Reducing Human Vulnerability

Introduction

Environmental sustainability can only be realized if people and social systems are not vulnerable to environmental change. Vulnerability is affected by an individual's exposure to environmental hazards, and an individual's capability to cope with exposure to environmental hazards.

Environmental hazards can be brought on by human activities, or they can have natural origins. Natural hazards include earthquakes, volcanoes, drought and flood. Hazards brought on by human activities can include inappropriate practices such as unsuitable agricultural methods which may exacerbate drought or floods, or water pollution, air pollution and inadequate sanitation facilities.

Human Vulnerability to Environmental Change

Human vulnerability to environmental change should be reduced in order to move towards environmental sustainability. This can be done in a number of ways, either by reducing the risk of environmental hazards or by increasing the ability of humans to cope.

Correct management of the environment will ultimately lead to a reduced likelihood of disasters. This should preferably be done through a precautionary approach which requires early warning of impending environmental disasters and hazards, as well as mitigation of risks associated with environmental disasters and hazards, and response measures for dealing with the aftermath of environmental disasters and hazards. If the environment is managed correctly, disasters caused by human activities will be less likely to occur. In addition, natural environmental disasters may have reduced impact due to the resilience of the natural environment.

The ability of humans to cope with environmental disasters and hazards can vary between individuals and communities, as well as through time. The ability of an individual or community to cope with and prepare for change will affect their vulnerability to that change. Vulnerability is affected by numerous factors, including access to a wide variety of resources, competition for resources, and current state of health and welfare.

The state of vulnerability is affected by having limited choices, being unable to adapt, being marginalised and dependent on others, and being insecure about the future. The opposite end of the spectrum represents a state of security which is characterised by a diversity of choices, being highly adaptable, having power and control over your situation, and being secure about the future.

The indicators and variables representing human vulnerability are:

- **Basic human sustenance**
  - Households with access to sanitation
  - Access to water
  - Access to refuge removal

- **Environmental health**
  - Death rate from respiratory diseases and tuberculosis
  - HIV prevalence
  - Malaria
  - Under five mortality

For further information on human vulnerability please refer to the following:

United Nations Environment Programme 2004. *Global Environment Outlook 3*. http://www.unep.org/geo/

United Nations Environment Programme, Various. *Global Environment Outlook Yearbooks.* http://www.unep.org/geo/

United Nations Environment Programme 2002. *Africa Environment Outlook*. http://www.unep.org/dewa/Africa/

United Nations Environment Programme 2006. *Africa Environment Outlook 2*. Our Environment, Our Wealth Website http://www.unep.org/dewa/Africa

Indicator: Basic human sustenance

Variable: 24

Description: Households with access to sanitation

Units: Number and percentage of households with access to sanitation.

Source: Department of Water Affairs and Forestry (DWAF) 2006. *Annual Report 2005-2006*. http://www.dwaf.gov.za/

Statistics South Africa (Stats SA) 2006. *General Household Survey (Statistical release P0318), 2006*. http://www.statssa.gov.za

Census 1991, 1996, 2001. Department of Water Affairs and Forestry (DWAF) internal processes.

Department of Provincial and Local Government (DPLG) Municipal Infrastructure Grant (MIG).

Logic: This variable is important as it visually indicates population growth within South Africa as well as provides an indication of whether access to basic sanitation has improved within the country. Target 10 of Goal 7 of the Millennium Development Goals requires a halving of the proportion of households without sustainable access to safe drinking water and basic sanitation.

Discussion: An increase access to sanitation is a key component of development and poverty reduction, as it has major health benefits as well as associated social, economic and environmental benefits. Inadequate sanitation can cause several diseases which are transmitted to humans through exposure to sewage. Sanitation is a critical intervention needed to improve living conditions among South Africa's poor and to reduce or prevent diarrhoea and other seriously debilitating conditions, especially among children.

South Africa has reduced the relative proportion of household without sanitation infrastructure from 50.1% in 1994 to 27.4 % in 2007. Significant progress has therefore been made towards achieving this Millennium Development Goal 7. It should be noted that the figure reflects the provision of infra structure and does not reflect actual use if the service has been provided. Access to toilet facilities has increased since 2002. The General Household Survey (2006) released by Statistics South Africa has shown that the percentage of households using the bucket system (or no toilet facilities) have been on a steady decline. The total number of households still using the bucket system has declined from 609 675 in 1994 to 9 044 in 2009.

Notes: This indicator addresses the Johannesburg Plan of Implementation: Section 7 and 8 and the Millennium Development Goal 7.

Table 18: Percentage of households (HH) with access to basic sanitation services

	Percentage of HH with access to sanitation infrastructure
1994	49.9
1995	50.9
1996	51.6
1997	53.2
1998	54.4
1999	56.2
2000	57.6
2001	59.2
2002	62.5
2003	64.1
2004	66.1
2005	69.1
2006	70.7
2007	72.6
2008	74.6
2009	77.1

Source: Census 1991, 1996, 2001; Department of Water Affairs and Forestry (DWAF) internal processes; Department of Provincial and Local Government (DPLG) Municipal Infrastructure Grant (MIG)

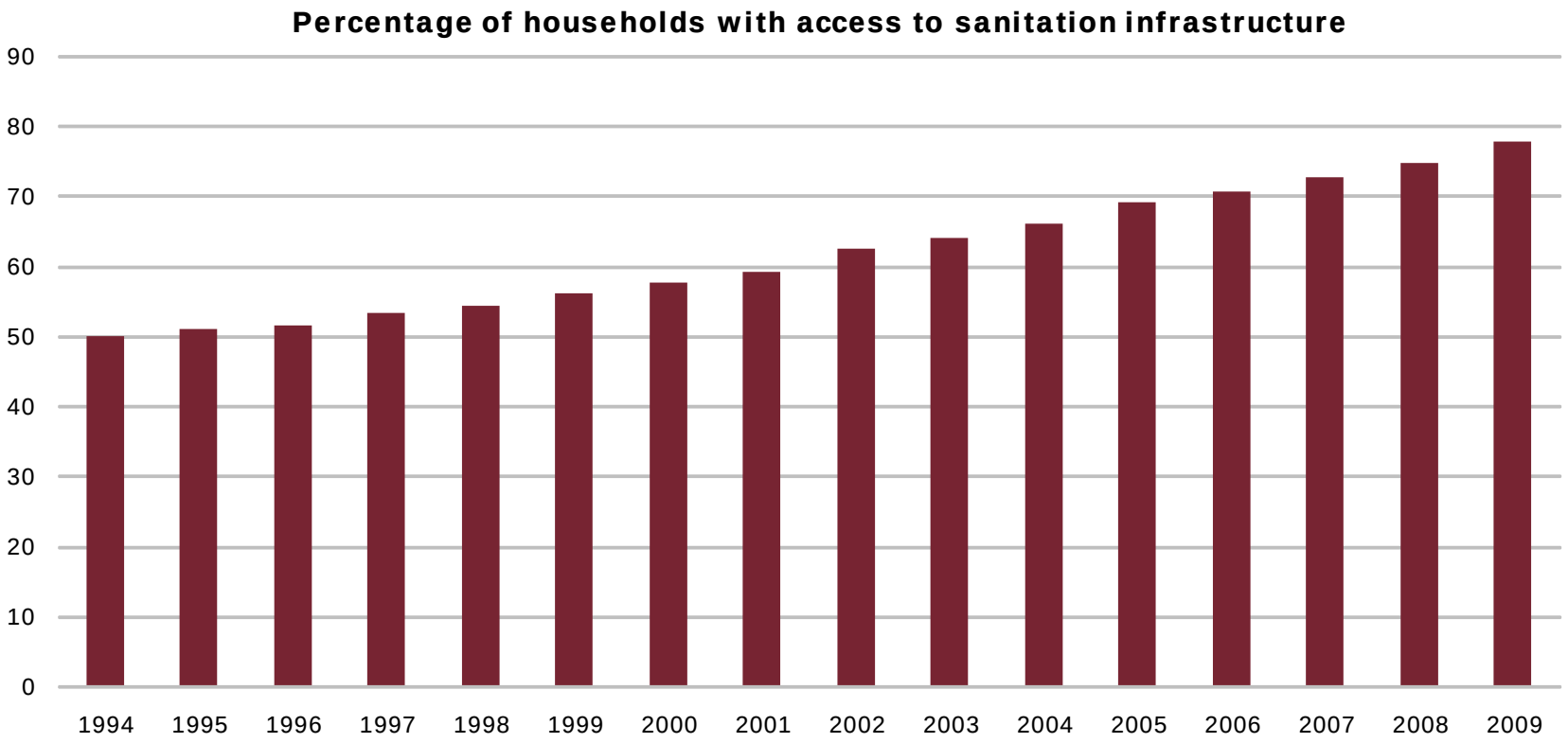

Figure 28: Percentage of households with access to basic sanitation services
Source: Census 1991, 1996, 2001; Department of Water Affairs and Forestry (DWAF) internal processes; Department of Provincial and Local Government (DPLG) Municipal Infrastructure Grant (MIG)

Table 19: Number of households using the bucket system

Year	Total number of households	Number of households using the bucket system
1994	10 150 478	609 675
1995	10 347 884	608 738
1996	10 550 871	605 494
1997	10 759 617	575 594
1998	10 974 185	555 932
1999	11 194 976	516 858
2000	11 422 150	490 021
2001	11 656 059	456 752
2002	11 950 115	413 481
2003	12 139 159	441 693
2004	12 396 707	439 778
2005	12 656 163	231 040
2006	12 802 423	211 508
2007	12 879 070	113 085
2008	13 028 214	23 083
2009	13 104 966	9 044

Source: Census 1991, 1996, 2001; Department of Water Affairs and Forestry (DWAF) internal processes; Department of Provincial and Local Government (DPLG) Municipal Infrastructure Grant (MIG)

Indicator: Basic human sustenance

Variable: 25

Description: **Access to water**

Units: Percentage of the population of South Africa with access to water.

Source: Department of Water Affairs and forestry (DWAF) 2006. *Annual Report 2005–2006*. http://www.dwaf.gov.za

Census 1991, 1996, 2001; Department of Water Affairs and Forestry (DWAF) internal processes.

Department of Provincial and Local Government (DPLG) Municipal Infrastructure Grant (MIG).

Climbing South Africa's Water Services Ladder. http://www.competition-regulation.org.uk/conferences/southafrica04/mackintosh.pdf

Logic: The percentage of the population with access to improved drinking water supply is related to our capacity to provide a healthy environment, reducing risks associated with water-borne diseases and exposure to pollutants. The Water Service Act (Act No. 108 of 1997) provides for the right of access to basic water supply. The Millennium Development Goals require that countries by 2015 halve the proportion of people without sustainable access to safe drinking water. South Africa has exceeded this goal to date.

Discussion: One of the key challenges facing the South African government pertains to the provision of adequate water services. Prior to 1994, an estimated 40% of the South Africa population had no adequate water supply services. In those rural areas where water supply existed, drinking water quality was often poor and could not be considered safe for human consumption. The resulting impact on primary health was significant with diarrhoea being responsible for some 25% of all deaths in the one to five group and an annual estimated 43 000 deaths and 3 million incidences of illness.

Since 1994, South Africa has made remarkable progress towards providing its population with access to basic water supply infrastructure equal to or above RDP levels. In 1994 only 61.7% of households had access to basic water services and this figure has increased to 91.8% of households in 2009. As of 2006 there were approximately 3.3 million people with no access to water and a further 4.9 million people with access to water below RDP levels. This indicator is important as it visually indicates population growth within South Africa as well as provides an indication of whether access to basic water has improved within the country. Target 10 of Goal 7 of the Millennium Development Goals requires a halving of the proportion of households without sustainable access to safe drinking water and basic sanitation.

Notes: RDP levels are defined as a minimum quantity of 25 litres of potable water per person per day within 200m of the household which should not be interrupted for more than 7 days in any year.

Table 20: Percentage of households (HH) with access to water infrastructure (no access, below RDP and above or equal to RDP levels)

Year	% HH with access equal to or above RDP levels	% HH with access below RDP levels	% with no access	Total number of households
1994	61.7%	2.7%	35.6%	10 150 478
1995	61.9%	4.4%	33.7%	10 347 884
1996	62.4%	6.1%	31.5%	10 550 871
1997	64.3%	7.5%	28.2%	10 759 617
1998	65.8%	9.0%	25.1%	10 974 185
1999	68.8%	10.3%	21.0%	11 194 976
2000	71.0%	11.8%	17.2%	11 422 150
2001	73.6%	13.2%	13.2%	11 656 059
2002	78.2%	11.8%	10.0%	11 950 115
2003	76.3%	14.4%	9.3%	12 139 159
2004	79.8%	12.1%	8.1%	12 396 707
2005	82.7%	10.6%	6.7%	12 656 163
2006	84.7%	9.3%	6.0%	12 802 423
2007	87.2%	7.8%	5.0%	12 879 070
2008	89.7%	6.0%	4.3%	13 028 214
2009	91.8%	4.6%	3.5%	13 104 966

Source: Census 1991, 1996, 2001; Department of Water Affairs and Forestry (DWAF) internal processes; Department of Provincial and Local Government (DPLG) Municipal Infrastructure Grant (MIG)

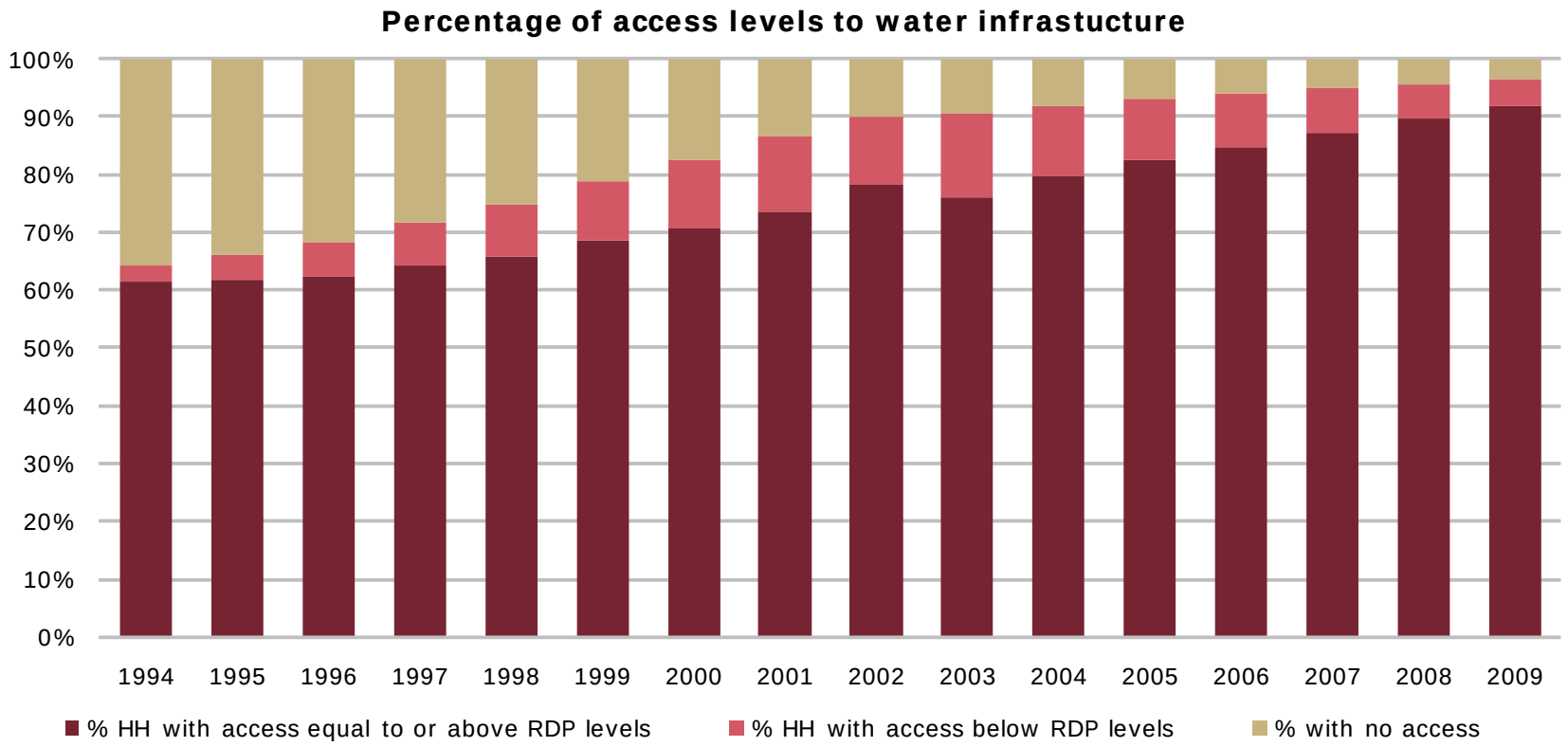

Figure 29: Percentage of households with no access, access below and access equal to or above RDP levels to water infrastructure
Source: Census 1991, 1996, 2001; Department of Water Affairs and Forestry (DWAF) internal processes; Department of Provincial and Local Government (DPLG) Municipal Infrastructure Grant (MIG)

Indicator: Basic human sustenance

Variable: 26

Description: Access to refuge removal

Units: Number of households with access to various types of refuge removal.

Source: Statistics South Africa (Stats SA) 2002–2007. *General Household Survey (Statistical release P0318)*. http://www.statssa.gov.za

Logic: The access to refuge removal is a critical part in the healthy functioning of a community.

Discussion: The collection of household refuse is one of the most powerful visual benchmarks of inequality in South Africa. Municipal governments in South Africa have been turning increasingly to commercialization (i.e privatization, outsourcing) as a way of addressing this refuse collection backlog.

The role of refuge removal is an integral part of the healthy functioning of society. Various diseases are spread through the unsanitary disposal of refuge. Despite direct health consequences of inadequate refuge disposal there are also many environmental factors that need to be considered such as soil contamination. Since 2002 there has been a marked increase in the number of residences using municipal refuge removal facilities. In 2007 it was estimated that more than 60% of all households had their refuge removed by municipalities.

Notes: This indicator links directly to Output 3 of the Delivery Agreement for Outcome 10.

Table 21: Number of households in each province with different access levels to refuge removal during 2006

Province	Removed by local authority at least once a week	Removed by local authority less often than once a week	Removed by community members at least once a week	Removed by community members less often than once a week	Communal refuse dump/ Communal container	Own refuse dump	No rubbish removal	Other	Unspecified	Total
Western Cape	1 220 728	6 017	12 716	7 320	60 896	25 978	14 696	3 935	14 886	1 367 171
Eastern Cape	685 154	36 190	4 387	1 050	18 321	833 776	195 525	17 159	4 311	1 795 873
Northern Cape	228 292	4 644	2 111	761	4 010	29 844	16 612	6 229	1 198	293 701
Free State	651 242	11 007	3 559	97	53 818	116 075	24 656	10 052	2 910	873 415
KwaZulu-Natal	1 236 045	91 651	9 355	13 179	23 429	1 033 480	89 596	3 550	36 871	2 537 156
North West	460 742	7 764	231	1 340	15 509	402 759	52 494	959	1 984	943 782
Gauteng	2 755 756	13 071	4 288	3 164	95 241	125 161	178 752	56 804	11 729	3 243 966
Mpumalanga	386 295	12 017	3 689	1 414	17 878	407 960	46 779	9 360	3 015	888 406
Limpopo	221 658	5 403	2 383	2 008	27 416	997 014	44 775	14 001	2 802	1 317 459
Total	**7 845 913**	**187 764**	**42 719**	**30 332**	**316 517**	**3 972 044**	**663 884**	**122 048**	**79 706**	**13 260 930**

Source: Statistics South Africa (Stats SA) 2002–2007. *General Household Survey (Statistical release P0318)*. http://www.statssa.gov.za

Table 22: Percentage of households who have their refuge removed by the municipality (2002–2007)

Year	Eastern Cape	Free State	Gauteng	KwaZulu-Natal	Limpopo	Mpumalanga	Northern Cape	North West	Western Cape	South Africa Average
2002	31.8	61.7	88.2	52.7	12.3	38.2	68.3	41.9	83.5	55.1
2003	31.8	66.9	88.3	53.2	12.6	45.6	64.1	42.5	84.9	56.9
2004	32.7	66.1	87.8	52.9	13.3	42.4	68.3	45.1	87.8	57.2
2005	40.5	73.4	85.6	56.0	15.5	41.2	79.8	47.9	91.7	60.2
2006	40.3	78.7	85	56.1	16.8	42.3	76.5	48.3	91.9	60.7
2007	40.3	76.1	85.7	53.1	17.3	45.0	79.6	49.8	90.7	61.0

Source: Statistics South Africa (Stats SA) 2002–2007. *General Household Survey (Statistical release P0318)*. http://www.statssa.gov.za

Indicator: Environmental health

Variable: 27

Description: **Death rate from respiratory diseases and tuberculosis**

Units: Number of deaths.

Source: Statistics South Africa 2008. *Mortality and causes of death in South Africa, 2003, 2004, 2005, 2006 and 2007*. Findings from death notification. Statistical release P0309.3.

Logic: Indicator of the degree to which people are affected and impacted on by poor air quality. Poor air quality in a country often manifests in respiratory problems and diseases and also plays a role in the increase of the transmission of infectious diseases.

Discussion: Air pollution is a threat to human health for many reasons, but especially because poor air quality can lead to respiratory distress. From a public health perspective, air pollutants are responsible for nearly 5% of the global burden of disease (UNEP 2002)[a, b]. Air pollution aggravates asthma and other allergic respiratory diseases, and can result in adverse pregnancy outcomes, such as stillbirth and low birth weight. Studies show that human life can be cut short due to indoor and urban air pollution – including exposure to particulates (WHO 2002)[a, c].

The quality of environmental health in a country is highly correlated with wealth. Countries at higher levels of development generally have the capacity to invest in environmental infrastructure so their people have better access to safe drinking water and adequate sanitation. They also have little need to light fires indoors for heating and cooking, and therefore tend to have significantly less indoor air pollution (Ezzati and Kammen, 2002)[a, d].

Tuberculosis was the top leading underlying cause of death in 2003 and 2005 in South Africa, with 12% of all deaths in this period being attributed to it. Included in the top ten underlying natural causes of deaths are chronic lower respiratory diseases, and respiratory and cardiovascular disorders specific to the prenatal period. Of the leading underlying causes of death, the main differences between the proportions of male and female deaths occur in relation to tuberculosis and chronic lower respiratory diseases, where male deaths predominate[e].

With regard to air pollutants, the depth of policy making is, in general, inversely related to the severity of the problem. Of the different types of air pollution, indoor air pollution poses by far the most severe threat, accounting for several million premature deaths per year. Yet there are no international targets or action plans, and there is very little regional or national activity. Regarding urban air pollution, policy targets, monitoring networks, and mitigation efforts are most advanced in regions where the problem is least severe. There are no international policy targets, though the World Health Organization (WHO) has set standards that some countries have adopted[a].

Results from the mortality and causes of death survey conducted by Statistics South Africa show that while mortality resulting from tuberculosis is on the increase there has been a slight decrease in the mortality rate ascribed to respiratory conditions.

Notes:

a) Esty, D.C., Srebotnjak, T., Kim, C.H., Levy, M.A., de Sherbinin, A., Anderson, B. *Pilot 2006 Environmental Performance Index*. Yale Center for Environmental Law & Policy, Yale University. Center for International Earth Science Information Network (CIESIN), Columbia University. http://www.yale.edu/epi

b) United Nations Environment Programme (UNEP) 2002. *Global Environmental Outlook-3*. 2004. Decisions Adopted by the Conference of the Parties to the Convention on Biological Diversity at its Seventh Meeting. UNEP/CBD/COP/7/21/Part 2. London, Earthscan.

c) World Health Organization (WHO) 2002. *World Health Report 2002.* Geneva, World Health Organization.

d) Ezzati, M., and Kammen, D.M. 2002. *The Health Impacts of Exposure to Indoor Air Pollution from Solid Fuels in Developing Countries: Knowledge, Gaps, and Data Needs*. Environmental Health Perspectives, 110(11):1057–1068.

e) Statistics South Africa 2005. Press release – *Mortality and causes of death in South Africa, 1997–2003*. Findings from death notification. http://www.statssa.gov.za/news archive/18feb2005 1.asp.

Table 23: Number of deaths resulting from respiratory diseases and tuberculoses (1997–2007)

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Tuberculosis mortalities	22 071	28 532	34 250	42 246	51 098	60 311	67 609	70 355	73 903	77 578	76 761
Respiratory related deaths	27 325	32 077	32 241	34 274	38 274	41 517	47 534	48 757	47 396	39 300	38 230

Source: Statistics South Africa 2008. *Mortality and causes of death in South Africa, 2003, 2004,2005, 2006 and 2007*. Findings from death notification. Statistical release P0309.3

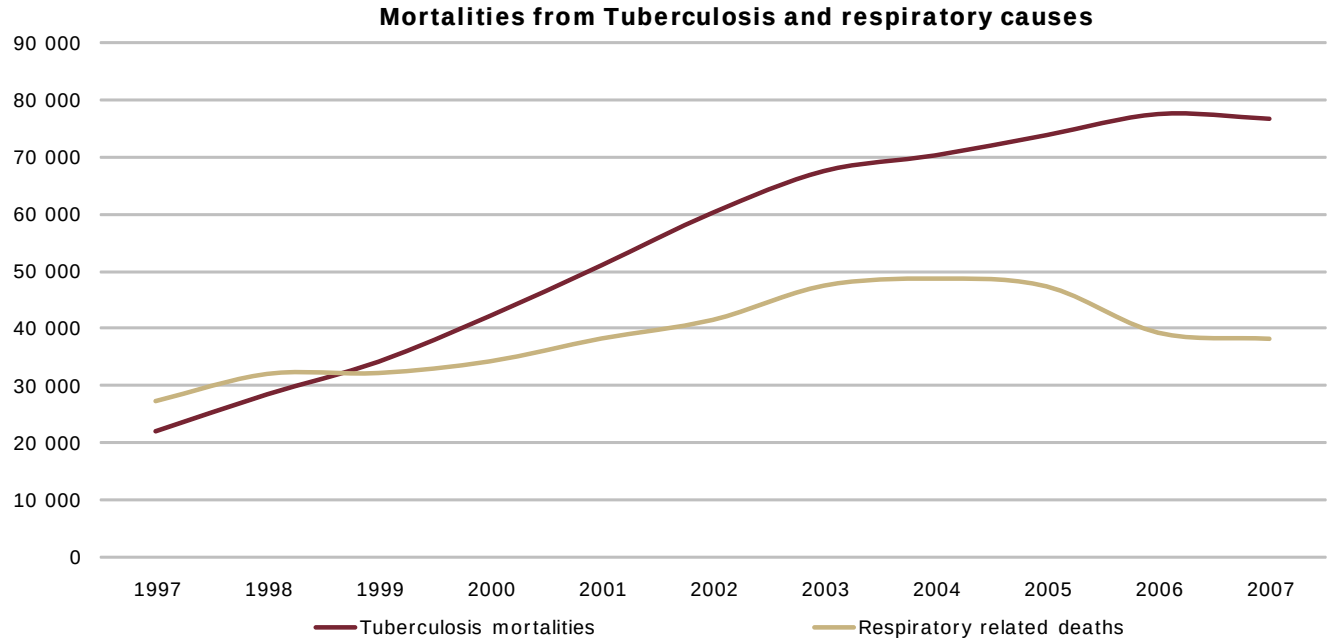

Figure 30: Death rate from respiratory diseases and tuberculosis (1997–2007)
Source: Statistics South Africa 2008. *Mortality and causes of death in South Africa, 2003, 2004, 2005, 2006 and 2007.* Findings from death notification. Statistical release P0309.3

Indicator: Environmental health

Variable: 28

Description: HIV prevalence

Units: Percentage of people infected by HIV (total population and antenatal attendees).

Source: Department of Health (DOH) 2005, 2006 and 2007. *Report National HIV and Syphilis Prevalence Survey South Africa 2006*. http://www.doh.gov.za

Statistics South Africa (Stats SA). *Mid-year population estimates. Statistical release P0302*. http://www.statssa.gov.za

Institute for Futures Research: *The State of HIV/AIDS in South Africa*, Vol 13 no 13 November 2008.

Logic: Disease in informal settlements compounds vulnerability, with HIV/AIDS being a major development issue in South Africa. The loss of family members to AIDS-related death; productivity losses due to illness, caring for the sick, and funerals; the direct costs of medication, as well as other burdens, have forced poorer households to the very brink of survival.

Discussion: Globally the adult HIV prevalence rate has stabilised since 2000 at about 0.8%, while in Sub-Saharan Africa prevalence has decreased from 5.7% in 2001 to 5% in 2007. Sub-Saharan Africa remains one of the most HIV affected regions in the world. In 2007 it was estimated that 1.7 million people in this region were newly infected with HIV, the majority of which (61%) were women. According to the 2008 mid-year population estimates a total of 5.35 million people are infected by the HIV virus amounting to approximately 11% of the total population of South Africa.

Looking at prevalence rates of antenatal attendees in the provinces it is clear to see that there has been an overall increase in the prevalence rate of HIV up to 2005. After 2005 seven provinces had a decrease in prevalence rates of antenatal attendees. Since 1990 there has been a steady increase in the prevalence of HIV in antenatal attendees. As of 2006 the prevalence was around 30% of all antenatal attendees.

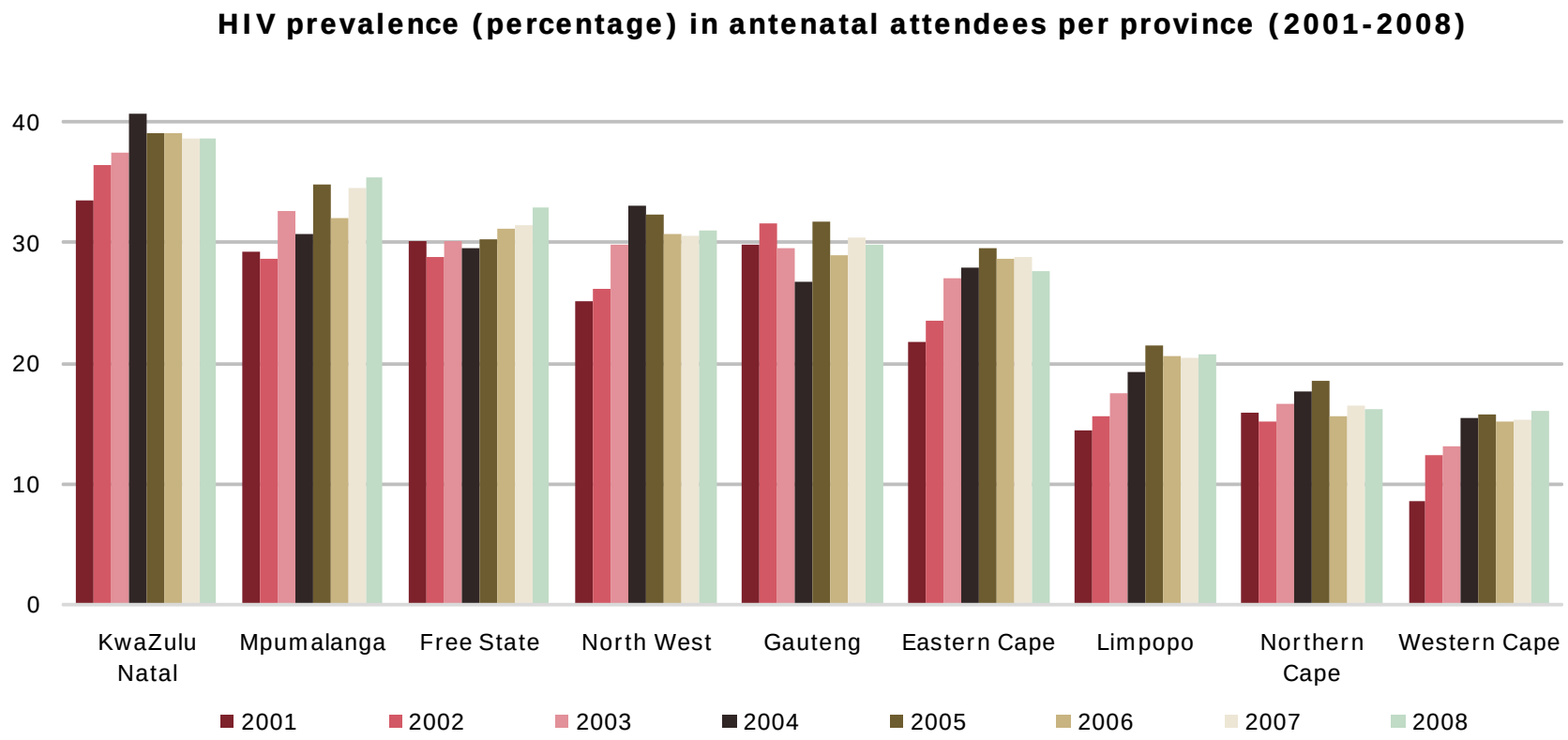

Figure 31: HIV prevalence in antenatal attendees per province (2001–2008)
Source: Department of Health (DOH) 2009. *Report National HIV and Syphilis Prevalence Survey South Africa 2008*. http://www.doh.gov.za

Table 24: HIV prevalence (percentage) in antenatal attendees per province (2001–2008)

	2001	2002	2003	2004	2005	2006	2007	2008
KwaZulu-Natal	33.5	36.5	37.5	40.7	39.1	39.1	38.7	38.7
Mpumalanga	29.2	28.6	32.6	30.8	34.8	32.1	34.6	35.5
Free State	30.1	28.8	30.1	29.5	30.3	31.1	31.5	32.9
North West	25.2	26.2	29.9	33.1	32.4	30.8	30.6	31.0
Gauteng	29.8	31.6	29.6	26.7	31.8	29.0	30.5	29.9
Eastern Cape	21.7	23.6	27.1	28.0	29.5	28.6	28.8	27.6
Limpopo	14.5	15.6	17.5	19.3	21.5	20.6	20.4	20.7
Northern Cape	15.9	15.1	16.7	17.6	18.5	15.6	16.5	16.2
Western Cape	8.6	12.4	13.1	15.4	15.7	15.1	15.3	16.1

Source: Department of Health (DOH) 2009. *Report National HIV and Syphilis Prevalence Survey South Africa 2008.* http://www.doh.gov.za

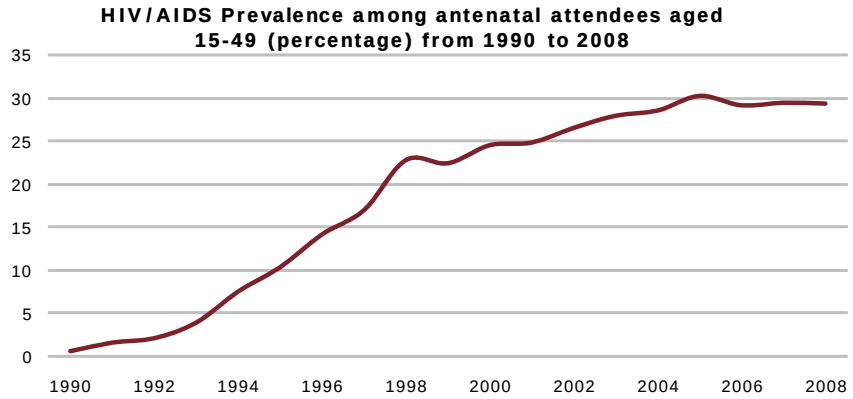

Figure 32: HIV prevalence (percentage) among antenatal attendees aged 15–49 (1990–2008)

Source: Department of Health (DOH) 2009. *Report National HIV and Syphilis Prevalence Survey South Africa 2008.* http://www.doh.gov.za

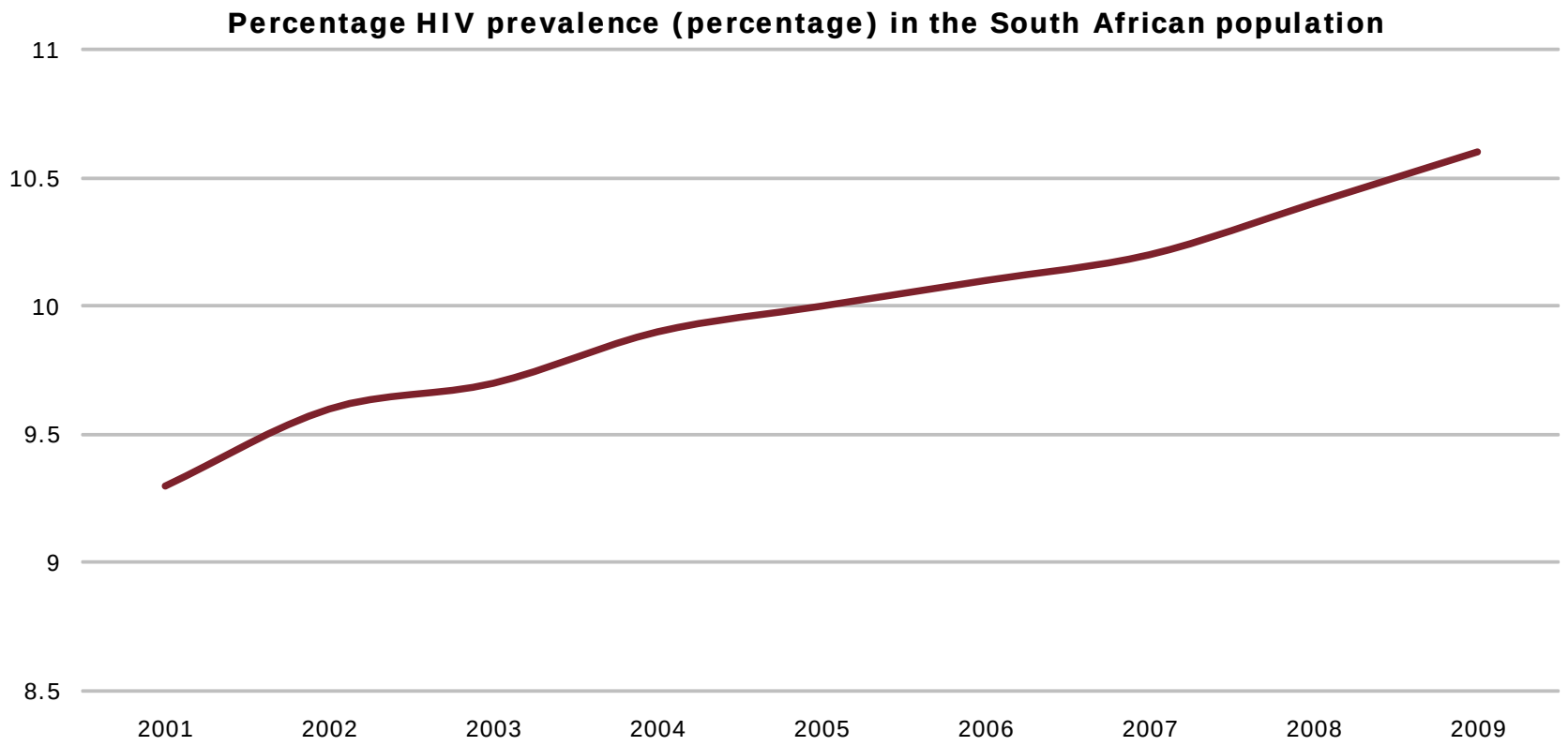

Figure 33: HIV prevalence in the South African population (2001–2009)

Source: Statistics South Africa (Stats SA) 2005, 2006,2007,2008 and 2009. *Mid-year population estimates.* Statistical release P0302. http://www.statssa.gov.za

Indicator: Environmental health

Variable: 29

Description: Malaria

Units: Number of malaria cases and fatality rates.

Source: Department of Health (DOH). http://www.doh.gov.za

Africa Fighting Malaria. http://www.fightngmalaria.org

Logic: Malaria is a preventable and curable infectious disease caused by the *Plasmodium* parasite transmitted by the female Anopheles mosquito. Malaria affects a large number of South Africans especially in areas that are hot and humid. Malaria can be managed by means of human intervention, thus this variable is important in providing information on the effectiveness of malaria control programmes in the country.

Discussion: Malaria is a major global public health problem, with an estimated 300–500 million cases and approximately 1 million deaths annually. Estimates show that nearly 60% of the cases of clinical malaria and over 90% of the deaths occur in Sub-Saharan Africa. In areas of stable transmission Angola, Malawi, Mozambique, Tanzania, and Zambia, children under five years and pregnant women are at greatest risk of severe malaria due to the low levels of acquired immunity. Malaria is endemic to the low-altitude areas of Limpopo, Mpumalanga and North-Eastern KwaZulu-Natal. About 10% of the South African population resides in malaria-risk areas. In South Africa a total of 7 727 malaria cases and 44 deaths were reported to the National Department of Health during 2008, a decrease in excess of 35% compared to the 12 163 cases reported for the same period in 2006. One of the most important indicators for evaluating the overall impact of malaria control is malaria case fatality rates (CFR).

The total number of malaria cases in South Africa has been on a steady decline since 2000. During 2008 a total of 7 727 cases were reported, a marked decrease when compared to the 64 622 cases reported in 2000. Overall, during the period January 1999 to December 2008, malaria cases have declined. This is largely due to the malaria control programmes carried out in South Africa, where the pesticide Dichloro-Diphenyl-Trichloroethane (DDT) is sprayed. In 1995 South Africa stopped spraying with DDT and then experienced one of the worst malaria epidemics recorded in history. In 2000, the epidemic reached its peak due to the floods in Mozambique, but was brought under control through the re-introduction of DDT spraying. Areas prone to malaria are expected to increase in the future due to the effects of climate change.

Notes: This indicator addresses the Johannesburg Plan of Implementation: Section 55 and the Millennium Development Goal 6.

Fatality rate is the number of reported deaths due to malaria divided by the number of malaria reported cases multiplied by 100.

Table 25: Number of malaria cases, deaths and fatality rate (1996–2008)

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Cases	27 035	23 121	26 445	51 444	64 622	26 506	15 649	13 459	13 399	7 755	12 163	5 210	7 727
Deaths	163	104	198	406	458	119	96	142	89	64	89	48	44
Fatality rate	0.60	0.45	0.75	0.79	0.71	0.45	0.61	1.06	0.66	0.83	0.73	0.92	0.57

Source: Department of Health (DOH).http://www.doh.gov.za

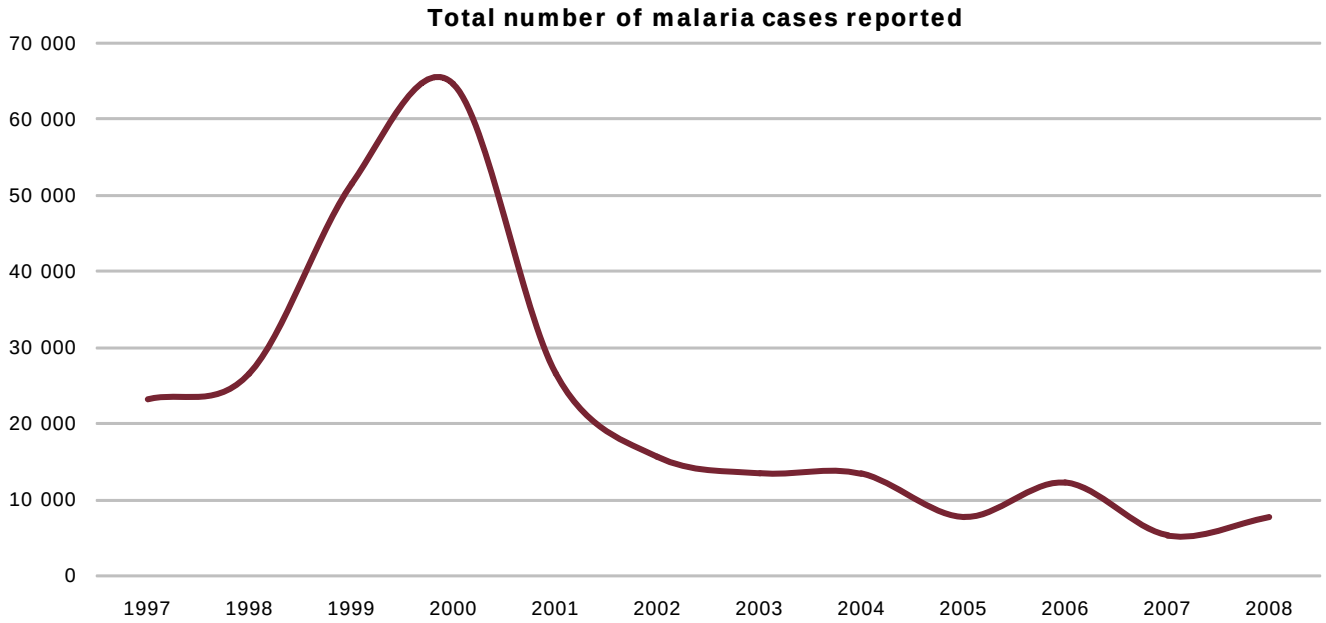

Figure 34: Total number of reported malaria cases in South Africa (1997–2008)
Source: Department of Health's Malaria Notification System

Indicator: Environmental health

Variable: 30

Description: Under 5 mortality

Units: Number of deaths per age category.

Sources: Statistics South Africa (Stats SA) 2006. *Mortality and causes of death in South Africa, 2003, 2004 and 2005.* Statistical release P0309. http://www.statssa.gov.za

Department of Environmental Affairs and Tourism (DEAT) 2006. *South Africa Environment Outlook.* A report on the state of the environment. Department of Environmental Affairs and Tourism, Pretoria.

Logic: Under-5 mortality rate is a measure of the vulnerability of the most vulnerable population group.

Discussion: The under five mortality rate indicates the probability of dying between birth and exactly five years of age, expressed per 1 000 live births. This measure of mortality has several advantages as a barometer of child well-being in general and child health in particular. The under 5 mortality rate measures an outcome of the development process rather than an input such as per capita calorie availability or the number of doctors per 1 000 population. The under 5 mortality rate can also be the result of a wide variety of inputs: nutritional status and the health knowledge of mothers, the level of immunization and oral rehydration therapy, the availability of maternal and child health services (including prenatal care), income and food availability in the family, the availability of safe drinking water and basic sanitation.

The tables below show the total number and percentage distribution of deaths for the period 1997 to 2007 classified by five-year age intervals. The number of deaths at each age group has increased from 1997 to 2007. Increases in the number of deaths are particularly observed at middle age groups (25–29 years up to 50–54 years) and at very young ages (0 to 4). In addition, for all the years, the number of deaths was higher at ages 0 to 4 and 30 to 34 and lower at age groups 5 to 9 and 10 to 19 when compared to deaths at other ages. The trend in mortality has remained fairly constant over the observation period. The percentage of mortality in the 60 to 90 age group has been on the decrease year on year since 1997.

Mother-to-child transmission of HIV, coupled with poor environmental conditions, has increased infant and childhood mortality[a]. Socio-economic factors play an important role in infant mortality rates. Children in households lacking access to safe water and adequate sanitation are most vulnerable to ailments such as diarrhoea, especially when they are HIV positive. Cooking and heating using open wood and coal fires increase indoor air pollution and promote and compound respiratory diseases.

Limitations: The Millennium Development Goals (MDGs) set a target for reducing under-five mortality by two thirds by 2015. There are, however, no corresponding targets for mortality in the one to four age groups. The policy dialogue regarding this age group is limited.

Some factors limit the accuracy and completeness of data obtained from the death notification forms. Extensive assessment of the quality of the information reported on the death notification forms is beyond the scope of the statistical release, and no adjustments were made for misclassification of underlying causes of death due to inadequacies of certification.

Life expectancy has declined dramatically, mostly because of the increased number of HIV and AIDS infections.

Notes: a) Dorrington, R. *et al*. 2004. *The Demographic Impact of HIV/AIDS in South Africa*. National Indicators for 2004. The Centre for Actuarial Research, South African Medical Research Council and Actuarial Society of South Africa, Cape Town.

Table 26: Number of deaths by age and year of death (1998–2007)

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
0–4	10.30%	10.40%	10.10%	9.50%	9.10%	9.30%	9.37%	10.00%	10.43%	10.52%	10.22%
5–9	0.90%	0.90%	0.90%	0.90%	0.80%	0.90%	0.90%	1.05%	1.04%	0.91%	0.89%
10–14	0.90%	0.80%	0.80%	0.70%	0.70%	0.70%	0.66%	0.68%	0.68%	0.71%	0.69%
15–19	2.00%	1.90%	2.00%	1.90%	1.90%	1.80%	1.71%	1.63%	1.57%	1.55%	1.51%
20–24	4.30%	4.30%	4.50%	4.50%	4.40%	4.40%	4.44%	4.44%	4.27%	4.21%	4.10%
25–29	5.80%	6.30%	7.00%	7.40%	7.90%	8.30%	8.36%	8.26%	7.84%	7.40%	7.15%
30–34	6.00%	6.60%	7.50%	8.20%	8.70%	9.40%	10.05%	10.30%	10.10%	9.80%	9.55%
35–39	5.90%	6.40%	7.10%	7.70%	8.10%	8.70%	8.87%	9.31%	9.36%	9.10%	9.01%
40–44	5.70%	6.00%	6.30%	6.80%	7.10%	7.40%	7.80%	8.20%	8.23%	8.18%	8.02%
45–49	5.90%	6.00%	6.20%	6.20%	6.30%	6.40%	6.60%	6.86%	7.03%	7.05%	7.10%
50–54	5.50%	5.50%	5.70%	5.90%	6.00%	6.00%	6.04%	6.14%	6.13%	6.28%	6.40%
55–59	6.50%	6.30%	6.00%	5.50%	5.20%	5.10%	5.09%	5.24%	5.55%	5.70%	5.98%
60–64	6.50%	6.10%	6.00%	6.10%	6.00%	5.80%	5.54%	5.29%	5.06%	4.98%	5.14%
65–69	7.40%	7.10%	6.60%	5.90%	5.70%	5.40%	5.16%	5.06%	5.31%	5.49%	5.61%
70–74	6.80%	6.70%	6.60%	6.60%	6.40%	5.80%	5.57%	5.03%	4.71%	4.78%	4.92%
75–79	7.40%	6.60%	5.90%	5.30%	5.10%	4.80%	4.73%	4.51%	4.73%	4.87%	4.92%
80–84	4.90%	5.20%	5.00%	5.10%	5.10%	4.70%	4.18%	3.59%	3.41%	3.49%	3.63%
85–89	3.40%	3.30%	3.30%	3.10%	2.90%	2.50%	2.83%	2.53%	2.66%	2.97%	3.08%
90+	2.10%	2.20%	2.00%	2.20%	2.30%	2.20%	2.08%	1.88%	1.88%	2.01%	2.07%

Source: Statistics South Africa (Stats SA) 2007. *Mortality and causes of death in South Africa, 2003, 2004, 2005. 2006 and 2007.* Statistical release P0309. http://www.statssa.gov.za

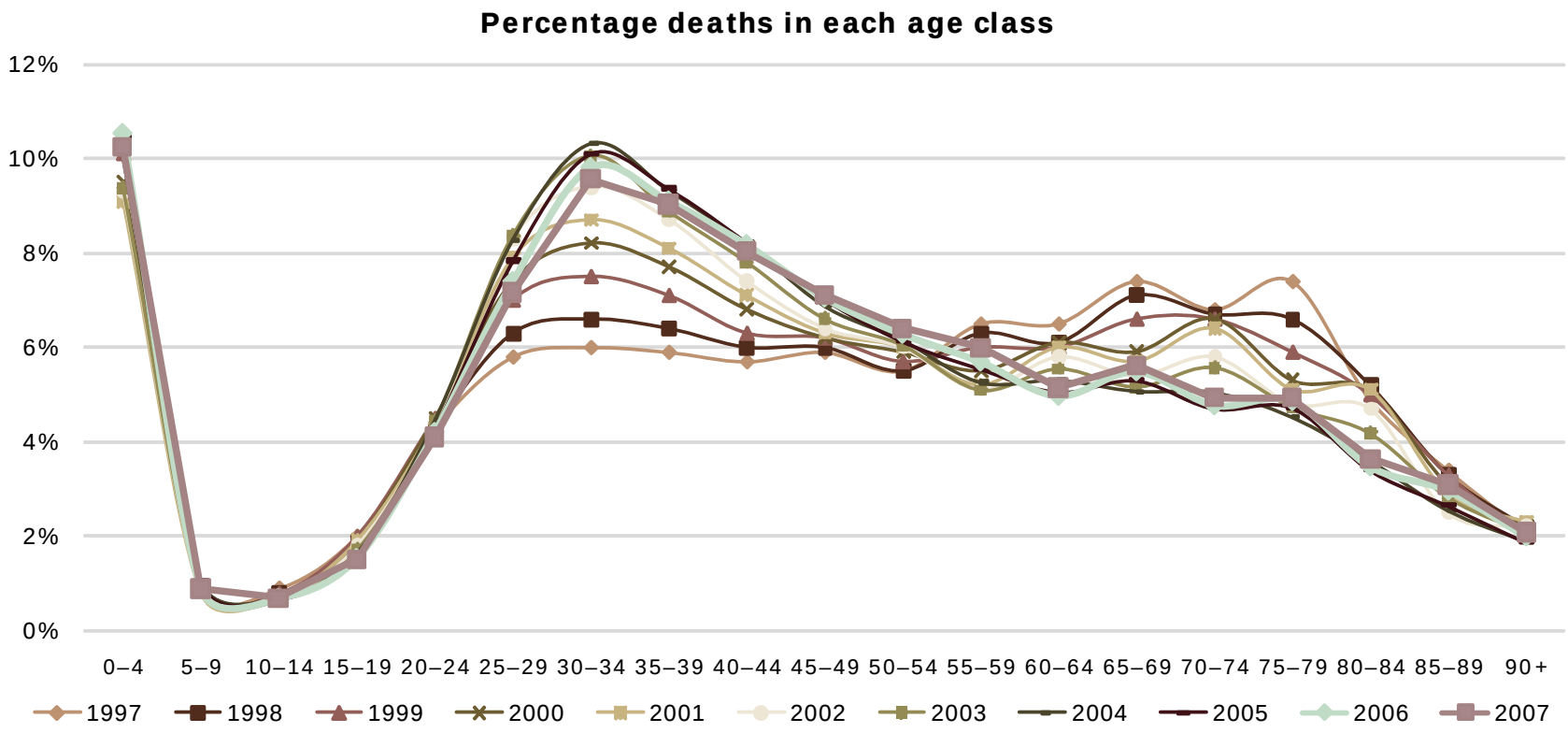

Figure 35: Percentage of deaths in each age class (1997–2007)
Source: Statistics South Africa (Stats SA) 2007. *Mortality and causes of death in South Africa, 2003, 2004, 2005, 2006 and 2007.* Statistical release P0309. http://www.statssa.gov.za

There is hope if people will begin to awaken that spiritual part of themselves, that heartfelt knowledge that we are caretakers of this planet.

~Brooke Medicine Eagle