

The costs of the National Strategic Plan on HIV and AIDS & STIs 2007-2011

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Executive summary

This document provides estimates of the costs of providing the following key interventions outlined in the NSP:

- Life skills interventions in the education sector
- Post exposure prophylaxis for survivors of sexual assault
- STI treatment
- Condom provision
- Multi media behavioural change programmes
- Prevention of mother to child transmission
- HIV-testing (VCT)
- Comprehensive care and support including antiretroviral treatment, wellness services, food support for HIV-infected adults and children, active TB case finding and palliative care

Estimates of annual and total costs have been based on targets contained in the NSP regarding the coverage of each intervention or programme together with the associated unit costs. However because the targets in the NSP are for the country as a whole but one of the key purposes of this document is to inform costs for the public sector, the costs of meeting 80 per cent of these targets has been estimated under the assumption that the remainder would be addressed by businesses and the private health care sector. While costing covers many of the key programmatic areas, some areas have been omitted because costing can only be done once detailed Operational Plans have been finalized. These areas include the creation of an enabling social, political and regulatory environment and the creation of information systems for monitoring and evaluation.

The annual total cost calculated in this report is R5 billion in 2007 and R12 billion by 2011. The key driver of costs is antiretroviral treatment for adults and children, at approximately 41% of the total. The second most expensive intervention (36% of the total) is food support to adults, children and mothers opting to breast feed. It is noteworthy that the addition of dual therapy to the PMTCT programme has an incremental cost that is less than 1% of the total cost of the NSP. This is a highly cost-effective intervention; if one considers that it averts costs relating to the comprehensive care of HIV-positive children, it is likely to be cost saving.

While some costs included in this report clearly would not fall solely on government, cost implications are nevertheless extremely large. This poses questions around the affordability and sustainability of the plan, around what efficiencies might be possible and difficult resource allocation choices within the health sector and between sectors. In attempting to increase the feasibility of this plan, some of the key considerations are:

1. Extending prevention programmes and getting them to work is critical to reduce long term morbidity and costs. A simple example is PMTCT. If this programme were functioning properly, it would radically reduce paediatric aids cases.
2. Innovative financing arrangements such as partnerships with the key donors (Global Fund to Fight AIDS, TB and Malaria and PEPFAR) as well as partnerships with the private health sector, business and a range of other stakeholders is crucial.
3. Attention should be placed on increasing the affordability of medicines.
4. To enhance efficiency, attention must be given to strengthening the primary health care infrastructure so that the location of care can be shifted out of hospitals into quality primary health care services, especially at the community health centre level. This will also improve the accessibility of the service to patients.
5. Improved monitoring and evaluation is essential to show value for money for the large amount of resources being allocated to the programme. In addition, weaknesses in existing monitoring and evaluation systems makes it very difficult to adequately cost the NSP because of uncertainty around baseline performance and outputs.

6. Attention needs to be given to programmes to improve adherence to treatment; poor compliance and associated rapid development of resistant strains would lead to increasing reliance on more expensive lines of treatment.

General approach to costing

The general approach to estimating resource needs for the NSP is to estimate the number of people in need of an intervention from epidemiological and demographic data together with the coverage of the service based on the targets contained in the NSP (i.e. the percentage of the need that is to be met). However because the targets in the NSP are for the country as a whole but one of the key purposes of this document is to inform costs for the public sector, the costs of delivering 80 per cent of these targets has been estimated under the assumption that the remainder of these interventions would be provided by business or the private health care sector. This assumption can be changed if required in the freely available spreadsheet model that accompanies this report. The unit cost of each intervention is then calculated by estimating the physical ingredients of the intervention (e.g. ARVs, diagnostic tests, health facility consultations) and multiplying this by the cost of each ingredient. Overall resource needs are a function of the number of people using the intervention and the associated unit cost.

Costing takes a provider's perspective which means that costs are only included if they fall on the provider of a service. In general, this means that no costs incurred by patients (such as travelling costs to and from facilities) have been included. All costs have been presented in 2005/06 prices; where necessary inflation adjustments have been made using the Consumer Price Index (CPIX).

While every effort has been made to include as many interventions as possible, many interventions have been excluded. Some have been "excluded" because they are mentioned in a number of places within the NSP – the costs have been estimated in such a way that double counting is avoided. Some interventions are excluded because the intervention has a much broader scope than being merely HIV-related. The costs of the South African blood service are an example. Other interventions have been excluded because no data currently exist. For example, so called programme level costs incurred in the management of HIV-related interventions at provinces or national have been excluded because no data exist on the magnitude of these costs. Finally, other costs have been excluded because an intervention needs to be developed and piloted before costing can be undertaken. The following list details where costs have been excluded or included:

- Goal 1 – some included
- Goal 2 – some included
- Goal 3 – some included
- Goal 4 – all excluded
- Goal 5 – some included
- Goal 6 – some included
- Goal 7 – some included
- Goal 8 – some included in other Goals
- Goal 9-19 – all excluded

Where some costs have been included (Goal 1, 2, 3, 5, 6, 7 and 8) a full summary of which costs have been included or excluded is presented in the appendix.

Linking costs to budgets

This costing can be used to assist national and provincial departments (such as the Departments of Health and Social Development) to estimate the resources they need to provide interventions within the NSP umbrella. Because it may be difficult in some cases to estimate the proportion of the costs that might be required by the different departments or provinces, an excel spreadsheet model has been designed to accompany this report which will be made available on request. The spreadsheet has also been designed to allow for new

interventions to be included as data become available and provides a user-friendly mechanism to remove the private sector so that public sector budgets can be calculated.

Goal 1: Reduce vulnerability to HIV infection and the impact of AIDS

No costs have been included. Some of these interventions are broader in scope than HIV/AIDS (e.g. scaling up access to government poverty alleviation programmes benefits the general population and not only HIV-infected or vulnerable people) while others are programme-level costs (e.g. develop clear and consistent HIV prevention messages to be delivered by the leadership). Others (such as expanding access to HIV-testing) have been included in other sections so as to avoid double counting. Finally, some interventions have been excluded because there are currently no data available on which to base the costing.

Goal 2: Reduce sexual transmission of HIV

This section contains a number of interventions that have been piloted and/or implemented such as multimedia behaviour change interventions, the school based life skills education programme, syndromic management of STIs, male and female condom provision and post exposure prophylaxis for sexual assault survivors.

Life skills interventions in the education sector

Life skills programmes in the education sector are considered a key way of reaching school-age children. The existing programmes have operated for a number of years, financed via the Department of Education Conditional Grant, and are in need of evaluation and review. The existing level of the grant is shown in Table 4, as per the 2007 Budget Review ^[1]. Beyond the MTEF (medium term expenditure framework) period it has been assumed that costs would increase by 5% per annum. It is proposed that the Department of Education undertakes a review of the existing programme and makes changes as necessary to these costs.

Behavioural change interventions

Programmes relating to IEC and media campaigns (TV, radio, billboards, newspapers etc), youth and peer-oriented programmes, interventions to reduce gender based violence, interventions that encourage the greater involvement of men in HIV prevention, prevention programmes for HIV-positive people and programmes targeting high risk groups (gay men, mobile populations, sex workers, injecting drug users, prisoners and the uniformed forces) have been grouped in this section.

Costs of the existing programmes such as Love Life, Soul City and Khomanani were reviewed and expenditure is approximately R300 million per annum. This amount has been increased by 5 per cent per annum to reach R365 million in 2011, as shown in Table 4. The costing of this section will need to be revisited once interventions are designed and/or finalised.

Condom provision

Condoms have been shown to be highly effective in reducing sexual transmission of HIV and it is therefore crucial that sufficient condoms are readily available in the country to promote their consistent use.

The costs of condoms are a function of the unit cost per condom and the targets of numbers of condoms disbursed per annum. See Table 14 for details on unit costs. The national

department of health procured 415 million condoms in the 2004/05 financial year, and planned to buy 425 million male condoms and 1.3 million female condoms in 2005/06.

The cost of condoms has been based on a target of providing access to 50 condoms per annum to an increasing percentage of the population aged 15-49 years between 2007 and 2011 respectively. The split between male and female condoms is based on the proportion of each type that was purchased in 2005/06. Results indicate that 651 million condoms would need to be purchased in 2007 to provide 50 condoms to 50 per cent of the population, and that 1.3 billion would need to be purchased by 2011. Costs range between R237 and R460 million per annum. See Table 4.

Programmatic interventions to strengthen STI management

Sexually transmitted infections are a key co-factor in the transmission of HIV. Internationally, attention placed on HIV has often meant that other STIs have received inadequate attention despite their direct importance in HIV transmission. The costing of STI treatment is based on treating an increasing proportion of STI cases across the projection period. Available data from the District Health Information System indicate an incidence of 62 STI cases per 1,000 population over the age of 14 [2]. However, numbers of treated cases are likely to be an underestimate of the true incidence of STIs. These data have therefore been adjusted under the assumption that 78% of cases are currently untreated (Leigh Johnson, personal communication). There is also very limited information about the cost per case treated. It has therefore been assumed that this cost would be equivalent to the average cost per primary care visit, based on a review of a large number of District Health Expenditure Reviews inflated to 2005/06 prices [3]. Annual costs range between R74 and R146 million between 2007 and 2011 (see Table 4). Two areas which require more detailed costing are the introduction and rollout of more specific treatment for herpes (HSV-2) and the development of the new HPV vaccine, a potentially important scientific breakthrough that is being introduced in several countries. The potential piloting of the vaccine in South Africa will need to be costed at a later date.

Post exposure prophylaxis for survivors of sexual assault

The national policy for survivors of sexual assault indicates that all survivors should receive comprehensive assessment and treatment, including post-exposure prophylaxis (PEP) against possible HIV-infection.

The costing of the package of sexual assault care has been derived from a detailed costing of one urban-based site in the Cape Town metropolitan area and one rural site in Thohoyandou, Limpopo [4], with adjustments made to bring these costs in line with likely approaches to national roll out as outlined in National Department of Health's Sexual Assault Clinical Management Guidelines [5].

The comprehensive sexual assault policy contains a number of elements that are not directly HIV-related - the costs contained in this section have been limited to the HIV-related component (PEP). Table 1 in the technical appendix outlines the cost items included, their method of calculation and the percentage that is assumed to be purely PEP delivery related, while Table 2 provides details on the annual costs.

The annual number of women and children using PEP has been based on 2004 cases reporting to the South African Police Service. Given that there is likely to be a high proportion of sexual assault survivors who do not report to the police, this number has been increased by 5% annually between 2007 and 2011. Besides the number of women and children reporting to the police, the costs are also influenced by a number of factors such as age and HIV-status. A base case scenario has been constructed for costing purposes, with assumptions as per Table 3. The total costs of providing PEP range between R3 million and R10 million per annum as shown in Table 4.

Table 1: Cost items used in national scale up estimation model

COST CATEGORY	COST ITEM DESCRIPTION	COST ITEM CALCULATION	% PEP
Central level fixed costs	Central management – coordinating body	3 individuals at 20% of their time using an average salary of deputy director level	10%
	Chief forensic medical officer	1 per province multiplied by 2004 salary of similar position in Western Cape	0%
	Training costs for central coordinating body	Using cost of training from Western Cape post-sexual assault training course for three people	10%
Site based fixed costs	Training costs	Utilising detailed costing done of WC 5 day training course multiplied by average number of staff per site and annualised over 3 years	10%
	Furniture and equipment costs	From case study site based costing reduced to basic requirements from a public sector site for delivery annualised figure over 4 years	0%
	Building costs	% of sites requiring private room renovation by estimated cost based on per m ² cost from building association of South Africa annualised over 20 years	0%
	Staff costs	2 doctors @ 10% of time; 3 nurses @ 15% of time; admin clerk @ 20% of time	5%
	Overhead costs	Calculated from case study sites and include stationery	5%
Patient level variable cost	Drugs costs	Calculated per visit (1 st , 1 week, 6 week, and 3 month follow up) based on 2004 prices of ARV, STD, Hep B vacc and post-coital contraception as per policy guideline	100% ARVs; 0% other
	Laboratory costs	Calculated per visit (1 st , 3 day, 6 week, and 3 month follow up) as per policy guideline based on 2004 prices of tests	HIV tests only
	Other medical supplies	Includes comfort kit given to survivors, IEC material and sundries such as syringes and needles as costed per visit from case study sites	HIV test related + 25% IEC

Source: [4] p. 27

Table 2: Base case costs of scale-up of post sexual assault services (2005/06 prices)

	NATIONAL	INC PEP NATNL	PER SURVIVOR PROVIDED PEP
FIXED CENTRAL COSTS			
Central staff	163,800.00	16,380.00	0.64
Provincial staff	2,177,280.00	-	-
Training costs of centralised staff (annualised cost)	40,320.00	4,032.00	0.16
ESTIMATED CENTRAL MANAGEMENT COSTS	2,381,400.00	20,412.00	0.79
FIXED SITE COSTS			
Training costs	3,314,046.30	331,404.63	12.90
Medical Equipment	276,848.48	-	-
Non medical equipment	1,557,575.76	-	-
Furniture	338,034.19	-	-
Building costs (where private rooms need developing)	384,481.26	-	-
ESTIMATED ANNUAL COSTS	5,870,985.98	331,404.63	12.90
RECURRENT COSTS (But fixed)			
Staff costs at clinic	60,480,000.00	3,024,000.00	117.73
Printing & stationery	4,452,000.00	222,600.00	8.67
Telephone & fax	4,284,000.00	214,200.00	8.34
Other overhead costs	8,274,000.00	-	-
Total clinic annual costs - recurrent fixed	77,490,000.00	3,460,800.00	134.73
HEALTH SERVICE COSTS - VARIABLE (Dep on no. patients)			
First visits			
Drug costs	5,516,438.70	522,378.33	20.34
Laboratory costs	5,756,835.33	530,425.71	20.65
Medical supplies	3,442,717.69	70,798.35	2.76
Total first visit costs	14,715,991.71	1,123,602.39	43.74
1 week follow up visits**			
Drugs	4,449,314.12	4,449,314.12	173.22
Total 3 day visit costs	4,449,314.12	4,449,314.12	173.22
6 week visits			
Drugs	697,544.87	-	-
Laboratory	161,824.79	161,824.79	6.30
Medical supplies	29,128.46	29,128.46	1.13
Total 6 week visit costs	859,369.66	190,953.26	6.30
3 month visits			
Drugs	193,762.46	-	-
Laboratory	44,951.33	44,951.33	1.75
Medical supplies	8,091.24	8,091.24	0.32
Total 3 month visit costs	238,713.80	53,042.57	1.75
TOTAL COST (million Rands)	106.01	9.63	373.44

Source: Post sexual assault costing model, Debbie Muirhead

Table 3: Model parameters used to calculate costs in the base case (2005/06 prices)

INPUT DATA REQUIRED TO CALCULATE COSTS	National 1
Number adult women reporting to police after sexual assault	28,228
% estimated to visit health services after rape	100%
Total no women presenting to services	28,228
% Women presenting in 72 hours	80%
% Women presenting as HIV negative	81.5%
Therefore no. women qualifying PEP	18,405
% women presenting pregnant	10%
Therefore number women on alternative STI treatment	2,823
Number of women on standard STI treatment	25,405
% Victims no present Hep B antibodies	60%
Therefore no. women requiring Hep B Vaccine 2 & 3	16,937
Number child sexual assaults reported to police	17,597
% estimated to visit health services after rape	100%
Total no children presenting to services	17,597
% Children under 4 years of age	4.4%
% Children between 4 and 8 years	14.4%
% Children between 8 and 11 years	12.0%
Number of child survivors under 4 years	774
Number of child survivors between 4 and 8 years	2,534
Number of child survivors between 9 and 11 years	2,112
Number of child survivors between 12 and 17 years	12,177
% Children presenting in 72 hours	60%
% Children presenting as HIV negative	96%
Therefore no. children qualifying PEP	10,136
Number of children under 4 years of age qualifying PEP	446
Number of children between 4 and 8 years qualifying PEP	1,460
Number of children between 8 and 11 years qualifying PEP	1,216
Number of children between 12 and 17 years qualifying PEP	7,014
% children presenting pregnant	1%
Therefore number children on alternative STI treatment	176
Number of children on child STI regimen (< 12)	5,420
Number of children on standard STI treatment	12,001
% Victims no present Hep B antibodies	80%
Therefore no. children requiring Hep B Vaccine 2 & 3	14,078

Source: Post sexual assault costing model, Debbie Muirhead

Summarized costs for Goal 2

As shown in Table 4, Goal 2 annual total costs increase from R723 million in 2007 to R1.1 billion in 2011. Key cost drivers are condom provision at 32% of Goal 2 total costs, IEC and behaviour change interventions at 32% and school based interventions at 19%. In total, Goal 2 amounts to 12% of the total costs of the NSP.

Table 4: Reduce sexual transmission - scenarios and annual total costs (2005/06 prices)

Goal 2		Year					% Goal 2	% NSP
		2007	2008	2009	2010	2011		
2.2. Implement interventions targeted at reducing HIV infection in young people, focusing on young women								
Various school based interventions	Annual cost of life skills interventions	158	166	174	183	192	19%	2.2%
2.9. Increase the accessibility and availability of comprehensive sexual assault care including PEP and psychosocial support								
Post exposure prophylaxis for HIV-negative survivors of sexual assault	Increase the proportion of HIV-negative sexual assault survivors receiving access to PEP	40%	60%	80%	90%	95%		
	# adults and children receiving PEP	16,167	25,463	35,648	42,110	46,672		
	Annual cost PEP	3	5	7	9	10	1%	0.1%
2.11. Costing of key prevention interventions for higher risk populations, workers, students at higher educational institutions, out of school youth and HIV+ adults								
STI treatment	% receiving STI treatment	50%	70%	80%	90%	95%		
	# receiving STI treatment	1,049,196	1,482,761	1,709,873	1,940,375	2,065,508		
	Annual cost STI treatment	74	105	121	138	146	13%	1.5%
Male and female condoms	% population aged 15-49 with access to 50 condoms per annum	50%	70%	80%	90%	95%		
	# condoms (millions)	521	733	842	952	1,009		
	# male condoms (99%) (millions)	516	726	834	942	999		
	# female condoms (1%) (millions)	5	7	8	10	10		
	Annual cost condoms	190	267	307	347	368	32%	3.8%
IEC and behaviour change programmes	Annual cost multimedia interventions for the youth	300	315	331	347	365	36%	4.2%
Annual total cost for Goal 2		725.80	858.82	940.82	1,023.78	1,081.10	100%	11.8%

Goal 3: Reduce mother to child transmission (MTCT) of HIV

The key components of Goal 3 are HIV-testing for pregnant women, ARV prophylaxis for MTCT, CD4 testing for women found to be positive, formula milk and/or food support (see Table 14 for details). Unit costs for staff time are derived from Western Cape expenditure, divided by the number of first antenatal bookings. This proved to be an easier way to allocate staff costs than attributing specific staff time to different components of care or PMTCT activities. These costs include all extra staff provision through the PMTCT programme, including co-ordinators and administrative costs. Within the NSP, women can either opt to exclusively breast feed, in which case food support is provided, or to use formula milk. Current formula milk costs have been used, and the costs of HIV testing are assessed as described under Goal 4 below.

Two ARV regimen scenarios have been considered. The first includes 12 weeks of AZT, intrapartum AZT and nevirapine and postnatal AZT for the mother. The infant receives nevirapine at birth and 1 week of AZT. The second scenario adds 3TC at birth and for 1 week thereafter. These regimens are summarized below.

ARV regimens - scenario 1				
	Annual cost	# weeks used	# daily dose equivalents	Average weighted cost
MOTHER				
Antenatal regimen (AZT 300mg bd)	973.47	12.00		224.65
Intrapartum regimen (NVP 200mg)	517.65		0.50	0.71
Intrapartum regimen (AZT 300mg bd)	973.47		1.00	2.67
Postnatal regimen (AZT 300mg bd)	973.47	1.00		18.72
INFANT				
NVP stat	698.83		0.50	0.96
AZT	1,314.18	1.00		25.27
ARV regimens - scenario 2 adds the following				
Intrapartum regimen (3TC 150mg bd)	440.89		1.00	1.21
Postnatal regimen (3TC 150mg bd)	440.89	1.00		8.48
Services				
	Unit cost	% used per ANC attendee	Average weighted cost	
PMTCT visit	172	100%	172	

The population in need of the PMTCT intervention is based on estimates of annual pregnancies from ASSA2003*lite*¹. These have been adjusted to remove approximately 20% of births which are assumed to be managed in the private health care sector. Current ANC prevalence rates have been used and extrapolated from ASSA2003 and it was assumed that no women entering the PMTCT intervention would be on ART or aware of their HIV-status.

A cascade of attrition has been incorporated from enrolment, to accepting HIV testing, to receiving CD4 testing, to receiving the antenatal regimen, the labour regimen, electing to formula feed or choosing to breast feed and using food support. These are shown together with the cost of each element during the projection period in Table 5. Total costs for Goal 3

¹ ASSA 2003 is the AIDS demographic model of the Actuarial Society of South Africa. All demographic data in this report have been derived from ASSA2003*lite*_060315 as downloaded in August 2007 from www.assa.org.za

range between R239 and R413 million between 2007 and 2011. The key cost driver is PMTCT service delivery including staff and administration at 38 per cent, followed by formula milk at 20 per cent and VCT at 18 per cent. The nevirapine regimen costs between 0.2 and 0.4 million while the zidovudine regimen costs an additional 29 to 61 million per annum – at approximately 14 per cent of costs for Goal 3. If 3TC is added as tail protection, this will cost an additional 1 to 2.2 million per annum. In total, Goal 3 interventions comprise less than 5 per cent of the total costs of the NSP. See Table 5

Table 5: Goal 3 scenarios and annual total costs (2005/06 prices)

		Year					% Goal 3	% NSP
		2007	2008	2009	2010	2011		
3.2. Scale up coverage and improve quality of PMTCT to reduce MTCT to less than 5%								
Increase proportion of pregnant women tested through implementation of provider-initiated VCT for all pregnant women	% pregnant women tested for HIV	70%	85%	90%	95%	95%		
	# pregnant women tested	609,301	734,037	771,395	808,389	802,709		
	Annual cost VCT	49	59	62	65	65	18%	0.8%
Increase the proportion of HIV-infected pregnant women in need who receive PMTCT services (depends on # testing)	% receiving PMTCT	60%	70%	80%	90%	95%		
	# women receiving PMTCT	106,144	150,247	181,287	214,262	224,716		
	Annual cost PMTCT services (per ANC attendee)	105	126	133	139	138	38%	1.6%
	Annual cost NVP regimen	0.2	0.3	0.3	0.4	0.4	0.1%	0.0%
	Annual cost AZT regimen	28.8	40.8	49.2	58.1	61.0	14%	0.6%
	Annual cost 3TC regimen	1.0	1.5	1.8	2.1	2.2	0%	0.0%
Increase proportion of HIV positive pregnant women receiving a CD4 count at time of positive diagnosis (depends on # in PMTCT) - from Goal 7.1	% women receiving CD4 test	50%	80%	95%	95%	95%		
	# receiving CD4 test	53,072	120,197	172,223	203,549	213,480		
	Annual cost CD4 testing	3	7	10	12	13	3%	0.1%
Provide food support to HIV-positive women choosing to exclusively breast feed (depends on # in PMTCT)	% women receiving food support	15%	20%	40%	60%	80%		
	# women receiving food support	15,922	30,049	72,515	128,557	179,773		
	Annual cost food support	5	9	22	39	54	8%	0.3%
Provide formula milk to children of HIV-positive women choosing to practice replacement feeding (depends on # in PMTCT)	% children receiving formula milk	50%	45%	45%	42%	40%		
	# children receiving formula milk	53,072	67,611	81,579	89,990	89,886		
	Annual cost formula milk	47	60	72	80	79	20%	0.9%
Annual total cost for Goal 3		238.87	303.98	350.41	395.21	412.59	100%	4.3%

The table below summarizes demographic and HIV-prevalence data, NSP coverage assumptions and associated costs for interventions in Goal 3. PCR testing for infants from Goal 7 is included for clarity. Annual total costs in scenario 1 (no 3TC tail protection) range from R255 to R484 million. If 3TC is included, costs increase slightly to between R256 and R486 million per annum.

	2007	2008	2009	2010	2011
ANC HIV prevalence	29%	29%	29%	29%	29%
# pregnancies	1,088,037	1,079,466	1,071,383	1,063,670	1,056,196
# pregnancies in public sector	870,430	863,573	857,106	850,936	844,957
% pregnant women tested for HIV	70%	85%	90%	95%	95%
# pregnant women tested	609,301	734,037	771,395	808,389	802,709
Annual cost VCT	49.19	59.27	62.28	65.27	64.81
% receiving PMTCT	60%	70%	80%	90%	95%
# women receiving PMTCT	106,144	150,247	181,287	214,262	224,716
Annual cost PMTCT services (per ANC attendee)	104.80	126.25	132.68	139.04	138.07
Annual cost NVP regimen	0.18	0.25	0.30	0.36	0.37
Annual cost AZT regimen	28.80	40.76	49.18	58.13	60.97
Annual cost 3TC regimen	1.03	1.46	1.76	2.08	2.18
% women receiving CD4 test	50%	80%	95%	95%	95%
# receiving CD4 test	53,072	120,197	172,223	203,549	213,480
Annual cost CD4 testing	3.18	7.21	10.33	12.21	12.81
% women receiving food support	15%	20%	40%	60%	80%
# women receiving food support	15,922	30,049	72,515	128,557	179,773
Annual cost food support	4.78	9.01	21.75	38.57	53.93
% children receiving formula milk	50%	45%	45%	42%	40%
# children receiving formula milk	53,072	67,611	81,579	89,990	89,886
Annual cost formula milk	46.92	59.77	72.12	79.55	79.46
% children born to HIV+ mothers in PMTCT programme receiving PCR	45%	65%	85%	90%	90%
# children receiving PCR	47,765	97,660	154,094	192,836	202,244
Annual cost PCR	17.43	35.65	56.24	70.39	73.82
Annual total cost for PMTCT - scenario 1	255.28	338.17	404.90	463.52	484.24
Annual total cost for PMTCT - scenario 2	256.31	339.63	406.65	465.59	486.41

Goal 4: Minimize the risk of HIV transmission through blood and blood products

Minimising HIV transmission from blood and blood products includes a number of interventions such as universal precautions and safe disposal of biohazardous material that are not solely HIV-related and these costs have therefore been excluded. The costs of the goal relating to the provision of post-exposure prophylaxis for health workers exposed to HIV has also been excluded because it cannot be costed in its current form. In addition, most of the cost of running the South African Blood service would not be HIV-related, so these costs have also been excluded. However, it is noted that the costs of interventions related to injecting drug users are an omission that needs to be addressed as soon as these policy interventions are finalized.

Goal 5: Increase coverage of voluntary counselling and testing and promote regular HIV testing

The wide scale promotion of voluntary counselling and testing is central and key to enhance both prevention and care efforts. The NSP contains numerous references to the promotion of a wide variety of HIV-testing venues and opportunities, including routine provider initiated

voluntary counselling and testing within all health settings with a special focus on TB, STI, antenatal, family planning and general curative services; community based VCT projects; and increased access through private services, NGOs and medical aids.

The main variables influencing the total costs of VCT are uptake and unit costs; the key uncertainty in this costing will relate to the actual uptake or demand for testing that is realised between 2007 and 2011.

The cost per person tested broadly consists of the following unit costs:

- Counselling costs (including counselling, counselling coordination, mentoring and training)
- HIV test kit costs (two rapid tests and serological tests for a proportion of clients)
- Wastage

The cost of pre-test and post-test counselling was based on published work from a number of clinics in the Western Cape, inflated to 2005/06 prices [6]. Test kit prices, seropositivity rates, and requirements for confirmatory testing and wastage have been taken into account, in arriving at a total cost per person tested of R81 as shown in Table 6.

Table 6: Unit costs and ingredients for HIV testing

HIV tests	Unit cost	% used per patient	Average weighted cost
Abbott	10	100%	10
Gaifor	15	30%	4.5
ELISA	35	10%	3.5
Services			
	Unit cost	% used per patient	
Pre and post test counselling	62.74	100%	62.74
Total cost per person in VCT or HIV-testing			80.74

The NSP contains two VCT or HIV testing uptake scenarios. In the first scenario, between 25 and 70 per cent of adults (total population aged over 18) are assumed to have had 1 HIV-test in their lifetime. For this scenario, it was necessary to know the number of adults who were aware of their HIV status prior to 2007. These data have been taken from the "Nelson Mandela/HSRC Study of HIV/AIDS" [7] which indicated that approximately 20% of respondents were aware of their HIV-status. In the second scenario, between 7 and 25 per cent of adults are assumed to have had an HIV-test in the past year. Given that the latter scenario produces higher costs, only this scenario has finally been included in the costing of the NSP. Annual costs range between R149 million in 2007 and R552 million in 2011. HIV-testing within this goal is less than 5% of the total costs of the NSP.

Table 7: HIV testing (VCT) scenarios and annual total costs (2005/06 prices)

Goal 5		Year					% Goal 5	% NSP
		2007	2008	2009	2010	2011		
5.2. Increase uptake of VCT								
Increase the proportion of adults testing in the past 12 months	% adults testing in past 12 months	7%	11%	18%	22%	25%		
	# adults testing in past 12 months	1,847,939	2,931,357	4,840,043	5,967,173	6,838,270		
	Annual cost VCT	149	237	391	482	552	100%	4.6%
Annual total cost for Goal 5		149.20	236.68	390.79	481.79	552.12	100%	4.6%

Goal 6: Enable people living with HIV and AIDS to live healthy and productive lives

This section contains a number of elements that will be key cost drivers in the NSP, including antiretroviral treatment, wellness services for patients who are not yet eligible for ART, food support and active case finding for TB.

Wellness services, cotrimoxazole and CD4 counts for patients not on ART

The NSP contains a number of targets for the provision of wellness services including annual CD4 counts and cotrimoxazole prophylaxis, although it is not clear about what population of patients would be in need of these services. For the purposes of costing, it has therefore been assumed that patients in need would be adults developing AIDS who do not have access to ART.

The three basic cost items included in wellness services are the unit cost per HIV clinic visit, the annual cost of cotrimoxazole and the cost per CD4 count test. The unit cost per HIV visit has been based on primary cost analyses conducted in 14 clinics, community health centres and outpatient departments [8] and is therefore widely representative of the likely costs of this service for the country. The following items have been included in the cost per visit:

- Overheads (e.g. utilities, office supplies and non-clinical staff such as clerical staff and cleaners)
- Counselling, adherence interventions and community mobilization
- Prophylactic (e.g. cotrimoxazole and fluconazole for eligible patients) and curative medicines
- Clinical staff (doctors, nurses, pharmacists)
- Capital (e.g. buildings and equipment)

Overhead costs include recurrent costs that are not directly related to patient care including utilities (water, electricity) and non-clinical staff (administrative, cleaning and security personnel). Under the assumption that all patients utilise a similar amount of overheads during each visit, overhead costs have been calculated by establishing overhead expenditure from routine facility accounting data and dividing this by total patient visits. All data were measured over an annual period to minimise biases that might result from seasonal variations in expenditure and visits.

Prescriptions for curative and prophylactic medicines and multivitamins were extracted from 752 visits. Clinical staff - including medical officers and nurses - are likely to be a key constraint in attaining universal access to HIV-related care [9]. At clinics, clinical staff requirements were estimated by timing 94 visits. This estimate of the time per clinical consultation was multiplied against the average clinical staff cost per minute (adjusted for annual working days and patient contact hours) to calculate a clinical staff cost per visit. If required, this estimate can be used in later work to estimate the number of health professionals required to deliver the NSP.

Capital costs relate to the costs of medical equipment, furniture and buildings. Following costing literature [10], these were calculated by establishing the replacement value of each item, estimating the working life and converting this amount to annual instalments with the same present value using a real interest rate of 8% per annum (the return on South African long-term government bonds). The resultant annual cost was allocated to clinic visits using the same method as for overheads.

While the NSP is clear about the utilisation of cotrimoxazole and CD4 counts, it is less clear about how often patients would need to be followed-up in clinics. Although primary research

indicates that patients with AIDS who are not on ART would utilise approximately 8 visits per annum [11] it has been conservatively assumed that wellness services can be delivered through 2 HIV-specific clinic visits per annum. Table 8 summarizes the ingredients and unit costs of wellness services.

Table 8: Unit costs and ingredients for wellness services

Services	Unit cost	# used per annum	Average cost per annum
HIV visit	154.30	2	308.61
Medicines			
	Annual cost	# used per annum	
Cotrimoxazole	50.00	1	50.00
Laboratory test			
	Cost per test	# used per annum	
CD4	60	1	60.00

Food support

Key drivers of the costs of food support are the unit costs and the number of people assumed to be requiring this intervention. The NSP aims to provide food support to between 400,000 and 700,000 households over the scaling-up period at an annual cost of R4,800 per household (see Table 14).

Adult antiretroviral treatment (including mothers receiving ART through the PMTCT intervention)

The rapid rollout of the antiretroviral treatment programme offers substantial promise in reducing mortality, human suffering and preservation of families. At the same time, rapid rollout presents a huge challenge for the capacity of the health system.

The resources required to increase access to ART have been assessed from the start of provision in the public sector and the end of 2011. Although the NSP starts from 2007, patients who are already enrolled on ART and remain in care by 2007 need to be included. Estimates include medicines (ARVs and other curative and prophylactic drugs), laboratory investigations and clinical services associated with initiating and monitoring a patient on ART and treating opportunistic and HIV-related illnesses, counselling, adherence interventions and community mobilization. Although patients on ART would be likely to need ongoing inpatient and TB care, these costs have been excluded as they are reflected in non HIV-related government budgets.

A variety of data have been used to calculate the costs of delivering ART including:

- The cost per ART visit and the average utilisation of visits by patients on ART and immediately prior to commencing ART (community mobilisation, adherence and counselling costs are included)
- The costs and utilisation of first and second-line antiretroviral drug regimens
- The costs and utilisation of laboratory testing
- The expected average life-expectancy of a patient on ART and the anticipated duration of first and second-line antiretroviral regimens
- The number of patients entering care between 2004 and the end of 2011

The cost per ART visit (excluding antiretroviral drugs and laboratory testing) was based on an average weighted cost per visit at three ART clinics in Khayelitsha and the TC Newman outpatient department in Paarl [8]. The following items have been included in the cost per visit:

- Overheads (e.g. utilities, office supplies and non- clinical staff such as clerical staff and cleaners)
- Counselling, adherence interventions and community mobilization
- Prophylactic (e.g. cotrimoxazole and fluconazole for eligible patients) and curative medicines
- Clinical staff (doctors, nurses, pharmacists)
- Capital (e.g. buildings and equipment)

Overhead and capital costs have been calculated using the same method as described for wellness services. Prescriptions for curative and prophylactic medicines and multivitamins were extracted from the records of 60 patients who had been on ART for at least one year. This amounted to a curative and prophylactic medicine costing sample of 1,532 visits. Clinical staff requirements were estimated by timing 66 ART visits; as before, this time per consultation was multiplied against the average clinical staff cost per minute (adjusted for annual working days and patient contact hours) to calculate a clinical staff cost per visit.

Once the unit cost is established, it is necessary to estimate the frequency at which this service is utilised. The utilisation of ART visits was calculated from 1,729 patients with 2,229 ART patient years of follow-up over a median follow-up of 1.03 years (IQR 0.68 – 1.70, max 4.08) [8]. These data are summarized in Table 10.

ARV regimens and laboratory investigations have been based on national ART guidelines [12]. These specify a nucleoside reverse transcriptase inhibitor (NRTI) backbone of stavudine and lamivudine, with a non-nucleoside reverse transcriptase inhibitor (NNRTIs -nevirapine or efavirenz) to accompany the NRTI backbone in the first-line regimen. The NRTI backbone was assumed and primary data were used to determine the relative use of NNRTIs. Primary data indicated that 47% (44%-49%) of patients received efavirenz and the remainder received nevirapine. The second-line regimen consists of zidovudine, didanosine and lopinavir/ritonavir. Public sector ARV costs (including delivery costs to the provincial depots) were sourced from the South African national ARV tender [13], as presented in Table 9.

Table 9: Public sector ARV prices (adults) (2005/06 prices)

Medicine name, formulation and quantity	Manu- facturer	Share of tender	Cost per unit
First-line regimen			
Stavudine Capsules 30mg; 60'S	Aspen	70%	20.18
Stavudine Capsules 30mg; 60'S	Medpro	30%	22.23
Stavudine Capsules 30mg; 60s - average weighted cost			20.79
Stavudine Capsules 40mg; 60'S	Aspen	60%	22.46
Stavudine Capsules 40mg; 60'S	Medpro	40%	24.16
Stavudine Capsules 40mg; 60s - average weighted cost			23.14
Lamivudine Tablets 150mg; 60'S	Glaxo	20%	42.16
Lamivudine Tablets 150mg; 60'S	Aspen	80%	35.39
Lamivudine Tablets 150mg; 60'S - average weighted cost			36.74
Efavirenz Tablets 600mg; 30'S	MSD	100%	217.08
Nevirapine Tablets 200mg; 60'S	Aspen	100%	43.14
Second-line regimen			
Didanosine Tablets 25mg; 60'S	Aspen	100%	70.89
Didanosine Tablets 100mg; 60'S	Aspen	100%	82.32
Zidovudine Tablets 300mg; 60'S	Aspen	100%	81.12
Lopinavir/Ritonavir Capsules 133.3mg;33.3mg;180'S	Abbott	100%	359.89

In line with national guidelines [14], 1 CD4 and 1 viral load test was included at baseline, and six-monthly thereafter during the first-line regimen and second-line regimens. The overall usage of safety monitoring investigations was based on the requirements for each individual ARV. Laboratory test costs were obtained from the National Health Laboratory Services.

Overall utilisation of services, unit costs and cost per patient period is summarized in Table 10.

Table 10: Unit costs and summarized ingredients per health state on ART

ARV regimens						
ARV drugs	Annual cost	% used first 6 months FL	% used FL annually	% used first 6 months SL	% used SL annually	% used when failing
AZT	973.47	0%	0%	100%	100%	100%
3TC	440.89	100%	100%			
d4T	263.59	100%	100%			
ddl	1907.08			100%	100%	100%
NVP	517.65	53%	53%			
EFV	2604.96	47%	47%			
LPV/r	4318.71			100%	100%	100%
ARV cost per period		1,098.45	2,196.90	3,599.63	7,199.26	7,199.26
Laboratory testing						
	Unit cost	# used first 6 months FL	# used FL annually	# used first 6 months SL	# used SL annually	# used when failing
FBC	34.95	-	-	4.00	2.00	2.00
ALT	25.4	1.60	1.07	-	-	-
CD4	60	1.00	2.00	2.00	2.00	2.00
VL	300	1.00	2.00	1.00	2.00	2.00
Glucose	16.45		-		1.00	1.00
Chol/TG	48.23	-	-	2.00	1.00	1.00
Lab cost per period		400.61	747.08	656.26	854.58	854.58
Services						
	Unit cost	# used first 6 months FL	# used FL annually	# used first 6 months SL	# used SL annually	# used when failing
ART visit	158.69	13.5	10.8	5.4	10.8	13.4
Service cost per period		2,142.32	1,713.85	856.93	1,713.85	2,126.45
Total cost per period		3,641.38	4,657.83	5,112.82	9,767.69	10,180.29

Although ART has been available in South Africa for a number of years via the public health care system, estimates of average life expectancy from primary data are still unavailable. One therefore has to make assumptions about the overall time that patients might spend on ART and about the rate at which transitions are made from first-line to second-line regimens. For the purposes of this costing, a conservative median life-expectancy of 6.5 years has been assumed. Transitions to second-line are such that approximately 60% of the time on ART is spent on first-line regimens and the remainder on second-line regimens. Primary data indicates that this split between regimens is appropriate [8]. These assumptions are summarized in Table 11. It should however be noted that emerging data indicate that life-expectancy on ART might be considerably higher than 6.5 years. In a review of studies, mean outcomes on ART ranged between 5.8 [15] and 18.8 life years [11] while the majority of studies calculated outcomes between 11 and 15 life years [16-20]. However, given that most of these estimates come from research settings, the extent to which they are generalizable to the general population is unknown.

Table 11: Assumptions for survival and transitions between first and second-line ARV regimens

Duration on ART (years)	Alive and in care	On SL	Failing SL
0.00	100%	0%	0%
0.50	86%	6%	0%
1.50	79%	14%	0%
2.50	72%	15%	1%
3.50	66%	15%	2%
4.50	59%	17%	5%
5.50	53%	20%	7%
6.50	48%	23%	10%
7.50	42%	27%	13%
8.50	37%	30%	15%
9.50	33%	33%	17%

The NSP indicates that 120,000 new adults will start ART in 2007, and this progressively increases to 420,000 adults started on treatment during 2011 as shown in Figure 1. Given the uptake of ART as specified in the NSP and the above survival assumptions, it is estimated that over 1 million adults will be on ART by 2011.

Figure 1: Total adults starting and remaining on ART over the scaling-up period

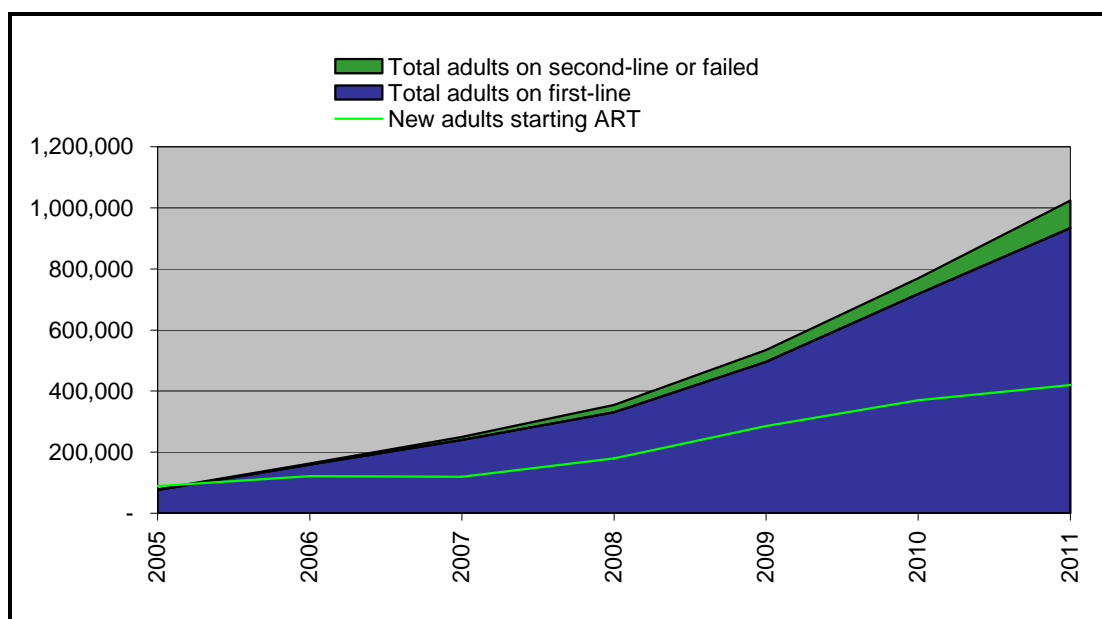


Figure 2: Annual total cost for ARVs, laboratory investigations and services for adult ART

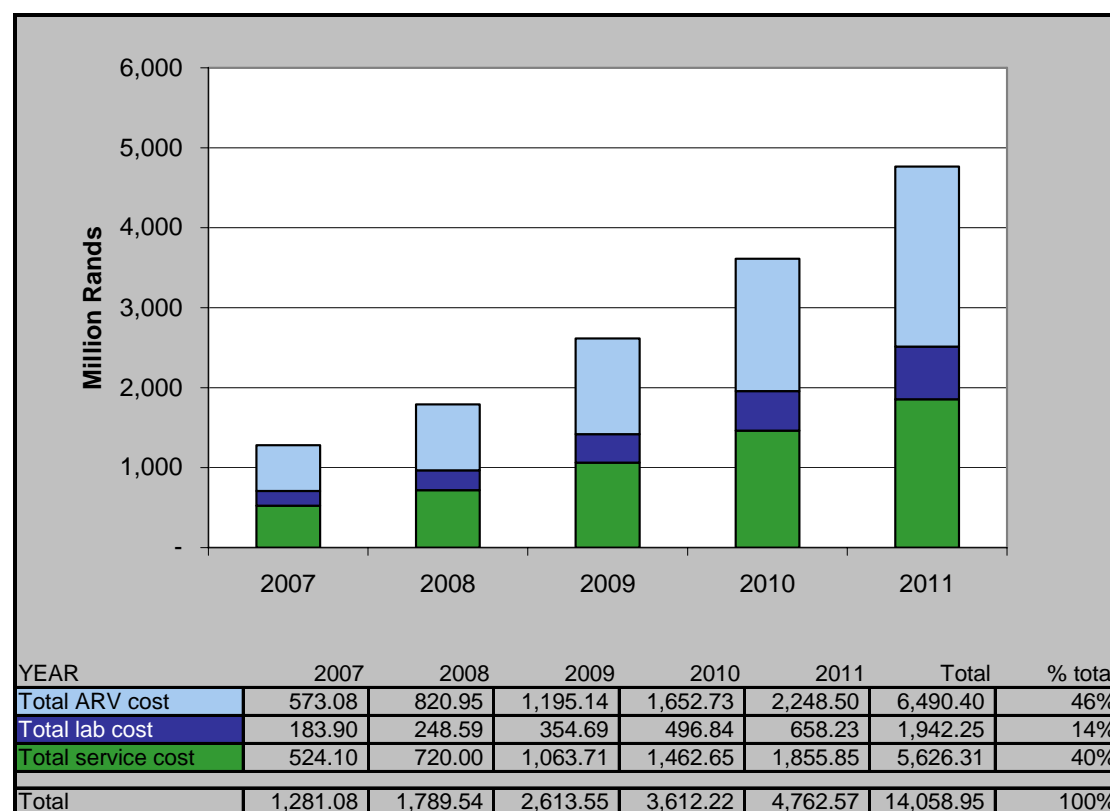


Figure 2 summarizes the annual total cost of ART across the projection period. Costs range between R1.3 billion in 2007 and R4.8 billion in 2011. ARVs are the key cost driver, at 46% of the cost. Given the magnitude of this programme, it is essential to consider less resource intensive models of care. Because services account for 41% of the total cost, one way to reduce costs would be to consider less frequent patient follow-up or to increase the proportion of patients initiated on ART and monitored by nurses outside a hospital setting. Community health centres are potentially an ideal location for ART because of the potential for enhancing access particularly to doctors, laboratory and radiological services. However there are currently only approximately 230 of these facilities in the national health system. It is proposed that this number needs to be increased to at least a ratio of 1 CHC per 100,000 uninsured persons. In addition, the strong network of private general practitioners provides an opportunity to increase access through the establishment of various partnership arrangements between provincial and district health authorities and general practitioners. The costs of this model are currently being assessed by researchers at the University of Cape Town.

Effective management of TB/HIV co-infection

Goal 6.3 within the NSP speaks to the effective management of TB/HIV co-infection and contains targets for active TB case finding. For the purposes of costing, it has been assumed that an increasing percentage of patients developing AIDS (from ASSA2003/ite) will be screened between 2007 and 2011. The cost per patient screened has been taken from Hausler et al [6] and is shown in Table 14.

Improve quality of life for people requiring terminal care

Goal 6.4 indicates that palliative care should be provided to between 220,000 and 250,000 patients per annum over the projection period. Palliative care includes a combination of inpatient and home-based care depending on the needs of the patient. The cost per palliative care admission has been based on the cost structure of Lentegeur hospice (R296 per inpatient day) for an average admission of 18 days. The monthly cost per home-based care visit is R48 for category 2 patients (includes 4 home based care visits per month) and R120 for category 3 patients (includes 8 home based care visits per month). Approximately 3.5% of palliative care patients are inpatients, 64% are home-based in category 2 and 32% are home-based in category 3. In total one can anticipate an average weighted cost of R603 per patient per annum. These data are summarized in Table 12.

Table 12: Ingredients and summarized unit costs for palliative care

Services	Unit cost	# used	Average cost per service
Inpatient care	296.00	18	5,328.00
Home based care (Cat 2)	48.00	6	288.00
Home based care (Cat 3)	120.00	6	720.00
			Weighted cost per service
% inpatient		4%	186.48
% home-based care category 2		64%	185.28
% home-based care category 3		32%	231.60
			Average weighted cost per annum
			603.36

Source: Dr Liz Gwyther, Chairperson of the Hospice Palliative Care Association of South Africa

Summarized costs for Goal 6

Table 12 summarizes the costs of Goal 6. These range from R3.3 to R8.3 billion across the projection period and account for 70% of the costs of the entire NSP. The costs of wellness services decrease over the period of scaling-up because the pool of patients in need but not on ART is decreasing. These services comprise less than 1% of the costs of Goal 6. Similar patterns are found for cotrimoxazole and CD4 testing. The cost of food support ranges between R1.9 and R3.4 billion between 2007 and 2011 and comprises 46% of the costs of Goal 6 and 33% of the costs of the entire NSP (see Table 12). Given the exceptionally high costs of this intervention, it will be particularly important to assess demand, need and effectiveness. ART is the most important driver of costs for Goal 6 and for the NSP in general, at 51% and 36% of costs respectively. The cost of active TB case finding is R18 million in 2007 and increases to R42 million per annum by 2011, at 1% of the costs of Goal 6 and 0.4% of the costs of the NSP. Finally, palliative care costs approximately R100 million per annum or approximately 1% of the total NSP.

Table 12: Goal 6 scenarios and annual total costs (2005/06 prices)

Goal 6		Year					% Goal 6	% NSP
		2007	2008	2009	2010	2011		
6.1. Scale up coverage of the comprehensive care and treatment package								
Improve enrolment in and quality of positive living interventions through wellness programmes (assumed of	% enrolled in wellness programmes	30%	40%	50%	60%	75%		
	# enrolled in wellness programmes	77,389	88,482	71,067	44,507	23,104		
	Annual cost of wellness programmes	24	27	22	14	7	0.3%	0.2%
Increase the proportion of HIV+ adults not on ART who had a CD4 count within last 12 months (assumed of those newly symptomatic)	% receiving CD4 count in last 12 months	30%	45%	60%	70%	80%		
	# receiving CD4 count	77,389	99,542	85,281	51,925	24,644		
	Annual cost of CD4 counts	5	6	5	3	1	0.1%	0.1%
Increase the proportion of eligible adults receiving cotrimoxazole (assumed of those newly symptomatic not on ART)	% receiving cotrimoxazole	20%	30%	50%	70%	80%		
	# receiving cotrimoxazole	51,593	66,362	71,067	51,925	24,644		
	Annual cost of cotrimoxazole	3	3	4	3	1	0.0%	0.0%
Provide food support to eligible households	# households receiving food support	400,000	450,000	500,000	600,000	700,000		
	Annual cost food support	1,920	2,160	2,400	2,880	3,360	46%	32.5%
Increase the number of new adults starting ART	# new adults starting ART	96,000	144,000	228,000	296,000	336,000		
	Annual cost adult ART	1,281	1,790	2,614	3,612	4,763	51%	35.9%
6.3 Ensure effective management of TB/HIV co-infection								
Screen children and adult TB patients for HIV and HIV positive adults (and children?) for TB	% new AIDS cases screened for TB under TB active case finding	40%	60%	80%	90%	90%		
	# adults and children screened	159,529	247,381	335,042	377,493	374,027		
	Annual cost TB active case finding	18	28	37	42	42	1%	0.4%
6.4. Improve quality of life for people with HIV and AIDS requiring terminal care								
Provide a comprehensive package of palliative care to eligible adults and children	# adults	160,000	200,000	200,000	200,000	180,000		
	# children	16,000	20,800	20,000	16,000	16,000		
	Annual cost palliative care	85	107	106	104	95	2%	1%
Annual total cost for Goal 6		3,334.97	4,120.36	5,187.78	6,658.12	8,268.82	100%	70%

Goal 7: Address the special needs of pregnant women and children

Goal 7 includes interventions relating to determining the HIV status of infants, children and adolescents, comprehensive care for children including ART, and food support.

Determine the HIV status of infants, children and adolescents as soon as possible

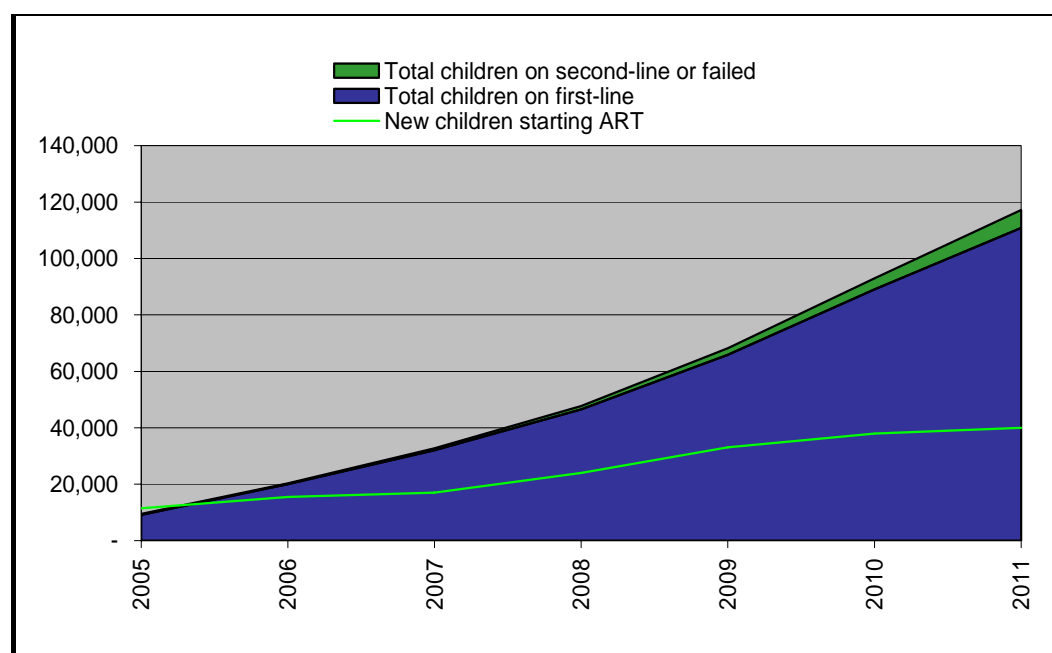
In this section, costs have been included for increasing the proportion of exposed children who are tested with PCR by 6 months, increasing the proportion of symptomatic children tested for HIV and for increasing the proportion of children receiving a CD4% test and cotrimoxazole at the time of diagnosis. All unit costs are summarized in Table 14.

Child antiretroviral treatment

Similar to adults, ART for children offers substantial benefits in terms of reductions in morbidity and mortality. Costs have been based on a similar model of care as described for adults but ARV prices have been increased to reflect the cost of paediatric formulations.

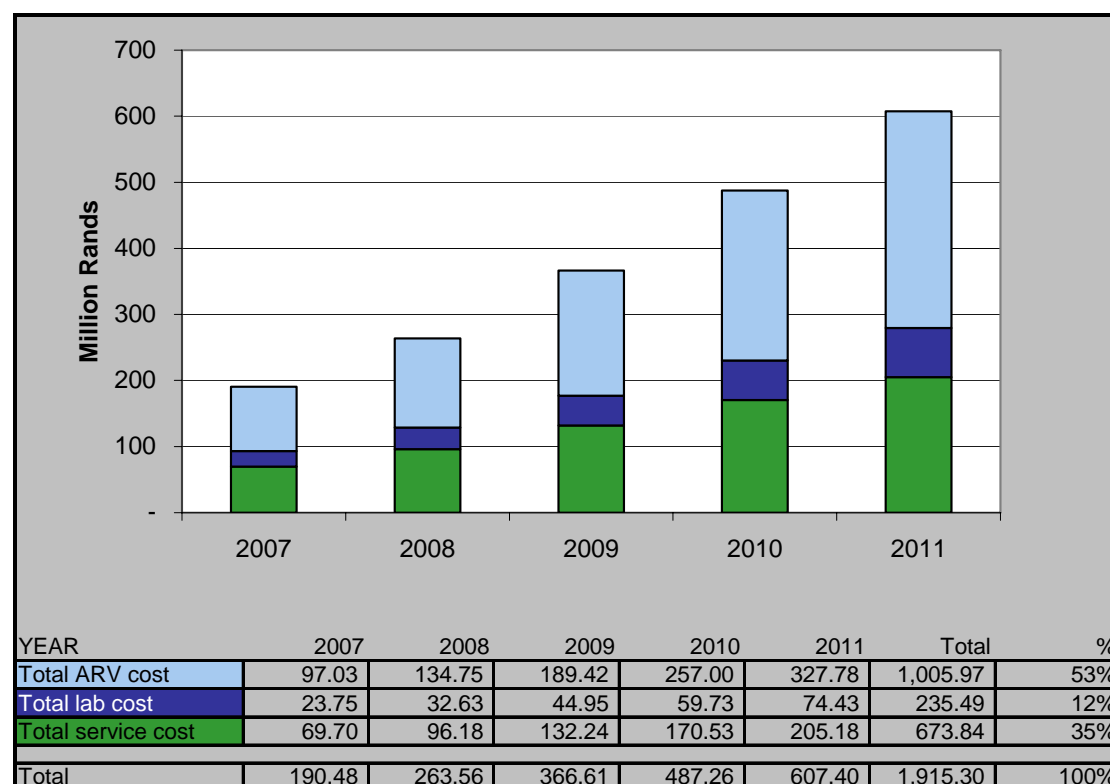
The NSP indicates that up to 40,000 new children will start ART by 2011. Given survival assumptions as outlined for adults, it is estimated that just under 120,000 children will remain in care by the end of 2011. See Figure 3.

Figure 3: Total children starting and remaining on ART over the scaling-up period



The annual cost of child ART is summarized in Figure 4. Fifty-three per cent of the cost relates to ARVs (between R97 and R330 million per annum) and 35% is for services. The annual total cost reaches just over R600 million by 2011.

Figure 4: Annual total cost for ARVs, laboratory investigations and services for child ART



Food support for children

As before, key drivers of the costs of food support are the unit costs and the number of people assumed to be requiring this intervention. According to the NSP, up to 150,000 children could be receiving food support by 2011, at an annual cost of R3,000 per child (see Table 14).

Summarized costs for Goal 7

Targets and annual costs for Goal 7 are presented in Table 13. PCR testing costs range between R17 million in 2007 and R74 million in 2011 and comprise 7% of the costs for Goal 7. HIV testing for children and adolescents ranges between R2 million in 2007 and R4 million in 2011. The provision of a CD4% test and cotrimoxazole ranges from R3 to R17 million per annum. As for adults, the key drivers of costs in Goal 7 are ART and food support. The former costs R190 million in 2007 but increases rapidly to R607 million by 2011. The latter ranges between R90 and R450 million per annum. ART comprises 56% of the costs of Goal 7 and 4.9% of the costs of the entire NSP (see Table 13).

Table 13: Goal 7 scenarios and annual total costs (2005/06 prices)

Goal 7		Year					% Goal 7	% NSP
		2007	2008	2009	2010	2011		
7.2 Determine the HIV status of infants, children and adolescents as early as possible								
Increase the proportion of exposed children tested with PCR by 6 months	% children born to HIV+ mothers in PMTCT programme receiving PCR	45%	65%	85%	90%	90%		
	# children receiving PCR	47,765	97,660	154,094	192,836	202,244		
	Annual cost PCR	17	36	56	70	74	7%	0.6%
Increase the proportion of symptomatic children attending PHC and hospital facilities tested for HIV	% symptomatic children (assume new AIDS cases) tested for HIV	50%	65%	80%	90%	90%		
	# children tested for HIV	22,430	30,612	38,934	44,332	43,902		
	Annual cost HIV testing	2	2	3	4	4	0%	0.0%
Increase the proportion of children receiving a CD4% test and cotrimoxazole at time of diagnosis	% receiving CD4 and cotrimox (of those diagnosed in HIV-testing above)	35%	45%	60%	80%	90%		
	# receiving CD4 and cotrimox	7,850	13,776	23,360	35,466	39,512		
	Annual cost CD4 and cotrimox (includes services)	3	6	10	15	17	1%	0.1%
7.3. Provide a comprehensive package of services that includes wellness care and ART to HIV-affected, -infected and -exposed children and adolescents								
Provide food support to eligible children	# children receiving food support	30,000	45,000	65,000	100,000	150,000		
	Annual cost food support	90	135	195	300	450	34%	3.0%
Increase the number of new children starting ART	# new children starting ART	13,600	19,200	26,400	30,400	32,000		
	Annual cost ART children	190	264	367	487	607	56%	4.9%
Annual total cost for Goal 7		303.01	442.44	630.77	876.07	1,151.30	100%	8.7%

Total costs

To summarize, Figure 5 outlines the costs of the interventions contained in this report, grouped according to goals. The annual total costs calculated in this report range between R5 billion in 2007 and R11.5 billion by 2011. Goal 6 is clearly the most important cost grouping, and comprises 70% of total costs. The second most costly grouping is Goal 2, at 12% of the total.

Four key interventions account for 90% of the total costs of the NSP (as summarized in Figure 6) – these are:

1. ART for adults and children (41%)
2. Food support for adults, children and mothers choosing to breast feed (36%)
3. HIV testing for the general population, mothers in PMTCT, infants exposed to HIV and symptomatic children (6%)
4. Condom provision (4%)
5. Net costs of PMTCT excluding VCT and food for mothers (3%)

It is suggested that if the available budget set aside by Treasury is insufficient to meet all goals, then the most efficient approach to priority setting would be to assess the effectiveness and cost-effectiveness of these five key interventions first.

For example, ART for adults and children has a combined total cost of R16 billion. From this, it is clear that exploring less resource intensive options of ART delivery, including management of patients outside of hospital settings, less frequent patient follow-up and increasing the proportions that are monitored by nurses, could significantly decrease costs and improve cost-effectiveness. On the other hand, the replacement of stavudine or zidovudine with tenofovir will potentially increase ART costs.

The second most expensive intervention is food support for adults, children and mothers choosing to breast feed at a total cost of R14 billion between 2007 and 2011. Given that very little is currently known about demand for or effectiveness of this intervention, this is a clear area where additional research is needed to justify this level of expenditure.

The remaining interventions comprise approximately 13% of total costs. All three of these interventions are essential for the response to HIV/AIDS. HIV testing is a crucial entry point into care and treatment, condom provision is essential to prevention efforts and PMTCT is highly cost-effective, if not cost-saving. Adding short-course zidovudine to the PMTCT programme adds a negligible amount to the total costs of the NSP.

Figure 5: Total costs of the NSP

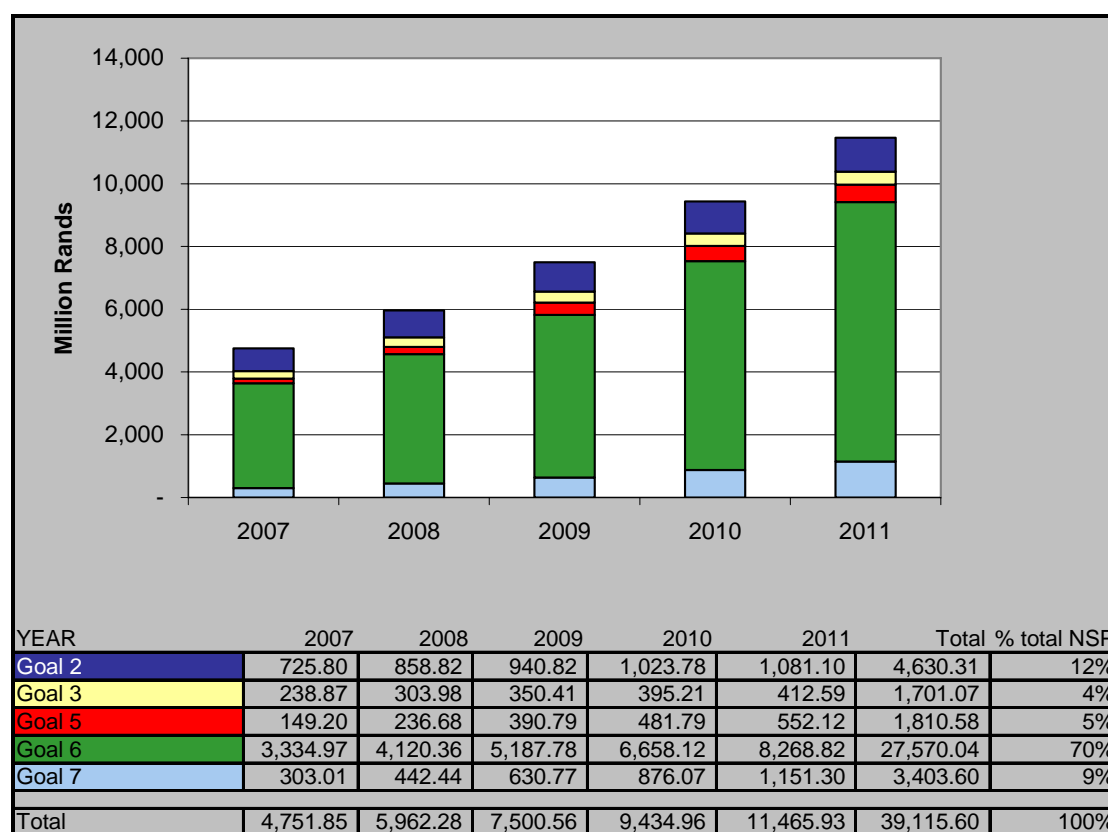
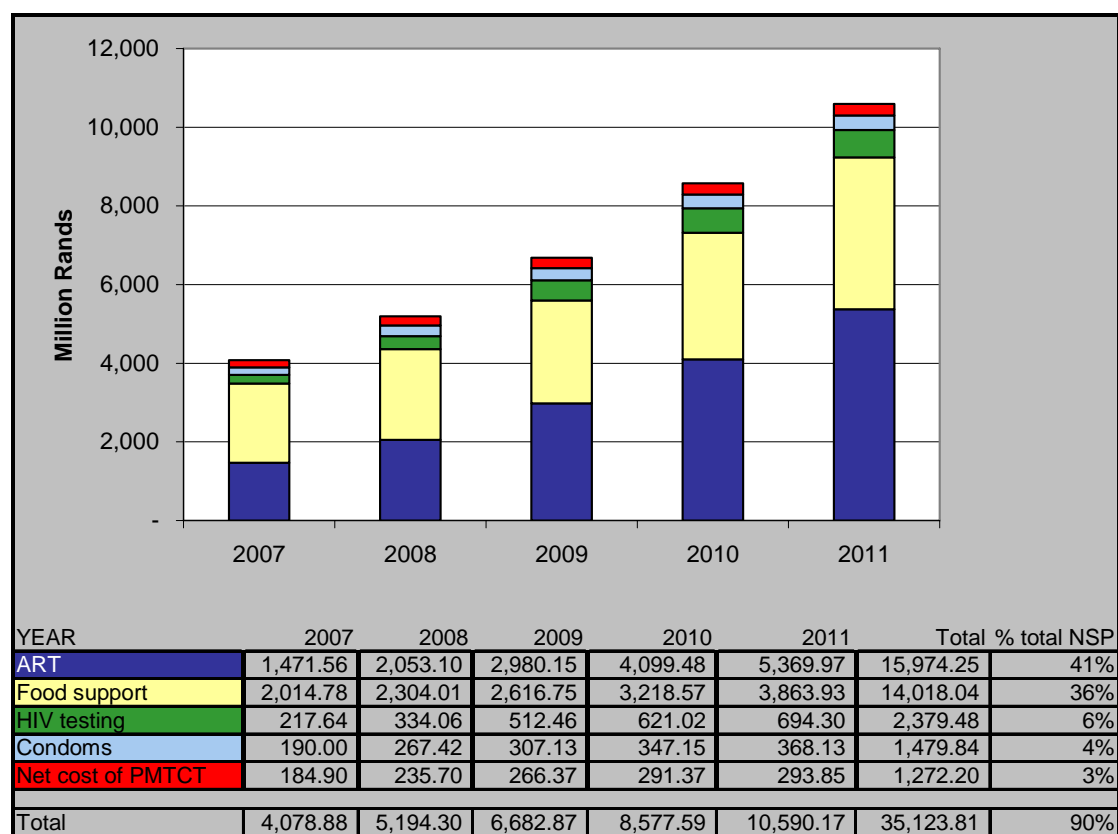


Figure 6: Key cost drivers of the NSP



Conclusion

To conclude, this report has assessed the costs of a number of the key NSP interventions. While every effort has been made to include as many interventions as possible, there are a number of areas where costs have not been assessed. It is proposed that national and provincial departments use this report and the accompanying spreadsheet as a starting point for assessing their budgetary requirements, and that costs are updated as additional information becomes available about new interventions. Finally, monitoring and evaluation information that provides data about the extent to which NSP targets are being met should inform budgetary allocations over the years.

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Appendix A: Summary of interventions included or excluded from costing

Goal 1: Reduce vulnerability to HIV infection and the impact of AIDS	
	Notes on costing
1.1. Accelerate poverty reduction strategies and strengthen safety nets to mitigate the impact of poverty	
Scale-up access to government poverty alleviation programmes	Not directly HIV-related
Monitor poverty reduction programmes and report on MDG target 1	Not directly HIV-related
Ensure equitable provision of basic social services	Not directly HIV-related
Introduce sustainable income transfer system	Not directly HIV-related
1.2 Accelerate programmes to empower women and educate men and women on human rights in general and women rights in particular	
Implement all national policies and legislation	Not directly HIV-related
Develop and implement a communication strategy	Not directly HIV-related
Roll out integrated microfinance and gender education interventions	Not directly HIV-related
1.3. Develop and implement strategies to address gender based violence	
Develop and implement a communication strategy	Not directly HIV-related
1.4. Create an enabling environment for HIV testing	
Develop high profile campaigns utilising peer influence	Included in Goal 2
Expand access to HIV testing beyond formal health care settings	Included in Goal 5
Develop clear consistent HIV prevention messages to be delivered by leadership	Programme-level costs
1.5 Build and maintain leadership from all sectors of society to promote and support the NSP goals	
Ensure regular updates in sectors on priority activities and messages	Programme-level costs
Mobilise and engage custodians of culture and cultural practices through debates, seminars and workshops on cultural practices that fuel the spread of HIV as well as those that are desirable	Not included
1.6. Support national efforts to strengthen social cohesion in communities and to support the institution of the family	
Support programmes as above	Not directly HIV-related
1.7. Build AIDS competent communities through tailored competency processes	
Design and implement as above	Not included

Goal 2: Reduce sexual transmission of HIV	
	Notes on costing
2.1. Strengthen behaviour change programmes, interventions and curricula for the prevention of sexual transmission of HIV, customised for different target groups with a focus on those more vulnerable	
Introduce, evaluate and customize as above	Programme level costs, interventions still need to be developed
2.2. Implement interventions targeted at reducing HIV infection in young people, focusing on young women	
Identify and prioritise interventions in schools reporting high rates of teenage pregnancies	Based on budget for previous DoE conditional grant from 2007 Budget Review, increased by 5% annually
Implement policies aimed at keeping young people in schools	
Introduce, strengthen and evaluate life skills, SRH education and HIV prevention programmes in all primary and secondary schools	
Enhance training of teachers and NGOs to ensure quality delivery of life skills	
2.3. Increase open discussion of HIV and sexuality between parents and children	
Evaluate, adapt and implement parenting programmes that promote positive engagement and communication with children on sexuality and HIV	Not included as programme still needs to be developed
Strengthen SRH and HIV prevention programmes including VCT, STI, contraceptive services and psychosocial support in higher education institutions	Included in 2.11
Develop and implement guidelines for educational institutions to be sites of safety protection and care for children and young people	Included in 2.2
Increase targeted HIV prevention and SRH programmes and initiatives for out of school youth in different settings focusing on informal settlements and rural areas and considering the needs of street children and child headed households	Not included
Increase and coordinate multi-media strategies aimed at youth that promote communication about HIV including HIV prevention, gender and sexuality	Included in 2.11
Increase access to youth friendly health services in the public sector	Not included
2.4. Increase roll out of workplace prevention programmes	
Incremental roll-out of comprehensive prevention package including IEC, VCT, provision of male and female condoms, STI management and TB screening	Included in 2.11
As above but to higher risk occupational groups	Included in 2.11
Develop targeted HIV prevention programmes for domestic workers, gardeners and other employees that are hard to reach	Not included
2.5. Increase roll out of prevention programmes for higher risk populations	
Incremental roll-out of comprehensive customised HIV prevention package in prisons including VCT, male condoms, lubricants, STI symptom recognition, PEP and STI treatment	Included in 2.11 and 2.9
Incremental roll-out of comprehensive customised HIV prevention package for MSM, lesbians and transsexuals including VCT, condoms, lubricants, STI symptom recognition, PEP and STI treatment	Included in 2.11 and 2.9
Incremental roll-out of comprehensive customised HIV prevention package for sex workers and their clients including VCT, condoms, lubricants, STI symptom recognition, PEP and STI treatment	Included in 2.11 and 2.9
2.6. Develop and integrate a package of sexual and reproductive health and HIV prevention services into all relevant health services	
Integrate sexual and reproductive health services and HIV prevention guidelines and programmes into family planning, ANC, STI, TB, ARV treatment services in public and private sectors	Included in unit costs for services and costed in other goals
Increase access to quality STI services in the public and private sector offered by adequately trained staff utilising the updated syndromic management guidelines	Included in 2.11

2.7. Develop a comprehensive package that promotes male sexual health	
Convene a multidisciplinary expert working group to review policy on circumcision	Programme level costs
2.8. Develop and integrate interventions for reducing recreational drug use in young people with HIV prevention efforts	Not included (programme needs to be developed)
2.9. Increase the accessibility and availability of comprehensive sexual assault care including PEP and psychosocial support	
Increase the proportion of facilities offering package of sexual assault care	Included but not change in goal for costing purposes
Evaluate improve and roll out training programmes	
Increase the number of districts with accessible social and mental health services to support child and adult victims of gender based violence	
2.10. Scale up prevention programmes for HIV-positive people	
Develop and implement programmes that support voluntary disclosure of HIV+ status	Not included (programme needs to be developed)
Develop and implement HIV prevention programmes and interventions to reduce HIV transmission and acquisition by HIV+ persons	Not included (programme needs to be developed)
Integrate safer sexual practices, male and female condoms, STI management into all ARV treatment programmes including palliative and home based care	Included in 2.11
Enhance and support integrated positive prevention and care services provided by NGOs, CBOs and community support groups	Not included
2.11. Costing of key prevention interventions for higher risk populations, workers, students at higher educational institutions, out of school youth and HIV+ adults	
STI treatment	Included but note change in goal for costing purposes
Male and female condom provision	Included but note change in goal for costing purposes
IEC and behaviour change programmes	Based on current costs of Khomonani, LoveLife and Soul City, inflated 5% annually
VCT	Included in Goals 3, 5 and 7
TB screening	Included in Goals 6 and 7

Goal 3: Reduce mother to child transmission of HIV	
	Notes on costing
3.1. Broaden existing mother to child transmission services to include other related services for target groups	
Implement programmes to reduce the percentage of unwanted pregnancies through scaling up contraceptive services in public sector facilities, increasing access to TOP services and develop policy on medical abortion	Not directly HIV-related
Expand PMTCT guidelines to include fertility guidelines for HIV infected women, men and discordant couples aimed at supporting informed pregnancy choices	Not included
Implement HIV prevention programmes for uninfected pregnant women	Not included (unless part of VCT)
Implement responsible fatherhood programmes in health districts and in the community	Not directly HIV-related
Expand PMTCT guidelines to cover postnatal services including contraception, and services for mothers and infants beyond six weeks	Not included
3.2. Scale up coverage and improve quality of PMTCT to reduce MTCT to less than 5%	
Increase the proportion of public sector antenatal services providing PMTCT	Included in PMTCT goals
Increase proportion of pregnant women tested through implementation of provider-initiated VCT for all pregnant women	Included
Develop a policy and guidelines on VCT in pregnancy including consideration of provider initiated testing, and frequency of testing	Included in PMTCT goals
Increase the proportion of HIV-infected pregnant women in need who receive PMTCT services (depends on # testing)	Included
Increase the proportion of facilities that meet quality standards for infant feeding counselling	Included in PMTCT service cost
Implement community based strategies to support HIV+ women during and after pregnancy	Included in PMTCT service cost
Undertake CD4 testing of all positive pregnant women and prioritise those with CD4<200 for accelerated access to ART	Included in Goal 7.1
Increase proportion of HIV positive pregnant women receiving a CD4 count at time of positive diagnosis (depends on # in PMTCT) - from Goal 7.1	Included
Provide food support to HIV-positive women choosing to exclusively breast feed (depends on # in PMTCT)	Included
Provide formula milk to children of HIV-positive women choosing to practice replacement feeding (depends on # in PMTCT)	Included

Goal 4: minimize the risk of HIV transmission through blood and blood products

	Notes on costing
4.1. Minimize the risk of HIV transmission from occupational exposure among health care providers in the formal, informal and traditional settings	Not included
4.2. Minimize exposure to infected blood through procedures associated with traditional and complementary practices	Not included
4.3. Investigate the extent of HIV risk from Injecting Drug Use and develop policy to minimise risk of HIV transmission through injecting drug use and unsafe sexual practices	Not included
4.4. Ensure safe supplies of blood and blood products	Not included

Goal 5: Increase coverage of voluntary counselling and testing and promote regular HIV testing

	Notes on costing
5.1. Increase access to VCT services that recognise diversity of needs	
Implement provider-initiated VCT in all health facilities with a special focus on STI, TB etc	Included below
Increase access to VCT through workplaces and trade unions	Included below
Investigate community based VCT strategies	Included below
5.2. Increase uptake of VCT	
Increase the number of adults who have ever had an HIV test with a focus on men	Included if higher cost than adjacent goal
Increase the proportion of adults testing in the past 12 months	Included if higher cost than adjacent goal
Increase the proportion of newly diagnosed HIV+ adults accessing wellness services	Included in other wellness services

Goal 6: Enable people living with HIV and AIDS to lead healthy and productive lives	
	Notes on costing
6.1. Scale up coverage of the comprehensive care and treatment package	
Review and update clinical and programmatic guidelines for the management of HIV and AIDS	Not included
Improve enrolment in and quality of positive living interventions through wellness programmes (assumed of symptomatic adults not on ART)	Included
Increase the proportion of HIV+ adults not on ART who had a CD4 count within last 12 months (assumed of those newly symptomatic)	Included
Increase the proportion of eligible adults receiving cotrimoxazole (assumed of those newly symptomatic not on ART)	Included
Implement integrated contraceptive, cervical screening and fertility services for women	Not included
Provide food support to eligible households	Included
Provide psychosocial support including counselling for bereavement, disclosure and adherence	Included in input costs for ART and wellness services
Develop and implement community based ART promotion and literacy programmes	Included in input costs for ART
Increase the number of new adults starting ART	Included
Increase the proportion of adults started on ART outside a hospital setting	Included in input costs for ART
Increase the proportion of adults started on ART by nurses	Partially included in input costs, but needs more
Increase the proportion of adults on ART managed by nurses	Partially included in input costs, but needs more
6.2. Increase retention of children and adults on ART	
Increase the proportion of people who are still on ART after completing one year of treatment	Current modelling assumption is that 82% are on treatment at one year - would need to adjust survival to calculate incremental costs here
Maintain the percentage of people on ART with viral loads <400 copies/ml after completing one year of treatment	As above
Actively trace people on ART who are more than one month late for clinic/pharmacy appointment	Included in input costs
Implement facility and community based adherence support strategies and programmes	Included in input costs
Increase the proportion of children receiving cotrimoxazole and CD4% test at time of diagnosis	Costed in Goal 7
6.3 Ensure effective management of TB/HIV co-infection	
Ensure implementation of National TB Control Plan	Programme level costs
Screen children and adult TB patients for HIV and HIV positive adults (and children?) for TB	VCT costs already included in Goal 6, only cost TB active case finding here
Improve CD4 monitoring of TB/HIV co-infected children and adults	Included under 6.1 and 7
Increase percentage of TB/HIV co-infected adults receiving cotrimoxazole	Included under 6.1 and 7
Review guidelines for and implementation of INH prophylaxis for adults and children	Programme level costs

6.4. Improve quality of life for people with HIV and AIDS requiring terminal care	
Provide a comprehensive package of palliative care to eligible adults and children	Included
6.5. Strengthen the health system and remove barriers to access	
Increase the proportion of health facilities provided comprehensive HIV care including ART	Included in 6.1 input costs
Build the capacity of health workers and managers to provide comprehensive care, treatment and support	Included in 6.1 input costs
Expand the human resource pool through increased production, retention strategies and partnerships with private providers	Included in 6.1 input costs
Strengthen support, mentoring and supervision of health care providers	Included in 6.1 input costs
Implement policy on occupational exposure to TB in health workers	Not included
Develop career pathways for counsellors as mid-level workers according to the National Qualifications Framework	Programme level costs
Streamline drug procurement and supply management to decrease the number of facilities experiencing drug stock-outs	Included in 6.1 input costs
Decrease the proportion of facilities reporting long turn around times for essential laboratory tests	Included in 6.1 input costs

Goal 7: Address the special needs of pregnant women and children	
	Notes on costing
7.1. Decrease HIV and AIDS related maternal mortality through women-specific programmes	
Implement community-based strategies to support HIV positive women during and after pregnancy	Included under 3.2 in PMTCT input costs
Provide food support to HIV+ women choosing exclusively to breast feed	Included under 3.2
Increase the proportion of HIV+ pregnant women receiving a CD4 count at time of diagnosis	Included under 3.2
Increase the number of HIV+ pregnant women starting comprehensive AIDS care including ART	Included under 6.1
7.2 Determine the HIV status of infants, children and adolescents as early as possible	
Implement provider-initiated testing of children of HIV+ adults using services	Excluded
Increase the proportion of facilities with immunisation services offering HIV DNA PCR tests for early infant diagnosis	Included below
Increase the proportion of exposed children tested with PCR by 6 months	Included
Increase the proportion of symptomatic children attending PHC and hospital facilities tested for HIV	Included
Increase the proportion of children receiving a CD4% test and cotrimoxazole at time of diagnosis	Included
Increase the proportion of children receiving a CD4% test and cotrimoxazole at time of diagnosis	Included
7.3. Provide a comprehensive package of services that includes wellness care and ART to HIV-affected, -infected and -exposed children and adolescents	
Review clinical guidelines for the management of infants, children and adolescents with HIV and AIDS	Programme level costs
Increase the proportion of children with development delays identified and referred for appropriate management	Not included
Implement biannual development screening for all children <5 years	Not included
Provide food support to eligible children	Included
Increase the proportion of HIV+ children not on ART who had a CD4 count according to guidelines	Included in 7.2
Increase the proportion of HIV+ and exposed children receiving cotrimoxazole (assumed of those newly symptomatic)	Exposed children receive cotrimoxazole in PMTCT programme and symptomatic children are already catered for via ART and via wellness services in 7.2
Increase the number of new children starting ART	Included
Increase the proportion of adults children starting on ART outside a hospital setting	Included in input costs for ART
Increase the proportion of children started on ART by nurses	Partially included in input costs, but needs more
Increase the proportion of stable children on ART managed by nurses	Partially included in input costs, but needs more
Increase the proportion of adolescent friendly ART facilities equipped to provide comprehensive care, treatment and support for HIV + adolescents	Partially included in input costs, but needs more
Provide psychosocial support for children and adolescents including counselling for bereavement, disclosure, adherence and sexual aspirations	Included in input costs for ART

Goal 8: Mitigate the impact of HIV and AIDS and create an enabling social environment for care, treatment and support

	Notes on costing
8.1. Strengthen the implementation of OVC policy and programmes	
Monitor implementation of the National Action Plan for OVCs (2006-2008)	Programme level costs
Develop and operationalise mechanisms to identify, track and link OVC and child-headed households to grants, benefits and social services at local level	Not included
Increase the number of sub-districts that have OVC response mechanisms	Not included
Increase the proportion of vulnerable children accessing social grants (child support, foster care and care dependency), benefits and services	Not included
Implement service delivery guidelines defining core services at local level for OVC (exemption from school and health service fees, child support grants, birth registration)	Not included / programme level costs
Increase the proportion of children obtaining vital documents such as birth and death registration	Not included
Increase the proportion of registered civil society organizations receiving organisational support and mentoring	Not included
Increase the proportion of child headed households receiving services of a community care giver	Not included
Develop the capacity of schools, educators and early childhood development centres to provide psychosocial, educational and adherence support to children in need	Not included
8.2. Expand and implement CHBC as part of the EPWP	
Recruit and train new community care givers (including CHWs) with emphasis on men	Not included as CHWs are included in input costs for ART and PMTCT
All community caregivers to receive nationally determined stipends	Not included as CHWs are included in input costs for ART and PMTCT
Develop standards and career pathways for community care givers as mid-level workers according to the National Qualifications Framework	Not included as CHWs are included in input costs for ART and PMTCT
Strengthen support, mentoring and supervision of community caregivers	Not included as CHWs are included in input costs for ART and PMTCT
8.3. Strengthen the implementation of policies and services for marginalised communities affected by HIV and AIDS	
Increase the proportion of older persons receiving support through HCBC	Not included
Increase the proportion of people with disabilities in care, treatment and support programmes	Not included
Develop and implement targeted care and support programmes and material for people with disabilities	Not included
Promote integration and equitable representation of LGBT people in care, treatment and support programmes	Not included

Appendix B: Summary of unit costs

Table 14: Summarized unit costs of NSP interventions (in 2005/06 prices)

Tests for HIV-treatment	Cost per test	Description
FBC	34.95	
ALT	25.40	
CD4	60.00	
VL	300.00	
Glucose	16.45	
Chol/TG	48.23	
Drugs	Annual cost	
AZT	973.47	
3TC	440.89	
d4T	263.59	
ddl	1,907.08	
NVP	517.65	
EFV	2,604.96	
LPV/r	4,318.71	
Commodities	Cost	
Cotrimoxazole	50.00	Annual cost of cotrimoxazole
Formula milk	884.00	4-month cost of 2 tins Pelargon per week
Food for Hh	4,800.00	Annual cost of food support per household (source: DSD)
Food for Mothers	300.00	4-month cost of food support for mothers
Food for children	3,000.00	Annual cost of food support for children (source: DSD)
Male condoms	0.28	Cost per condom with 25% markup for distribution
Female condoms	9.25	Cost per condom with 25% markup for distribution
Tests for HIV diagnosis	Cost per test	
Abbott	10.00	VCT first rapid test
Gaifor	15.00	VCT confirmatory rapid test
ELISA	35.00	VCT serological test
PCR	365.00	For testing infants
Service delivery for ART	Cost per service	
ART visit	158.69	Comprehensive visit cost including follow-up with doctor or nurse, counselling, non-ARV prophylaxis and treatment and community outreach (Cleary et. al, 2006)
Service delivery for HIV-Tx	Cost per service	
Inpatient day	896.31	Inpatient day in secondary hospital
TB full course	4,637.15	Cost per TB case treated (Cleary et. al, 2006)
Home-based care		Home based care
Palliative care	296.00	Cost per IPD, St Luke's, Lentegour (Liz Gwyther personal communication)
Home-based care - category 2	48.00	Cost per month
Home-based care - category 3	120.00	Cost per month
HIV visit	154.30	Average clinic, CHC and OPD visit cost for HIV care
TB screening	111.76	Cost per person screened under TB active case finding
STI treatment	70.93	Average cost per primary care visit (Cleary et al, 2005)
Service delivery for VCT & PMTCT	Cost per service	
Pre and post test counselling	62.74	Cost per patient pre and post test counselled for VCT (Hausler et. al, 2005)
PMTCT visit	172.00	PMTCT component of antenatal visit (Boulle et al, 2006)
Other	Cost per service	
Cost per person provided with PEP	209.32	Christofides et al, 2006