1	24.9	22.4	22.1	21.7	21.8	20.1	19.3
2015 Target	22.8	22.8	22.8	22.8	22.8	22.8	22.8	22.8	22.8	22.8	22.8	22.8

Source: Department of Health (2013)

The UNAIDS (2014) report shows that HIV prevalence among pregnant women aged 15–24 years declined between 2010 and 2012 and was 19.3% in 2012, below the 2015 target of 22.8% (Figure 3).

Figure 3: HIV prevalence among pregnant women aged 15–24 years, South Africa, 2010–2012



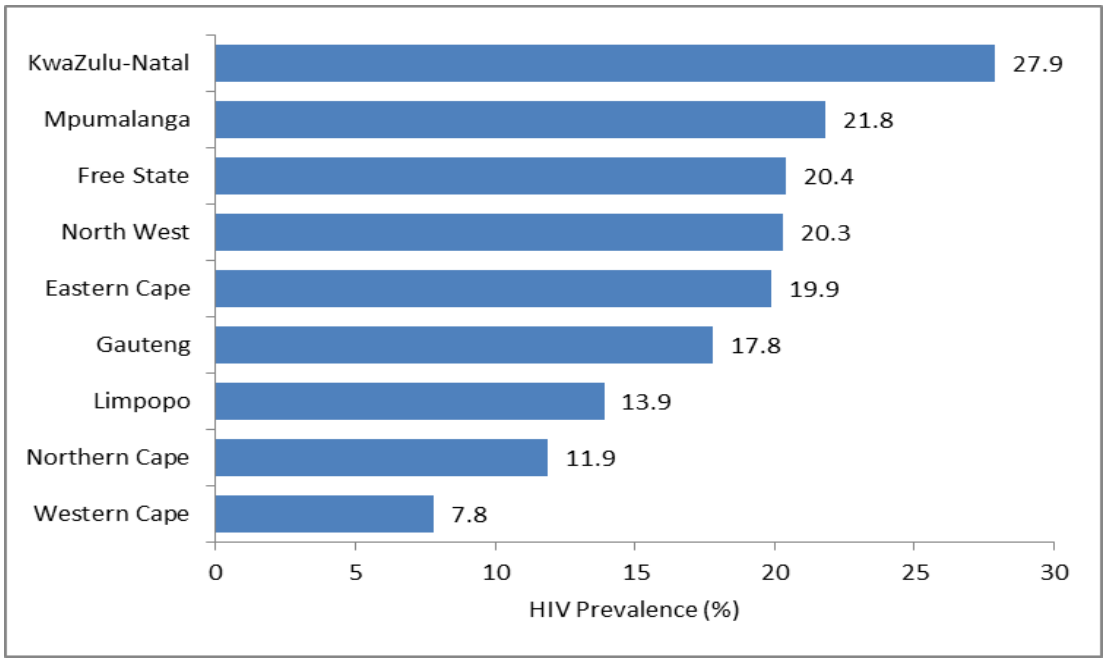
	15 - 19	15 - 24
2010	14	21.8
2011	12.7	20.5
2012	12.4	19.3

Source: UNAIDS (2014)

HIV prevalence by province

Figure 4 shows HIV prevalence by province among people aged 15–49 years in South Africa in 2012. Provincially, KwaZulu-Natal had the highest HIV prevalence (27.9%) and Western Cape the lowest (7.8%), with Eastern Cape at 19.9%.

Figure 4: HIV prevalence by province (15–49 years), South Africa, 2012



Source: South African National HIV Prevalence, Incidence and Behaviour Survey (2014)

HIV prevalence in key populations

South Africa's National Strategic Plan 2012–2016 identifies a number of key affected populations that are at risk of HIV transmission. These include men who have sex with men (MSM), sex workers (SW) and their clients, people who inject drugs (PWID), transgender people, prisoners and migrants.

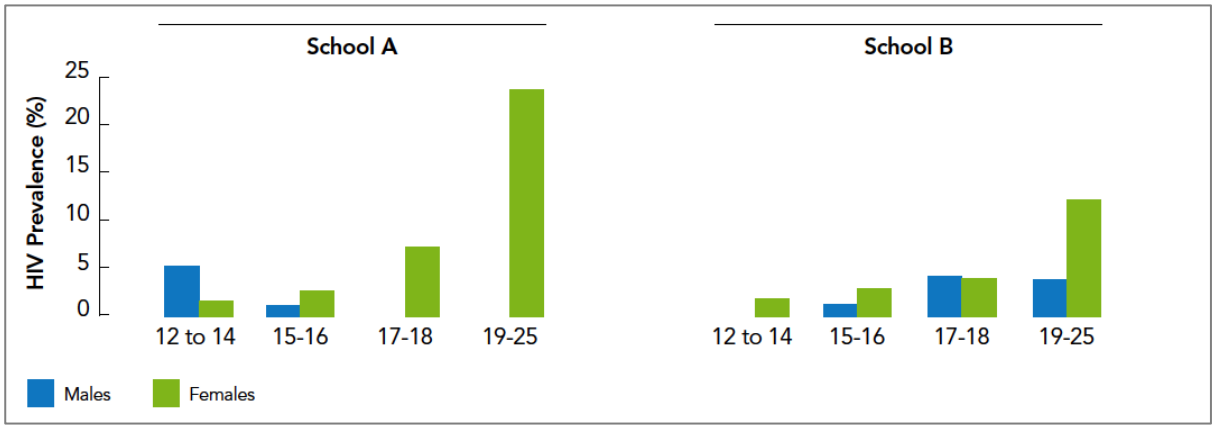
Eight studies of South African MSM conducted between 2005 and 2010 revealed that HIV prevalence ranged from 10.4 to 43.6%. HIV prevalence among MSM in South Africa is an estimated 9.2% of all new HIV infections in the country related to this group. HIV prevalence among MSM varies geographically. For example, one study reported an HIV prevalence of 43.6% among MSM in Johannesburg and Durban (Rispel and Metcalf, 2009). By contrast, 10% of self-identified MSM from urban areas in Western Cape are reportedly living with HIV (Burrell et al., 2009).

HIV prevalence among sex workers varies between 34 and 69 per cent, depending on the geographical area (Parry et al., 2009; Van Loggerenberg et al., 2008; Dunkle et al., 2005). The South African Centre for Epidemiological Modelling and Analysis (SACEMA, 2010) estimated 19.8% of all new HIV infections in 2010 were related to sex work.

Although the epidemic in South Africa is generalised, there are specific groups that have HIV prevalence above the national average, which are classified by the South African National HIV Prevalence, Incidence and Behaviour Survey (Shisana et al, 2014) as the most at risk population with higher risk of HIV exposure. These include black African females aged 20–34 years (HIV prevalence of 31.6%), people co-habiting (30.9%), African males aged 25–49 years (25.7%), disabled persons 15 years and older (16.7%) and high-risk alcohol drinkers 15 years and older (14.3%).

Case study 1: HIV prevalence among boys and girls in 2 schools in rural KwaZulu-Natal, SA, 2012

Figure 5: HIV prevalence among high school learners



Source: UNAIDS The gap report (2014)

3.1.2 HIV incidence

HIV incidence is the estimated number of new (total number of diagnosed and undiagnosed) HIV infections in a given period. These measures are important because they provide insights into the more recent dynamics of the country's HIV epidemic. More importantly, they are the most direct means of assessing the impact of HIV-prevention programmes that the country has implemented. HIV-incidence analysis in South Africa is based on two independent methods:

(i) direct HIV incidence measures using a laboratory-based testing algorithm; and

(ii) indirect HIV incidence estimates using a mathematical model (South African National HIV Prevalence, Incidence and Behaviour Survey, 2014).

Table 4 shows that according to all three approaches to estimating HIV incidence in South Africa, there has been a decline in HIV incidence from 2008 to 2012 among the population aged 15–49 years. The THEMBISA model indicates declines for all age groups and both sexes, and the HSRC survey estimates that incidence has increased among females aged 15–49 years and 15–24 years. Spectrum estimates show a 0.36 percentage points decline in incidence for males and females aged 15–49 years, from 1.9% in 2008 to 1.54% in 2012. The HSRC survey estimates that there were 469 000 new infections in 2012. The highest incidence of 2.54% was among females aged 15–24 years. Although there has been a decline in incidence, young women in this age group have HIV prevalence rates 3.9 times higher than their male counterparts. This is associated (among others) with social and behavioural factors, such as age-disparate relationships.

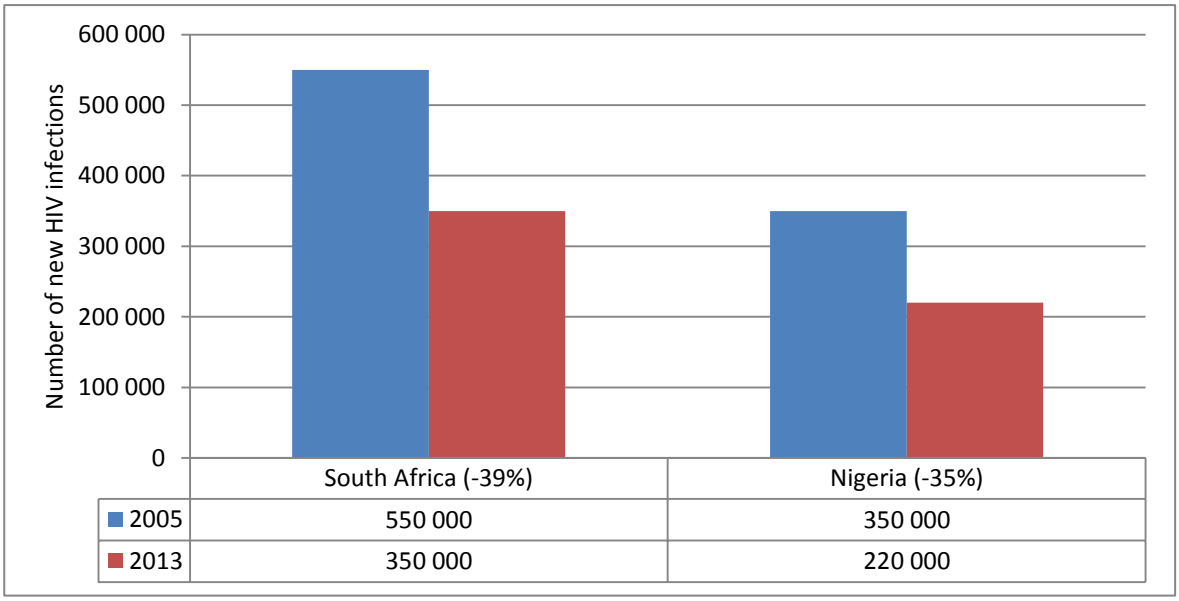
Table 4: HIV incidence estimates by various methods, 2008-2012

Source	Method	Period	15–49 years incidence estimate (%)			15–24 years incidence estimate (%)		
			Total	Males	Females	Total	Males	Females
HSRC survey	LAg avidity assay	2012	1.7	1.2	2.3	1.5	0.6	2.5
	Synthetic cohort	2008–12	1.9	1.6	2.1	1.5	1.0	2.1
		2005–08	1.9	1.6	2.2	2.3	1.4	3.5
THEMBISA	Mathematical model	2011–2012	1.5	1.1	1.9	1.8	0.8	2.8
		2008–2009	1.8	1.4	2.2	1.9	0.9	3.1
		2005–2006	1.9	1.6	2.4	2.1	1.0	3.2
Spectrum	Mathematical model	2011–2012	1.5					
		2008–2009	1.8					
		2005–2006	2.1					

Source: SANAC (2014)

HIV incidence differs substantially by age and sex. Table 4 shows that among young people aged 15–24 years, the incidence rate was 1.5%, with 2.5% among females and 0.55% among males. Among persons aged 25 years and older, the total annual number of new infections was estimated to be 125 000 among men (1.3%) and 175 000 among women (1.6%) (RSA, 2014). UNAIDS (2014) estimates that there were 330 000 new infections in the age group 15+ during 2013 and that the number of new HIV infections declined by 39% between 2005 and 2013 (Figure 6).

Figure 6: Number of new HIV infections in South Africa, 2005 and 2013



Source: UNAIDS 2013 estimates

Overall, the HIV incidence among females is higher than that of males in all age categories, and the HIV incidence rate among females aged 15–24 years was more than four times higher than the incidence rate found among males in this group (Table 5). In the age group 15–24 years, the total annual number of new infections was estimated to be 139 000.

Table 5: HIV incidence rates by age, 2012

Age Groups	HIV incidence % (95% CI)
Age ≥ 2 years	
Total	1.07 (0.87–1.27)
Male	0.71 (0.57–0.85)
Female	1.46 (1.18–1.84)
Age 15–24 years	
Total	1.49 (1.21–1.88)
Male	0.55 (0.45–0.65)
Female	2.54 (2.04–3.04)
Age 15–19 years	
Total	1.72 (1.38–2.06)
Male	1.21 (0.97–1.45)
Female	2.28 (1.84–2.74)

Source: South African National HIV Prevalence, Incidence and Behaviour Survey (Shisana et al., 2014)

Considerable progress has been made in reducing new infections among children aged 0–14 years, with a 79% decline from an estimated 78 000 infections in 2004 to 16 000 in 2013. This is attributable to the accelerated Prevention of Mother-to-Child Transmission (PMTCT) programme for the Elimination of MTCT (eMTCT). The Medical Research Council reported an MTCT transmission rate of 2.7% at six weeks in 2012, and the THEMBISA model estimates the rate to be 4.2% (RSA, 2014). All estimation methods suggest a dramatic decline in perinatal transmission in recent years, with declines of 23% to 36% over the period 2010 to 2011. Furthermore, the THEMBISA model estimates a decline of 76% from 2005 to 2012 (SANAC, 2014).

No national data on HIV incidence among key populations is available. However, Table 6 shows emerging data on the incidence of HIV among sex workers (SW), people who inject drugs (PWID), MSM and their sex partners. New HIV infections were highest among sex workers (5.5%) and their partners (19.8%), followed by MSM (7.9%) and their partners (9.2%) and PWID (1.1%) and their partners (1.3%). Overall, key populations had an estimated proportion of new infections of 14.5%, which increased to 30.3% with their partners/clients.

Table 6: Percentage of new infections attributed to selected key populations, 2012

	Percentage of new HIV infections, group only	Percentage of new infections, group and their partners/clients
Sex workers (SW)	5.5%	19.8%
People who inject drugs (PWID)	1.1%	1.3%
Men who have sex with men (MSM)	7.9%	9.2%
Total	**14.5%**	**30.3%**

Source: South African Centre for Epidemiological Modelling and Analysis (SACEMA)

Several factors have contributed to the decline in new HIV infections over the past 10 years. Behaviour-change efforts may have contributed to the downward trend in new infections as the country increased its prevention efforts, such as intensifying age-appropriate sex education in schools, expanding community-based behavioural prevention programmes, increasing condom promotion and dissemination, scaling up HCT, and introducing prevention programmes among sex workers. ART is also likely to have contributed to incidence reduction (RSA, 2014).

3.2 CONDOM USE AT LAST HIGH-RISK SEX

MDG Indicator 6.2: Condom use at last high-risk sex

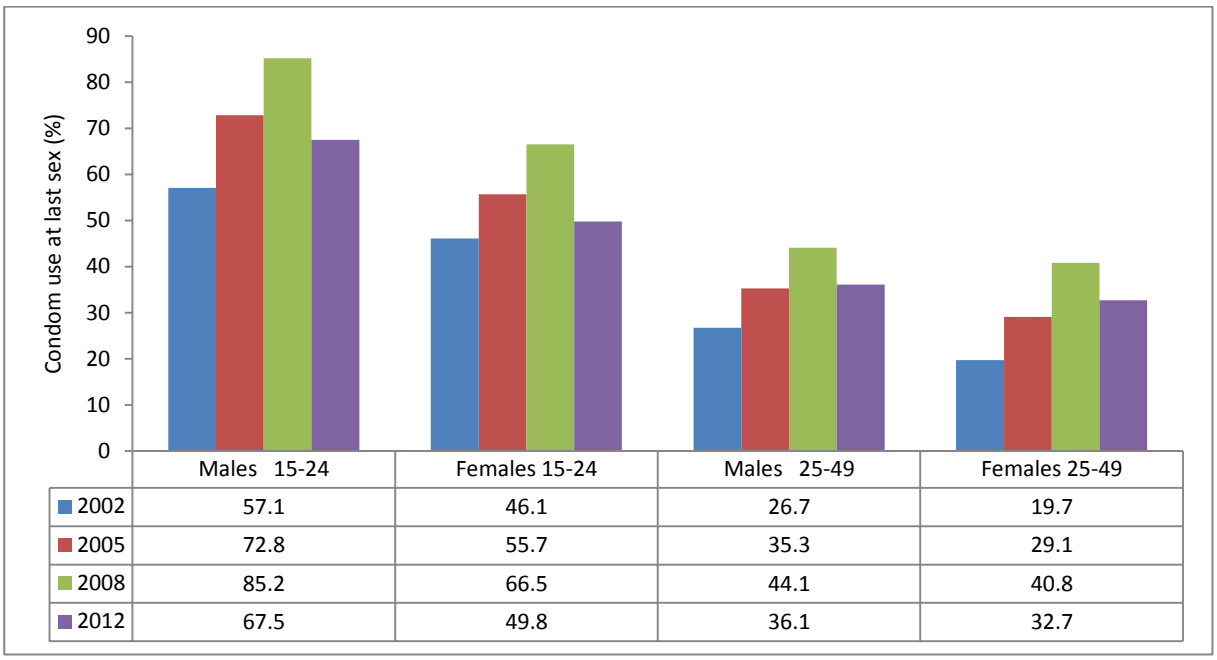
District Health Information System (DHIS) data shows that male condom distribution has declined from the 2010 baseline of 492 million to 391 million in 2011 (20.3% below baseline), but increased to 529 924 651 in 2012 (7.6 % above baseline) and 506 427 732 in 2013 (2.8% above baseline). The target for male condom distribution for 2016 is one billion condoms, which represents a 51% increase from baseline.

With respect to female condom distribution, a 23% and 28% increase was recorded in 2011 (6 267 500) and 2012 (11 677 163) from the 2010 baseline of 5.1 million, and then a 56% increase was recorded in 2013 (13 254 025). With a target of 25 million for 2016 (400% increase from baseline), female condom distribution systems require resources to increase distribution and acquisition if South Africa is to meet its 2016 target.

Risky sexual behaviour is one of the factors that fuels HIV infections. In the fight against HIV infection, protected sex through the use of condoms is promoted in advocacy campaigns and programmes. Figure 7 indicates that condom use at last sex declined in people aged 15–24 years by 17% from 2008 to 2012 (85.2% to 67.5% in males and 66.5% to 49.8% in females). It also declined by 8% in people aged 25–49 years from 44.1% to 36.1% in males and 40.8% to 32.7% in females.

The trend from 2002 to 2008 was showing that South Africa was on course to achieve the MDG 2015 target of 75.9%, but this trend changed negatively in 2012 and the target has not been achieved.

Figure 7: Condom use at last sex by age and sex, South Africa 2002–2012



	Males 15-24	Females 15-24	Males 25-49	Females 25-49
2002	57.1	46.1	26.7	19.7
2005	72.8	55.7	35.3	29.1
2008	85.2	66.5	44.1	40.8
2012	67.5	49.8	36.1	32.7

Source: South African National HIV Prevalence, Incidence and Behaviour Survey (Shisana et al., 2014)

A mixed picture emerges for condom use in various studies. The 2013 National HIV Communication Survey (NCS) found that among respondents who had sex in the past year, 47% had used a condom at last sex, which constitutes an increase from the 40% reported in the 2008 survey. It was also found that 76% of respondents used a condom at last sex with a casual partner, 65% used a condom at last sex with a main or regular partner, and 28% used a condom at last sex with their spouse or cohabiting partner (Johnson, Kincaid, Figueroa, Delate, Mahlasela and Magni, 2013).

The third National HIV Communication Survey states that one of the most remarkable changes in HIV prevention behaviour in South Africa over the last 20 years has been the dramatic increase in condom use at first sex. Less than 10% of respondents who first had sex 40 years ago said they used a condom the first time. From 1992 to 2012, condom use at first sex increased from 18% to 66%, which is a 48 percentage change increase in the last 20 years. Condom use at first sex increased consistently after 1995, which marks the beginning of large-scale HCPs that promoted the use of condoms to prevent HIV in South Africa. This positive increase in condom use was combined with the increased availability of condoms in the period 1995 onwards, with over 450 million condoms now being distributed through the public health system (Johnson, Kincaid, Figueroa, Delate, Mahlasela and Magni, 2013).

3.3 HIV TESTING

HIV testing and counselling (HCT) services are a vehicle through which millions of people learn about their HIV status. For individuals who test positive, HCT provides a platform for people to select health care services that provide opportunities for long-term care and treatment (WHO, 2013). It is widely acknowledged that testing for HIV decreases the likelihood of high-risk behaviour among individuals who choose to test, which leads to a reduction in HIV transmission rates (Kamb, Fishbein, Douglas et al., 1998). For this reason, there is a drive to increase the prevalence and accessibility of HCT.

Indicator: Percentage of people who received an HIV test in the past 12 months and know their status

In response to the country's growing demand for HIV testing, the South African Department of Health (DOH) launched a nationwide HIV counselling and testing campaign in 2010 to increase testing rates and to provide a stepping stone to antiretroviral (ART) treatment (DOH, 2010).

In 2011, 64.3% of all South Africans had ever been tested for HIV. The Department of Health (2012) data shows that 8 772 423 South Africans were tested for HIV in 2011/12, and 8 978 177 were tested in 2012/13. This represents around 66.2% of the intended NSP target. The 2012 National HIV Communication Survey (NCS) found that there has been a large increase in the number of South Africans ever tested for HIV, with 2.6 million more people reporting having ever been tested than three years before. It was found that 38% or 10.7 million people were tested for HIV in the past 12 months, and this correlates well with the routine HTC campaign testing data where records indicate that 10 700 276 people were tested in this period. That represented 64.3% of South Africans who were eligible for testing. This ratio is higher than the 2015 target of 49.1%.

Table 7: Respondents aged 15 years and older, who had ever been tested for HIV, by demographic variables, 2012

Variable	Tested for HIV		
	n	Per cent	95% CI
Sex			
Male	11 403	59.0	57.2–60.8
Female	14 978	71.5	70.1–72.9
Age (years)			
15–24	7 121	50.6	48.5–52.7
25–49	11 553	78.2	76.6–79.8
50 +	7 707	54.8	52.7–57.0
Race			
Black African	15 166	65.8	64.3–67.2
White	2 823	62.7	58.8–66.4
Coloured	4 911	67.8	65.4–70.1
Indian/Asian	3 419	60.6	55.7–65.3
Locality type			
Urban formal	15 580	68.0	66.3–69.8
Urban Informal	2 691	67.9	64.1–71.6
Rural formal	5 602	61.6	59.6–63.5
Rural Informal	2 508	63.0	57.4–68.2
Province			
Western Cape	3 245	70.4	67.8–72.8
Eastern Cape	3 311	63.3	60.5–66.1
Northern Cape	2 037	69.8	67.0–72.4
Free State	1 940	66.5	63.5–69.3
KwaZulu-Natal	6 178	65.5	62.4–68.5
North West	1 818	62.0	58.0–65.8
Gauteng	3 620	68.1	65.0–71.0
Mpumalanga	1 917	57.5	52.4–62.3
Limpopo	2 315	62.6	59.8–65.2
Total	**26 387**	**65.5**	**64.2-66.7**

Source: SABSSM (2014)

3.4 COMPREHENSIVE CORRECT KNOWLEDGE OF HIV AND AIDS

MDG Indicator 6.3: Proportion of population aged 15–24 years with comprehensive correct knowledge of HIV/AIDS

Knowledge about HIV and AIDS transmission accompanied by an appropriate reduction of behavioural risks is important in combating and reversing the spread of HIV and AIDS.

There is also conflicting evidence about comprehensive correct knowledge of HIV/AIDS. Results from the 2009 National HIV Communication Survey in South Africa suggest that knowledge levels of HIV prevention methods are high. The results indicate a knowledge level of 87% for condoms on average across age groups. Knowledge levels of other HIV prevention methods such as faithfulness, partner reduction and abstinence are lower, but have improved since the 2006 National Communication Survey. The 2009 NCS also indicates that knowledge levels of treatment allowing people living with HIV to be healthy are high in South Africa, and have significantly increased – of those who knew of treatment, 87% (85% male and 88% female) identified antiretroviral therapy (ART) as a treatment, and 73% knew that ART is for life (in 2006, 42% identified ART and 40% knew it was for life).

Indicator: Percentage of young women and men aged 15–24 years who both correctly identify ways of preventing the sexual transmission of HIV and who reject major misconceptions about HIV transmission

The South African National HIV Prevalence, Incidence and Behaviour Survey (2012) indicator for correct knowledge and/or misconceptions about HIV transmission consisted of six questions:

- Can a person reduce the risk of getting HIV by using a condom every time he/she has sex?
- Can a person reduce the risk of HIV by having fewer sexual partners?
- Can a healthy-looking person have HIV?
- Can AIDS be cured?
- Can a person get HIV by sharing food with someone who is infected?
- Can HIV be transmitted from a mother to her unborn baby?

Numerator: Number of respondents aged 15–24 years who gave the correct answers to all six questions

Denominator: Number of respondents aged 15–24 years who gave answers to all six questions

Table 8 shows that only 24.2% of young women and men aged 15–24 years could correctly identify ways of preventing the sexual transmission of HIV and reject major misconceptions about HIV transmission. For 15–19-year-olds, it was 23.7%, and 24.7% among 20–24-year-olds.

Table 8: Percentage of young women and men aged 15–24 years who both correctly identified ways of preventing the sexual transmission of HIV and who rejected major misconceptions about HIV transmission

All 15–24 years	Females	Males	15–19 years	20–24 years
24.2	25.3	23.2	23.7	24.7

Source: South African National HIV Prevalence, Incidence and Behaviour Survey (2014)

3.5 SCHOOL ATTENDANCE BY ORPHANS

MDG Indicator 6.4: Ratio of school attendance of orphans to school attendance of non-orphans aged 10–14 years

The extent to which orphans of particular age attend school provides an indication of the impact of orphanhood on children's education. No doubt, some of the orphanhood figures would be due to AIDS-related mortality of the parents, but others would be due to other causes of death that are not AIDS-related. Any indicator of school attendance of orphans should therefore be interpreted with caution.

According to the General Household surveys conducted from 2002 to 2012, the ratio of school attendance of orphans to school attendance of non-orphans aged 10–14 years is almost 1, which suggests that there has been no difference in school attendance by orphaned children aged 10–14 compared to non-orphaned children in South Africa since 2003 (Table 9). Put differently, the data appears to suggest that in South Africa, orphaned children aged 10–14 years are as likely to attend school as non-orphaned children.

Table 9: Current school attendance among orphans and non-orphans aged 10–14 years

	All 10–14 years	Males	Females
Orphans	99.1	99.3	98.8
Non-orphans	99.3	98.9	99.7

Source: South African National HIV Prevalence, Incidence and Behaviour Survey (2014)

3.6 PROPORTION OF POPULATION WITH ADVANCED HIV INFECTION WITH ACCESS TO ANTIRETROVIRAL DRUGS

Target 6.b: Achieve, by 2010, universal access to treatment for HIV/AIDS for all those who need it.

MDG Indicator 6.5: Proportion of population with advanced HIV infection with access to antiretroviral drugs

3.6.1 Eligibility for ART

Eligibility criteria for ART initiation have evolved progressively over time. From programme inception until early 2010, adults were eligible for ART initiation when their CD4 count was 200 cells/µl and less, or if they were in WHO clinical Stage 4. In early 2010 all infants, pregnant women and patients co-infected with TB became eligible for ART with a CD4 count of 350 cells/µl or less. In late 2011, all HIV-infected adults became eligible when their CD4 count was 350 cells/µl and below. In April 2013, all pregnant women and TB co-infected patients became eligible for ART irrespective of their CD4 count, although pregnant women with a CD4 count above 350 cells/µl when initiating ART were expected to interrupt ART on cessation of breast-feeding, until their CD4 count was 350 cells/µl or less threshold (SANAC, 2014). The current threshold for ART initiation is CD4 < 500, with Option B+ being to test and treat for children under 5 years.

ART guidelines are regularly aligned with global policies, and include phased replacement of the multiple-drug regimens with FDCs, which are simpler in relation to adherence, and overall, more cost-effective. The roll-out of Nurse-Initiated Management of ART (NIMART) further strengthens implementation of the programme, although challenges have been identified in relation to retention in care and pre-ART support (RSA, 2014).

3.6.2 ART coverage or access

Considerable progress has been made with coverage of ART in South Africa. Table 10 shows that in 2013, South Africa had the largest ART programme in the world, with more than 2.5 million people on ART, of which 2.3 million were in the public sector and 148 331 (6.4%) were children. This surpassed the country's universal access target of 80% in accordance with the 2010 WHO treatment guidelines (offering treatment to people with a CD4 count of 350 cells/µl and below) and was made possible through a supportive legislation and policy environment.

The 2012/13 target of initiating 500 000 new patients on ART was exceeded, with more than 612 000 being initiated and 659 513 new patients initiated on ART in 2013/14 alone, while the target for 2014/15 was set at 642 080. The cohort data reveals a burgeoning number of adults started on treatment and that over time, more people are commencing treatment earlier.

Table 10: Adults and children on ART in South Africa by year and source

Year	Annual Health Statistics[a]	DHIS[b]	DHIS[c]	THEMBISA Model[d]	Johnson 2012[d]	UNGASS Reports	CCMT Dispatch	National HIV Survey[h]
2007				354 000	382 000	371 731[e]	318 447	863 200
2008				553 000	588 000	727 991[f]	532 693	
2009				869 000	912 000	919 923[f]	695 293[g]	
2010				1 247 000	1 287 000			
2011		1 007 763	1 176 875	1 735 000	1 793 000	1 406 650[f]		
2012	1 735 690	1 534 827	1 933 799	2 322 000		2 150 880[f]		2 002 000
2013		2 309 411	2 411 653					

a Based on data from CCMT, estimated for March of 2012
b Derived from routine reporting through the three-tier system, for end March each year
c DHIS data for mid-year of each year to enable comparisons with models
d Estimated for mid-year
e Estimated for public and private sectors combined
f Restricted to public sector
g Data is for January 2009, whereas other data in the series is for mid-year
h Derived from testing HIV-positive samples for ART

Table 11 shows that the ART uptake increased from 44.8% in 2010 to 65.5% in 2012. This is a significant increase and shows an increased level of commitment to get this programme on track during this period.

Table 11: Trends in ART uptake in South Africa, 2010–2012

	2010	2011	2012
Antiretroviral treatment uptake	44,8%	53,6%	65,5%

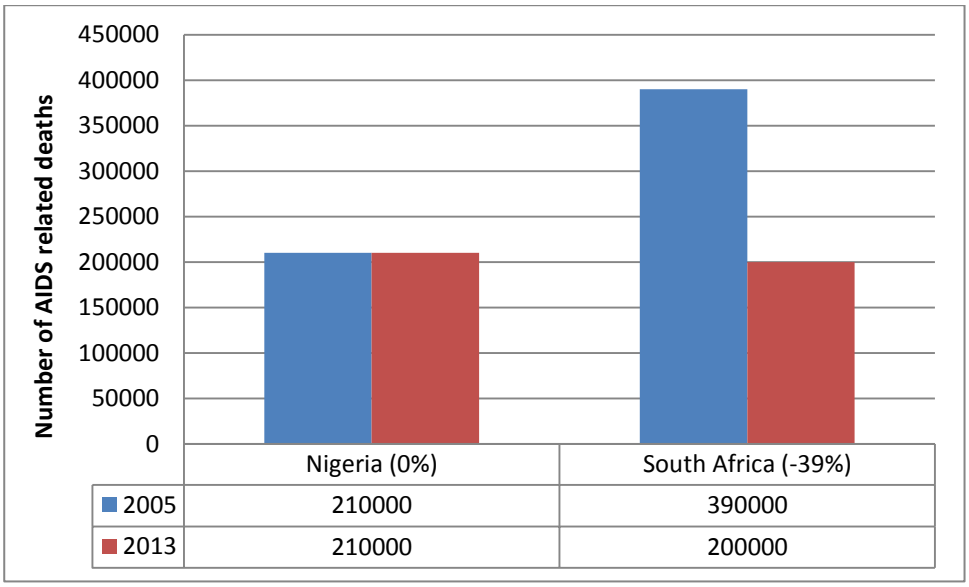
Source: Department of Health (2014)

The success of the expansion of the ART programme in South Africa can be attributed to several factors, such as strengthening and expansion from 2010, including a large scale HTC campaign. Between 2011 and 2012, South Africa used an evidence-based approach to drug procurement and reformed its tender process to increase resource allocation for ART in line with the demand created by the number of people on ART and those to be initiated. Competition among suppliers in purchasing ARVs resulted in savings of ZAR 4.7 billion (US$ 640 million) or a 53% overall reduction of ARV costs, allowing the government to expand the ART programme tremendously. The government and its partners also strengthened the supply chain management (SCM) of ARVs to reduce the frequency of stock-outs of ARVs (see Case Study 2 below).

PMTCT: Data and reporting on PMTCT has been captured in the MDG 4 goal report. Between 2008 and 2011, the MTCT rate dropped from 8% to 2.7% (DHIS, 2012).

Figure 8 shows that the number of AIDS related deaths was reduced by 48% between 2005 and 2013 in South Africa, largely due to the impact of ART.

Figure 8: Impact of the ART programme on AIDS-related deaths in South Africa, 2005 and 2013



Source: UNAIDS 2013 estimates

Despite having the largest ART programme in the world, with an accelerated uptake of 65.5% (2012) and substantial reduction of 48% in AIDS-related mortality (2013)…

However, South Africa made substantial progress in achieving universal access for all who need ART. It is worth noting that the percentage of eligible adults and children receiving antiretroviral therapy leapt from 58.3% in 2010 to 75.2% in 2011 (SA GAPR, 2011). ART coverage for HIV-positive pregnant women also leapt from 87.3% to 99**%** (SA GAPR, 2011; DHMIS 2012).

At this rate of progress, South Africa is on course to achieve the National Strategic Plan (NSP) 2016 target of initiating at least 80% of eligible patients on antiretroviral treatment (ART), with 70% alive and on treatment five years after initiation.

Case study 2: South Africa reforms tender process to reduce ARV drug prices

South Africa has reformed its tender process to increase competition among suppliers and improve transparency. Savings amounted to ZAR 4.7 billion (US$ 640 million*) between 2011 and 2012 allowing the Government to treat twice the number of people. The new tender achieved a 53% overall reduction of ARV costs.

South Africa was paying substantially more for its antiretroviral drugs (ARVs) than most other low and middle-income countries. Bound by the terms of its existing tender for the procurement of ARVs, the Government purchased only one third of all products at internationally competitive prices in 2010. In December 2009, the Government of South Africa made a landmark set of commitments to increase HIV case finding and expand access to antiretroviral therapy (ART), aiming to start treating close to one million new patients with ARVs in the next two years. This promised to significantly increase demand for, and spending on, ARVs. The drug prices set by the 2011-2012 tender would be a major determinant of the Government's ability to achieve these aggressive scale-up goals.

How the ARV tender was changed

Working closely with partners, the South African Government was able to implement interventions that achieved price benchmarking, robust allocation of preference points, price stability, reliability of need estimates, and transparency of the process.

This new approach led to a 53% overall reduction in the cost of ARV drugs and projected savings over the two-year contract period of ZAR 4.7 billion (US$ 640 million).

These savings came at a crucial time in South Africa's response to HIV and have made an ambitious treatment scale-up possible. In 2010 and 2011, almost 800,000 new patients began treatment with ARV drugs, resulting in a total of 1.7 million South Africans initiated on antiretroviral treatment by December 2011.

The South African government has built on this achievement, successfully applying these reforms to other tenders, including those for anti-tuberculosis drugs and anti-infectives, and achieving additional significant savings.

Lessons learned

A key to South Africa's tender success was the careful review of tender language to ensure that it encouraged lower prices. This process – and the strategies that resulted and have been highlighted in this case study – helped South Africa significantly reduce ARV drug prices, and can be adapted to other countries to mitigate high prices and facilitate the stable supply of ARV drugs.

Source: UNAIDS (2013) Efficient and Sustainable HIV Responses: Case studies on country progress. Available online at http://www.unaids.org/sites/default/files/media_asset/JC2450_case-studies-country-progress_en_0.pdf

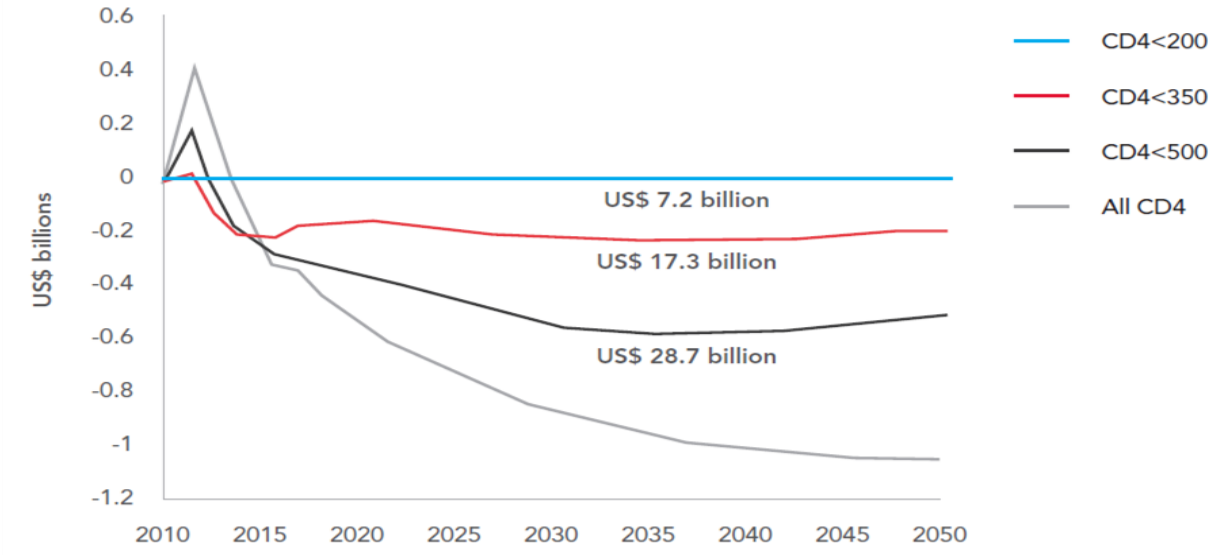
Case study 3: HIV treatment saves money

Early initiation of treatment maximises both health and economic gains. In South Africa, for example, all treatment expansion scenarios based on higher CD4 thresholds for treatment initiation have been estimated to generate simultaneous health and economic benefits, but the most substantial benefits occur when treatment is available to all people living with HIV, regardless of CD4 count (Figure 9). Rapid expansion of HIV treatment to all people living with HIV would avert 3.3 million new HIV infections in South Africa through 2050 and save US$30 billion.

According to another modelling exercise, investments in HIV treatment scale-up generate returns more than two-fold greater when averted medical costs, averted orphan care and labour productivity gains are taken into account. Nor will it be necessary to wait decades to see the economic benefits of early investments in rapid treatment scale-up. In some countries, savings from investments in HIV treatment scale-up would be immediately felt. Actual costs savings would emerge somewhat later in countries with high HIV prevalence. Yet even in South Africa, home to more people living with HIV than any other country, estimates indicate that the country would reach the break-even point within a decade after scaling up treatment to all people, regardless of CD4 count.

Source: UNAIDS (2015) Ambitious treatment targets: Writing the final chapter of the AIDS epidemic. Discussion paper

Figure 9: Expanding access to ART is a smart investment: Case of South Africa



Source: Ganichi (2011)

3.7 INCIDENCE AND DEATH RATES ASSOCIATED WITH MALARIA

Target 6c: Halt and begin to reverse the incidence of malaria and other major diseases

MDG Indicator 6.6: Incidence and death rates associated with malaria

Incidence of malaria

Malaria is endemic only in three north-eastern provinces of South Africa: Limpopo, Mpumalanga and KwaZulu-Natal. Table 12 shows the malaria incidence rate per 1 000 from 2011 to 2014. Over this period, malaria incidence remained very low in all three provinces. This is the result of more than 50 years of consistent and successful malaria control, through insecticide vector control, and case management (Maharaj et al., 2013).

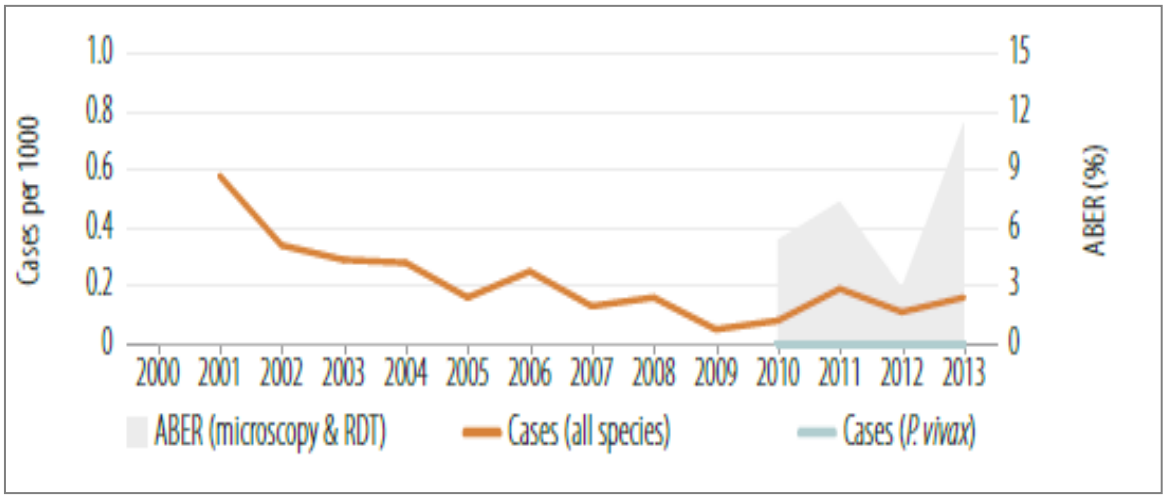
Table 12: Malaria incidence rate per 1 000, South Africa, 2011–2014

Province	Incidence rate per 1 000			
	2011	2012	2013	2014
Limpopo	0.62	0.37	0.45	1.01
Mpumalanga	0.89	0.67	1.02	1.25
KwaZulu-Natal	0.06	0.05	0.05	0.06
North West	0.03	0.01	0.03	0.02
Gauteng	0.18	0.11	0.16	0.15
Northern Cape	0.06	0.03	0.02	0.01
Eastern Cape	0.02	0.00	0.00	0.00
Western Cape	0.02	0.01	0.02	0.03
Free State	0.03	0.02	0.02	0.02
Total	**0.20**	**0.35**	**0.17**	**0.26**

Source: Malaria data – Department of Health (2015)

Following cross-border malaria initiatives between South Africa, Swaziland and Mozambique in year 2000, malaria in South Africa continued to decrease drastically from 2001 to 2013 (Maharaj et al., 2013). The total number of reported malaria cases decreased markedly from 0.6 per 1 000 (64 622) in 2000 to just under 0.2 per 1 000 (9 874) in 2013 (Figure 10). The World Malaria Report (2014) states that South Africa achieved a >75% decrease in malaria case incidence in 2013.

Figure 10: Confirmed malaria cases per 1 000 and ABER, South Africa, 2000–2013



Source: World Malaria Report (2014)

ABER = Annual Blood Examination Rate. Calculated as (number of slides examined/population) x 100. WHO recommendation for malarious areas is that the number of slides examined per month should equal at least 1% of the population.

Death rates associated with malaria

The Department of Health records show that there were 51 deaths from malaria in 2009, 87 in 2010, 91 in 2011, 72 in 2012 and 105 in 2013 (Table 13). This is a 100% increase from 2009 to 2013. Overall, there were 406 deaths from malaria between 2009 and 2013.

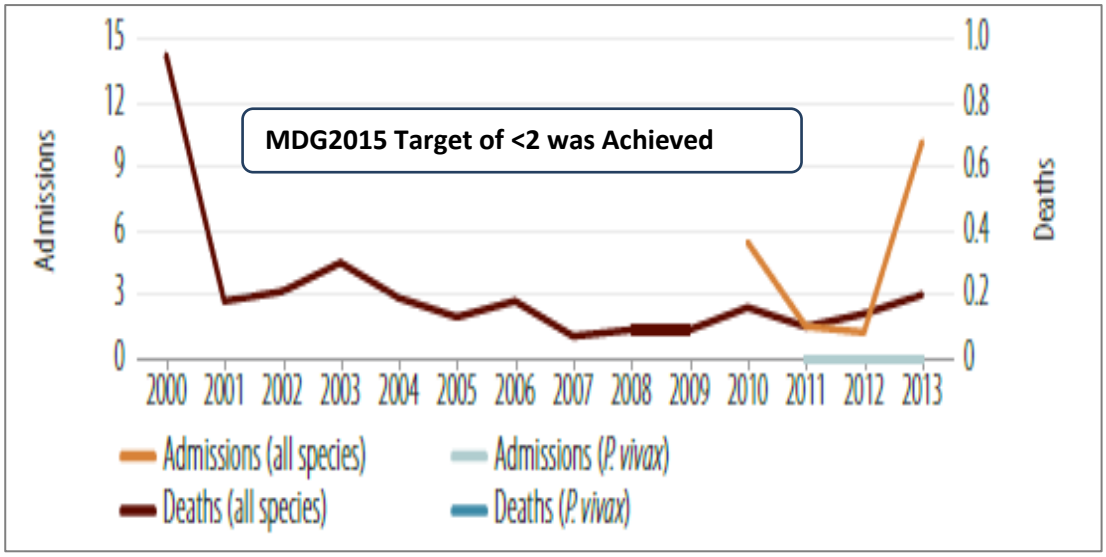
Table 13: Malaria deaths in South Africa, by province, 2011–2014

PROVINCE	2011	2012	2013	2014
Limpopo	31	23	25	91
Mpumalanga	16	15	34	33
KwaZulu-Natal	6	4	13	8
North West	1	0	3	0
Gauteng	29	27	24	28
Northern Cape	3	1	0	1
Eastern Cape	2	0	3	0
Western Cape	3	0	1	4
Free State	0	2	2	1
Total	**91**	**72**	**105**	**166**

Source: Malaria data – Department of Health (2015)

Overall, malaria-related mortality decreased by 80% between 2000 and 2013 (Maharaj et al., 2013; Malaria World Report, 2014) (Figure 11). The death rate due to malaria in South Africa has remained very low at 0.2 per 100 000 since 2001 in line with MDGs.

Figure 11: Malaria (admissions and) deaths (per 100 000), SA, 2000–2013



3.8 INCIDENCE, PREVALENCE AND DEATH RATES ASSOCIATED WITH TUBERCULOSIS

MDG Indicator 6.9: Incidence, prevalence and death rates associated with tuberculosis

The primary MDG target for TB is to halt TB incidence and halve prevalence by 2015. The following key indicators are linked to this target:

- Increasing the TB detection rate to above 85%;
- Increasing the treatment success rate to above 85%; and
- Reducing the death rate to no more than 147 deaths per 100 000 population.

3.8.1 Incidence and prevalence of tuberculosis

TB incidence is the number of new and recurrent episodes of TB (all forms) occurring in a given year, and can be expressed as an actual number or proportion of the total population (rate per 100 000). South Africa has one of the world's worst TB epidemics driven by HIV, with 450 000 new cases in 2013 or 860 per 100 000 population (WHO, 2014). The country has moved from being the 3rd highest to the sixth, based on the revised WHO estimates.

Approximately 1% of the population of about 52 million develop active TB disease each year. According to the electronic TB register, the total number of new and relapsed TB cases was 349 582 in 2012, declining to 328 896 in 2013. From these, 85% (296 996) were new cases and 15% (52 586) were retreated cases. Of the new cases, 86% (254 529) were pulmonary TB cases and 14.3% (42 467) were extra-pulmonary TB cases. About 47% (119 898) of the pulmonary TB cases were smear positive (SS+). In 2013, a total of 328 896 of all types of TB cases were reported. About 90% (295 997) of these patients were new cases and 10% (32 899) were retreated cases.

Table 14 shows a decline in new TB cases from 2010 to 2013. By 2013, the TB incidence rate in the country was 860 per 100 000 population. The decline in TB incidence from 1 003 per 100 000 population in 2012 to 860 per 100 000 population in 2013 was 85.7%, and was lower than the NSP target of reducing TB incidence by 50%.

Table 14: TB incidence, prevalence rate (per 100 000) and DOTS coverage (%), 2010–2013

	2010	2011	2012	2013
TB incidence rate per 100 000	981	993	1 003	860
TB prevalence rate per 100 000*	795	768	857	715
DOTS** coverage (%)	100	100	100	100

MDG2015 Target = < 253

Sources: World Health Organisation (2014); National TB Control Programme (2014)

*The prevalence rate is the prevalence per 100 000 population.

** DOTS = Directly Observed Treatment Short-course.

Table 15 shows that there was a slight decline in number of new pulmonary TB cases from 2010 to 2012. The table also shows an increasing trend in the number of laboratory confirmed MDR-TB cases in the country. This shows an estimated 1.8% (1.4%–2.3%) of all new cases had MDR-TB in 2012, and 6.7% (5.4%–8.2%) of all retreatment cases.

Certain populations are at higher risk of TB infection and re-infection, or progressing from TB infection to TB disease. The NSP considers the following groups as key populations for TB: household contacts of confirmed TB cases, including infants and young children; healthcare workers, mine workers, correctional services staff and inmates; children and adults living with HIV; diabetics and people who are malnourished; smokers, drug users and alcohol abusers; mobile, migrant and refugee populations; people living and working in poorly ventilated and overcrowded environments, including those who live in informal settlements (SANAC, 2014).

South African gold miners have one of the highest TB incidence rates in the world, currently estimated at 3 000 /100 000 of the population. TB is a major health problem in South African prisons due to overcrowding, with the prevalence of undiagnosed active TB among prisoners as high as 2.4%. Furthermore, children under 15 years of age accounted for 11.5% of all new TB cases in 2012 and 11.3% in 2013. Treatment outcomes for childhood TB for all new cases were 85.9% in 2011 and 85.2% in 2012. During 2011, more than 150 000 household contacts were screened for TB and more than 3 000 new cases, which would not have been detected through routine means, were identified (Churchyard, Mametja et al., 2014).

The TB notification rate (new and relapse cases, all forms) has been on an increasing trend since 1990. However, the latest data shows a decreasing trend (NDoH, 2013). In 2011, the WHO reported 380 000 TB cases; in 2013 (including HIV-positive TB patients) (WHO, 2014), and in 2012 the National Department of Health recorded 349 582 cases of TB (NDoH, 2013).

TB case detection was highest among people in the age group 30–39 years living in townships and informal settlements. Historically, TB notification rates increased with advancing age, and men had a higher TB burden compared to women. Recently, rates peak among women in their twenties and men in their thirties, reflecting the age distribution of HIV infection (Lawn et al., 2006).

The TB Programme in South Africa is implementing new approaches to expand DOTS coverage. This includes supporting the expansion of rapid molecular testing methods (mainly XPert MTB/Rif®) as provided in the national strategy, and identifying and supporting TB and TB/HIV public-private mix strategies and interventions (National Department of Health, 2014).
TB prevalence (per 100 000) in South Africa has been inconsistent despite full-scale DOTS coverage between 2010 and 2013. By 2013, the TB prevalence was 715 per 100 000 population (WHO, 2014).

TB prevalence rate was 530 000 in 2012. This was higher than MDG2015 Target <= 134 000

3.8.2 Death rates associated with TB

MDG Indicator 6.10: Proportion of TB cases detected and cured under directly observed treatment short course (DOTS)

The treatment success rate is where the course of TB drugs has been completed, but there is no bacteriological evidence of success. In other words both 'success' and 'cure' is when the course of drugs has been completed, and for 'cure' there in addition has to be bacteriological evidence.

Table 15 shows treatment success of 76.1% for all TB cases, with a defaulter rate of 6.7% in 2012.

Table 15: Treatment outcomes – All TB cases, 2012

Province	All TB cases	Treatment success		Defaulted		Died	
Eastern Cape	55 843	40 056	71.7%	4 918	8.8%	6 159	11.0%
Free State	20 280	14 838	73.2%	1 191	5.9%	2 559	12.6%
Gauteng	54 941	44 930	81.8%	3 094	5.6%	3 782	6.9%
KwaZulu-Natal	103 986	81 488	78.4%	5 515	5.3%	7 283	7.0%
Limpopo	18 188	11 734	64.5%	932	5.1%	2 430	13.4%
Mpumalanga	21 819	16 224	74.4%	1 219	5.6%	1 805	8.3%
North West	24 018	15 955	66.4%	1 821	7.6%	2 839	11.8%
Northern Cape	8 666	6 418	74.1%	668	7.7%	889	10.3%
Western Cape	46 187	37 611	81.4%	4 229	9.2%	1 963	4.3%
Total	**353 928**	**269 254**	**76.1%**	**23 587**	**6.7%**	**29 709**	**8.4%**

Source: National TB Control Programme (2013)

Mortality from TB has been decreasing consistently from 2008 to 2013 irrespective of whether this trend is measured using number of TB deaths, percentage of all deaths or TB-specific death rate per 100 000. Mortality from TB in South Africa decreased consistently from 75 281 in 2008, to 40 542 in 2013 (Table 16). Calculated as a percentage of all deaths, mortality from TB has been declining consistently from 2008. TB specific death rates showed a similar decreasing trend from 153 per 100 000 population in 2008 to 76 per 100 000 population in 2013, this is an achievement of the MDG target of less than 147 per 100 000.

Table 16: Number and percentage of TB deaths, South Africa, 2008–2013

Year	Number of TB deaths	% of all deaths	TB-specific death rate per 100 000
2008	75 281	12.6	153
2009	69 791	12.0	140
2010	63 281	11.6	125
2011	54 112	10.7	107
2012	48 409	8.4	92
2013	40 542		76

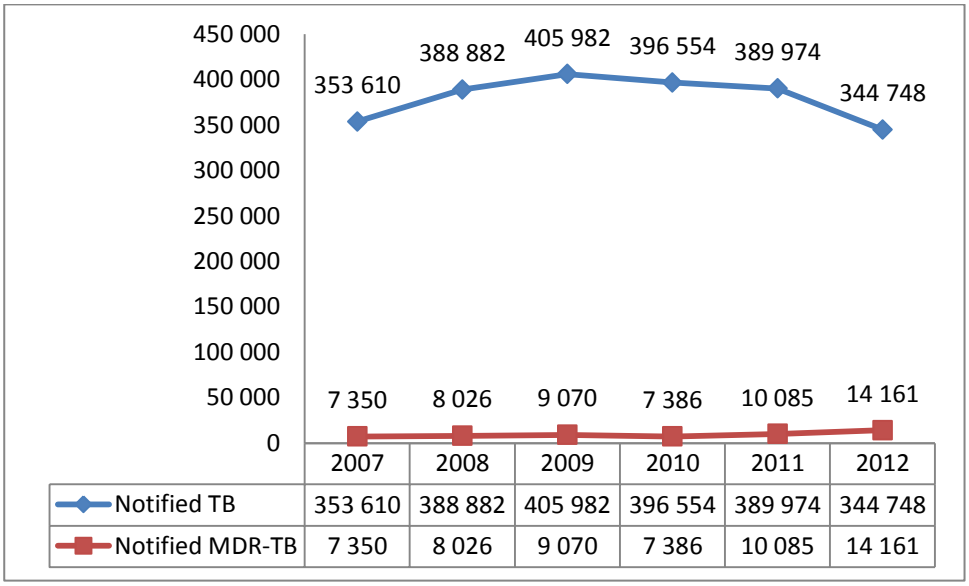
Source: SANAC (2014) and Stats SA (2014)

3.8.3 MDR-TB and XDR-TB

Due to late detection, poor treatment and management, and failure to retain TB patients on treatment, drug-resistant forms of TB (multi-drug resistant – MDR TB – and extensively drug resistant – XDR TB) have increased significantly. Figure 12 shows that multidrug-resistant disease is on the rise in South Africa. MDR-TB cases almost doubled from 7 350 in 2007 to 14 141 in 2012.

The latest data from the Department of Health shows that the number of MDR-TB cases diagnosed in 2013 declined to 9 791.

Figure 12: Trends for notified TB and MDR cases, South Africa (2007–2012)



Source: RSA (2014)

However, in the analysis of global MDR-TB surveillance data, Falzon et al. (2013) identified South Africa as one of six countries that can achieve universal access to MDR-TB care by 2015, should the country sustain its current pace of progress.

The World Health Organisation (WHO) has called for an end to the global TB epidemic and has developed an End TB Strategy, which provides a framework for tackling TB from 2016 onwards, with priority actions for stamping out MDR-TB (including XDR-TB). The *Post-2015 TB Strategy* sets a goal to diagnose and treat all MDR-TB patients.

3.8.4 TB-HIV co-infection

ART is offered to people diagnosed with both HIV and TB as per national ART guidelines. In 2012, 101 937 patients (31% of estimated HIV-positive incident TB cases) were receiving ART. At 45%, the ART initiation in HIV-infected TB patients was still below the national target of 60% (RSA, 2014).

The domestic target is the TB-HIV co-infected patients who have been placed on ART. Table 17 shows that 88.7% of TB patients know their HIV status and that 56.7% of TB patients are co-infected with HIV in South Africa. The percentage of HIV-TB co-infected patients who have been placed on ART has increased from the baseline of 26.4% in 2009 to 65.5% in 2013. This exceeded the domestic target of 60%, but is short of the MDG 2015 target of 85%.

Table 17: TB-HIV co-infection data in South Africa, 2013

Province	No. of TB patients	TB patients with known HIV status		TB patients HIV +		TB/HIV patients started ARTs*	
		Number	Per cent	Number	Per cent	Number	Per cent
Eastern Cape	55 843	49 054	87.8	26 619	47.7	18 873	70.9
Free State	20 280	18 436	90.9	12 527	61.8	10 602	84.6
Gauteng	54 941	49 304	89.7	36 408	66.3	23 739	65.2
KwaZulu-Natal	103 986	89 512	86.1	64 184	61.7	37 575	58.5
Limpopo	18 188	16 653	91.6	10 893	59.9	6 697	61.5
Mpumalanga	21 819	18 890	86.6	13 772	63.1	8 788	63.8
North West	24 018	21 530	89.6	14 289	59.5	9 829	68.8
Northern Cape	8 666	7 188	82.9	3 347	38.6	2 230	66.6
Western Cape	46 187	43 304	93.8	17 871	38.7	12 566	70.3
RSA	**353 928**	**313 871**	**88.7**	**199 910**	**56.5**	**130 899**	**65.5**

Source: Department of Health (2014)

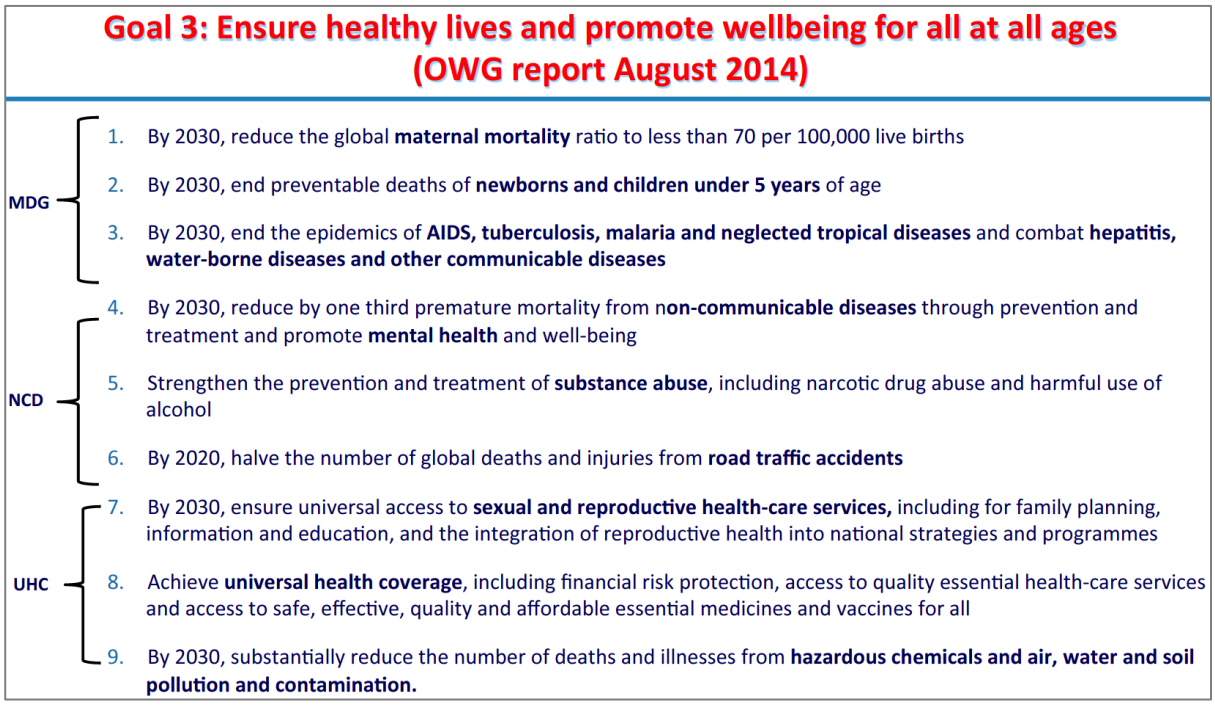
* Number started ARTs = prior to and/or during TB treatment

4. TOWARDS SUSTAINABLE DEVELOPMENT GOALS – FRAMING THE IMPERATIVES

4.1 SDG 3: TO ENSURE HEALTHY LIVES AND PROMOTE WELL-BEING FOR ALL

In the *Report of the Open Working Group of the General Assembly on Sustainable Development Goals* the overall goal for health (Goal 3) is stated as: 'Ensure healthy lives and promote well-being for all at all ages' (United Nations, 2014). The working group suggested a target of ending the epidemics of HIV and AIDS, tuberculosis, malaria and neglected tropical diseases by 2030 (Figure 13).

Figure 13: SDG Goal 3 with proposed targets for MDG, NCD and a mix



Source: WHO (2015)

The third sub-goal includes and expands the set of leading infectious diseases that were part of the current MDG 6 goal. Sub-goal 3: By 2030, end the epidemics of AIDS, tuberculosis, malaria and neglected tropical diseases and combat hepatitis, water-borne diseases and other communicable diseases. Below are proposed SDG targets for AIDS, TB and malaria:

4.2 HIV/AIDS

WHO and UNAIDS have each proposed targets that partly overlap. The WHO-proposed targets for HIV for 2030 (baseline year is 2010) are:

- 90% reduction in new adult HIV infections, including among key populations
- Zero new infections among children
- 90% reduction in AIDS-related deaths
- 90% reduction in stigma and discrimination faced by people living with HIV and key populations.

UNAIDS proposed the following targets for HIV for 2030 for low- and middle-income countries:

- 95% of people living with HIV should know their status
- 95% of people who know their status should be receiving treatment
- 95% of people on HIV treatment should be virally suppressed
- New infections among adults should be reduced to 200 000
- Zero discrimination.

The first three of the UNAIDS targets are basically the equivalent of one effective coverage indicator. The 2030 targets are an extension of a set of 2020 targets (90-90-90 for treatment, 500 000 new infections among adults, zero discrimination) which were agreed upon by the UNAIDS governing body (PCB). Ending the epidemic is defined as a 90% reduction in new infections and AIDS-related mortality from 2010 levels (WHO, 2015).

4.3 TUBERCULOSIS

In May 2012, member states called on WHO, at the 65th World Health Assembly, to develop a post-2015 tuberculosis (TB) strategy and targets, and present these to the 67th World Health Assembly in 2014. With the goal of ending the global tuberculosis epidemic, specific targets were set for the new WHO TB Strategy with milestones for 2020, 2025, 2030 and targets for 2035. The baseline year is 2015. Milestones for 2030 are:

- 90% reduction in tuberculosis deaths
- 80% reduction in tuberculosis incidence rate (less than 20 tuberculosis cases per 100 000 population)
- No affected families facing catastrophic costs due to tuberculosis.

4.4 MALARIA

The new malaria goals and targets are proposed as part of the process of developing a global technical strategy that was initiated in 2013 at the request of the World Health Assembly. The final version was to be on the agenda of the World Health Assembly in May 2015. The proposed targets for malaria for 2030, with 2015 as the baseline year, are:

- 90% reduction in global malaria mortality rate
- 90% reduction in global malaria case incidence
- Eliminate malaria from at least 35 countries in which transmission occurred in 2015
- Prevent re-establishment in all countries that are malaria-free (WHO, 2015).

5. CONCLUSION AND RECOMMENDATIONS

5.1 CONCLUSION

HIV/AIDS and tuberculosis are undoubtedly South Africa's major public health problems that cause substantial morbidity, mortality, negative socio-economic impact and human suffering.

By 2015, South Africa had made substantial progress in halting and beginning to reverse the spread of HIV/AIDS, because of political commitment and leadership and financial resources provided for the HIV and AIDS response in the past 10 years. HIV incidence is decreasing among some target groups in South Africa, but not among young women. Worldwide, South Africa has the largest number of PLHIV, representing one-quarter of the disease burden in sub-Saharan Africa; but it also has the largest antiretroviral treatment programme in the world.

One of the most remarkable changes in HIV prevention behaviour in South Africa over the last 20 years has been the dramatic increase in HIV counselling and testing and condom use at first sex, which are partly responsible for reductions in HIV prevalence in the age group 15–24 and incidence rate among adults aged 15–49 years. HIV prevalence among pregnant women aged 15–24 years dipped below the MDG 2015 target.

South Africa has progressed to halt, and begin to reverse, the incidence of malaria. The total number of reported malaria cases decreased markedly, and malaria-related mortality decreased by 80% from 2000 to 2013. South Africa is now one of the few countries in Africa that are ready for malaria elimination.

With regard to TB, South Africa has the sixth highest incidence of TB in the world. Although TB remains the leading cause of death in South Africa, the treatment success rate has improved over the study period but still lags behind the 85% MDG target. The other challenges are HIV co-infection rates and growing MDR and XDR-TB epidemics.

Despite recent progress in addressing these three diseases, important challenges, uncertainties and unmet priorities remain. For example, progressive expansion of ART coverage and other interventions is leading to measurable impact on the HIV epidemic and its related direct costs. Stable or even declining HIV incidence in an expanding population means that although incidence and prevalence may have peaked in South Africa, the absolute number of people living with HIV may continue to increase.

Furthermore, many programmes across the country fail to effectively use and integrate available prevention and treatment interventions on large scale. Common themes extending to HIV, TB, and malaria are the need to adopt interventions according to local epidemiology and to invest in strategic information. On-going evaluation of progress made (intervention coverage, reduction in illness and deaths) since the first report was released in 2010 is, therefore, important for informing policymakers and policy responses required to address the three diseases in a comprehensive and effective manner.

5.2 RECOMMENDATIONS

The four MDG indicators that were not achieved are condom use at last high-risk sex, proportion of population with advanced HIV infection with access to ART, incidence of TB and proportion of TB cases detected and cured under DOTS. The two domesticated indicators that are still to be achieved by the 2016 NSP target date are HIV prevalence in men and women aged 15–49 and percentage of TB-HIV co-infected patients who have been placed on ART.

The recommendations and key actions to fast-track the achievement of MDG 6 below are mainly to deal with the six MDGs that were not achieved by 2015, and domesticated indicators that are due for evaluation after the 2016 NSP target date. These include the following:

- *Reducing new HIV infections particularly among young women*

The single biggest prevention priority for South Africa is to reduce new infections among young women and girls between the ages of 15 and 24 through, inter alia, reducing inter-generational and transactional sex. There are three key programme areas on which to focus. First, delivery of tailored combination prevention packages in rural, urban, prison and school-based settings that are viewed as 'friendly' by the target key population and that will facilitate increased access. Acceleration of the male medical circumcision programme which reduces the risk of female-to-male sexual transmission of HIV by approximately 60%. South Africa has high levels of HIV prevalence, a generalised heterosexual HIV epidemic, and low levels of male circumcision. It is one of several countries where WHO and UNAIDS recommended the intervention be added as it is likely to have the greatest public health impact.

We recommend the adoption of the WHO proposed targets for HIV for 2030 which are:

- 90% reduction in new adult HIV infections, including among key populations
- Zero new infections among children
- 90% reduction in AIDS-related deaths.

- *Increase condom use at last high-risk sex*

Strengthen the comprehensive condom programme to generate demand for condoms and their effective and consistent use as a dual method for family planning and STI and HIV reduction. Scale up the implementation of the Integrated School Health Programme (SANAC, 2012).

- *Proportion of population with advanced HIV infection with access to ART*

A key focus should be on effective promotion to encourage South Africans (especially key populations) to take up early HIV counselling and testing (HCT) as an entry point to HIV care.

We recommend that HIV-positive people should begin to receive treatment before they become sick, especially in the light of increasing evidence that effective treatment should start far earlier than previously thought (Higher Education South Africa, 2010).

- *Reducing new TB infections and increasing the proportion of TB cases detected*

A more integrated health system approach has ensured that TB screening is integrated into the HCT campaign and that all people living with HIV in care or on treatment are regularly screened for TB. We recommend the adoption of the following WHO TB Strategy 2030 milestones of:

  - 90% reduction in tuberculosis deaths
  - 80% reduction in tuberculosis incidence rate (less than 20 tuberculosis cases per 100 000 population).

- *Increasing TB-HIV co-infected patients who have been placed on ART*

Improved access to ART is supported by the development and implementation of the ART guidelines, in line with the new policy of ART for all adult patients with CD4 cell counts < 350 cells/micro and all children under 5 years of age, as well as for all HIV and TB co-infected adults and all pregnant women on ART, irrespective of CD4 count.

- *Efforts towards malaria elimination*

With regard to malaria, the national malaria programme should be redirected towards malaria elimination and the Department of Health should work with countries like Swaziland, Mozambique, Zimbabwe and Botswana to ensure that this is achieved. We recommend the adoption of the SDG goal to eliminate malaria from South Africa by 2030.

REFERENCES

Boerma JT, Ghys PD & Walker N. (2003). *Estimates of HIV-1 prevalence from national population-based surveys as a new gold standard*. Lancet, 362, pp 1929-1931

Burrell E, Baral S, Beyrer C, Wood R & Bekker L. Comparison of sexual risk behaviours and HIV prevalence among men who have sex with men (MSM) in traditionally black and coloured townships in Cape Town, South Africa. 4th South African AIDS Conference 2009.
CHAI (2013). Annual Planning Tool

Churchyard GJ, Mametja LD, Mvusi L, Ndjeka N, Hesseling AC, Babatunde S & Pillay Y. (2014). Tuberculosis control in South Africa: Successes, challenges and recommendations.
S Afr Med J 2014;104(3 Suppl 1):244-248. DOI:10.7196/SAMJ.7689

Cooper D, Morroni C, Orner P, Moodley J, Harries J, Cullingworth L & Hoffman M. (2004).
Ten years of democracy in South Africa: documenting transformation in reproductive health policy and status. *Reproductive Health Matters* 12(24): 70-85.
http://goliath.ecnext.com/coms2/summary_0199-3557620_ITM

Cornell M, Technau K, Fairall L, Wood R, Moultrie H, Van Cutsem G, Giddy J, Mohapi L, Eley B, MacPhail P, Prozesky H, Rabie H, Davies MA, Maxwell N & Boulle A. (2009). International Epidemiologic Databases to Evaluate AIDS Southern Africa Collaboration: Monitoring the South African National Antiretroviral Treatment Programme, 2003–2007: The IeDEA Southern Africa collaboration. South African Medical Journal; 99: 99:653-660

Department of Health. (2007). *Tuberculosis Strategic Plan for South Africa, 2007-2011*. Pretoria: Department of Health

Department of Health. (2008). *Progress Report on Declaration of Commitment on HIV and AIDS, Republic of South Africa. Reporting period January 2006-December 2007*. Pretoria: Department of Health

Department of Health. (2010). *Country Progress Report on the Declaration of Commitment on HIV/AIDS*. Pretoria: Department of Health

Department of Health. (2010). *Outline of the national HIV Counselling and Testing (HCT) campaign*. Accessed at www.gov.za Pretoria: DOH

Department of Health. (2011). *Country Progress Report on Declaration of Commitment on HIV and AIDS, Republic of South Africa. 2010 Report, reporting period January 2008-December 2009*. Pretoria: Department of Health

Department of Health. (2012). *Annual Performance Plan 2012/13 - 2014/15*. www.tbfacts.org/App2012-2014.pdf

Department of Health. (2013). *Health Indicators Update: Antiretroviral Indicators*. Pretoria, Department of Health

Department of Health. (2014). *Health statistics: Reported cases of malaria*. Accessed on 10 March 2015 at http://www.healthlink.org.za/healthstats/34/data/eth#sthash.vEImzHhk.dpuf

Dunkle KL, Beksinska ME, Rees VH, Ballard RC, Htun Y & Wilson ML. (2005). Risk factors for HIV infection among sex workers in Johannesburg, South Africa. International Journal of STD and AIDS 16(3): 256-261

Falzon D, Jaramillo E, Wares F, Zignol M, Floyd K & Raviglione MC. (2013). Universal access to care for multidrug-resistant tuberculosis: an analysis of surveillance data*. Lancet Infect Dis*. 2013 Jun 3. doi:pii: S1473-3099(13)70130-0. 10.1016/S1473-3099(13)70130-0

Goga AE, Dinh TH, Jackson DJ for the SAPMTCTE study group. (2012). *Population-level impact of the National PMTCT programme: 2010 and 2011*. PMTCT Symposium, Johannesburg, 23-24 October, 2012

Grimwade K, French N., Mbatha DD, Zungu DD, Dedicoat M & Charles FG. (2004). HIV infection as a cofactor for severe falciparum malaria in adults living in a region of unstable malaria transmission in South Africa. *AIDS*, *18*: 547–554

Higher Education South Africa. (2010). *HIV and AIDS in the higher education sector: Findings of the study on HIV seroprevalence and related factors in South Africa*. Pretoria: HEAIDS

Jewkes RK, Dunkle K, Nduna M & Shai N. (2010). Intimate partner violence, relationship power inequity and incidence of HIV infection in young women in South Africa: a cohort study. *Lancet*, 376(9734): 41-48. doi: 10.1016 S0140-6736(10) 60548-X

Johnson LF. (2012). Access to antiretroviral treatment in South Africa, 2004-2011. *Southern African Journal of HIV Medicine*; 22-27

Johnson, LF. (2014). THEMBISA version 1.0: A model for evaluating the impact of HIV/AIDS in South Africa. Cape Town: Centre for Infectious Disease Epidemiology and Research, University of Cape Town

Johnson S, Kincaid DL, Figueroa ME, Delate R, Mahlasela L & Magni S. (2013). The Third National HIV Communication Survey, 2012. Pretoria: JHHESA. Available online at http://jhhesa.org/sites/default/files/hiv_survey.pdf

Kamb ML, Fishbein M, Douglas JM, Rhodes F, Rogers J, Bolan G, Zenilman J, Hoxworth T, Malotte CK, Latesta M, Kent C, Lentz A, Graziano S, Byers RH & Peterman TA. (1998). *Efficacy of risk-reduction counseling to prevent human immunodeficiency virus and sexually transmitted diseases: a randomized controlled trial*. Project RESPECT Study Group. JAMA 1998, 280, (13):1161–7

Lawn SD, Bekker LG, Middelkoop K, Myer L & Wood R. (2006). Impact of HIV infection on the epidemiology of tuberculosis in a peri-urban community in South Africa: the need for age-specific interventions. *Clinical Infectious Diseases*, *42*: 1040-7

Maharaj R, Raman J, Morris N, Moonasar D, Durrheim DN, Seocharan I, Kruger P, Shandukani B & Kleinschmidt I. (2013). Epidemiology of malaria in South Africa: From control to elimination. *South African Medical Journal*, 103, No 10 (2013)

Mamotte N, Wassenaar D, Koen J & Essack Z. (2010). Convergent ethical issues in HIV/AIDS, tuberculosis and malaria vaccine trials in Africa: Report from the WHO/UNAIDS African AIDS Vaccine Programme's Ethics, Law and Human Rights Collaborating Centre consultation, 10-11 February 2009, Durban, South Africa. *BMC Medical Ethics*, *11*: 3

Mayer KH & Hamilton CD. (2010). Synergistic Pandemics: Confronting the Global HIV and Tuberculosis Epidemics. *Clinical Infectious Diseases, 50*: S67–S70.

Moonasar D, Asomugha C, Baker L, Blumberg L, Barnes K I, Maharaj R & Benson F. (2011). Preventing disease and saving lives: The malaria season is upon us. *Issues in Medicine*, 101 (12)

Parry CD, Carney T, Petersen P, Dewing S & Needle R. (2009). Rapid assessment of HIV risk behavior in drug using sex workers in three cities in South Africa. *AIDS and Behavior* 13(5):849-859

Rehle TM, Hallett TB, Shisana O, Pillay-van Wyk V, Zuma K, Carrara H & Jooste S. (2010). A Decline in New HIV Infections in South Africa: Estimating HIV Incidence from three National HIV Surveys in 2002, 2005 and 2008. *PLoS ONE, 5*: e11094. doi:10.1371/journal.pone.0011094

Republic of South Africa. (2013). *Global AIDS Response Progress Report: Mid-term Review of Progress in achieving the 2011 UN General Assembly Political Declaration on HIV/AIDS targets and elimination commitments in South Africa*. Pretoria: SANAC

Republic of South Africa. (2014). *Global AIDS Response Progress Report (GARPR)*

Rispel LC & Metcalf CA. (2009). Breaking the silence: South African HIV policies and the needs of men who have sex with men. *Reproductive Health Matters* 17(33):133-142

Setswe G & Zuma K. (2013). HIV, AIDS and tuberculosis epidemics in South Africa: overview and responses. In *State of the Nation: South Africa, 2012-2013*. Cape Town: HSRC Press

Sharp BL, Craig M, Curtis B, Mnzava A, Maharaj R & Kleinschmidt I. (2000). Review of malaria in South Africa. In: Ntuli, A, Crisp, N, Clarke, E & Barron, P. *South African Health Review 2000*, Health Systems Trust, pp. 1-20

Shisana,O, Simbayi L & the SABSSM I Implementation Team. (2002). *Nelson Mandela/HSRC study of HIV/AIDS: South African national HIV prevalence, behavioral risks and mass media, household survey 2002*. Cape Town: HSRC Press

Shisana O, Rehle T, Simbayi LC, Parker W, Zuma K, Bhana A, Connolly C, Jooste S, Pillay V & the SABSSM II Implementation Team. (2005). *South African National HIV Prevalence, HIV Incidence, Behavioural and Communications Survey, 2005.* Cape Town: HSRC Press

Shisana O, Rehle T, Simbayi LC, Zuma K, Jooste S, Pillay-van-Wyk V & the SABSSM III Implementation Team. (2009). *South African National HIV Prevalence, Incidence, Behaviour and Communication Survey 2008: A Turning Tide Among Teenagers?* Cape Town: HSRC Press

Shisana O, Rehle T, Simbayi LC, Zuma K, Jooste S, Zungu N, Labadarios D, Onoya D & the SABSSM IV Implementation Team. (2014). *South African National HIV Prevalence, Incidence and Behaviour Survey, 2012*. Cape Town: HSRC Press

South African National AIDS Council. (2011). *End of Term Review of the NSP 2007-2011*. Pretoria: SANAC

South African National AIDS Council. (2012). *Global Response Progress Report 2012, Republic of South Africa*. Pretoria: SANAC

South African National AIDS Council. (2012). *National strategic plan on HIV, STI and TB, 2012-2016*. Pretoria: SANAC

South African National AIDS Council. (2013). *National Sex Workers Report*. Pretoria: SANAC

Statistics South Africa. (2013). *Mortality and causes of death in South Africa, 2010: Findings from death notification*. www.statssa.gov.za/publications/p03093/p030932010.pdf

Statistics South Africa. (2014). *Midyear population estimates*. Pretoria: Stats SA
UNAIDS (2013). *Efficient and Sustainable HIV Responses: Case studies on country progress.* Available online at http://www.unaids.org/sites/default/files/media_asset/JC2450_case-studies-country-progress_en_0.pdf

UNAIDS. (2014). *Global AIDS Response Progress Reporting 2014: Construction of Core Indicators for monitoring the 2011 United Nations Political Declaration on HIV and AIDS*. Geneva: UNAIDS

UNAIDS. (2014). *Global Report: UNAIDS report on the global AIDS epidemic, 2013*. Geneva: UNAIDS

United Nations. (2014). *Report of the Open Working Group of the General Assembly on Sustainable Development Goals.* UN General Assembly, 12 August 2014, A/68/970

Van Loggerenberg F, Mlisana K, Williamson C, Auld SC, Morris L, Gray CM, Abdool Karim Q, Grobler A, Barnabas N, Iriogbe I & Abdool Karim SS. (2008). Establishing a Cohort at High Risk of HIV Infection in South Africa: Challenges and Experiences of the CAPRISA 002. *Acute Infection Study* 3(4):e1954

Vitoria M, Granich R, Gilks CF, Gunneberg C, Hosseini M, Were W, Raviglione M & De Cock KM. (2009). The Global Fight Against HIV/AIDS, Tuberculosis, and Malaria: Current Status and Future Perspectives. *American Journal Clinical Pathology* 131: 848

WHO. (2007). *Implementation of indoor residual spraying of insecticides for malaria control in the WHO African Region Report*

WHO. (2013). *HIV testing and counseling*. [Online]. Available: http://www.who.int/hiv/topics/vct/en/

WHO. (2015). *Towards a monitoring framework with targets and indicators for the health goals of the post-2015 Sustainable Development Goals*. Draft, WHO, January 2015. Available online at http://www.who.int/healthinfo/indicators/hsi_indicators_sdg_targetindicators_draft.pdf