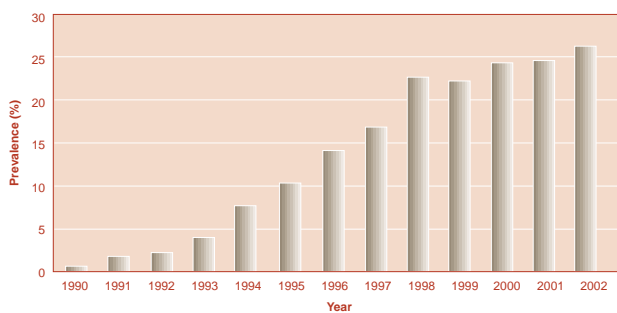


Tanya Doherty<sup>i</sup> and Mark Colvin<sup>ii</sup>

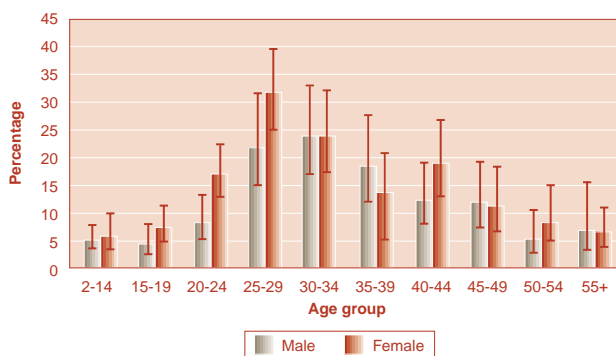
<sup>i</sup> Health Systems Trust

<sup>ii</sup> Medical Research Council

## HIV prevalence trends among antenatal clinic attendees



## HIV prevalence by age and sex [95% CI], 2002



## Key Messages

- ◇ South Africa has an estimated 4-6 million people living with HIV/AIDS.
- ◇ Prevalence appears to be levelling.
- ◇ Incidence data are difficult to obtain, but it is believed that incidence rates have peaked.
- ◇ Behavioural change, expansion of PMTCT and access to antiretrovirals will help to reduce incidence of new infections.
- ◇ The burden of data collection requirements for monitoring the HIV/AIDS epidemic can result in poor quality data.

## Framework for Monitoring and Evaluation

### Global:

- ◇ UNGASS Declaration of Commitment on HIV/AIDS; Guidelines on construction of Core Indicators
- ◇ Millennium Development Goal #6
- ◇ WHO '3 by 5 initiative'
- ◇ Abuja Declaration on HIV/AIDS, TB and other infectious diseases

### South Africa:

- ◇ HIV/AIDS and STD Strategic Plan 2000-2005
- ◇ Various DoH Guidelines and Recommendations on specific aspects of HIV/AIDS
- ◇ Operational Plan for Comprehensive HIV/AIDS Care, Management and Treatment
- ◇ Health Goals, Objectives and Indicators 2001-2005

## Key Indicators

- HIV prevalence (%) (antenatal)
- HIV prevalence (%) (total population and selected sub-groups)
- HIV incidence rate
- AIDS orphans
- Percentage of deaths due to AIDS

## Key References and Data Sources

- ◇ Annual Antenatal HIV and syphilis seroprevalence surveys
- ◇ NM/HSRC Household Survey 2002
- ◇ HIV/AIDS profile in the provinces of SA – Dorrington/Bradshaw
- ◇ Impact of HIV/AIDS on the Health Sector (HSRC)

## Introduction

Sub-Saharan Africa remains the region most affected by the HIV/AIDS epidemic. UNAIDS<sup>1</sup> estimates that in 2003, 26.6 million people in this region were living with HIV and approximately 2.3 million people died from AIDS. In South Africa (SA) it is estimated that 5.3 million people were living with HIV at the end of 2002, based on antenatal clinic-based surveillance.<sup>2</sup> The national prevalence of HIV amongst pregnant women in SA in 2002 was estimated to be 26.5%.

Until recently there have been relatively few data generated from outside of antenatal clinic settings, and those which have been available have not allowed accurate disaggregation to a provincial level or by population groups in SA. This situation has now changed and data on the impact of HIV and AIDS at the household, community, and population level are becoming more available. This has been critical to the development of estimates and predictions to monitor the epidemic and to determine the impact of prevention initiatives.

The availability of data on sub-populations, racial groups, age groups and localities has enabled closer analysis of issues of equity in both the burden of infection and access to care and treatment. The data presented in this chapter highlight the disparities between and within provinces in access to basic prevention and care services.

Many of the challenges to the provision of adequate care and treatment services in under-resourced provinces relate to poor health system functioning. This is largely due to a severe human resource crisis, limited management capacity and poor health system infrastructure.

The announcement of the national Department of Health's operational plan for comprehensive HIV and AIDS care, management and treatment for SA, including the provision of antiretroviral (ARV) drugs in the public sector is an encouraging move that could result in a significant change in the quality of life for individuals living with HIV; however, it should be accompanied by general health system strengthening in order to prevent widening of the inequities between provinces, racial groups and urban / rural locations.

This chapter provides information on the extent of the HIV epidemic in SA using data from both the antenatal survey and the Nelson Mandela/Human Science Research Council (NM/HSRC) household survey. Attempts are made to present HIV prevalence data by sub-population groups and in different

sectors. The impact of HIV on the economy and on health services is also discussed.

## Framework for Monitoring and Evaluation

### International Monitoring Frameworks and Commitments for HIV/AIDS

Numerous monitoring and evaluation frameworks for HIV/AIDS have been developed by international organisations to provide guidance to countries. The monitoring and evaluation frameworks are needed to monitor progress towards goals and targets of national and global HIV/AIDS initiatives, and to strengthen country responses to the epidemic.<sup>3</sup> However, despite these guidelines few data exist for many important indicators.

The stated intention to fight the HIV/AIDS pandemic and ambitious targets and commitments have been articulated in a variety of international documents. The Declaration of Commitment on HIV/AIDS<sup>4</sup> adopted by the United Nations General Assembly Special Session (UNGASS) on HIV/AIDS in June 2001 commits Member States and the global community to taking decisive and urgent action to address the HIV/AIDS crisis. The Millennium Development Goals,<sup>5</sup> adopted in September 2000, call for expanded efforts to halt and reverse the spread of HIV/AIDS by 2015. The Abuja Declaration<sup>6</sup> and Framework for Action on HIV/AIDS, Tuberculosis and Other Related Infectious Diseases adopted at the African Summit in 2001, declare regional and national commitments to confront the epidemic. The Southern African Development Community (SADC) declaration on HIV and AIDS<sup>7</sup> reaffirms the Abuja declaration and commits member states to combating HIV and AIDS through effective regional collaboration, mutual support and the participation of all key stakeholders. These goals commit the global community to take strong action to address the HIV/AIDS crisis.

Achieving these goals requires significantly expanding HIV/AIDS programmes to enable greater numbers of individuals to access prevention and care services. A set of indicators have been developed by UNAIDS to assist countries to monitor the targets set in these global commitments on HIV/AIDS.<sup>8</sup> These include global and national level indicators. The national indicators covering programmes, behaviour and impact are listed in Table 2.

<sup>1</sup> Available from URL: <http://www.sadc.int/>

Table 1: Summary of the key global declarations and commitments for HIV/AIDS

Organisation/Initiative	Target
Declaration of commitment on HIV/AIDS: prevention goal	To reduce by 2005 HIV prevalence among young men and women aged 15-24 in the most affected countries by 25% (and by 25% percent globally by 2010).
Declaration of commitment on HIV/AIDS: coverage goal	By 2005, ensure that at least 90% (and by 2010 at least 95%) of young men and women aged 15 to 24 have access to the information, education, including peer education and youth-specific HIV education, and services necessary to develop the life skills required to reduce their vulnerability to HIV infection, in full partnership with young persons, parents, families and health-care providers.
Declaration of commitment on HIV/AIDS: coverage goal	By 2005, reduce the proportion of infants infected with HIV by 20%, and by 50% by 2010, by ensuring that 80% of pregnant women accessing antenatal care have information, counselling and other HIV-prevention services available to them.
Millennium Development Goal #6	To have halted and begun to reverse the spread of HIV/AIDS by 2015
WHO and UNAIDS '3 by 5 initiative' <sup>7</sup>	To provide antiretroviral therapy to 3 million people with HIV/AIDS in developing countries by the end of 2005.

Table 2: National programme and behaviour indicators

Indicators	Reporting Schedule	Method of data collection
<b>National programme and behaviour</b>		
1. Percentage of schools with teachers who have been trained in life-skills-based HIV/AIDS education and who taught it during the last academic year	Biennial	School-based survey and education programme review
2. Percentage of large enterprises / companies that have HIV/AIDS workplace policies and programmes	Biennial	Workplace survey
3. Percentage of patients with STIs at health care facilities who are appropriately diagnosed, treated and counselled	Biennial	Health facility survey
4. Percentage of HIV-infected pregnant women receiving a complete course of antiretroviral prophylaxis to reduce the risk of MTCT	Biennial	Programme monitoring and estimates
5. Percentage of people with advanced HIV infection receiving antiretroviral combination therapy	Biennial	Programme monitoring and estimates
6. Percentage of injecting drug users who have adopted behaviours that reduce transmission of HIV <sup>i</sup>	Biennial	Special survey
7. Percentage of young people aged 15-24 who both correctly identify ways of preventing the sexual transmission of HIV and who reject major misconceptions about HIV transmission <sup>ii</sup> ( <b>Target: 90% by 2005; 95% by 2010</b> )	Every 4-5 years	Population-based survey
8. Percentage of young people aged 15-24 reporting the use of a condom during sexual intercourse with a non-regular sexual partner <sup>ii</sup>	Every 4-5 years	Population-based survey
9. Ratio of current school attendance among orphans to that among non-orphans, aged 10-14 <sup>ii</sup>	Every 4-5 years	Population-based survey
<b>National impact indicators</b>		
1. Percentage of young people aged 15-24 who are HIV-infected <sup>ii</sup> ( <b>Target: 25% reduction in most affected countries by 2005; 25% reduction globally, by 2010</b> )	Biennial	HIV sentinel surveillance
2. Percentage of HIV-infected infants born to HIV-infected mothers ( <b>Target: 20% reduction by 2005; 50% reduction by 2010</b> )	Biennial	Estimate based on programme coverage

Source: Guidelines on construction of Core Indicators<sup>8</sup>

Notes: <sup>i</sup> Applicable to countries where injecting drug use is an established mode of HIV transmission.

<sup>ii</sup> Millennium Development Goal indicators.

Some of these indicators can be measured through service statistics, however these are often incomplete and of poor quality. Service utilisation and coverage are best measured by national population or facility surveys; however, these are costly, time-consuming and require specialised expertise for design and implementation. Several African countries including SA have recently conducted population level HIV prevalence surveys that have been a valuable source of comparison with antenatal prevalence data.

## National Monitoring Frameworks for HIV/AIDS

The South African government's key actions to address HIV/AIDS are laid out in the national five-year strategic plan for HIV/AIDS and STDs.<sup>9</sup> The overall goals stated in the plan are to reduce the number of new HIV infections (especially among youth) and to reduce the impact of HIV/AIDS on individuals, families and communities. Key indicators were developed to track the country's response to the epidemic (Box 1). Some of these are broad socio-demographic indicators that are not directly related to HIV/AIDS. The prevalence indicators can be measured using the national sentinel surveillance amongst pregnant women, while others require focused research studies amongst defined populations or sectors. The strategic plan does not outline how these indicators should be collected or how regularly they should be reported on.

In 2002, the national Department of Health (NDoH) released a report on the progress achieved with the strategic plan.<sup>10</sup> This report highlights the increased resource allocation for HIV/AIDS, capacity development efforts, implementation of new prevention programmes such as Prevention of Mother-to-Child Transmission (PMTCT) and care programmes including home-based care. While the report lists the number of programmes or services initiated, no data on coverage or uptake of these services is presented. It is therefore difficult to measure whether the increased resources and programme implementation have resulted in increased access to HIV services.

The Health Goals, Objectives and Indicators document<sup>11</sup> does specify details of a number of indicators to monitor the goal of decreasing the incidence of HIV/AIDS, STIs and TB, including:

- ◆ HIV prevalence by 5-year age groups
- ◆ HIV prevalence (antenatal) (15-24 years) (**Target:** Reduce by 20% by 2005)
- ◆ Percentage of hospitals and clinics where VCT is available
- ◆ Percentage of adult population with access to VCT (Target for % of PHC facilities and hospitals to offer VCT is 90% by 2003/04 and 100% by 2007/08)<sup>b</sup>

### Box 1: National set of primary indicators and surveillance data for SA<sup>9</sup>

#### General trend of the epidemic

1. Prevalence of HIV amongst antenatal clinic attendees (using national sentinel surveillance procedure).

#### Youth

2. Prevalence of HIV amongst antenatal clinic attendees below the age of 18 years (using national sentinel surveillance procedure).
3. Teenage pregnancy incidence and rate.

#### Prevention

4. Proportion of STD cases effectively managed using syndromic treatment in a) the public sector; b) the private sector.
5. Percentage of sexually active women using condoms.
6. Proportion of children leaving primary school who are fully informed of the causes and methods of transmission of HIV.

#### Socio-economic indicators predisposing to HIV transmission

7. Proportion of households living below the minimum poverty line.
8. Unemployment rate.

#### Abuse of women

9. The number of reported rape cases.
10. The number of cases of workplace legislation abuse related to employees contracting HIV.

#### Social values, human rights and acceptance in the community

11. The number of VCT clients.
12. The number of homeless children, as a proxy indicator of the capacity of society to care for AIDS orphans.
13. The number of people "coming out" as people living with AIDS.

Source: HIV/AIDS and STD Strategic Plan<sup>9</sup>

- ◆ HIV incidence in infants (**Target:** Reduce by 20% by 2005)
- ◆ Percentage of HIV/AIDS population with access to TB treatment
- ◆ Percentage of HIV+ or AIDS patients referred for Home Based Care.

Since the strategic plan was developed, the PMTCT programme was launched and a set of indicators were developed for monitoring the performance of the eighteen pilot sites. The purpose of the pilot sites was to assess the feasibility of implementing a national programme; therefore far more data items were required for these 'research sites' than are required for a scaled-up programme. The dataset for the pilot sites consisted of 23 indicators and 30 data elements that were

b Provincial Strategic Planning Guidelines

**Table 3: PMTCT Indicators Included in the revised National Minimum Data Set for Primary Health Care**

Indicator	Numerator	Denominator
HIV testing rate among antenatal clients	HIV tests done on antenatal clients	1 <sup>st</sup> Antenatal visits
HIV-positive rate among pregnant women tested	Antenatal clients testing HIV positive	HIV tests done on antenatal clients
Nevirapine uptake among pregnant women with HIV	Nevirapine doses to antenatal women (at the facility, during labour)	Deliveries to HIV-positive women
Nevirapine uptake among infants born to women with HIV	Nevirapine doses to infants born to women with HIV	Live births to women with HIV
HIV transmission rate at 1 year	Positive HIV tests of infants at 1 year	First HIV tests of infants at 1 year

Note: As approved by NHISSA on 16/08/02. All provinces will be collecting data from 1 April 2004.

separate from the essential primary health care data. Many health facilities were unable to collect this amount of data and consequently the data that were received were frequently of poor quality.<sup>12</sup> Now that the programme has been scaled up in many provinces, a revised set of indicators has been selected for integration into the national PHC minimum data set (Table 3).

The NDoH's operational plan for comprehensive HIV and AIDS care, management and treatment for SA, which includes the provision of antiretrovirals, has its own set of monitoring guidelines that are essential to the effectiveness of the programme. The plan<sup>13</sup> includes several indicators designed to measure programme outcome and impact (Box 2).

**Box 2: Outcome and impact indicators for monitoring and evaluation<sup>i</sup>**

- ◇ Number of people tested
- ◇ Percentage of people testing HIV-positive
- ◇ Number of HIV-positive people in care and staged
- ◇ Number of eligible patients receiving ARVs
- ◇ Number of persons on ARVs with undetectable viral load
- ◇ Time between meeting staging criteria and receipt of ARVs
- ◇ Mean change in CD4 among persons on ARVs
- ◇ Rate of opportunistic infections among HIV infected
- ◇ Average weight gain of patients on ARVs
- ◇ Percentage of patients on first and second line regimen
- ◇ Number of adverse events<sup>ii</sup>
- ◇ Prevalence of resistant strains (sentinel study)
- ◇ Number and duration of inpatient visits
- ◇ Number of casualty visits
- ◇ Quality of life and score on Karnofsky Index
- ◇ Number of AIDS-related deaths

Source: Operational Plan for HIV/AIDS Care<sup>13</sup>

Note: *i* Draft list as given in source. Work is currently underway to refine this.

*ii* Data will be collected by the pharmacovigilance unit.

It is planned that data relating to this programme will be collected through an electronic patient information system with a paper based back-up system in place. However, while this system is being developed, data will be recorded on paper at facility and district levels. Monitoring of these indicators will rely on accurate data capturing by frontline health workers. Given the experiences with data completeness in the PMTCT programme<sup>12</sup> additional human resources may be needed for information management to ease the burden on practitioners. The operational plan<sup>13</sup> allows for the hiring and training of one clerk and one data-capturer per ARV site.

### Indicator Definitions

**HIV prevalence (%) (antenatal):** Percentage of women surveyed at antenatal clinics testing positive for HIV over a specified time point.

**HIV prevalence (%) (total population):** Percentage of population estimated to be HIV positive. Population used as denominator is generally the projected population calculated from the given model.

**HIV incidence rate:** The number of new cases of HIV in a given period in a specified population.

**AIDS orphans:** Number of children under 15 years whose mothers have died of HIV/AIDS. (This is the definition most frequently used, but some sources use 18 as an age limit and may consider maternal, paternal or dual (both parents dead) orphans.)

**Percentage of deaths due to AIDS:** Percentage of total deaths attributed to AIDS related causes.

## Data: Population Prevalence and Incidence

### Population level prevalence of HIV

Estimates of HIV prevalence in the South African population were, until recently, based on extrapolations from the NDoH antenatal HIV prevalence surveys. These surveys have been conducted annually since 1990 and provide clear evidence as to the explosive growth of the HIV epidemic from a prevalence of less than 1% among pregnant women in 1990 to over 26% by 2002. However, while providing reasonably accurate estimates of the prevalence of HIV among women attending public sector antenatal health care facilities, these surveys provide no data on women using private health care, women using contraception and no data on men and children. It is also unclear how biased the antenatal data are, as women are asked for consent to participate and the NDoH does not publish data on the refusal rates. Finally, not all the provinces follow the protocol rigidly which may result in unknown biases; for example, in KwaZulu-Natal (KZN) the sites used are not based on a probability sample but were hand selected for convenience. All 35 sentinel sites in KZN are on main roads where HIV prevalence is often higher than in more isolated places. The Dorrington/Bradshaw<sup>14</sup> and UNAIDS<sup>15</sup> estimates and projections are based largely on this data source.

It was due to this lack of information on the prevalence of HIV in the general population that the Nelson Mandela Foundation funded the HSRC in 2002 to conduct a national, community-based HIV prevalence survey.<sup>16</sup> The sampling frame consisted

of the entire population over 2 years of age except for the homeless and those living in institutions. The major limitation of this study was that of the 13 518 individuals selected for participation, only 8 428 (62.3%) provided specimens for HIV testing. Analysis shows that those that refused to provide specimens did not differ significantly from those that did as measured by demographic or behavioural indicators but, nevertheless, it cannot be determined to what extent the data may be biased due to non-participation. The Rehle/Shisana<sup>17</sup> estimates and projections are based on both the antenatal data and the NM/HSRC data.

The results of all the major published studies are compared in Table 4.

Table 5 compares the 2001 antenatal HIV prevalence data<sup>18</sup> with the NM/HSRC data for comparable groups. The prevalence of HIV among the under 25 year olds is significantly lower in the NM/HSRC sample than the antenatal sample. This is probably because not all women in this age group are sexually active and by only sampling those practising unprotected sex, the antenatal data overestimate the HIV prevalence in this age group. This is an acknowledged bias in antenatal data.

Among older women the picture is more complicated. It is believed that antenatal data probably *underestimate* the prevalence in older women because they are likely to have had their HIV infections for longer, will be less fertile for biological reasons, and many may know their HIV status and choose not to have children. However, in both the antenatal data and the NM/HSRC data, the estimates fluctuate inconsistently across age bands and have wide confidence intervals making comparisons difficult.

**Table 4: Comparison of various population HIV prevalence level estimates for SA**

Population HIV infected	NM/HSRC <sup>16</sup>	UNAIDS <sup>1</sup> end 2002	2002 antenatal <sup>2</sup>	Dorrington/ Bradshaw <sup>14</sup>	Rehle/ Shisana <sup>17</sup>
South African population	5.1 million 11.4%	5.0 million 11.4%	5.3 million 11.8%	6.5 million 14.2%	4.69 million 10.4%
15-49 year old adults	15.6%	4.7 million 20.1%	5.25 million 19.3%		17.4%
18-64 year old adults	15.5%			6.1 million	
Women aged 15-49 years	17.7% 21.4% <sup>i</sup>	2.7 million	26.5%	3.2 million 25.9%	
Youth 15-24 years	9.3%			1.2 million	
Female youth 15-24 years	12.0%			948 000	
Male youth 15-24 yrs	6.1%			263 000	
Children 0-15 years		250 000			
Children 0-14 years				205 134	
Children 2-14 years	5.6%				

Note: <sup>i</sup> General population standardised to antenatal population.

**Table 5: Comparison of antenatal data to NM/HSRC data, HIV prevalence % [95% CI]**

Age Group	Antenatal 2001 <sup>18</sup>		NM/HSRC <sup>16</sup>					
			total sample		all women		African + Coloured women	
15-19	15.4	[13.8 - 16.9]	5.9	[4.0 - 8.8]	7.3	[4.7 - 11.3]	8.1	[5.2 - 12.5]
20-24	28.4	[26.5 - 30.2]	13.2	[10.4 - 16.7]	17.1	[12.9 - 22.3]	17.5	[13.2 - 22.9]
25-29	31.4	[29.5 - 33.3]	28.4	[22.9 - 34.6]	32.0	[24.9 - 40.1]	35.3	[27.4 - 44.1]
30-34	25.6	[23.5 - 27.7]	24.1	[19.0 - 30.1]	24.1	[17.3 - 32.5]	27.0	[19.4 - 36.1]
35-39	19.3	[17.0 - 21.5]	15.6	[11.2 - 21.3]	13.8	[8.7 - 21.1]	15.5	[9.7 - 23.8]
40-44	9.1	[6.2 - 11.9]	16.4	[12.1 - 22.0]	19.0	[12.9 - 27.2]	20.9	[14.0 - 30.0]
45-49	17.8	[4.3 - 31.4]	11.5	[7.9 - 16.6]	11.2	[6.5 - 18.7]	11.0	[5.9 - 19.4]

Table 6 compares the estimates by province for women aged between 15 and 49 years as reported by the NM/HSRC study, the antenatal study and modelled estimates. In comparison to the antenatal data, the NM/HSRC study found a significantly lower HIV prevalence in KwaZulu-Natal, the Free State and the Eastern Cape and significantly higher estimates in the Western Cape.

### Incidence of HIV

The prevalence of HIV in a population provides information on the number and proportion of people who are currently living with HIV. Because individuals can live up to 10 years or longer with HIV, the prevalence of HIV will not change rapidly even when the incidence of HIV (i.e. the number of new cases in a given time period) changes dramatically. Therefore the best indicator

of current HIV transmission rates is the incidence rate of HIV rather than the prevalence. Knowledge of incidence rates also allows us to better predict future prevalence levels and to assess the impact of preventive interventions.

However, data on incidence rates are difficult to obtain and most estimates of incidence rates are modelled from prevalence levels and by making a number of assumptions. Dorrington/Bradshaw have calculated incidence rates for 2002 for each province and for various age groups. They believe that incidence rates have peaked in all provinces and that the overall national incidence rate is now 2.1%, i.e. that in 2002, 2.1% of the HIV uninfected population became infected. Note that the highest incidence rates are among the newborns and breast-fed children and that the provinces with the highest HIV prevalence are not necessarily the provinces with the highest HIV incidence rate.<sup>14</sup>

**Table 6: Comparison of the NM/HSRC provincial HIV prevalence estimates with data from the antenatal survey and the Dorrington/Bradshaw modelled estimates, HIV prevalence % [95% CI]**

Province	NM/HSRC <sup>16</sup> 2002 <sup>i</sup>		Standardised rate <sup>ii</sup>	Antenatal <sup>18</sup> 2002		Dorrington/Bradshaw <sup>14, iii</sup> 2002
Eastern Cape	12.0	[8.1 - 17.0]	14.9	23.6	[21.1 - 26.1]	23.8
Free State	14.6	[8.5 - 24.2]	17.7	28.8	[26.3 - 31.2]	28.9
Gauteng	27.7	[20.0 - 37.0]	29.3	31.6	[29.7 - 33.6]	25.0
KwaZulu-Natal	22.1	[16.2 - 29.5]	22.7	36.5	[33.8 - 39.2]	34.5
Limpopo	11.8	[7.5 - 18.1]	13.7	15.6	[13.2 - 17.9]	22.7
Mpumalanga	23.4	[15.9 - 33.3]	24.8	28.6	[25.3 - 31.8]	30.2
Northern Cape	11.8	[7.4 - 18.1]	19.4	15.1	[11.7 - 18.6]	14.8
North West	18.5	[11.3 - 28.9]	22.1	26.2	[23.1 - 29.4]	26.3
Western Cape	20.7	[12.0 - 33.4]	23.9	12.4	[8.8 - 15.9]	8.4
South Africa	19.2	[16.5 - 20.7]	21.4	26.5	[25.5 - 27.6]	25.9

Notes: *i* African + Coloured women (15-49 years).

*ii* NM/HSRC rates for African and Coloured women standardised to the antenatal population.

*iii* Women of child-bearing age (15-49 years).

**Table 7: HIV Incidence rate estimates for SA (%), 2002**

	EC	FS	GP	KZN	LP <sup>i</sup>	MP	NC	NW	WC	SA
Total population	2.1	2.3	2.0	2.3	1.9	2.3	1.3	2.1	0.7	2.1
Adults (18-64)	3.4	3.4	2.9	3.3	3.1	3.5	2.0	3.2	1.1	3.1
Adult men (18-64)	1.5	1.7	1.5	1.6	1.5	1.7	0.9	1.6	0.4	1.5
Adult women (18-64)	3.2	2.9	2.4	2.5	2.6	2.9	2.0	2.6	1.4	2.7
Perinatal (of births)	5.5	6.5	5.6	8.3	5.2	6.9	3.4	5.9	1.5	6.0
Mother's milk (of infants) <sup>ii</sup>	3.5	4.1	3.5	5.4	3.2	4.4	2.1	3.7	1.0	3.8

Source: Dorrington/Bradshaw<sup>14</sup>

Notes: *i* The model does not fit this province very well and as a result probably overstates the impact of the epidemic.

*ii* The incidence for mother's milk is calculated here as the number of new infections in 2002 through breast milk as a percentage of babies born uninfected during the year.

## Conclusion

There is no one 'gold standard' data set on the prevalence of HIV in the general population. Each study approach has its strengths and weaknesses and needs to be interpreted in its own context. However, it is hoped that when the NM/HSRC study is repeated in 2004 the participation rates will be improved and hence allow this community-based survey to produce the best general populace data set available.

One complicating factor in estimating the prevalence of HIV in SA in the future will be the roll-out of ARVs. The increased availability of these drugs is likely to result in people with the infection living longer and so whilst the incidence of new infections may continue to drop, the prevalence of people living with HIV may become stable or even increase because people will live longer with HIV. Future projections of prevalence rates will therefore have to incorporate such possibilities into their calculations.

## The distribution of HIV in the population

Whilst national or provincial estimates on the prevalence of HIV are useful for tracking the course of the epidemic, they do not provide a picture of the differences in prevalence by various demographic and socio-economic factors. Such data come from special studies conducted in communities or specific sub-populations. The NM/HSRC study has, for the first time, provided insight into how HIV is distributed among sub-populations at a national level. A few of the key findings from this survey and other sources are highlighted here.

## HIV prevalence by socio-economic factors

Poverty makes individuals more vulnerable to HIV infection for a variety of reasons, including having less access to information and a reduced capacity to negotiate safer sexual practices. However, HIV infection is by no means confined to the poorer sectors of society and wealthier people have their own risk factors such as access to disposable income and frequency of travel. The NM/HSRC study showed that among Africans, the chance of being infected with HIV was similar across socio-economic strata as measured by self-reported income level. Studies in businesses have shown a slightly different picture in that the prevalence of HIV tends to decrease in the managerial and higher job bands regardless of race.

As with many studies across Africa and in SA, the NM/HSRC study showed that there was no association between level of education and being infected with HIV. Indeed, among Africans, 21.1% of those with a matric were HIV positive compared to 8.7% of those with no schooling.

## HIV prevalence by race

Importantly, the NM/HSRC study has dispelled the myth that HIV/AIDS is a "black disease" with the finding that 6.2% of the White population is HIV infected.<sup>16</sup> Such a high percentage indicates a generalised epidemic and cannot be accounted for by being isolated to sub-sections of the community such as homosexuals or injecting drug users. It must be noted that no similar HIV infection level has been measured in any other predominantly White community anywhere else in the world.<sup>19</sup> The HIV prevalence among Africans was 12.9%.



## HIV prevalence by locality

The finding from the NM/HSRC study that there is no significant difference in HIV prevalence between urban formal and rural areas indicates that SA does not have the same rural / urban differential in HIV prevalence levels as occurs in many other African countries. This may be due to the superior transport networks that exist in SA permitting easier traffic flow between urban and rural areas.

However, there is a significantly higher prevalence of HIV among those people living in urban informal areas, indicating the link between deprived socio-economic circumstances and an increased vulnerability to HIV infection. Apart from a higher HIV prevalence, residents in informal areas also tended to have more concurrent sexual partners, were sexually active at a younger age and had a higher prevalence of STIs than people from other locality types.

## HIV prevalence by gender

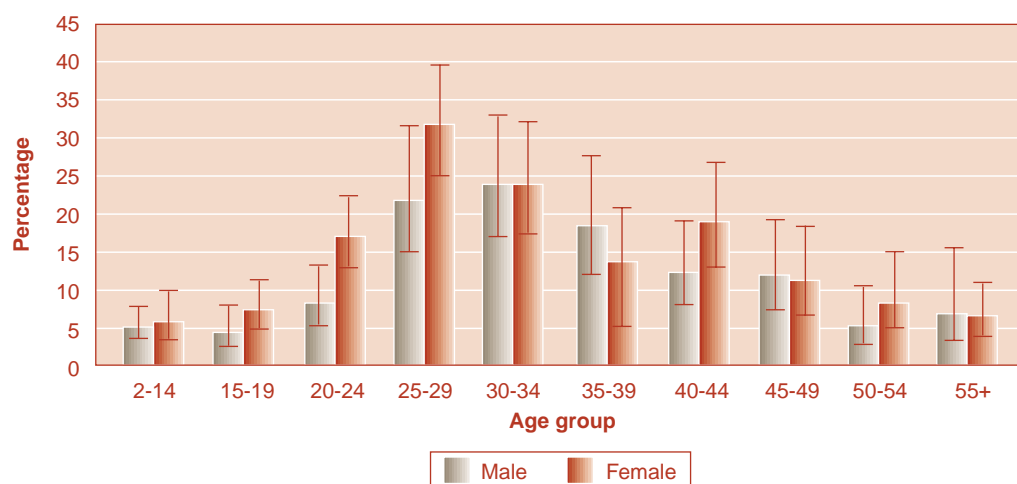
Figure 1 shows the distribution of HIV by age and sex as found in the NM/HSRC study. These data are compatible with other studies that have also shown that HIV prevalence rises rapidly among young women and peaks in the 20 to 30 year olds whereas it rises more slowly among men and peaks in a slightly older age group. Overall, the prevalence among women was 15.0% compared to 11.5% among men ( $\geq 15$  years,  $p=0.01$ ). This gender imbalance is the norm in developing countries that have generalised, heterosexual HIV epidemics, but stands in stark contrast to the epidemics in the US and Europe, where more men than women are infected.

## HIV prevalence in youth

An encouraging finding from the annual antenatal seroprevalence surveys is the continued decline in HIV and syphilis prevalence among the under 20 year olds. Age specific analysis of antenatal data, as displayed in Table 8, shows a modest decline in HIV infection rates among 15-19 year old ANC attendees from 21% in 1998 to 16.5% in 1999 and down to 14.8% by 2002. Although the decline in HIV is not statistically significant, the trend is encouraging and at least shows a stabilisation among this age group. Table 9 shows the prevalence rate amongst youth aged 15-24 years as reported in the NM/HSRC study, which was found to be 9.3%. When stratified by gender the differences in prevalence are pronounced. Women aged 15-24 years were found to have an HIV prevalence of 12%, similar to the antenatal finding and double the prevalence amongst male youth (6%).

The NM/HSRC report provides the first population level data on HIV prevalence amongst children. This study found an unexpectedly high prevalence of 5.6% amongst children aged 2-14 years. The researchers suggest that this finding warrants further research to determine whether the high prevalence rate in this age group is attributable to sexual abuse, vertical transmission or nosocomial infections. Due to the small size of this sample the data cannot be presented by race group, locality or province. However when analysed by sex, no significant differences were found in the prevalence rate amongst boys and girls.

Figure 1: HIV prevalence by age and sex, SA, 2002<sup>16</sup>



**Table 8: Estimated HIV prevalence [95% CI] by age group among ANC attendees, 1998-2002**

Age group	1998	1999	2000	2001	2002
<20	21.0 [18.4 - 23.8]	16.5 [14.9 - 18.1]	16.1 [14.5 - 17.7]	15.4 [13.8 - 16.9]	14.8 [13.4 - 16.1]
20-24	26.1 [24.1 - 28.1]	25.6 [24.0 - 27.3]	29.1 [27.4 - 30.8]	28.4 [26.5 - 30.2]	29.1 [27.5 - 30.6]
25-29	26.9 [24.7 - 29.0]	26.4 [24.6 - 28.3]	30.6 [28.8 - 32.4]	31.4 [29.5 - 33.3]	34.5 [32.6 - 36.4]
30-34	19.1 [17.1 - 21.1]	21.7 [19.1 - 23.8]	23.3 [21.5 - 25.1]	25.6 [23.5 - 27.7]	29.5 [27.4 - 31.6]
35-39	13.4 [11.2 - 15.6]	16.2 [14.1 - 18.3]	15.8 [13.9 - 17.7]	19.3 [17.0 - 21.5]	19.8 [17.5 - 22.0]
40+			11.0 [7.9 - 14.2]	9.8 [7.0 - 12.6]	17.2 [13.5 - 20.9]

Source: Antenatal sero-prevalence surveys

**Table 9: HIV prevalence by age group, 2002**

Age	HIV+ (%)	[95% CI]
Total	11.4	[10.0 - 12.7]
Children (2-14 years)	5.6	[3.7 - 7.4]
Youths (15-24 years)	9.3	[7.3 - 11.2]
Male	6.1	[3.9 - 8.3]
Female	12.0	[9.2 - 14.7]
Adults (≥25 years)	15.5	[13.5 - 17.5]

Source: NM/HSRC<sup>16</sup>

## HIV prevalence in working populations

An increasing number of businesses are conducting HIV prevalence studies among their workforces for the purposes of risk assessment and strategic planning. Table 10 lists some of these companies and the data reflect a wide variation in HIV prevalence levels. It must be noted that crude data from companies are not directly comparable as each has a different workforce structure in terms of age, sex and race. In general, however, the prevalence of HIV amongst the employed population is lower than that measured among antenatal clinic attendees in the same area.

Economists have used the HIV surveillance data along with individual level data from workplaces to calculate the cost of HIV to a range of companies. The differences in costs to the companies arise largely from differences in employee benefits; a case of AIDS costs more to a company that provides comprehensive benefits in comparison to a company that has only minimal benefits. However, in all companies, HIV will have a significant impact and these data have proved useful for planning and scenario setting. For example, all three major motor manufacturers in the Eastern Cape (DaimlerChrysler, Delta and

**Table 10: HIV prevalence levels in selected workforces**

Sector	HIV+ (%)
National Utility Firm	8.9
National parastatal	15.1
Transport parastatal	16.5
Heavy Industry - MP	22.0
Heavy industry - EC	5.7
Heavy industry - EC	8.4
Retail distributor - KZN	7.9
Chemical - KZN	18
IT Company - GP	7.2
Pharmaceutical - GP	8.5

Source: Information compiled from various sources

Volkswagen) have conducted prevalence surveys and economic impact assessments and now all offer employees antiretrovirals as part of a comprehensive HIV/AIDS prevention and treatment programme.<sup>c</sup>

Whilst these developments are to be applauded, there is also evidence that companies are protecting themselves from the impact of this epidemic by using less constructive approaches, in particular the trend to "outsource" lower skilled jobs to labour brokers who frequently do not provide benefits, is of concern because the burden of caring for HIV infected individuals will now fall on the family and the state.<sup>20</sup>

## HIV prevalence among sex workers

Prevalence data among sex workers comes from small sentinel studies conducted in KwaZulu-Natal. HIV prevalence among sex workers tested in major urban areas increased from 50%

c Newspaper article, This Day, 19 March 2004.

**Table 11: Estimated number of maternal orphans under 18 years, SA, 2002**

	EC	FS	GP	KZN	LP <sup>i</sup>	MP	NC	NW	WC	SA
Total orphans	138 409	53 757	144 827	231 672	109 856	76 182	12 502	69 333	49 442	885 980
Total AIDS orphans	38 322	20 854	58 100	120 167	30 498	36 541	2 672	24 645	7 133	338 932
New orphans	28 273	12 270	36 228	60 073	21 781	18 365	2 545	15 728	8 843	204 107
New AIDS orphans	17 507	8 850	25 608	48 510	13 477	14 290	1 299	10 745	3 414	143 700

Source: Dorrington/Bradshaw<sup>14</sup>

Notes: <sup>i</sup> The model does not fit this province very well and as a result probably overstates the impact of the epidemic.

in 1997 to 61% in 1998.<sup>15</sup> An increase was also seen in those tested outside major urban areas, from 44% in 1997 to 67% in 1998; however this rate decreased to 50% in 2000. There is no routine surveillance of HIV prevalence in this sub-group and data are limited to one geographical region. It is therefore difficult to draw any conclusions regarding trends in HIV prevalence amongst this group. Further research is needed to determine the impact of targeted prevention campaigns and increased access to VCT services on the prevalence in this high-risk group.

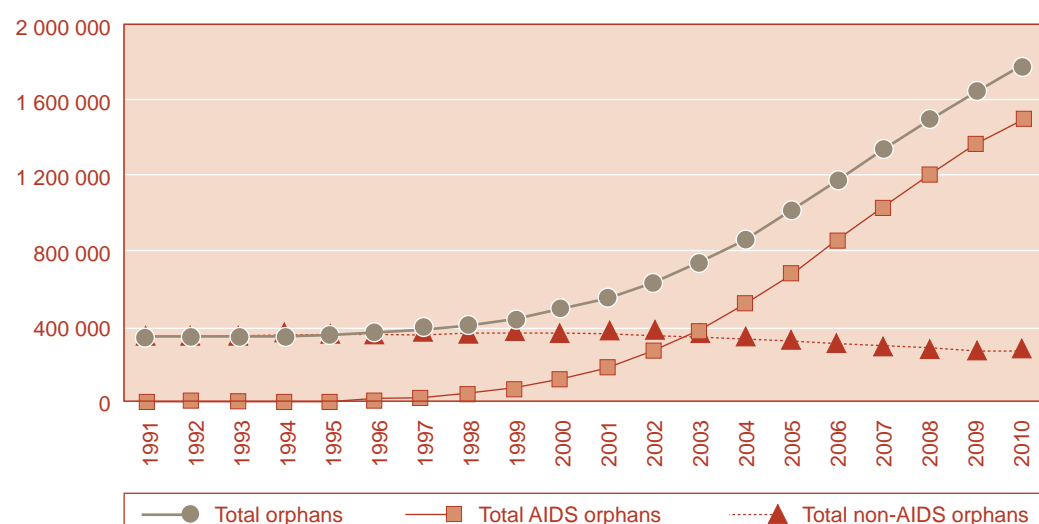
## Prevalence of orphans

Caring for orphans is one of the greatest challenges facing SA. The prevalence of orphans in SA in 2002 has been determined using the ASSA 2000 model.<sup>14</sup> The model estimated that there were over 885 000 orphans (under 18 years) in SA in July 2002. Of the overall total, 38% were estimated to have been orphaned as a result of AIDS. UNAIDS estimated that at the end of 2001 there were 660 000 children (under age 15) in SA who had lost one or both parents due to AIDS.<sup>15</sup>

The greatest burden of AIDS orphans is in KwaZulu-Natal and Gauteng, the two provinces with the highest antenatal HIV prevalence rates. In KwaZulu-Natal and Mpumalanga, AIDS orphans constitute half of the total orphans in these provinces. Modelling of the impact of HIV on orphans in Figure 2 shows the rapid rise that can be expected over the next 10 years. This will place an enormous burden on the health, welfare and education sectors and will result in immense suffering among children.

UNICEF estimated that 15% of South African households with orphans have children taking care of one or more orphans. The ratio of current school attendance among orphans to that of non-orphans is 0.95.<sup>21</sup>

The provision of antiretrovirals will hopefully curb the rise in orphans in the long term as parents will be able to live longer and family units should be less disrupted.

**Figure 2: Maternal orphans under 15 years, SA<sup>14</sup>**

## Mortality due to AIDS

Individuals infected with HIV will, in the absence of ARVs, progress to develop AIDS and most will die within one to two years of developing AIDS. In many developed countries, the incidence and prevalence of AIDS is known with a fair degree of accuracy as these countries have reliable health information systems. However, in SA AIDS is not a notifiable disease and there is no reliable, empirical data on deaths due to AIDS. Instead, researchers have made estimates based on the prevalence of HIV and knowledge of the mean time between acquiring the infection and developing AIDS.

Dorrington et al.<sup>14</sup> estimate that of the 6.5 million people living with HIV, 409 113 (6.3%) had full blown AIDS (WHO stage 4) as of mid year 2002. An additional 18% (1.2 million) are estimated to be in WHO stage 3 of the disease and the remaining 75% will be largely asymptomatic.

AIDS is now the leading cause of death in sub-Saharan Africa<sup>15</sup> and SA.<sup>22</sup> In 2002 AIDS accounted for 40% of all deaths in SA and over half the deaths in KwaZulu-Natal (52%) and Mpumalanga (51%).<sup>14</sup> By mid-year 2002, an estimated cumulative total of 688 000 people in SA had died of AIDS.<sup>14</sup>

It has been argued that making AIDS a notifiable disease will improve our estimates of the prevalence and incidence of HIV. However, whether this administrative step will yield useful data is debatable, as many people do not access the formal health care system and even when they do, there is substantial evidence from other notifiable diseases that these conditions are typically under-detected and under-reported, resulting in highly unreliable data. AIDS is more difficult to diagnose than many of the other notifiable diseases and there is no reason to believe that reporting rates of AIDS will be any better than for other conditions. Although the then health minister, Dr Zuma, announced in 1997 that AIDS would be put onto the list of notifiable diseases, this has never been implemented.

## Prevention Indicators

### Behaviour change in the context of HIV/AIDS

The primary goal of HIV prevention interventions is to achieve a change in people's behaviour that will result in a lowering of the HIV transmission rate. However, there is scant evidence on how effective various prevention efforts have been. This is partly because of the lack of research in this field, particularly longitudinal research, but also because of the complex web of

factors and interactions that mediate between particular interventions and subsequent behaviour change. Measuring human behaviour, particularly in the field of human sexuality, is difficult and notoriously subject to bias.

Nevertheless, in spite of these limitations, there is accumulating evidence that individuals are modifying their behaviour. The NM/HSRC study found that 40.2% of adult and youth respondents had changed their sexual behaviour in response to the HIV/AIDS epidemic with most (65%) indicating that they were sticking to one partner, 33.9% were always using condoms, 18.1% were abstaining from sex and 12.2% had reduced their number of sexual partners.<sup>16</sup>

Perhaps the most convincing evidence of behaviour change is the dramatic increase in the distribution and use of condoms. The allocation of condoms by the DoH rose from 198 million in 2000 to an estimated 275 million by 2002 and the NM/HSRC study found that 97.9% of respondents aged 15-24 and 96.1% of 25-49 year olds knew where to obtain condoms should they need them.<sup>16</sup> Comparisons between the South Africa Demographic and Health Survey (SADHS)<sup>23</sup> conducted in 1998 and the 2002 NM/HSRC survey (Table 12) show significant increases in condom use in all age groups over the 5 years between surveys, particularly among women. These data should however be interpreted with caution as the survey questions posed were somewhat different.

**Table 12: Percentage of females who have ever used a condom, and percentage who used a condom at last intercourse among females who have had sex in the past 12 months, 1998 and 2002**

	NM/HSRC 2002 (%)	SADHS 1998 (%)
<b>Ever condom use</b>		
15-19	68.3	28.4
20-24	63.3	32.4
25-29	60.3	28.4
30-34	50.7	27.5
<b>Condom use at last intercourse<sup>i</sup></b>		
15-19	47.9	19.5
20-24	47.4	14.4
25-29	33.7	7.6
30-34	28.0	6.6
Urban	29.6	10.0
Non-urban	27.5	5.5

Note: <sup>i</sup> NM/HSRC – last intercourse with any partner  
SADHS – last intercourse with casual acquaintance

Whilst the data on condoms and behaviour change reported above is good news, other key indicators of sexual behaviour do not appear to be significantly improving. Results from the NM/HSRC study show that younger people tended to have become sexually active at an earlier age than their older counterparts; the exact opposite trend to what has occurred in countries such as Uganda where the epidemic is in decline. A review of sexual behavioural studies of South African youth during the 1990s<sup>24</sup> reported that at least 50% of youth were sexually experienced by 16 years of age. The same article concluded that a combination of personal factors and contextual factors, including poverty and cultural norms that promoted the subjugation of women, all served to undermine safer-sex prevention efforts.

## Voluntary counselling and testing (VCT)

### Access to services

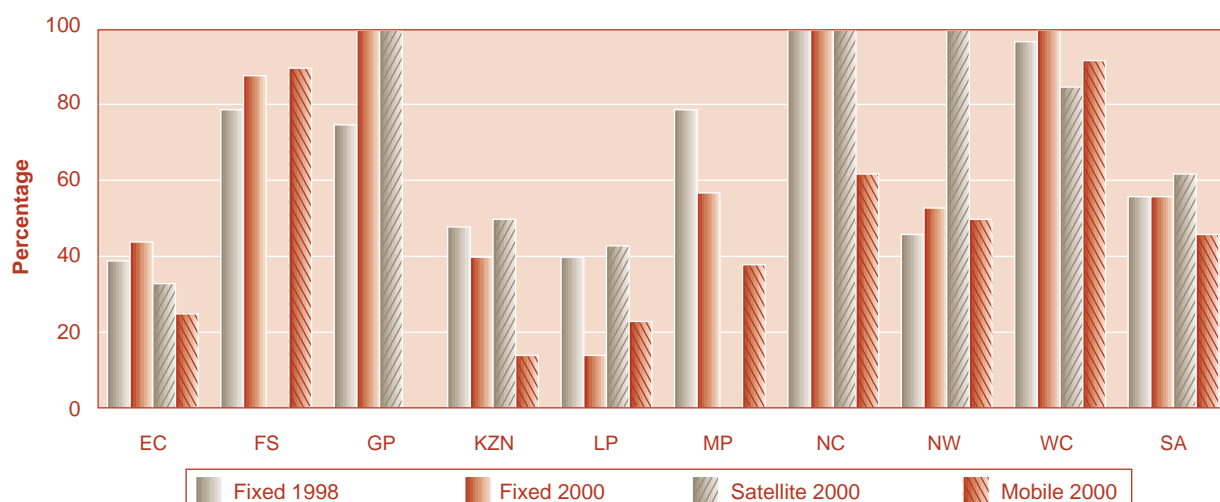
The 2000 National Primary Health Care Facilities Survey<sup>25</sup> found wide provincial variations in the availability of VCT services. Figure 3 reflects patterns of inequity, as the largest provision of VCT services is in the most urbanised provinces where there is better infrastructure, better distribution of human resources and fewer social and cultural constraints.

In 2000, 56% of fixed facilities provided services for HIV testing.<sup>25</sup> This is the same figure recorded in the 1998 facility survey. The provinces with the largest proportion of facilities with HIV testing services were the Western Cape, Gauteng and the Northern Cape. In the Eastern Cape, Limpopo and KwaZulu-Natal less than 50% of PHC facilities had HIV testing services. WHO estimated that in 2001 only 2% of the population at risk in SA had access to VCT services.<sup>28, d</sup>

A national baseline assessment of STI and HIV services<sup>26</sup> in the public sector has provided more recent data on availability of VCT services. This survey found that 67% of all PHC facilities were offering HIV counselling and 69% were offering HIV testing in July 2002. The smaller proportion of facilities offering counselling is attributed to shortages of trained staff. It is clear that availability of VCT services has increased over the past few years although it still falls far short of the NDoH expansion plans for PMTCT and VCT that aimed to have VCT services available in 80% of public health facilities by the end of the 2003/4 financial year.

Data from the STI baseline survey show that 53% of PHC facilities in SA are designated VCT sites (Table 13).<sup>26</sup> Some of the facilities offering VCT services are not designated sites as they do not meet all the necessary criteria.

Figure 3: Percentage of fixed (1998, 2000), satellite and mobile (2000) clinics providing HIV testing



Source: 2000 National Primary Health Care Facility Survey<sup>25</sup>

Table 13: Estimate of percentage of PHC facilities that are designated VCT sites

Province	EC	FS	GP	KZN	LP	MP	NC	NW	WC	SA
% of facilities that are VCT sites	27	68	46	33	72	62	63	66	87	53

Source: Baseline Survey of STI and HIV services<sup>26</sup>

d For the purpose of calculating coverage, the population in need was estimated as twice the prevalence (to indicate the population with some risk of infection) divided by 5 years, since not everyone would be tested in 1 year. This is no more than a rough approximation to the actual need, which is difficult to ascertain.

## Utilisation of VCT services

VCT is the entry point into HIV prevention and care services and without large efforts to increase access to this service, effective HIV/AIDS care will not be delivered to a large proportion of the population.

There is limited data on the utilisation of VCT services and on the prevalence of HIV amongst users of VCT services. This is largely due to the rapid expansion of VCT services over the past few years and the separation of services between clinics, community health centres and district level hospitals making accumulation of data extremely difficult.

The National Baseline Assessment of STI and HIV services<sup>26</sup> provides some data on utilisation of VCT services. The results of this survey show that overall 0.8% of all PHC clients accessed HIV counselling and testing services at PHC facilities during the period of the survey (July 2002).

The survey found large differences in the average number of clients tested for HIV in PMTCT sites (23 tests per month) compared with other VCT sites (11 tests per month). This may be due to the fact that VCT has become a routine part of antenatal care whereas clients attending primary health care centres or hospitals for other services need to actively request to be tested. The provinces with the greatest proportion of the population 15 years and over who were tested for HIV in 2002 were the Western Cape (3.78%), North West (2.52%) and Northern Cape (2.67%). The other six provinces test considerably fewer clients with the smallest number tested in the Northern Cape (1 280). This reflects differences in availability of PMTCT and other VCT services across provinces as well as the availability of trained staff to undertake counselling and testing. The survey found that only 27% of all PHC facility staff were trained in HIV counselling.

The NM/HSRC household survey provides some information on the factors influencing utilisation of VCT services. The study found that only 19.8% of people who knew about VCT services made use of the services. When asked if they would consider going for an HIV test, 59.4% reported that they would consider a test if confidentiality was maintained, however, 71% reported that their reason for not testing was because they considered themselves to be at low risk of being infected. This highlights that negative perceptions of services and low perceived risk are significant factors influencing utilisation of VCT services. Planning for VCT services should therefore take into consideration issues of access and acceptability to ensure optimal utilisation of this service.

Utilisation of VCT services, particularly amongst pregnant women has shown an increase as PMTCT services have been scaled

up across the country. Uptake of HIV testing amongst pregnant women attending PMTCT pilot sites in 2001 was 51%;<sup>12</sup> this increased to 56% in 2002.<sup>10</sup> The availability of space for counselling and the availability of lay counsellors may be limiting the uptake of VCT services in many parts of the country.

## Prevention of mother-to-child transmission (PMTCT)

### Access to PMTCT services

A programme for PMTCT was initiated in SA in 2001. A total of 18 pilot sites, two in each of the 9 provinces, were selected using broad criteria including high HIV prevalence, representation of urban and rural health services, and primary and secondary level facilities. These served as research and learning sites to assess the feasibility of implementing this programme more widely. In May 2002, the Constitutional Court of SA ruled that PMTCT services should be available at all sites with capacity, as judged by local medical staff. There has subsequently been a gradual and steady expansion of the PMTCT programme beyond the original pilot sites.

The extent of coverage of PMTCT services in SA is difficult to determine because few data are available outside of the 18 pilot sites. These pilot sites achieved coverage of approximately 9% (84 406/901 882) of the total antenatal bookings in the public sector in 2002, which represents the same coverage in these sites as found in 2001.<sup>27</sup> The total national coverage for PMTCT certainly exceeds this figure as some provinces managed to extend PMTCT beyond the pilot sites during this same time period, with KwaZulu-Natal and the Western Cape achieving high levels of provincial coverage. The 9% figure therefore represents a conservative estimate of national PMTCT coverage in SA. WHO<sup>28</sup> estimated that in 2001, 13% of pregnant women in SA had access to PMTCT services.<sup>e</sup> This however was the year in which the programme began therefore one would expect the current figure to be higher. The baseline survey of STI and HIV services in July 2002 estimated that 29% of PHC facilities were providing PMTCT services.<sup>26</sup>

Table 14 shows the proportions of PHC facilities in each of the provinces that were designated PMTCT sites in July 2002. The Western Cape had the highest proportion of PHC facilities that were PMTCT sites (57%). The lowest proportions of PMTCT facilities were found in Mpumalanga (16%) and Free State (18%).<sup>26</sup> It should be noted that PMTCT has been further scaled up since 2002 however poor documentation and incomplete routine data collection has made it extremely difficult to determine current levels of national coverage for this programme.

e For the purpose of calculating coverage, the population in need is defined as all pregnant women.

**Table 14: Estimate of proportion of PHC facilities that were designated PMTCT sites in July 2002**

	Proportion of PHC facilities that were PMTCT sites (%)	[95% CI]
EC	29	[21 - 39]
FS	18	[10 - 31]
GP	22	[13 - 35]
KZN	20	[14 - 28]
LP	35	[24 - 47]
MP	16	[9 - 26]
NC	29	[19 - 40]
NW	31	[21 - 44]
WC	57	[46 - 67]
SA	29	[26 - 33]

Source: Baseline Survey of STI and HIV services<sup>26</sup>

### Transmission rates and estimates of numbers of infected children

A total of 1907 live infants were born to HIV-positive women in the PMTCT pilot sites between April 2001 and March 2002, and were due for follow up visits and testing (9 month and 12 month testing) between January and December 2002. Of these a total of 949 infants were seen and tested for HIV in the pilot sites which translates to a follow up rate of 50%. Of these, 18% tested HIV positive.<sup>27</sup>

This figure cannot be extrapolated to the full cohort, as no information is available on the other 50%, for whom seroconversion could be vastly different for a variety of reasons. Furthermore, no information is available on infant feeding practices of the mothers of infants on whom HIV tests were conducted. Given that this programme collects unlinked aggregated data it is not possible to link key data items to individual patients. It is therefore not possible to draw any conclusions on impact or effectiveness of the programme from these data. A national PMTCT cohort study commissioned by the NDoH is underway in three sites across the country in order to determine the outcome of infants enrolled in PMTCT programmes. This study collects longitudinal data on infant feeding practices and HIV transmission from a cohort of 800 HIV infected mothers and their infants between birth and nine months. This will be the first study in SA to provide data on the operational effectiveness of the PMTCT programme.

**Table 15: Infant follow up and HIV testing in the 18 pilot sites**

Province	Number of live births	Number of infants tested for HIV	HIV testing rate (%)	Number of infants testing HIV+
Eastern Cape <sup>i</sup>	305 (Sep 01 - Mar 02)	76 (Jun - Dec 02)	25	4
Free State <sup>i</sup>	129 (Aug 01 - Mar 02)	56 (May - Dec 02)	43	21
Gauteng <sup>ii</sup>	403 (May - Dec 01)	40 (May - Dec 02)	10	3
KwaZulu-Natal <sup>ii</sup>	470 (Sep - Dec 01)	368 (Sep - Dec 02)	78	38
Limpopo <sup>i</sup>	45 (Nov 01 - Mar 02)	17 (Aug - Dec 02)	38	3
Mpumalanga <sup>ii</sup>	55 (Sep - Dec 01)	12 (Sep - Dec 02)	22	3
Northern Cape <sup>i, iii</sup>	65 (Aug 01 - Mar 02)	25 (May - Dec 02)	38	17
North West <sup>i</sup>	11 (Jul 01 - Mar 02)	44 (Apr - Dec 02)	39	8
Western Cape <sup>iv</sup>	424 (Apr 01 - Mar 02)	311 (Jan - Dec 02)	73	73
Totals	1907	949	50	170 (18%)

Source: Evaluation of the PMTCT Initiative<sup>27</sup>

- Notes: *i* Province changed infant testing policy from 9 to 12 months during 2002.  
*ii* Province tests infants at 12 months.  
*iii* Data only available for Galeshewe Day Hospital site.  
*iv* Province tests infants at 9 months.

**Table 16: Estimated number of infants infected through vertical transmission routes, SA, 2002**

	EC	FS	GP	KZN	LP <sup>i</sup>	MP	NC	NW	WC	SA
Uninfected births	192 233	62 517	176 272	237 774	153 512	77 083	20 922	86 710	91 452	1 098 476
HIV+ births	11 280	4 366	10 500	21 430	8 344	5 748	746	5 435	1 364	69 213
Infected by mother's milk	3 304	1 295	3 123	6 404	2 460	1 712	224	1 611	443	20 162

Source: Dorrington/Bradshaw<sup>14</sup>

Notes: i The model does not fit this province very well and as a result probably overstates the impact of the epidemic.

Despite the lack of programme data, the ASSA model has provided estimates of the number of infants infected with HIV through vertical transmission routes. The ASSA model predicts a total of over 1.1 million births for the period 1 January to 31 December 2002. Of all babies born during this period, about 69 000 (5.9%) are estimated to have been infected at birth and a further 20 000 are estimated to become infected through breast milk (Table 16). The percentage of infants estimated to be infected ranges from a high of 8.3% in KwaZulu-Natal to a low of 1.5% in the Western Cape. The DoH model estimates that, based on the 2002 HIV prevalence rate amongst pregnant women, an estimated 91 271 babies became infected with HIV through the mother-to-child transmission route.<sup>2</sup>

## Treatment

### Access to ARVs

Current access to ARVs in SA for individuals utilising the public health sector is extremely limited. Of the approximately 500 000 South Africans who could immediately benefit from Highly Active Antiretroviral Treatment (HAART), between 20 000 – 40 000 are currently receiving this treatment. The majority of these are accessing treatment through the private sector.<sup>29</sup> ARVs are accessed through medical schemes, work place schemes and NGO projects. The public sector provision of ARVs has been limited to PMTCT and post-exposure prophylaxis. However, the situation has recently changed. In August 2003 the Cabinet announced that ARVs would be made available in the public sector, giving the Minister of Health until the end of September to develop a plan for implementation. An operational plan for comprehensive HIV/AIDS care, management and treatment<sup>13</sup> has been developed and outlines the key activities to be undertaken in order to establish comprehensive treatment and care services. Efforts are underway to assess and accredit facility readiness for providing treatment services and the necessary infrastructural constraints that serve as barriers to the provision of this service are being identified.

### Cost-effectiveness of ARVs

One of the major hindering factors in the provision of ARVs in the public sector has been affordability. High drug and test costs have made the provision of ARVs in high prevalence settings unaffordable due to the risk that resources could be diverted from more cost-effective interventions. Several models of the cost of providing HAART in SA have been made. A model published in 2000, simulating the demographic impact of providing ARVs in SA, reported that if 25% of the HIV-infected adult population received triple therapy from 2000 to 2005, life expectancy at birth for the country would increase by 3.1 years by 2005 at a cost of US\$15 000 per life-year gained. The total cost to the country estimated over the 5-year period was US\$19 billion.<sup>30</sup>

In October 2002, the Treatment Action Campaign modelled the costs and benefits of phased-in introduction of HAART to adults with a CD4 count of less than 200 cells/ml.<sup>31</sup> They estimated that by providing HAART, the life expectancy of the average South African will be extended by about 8 years by 2015. There is no doubt that in order to effectively manage the HIV epidemic in SA both prevention and treatment interventions are required. The addition of treatment to HIV/AIDS care has the potential to greatly improve life expectancy and other key health system indicators. One of the key challenges for SA will be to ensure that interventions to provide access to ART are appropriately balanced with broader social and economic interventions to alleviate poverty and gender inequalities. A further key challenge will be to expand access to treatment in ways that will not reinforce or accentuate the already existing health systems inequities.



## Impact of HIV on Health Services

In SA it is estimated that in 2002, of the estimated 5.3 million people living with HIV and AIDS, about 25% (1.4 million people) were likely to be symptomatic including 7% (390 000 people) with AIDS. It is therefore not surprising that studies from across sub-Saharan Africa and SA have shown the immense impact that AIDS is having on already strained health care systems. However, the worst of the impact is still to come because those with AIDS who are currently accessing the health care system are mainly those infected more than 7 years ago. It is estimated that the number of AIDS cases will escalate sharply to 800 000, or double the current numbers, by 2010.<sup>14</sup>

The protracted nature of HIV related illnesses and the escalating number of people with AIDS requiring health care, will necessitate increasing resources to be committed to this sector. Abt and Associates have estimated that if current levels of care are to be sustained, acute health care costs in real terms will have to be doubled by 2010. The alternative is the implementation of a formal or de facto system of health care rationing as has happened in many other African countries. The 'squeezing out' of HIV uninfected patients may result in a decrease in quality of care.

A national survey conducted by the HSRC, MRC and MEDUNSA on the impact of HIV/AIDS on the health sector<sup>32</sup> found an estimated HIV prevalence of 15.7% amongst health workers employed in public and private health facilities in four provinces

**Table 17: Results from HIV prevalence studies among patients using health services in SA**

Reference	Study setting	Year	No. tested	% HIV+	Mortality HIV+	Mortality HIV-
HSRC 2002 <sup>32</sup>	Public sector health facilities in 4 provinces	2002	581	28%		
Colvin 2001 <sup>33</sup>	Adult medical wards, tertiary hospital, KZN	1997	507	54%	22%	9%
Wilkinson 1999 <sup>34</sup>	Gynaecology wards, district hospital, KZN	1997	196	42%	1%	1%
Pillay 2001 <sup>35</sup>	Paediatric wards, tertiary hospital, KZN	1997	160	63%	20%	12%
Meyers 2000 <sup>36</sup>	Paediatric wards, tertiary hospital, Gauteng	1996	507	29%	17%	5%
Johnson 2000 <sup>37</sup>	Paediatric wards, tertiary hospital, Gauteng	1998	176	18%	N/A	N/A
Yeung 2000 <sup>38</sup>	Paediatric wards, rural hospital, KZN	1996/7	281	26%	21%	7%
Roux 2000 <sup>39</sup>	Paediatric wards, 18 hospitals in Cape Town	1999	1 264	8.3%	N/A	N/A

in 2002. Table 18 shows that the HIV prevalence was higher amongst non professionals (20.3%), males (18.9%) and health workers between the ages of 18-35 years (20%).

**Table 18: HIV prevalence and response rates among health workers by socio-demographic and health facilities' characteristics, 2002**

	Response rate (%)	HIV prevalence (%)	[95% CI]
Total	82.5	15.7	[12.24 - 19.88]
<b>Sector of facility</b>			
Public	81.99	16.3	[12.55 - 20.84]
<b>Type of facility</b>			
Primary health care facility / clinic	86.6	17.5	[12.72 - 23.70]
Public hospitals	77.5	15.9	[11.20 - 21.96]
<b>Province of facility</b>			
Free State	82.6	9.6	[7.06 - 12.91]
KwaZulu-Natal	81.3	17.1	[11.69 - 24.26]
Mpumalanga	72.5	19.6	[12.99 - 28.58]
North West	91.7	19.7	[14.61 - 25.93]
<b>Occupation status</b>			
Professional	79.3	13.7	[8.47 - 21.46]
Non-professional	87.5	20.3	[14.2 - 28.14]
<b>Gender</b>			
Male	80.8	18.9	[11.05 - 30.48]
Female	82.9	15.3	[11.51 - 20.04]
<b>Age</b>			
18 to 35 years	79.9	20.0	[14.09 - 27.63]
36 to 45 years	84.0	16.6	[10.53 - 25.13]

Source: *Impact of HIV on the health sector, 2002*<sup>32</sup>

HIV was found to be impacting on health services through a variety of mechanisms including loss of staff due to illness, absenteeism, low staff morale and increased burden of patient load. The authors of this report suggest that in the absence of antiretroviral therapy, South Africa could expect to lose at least 16% of its health workers due to AIDS in the future.

The private health care sector, which caters for about 7 million users, will also feel the impact of AIDS although to a lesser extent than the public sector mainly because of the lower HIV prevalence rate among those accessing this sector. The HSRC survey found an HIV prevalence of 36.6% among patients in private hospitals compared with 46.2% among patients in public hospitals. The private sector also has greater room to absorb the impact of HIV due to the lower bed occupancy rate and

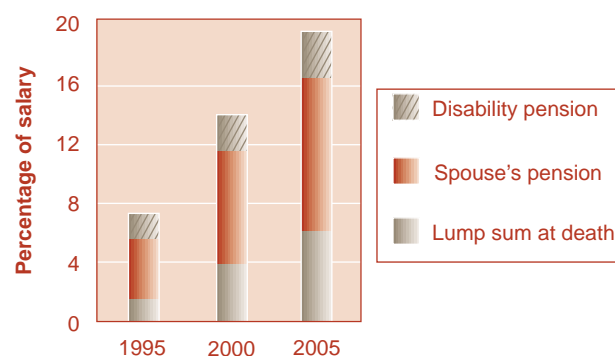
shorter average length of hospital stay for individuals with HIV/AIDS. Nevertheless, the HIV epidemic is fuelling escalating medical aid costs and those schemes in the lower end of the market are under threat because of the high HIV infection rates among their clientele.

## Impact of HIV on the economy

HIV/AIDS has the potential to impact severely on the South African economy and the effects are already being felt in industry. This is due to the fact that HIV affects people in the most productive age group. The two major economic effects of AIDS are a reduction in the labour supply and increased production costs. The economic impact of HIV is felt first by individuals and their families and then by businesses and the macro-economy. Poor families are disproportionately affected by HIV and the additional burden of HIV further jeopardises household income and food security creating a vicious cycle of poverty and illness.

At the level of individual businesses, HIV/AIDS amongst managers, employees and their families will result in direct and indirect costs. Direct costs to companies include costs of health care and other employee benefits. A study in SA<sup>40</sup> examined the expected impact of AIDS on employee benefits. The study showed that at the current levels of benefits per employee, the total costs of benefits would rise from 7% of salaries in 1995 to 19% by 2005 (Figure 4). However, as lower income earners who are disproportionately affected tend to have few benefits, the impact of HIV/AIDS on direct costs may not be as high as expected.

**Figure 4: Illustrative impact of AIDS on employee benefits in SA<sup>40</sup>**



The most significant costs for companies are likely to be indirect. These include costs of absenteeism due to illness or funeral attendance, lost skills, training and recruitment costs, reduced work performance and lower productivity. Obviously, these costs are most striking for skilled workers, where instant substitution is more difficult.

The mining industry was one of the first to introduce HIV prevention initiatives in the 1980s. It is one of the largest employers of workers with minimal task specialisation. This has meant that although the industry has been severely affected by HIV, replacement workers are fairly easy to find therefore production has not been seriously affected. Despite the prevention, and more recently, treatment initiatives, the National Union of Mineworkers in SA estimates that there could be between 12 000 and 14 000 AIDS related deaths among mine workers per year by 2010. Table 18 shows the cost of AIDS to the mining industry, estimated for the years 1995 and 2010. The projections indicate that total costs will increase from R114 million in 1995 to R1 509 million in 2010.

**Table 19: The cost of AIDS to the mining industry (R million)<sup>40</sup>**

	1995	2010
Prevention	5	10
Treatment	38	600
Compensation	39	480
Research	1	5
Replacement	1	16
<b>Total Direct Costs</b>	<b>84</b>	<b>1 111</b>
Foregone earnings	19	230
Productivity loss	11	168
<b>Total Opportunity Costs</b>	<b>30</b>	<b>398</b>
<b>Total Costs</b>	<b>114</b>	<b>1 509</b>

The South African Business Coalition on HIV/AIDS (SABCOHA) has recently released the results of a survey<sup>41</sup> on the impact of HIV/AIDS on business in SA. More than 1000 companies in the retail, manufacturing, wholesale, motor trade, building and construction sectors participated in the survey. The results indicate that only one quarter of companies have an HIV/AIDS policy in place. Large differences were found between small and large companies with regard to workplace programmes as only 13% of small companies (under 100 employees) had implemented a policy compared with 90% of large companies (more than 500 employees). Of the companies who had implemented a workplace HIV/AIDS programme, the majority indicated that the cost of these programmes had been small.

In terms of the impact of HIV/AIDS on businesses, this survey found that more than 30% of the companies had experienced reduced labour productivity or increased absenteeism and raised cost of employee benefits due to HIV/AIDS. Thirty percent reported higher labour turnover rates; 27% indicated that they have lost experience and skills, while 24% incurred recruitment and training costs due to the epidemic.

The impact of HIV/AIDS appears to be affecting small and large companies differently. More than 75% of large companies indicated that HIV/AIDS has led to lower labour productivity or increased absenteeism, higher employee benefit costs and higher labour turnover rates. However, less than a third of small companies have noted any of these impacts.

### Conclusion

Many businesses and industries have begun to implement workplace prevention and treatment programmes that will hopefully curb the economic disruptions resulting from the HIV epidemic. These initiatives should be encouraged across all sectors and income levels in combination with efforts to reduce employee risk profiles through improvements in working and, particularly for agricultural and mine workers, living conditions. The emergence of greater evidence on the impact of HIV/AIDS on businesses will hopefully encourage more companies, particularly smaller ones, to develop workplace HIV/AIDS programmes.

## Overall Conclusions

SA and its neighbours lie at the epicentre of the HIV/AIDS epidemic and the resulting toll on human suffering in the region is immense. Estimates of the overall prevalence in SA vary but all put the figure at between 4 and 6 million people living with HIV/AIDS. Key indicators of human development are in decline after decades of steady improvement and the economic impact threatens to deepen the plight of the poor and undermine the economic development of the region.

However, not all the news is bad. There are some indications that people are responding to the epidemic by adopting safer sexual practices and researchers believe that the rate of new infections is falling. The expansion of PMTCT programmes will decrease the mother-to-child transmission rates; increasing access to antiretrovirals will reduce the burden of disease and, hopefully, reduce the associated stigma. The proposed national framework for monitoring the response to HIV/AIDS, if implemented appropriately, will enable us to measure and thereby improve the management of the epidemic. The increase in resources being committed by both government and the international community will also improve our capacity to turn the tide against the worst epidemic to strike the region in recorded history.

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# Commentary

## Nono Simelela – Director HIV/AIDS and STIs, NDoH

When the National assembly adopted *The White paper for the Transformation of South Africa's National Health System* in 1995, increasing access to basic health care was the key objective. Our country and its leadership agreed that it was important for millions of mothers, children, elderly persons and in fact all citizens of this country to have access to such care.

As a major policy directive, universal access to care has been accompanied by a sharp increase in attendance to antenatal care, unprecedented immunisation coverage levels and a halving of the national syphilis prevalence among pregnant women following the introduction of syndromic management. SA is now working towards polio and measles free certification and positive behavioural and incidence trends are beginning to emerge around HIV.

Such progress has been made against the background of significant investments in the form of financial allocation as well as the training of a skilled cadre of health care workers. It has also taken place in a policy environment that has yet to be very much defined, beyond the White Paper. Therefore, regulatory, legislative and structural instruments were consistently developed and / or adapted over past years while service provision was taking place. Hence against an increasing HIV and AIDS burden, government was able to develop a well considered strategy, the implementation of which has been able to slow down the progression of what was once described as the fastest growing HIV epidemic in the world. Gains made in this regard have been acclaimed internationally, together with the fact that SA was able to mount, in relatively short time, the largest condom procurement and distribution systems in the world and the largest PMTCT programme on the African continent. Not shying away from challenges, the country is now gearing itself for what is set to be the largest antiretroviral treatment programme worldwide.

It goes without saying that a lot has been learned over this period about policy research, development and analysis and the processes related to these. A lot has also been learned

about programme planning and implementation as well as the resource implications of these; the most important being human. Over these years the questions have not so much revolved around what to do, but how to do it. More so, because in many of the policy related interventions undertaken in the context of health sector reform or disease prevention and control, South Africa's policy and public health environment was unique, with very little to replicate from elsewhere. To the extent that such 'replication' was necessary, interventions have been fairly easy to set up, scale up, sustain and monitor. Classic examples are immunisation, antenatal care, STI management and the treatment of minor ailments, where positive health outputs have been clearly demonstrated.

However, the generation of positive health outcomes from these has not been shown as clearly, highlighting some of the complexities faced by more elaborate health interventions (such as maternal delivery, VCT and PMTCT). The imponderables have here very much revolved around the health care system itself, and its absorption capacity and capability with regard not only to disease burden but health interventions.

In the context of the comprehensive HIV treatment and care programme a unique opportunity presents itself to strengthen the health system. This opportunity comes at a time when the regulatory, legislative and structural changes that were necessary to transform our health care machinery are culminating with the finalisation of the new Health Act and the anticipated significant reduction in health care cost and drug prices. It also comes at a time when research and information as fields of health in this country have come to the point of clearly describing the triple burden of disease we face and the health systems challenges requiring our attention. The onus is upon us now to make the best of this opportunity, given what we know and the commitments made by government in the form of additional resources including scarce skills and rural allowances, to build strong health care systems, able to take us as a nation firmly forward in this 21<sup>st</sup> Century.

**“Over these years the questions have not so much revolved around what to do, but how to do it.”**