

HIV/AIDS profile in the provinces of South Africa

Indicators for 2002

by
**Rob Dorrington, Debbie Bradshaw
and
Debbie Budlender**



The Centre for
Actuarial Research



The Burden of
Disease Research
Unit



The
Actuarial Society
of
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www.assa.org.za

Key to Provincial Abbreviations

EC	Eastern Cape	MP	Mpumalanga
FS	Free State	NC	Northern Cape
GT	Gauteng	NW	North West
KZ	KwaZulu-Natal	WC	Western cape
LM	Limpopo	SA	South Africa

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Indicators for 2002

Introduction

South Africa has never experienced an epidemic of the magnitude of the HIV/AIDS epidemic. The routine surveillance conducted by the Department of Health has shown that among pregnant women attending public health clinics for antenatal care, the prevalence has increased from less than 1% in 1990 to 25% in 2001¹. The rapid mortality surveillance system established by the Burden of Disease Unit of the Medical Research Council (MRC) and Centre for Actuarial Research at the University of Cape Town (UCT) has shown that there has been an increase in young adult mortality and that by the year 2000, AIDS had become the biggest single cause of death².

For all spheres of planning, it is essential to have an understanding of the impact of the epidemic. The Actuarial Society of South Africa (ASSA) has developed an AIDS and demographic model³ that has been used to project the impact of the disease of each on the provinces. The model has been calibrated to Department of Health's antenatal prevalence data and mortality data from the Department of Home Affairs, adjusted for under-reporting. Further details about the ASSA2000 model and its calibration are given in the Appendix on page 30.

This booklet presents a concise set of basic indicators on HIV/AIDS in the country. It focuses, in particular, on the situation within each of the nine provinces. The figures are derived from the ASSA2000 model. *Model estimates should be treated with circumspection since there is always a degree of uncertainty surrounding such estimates. There is still a great deal to understand about the dynamics of this epidemic and the provincial version of the ASSA model is provisional at this stage. However, models play an extremely important role in understanding possible trends in variables that are hard to measure.*

Work is continuously underway to improve the model and incorporate the latest available data.

Preliminary estimates suggest from the next cycle of modelling that the next revision will probably be about 10% lower than the estimates in this booklet.

The stock figures such as population, and number of AIDS sick, represent estimates as at 1 July 2002. The flow figures, such as the number of births and deaths, are estimates for the twelve months from 1 January 2002 to 31 December 2002. The flow figures reported here thus differ from the standard estimates of the ASSA2000 model as the latter cover the period from 1 July of one year to 30 June of the following year. The indicators have been grouped into batches, with a short commentary on each batch. Selected prevention-orientated indicators from the Demographic and Health Survey⁴ (DHS) and other reports are also included.

The sum of the provincial projections produced by the ASSA2000 provincial version does not exactly equal the full projection for the country as a whole. There are several reasons for this discrepancy, some linked to the structure of the model; however, a further reason is that the full projection for the country as a whole assumes, for illustrative purposes only, no interventions on the part of government to address the epidemic and no behavioural change on the part of individuals. For the provincial modelling, however, interventions and changes are assumed for the Western Cape alone. The reason for this is that at the time of releasing these models the Western Cape was the only province with a clearly articulated intention for rolling out these programmes. For the Western Cape the projections assume interventions in respect of treatment of sexually transmitted diseases, mother-to-child transmission prevention, and behavioural changes such as reduction in the number of partners and increase in condom usage.

For the sake of consistency, the national figures reported below are the sum of the nine provinces, where the sum could be obtained by simple summation, rather than the figures produced by the full national projection. However, in cases where

¹ Department of Health 2002. Summary Report: National HIV and Syphilis Sero-prevalence survey in South Africa 2001.

² Dorrington RE, Bourne D, Bradshaw D, Laubscher R and Timaeus IM 2001. The impact of HIV/AIDS on adult mortality in South Africa. MRC Technical Report.

³ The model and more detailed statistics can be accessed at www.assa.org/aidsmmodel.asp

⁴ Department of Health, Medical Research Council, Macro International 2002. South African Demographic and Health Survey, 1998. Full Report.

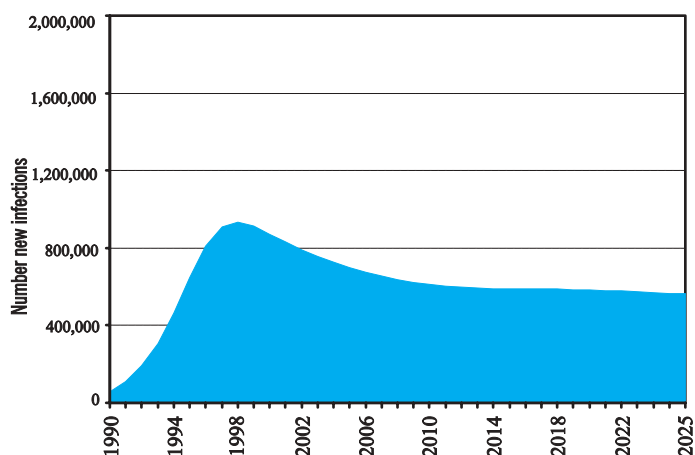
the data represent a rate rather than an absolute number, the rates produced by the full national model have been used.

The course of the epidemic

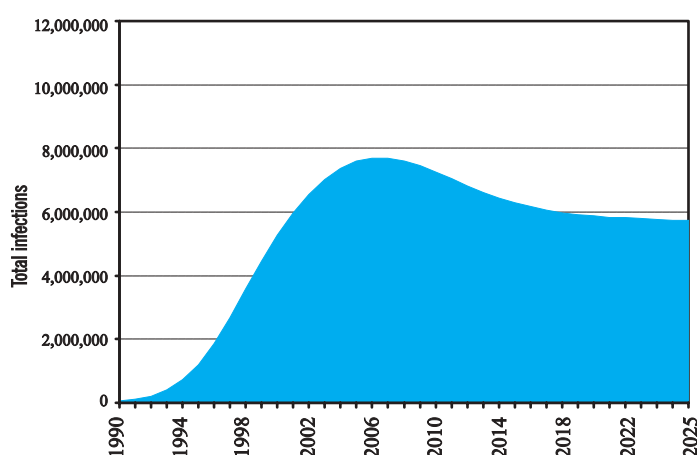
Nationally, the epidemic can be considered to be entering the mature phase. Assuming a worst-case scenario with no changes in behaviour and no interventions, the ASSA model estimates that 6.5 million people are infected with HIV in the year 2002. The top right-hand figure on this page shows that the total number of people infected with HIV is reaching its peak, which is the natural course of

the epidemic. This is because the number of new infections has slowed down and because people who are infected are dying, as shown in the two figures on the left-hand side on this page. Incidence, the number of people who are newly infected, peaked in about 1998 and has begun to decrease. However, the number of people dying from AIDS each year has only now started to increase. Without interventions to reduce mortality, it will peak in about 2010. In turn, this mortality will result in increasing numbers of children who are orphaned. The number of maternal orphans who are under 15 years of age will peak in about 2015.

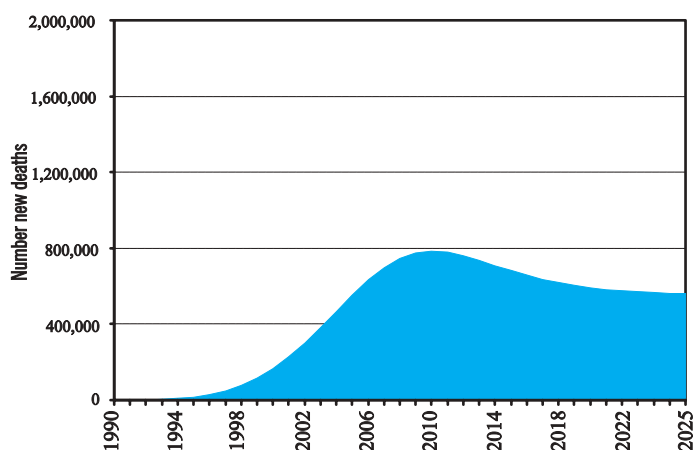
New HIV infections



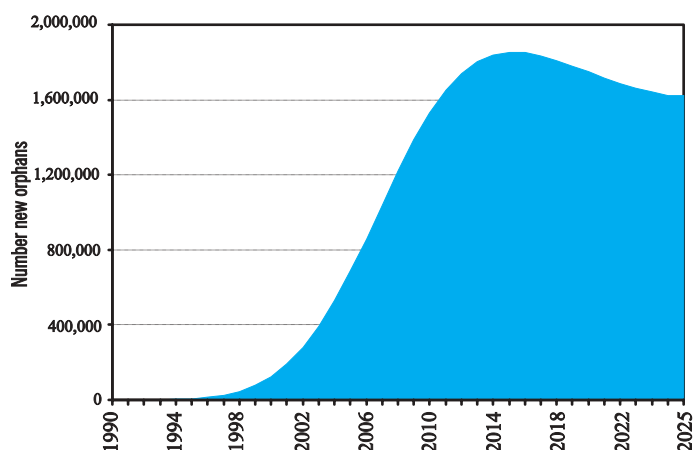
Total HIV infections



AIDS deaths



AIDS orphans

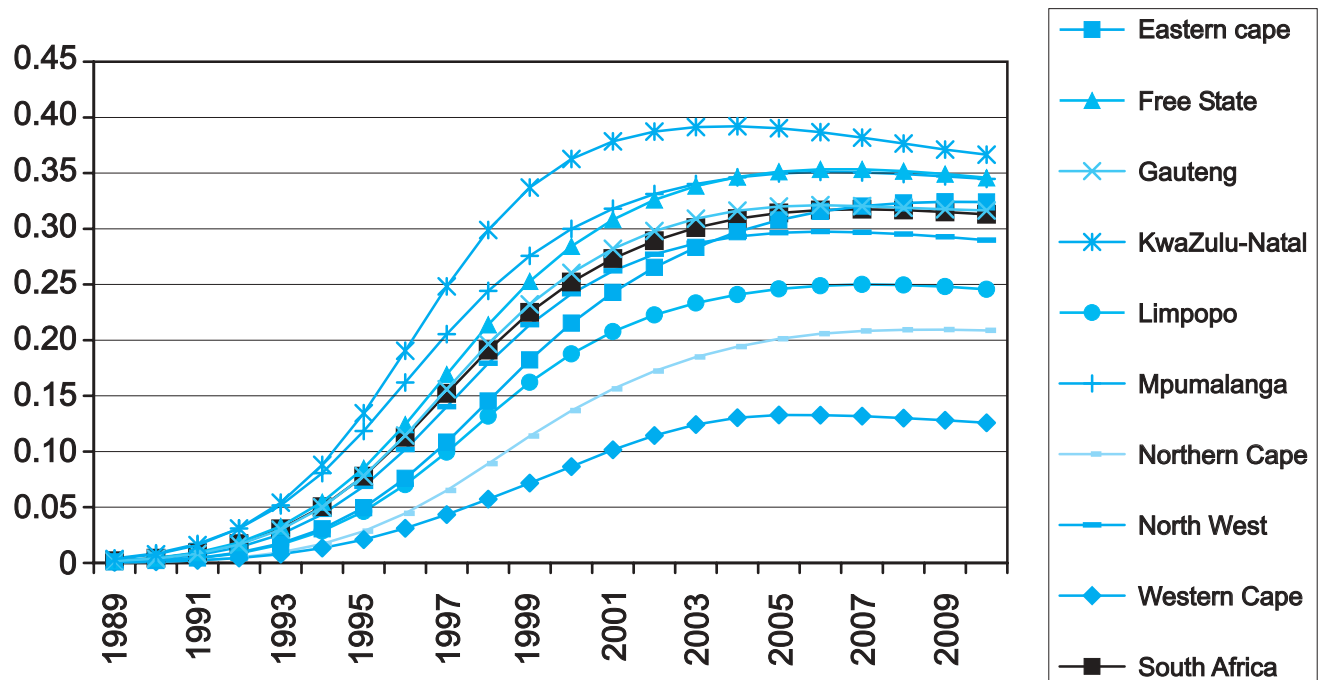


The waves of the AIDS epidemic (no change scenario)

Provincial variations

The antenatal data reveal that the spread of the epidemic has differed between the provinces. The projections of the prevalence among pregnant women attending public sector services for each of the provinces are shown in the graph below. The provinces differ in terms of ultimate plateaux, ranging from a low of 14% for the Western Cape to a high of nearly 40% for KwaZulu-Natal. Four of the nine provinces appear to be following similar epidemics while the epidemic in KwaZulu-Natal

appears to have started earliest and is expected to peak at the highest level. The epidemic in the Northern Province, Northern Cape and the Western Cape are expected to level off at lower levels than the others. The Eastern Cape is beginning to reveal a distinctive pattern, with a much slower increase and no plateau by the year 2010. These differences in the stage of the epidemic as well as the different patterns need to be borne in mind when interpreting the snapshot estimates for 2002 presented in this booklet.



Projected prevalence among antenatal attenders (no change scenario)

Population

The ASSA model, summed across all provinces, estimates the total population of the country as a whole as at 1 July 2002 to be around 46,6 million, slightly higher than the 46,4 million when the country as a whole is modelled. The ASSA estimates are higher than most other estimates for South Africa, in part due to higher estimates of immigration. Statistics South Africa estimates a mid-year population of 45,4 million⁵ while others range from 44,6 million (the lowest scenario by DBSA⁶) to 46,9 million (Institute for Futures Research⁷).

Of the total, some 51,1% are female. This percentage is slightly lower than the 51,8% recorded in the 1996 population census. Females outnumber males in all provinces except Gauteng, where females account for 49,5% of the provincial population. The percentage of females is highest in the Eastern Cape, where it reaches 52,8%. KwaZulu-Natal is the most populous province, and accounts for just over one-fifth (20,6%) of the total population. Gauteng accounts for a further 18,8%. Northern Cape is the smallest province in terms of population.

Population	EC	FS	GT	KZ	LM	MP	NC	NW	WC	SA
Total population	7 136 020	2 914 201	9 052 454	9 464 671	5 452 026	3 131 378	994 622	3 864 204	4 550 813	46 560 389
Male population	3 367 453	1 451 231	4 569 163	4 547 724	2 620 775	1 546 660	489 494	1 912 041	2 240 914	22 745 454
Female population	3 768 567	1 462 970	4 483 291	4 916 947	2 831 252	1 584 718	505 127	1 952 163	2 309 899	23 814 934

Births

The ASSA model predicts a total of over 1,1 million births for the period 1 January to 31 December 2002. KwaZulu-Natal accounts for over one-fifth (21,6%) of these births. Of all babies born during this period, about 69 000 (5,9%) are estimated to have been

infected at birth, while more than a further 20 000 will become infected through mother's milk during the year. The percentage of babies infected ranges from a high of 8,3% in KwaZulu-Natal, to a low of 1,5% in Western Cape.

Births	EC	FS	GT	KZ	LM*	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

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

People living with HIV/AIDS

The ASSA model estimates that there were 6,5 million people in South Africa living with HIV/AIDS on 1 July 2002. Of these, over 6,1 million (95,1%) were in the age group 18-64 years. This is also the age group which is most likely to form part of the labour force. An estimated 3,2 million women of child-bearing age (15-49 years), were living with HIV/AIDS. This group accounted for around half (49,5%) of all infections. In all adult age groups, there were more women than men living with HIV/AIDS. The gender imbalance is most stark among youth, aged 15-24 years, where there were close on four infected young women for every infected young man. The numbers of children under the age of 15 years infected is relatively small when compared with the numbers for other age groups below the age of 65. The main source of infection for children is perinatal and mother's milk, rather than the

sexual transmission which is the main source for adults.

KwaZulu-Natal accounts for 27% of total infections, and between 25,7% and 27,6% of infections in all the adult groups. It accounts for 30% or more of infections among youth and children. Gauteng accounts for 22,4% of infections overall, and as much as 26,0% of infections among adult men aged 18-64 years. However, it accounts for only 13,5% of infections among youth, and 15,3% of infected children. Eastern Cape accounts for 12,4% of infections among adults, but a higher percentage (16,3%) than Gauteng among youth. These patterns are more a reflection of the age and race profiles of the different provinces than the differences between the epidemic in the provinces. The patterns also affect the spread of the disease in each province in subsequent years.

People living with HIV/AIDS	EC	FS	GT	KZ	LM*	MP	NC	NW	WC	SA
Total HIV infections	805 879	487 772	1 449 899	1 745 490	600 713	518 156	78 426	582 089	192 946	6 461 372
Adults (18-64)	758 570	467 542	1 404 473	1 639 263	562 178	490 228	75 612	556 640	187 073	6 141 578
Adult men (18-64)	316 231	244 344	782 996	775 787	251 296	241 951	35 883	287 988	79 604	3 016 080
Adult women (18-64)	442 339	223 197	621 477	863 475	310 882	248 277	39 729	268 652	107 469	3 125 498
Child-bearing age women (15-49)	455 965	227 703	627 254	888 120	322 930	254 155	40 179	274 970	108 217	3 199 493
Youth (15-24)	197 875	84 772	163 283	371 676	151 959	99 211	12 779	104 439	24 754	1 210 749
Male youth (15-24)	38 213	17 802	35 814	85 742	34 428	21 835	2 556	22 536	4 144	263 069
Female youth (15-24)	159 661	66 970	127 470	285 934	117 532	77 376	10 224	81 903	20 610	947 680
Children (0-14)	29 018	12 776	31 488	68 208	23 204	18 379	1 904	15 830	4 327	205 134

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

⁵ Statistics South Africa, 2002. Mid-year estimates 2002. Statistical Release p0302, 1 July 2002.

⁶ Development Bank of South Africa, 2000. Provincial Population Projections, 1996-2021: High and low HIV/AIDS impact.

⁷ Haldenwang BB, 1999. High, medium and low projections of the South African Population, 1996-2031.

Prevalence rate

The prevalence rate is the percentage of a group who are infected at a particular point in time. Overall, in July 2002, the ASSA model estimates that 14,2% of people in South Africa were infected. The figure is as high as 18,4% in KwaZulu-Natal, and at a low of 4,2% in Western Cape. In all provinces except Western Cape and Northern Cape, more than one in every ten people is infected, although the fit to the Limpopo province is not very good and it is likely that the prevalence is lower than the figures in the table suggest.

Prevalence is highest among women of child-bearing age, at 25,9% overall, and 34,5% in KwaZulu-Natal. Among those attending antenatal clinics, prevalence is predicted to be 29,0% for the country as a whole, and 38,7% in KwaZulu-Natal. Prevalence is much higher for female youth than male youth, at 21,6% and 5,8% respectively. Among adults, however, the gender difference varies between provinces. For the country as a whole, prevalence is marginally higher for adult women than adult men. However, prevalence is lower for women than men in Free State, Gauteng, KwaZulu-Natal and North West.

Prevalence	EC	FS	GT	KZ	LM*	MP	NC	NW	WC	SA
Total population	11,3%	16,7%	16,0%	18,4%	11,0%	16,5%	7,9%	15,1%	4,2%	14,2%
Adults (18-64)	20,5%	26,5%	23,8%	31,4%	20,9%	28,1%	12,9%	24,8%	6,7%	23,4%
Adult men (18-64)	19,0%	27,4%	25,6%	31,6%	20,2%	28,0%	12,4%	25,7%	5,8%	23,3%
Adult women (18-64)	21,9%	25,5%	21,9%	31,3%	21,5%	28,2%	13,4%	23,9%	7,6%	23,5%
Child-bearing age women (15-49)	23,8%	28,3%	25,0%	34,5%	22,7%	30,2%	14,8%	26,3%	8,4%	25,9%
Youth (15-24)	12,5%	15,6%	13,0%	19,7%	12,1%	15,9%	6,7%	14,4%	3,3%	13,7%
Male youth (15-24)	4,9%	6,7%	5,9%	9,1%	5,3%	7,0%	2,7%	6,4%	1,1%	5,8%
Female youth (15-24)	20,1%	24,1%	19,8%	30,2%	19,4%	25,0%	10,6%	22,2%	5,5%	21,6%
Antenatal clinics	26,5%	32,6%	29,8%	38,7%	22,3%	33,1%	17,2%	27,7%	11,4%	29,0%

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

Incidence rate

The incidence rate is the percentage of people who are uninfected at the beginning of the period who will become infected over the twelve months. It is a better measure of where we are in the epidemic than prevalence. For the total population, the incidence rate is estimated to be 2% for the twelve months starting 1 July 2002, and has peaked in all provinces. The incidence rate is highest for new births, at 6%. It is next highest for babies in their

first year who become infected primarily through mother's milk.

Although KwaZulu-Natal has the highest prevalence rates, its incidence rates are not the highest. For example, the incidence of infection in Free State is higher than that in KwaZulu-Natal for all age groups except babies. Western Cape has the lowest incidence rates for all age groups.

Incidence	EC	FS	GT	KZ	LM*	MP	NC	NW	WC	SA
Total population	2,1%	2,3%	2,1%	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)**	3,5%	4,1%	3,5%	5,4%	3,2%	4,4%	2,1%	3,7%	1,0%	3,8%

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

** 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.

Stages of infection

A person who is HIV-positive typically passes through several stages of infection. The table below shows the proportion of those infected in each of four stages according to the WHO staging system. Those in stages 1 and 2 will be relatively asymptomatic, those in stage 3 will be suffering weight loss and bouts of illness from opportunistic infections, and those in stage 4 will have full-blown AIDS. Typically, a person not receiving treatment will die within a year to a year and a half of reaching this stage 4.

Overall, 55% of all infected people in South Africa were in the first stage in July 2002, with a further 20% in the second stage, 18% in the third stage, and 7% having full-blown AIDS. Thus about 75% are asymptomatic, which explains why so few of the people who are infected know they are infected. In those provinces with more advanced epidemics, the percentages in the early stages are close to 50%. On the other hand, in Western Cape, Eastern Cape, Northern Cape and Limpopo, more than 60% of infected people are in the first stage.

Stages of infection	EC	FS	GT	KZ	LM	MP	NC	NW	WC	SA
% in stage 1	62%	55%	54%	50%	61%	51%	62%	56%	63%	55%
% in stage 2	18%	20%	21%	21%	19%	20%	18%	20%	18%	20%
% in stage 3	15%	18%	19%	21%	15%	20%	15%	18%	15%	18%
% in stage 4	5%	7%	7%	8%	5%	8%	5%	6%	5%	7%

People who are sick with AIDS

As mentioned above, AIDS represents the last stage of HIV infection. The next table shows, for each province, the estimated number of new AIDS cases occurring in 2002, as well as the total estimated number of people who are sick with AIDS, i.e. in stage 4, on 1 July 2002. For all provinces, the number of new AIDS cases during the year is only a little less than the number of total AIDS sick at

mid-year; this is because people in this stage usually do not survive much more than a year after becoming AIDS sick, unless they receive treatment. (The numbers for new AIDS sick reflected in the table differ slightly from the results available on the ASSA website as the latter are derived from the numbers dying of AIDS in each province, while those in the table were derived by modelling the transition through the stages.)

AIDS sick	EC	FS	GT	KZ	LM*	MP	NC	NW	WC	SA
New AIDS sick over the year	35 796	28 290	87 727	113 541	27 859	33 513	3 598	32 673	8 908	371 907
Total AIDS sick mid-year	37 011	31 111	95 521	128 979	29 108	39 156	3 628	35 293	9 307	409 113

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

Deaths

Without therapy HIV/AIDS is invariably fatal. In 2002, AIDS will account for two-fifths (40%) of all deaths. In KwaZulu-Natal (52%) and Mpumalanga (51%), it will account for over half of all deaths. At

1 July 2002, AIDS will have resulted in over 688 000 deaths in the country. Approximately a third (34%) of these deaths will have occurred in KwaZulu-Natal, and 20% in Gauteng.

Deaths	EC	FS	GT	KZ	LM*	MP	NC	NW	WC	SA
Non-AIDS deaths over the year	64 875	25 320	72 936	76 993	41 008	23 996	8 681	32 227	39 004	396 538
AIDS deaths over the year	27 125	19 173	56 414	82 373	21 306	24 483	2 397	22 127	5 904	262 337
Accumulated AIDS deaths mid-year	67 715	49 766	139 249	231 265	55 190	71 424	5 465	56 407	14 166	688 493

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

Mortality statistics

By causing additional deaths, HIV/AIDS impacts on mortality statistics. In 2002, the infant mortality rate is 59 per 1 000 live births for the country as a whole, while the child mortality rate – the number of children per 1 000 births who die before reaching age five – is 100. Adult mortality as measured by the probability that a person aged 15 will not reach the age of 60 years (${}_{45}q_{15}$) is 43% for women, 56% for men, and 50% for both sexes combined. Male life expectancy at birth is 50 years while female life

expectancy is 55 years. On each of the mortality measures except infant mortality, KwaZulu-Natal performs worse than all other provinces while Western Cape performs best on all measures.

All the mortality measures show a marked increase over the last few years. For example, in 1990 the infant mortality rate was estimated to be 52 per 1 000 births, childhood mortality stood at 71 per 1000, adult mortality was 30% and life expectancy was over 61 years.

Mortality statistics	EC	FS	GT	KZ	LM*	MP	NC	NW	WC	SA
Infant mortality rate	72	63	46	68	53	59	46	56	30	59
Child mortality rate (${}_{5}q_0$)	112	106	82	124	87	106	72	95	46	100
Adult mortality (${}_{45}q_{15}$)	45%	51%	47%	59%	46%	56%	38%	49%	33%	50%
Adult male mortality (${}_{45}q_{15}$)	51%	57%	53%	64%	53%	62%	44%	56%	39%	56%
Adult female mortality (${}_{45}q_{15}$)	39%	44%	40%	53%	40%	50%	32%	43%	26%	43%
Life expectancy (e_0)	53,5	51,7	54,8	47,5	54,4	49,5	58,8	52,7	62,7	52,5
Male life expectancy (e_0)	51,1	49,4	52,2	45,9	51,8	47,6	55,8	50,3	59,3	49,9
Female life expectancy (e_0)	56,0	54,1	57,4	49,2	57,0	51,4	61,9	55,2	66,1	55,0

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

Maternal orphans

Defining an orphan as a person under the age of 18 years whose mother has died, it is estimated that there were over 885 000 orphans in South Africa in July 2002. Of the overall total, 38% would have been orphaned as a result of AIDS. In Mpumalanga and KwaZulu-Natal, approximately half of all maternal orphans were orphaned as a result of AIDS. KwaZulu-Natal and Gauteng between them currently account for over half (53%) of all AIDS orphans. Although it is common practice to use age 15 as the limit, using age 18 gives a better measure

of the burden to be borne by the provinces. For comparative purposes we have used age 15 in the individual provincial profiles later.

During the year starting 1 January 2002, over 204 000 children will be newly orphaned. In all provinces except Western Cape, more than half of all orphans are due to AIDS. Overall, AIDS will account for close on three-quarters (73%) of all new orphans. It will account for 81% of the new orphans in KwaZulu-Natal.

Maternal orphans	EC	FS	GT	KZ	LM*	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

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

Prevention

To date, the government's strategy in respect of HIV/AIDS has focused on prevention. The table below provides provincial indicators of the extent of implementation of different prevention strategies. The table shows that reported condom usage by women aged 15-49 years with non-regular sex partners is highest in the Free State (10,9%) and Gauteng (10,4%), and lowest in Northern Cape (5,0%). Overall, 8,2% of women aged 15-49 years with non-regular sex partners are reported to use condoms. Unfortunately, there are no equivalent figures in respect of male usage of condoms. In terms of sexually transmitted infections, the table shows

the highest incidence for Mpumalanga (21,0%), KwaZulu-Natal (20%) and Free State (16%), and the lowest for Gauteng (5,8%), Eastern Cape and Western Cape (both 6,2%). The overall incidence is 12,7%. Mother-to-child prevention (MTCP) through anti-retrovirals was provided to a total of 55 884 women during 2001. KwaZulu-Natal accounted for 37% of the total, while Eastern Cape, Western Cape and Gauteng each accounted for a further 13% to 14%. In the same period a total of 474 public facilities around the country offered voluntary counselling and testing (VCT). Of these, 171 (36%) were in Limpopo.

Prevention	EC	FS	GT	KZ	LM	MP	NC	NW	WC	SA
Number of condoms distributed by Department of Health (millions p.a.) ⁸	26	24	84	30	31	20	4	28	20	267
Condoms per woman 15-49 (p.a.)	14	30	33	12	22	24	15	27	16	21
Condom usage by males 15-49 with non-regular sex partner	-	-	-	-	-	-	-	-	-	-
Condom usage by females 15-49 with non-regular sex partner (1998) ⁹	6.1	10.9	10.4	6.7	6.4	9.5	5.0	9.0	8.1	8.2
% men age 15-49 with STI symptoms in last 3 months (1998) ¹	6.2	16.0	5.8	20.2	12.3	21.0	7.8	9.6	6.2	12.7
Number of pregnant women with access to MTCP (2001) ¹⁰	7 824	4 548	7 164	20 664	4 176	648	1 392	1 872	7 596	55 884
Access to MTCP as % of pregnant women	4%	7%	4%	8%	3%	1%	6%	2%	8%	5%
Number of public facilities offering VCT (2002) ¹¹	6	69	10	26	171	26	30	66	70	474
VCT clinics per 100 000 population	0.08	2.37	0.11	0.27	3.14	0.83	3.02	1.71	1.54	1.02

⁸ Derived by applying proportionate distribution of condoms to the provinces for the first eight months of 2002 to the total distributed for the year to March 2002 (personal communication with the Department of Health).

⁹ Department of Health, Medical Research Council, Macro International, 2002. South African Demographic and Health Survey 1998. Full Report. Department of Health: Pretoria

¹⁰ Annual extrapolations from data provided by McCoy D, Besser M, Doherty T, 2002. Interim findings on the National PMTCP Pilot Sites. Lessons and Recommendations. Health Systems Trust: Durban.

¹¹ Department of Health, 2002. Newsletter from the national HIV/AIDS and TB programme, Pretoria. <http://196.36.153.56/doh/aids/newsletter/2002/0603.html>

Provincial profiles 1990-2010

Introduction

The previous section of this report presents a snapshot for 2002 of the national and provincial situation in respect of HIV/AIDS. The introductory discussion explains that the differences in the situation across provinces are partly a result of differences in the stage of the epidemic reached and partly a result of different patterns of the epidemic across provinces. These two differences become clearer when we look at patterns over time. This section therefore presents a series of figures and accompanying tables for each province that show the change in key indicators over the period 1990 to 2010.

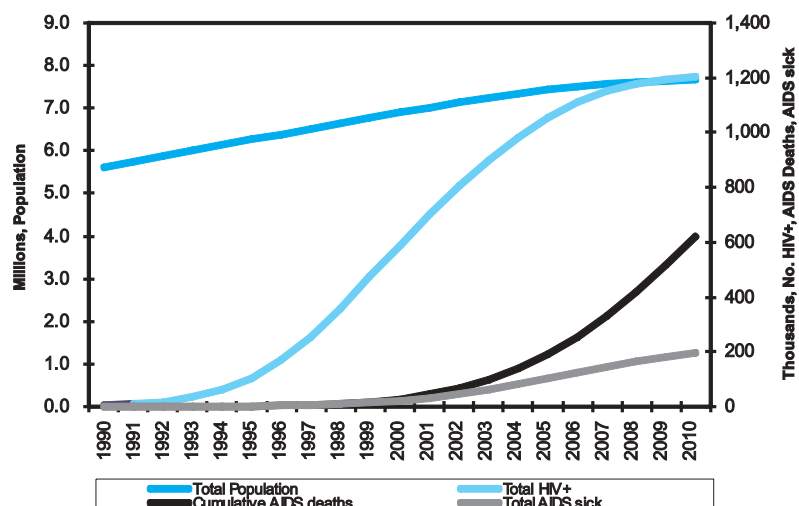
The first graph for each province shows the predicted total population, total number infected

with HIV/AIDS, the number who are sick with AIDS, and cumulative AIDS deaths for each year from 1990 to 2010.¹² The second graph shows infant, child and male and female mortality rates for each year of the period. The third graph shows the predicted number of children under 15 years who have lost their mother due to AIDS and other causes for each year. The estimates on which the graph is based differ from those in the previous section of this booklet, which refer to maternal orphans under 18 years of age. The relevant estimates for the larger age group would be approximately 30% higher than those shown in this section. The final graph for each province shows the population pyramids for 2000 and for 2010.

¹² The calculation of the number of AIDS sick in this section is derived from the number of AIDS deaths for ease of comparison. It thus differs slightly from the number of AIDS sick reported in the previous section which is based on the number of people in stage 4.

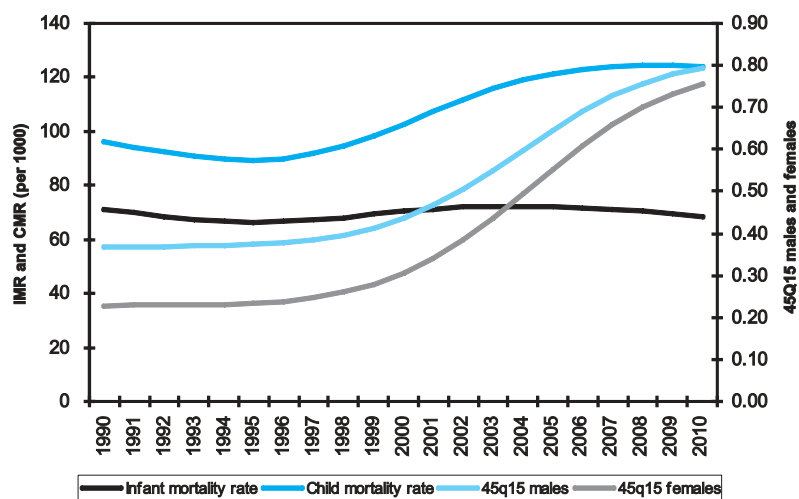
Eastern Cape

Total population, number of HIV+ and AIDS sick people and cumulative AIDS deaths, Eastern Cape



Year	Total Population	Total HIV+	Cumulative AIDS deaths	Total AIDS sick
1990	5 617 388	3 669	22	35
1991	5 752 745	8 218	58	86
1992	5 887 279	17 374	142	199
1993	6 016 559	34 161	330	438
1994	6 144 695	62 158	727	911
1995	6 270 116	105 662	1 518	1 784
1996	6 383 233	169 067	3 001	3 291
1997	6 515 831	254 699	5 610	5 671
1998	6 644 360	358 888	10 070	9 661
1999	6 772 279	473 578	17 272	15 220
2000	6 897 865	589 944	28 366	23 188
2001	7 019 725	701 840	44 692	33 524
2002	7 136 020	805 879	67 715	46 650
2003	7 244 554	900 000	98 942	62 381
2004	7 343 481	982 585	139 815	80 650
2005	7 431 019	1 052 342	191 559	100 826
2006	7 506 038	1 108 349	254 985	122 102
2007	7 567 903	1 150 422	330 319	143 244
2008	7 616 922	1 179 120	417 080	162 988
2009	7 654 077	1 195 650	514 096	180 118
2010	7 680 901	1 201 843	619 634	193 811

Mortality rates for children and adults, Eastern Cape

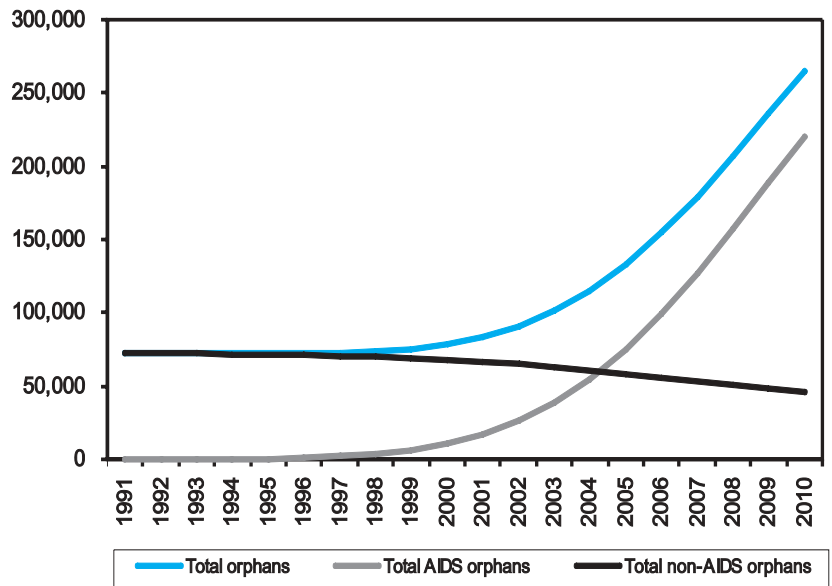


Year	Infant mortality rate	Child mortality rate	${}_{45}q_{15}$ males	${}_{45}q_{15}$ females
1990	71	96	37%	23%
1991	70	94	37%	23%
1992	69	92	37%	23%
1993	67	91	37%	23%
1994	67	90	37%	23%
1995	66	89	37%	23%
1996	67	90	38%	24%
1997	67	92	38%	25%
1998	68	94	40%	26%
1999	69	98	41%	28%
2000	70	103	44%	31%
2001	71	107	47%	34%
2002	72	112	51%	39%
2003	72	116	55%	44%
2004	72	119	60%	49%
2005	72	121	65%	55%
2006	72	123	69%	61%
2007	71	124	73%	66%
2008	70	125	76%	70%
2009	70	125	78%	73%
2010	69	124	79%	76%

Eastern Cape

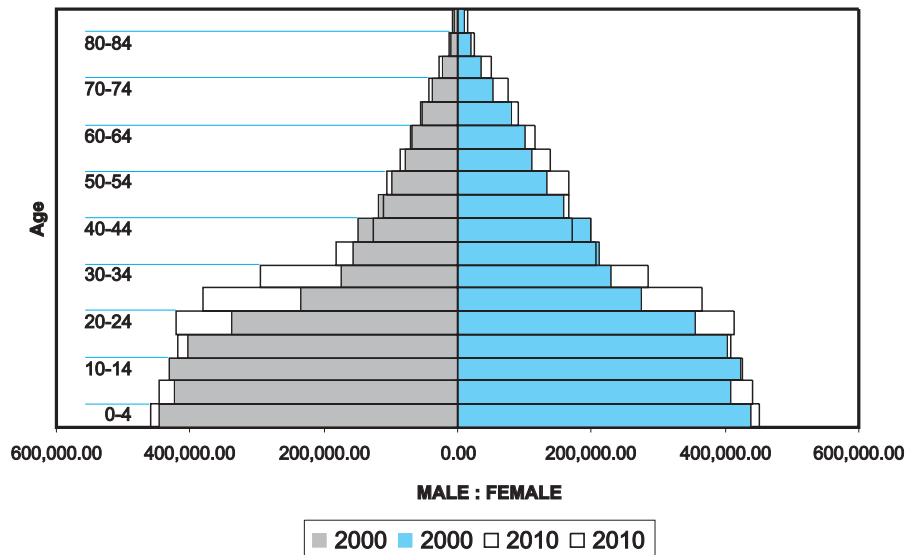
Maternal orphans under 15 years, Eastern Cape

Year	Total orphans	Total AIDS orphans	Total non-AIDS orphans
1991	72 528	15	72 513
1992	72 370	40	72 330
1993	72 231	97	72 134
1994	72 126	222	71 904
1995	72 095	483	71 612
1996	72 225	993	71 232
1997	72 672	1 938	70 734
1998	73 672	3 594	70 078
1999	75 555	6 338	69 217
2000	78 772	10 654	68 119
2001	83 730	17 088	66 642
2002	90 957	26 231	64 726
2003	101 133	38 653	62 479
2004	114 885	54 831	60 055
2005	132 644	75 038	57 606
2006	154 426	99 227	55 199
2007	179 448	126 768	52 679
2008	207 059	156 853	50 207
2009	236 311	188 344	47 967
2010	265 446	219 634	45 812



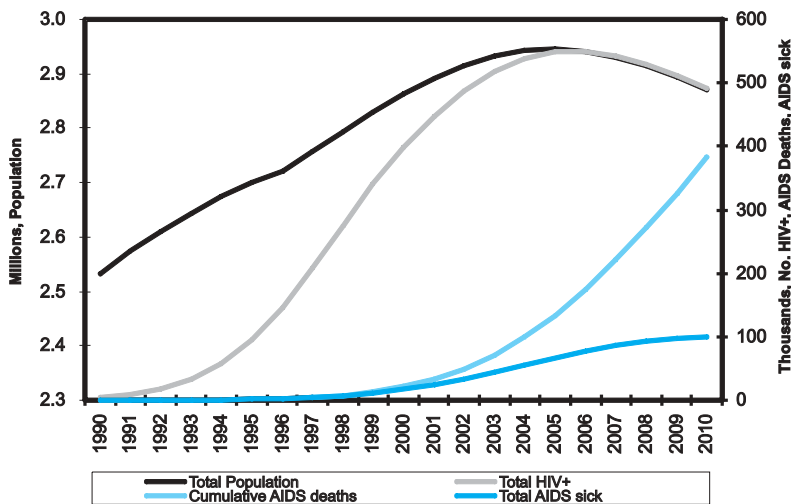
Population pyramid in 2000 and 2010, Eastern Cape

Age	2000		2010	
	Male	Female	Male	Female
0-4	447 289	439 645	458 225	452 521
5-9	423 087	408 549	445 028	441 377
10-14	432 189	423 290	431 245	426 839
15-19	404 104	404 115	418 407	407 384
20-24	338 093	356 236	421 684	414 291
25-29	234 067	274 457	381 560	364 424
30-34	173 119	228 559	294 896	286 039
35-39	156 504	211 439	182 213	206 247
40-44	147 774	199 303	125 340	171 120
45-49	118 620	159 634	111 170	165 526
50-54	97 491	133 395	105 037	165 656
55-59	77 857	110 199	84 583	137 997
60-64	70 920	100 331	68 657	114 818
65-69	55 024	79 845	52 277	90 302
70-74	38 678	52 954	42 528	74 668
75-79	21 582	34 969	26 711	50 189
80-84	10 274	18 920	13 773	25 798
>=85	4 519	10 833	6 352	16 019



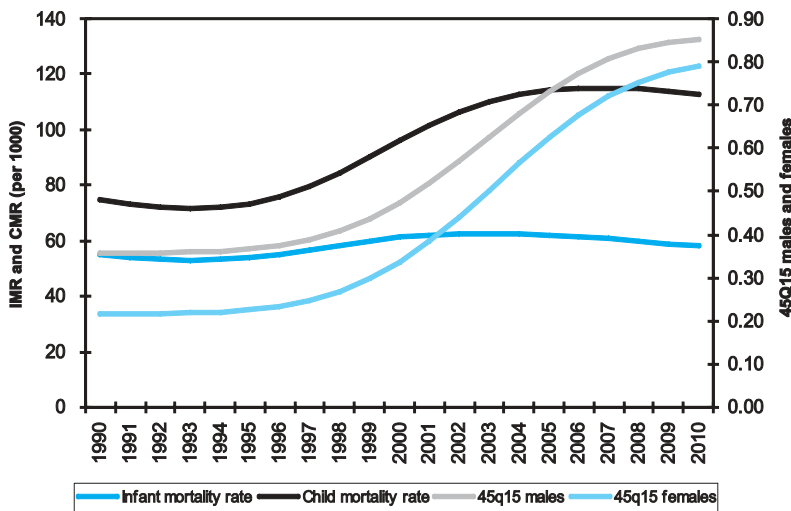
Free State

Total population, number of HIV+ and AIDS sick people and cumulative AIDS deaths, Free State



Year	Total Population	Total HIV+	Cumulative AIDS deaths	Total AIDS sick
1990	2 532 378	4 011	17	35
1991	2 572 946	8 798	47	86
1992	2 610 642	17 919	116	199
1993	2 643 960	33 624	270	438
1994	2 674 435	58 600	589	911
1995	2 700 423	95 694	1 212	1 784
1996	2 721 033	146 238	2 357	3 291
1997	2 757 705	208 156	4 353	5 671
1998	2 794 572	275 175	7 740	9 661
1999	2 829 716	340 281	13 161	15 220
2000	2 862 088	398 627	21 391	23 188
2001	2 890 653	448 040	33 294	33 524
2002	2 914 201	487 772	49 766	46 650
2003	2 931 662	517 649	71 641	62 381
2004	2 942 253	537 704	99 578	80 650
2005	2 945 537	548 142	133 923	100 826
2006	2 941 534	549 544	174 582	122 102
2007	2 930 845	542 983	220 953	143 244
2008	2 914 582	529 904	271 954	162 988
2009	2 894 171	512 129	326 159	180 118
2010	2 871 268	491 547	381 994	193 811

Mortality rates for children and adults, Free State

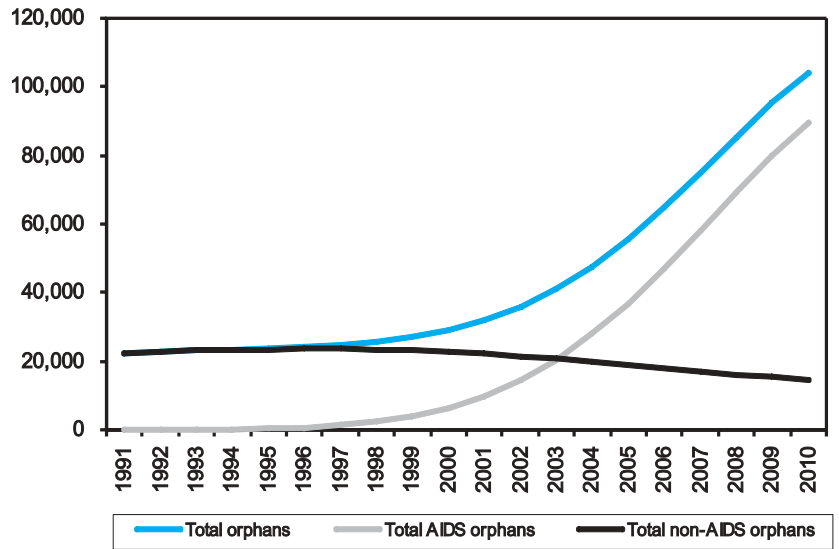


Year	Infant mortality rate	Child mortality rate	45q15 males	45q15 females
1990	55	75	36%	23%
1991	54	73	36%	23%
1992	54	72	36%	23%
1993	53	72	36%	23%
1994	53	72	36%	23%
1995	54	73	37%	23%
1996	55	76	37%	24%
1997	57	80	39%	25%
1998	58	85	41%	26%
1999	60	90	44%	28%
2000	61	96	47%	31%
2001	62	102	52%	34%
2002	63	106	57%	39%
2003	63	110	63%	44%
2004	63	113	68%	49%
2005	62	114	73%	55%
2006	61	115	77%	61%
2007	61	115	81%	66%
2008	60	115	83%	70%
2009	59	114	84%	73%
2010	58	113	85%	76%

Free State

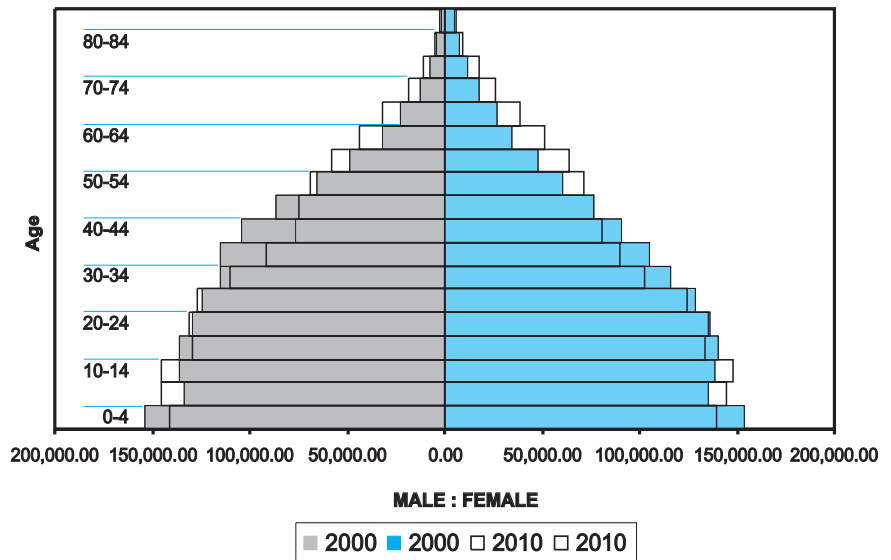
Maternal orphans under 15 years, Free State

Year	Total orphans	Total AIDS orphans	Total non-AIDS orphans
1991	22 484	11	22 473
1992	22 794	28	22 766
1993	23 102	68	23 033
1994	23 411	155	23 256
1995	23 747	330	23 417
1996	24 158	661	23 497
1997	24 732	1 253	23 480
1998	25 594	2 249	23 344
1999	26 922	3 838	23 083
2000	28 936	6 238	22 697
2001	31 819	9 672	22 148
2002	35 770	14 345	21 425
2003	40 993	20 415	20 578
2004	47 625	27 956	19 669
2005	55 667	36 913	18 754
2006	64 923	47 062	17 862
2007	74 878	57 927	16 951
2008	85 101	69 019	16 082
2009	95 116	79 800	15 316
2010	104 253	89 647	14 606



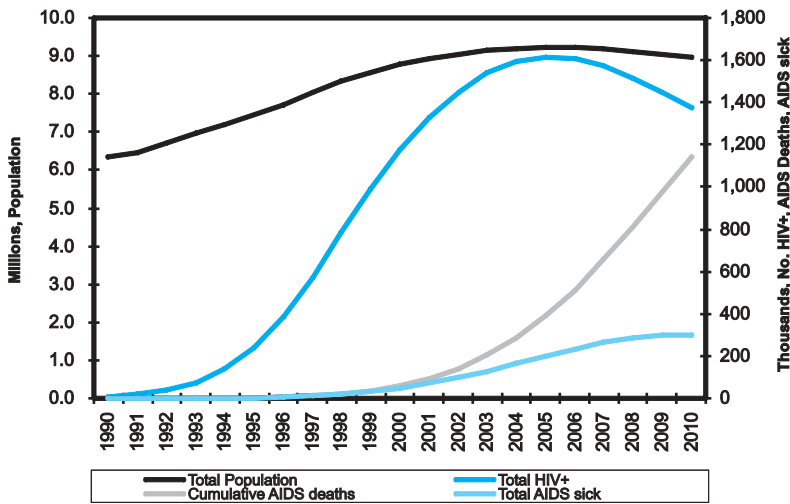
Population pyramid in 2000 and 2010, Free State

Age	2000		2010	
	Male	Female	Male	Female
0-4	153 964	154 111	141 275	139 438
5-9	133 947	135 140	144 973	144 537
10-14	136 483	138 962	144 999	147 522
15-19	136 277	140 672	129 517	133 794
20-24	129 348	135 276	130 860	136 473
25-29	124 739	128 860	126 836	124 753
30-34	115 415	116 154	110 098	102 753
35-39	115 226	105 057	91 541	90 183
40-44	103 915	90 346	76 592	80 570
45-49	86 461	76 553	74 552	76 540
50-54	65 356	60 203	68 505	71 550
55-59	48 537	47 603	57 997	64 231
60-64	31 826	34 530	43 955	51 150
65-69	22 543	27 310	31 591	39 012
70-74	13 001	17 419	18 856	25 991
75-79	7 358	11 690	11 044	17 676
80-84	3 880	7 497	4 718	8 884
>=85	1 729	4 701	2 245	6 058



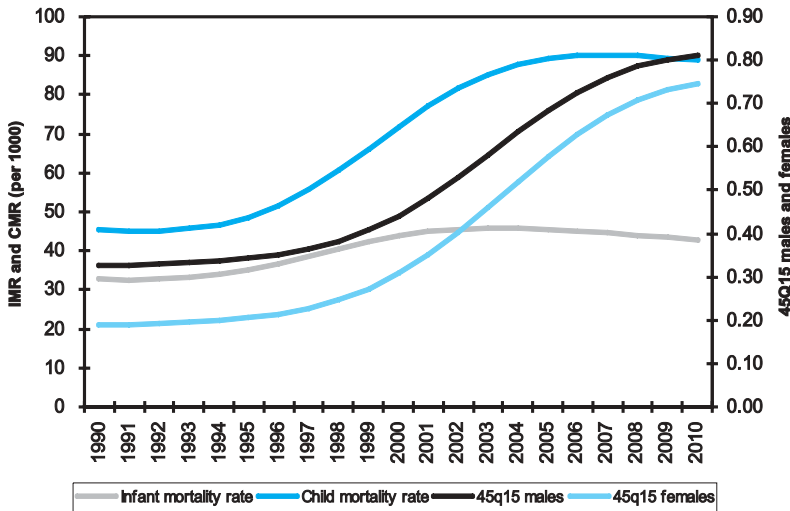
Gauteng

Total population, number of HIV+ and AIDS sick people and cumulative AIDS deaths, Gauteng



Year	Total Population	Total HIV+	Cumulative AIDS deaths	Total AIDS sick
1990	6 328 715	7 662	28	48
1991	6 442 341	17 454	78	121
1992	6 704 382	38 067	203	300
1993	6 960 527	75 996	502	707
1994	7 212 175	140 057	1 166	1 542
1995	7 457 711	240 786	2 548	3 157
1996	7 696 861	386 063	5 251	6 069
1997	8 035 008	574 402	10 257	11 070
1998	8 323 680	782 943	19 146	19 432
1999	8 565 328	988 170	33 917	31 502
2000	8 765 262	1 172 658	57 002	48 377
2001	8 927 110	1 327 703	91 156	70 234
2002	9 052 454	1 449 899	139 249	97 296
2003	9 142 158	1 538 208	203 984	128 870
2004	9 196 997	1 592 701	287 517	163 778
2005	9 218 283	1 614 551	390 994	199 745
2006	9 208 500	1 606 316	514 100	233 920
2007	9 171 622	1 572 151	654 820	263 149
2008	9 113 106	1 517 485	809 517	284 744
2009	9 039 331	1 448 642	973 371	297 036
2010	8 956 913	1 372 225	1 141 060	299 723

Mortality rates for children and adults, Gauteng

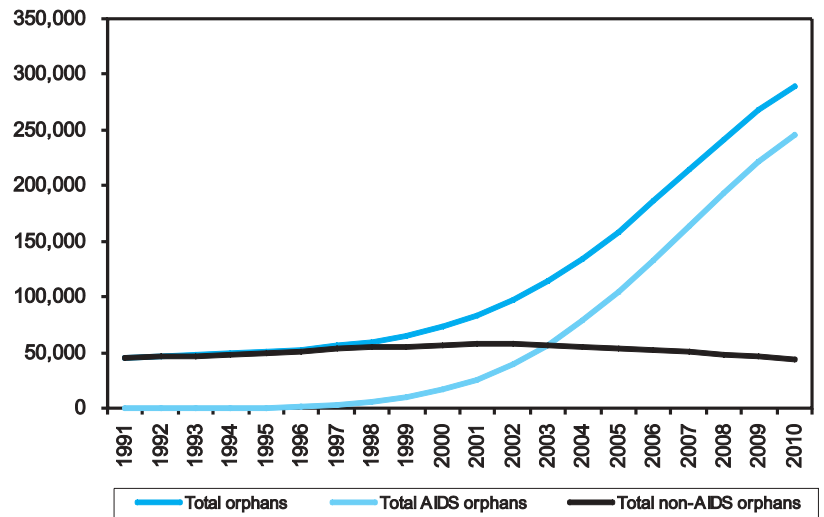


Year	Infant mortality rate	Child mortality rate	⁴⁵ Q ₁₅ males	⁴⁵ Q ₁₅ females
1990	33	46	33%	19%
1991	33	45	33%	19%
1992	33	45	33%	19%
1993	33	46	33%	20%
1994	34	47	34%	20%
1995	35	49	34%	21%
1996	37	52	35%	21%
1997	39	56	36%	23%
1998	40	61	38%	25%
1999	42	66	41%	27%
2000	44	72	44%	31%
2001	45	77	48%	35%
2002	46	82	53%	40%
2003	46	85	58%	46%
2004	46	88	63%	52%
2005	45	89	68%	58%
2006	45	90	73%	63%
2007	45	90	76%	67%
2008	44	90	79%	71%
2009	43	89	80%	73%
2010	43	89	81%	75%

Gauteng

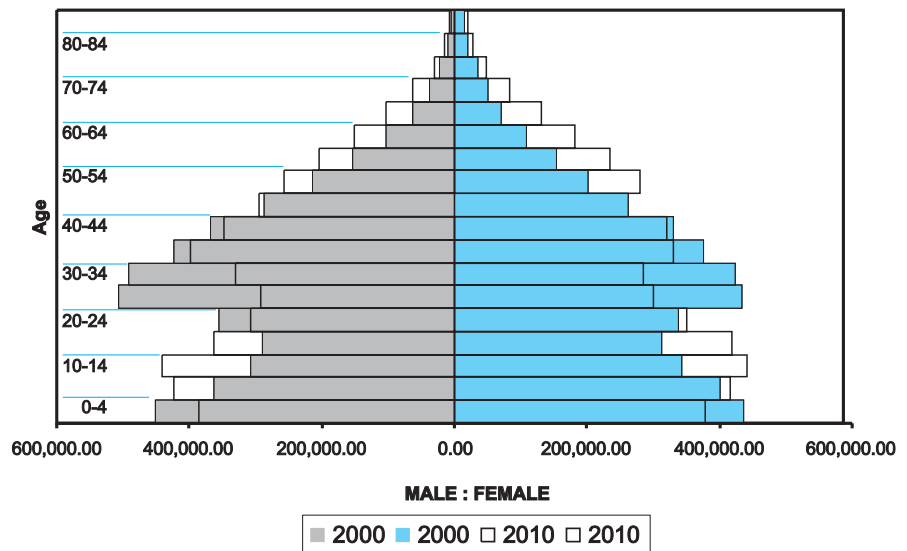
Maternal orphans under 15 years, Gauteng

Year	Total orphans	Total AIDS orphans	Total non-AIDS orphans
1991	45 228	18	45 210
1992	46 083	49	46 034
1993	47 289	125	47 164
1994	48 801	302	48 499
1995	50 638	682	49 956
1996	52 903	1 446	51 457
1997	55 814	2 886	52 928
1998	59 801	5 451	54 350
1999	65 389	9 726	55 663
2000	73 111	16 384	56 727
2001	83 432	26 107	57 326
2002	96 816	39 506	57 310
2003	113 727	57 013	56 714
2004	134 417	78 764	55 653
2005	158 699	104 449	54 251
2006	185 793	133 204	52 589
2007	213 979	163 399	50 580
2008	241 775	193 352	48 423
2009	267 668	221 326	46 341
2010	289 727	245 470	44 257



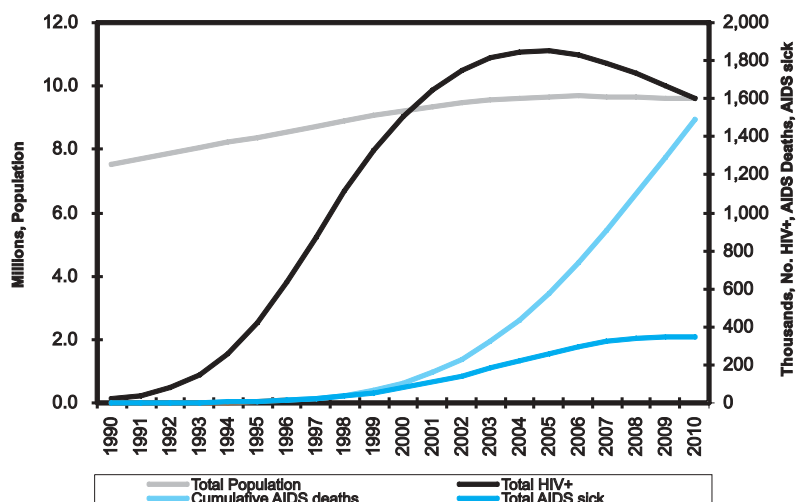
Population pyramid in 2000 and 2010, Gauteng

Age	2000		2010	
	Male	Female	Male	Female
0-4	450 296	436 500	386 767	377 971
5-9	362 587	400 937	423 023	414 845
10-14	307 051	342 282	440 786	441 455
15-19	289 416	313 389	362 609	417 734
20-24	354 894	338 536	307 545	349 310
25-29	507 594	433 274	293 652	299 244
30-34	491 285	423 749	331 395	284 989
35-39	424 615	374 869	398 887	331 276
40-44	367 465	330 732	348 521	319 868
45-49	287 409	263 270	294 651	295 977
50-54	215 033	202 053	257 460	279 238
55-59	152 996	153 253	203 309	233 625
60-64	102 425	107 341	152 406	180 285
65-69	62 479	71 479	104 026	130 668
70-74	37 276	50 912	62 677	83 676
75-79	21 914	35 759	31 476	48 634
80-84	11 298	21 304	14 185	27 850
>=85	5 381	14 208	7 150	19 740



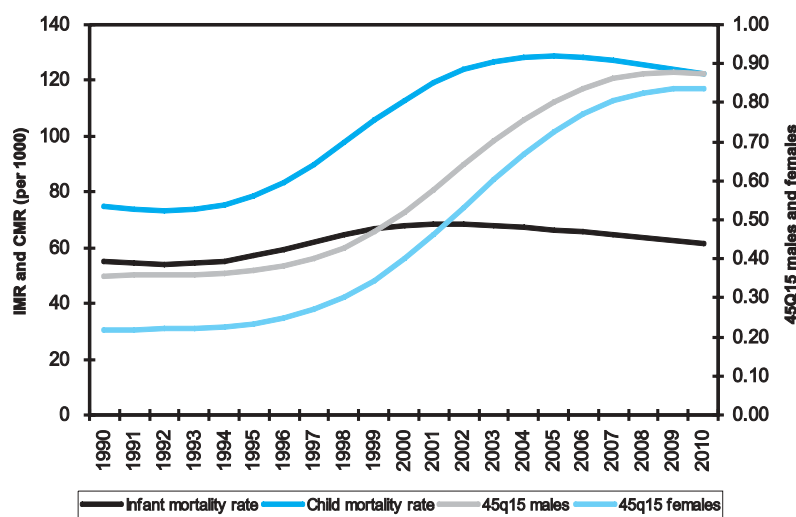
KwaZulu-Natal

Total population, number of HIV+ and AIDS sick people and cumulative AIDS deaths, KwaZulu-Natal



Year	Total Population	Total HIV+	Cumulative AIDS deaths	Total AIDS sick
1990	7 514 578	18 614	104	168
1991	7 696 067	40 451	276	410
1992	7 879 173	81 336	677	943
1993	8 052 556	151 171	1 548	2 012
1994	8 223 087	261 854	3 319	4 020
1995	8 384 742	423 140	6 716	7 584
1996	8 529 882	633 695	12 839	13 417
1997	8 714 258	873 713	23 252	22 422
1998	8 890 733	1 112 987	40 352	36 528
1999	9 057 974	1 326 931	66 733	54 885
2000	9 211 922	1 504 196	105 340	79 238
2001	9 348 732	1 643 162	159 216	108 569
2002	9 464 671	1 745 490	231 265	143 222
2003	9 556 833	1 813 217	323 962	181 582
2004	9 623 198	1 848 217	438 910	222 153
2005	9 663 375	1 853 006	576 305	261 660
2006	9 678 981	1 831 347	734 535	296 928
2007	9 673 613	1 788 587	910 100	324 457
2008	9 652 692	1 731 160	1 097 978	342 129
2009	9 622 429	1 666 034	1 292 322	348 975
2010	9 589 177	1 599 512	1 487 357	345 949

Mortality rates for children and adults, KwaZulu-Natal

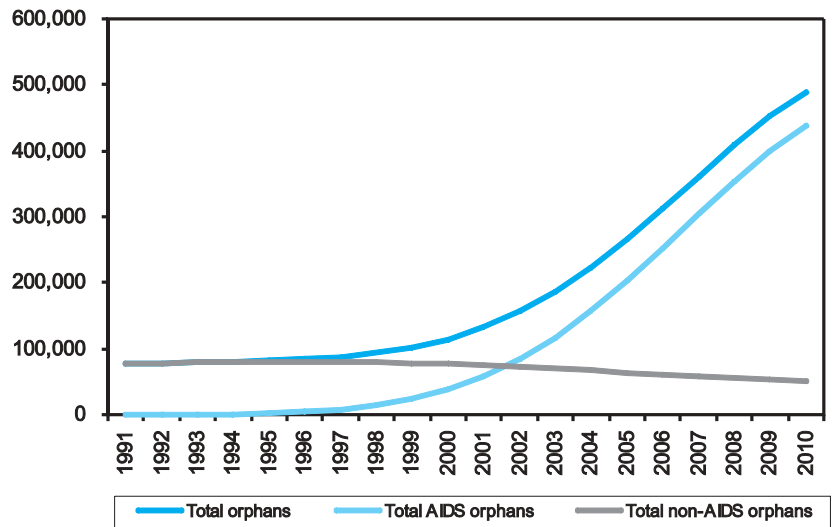


Year	Infant mortality rate	Child mortality rate	${}_{45}Q_{15}$ males	${}_{45}Q_{15}$ females
1990	55	75	36%	22%
1991	54	74	36%	22%
1992	54	73	36%	22%
1993	54	74	36%	22%
1994	55	75	36%	23%
1995	57	78	37%	23%
1996	59	83	38%	25%
1997	62	90	40%	27%
1998	65	98	43%	30%
1999	67	106	47%	34%
2000	68	113	52%	40%
2001	68	119	58%	46%
2002	68	124	64%	53%
2003	68	127	70%	60%
2004	67	128	76%	67%
2005	67	129	80%	72%
2006	66	128	84%	77%
2007	65	127	86%	80%
2008	63	126	87%	83%
2009	62	124	88%	84%
2010	61	122	87%	84%

KwaZulu-Natal

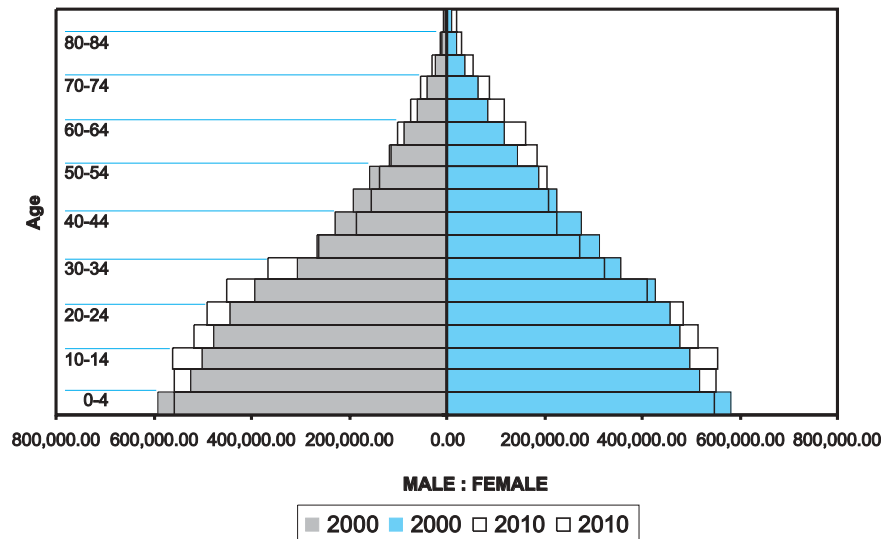
Maternal orphans under 15 years, KwaZulu-Natal

Year	Total orphans	Total AIDS orphans	Total non-AIDS orphans
1991	77 770	73	77 697
1992	78 601	188	78 412
1993	79 553	452	79 102
1994	80 724	1 013	79 710
1995	82 280	2 132	80 148
1996	84 558	4 228	80 329
1997	88 084	7 924	80 160
1998	93 603	14 042	79 561
1999	102 108	23 590	78 518
2000	114 732	37 683	77 049
2001	132 440	57 375	75 065
2002	156 048	83 501	72 547
2003	186 196	116 537	69 659
2004	223 023	156 412	66 611
2005	265 861	202 277	63 584
2006	313 039	252 370	60 669
2007	361 398	303 682	57 717
2008	408 367	353 445	54 922
2009	451 525	399 028	52 496
2010	487 920	437 651	50 269



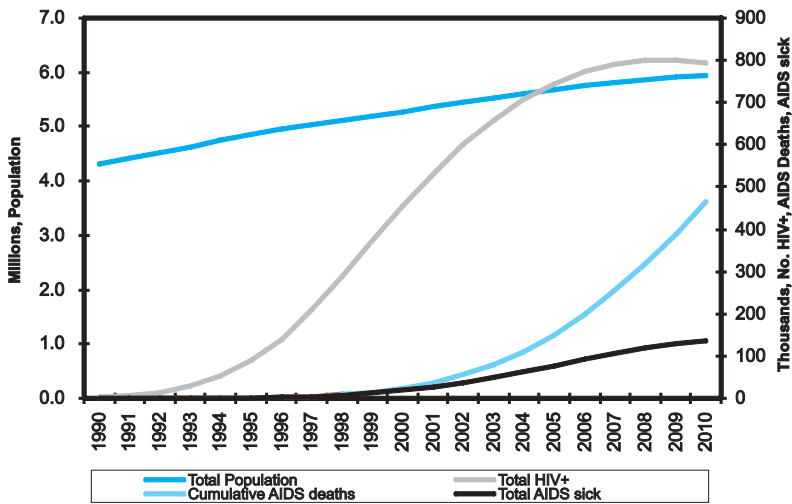
Population pyramid in 2000 and 2010, KwaZulu-Natal

Age	2000		2010	
	Male	Female	Male	Female
0-4	590 195	581 566	556 662	547 619
5-9	523 884	516 914	557 830	549 897
10-14	502 177	497 508	561 037	554 803
15-19	476 899	477 840	518 447	514 415
20-24	443 089	456 042	491 718	483 103
25-29	393 655	425 824	449 674	409 087
30-34	306 740	355 545	366 341	322 524
35-39	260 916	311 422	266 460	271 568
40-44	228 972	274 046	184 783	224 550
45-49	192 190	223 953	154 325	208 700
50-54	157 771	188 314	137 688	203 928
55-59	115 572	145 085	118 931	184 173
60-64	89 033	117 830	100 772	160 671
65-69	60 013	85 412	73 444	119 217
70-74	40 946	63 833	52 533	87 829
75-79	22 474	38 187	29 624	54 327
80-84	10 910	20 469	15 095	31 721
>=85	4 976	11 719	7 182	18 499



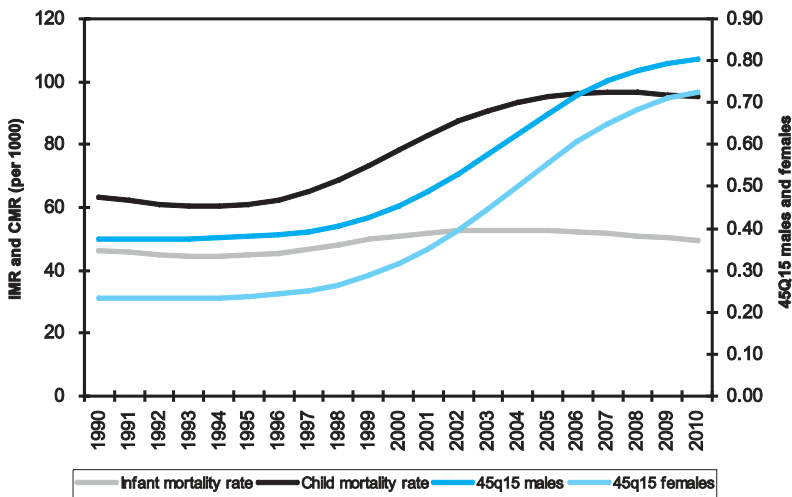
Limpopo

Total population, number of HIV+ and AIDS sick people and cumulative AIDS deaths, Limpopo



Year	Total Population	Total HIV+	Cumulative AIDS deaths	Total AIDS sick
1990	4 301 838	3 056	19	31
1991	4 416 853	6 868	51	76
1992	4 529 484	14 544	126	176
1993	4 636 207	28 606	292	386
1994	4 742 234	51 987	640	798
1995	4 848 327	88 132	1 332	1 560
1996	4 947 944	140 407	2 627	2 871
1997	5 026 225	208 226	4 897	4 932
1998	5 106 187	288 415	8 702	8 170
1999	5 190 565	373 580	14 720	12 645
2000	5 277 432	456 545	23 812	18 873
2001	5 365 365	532 917	36 955	26 829
2002	5 452 026	600 713	55 190	36 740
2003	5 535 670	659 074	79 567	48 452
2004	5 614 735	707 468	111 060	61 848
2005	5 687 848	745 544	150 451	76 414
2006	5 754 081	773 177	198 173	91 449
2007	5 812 880	790 775	254 174	105 966
2008	5 864 521	799 196	317 844	118 969
2009	5 909 699	799 915	388 054	129 580
2010	5 949 799	794 810	463 293	137 283

Mortality rates for children and adults, Limpopo

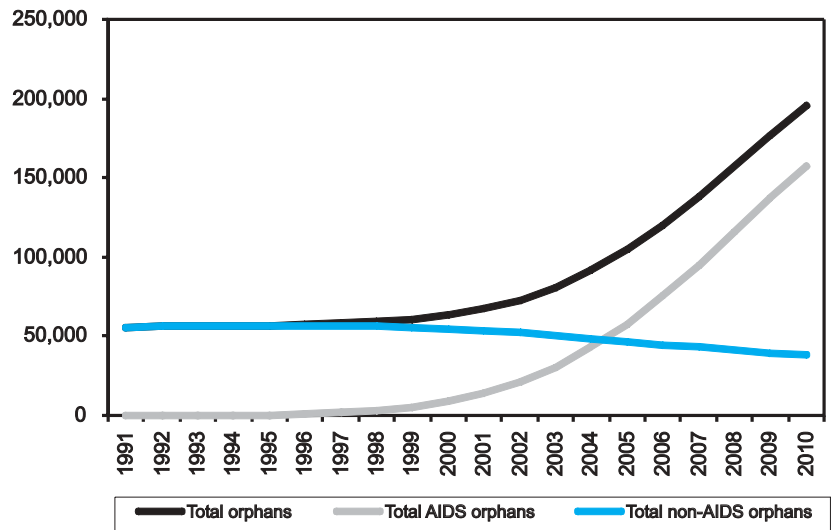


Year	Infant mortality rate	Child mortality rate	${}_{45}q_{15}$ males	${}_{45}q_{15}$ females
1990	46	63	37%	23%
1991	46	62	37%	23%
1992	45	61	38%	23%
1993	45	60	38%	23%
1994	44	60	38%	24%
1995	45	61	38%	24%
1996	46	62	38%	24%
1997	47	65	39%	25%
1998	48	69	41%	27%
1999	50	73	43%	29%
2000	51	78	45%	32%
2001	52	83	49%	35%
2002	53	87	53%	40%
2003	53	91	58%	45%
2004	53	93	63%	50%
2005	53	95	67%	56%
2006	52	96	72%	61%
2007	52	97	75%	65%
2008	51	96	78%	69%
2009	50	96	80%	71%
2010	50	95	80%	72%

Limpopo

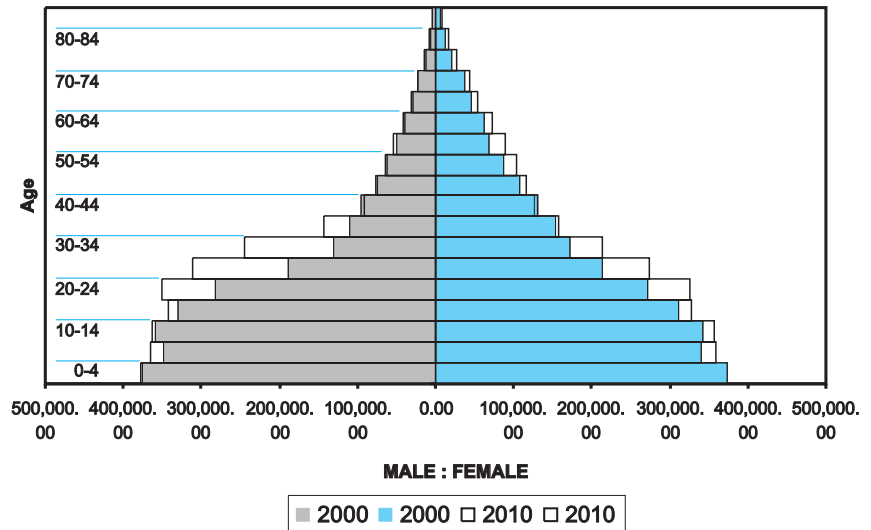
Maternal orphans under 15 years, Limpopo

Year	Total orphans	Total AIDS orphans	Total non-AIDS orphans
1991	55 798	13	55 785
1992	56 039	34	56 005
1993	56 290	83	56 207
1994	56 554	191	56 364
1995	56 882	414	56 468
1996	57 339	851	56 488
1997	58 053	1 657	56 396
1998	59 150	3 049	56 101
1999	60 834	5 311	55 523
2000	63 497	8 806	54 691
2001	67 449	13 927	53 522
2002	73 084	21 086	51 998
2003	80 886	30 654	50 232
2004	91 251	42 894	48 357
2005	104 396	57 898	46 498
2006	120 190	75 487	44 703
2007	137 907	95 056	42 850
2008	156 952	115 879	41 073
2009	176 526	137 015	39 511
2010	195 292	157 259	38 034



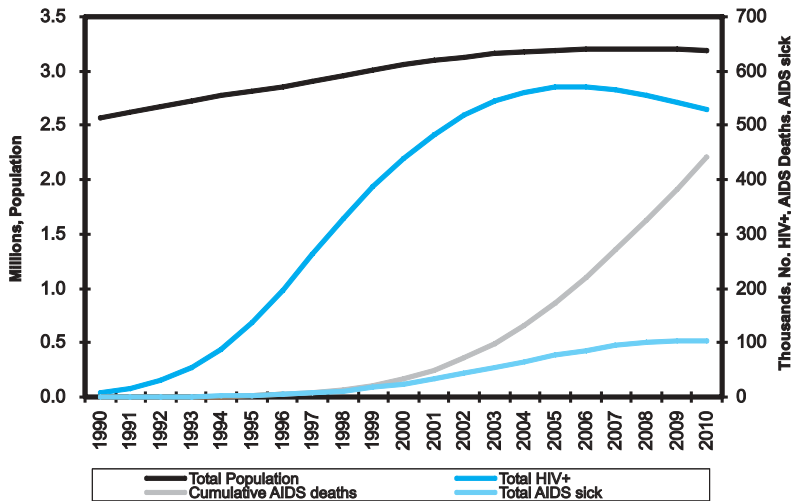
Population pyramid in 2000 and 2010, Limpopo

Age	2000		2010	
	Male	Female	Male	Female
0-4	375 932	372 685	378 485	373 038
5-9	347 988	339 915	364 969	359 769
10-14	358 415	342 760	362 585	355 880
15-19	329 217	311 517	343 078	328 672
20-24	283 093	271 430	349 927	325 600
25-29	189 005	214 700	310 492	273 783
30-34	130 570	172 605	244 191	213 879
35-39	109 375	153 241	143 550	157 892
40-44	94 942	130 086	91 178	125 679
45-49	77 370	108 527	74 749	115 925
50-54	62 050	86 913	65 133	104 168
55-59	48 839	68 128	53 087	90 194
60-64	39 703	61 622	42 329	71 766
65-69	28 237	44 711	32 048	53 256
70-74	22 813	37 215	23 462	43 534
75-79	13 242	20 547	13 604	26 473
80-84	7 045	12 966	7 984	16 858
>=85	3 213	6 817	3 840	8 741



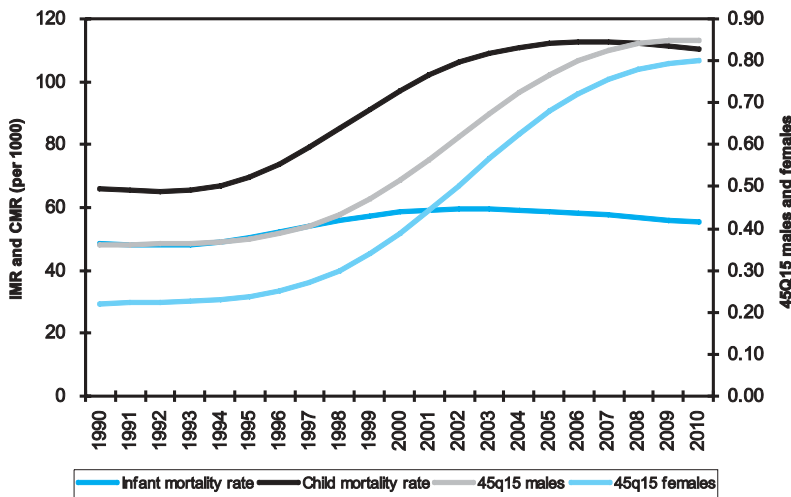
Mpumalanga

Total population, number of HIV+ and AIDS sick people and cumulative AIDS deaths, Mpumalanga



Year	Total Population	Total HIV+	Cumulative AIDS deaths	Total AIDS sick
1990	2 565 621	7 904	44	71
1991	2 621 587	16 324	116	171
1992	2 676 020	30 887	278	378
1993	2 725 608	54 151	617	773
1994	2 772 316	88 987	1 276	1 478
1995	2 815 440	137 036	2 486	2 667
1996	2 851 907	196 504	4 588	4 558
1997	2 906 976	262 234	8 038	7 343
1998	2 959 375	327 299	13 529	11 621
1999	3 009 080	387 056	21 785	17 033
2000	3 054 973	439 250	33 626	24 153
2001	3 096 053	483 072	49 902	32 637
2002	3 131 378	518 156	71 424	42 625
2003	3 160 127	544 364	98 868	53 592
2004	3 181 842	561 736	132 652	65 123
2005	3 196 436	570 617	172 807	76 324
2006	3 204 296	571 801	218 901	86 422
2007	3 206 328	566 574	270 042	94 567
2008	3 203 887	556 513	324 985	100 293
2009	3 198 474	543 344	382 301	103 380
2010	3 191 618	528 738	440 582	104 060

Mortality rates for children and adults, Mpumalanga

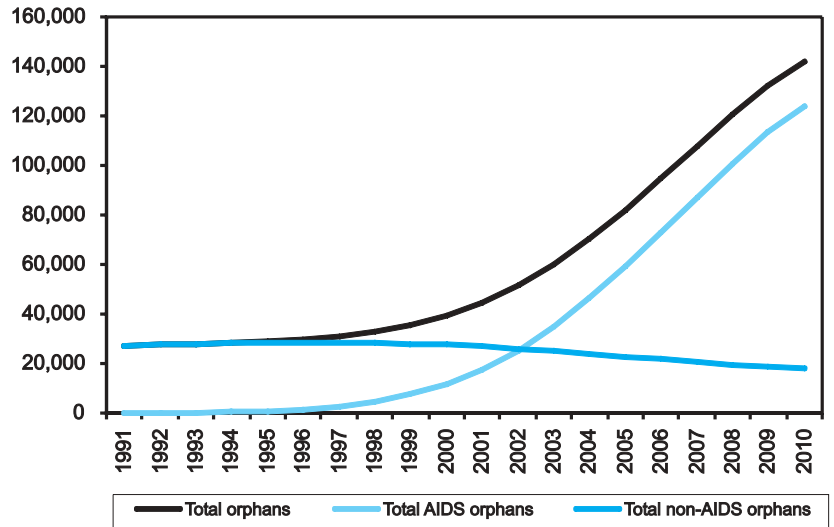


Year	Infant mortality rate	Child mortality rate	⁴⁵ q ₁₅ males	⁴⁵ q ₁₅ females
1990	49	66	36%	22%
1991	48	65	36%	22%
1992	48	65	36%	22%
1993	48	66	36%	23%
1994	49	67	37%	23%
1995	50	70	38%	24%
1996	52	74	39%	25%
1997	54	79	41%	27%
1998	56	85	43%	30%
1999	57	91	47%	34%
2000	58	97	51%	39%
2001	59	102	56%	44%
2002	59	106	62%	50%
2003	59	109	67%	57%
2004	59	111	72%	63%
2005	59	112	77%	68%
2006	58	113	80%	72%
2007	58	113	82%	76%
2008	57	112	84%	78%
2009	56	112	85%	79%
2010	55	111	85%	80%

Mpumalanga

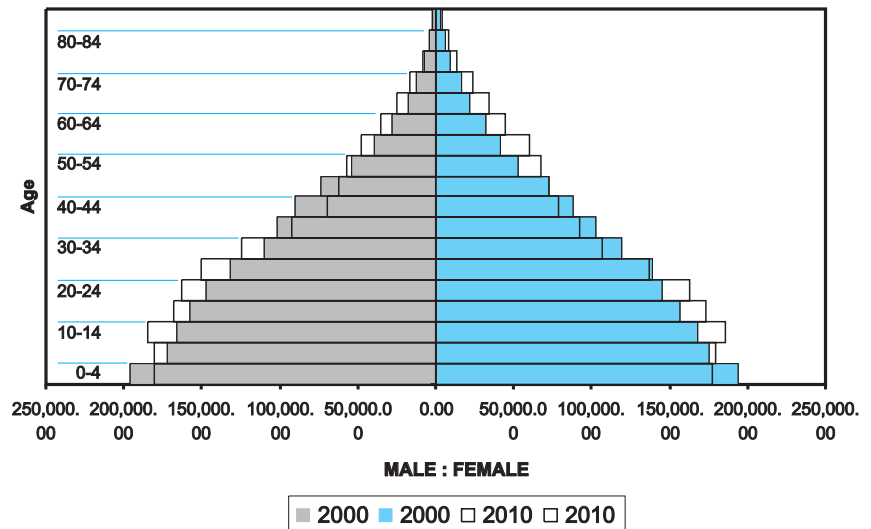
Maternal orphans under 15 years, Mpumalanga

Year	Total orphans	Total AIDS orphans	Total non-AIDS orphans
1991	27 022	29	26 993
1992	27 500	73	27 427
1993	27 984	172	27 812
1994	28 505	375	28 130
1995	29 122	766	28 356
1996	29 943	1 473	28 470
1997	31 127	2 680	28 448
1998	32 901	4 623	28 278
1999	35 543	7 586	27 957
2000	39 356	11 868	27 488
2001	44 563	17 732	26 831
2002	51 356	25 380	25 976
2003	59 878	34 902	24 976
2004	70 133	46 231	23 902
2005	81 913	59 098	22 816
2006	94 742	72 995	21 747
2007	107 760	87 114	20 645
2008	120 351	100 768	19 583
2009	131 952	113 316	18 635
2010	141 816	124 073	17 743



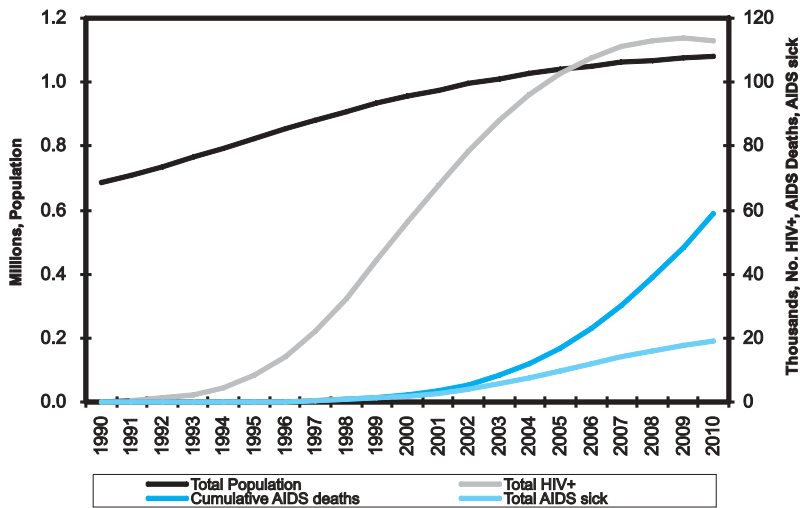
Population pyramid in 2000 and 2010, Mpumalanga

Age	2000		2010	
	Male	Female	Male	Female
0-4	195 744	194 343	180 211	177 518
5-9	171 753	175 666	180 966	179 318
10-14	166 050	167 995	185 004	185 723
15-19	157 810	156 896	168 001	173 244
20-24	147 417	144 949	162 743	162 432
25-29	132 095	138 508	150 248	136 749
30-34	110 066	119 534	124 441	106 764
35-39	101 239	103 099	92 456	91 835
40-44	90 021	87 768	69 006	79 005
45-49	73 987	72 554	62 346	72 250
50-54	53 646	52 949	57 029	67 331
55-59	39 789	41 434	47 560	59 799
60-64	28 303	31 656	34 795	44 746
65-69	17 478	21 462	25 372	33 736
70-74	12 742	16 428	16 536	23 398
75-79	7 105	9 571	8 495	13 455
80-84	3 832	6 211	4 515	7 957
>=85	1 686	3 189	2 105	4 527



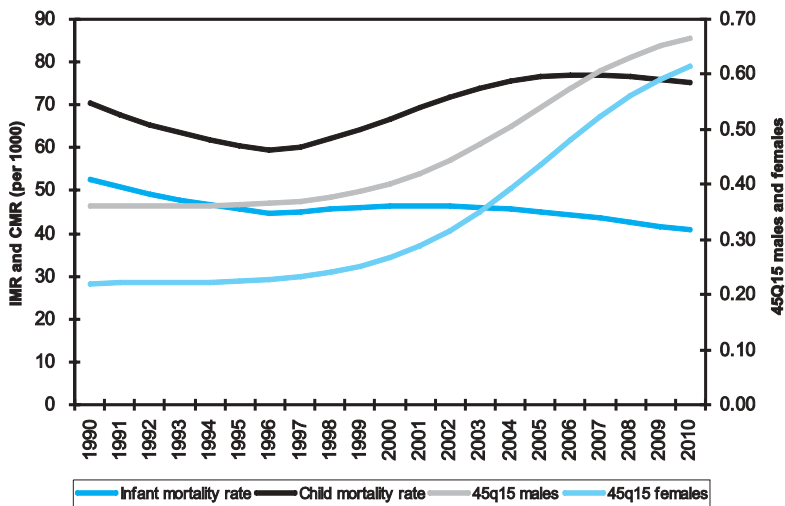
Northern Cape

Total population, number of HIV+ and AIDS sick people and cumulative AIDS deaths, Northern Cape



Year	Total Population	Total HIV+	Cumulative AIDS deaths	Total AIDS sick
1990	686 816	213	1	2
1991	709 573	498	3	4
1992	737 079	1 129	6	10
1993	765 015	2 383	16	23
1994	793 486	4 645	38	51
1995	823 367	8 386	84	107
1996	855 355	14 117	177	212
1997	882 902	22 232	355	395
1998	908 676	32 509	675	704
1999	932 694	44 168	1 223	1 179
2000	955 010	56 182	2 108	1 878
2001	975 672	67 758	3 469	2 838
2002	994 622	78 426	5 465	4 095
2003	1 011 774	87 919	8 263	5 655
2004	1 027 034	96 053	12 030	7 503
2005	1 040 329	102 676	16 908	9 582
2006	1 051 622	107 704	22 997	11 793
2007	1 060 968	111 132	30 324	13 995
2008	1 068 497	113 043	38 836	16 035
2009	1 074 415	113 608	48 395	17 767
2010	1 078 984	113 063	58 798	19 091

Mortality rates for children and adults, Northern Cape

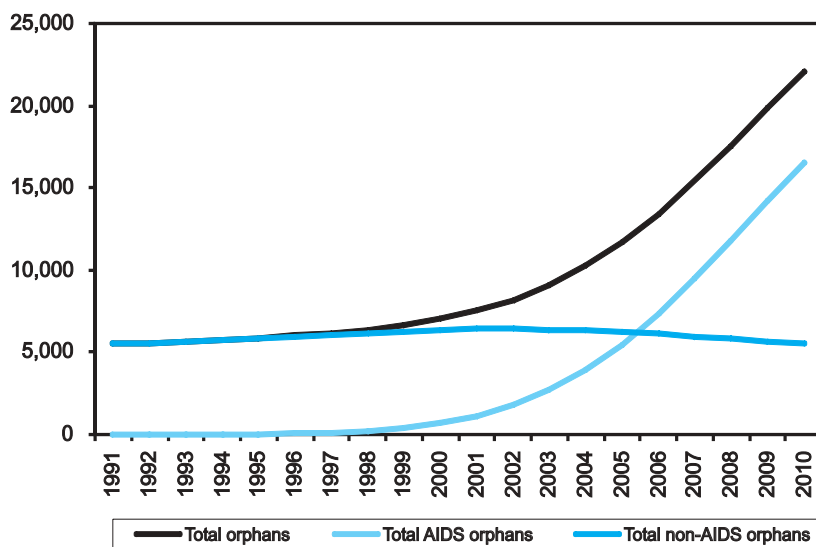


Year	Infant mortality rate	Child mortality rate	45q ₁₅ males	45q ₁₅ females
1990	53	70	36%	22%
1991	51	68	36%	22%
1992	49	65	36%	22%
1993	48	63	36%	22%
1994	47	62	36%	22%
1995	46	61	36%	22%
1996	45	59	37%	23%
1997	45	60	37%	23%
1998	46	62	38%	24%
1999	46	64	39%	25%
2000	46	67	40%	27%
2001	46	69	42%	29%
2002	46	72	44%	32%
2003	46	74	47%	35%
2004	46	75	51%	39%
2005	45	76	54%	44%
2006	44	77	57%	48%
2007	43	77	61%	52%
2008	43	77	63%	56%
2009	42	76	65%	59%
2010	41	75	66%	61%

Northern Cape

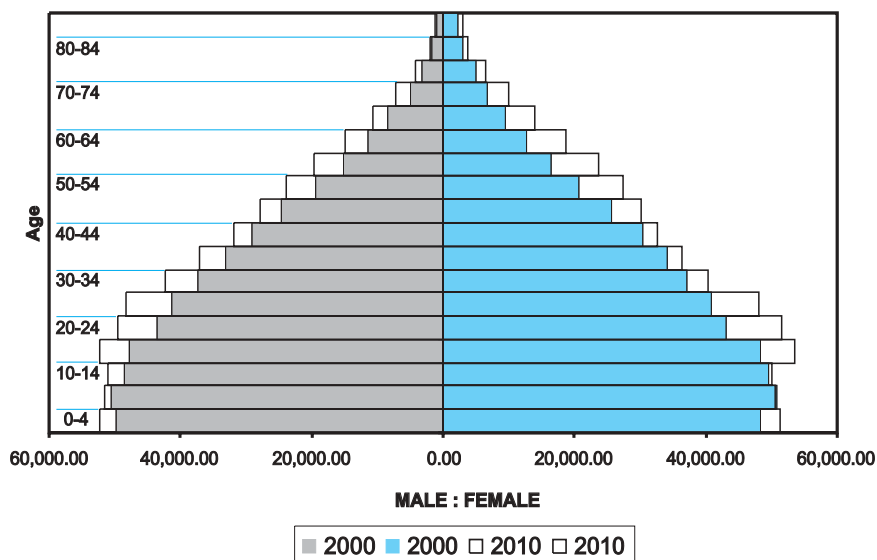
Maternal orphans under 15 years, Northern Cape

Year	Total orphans	Total AIDS orphans	Total non-AIDS orphans
1991	5 506	1	5 505
1992	5 568	2	5 566
1993	5 651	4	5 647
1994	5 752	10	5 741
1995	5 868	24	5 844
1996	6 004	52	5 952
1997	6 169	108	6 061
1998	6 379	211	6 168
1999	6 658	389	6 269
2000	7 039	683	6 357
2001	7 546	1 135	6 411
2002	8 215	1 796	6 419
2003	9 101	2 716	6 386
2004	10 251	3 934	6 317
2005	11 695	5 474	6 221
2006	13 435	7 331	6 104
2007	15 418	9 455	5 963
2008	17 583	11 774	5 809
2009	19 851	14 189	5 663
2010	22 090	16 571	5 520



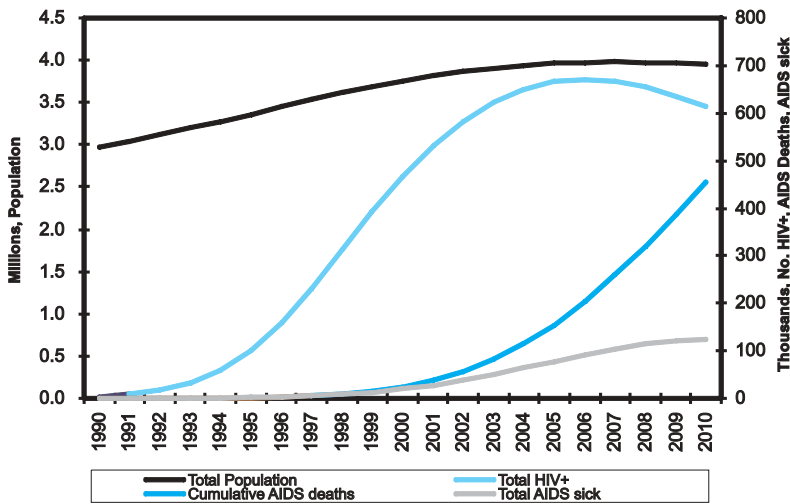
Population pyramid in 2000 and 2010, Northern Cape

Age	2000		2010	
	Male	Female	Male	Female
0-4	49 906	48 310	52 313	51 255
5-9	50 613	50 775	51 477	50 528
10-14	48 562	49 520	51 036	50 151
15-19	47 767	48 262	52 268	53 520
20-24	43 499	43 014	49 569	51 443
25-29	41 349	40 828	48 255	48 068
30-34	37 225	37 188	42 280	40 282
35-39	33 175	33 997	37 063	36 308
40-44	29 250	30 262	31 902	32 588
45-49	24 590	25 675	27 808	30 123
50-54	19 371	20 593	24 019	27 409
55-59	15 136	16 421	19 682	23 562
60-64	11 440	12 672	14 921	18 593
65-69	8 361	9 571	10 756	14 056
70-74	4 905	6 620	7 157	9 932
75-79	3 236	4 856	4 281	6 544
80-84	1 791	3 025	1 958	3 717
>=85	1 053	2 192	1 281	2 878



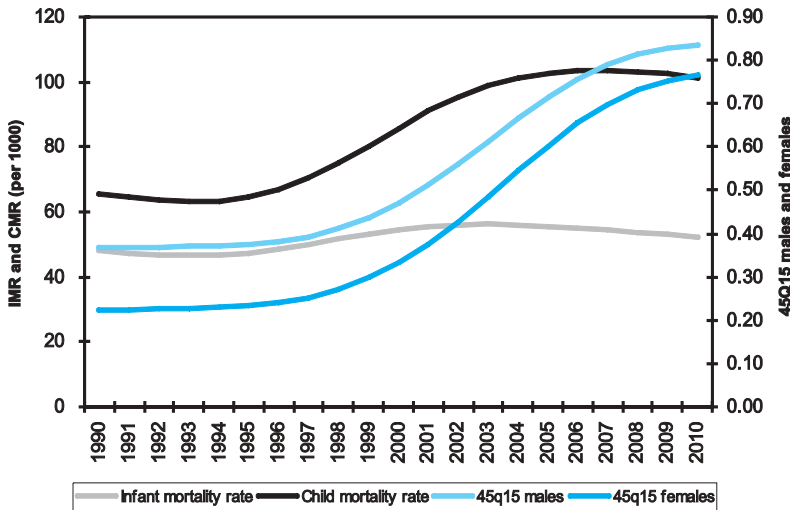
Northern West

Total population, number of HIV+ and AIDS sick people and cumulative AIDS deaths, North West



Year	Total Population	Total HIV+	Cumulative AIDS deaths	Total AIDS sick
1990	2 971 803	3 674	16	27
1991	3 037 421	8 221	44	67
1992	3 118 374	17 292	111	159
1993	3 197 215	33 502	263	356
1994	3 276 843	60 061	587	746
1995	3 359 831	100 741	1 239	1 477
1996	3 451 143	158 354	2 484	2 775
1997	3 534 634	230 879	4 748	4 984
1998	3 613 359	311 982	8 542	8 098
1999	3 686 432	392 864	14 625	12 902
2000	3 753 128	466 730	23 924	19 324
2001	3 812 734	530 218	37 485	27 799
2002	3 864 204	582 089	56 407	38 153
2003	3 906 592	622 038	81 739	50 372
2004	3 939 265	650 045	114 359	63 918
2005	3 961 890	666 306	154 801	78 137
2006	3 974 601	671 451	203 095	91 931
2007	3 978 202	666 741	258 649	104 204
2008	3 974 139	653 903	320 265	113 874
2009	3 964 249	635 133	386 266	120 272
2010	3 950 663	612 887	454 735	123 146

Mortality rates for children and adults, North West

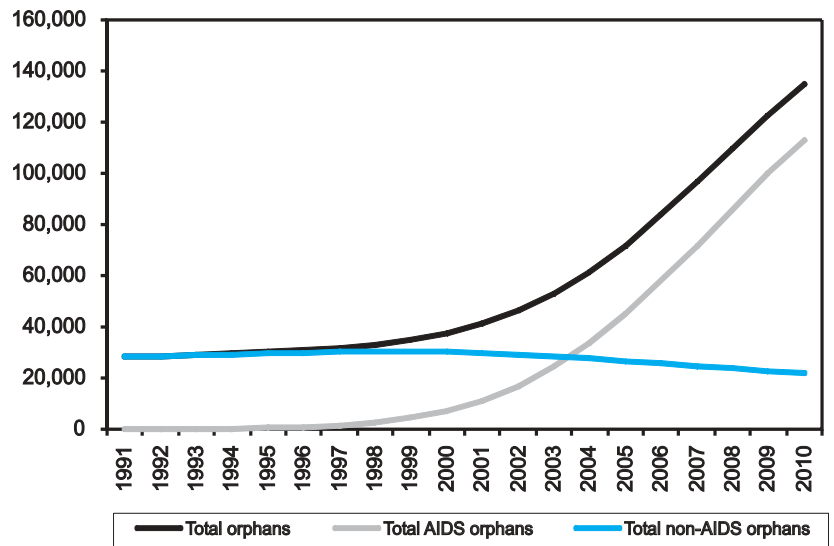


Year	Infant mortality rate	Child mortality rate	${}_{45}q_{15}$ males	${}_{45}q_{15}$ females
1990	48	66	37%	22%
1991	47	64	37%	22%
1992	47	64	37%	23%
1993	47	63	37%	23%
1994	47	63	37%	23%
1995	47	65	38%	23%
1996	48	67	38%	24%
1997	50	70	39%	25%
1998	52	75	41%	27%
1999	53	80	44%	30%
2000	55	86	47%	33%
2001	56	91	51%	38%
2002	56	95	56%	43%
2003	56	99	61%	49%
2004	56	101	67%	55%
2005	56	103	71%	60%
2006	55	104	76%	65%
2007	54	104	79%	70%
2008	54	103	81%	73%
2009	53	102	83%	75%
2010	52	101	84%	77%

Northern West

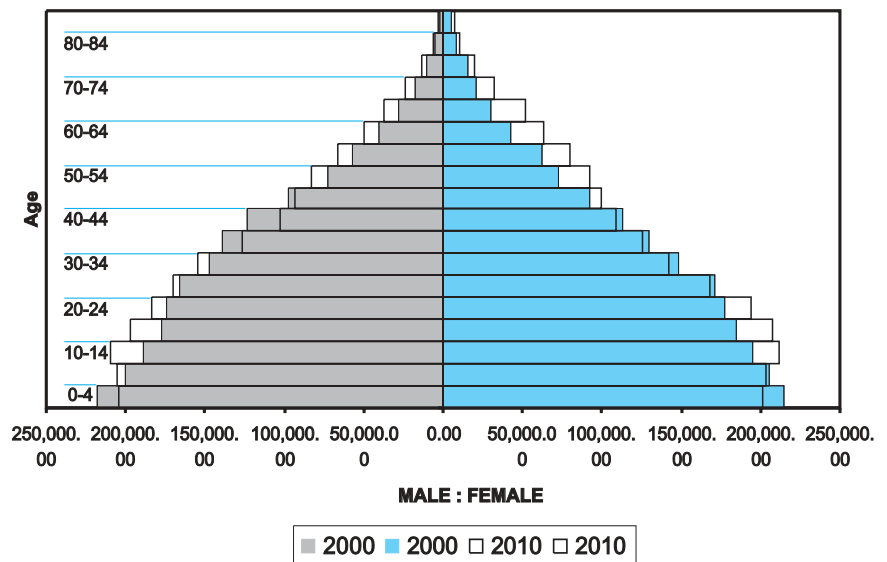
Maternal orphans under 15 years, North West

Year	Total orphans	Total AIDS orphans	Total non-AIDS orphans
1991	28 336	10	28 326
1992	28 671	27	28 644
1993	29 060	66	28 994
1994	29 501	153	29 348
1995	30 019	335	29 684
1996	30 668	689	29 978
1997	31 546	1 343	30 203
1998	32 805	2 474	30 331
1999	34 648	4 315	30 333
2000	37 338	7 147	30 192
2001	41 104	11 265	29 840
2002	46 197	16 950	29 246
2003	52 888	24 428	28 460
2004	61 377	33 820	27 557
2005	71 696	45 084	26 612
2006	83 613	57 956	25 657
2007	96 473	71 844	24 630
2008	109 719	86 103	23 616
2009	122 712	100 006	22 706
2010	134 542	112 708	21 834



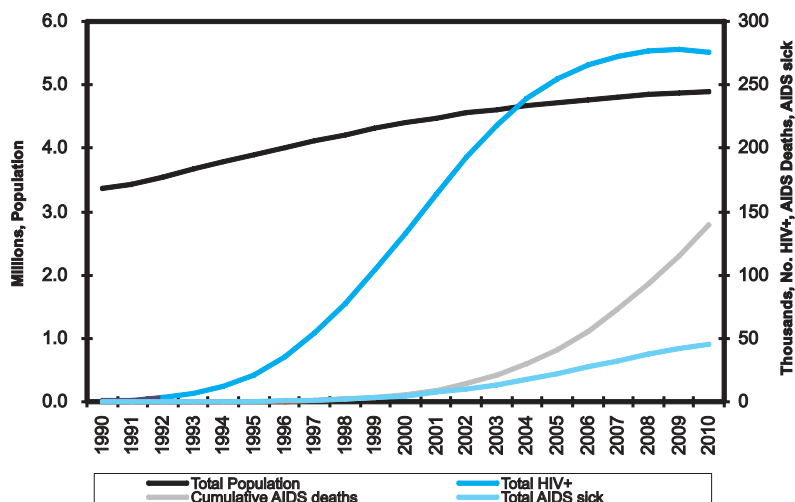
Population pyramid in 2000 and 2010, North West

Age	2000		2010	
	Male	Female	Male	Female
0-4	217 535	215 126	204 603	201 262
5-9	200 146	204 881	205 609	203 438
10-14	188 308	195 124	209 496	211 957
15-19	177 470	184 495	196 705	207 889
20-24	174 051	177 510	183 856	194 196
25-29	165 707	171 010	170 475	167 852
30-34	147 547	148 730	154 175	142 041
35-39	138 572	129 872	126 853	126 007
40-44	123 825	112 641	102 242	108 705
45-49	97 348	91 973	93 077	99 320
50-54	72 762	72 410	83 340	92 524
55-59	57 493	61 941	66 003	79 751
60-64	40 489	42 798	49 463	63 278
65-69	28 087	30 243	37 768	51 711
70-74	17 119	20 815	24 005	32 541
75-79	10 757	16 034	13 688	19 692
80-84	4 671	8 086	6 102	10 439
>=85	2 238	5 315	3 106	7 495



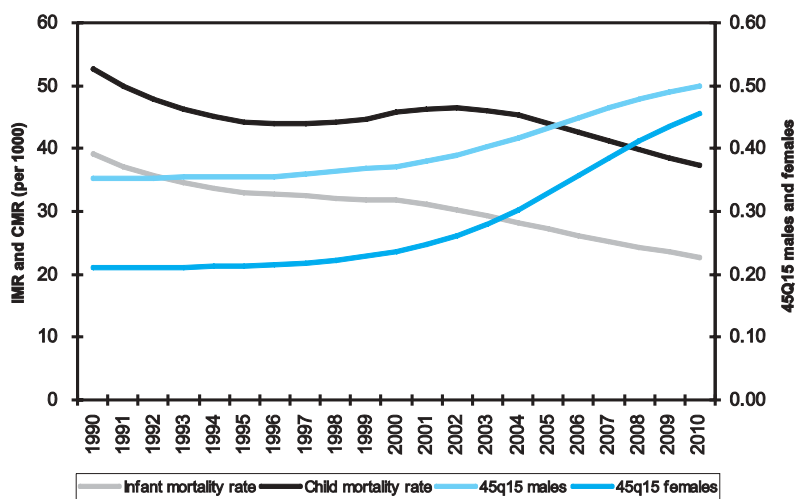
Western Cape

Total population, number of HIV+ and AIDS sick people and cumulative AIDS deaths, Western Cape



Year	Total Population	Total HIV+	Cumulative AIDS deaths	Total AIDS sick
1990	3 359 364	626	3	4
1991	3 441 112	1 378	7	11
1992	3 553 255	3 144	18	25
1993	3 665 258	6 497	44	63
1994	3 776 218	12 242	104	141
1995	3 886 981	21 444	234	298
1996	3 997 622	35 236	493	587
1997	4 111 555	54 220	984	1 091
1998	4 216 867	77 457	1 861	1 919
1999	4 312 352	104 005	3 332	3 149
2000	4 399 414	133 082	5 660	4 902
2001	4 478 733	164 005	9 167	7 260
2002	4 550 813	192 946	14 166	10 145
2003	4 615 965	218 468	20 975	13 620
2004	4 674 327	239 391	29 954	17 782
2005	4 725 994	254 969	41 438	22 469
2006	4 771 115	265 417	55 662	27 489
2007	4 809 934	272 545	72 727	32 577
2008	4 842 842	276 422	92 590	37 481
2009	4 870 416	277 317	115 017	41 787
2010	4 893 421	275 687	139 596	45 259

Mortality rates for children and adults, Western Cape

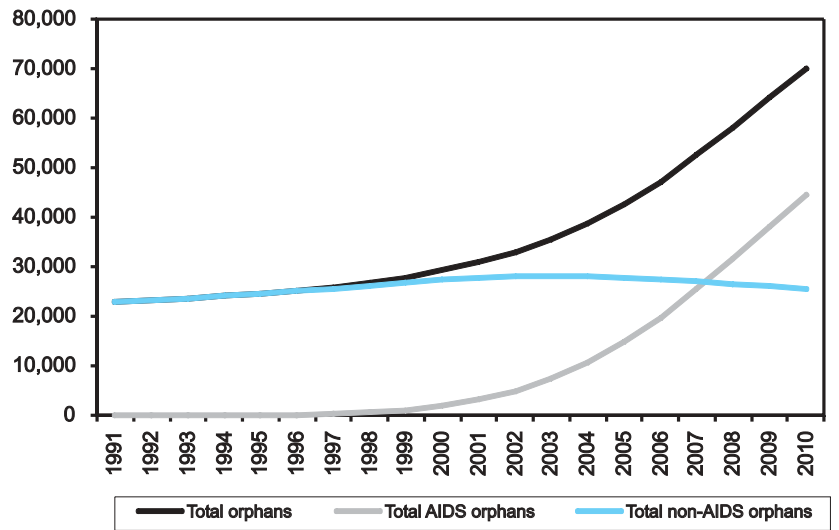


Year	Infant mortality rate	Child mortality rate	45q15 males	45q15 females
1990	39	53	35%	21%
1991	37	50	35%	21%
1992	36	48	35%	21%
1993	35	46	35%	21%
1994	34	45	35%	21%
1995	33	44	35%	21%
1996	33	44	36%	21%
1997	32	44	36%	22%
1998	32	44	36%	22%
1999	32	45	37%	23%
2000	32	46	37%	24%
2001	31	46	38%	25%
2002	30	46	39%	26%
2003	29	46	40%	28%
2004	28	45	42%	30%
2005	27	44	43%	33%
2006	26	43	45%	36%
2007	25	41	46%	38%
2008	24	40	48%	41%
2009	24	38	49%	44%
2010	23	37	50%	46%

Western Cape

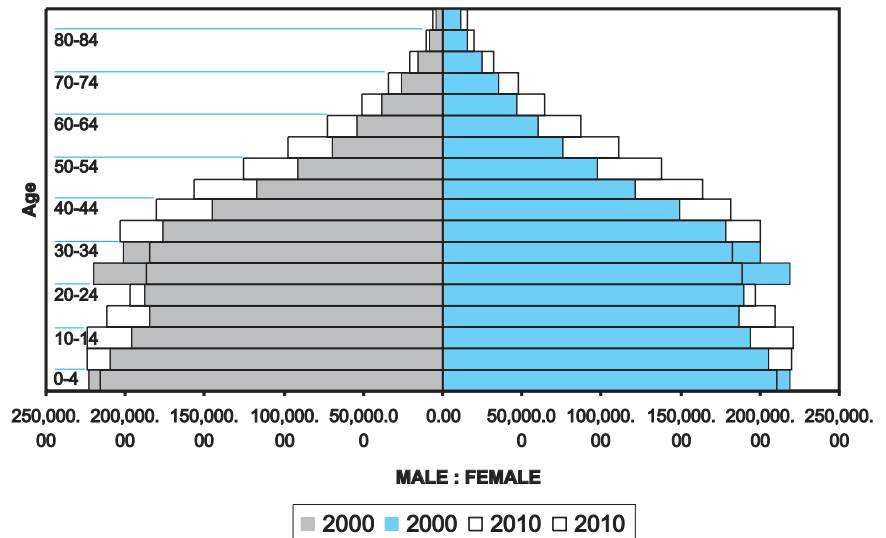
Maternal orphans under 15 years, Western Cape

Year	Total orphans	Total AIDS orphans	Total non-AIDS orphans
1991	23 015	2	23 013
1992	23 290	4	23 286
1993	23 634	11	23 623
1994	24 070	27	24 043
1995	24 592	64	24 529
1996	25 191	141	25 050
1997	25 894	294	25 600
1998	26 764	578	26 186
1999	27 867	1 074	26 792
2000	29 229	1 876	27 353
2001	30 864	3 097	27 767
2002	32 888	4 871	28 017
2003	35 437	7 325	28 112
2004	38 623	10 572	28 051
2005	42 534	14 682	27 852
2006	47 184	19 648	27 535
2007	52 427	25 334	27 093
2008	58 110	31 543	26 567
2009	64 038	38 009	26 030
2010	69 843	44 358	25 485



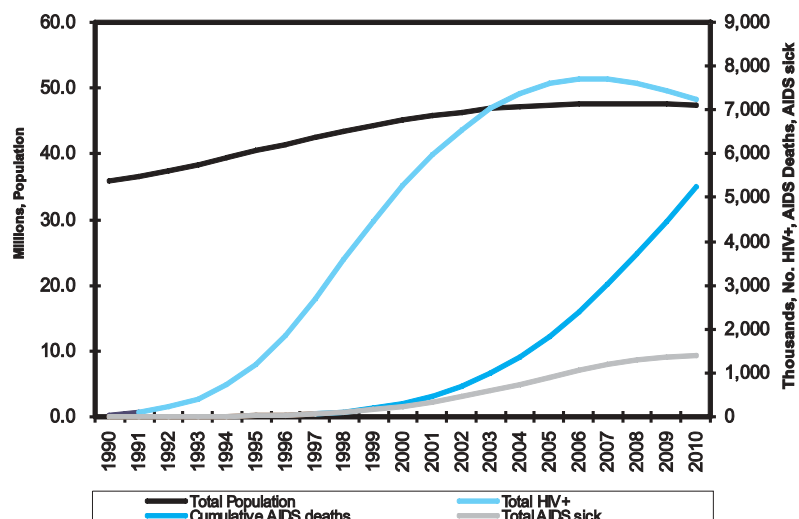
Population pyramid in 2000 and 2010, Western Cape

Age	2000		2010	
	Male	Female	Male	Female
0-4	223 274	218 813	215 279	210 759
5-9	209 527	205 415	224 092	220 143
10-14	196 053	193 664	224 393	220 836
15-19	185 163	186 621	212 043	209 242
20-24	187 553	189 862	197 003	197 333
25-29	219 990	218 373	186 389	188 756
30-34	200 959	199 960	184 157	182 879
35-39	176 618	178 045	203 774	199 836
40-44	145 232	149 681	180 484	181 855
45-49	116 958	121 539	156 187	163 585
50-54	91 543	97 833	125 965	138 038
55-59	69 430	75 536	97 650	111 145
60-64	53 905	60 651	72 512	87 110
65-69	38 867	46 741	50 681	64 167
70-74	25 441	34 940	34 545	47 492
75-79	15 856	25 335	20 561	32 255
80-84	8 305	15 911	10 551	20 163
>=85	4 537	11 285	6 150	15 412



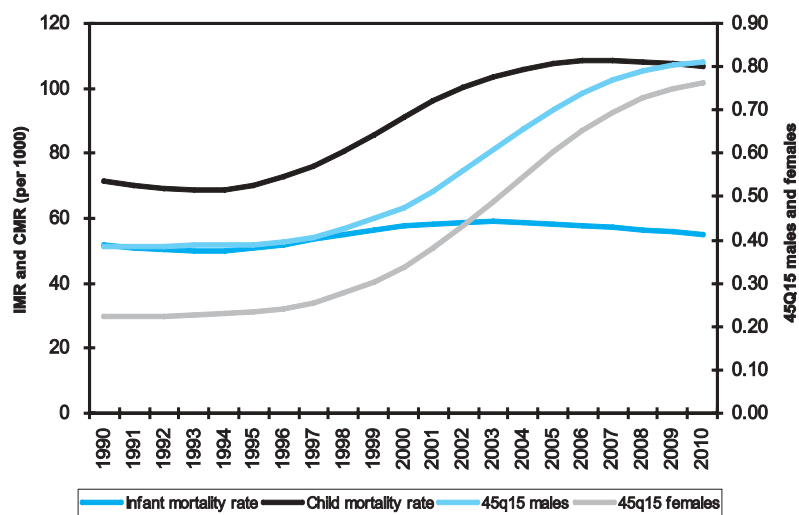
South Africa

Total population, number of HIV+ and AIDS sick people and cumulative AIDS deaths, South Africa



Year	Total Population	Total HIV+	Cumulative AIDS deaths	Total AIDS sick
1990	35 783 975	48 818	242	394
1991	36 513 522	106 732	648	974
1992	37 422 066	218 197	1 606	2 258
1993	38 375 873	412 674	3 725	4 922
1994	39 375 664	727 452	8 139	10 085
1995	40 410 256	1 203 847	16 817	19 519
1996	41 452 486	1 864 140	32 954	35 714
1997	42 489 541	2 684 545	61 410	61 996
1998	43 439 051	3 578 195	109 043	102 097
1999	44 298 552	4 457 033	184 624	159 180
2000	45 078 805	5 263 841	298 645	236 228
2001	45 768 984	5 968 521	462 642	334 253
2002	46 361 337	6 558 628	688 428	453 352
2003	46 848 269	7 027 931	987 061	591 088
2004	47 223 831	7 373 071	1 367 429	742 519
2005	47 485 369	7 594 403	1 834 484	899 071
2006	47 635 680	7 697 600	2 387 587	1 049 742
2007	47 683 822	7 695 201	3 019 659	1 182 710
2008	47 645 665	7 605 111	3 717 519	1 287 844
2009	47 540 955	7 449 678	4 463 489	1 358 743
2010	47 392 059	7 252 801	5 237 867	1 393 926

Mortality rates for children and adults, South Africa

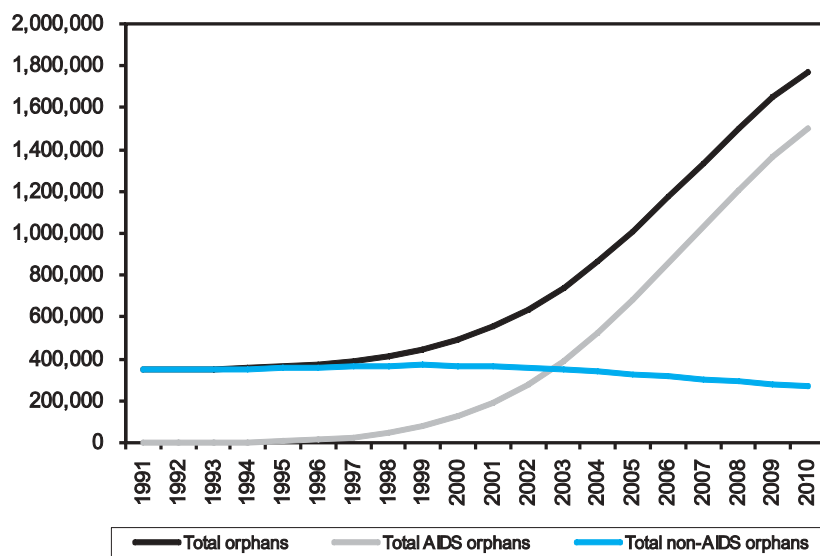


Year	Infant mortality rate	Child mortality rate	${}_{45}Q_{15}$ males	${}_{45}Q_{15}$ females
1990	52	72	38%	22%
1991	51	70	38%	22%
1992	50	69	38%	22%
1993	50	69	39%	23%
1994	50	69	39%	23%
1995	51	70	39%	23%
1996	52	73	39%	24%
1997	53	76	41%	25%
1998	55	81	43%	28%
1999	56	86	45%	30%
2000	58	91	47%	34%
2001	58	96	51%	38%
2002	59	100	56%	43%
2003	59	104	61%	49%
2004	59	106	66%	55%
2005	58	108	70%	60%
2006	58	108	74%	65%
2007	57	109	77%	69%
2008	56	108	79%	73%
2009	56	108	80%	75%
2010	55	107	81%	76%

South Africa

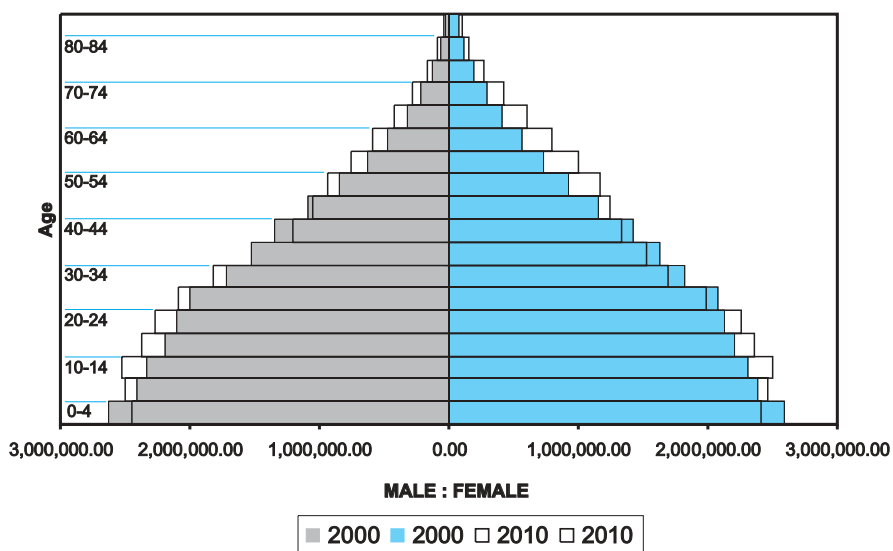
Maternal orphans under 15 years, South Africa

Year	Total orphans	Total AIDS orphans	Total non-AIDS orphans
1991	346 751	227	346 524
1992	347 701	581	347 120
1993	350 631	1 398	349 234
1994	355 642	3 162	352 480
1995	363 299	6 736	356 562
1996	373 229	13 469	359 760
1997	388 824	25 520	363 305
1998	412 435	45 799	366 635
1999	447 522	77 887	369 636
2000	493 846	124 989	368 857
2001	555 684	190 993	364 691
2002	636 876	279 102	357 774
2003	739 572	391 052	348 520
2004	865 216	527 054	338 162
2005	1 011 457	684 364	327 093
2006	1 172 985	857 201	315 784
2007	1 336 483	1 034 085	302 398
2008	1 499 424	1 208 646	290 777
2009	1 647 293	1 367 926	279 367
2010	1 770 870	1 502 457	268 413



Population pyramid in 2000 and 2010, South Africa

Age	2000		2010	
	Male	Female	Male	Female
0-4	2 627 264	2 588 025	2 445 272	2 405 342
5-9	2 408 441	2 380 491	2 498 542	2 464 815
10-14	2 327 617	2 306 987	2 526 926	2 499 311
15-19	2 198 234	2 201 901	2 377 371	2 363 462
20-24	2 096 313	2 132 964	2 272 112	2 256 177
25-29	1 995 412	2 072 358	2 091 707	1 991 600
30-34	1 713 882	1 825 019	1 824 188	1 690 510
35-39	1 530 748	1 623 630	1 519 514	1 520 565
40-44	1 347 930	1 423 919	1 203 272	1 332 898
45-49	1 089 738	1 158 612	1 054 323	1 240 890
50-54	846 912	924 110	934 110	1 163 580
55-59	634 345	724 370	760 033	995 492
60-64	469 458	566 620	590 839	798 883
65-69	321 470	413 751	426 926	598 097
70-74	214 672	299 869	287 948	427 637
75-79	125 514	198 208	165 310	271 583
80-84	63 460	116 197	83 802	158 730
>=85	31 914	78 451	42 836	107 456



Appendix

ASSA2000 model

Modelling of the AIDS epidemic in South Africa by actuaries began with the so-called Doyle or Metropolitan Life model, which was developed in 1989. The model was based on a population hypothetically divided into four groups that differed in terms of the relative ease with which individuals belonging to each group were expected to contract and transmit the HIV.

The code for the Metropolitan model was, and still is, proprietary. The Actuarial Society of South Africa (ASSA) felt that it was desirable for people to have access to a non-proprietary programme which users could alter to suit their needs. In 1996 ASSA therefore released the ASSA500 model. This was very similar in structure to the Metropolitan model with some simplifications to ease programming and comprehension and to shorten run times. The model was primarily designed to make users aware of the likely impacts of the epidemic on mortality.

In 1998 the AIDS Committee of ASSA decided to develop the model further. There were several reasons for this:

- The ASSA500 model represented the epidemic in a hypothetical black African population, rather than the population of the country as a whole;
- There were concerns about the accuracy of the preliminary results of the 1996 census and there was a need for national estimates that attempted to correct for suspected deficiencies which also took into account any likely demographic impact of HIV/AIDS;
- Many South African demographers were continuing to ignore the impact of AIDS in their projections of the South African population;
- The ASSA500 model had inherited a number of demographic shortcomings from the Metropolitan model, particularly the assumptions of constant fertility and non-HIV mortality over time and the assumption of no international migration.

The result was an Excel 95 workbook designated ASSA600, released to the public in early 1999. The model was designed to be appropriate for use as a national population model for the Pattern II (heterosexual) HIV epidemic found in South Africa. The base model contained a scenario that reflected its builders' best estimates of values for the model

parameters and was calibrated to fit the antenatal data up to 1997.

In 2000 the AIDS Committee felt that a further revision of the model was necessary. The update was needed because of increased knowledge about the epidemic, the availability of new data against which to calibrate the model, and greater awareness of the uses to which the model was being put. It was also decided to change the naming convention to reflect the year of the latest antenatal data used to calibrate the model.

The resultant ASSA2000 model incorporated the following adjustments reflecting new or updated information about the epidemic:

- 1998-2000 antenatal clinic summary results;
- 1998 South Africa Demographic and Health Survey (SADHS) data, in particular, data on prevalence of STDs and condom usage;
- improved estimates of the population; and
- mortality data on the pattern and level of deaths that suggested, in particular, that non-HIV mortality for adults has not improved over time as expected.

In addition, the model was altered to:

- improve the fit to antenatal clinic survey data;
- allow for the possibility of making separate male and female assumptions;
- model the population groups separately;
- limit the trend in mortality and fertility rates over time;
- limit future in-migration;
- change the HIV survival curve to be a function of a Weibull distribution;
- allow for a bimodal distribution of paediatric HIV survival; and
- disaggregate the 'contagion matrix' (used in ASSA600) into more measurable and controllable parameters of heterosexual behaviour. These include the probability that a partner comes from a particular risk group, the number of new partners per annum, the number of sexual contacts per partner, the age of the partner and the probability that a condom is used.

The ASSA2000 model has been produced as a suite of several versions. The *lite* version, like the ASSA600 model, treats the population of the country as one group. The *full* version models each of the four population groups separately, at a national

level, and aggregates to produce results for the population as a whole. The *provincial* version is an aggregation of the application of the *full* version of the model separately to each of the provinces. It thus allows for geographic differences in the spread of the epidemic. The ASSA AIDS Committee initially delayed the release of the *provincial* version pending the lifting of an embargo on the release by the Department of Health of the more detailed results of the provincial antenatal surveys for 2000. When, after many months, the Department seemed no nearer releasing the results, the Committee decided that the demand for the *provincial* version necessitated that it be released despite non-release of the detailed results by the Department.

For future projections, it is possible to consider a range of scenarios that would impact on the spread of the epidemic. A no change scenario and a realistic scenario have been modelled. As the course of the disease progresses and more information about it becomes available, the model structure and base scenario will be further updated and future versions of the model will be released.

Calibration

In order to ensure that the models are set up properly they are calibrated to ensure that they are consistent with the epidemic as it has been experienced to date. Calibration involves adjustments of parameters that have not been estimated independently so that the 'results' of the model more or less match observed reality. In particular, the model results should match the results of the annual antenatal clinic surveys both in terms of overall level and by age. The model results should also match the number of adult deaths estimated on the basis of those recorded by the Department of Home Affairs on the population register after adjusting for an estimate of under-recording.

Only the national model has been fully calibrated. Further data are still awaited from the Department of Health in order to finalise the calibration of the provincial versions. In the meantime, what is presented here are the results of the fits to date.

Website

The ASSA2000 models can be downloaded from the website of the Actuarial Society of South Africa at www.assa.org.za/aidsmodel.asp. A user manual is also available, as well as a spreadsheet containing a summary of the output and graphs for each province and for the country as a whole.