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The effect of socio-demographic, socio-economic and environmental factors on under-five mortality in South Africa: analysis of the 1998 South African Demographic Health Survey dataset

Phetoane, Basetsana Malefi

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CHILD MORTALITY IN SOUTH AFRICA: USING EXISTING DATA

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Authors:

Neil McKerrow[i]
Mphele Mulaudzi[ii]

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Child mortality is generally credited as a surrogate marker for the quality of care within a health service. However, if mortality rates are to be used as an indicator of quality of care, or to monitor and evaluate the effectiveness of programmes aimed at improving child health and the quality of health care, it is critical that this data is accurate. The quality of data routinely collected in the South African health system is extremely variable. While data from primary health care clinics are generally good, that from hospitals is poor and data from the vital registration process is often incomplete.

This chapter describes five data sources currently in use in South Africa that assist in the monitoring of child mortality rates. In order to facilitate an improvement in the quality of these datasets, the available data has been used to present a profile of child mortality in 2007.

The year 2007 has been selected as this is the most recent year for which data from the death registration programme are available and is therefore the only year for which data are available from all five data sources. It is accepted that these data are incomplete and that some datasets have improved in subsequent years. However, by using these data the authors hope to stimulate reflection on the data as well as to precipitate improved data collection.

i. Department of Paediatrics and Child Health, Pietermaritzburg Metropolitan Hospitals Complex and Department of Paediatrics, University of KwaZulu-Natal
ii. Department of Paediatrics and Child Health, Kalafong Hospital and University of Pretoria

Introduction

Child mortality is a crude reflection of the health status of children and a surrogate marker of the quality of health care in any society. The various infant and child mortality rates serve as an indicator for monitoring trends of child survival as well as the quality of health care delivered at different stages in a child's life within a given society.

Assuming that the mortality rates are based on good quality data, the rates allow comparisons between different countries or regions within a country and provide insight into the health service's strengths and weaknesses. These insights can then be used for implementing targeted interventions aimed at reducing child mortality and improving the well-being of children.

It is in monitoring the trends of child survival that the first challenge is met. The single greatest challenge in pursuing the goal of reduced child mortality is to ensure the timely analysis of good quality data in order to precipitate an appropriate response and thus improve maternal and child health care at national, provincial and local levels. The quality of data is determined by its completeness and comprehensiveness. Routine mortality data collected in South Africa has tended to be incomplete, missing a large proportion of deaths outside the health system and lacking sufficient detail to provide a comprehensive profile of direct and indirect causes of death. The aggregated nature and inevitable delay in the collection, analysis and reporting of these data undermines its value as an indicator for monitoring service delivery. As an example, the most recent data in this chapter are from 2007.

In reviewing child mortality data for South Africa, it is important to keep in mind the vast disparities in the socio-economic circumstances, health services and health status of children in the various provinces in the country. If mortality data are to be used to drive programmes aimed at reducing childhood mortality and improving access to and the quality of care provided within our health service, it is essential that data are collected and analysed in a disaggregated[a] fashion. Although the data sources listed include many indicators appropriate to this purpose, the quality of the current data is such that disaggregation beyond the provincial level may be of limited benefit.

This chapter uses existing datasets to present some of the available data to describe the current status of child health. This analysis will be confined to the provincial level in order to develop a national picture of child mortality as of 2007 and to highlight interprovincial variations. In addition to using the five data sources listed, important information generated by the Medical Research Council (MRC), by Statistics South Africa (StatsSA) and by the Actuarial Society of South Africa (ASSA) will be presented.

a Routinely collected facility data are aggregated (grouped together) at sub-district, district, provincial and then national level. Higher level averages obscure marked variations or discrepancies on the ground. To be meaningful, interventions to improve services require analysis of disaggregated (i.e. facility-level) data.

Data sources

There are five primary sources of information on childhood deaths in South Africa:

- The South Africa Demographic and Health Survey (SADHS);
- The Death Notification System (Vital Registration);
- The District Health Information System (DHIS);
- The Child Healthcare Problem Identification Programme (Child PIP); and
- Demographic surveillance sites.

Demographic and health surveys

The SADHS is a nationally-representative household survey that provides data on outcome and impact indicators related to population health and nutrition, including neonatal, infant and child mortality. Such surveys were undertaken in South Africa in 1998 and 2003.

The 2003 SADHS collected data on households, women, men and children from approximately 7 700 households. Information collected with respect to child health included growth, feeding practices, participation in health promotion and prevention programmes, and childhood morbidity and mortality patterns.

The methodology of the SADHS is rigorous and the standardised approach supports the tracking of trends and comparison with other countries. The data cover health and socio-economic circumstances as well as all deaths, irrespective of whether or not these occur within the health system or are officially reported. There are, however, limitations regarding the data on child deaths as surveys are only undertaken every five years, only count the number of deaths without providing details of the cause of death and are not disaggregated to district or sub-district levels. The data from the 2003 survey probably underestimated childhood mortality rates, especially in KwaZulu-Natal, as it did not compensate for the impact of increasing HIV-related maternal deaths on child mortality.

Death notification (vital registration)

The Department of Home Affairs (DHA) maintains a register of all births and deaths in order to monitor the demographic profile of the country. All deaths should be reported to the DHA using the appropriate notification forms (BI 1680 and BI 1663) for deaths occurring in or outside a health facility. These forms record the age and gender of people who have died, the date of death, the site of the death with respect to both geographic distribution and the actual venue where the death occurred, as well as the primary cause of death, but not the contributing factors.

Death notification data is analysed by StatsSA who release a mortality report each year. The turnaround time for the analysis and reporting of death notification data is two years, which is within internationally accepted norms. Unfortunately this delay means that the report cannot be used to monitor or strengthen programme implementation at the local level.

Whilst there has been a noticeable increase recently in the notification of deaths, under-reporting and incomplete forms or incorrect data remain a concern. The quality of the information reported depends on the knowledge, diligence and integrity of the certifying official who may be a doctor, registered nurse or traditional leader – few of whom have received training as to how the form should be completed.

District Health Information System

The Department of Health uses the DHIS for the collection of routine health service data from all public health facilities in South Africa. A number of indicators related to childhood mortality are collected. These include inpatient deaths below one and five years of age and the percentage of under-five deaths due to pneumonia, diarrhoea and severe malnutrition.

As DHIS data only record deaths in public sector hospitals, it cannot provide useful information regarding the private sector or population-based childhood mortality rates. Unfortunately hospital data are poor and data on child deaths are incomplete and tend to reflect the number of deaths rather than causes and contributing factors. In contrast DHIS coverage of primary health care (PHC) facilities is good and these data can be used to identify deficiencies within the health care system and to identify problem areas which require intervention.

Poor DHIS data result from inadequate training of facility information officers, the lack of quality control before data are submitted, the absence of feedback and a failure to disseminate information produced from the data.

Child Healthcare Problem Identification Programme

Child PIP is a set of mortality review and audit tools which aim to assist hospital staff in improving the quality of health care provided for children. The death of each child is reviewed and modifiable factors that may have contributed to the death are identified and, where possible, corrected.

In 2007, 49 hospitals had implemented Child PIP on a voluntary basis. This represented 14% of all hospitals in the country in all provinces and across all levels of care, as presented in Table 1.

Table 1: Number of hospitals in South Africa implementing Child PIP, 2007

Hospital level	Level 1	Level 2	Level 3	Total
Number hospitals using Child PIP	23	22	4	49
Total number of hospitals	262	67	15	344
Coverage of Child PIP	9%	33%	27%	14%

Source: Stephen et al., 2009.[1]

Child PIP is a facility-based system which collects data on deaths occurring in the health system, usually at hospital level. As it is implemented on a voluntary basis, it is likely that hospitals with better quality care or a desire to improve their standard of care are over-represented and, as such, the resulting data are not representative of a district, a province or the country. Furthermore, the lack of standardisation in implementation and in assigning modifiable factors makes comparisons between facilities, as well as longitudinally within a single facility over time, difficult.

Demographic surveillance sites

Demographic surveillance sites aim to collect detailed socio-economic, health and other data in a prescribed area over an extended time period. Data are collected through regular censuses during which most sites also collect information on deaths using verbal autopsies to identify the cause of death.

There are three recognised demographic surveillance sites in South Africa, all of which are in rural areas and are part of INDEPTH, an international network of demographic health sites. Details of these sites are provided in Table 2.

These sites are a valuable source of information on child deaths in their areas and are particularly useful in providing data on trends. There is, however, a long delay between the collection, analysis and publishing of data.

Table 2: Key features of the three South African demographic surveillance sites

	Agincourt, Limpopo (1999-2002)	Hlabisa, KZN (2000-2002)	Dikgale, Limpopo (1998-2000)
Population	21 villages 70 000 people	90 000 people 11 000 households	8 000 people
IMR, U5 deaths	35/1 000 12/1 000 person years	67/1 000 21/1 000 person years	56/1 000 (U5MR)
Methods	Annual census using verbal autopsies (covers 95% of deaths)	Census (4 monthly visits) Verbal autopsies	Annual census
Future	2003-2005 data to be analysed		About to start study on childhood deaths using VA

Source: 1st Report of the Committee on Morbidity and Mortality in Children Under Five Years, 2009.[2]

Of the five mortality data sources:

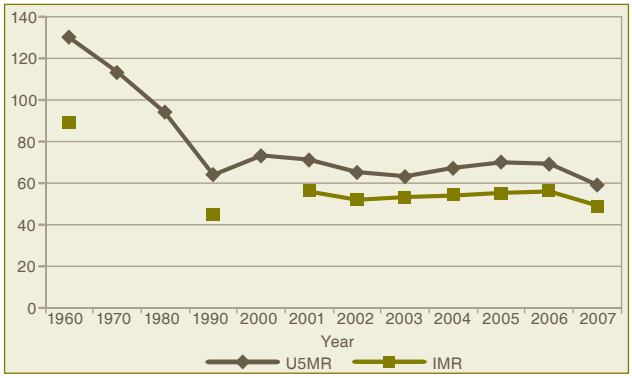
- SADHS provide good quality data on mortality rates and service utilisation, but no information on factors contributing to childhood mortality. They occur too infrequently to guide programme implementation or improvements in child well-being.
- Vital registration provides a comprehensive profile of child mortality in all sectors of society, but does not capture data about underlying factors or the quality of care.
- DHIS provides good insight into PHC services, but limited information on childhood deaths occurring in public sector hospitals.
- Child PIP is the only source of detailed information on factors contributing to child mortality, but given the limited number of hospitals implementing the programme these data may not be representative of the wider health service.
- Demographic surveillance sites provide some insight into child deaths in the community outside the health service. These sites release data too infrequently to monitor standards of health care.

Mortality trends

Estimates of child mortality in South Africa have been controversial and, recently, different sectors of the South African government have used rates adopted from different sources. Until 2009 the National Department of Health (NDoH) used the 2003 SADHS under-five mortality rate (U5MR) of 58 per 1 000 but has since adopted the figure of 69 per 1 000, derived from the ASSA model, which is also used by the Presidency.[3,4]

Whilst a variety of sources provide estimates of infant mortality rates (IMR) and U5MR, Figure 1 portrays the trend for South Africa taken from a single source, United Nations Children's Fund (UNICEF), which uses estimates taken from the Inter-agency Group for Child Mortality Estimation. This source is used to track the progress of the Millennium Development Goals (MDGs) which aims to reduce U5MR by two-thirds between 1990 and 2015. These estimates show a decline in U5MR during the second half of the last century as child survival programmes were introduced. This decline was reversed as a result of the HIV and AIDS epidemic in the 1990s and early part of this century. Since 2000 there has been little significant change in the IMR.

Figure 1: Estimates of U5MR and IMR for South Africa



Source: United Nations Children's Fund, 2009[b]

Recent mortality rates from local sources and modelling by ASSA, which illustrate the diversity in child mortality estimates with lower infant but higher under-five mortality rates, are presented in Table 3.

Table 3: Estimates of infant and under-five mortality rates per 1 000 for South Africa

Year	IMR	U5MR	Source
1998	45.0	61.0	SADHS 1998[5]
2000	59.1	94.7	MRC Burden of Disease Study[6]
2003	42.5	57.6	SADHS 2003[3]
2005	53.6	72.1	StatsSA mid-year estimate[7]
2006	48.0	73.0	ASSA 2003[8]
2007	46.1	70.9	ASSA 2003[8]

Since the mid-1990s there has been an increase in the notification of all deaths in South Africa with a consistent proportion of these occurring in the under-five age group. Notification systems have improved to a position where the current data are probably representative of the national picture, although StatsSA is unable to confirm the completeness of notification of childhood deaths. Table 4 shows the increase in death notifications since 1997.

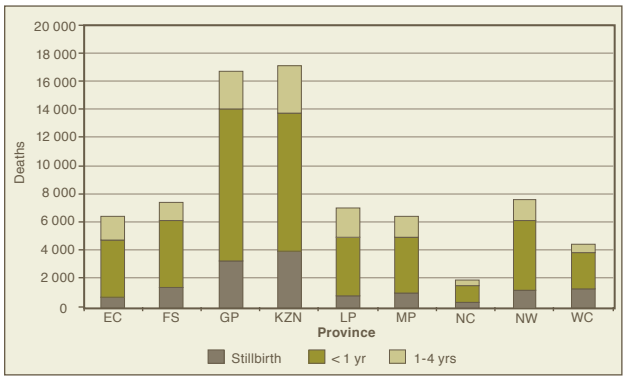
b Composite figure developed from data from annual UNICEF reports 2003-2010.

Table 4: Deaths in children 0-4 years as a percentage of all reported deaths, 1997-2007

Year	Total	0-4 years	Proportion of deaths %
1997	316 505	32 468	10.3
1998	365 053	37 923	10.4
1999	380 982	38 405	10.1
2000	414 769	39 226	9.5
2001	453 509	41 057	9.1
2002	500 082	46 404	9.3
2003	554 199	51 726	9.3
2004	572 620	56 039	9.8
2005	593 337	61 596	10.4
2006	612 462	64 297	10.5
2007	601 133	61 328	10.2

Source: 1st Report of the Committee on Morbidity and Mortality in Children Under Five Years, 2009.[2]

Figure 2: Number of stillbirths, infant and child deaths per province, 2007



Source: Statistics South Africa, 2009.[9]

Table 5: Estimated provincial infant mortality rates per 1 000, 1998-2007 from SADHS, Burden of Disease Estimates, StatsSA and ASSA*

Year	EC	FS	GP	KZN	LP	MP	NC	NW	WC	SA
1998[5]	61.2	53.0	36.3	52.1	37.2	47.3	41.8	42.0	30.0	45.0
2000[6]	70.9	61.8	44.4	68.4	51.6	58.9	46.4	55.2	31.7	59.1
2003[3]	68.3	48.1	33.5	30.4	34.1	40.5	28.7	61.9	43.5	42.5
2005[7]										53.6
2006[8]	62.0	58.0	37.0	62.0	37.0	53.0	34.0	44.0	26.0	48.0
2007[8]	60.3	56.0	35.3	60.0	36.2	50.8	33.4	42.6	25.3	46.1

Table 6: Estimated provincial under-5 mortality rates per 1 000, 1998-2007 from Burden of Disease Estimates, StatsSA and ASSA*

Year	EC	FS	GP	KZN	LP	MP	NC	NW	WC	SA
1998[5]	80.5	72.0	45.3	74.5	52.3	63.7	55.5	56.0	39.0	61.0
2000[6]	105.0	99.0	74.6	116.4	80.7	99.8	68.1	88.5	46.3	94.7
2003[3]	79.1	68.2	42.6	33.2	43.9	52.2	39.1	76.3	56.5	57.6
2005[7]										72.1
2006[8]	91.0	89.0	61.0	97.0	57.0	82.0	51.0	69.0	39.0	73.0
2007[8]	89.2	85.5	58.1	93.2	54.9	78.8	50.4	67.1	38.8	70.9

* These tables should not be interpreted as reflective of a time series. The data are drawn from vastly different sources and projection models.

Disaggregation of the data for infant (Table 5) and under-five (Table 6) mortality rates to the provincial level, show wide interprovincial variations with a two-fold variation between the provinces with the lowest and highest mortality rates.

The latest figures from StatsSA are based on a more complete set of data which suggest that the increase in infant and under-five mortality rates characteristic of the 1990s and early part of this century, has abated both nationally and in all nine provinces.

Mortality profile – 2007

Data from 2007 for the three primary sources of mortality data which collect data on an ongoing basis – namely vital registration,[9] DHIS[10] and Child PIP[1] – will be used to present a profile of child mortality in South Africa. Although more recent data are available from both Child PIP and the DHIS, only the data from 2007 has been used in order to complement the 2007 death notification data and present a contemporary profile.

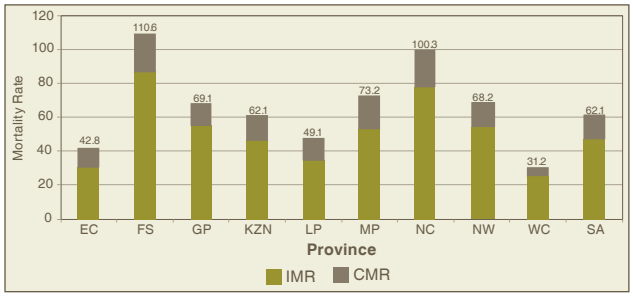
The numbers

Analysis of these data for 2007 shows that, whilst the majority of deaths occur in Gauteng and KwaZulu-Natal, the U5MR is actually highest in the Free State (110.6 per 1 000) and Northern Cape (100.3 per 1 000) with a national figure of 62.1 per 1 000.

All nine provinces have a similar ratio of stillbirths, infant and child deaths with 70-80% of under-five deaths occurring in the first year of life (Figure 2).

The interprovincial disparities seen in previous years still persist with a three-fold difference in mortality rates between the Free State and Western Cape. Figures for the Eastern Cape seem inappropriately low and should be viewed with caution.

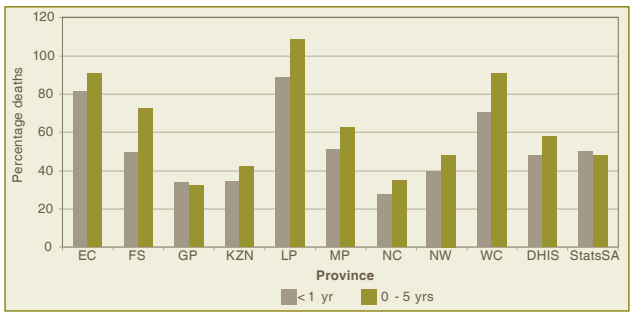
Figure 3: Infant and under-5 mortality rates per province, 2007



Source: Statistics South Africa, 2009.[9]

Across the country just over half of all childhood deaths occur outside the health system (Figure 4). This is less than the 57.9% of adult deaths that take place outside the health system. This figure hides an interprovincial range from two-thirds of deaths in Gauteng and the Northern Cape to less than 20% in the Eastern Cape, Western Cape and Limpopo. In most provinces deaths outside the health system are more common during infancy than during later childhood. This observation appears to be independent of urban or rural location and access to health services. Data for KwaZulu-Natal show that the highest rate of deaths outside the health system occur in the two large metropolitan areas of Durban (85%) and Pietermaritzburg (82%), whilst in the more rural districts a greater proportion of deaths occur within the health system.

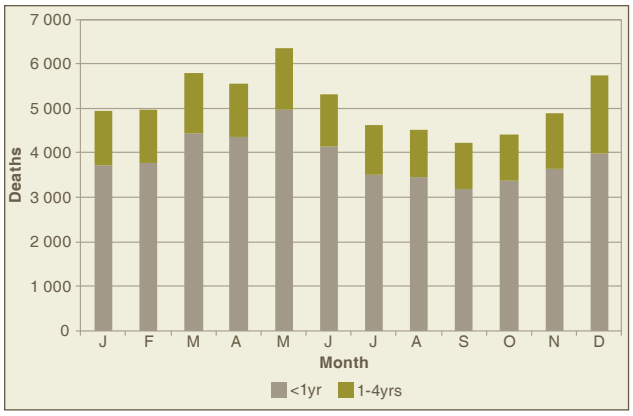
Figure 4: Proportion of deaths occurring in hospital, 2007



Source: Statistics South Africa, 2009.[9]

Seasonal variations in mortality are greatest during infancy with a likely association with the summer and early winter peaks in diarrhoeal disease (Figure 5).

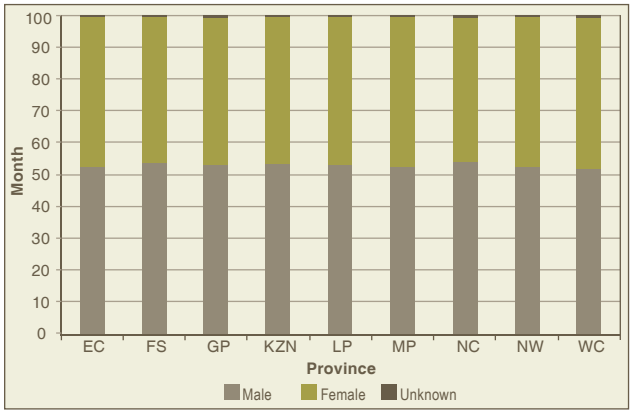
Figure 5: Seasonal variation in infant and child deaths, 2007



Source: Statistics South Africa, 2009.[9]

Mortality levels were slightly higher in boys with this gender balance being consistent across all provinces (Figure 6).

Figure 6: Gender of under-5 deaths per province, 2007



Source: Statistics South Africa, 2009.[9]

The cause of death

As is to be expected the primary cause of death is dependent on the age group under consideration. According to the death notifications during 2007, deaths in the neonatal period comprised 21.9% of childhood deaths with 54% occurring between one and twelve months of age and 24.1% occurring between one and five years of age.[c]

c Under five deaths include three sub-categories of death:
- Neonatal deaths which are those occurring in the first 28 days of life.
- Infant deaths which are those occurring in the first year of life (and includes neonatal deaths).
- Childhood deaths which are those occurring between ages 1-5 years.

Table 7: Cause of death of newborns, infants and children under-5 years, 2007

Causes of death	Neonatal		< 1 year		1-4 years	
	Rank	%	Rank	%	Rank	%
Respiratory and cardiovascular disorders specific to the perinatal period	1	45.1	3	13.3		
Disorders related to length of gestation and foetal growth	2	12.4	4	3.8		
Other disorders originating in the perinatal period	3	10.2	5	3.1		
Infections specific to the perinatal period	4	10.0	6	3.0		
Foetus and newborn affected by maternal factors and complications of pregnancy, labour and delivery	5	4.4				
Haemorrhagic and haematologic disorders of the foetus and newborn	6	2.6				
Intestinal infection diseases	7	2.1	1	20.6	1	24.0
Digestive system disorders of the foetus and newborn	8	2.1				
Other congenital malformations	9	1.5				
Transitory endocrine and metabolic disorders specific to the foetus and newborn	10	1.5				
Influenza and pneumonia			2	14.6	2	13.4
Malnutrition			7	2.1	3	6.0
Protozoal diseases			8	2.0		
Other acute lower respiratory infections			9	1.9	7	1.8
Certain disorders involving the immune mechanism			10	1.6	5	2.6
Tuberculosis					4	5.4
Human Immunodeficiency Virus					8	1.7
Other viral diseases					9	1.6
Inflammatory diseases of the Central Nervous System					6	1.9
Metabolic disorders					10	1.3
Other natural causes		6.9		31.3		29.5
Non-natural causes		1.2		2.6		10.9

Source: Statistics South Africa, 2009.[9]

The majority of neonatal deaths were due to respiratory and cardiovascular disorders followed by disorders related to growth and prematurity. Non-natural causes account for 1.2% of neonatal deaths (Table 7).

Neonatal disorders account for 23.2% of deaths during infancy with intestinal and respiratory infections responsible for a further third of deaths and the contribution of non-natural causes increasing to 2.6%.

After the first year of life, a quarter of deaths are due to intestinal infections with respiratory infections, malnutrition and tuberculosis (TB) being the next most common causes. Non-natural causes are responsible for 10.9% of deaths in this age group and 6.6% of deaths over the entire period from birth to five years.

Data from death notification forms underestimate the contribution of malnutrition and HIV and AIDS to childhood mortality. This is possibly because, when present with other diseases, these conditions are considered to be underlying factors.

In the under-five age group the top three causes of death are similar in all provinces, namely intestinal infections, influenza and pneumonia, and neonatal cardiovascular and respiratory disorders.

Data from Child PIP show that the most common cause of death of children, outside the neonatal period, who died in hospital did not change over the three years up to 2007 (Table 8). These causes are pneumonia, septicaemia, diarrhoea and TB. In this programme the contribution of both HIV and AIDS and malnutrition is determined and is presented later.

Table 8: Top five causes of death in hospital, 2005-2007

	2005	2006	2007
Pneumonia / ARI	18.6%	17.4%	15.9%
Septicaemia	12.7%	16.4%	14.4%
Acute diarrhoea	11.4%	13.1%	12.5%
TB: pulmonary / extra-pulmonary	8.3%	9.5%	8.7%
PCP (suspected or confirmed)	8.9%	9.5%	7.5%
Number of deaths audited	1 667	2 828	3 555

Source: Stephen et al., 2009.[1]

Data from demographic surveillance sites do recognise the contribution of both HIV and AIDS and malnutrition to child mortality (Table 9). Apart from this, the causes of death outside the health service at the community level are similar to those reported by both StatsSA and Child PIP, although the relative contribution of specific diseases is noticeably different.

Table 9: Causes of death at community level, in demographic surveillance sites, 1999-2002

	Agincourt, Limpopo (1999-2002)		Hlabisa, KwaZulu-Natal (2000-2002)	
Cause of death (under one year)	HIV and AIDS	31%	ARI	43%
	DD*	19%	HIV and AIDS	34%
	ARI*	18%	DD	4%
	Malnutrition	6 %	Sepsis	4%
			Malnutrition	3%
Cause of death (one to four years)	HIV and AIDS	34%	HIV and AIDS	61%
	Malnutrition	20%	DD	6%
	DD	8%	ARI	6%
	ARI	7%	Malnutrition	6%
	Accidents	6%		

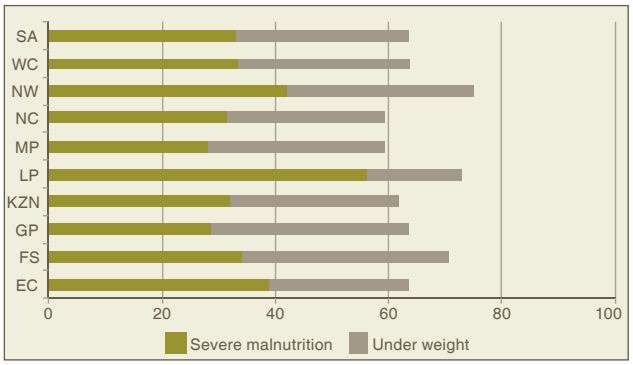
*DD - diarrhoeal disorders, ARI - acute respiratory infections

Source: 1st Report of the Committee on Morbidity and Mortality in children under five years, 2009.[2]

Child mortalities frequently have predisposing or underlying factors that increase their vulnerability and risk of death. In South Africa the two most common underlying factors are HIV infection and malnutrition.

At least a third of children who died in 2007 were severely malnourished and a further 30% were underweight for age. Whilst the contribution of severe malnutrition to child mortality showed wide variation between provinces, from 28.1% in Mpumalanga province to 56.3% in Limpopo province, this range was less marked when considering all forms of malnutrition ranging from 59.4% in Mpumalanga and the Northern Cape to 75.1% in North West province (Figure 7).

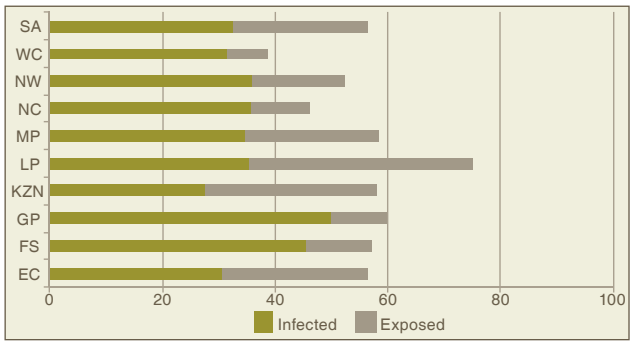
Figure 7: Nutritional status of under-5 deaths according to province, 2007



Source: Stephen et al., 2009.[1]

On average over 50% of children who died in 2007 were known or suspected to be HIV infected. Again, there were marked interprovincial variations which did not necessarily correlate with the U5MR (Figure 8). Limpopo province, where HIV infection was associated with the greatest proportion of childhood deaths, had an U5MR of 49.1 per 1 000 – which is the third lowest of all provinces – although the Western Cape had both the lowest proportion of HIV-associated deaths and U5MR.

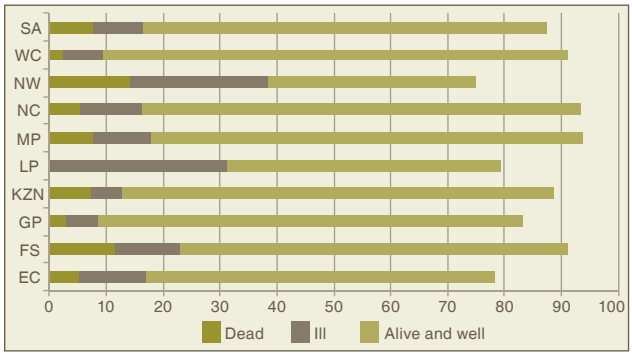
Figure 8: HIV status of under-5 deaths according to province, 2007



Source: Stephen et al., 2009.[1]

It is well recognised that the death of a mother is associated with a four-fold increased risk of death in her young children. It is estimated that 7.2% of South African children below 18 years of age are maternal orphans and a similar proportion (7.6%) of children below five years of age who died in hospital were maternal orphans.[11] Child PIP data show a wide variation between provinces in the proportion of children dying in hospital who were maternal orphans. Furthermore, these rates do not correlate with the reported rates of maternal orphans in the wider community. At 14.4% the North West province had the highest rate of maternal orphans amongst children who died, which was higher than the reported rate of 7.9% amongst all children. Comparable figures for other provinces were 11.7% and 10.1% in the Free State, 7.5% and 10.1% in KwaZulu-Natal and 2.5% and 2.4% in the Western Cape. This discrepancy in the North West province may reflect two different samples: the community, which includes all children up to 18 years of age, and children dying in hospital which is limited to children up to 13 years of age. Additional explanations may be the proportion of children who have died whose maternal well-being is unknown and the possibility that maternal orphans are more likely to die in the community and are thus under-represented in hospital data.

Figure 9: Maternal well-being of children who died in hospital



Source: Stephen et al., 2009.[1]

Maternal illness also appears to be linked to an increase in child mortality being associated with a further 2.5-31.3% of childhood deaths. Once again this does not necessarily relate to the infant or under-five mortality rates.

Table 10: Modifiable factors in child deaths recorded through Child PIP

	Modifiable factors per death	Site where modifiable factor occurred (%)				
		Home	Clinic/OPD	During referral	Emergency Care	Ward
Eastern Cape	3.1	42.0	13.7	0.7	12.6	31.1
Free State	2.6	54.2	17.5	2.3	9.3	16.8
Gauteng	2.0	50.1	17.0	4.1	5.2	23.5
KwaZulu-Natal	2.5	31.8	11.1	0.5	25.8	30.9
Limpopo	2.7	32.9	10.0	1.7	20.9	34.4
Mpumalanga	1.3	8.4	0.3	32.6	25.5	0
Northern Cape	2.1	61.8	25.2	0.9	3.3	8.9
North West	2.8	15.0	19.9	1.8	16.0	47.3
Western Cape	1.2	43.4	20.2	2.3	13.9	20.2
South Africa	2.2	38.5	15.3	1.0	18.5	26.7

Source: Stephen et al., 2009.[1]

Based on an audit of children who died in hospital it is estimated that across the country there are 2.2 modifiable factors per death (Table 10). These are factors considered to have contributed to the death of the child that, if corrected, could have prevented the death. The majority of these occur in the community where the most common factors are a failure to recognise the severity of the illness, late presentation to the health service, or a delay in transfer to a higher level of care. Common hospital-associated modifiable factors include insufficient or inexperienced staff or the lack of access to appropriate resources and high-care beds.

Social profile

The circumstances in which the children of South Africa live are presented in Table 11, which also provides a comparison between the provinces. Once again there is no obvious correlation between access to services and mortality rates.

Whilst access to services is poor in the Eastern Cape the low U5MR is probably incorrect, which precludes meaningful interpretation of any relationship between the two. On the other hand, access to services in the Free State is fairly good but the U5MR is high whilst access is worse in Limpopo which has a much lower U5MR.

Health profile

Table 12 provides data on the access of children in the various provinces to health care. Overall, the majority of children in all provinces are dependent on the public health system where between 7-8% live more than 30 minutes from a primary health care clinic. In the public health sector there is one paediatrician for every 40 180 children, though this ratio ranges from 1:9 856 in the Western Cape to 1:1.1 million in Mpumalanga province. Once again there is no obvious correlation between access to health care and the U5MR.

Table 11: Percentage of access to basic services classified by province

	Children in formal house[12]	Households accessing piped water[13]	Children in house with drinking water on site[14]	Children in house with basic sanitation[14]	Children in house with electricity[14]
Eastern Cape	47.7	70.8	35.4	41.4	65.9
Free State	73.9	97.3	92.5	69.5	89.8
Gauteng	67.9	97.9	91.0	87.7	82.0
KwaZulu-Natal	56.3	79.3	49.4	54.2	67.6
Limpopo	89.0	83.6	39.9	26.1	86.3
Mpumalanga	79.8	91.1	71.8	52.2	88.4
Northern Cape	86.8	94.4	92.9	56.4	89.9
North West	79.2	89.9	62.4	86.5	87.2
Western Cape	76.7	98.9	94.6	96.5	97.2
South Africa	68.3	88.7	62.7	58.9	79.6

Table 12: Access to child health and paediatric services per province using data from DHIS, StatsSA and ASSA

	Medical Aid coverage (%)[13]	Children <5 yrs /paediatrician[d]	Children >30 minutes from a PHC (%)[15]	PHC visits /child (U5)[10]	Admissions /1 000 children (U5)[8]
Eastern Cape	10.9	102 453	50.9	4.0	75.9
Free State	15.8	44 136	23.3	3.5	130.8
Gauteng	20.2	16 602	21.8	3.3	134.4
KwaZulu-Natal	11.8	59 492	47.8	4.3	60.2
Limpopo	7.3	225 668	46.7	5.4	91.4
Mpumalanga	12.2	1 102 914	37.6	4.4	107.8
Northern Cape	13.8	242 517	20.4	4.6	251.0
North West	11.2	1 088 194	50.3	4.3	76.2
Western Cape	22.4	9 856	7.8	4.6	228.6
South Africa	14.3	40 180	37.8		91.2

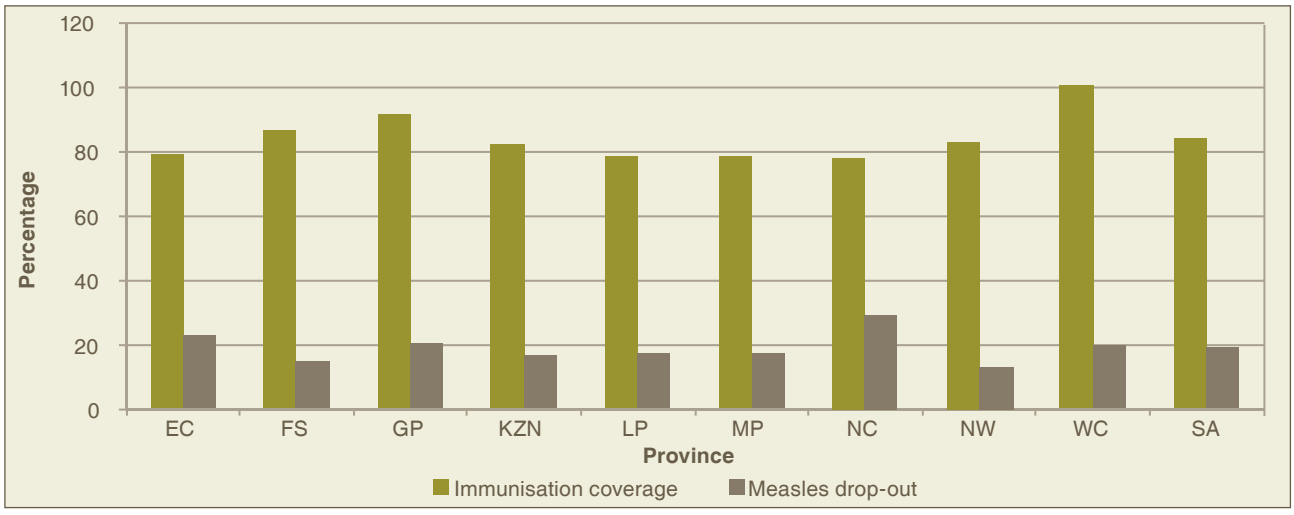
Although all children visit their local PHC clinic at least three times a year, this is below the targeted number of five well-child visits per annum over the first five years of life. The health promotion value of these visits is questionable as, apart from the Western Cape, immunisation coverage hovers around 80% and the measles drop-out rate is close to 20% (Figure 10).

The number of admissions per 1 000 children shows a four-fold variation between KwaZulu-Natal and the Northern Cape, which have the lowest and highest admission rates respectively. Once again there is no association between admission rates and mortality so it is impossible to comment on whether admission rates are a reflection of access to services or the quality of care.

Despite a low number of PHC visits per annum the utilisation of health services is fair, except for the Eastern Cape, with around 80% of pregnant women attending antenatal care, albeit late, and almost as many delivering with a skilled person in attendance (Figure 11).[d]

Figure 12 shows that 80% of pregnant women are able to secure an antenatal HIV test and, of those who were HIV-positive, 80% accessed Nevirapine. Despite this, the majority of HIV-exposed babies received Nevirapine, although very few returned at six weeks for a Polymerase Chain Reaction (PCR) test. Of those who did return for a PCR test, between 6.1% and 13.5% tested HIV positive.

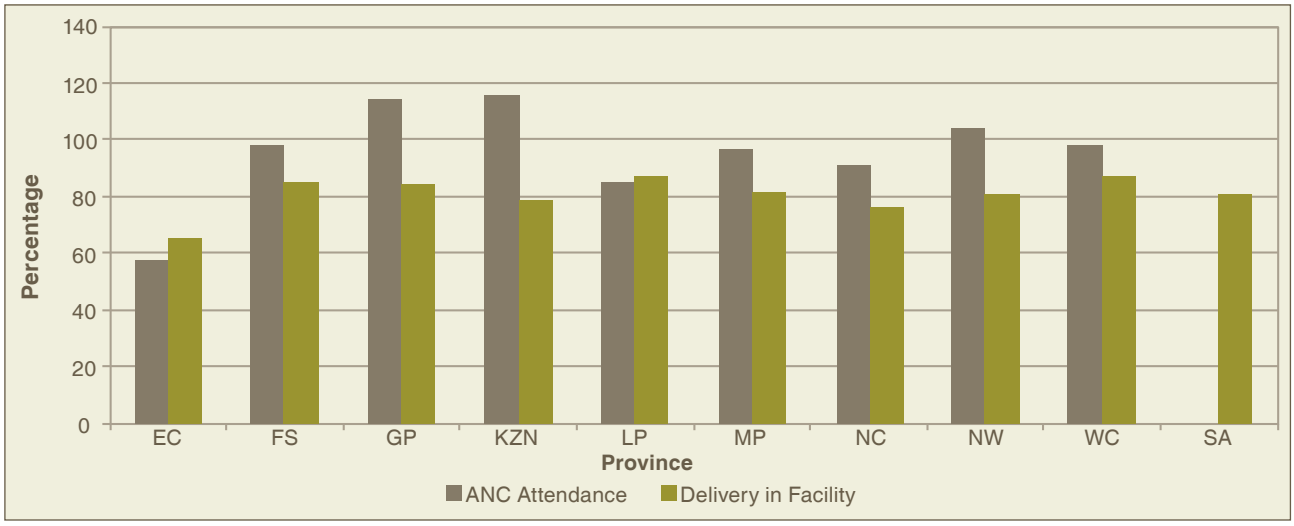
Figure 10: Immunisation coverage and measles drop-out per province using DHIS data



Source: National Department of Health, 2007.[10]

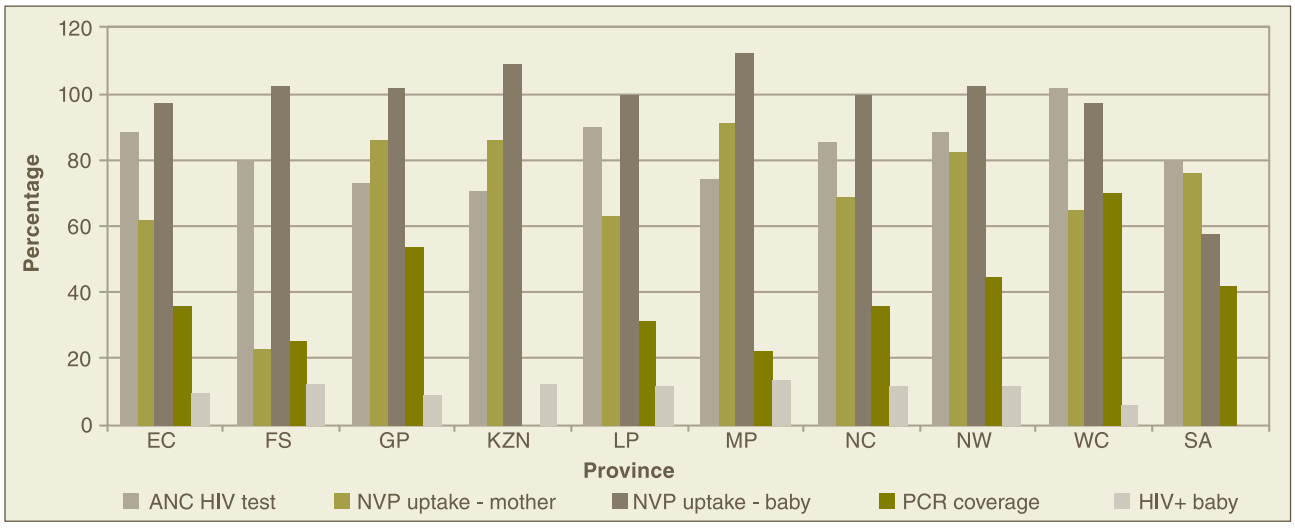
d Calculations based on population data from StatsSA and paediatrician numbers from Colleges of Medicine of South Africa.

Figure 11: Utilisation of maternity services per province using DHIS data



Source: National Department of Health, 2007.[10]

Figure 12: Uptake and outcome of Antenatal care HIV tests, Nevirapine to mother and baby, PCR test and HIV-positive babies



Source: National Department of Health, 2007.[10]

Summary

After five successive years of rising childhood mortality, the U5MR in 2007 was estimated to be 62.1 per 1 000 and appeared to have levelled off, if not actually declined. This national figure does, however, hide marked interprovincial variations from 38.8 per 1 000 in the Western Cape to 110.6 per 1 000 in the Free State. A fifth of these deaths occurred in the neonatal period and almost three quarters occurred before one year of age. In all age groups almost half of the deaths occurred outside the health system.

The major causes of childhood death were neonatal problems, intestinal infections or diarrhoeal disease, acute respiratory infections, unnatural deaths and TB. Malnutrition and HIV and AIDS underlie many of the deaths.

Seasonal and gender biases are as expected and the primary causes of death were similar throughout the country. Malnutrition, HIV and the loss of a mother are all significant underlying factors in child mortality in South Africa.

Whilst there are noticeable interprovincial variations in service infrastructure, as well as access to and the utilisation of health services, there does not appear to be an obvious correlation between these indicators and child mortality. This may in part be a reflection of the quality of these data.

In the first report of the Committee on Morbidity and Mortality in Children Under Five Years (CoMMiC) the Committee stressed the need to strengthen information systems in order to ensure that recommendations to reduce child mortality are based on an accurate understanding of all factors that

may contribute to the well-being or death of children in this country.[2] The Committee's recommendations included:

- Strengthening Vital Registration and the District Health Information System via modifications to the death notification forms, the Road-to-Health Card and the death notification process, as well as the introduction of a standardised children's ward admission register; and
- Entrenching mortality audits at all levels of care in the health system and exploring models for the auditing of deaths occurring in the community.

The CoMMiC report also recommended improving clinical care, with an emphasis on interventions in the home and at the primary health care level.

Recommendations

Given the nature, underlying factors and site of childhood deaths it is obvious that, in order to improve the well-being and reduce the morbidity and mortality of children, there needs to be a return to the basics. In doing this it is important to appreciate that the shortfall in the South African health system is not the selection of health programmes, but rather their effective implementation across all nine provinces. Improved implementation requires:

- The delivery of care across all levels of the health system, from the home and community, through the primary health care services, into the hospitals;
- The provision of a spectrum of care that includes the mother, newborn, child and adolescent;
- A range of services that encompasses preventative, promotive and curative activities;
- The abolition of silos and the integration of services;
- The strengthening of existing, appropriate, cost effective interventions that are known to promote child survival; and
- The provision of effective support services along with improved supervision, monitoring and evaluation programmes and communication strategies.

South Africa has implemented the District Health System as the vehicle for the delivery of health care and this must be supported and strengthened. Inherent in this is ensuring that every child, irrespective of where s/he lives, has equitable access to an appropriate level of care. To achieve this, the roles, responsibilities and relationships of all components within the system need to be better defined and, at each level, the focus must extend to cater for the entire population within the drainage area and not merely those individuals who are able to access the health service.

Priority programmes that need to be adopted or strengthened include:

Maternal:

- Prevention of HIV infection in women;
- Family planning services;
- Basic antenatal care;
- Prevention of mother-to-child transmission (PMTCT) and highly active antiretroviral therapy (HAART) for HIV-positive pregnant women; and
- Use of the partogram and delivery by a skilled attendant.

Newborn:

- Neonatal resuscitation;
- 'Kangaroo' mother care;
- Early breastfeeding;
- PMTCT, including follow-up and PCR testing at six weeks; and
- Follow-up of newborns within the first week of life, either at home by a health-care worker or at a health facility.

Child:

- Exclusive breastfeeding for six months;
- Expanded Programme on Immunisation;
- Growth monitoring and nutritional support;
- HIV screening and HAART;
- Screening for TB;
- Integrated Management of Childhood Illness (IMCI) – both case management algorithms in the PHC clinic and the 16 key activities in the household and community;
- The use of standard treatment guidelines throughout the health system; and
- Accident prevention programmes.

Adolescent:

- Life skills training – including sexuality and HIV and AIDS education; and
- Adolescent-friendly health services.

The ongoing reduction in childhood mortality cannot be achieved solely within the health system. It requires early access to and more regular utilisation of existing services and the extension of health care into the community and home. This can only be achieved through the introduction of the Household and Community component of the Integrated Management of Childhood Illness and a more effective Community Health Worker programme. The latter requires

standardised training, effective supervision and an expansion of roles to include basic therapeutic activities such as the dispensing of oral rehydration solution to children with diarrhoea and first-line antibiotics for children with acute respiratory infections.

References

1 Stephen CR, Mulaudzi MC, Kauchali S, Patrick ME, editors. Saving Children 2005-2007: A Fourth Survey of Child Healthcare in South Africa. Pretoria: University of Pretoria, Medical Research Council, Centers for Disease Control and Prevention; 2009.

2 1st Report of the Committee on Morbidity and Mortality in Children Under Five Years; 2009.

3 National Department of Health. South Africa Demographic and Health Survey 2003. Pretoria: National Department of Health; 2004.

4 The Presidency. Development Indicators 2009. Republic of South Africa. Pretoria; 2009.

5 National Department of Health, Medical Research Council. South Africa Demographic and Health Survey 1998. Full Report. Pretoria: National Department of Health.

6 Bradshaw D, Groenewald P, Laubscher R, Nannan N, Nojilana B, Norman R, et al. Initial Burden of Disease Estimates for South Africa 2000. Cape Town: South African Medical Research Council; 2003.

7 Statistics South Africa. Mid-Year Population Estimates, South Africa 2005. Pretoria: Statistics South Africa; 2005.

8 Actuarial Society of South Africa. ASSA 2003 Model: ProvOutput. AIDS Committee of Actuarial Society of South Africa; 2005.

9 Statistics South Africa. Mortality and Causes of Death in South Africa, 2007. Findings from Death Notification. Pretoria: Statistics South Africa; 2009.

10 National Department of Health. District Health Information Database; 2007.

11 Children's Institute. Statistics on Children in South Africa. University of Cape Town: Children's Institute; 2010.

12 Hall K. Children's Access to Housing. In: Pendlebury S, Lake L, Smith C, editors. South African Child Gauge 2008/9.University of Cape Town: Children's Institute; 2009.

13 Statistics South Africa. General Household Survey July 2005. Pretoria: Statistics South Africa; 2006.

14 Hall K, Marera DH. Children's Access to Basic Services. In: Pendlebury S, Lake L, Smith C, editors. South African Child Gauge 2008/9. University of Cape Town: Children's Institute; 2009.

15 Lake L, Marera DH. Child Health: The General Context. In: Pendlebury S, Lake L, Smith C, editors. South African Child Gauge 2008/9. University of Cape Town: Children's Institute; 2009.