

## ABSTRACT

Child health promotion activities offer some of the most cost-effective interventions that any government can make. Many child disease prevention activities are affordable, can be delivered effectively and offer decades of good health for a modest investment.

This chapter focuses on some key health promotion activities in South Africa including: immunisation, the Integrated Management of Childhood Illness strategy, childhood infection prevention, neonatal health and developmental screening. It highlights accomplishments over the past five years, reviews evidence for intervention effectiveness, describes challenges in implementing and institutionalising the interventions and outlines actions needed to maximise the effectiveness of the interventions in the future.

There have been impressive improvements in the delivery of some interventions – such as meeting the 90 per cent under-1 immunisation coverage goal, extension of Integrated Management of Childhood Illness services to all districts in the country and continued decline in the rates of many notifiable diseases. Other interventions have shown modest gains such as the number of birthing centres certified as being ‘baby-friendly’ in the country and caregivers’ use of oral rehydration therapy. Lack of adequate progress is noted for developmental screening and the prevention of mother-to-child transmission of HIV interventions.

Failure to achieve targets is most often due to multiple constraints and barriers within broader health care provision, systemic factors limiting the efficient delivery of services, such as staff constraints, inadequate skills and the organisation of service delivery, rather than problems with the individual interventions themselves.

There are sound arguments for providing a universal or core programme of preventive health care, accessible to every child in the country. The content of this core in a South African setting has yet to be defined, but many of the activities reviewed in this chapter would form the backbone of such a strategy.

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## INTRODUCTION

In 1994, one of the first decrees of the newly elected president, Nelson Mandela, was that health care at all government health institutions would immediately be available at no cost to children younger than six years and to pregnant women. Subsequently, there have been moves towards the formation of a District Health System and the delivery of comprehensive, integrated services at primary health care (PHC) clinics. All of these developments would be anticipated to positively influence child health promotion and disease prevention. Twelve years into democracy, it is worth reflecting if these gains have indeed been realised. Have programmes promoting children's health and well-being flourished; is there evidence that they are effective; what obstacles and challenges persist and what are the prospects for child health promotion and prevention in the next decade?

Health promotion can be defined as "any planned and informed intervention that is designed to improve physical or mental health or prevent disease, disability and premature death."<sup>1</sup> Although the health of children is primarily a parental responsibility, society and ultimately government has both a stake and a responsibility in ensuring that the rights of children are respected and realised. Child health promotion activities tend to be popular because they reflect family and community needs and perspectives while at the same time providing individualised care.

This chapter reviews key health promotion activities including: immunisation, the Integrated Management of Childhood Illness (IMCI) strategy, childhood infection prevention, neonatal health and developmental screening. While these are not the only health promotion activities undertaken in the country, they have been selected because they highlight important achievements and lessons in the delivery of this type of service. The chapter also briefly looks at accidents and injuries, and oral health in children. Other key programmes such as breastfeeding, child nutrition support and the prevention of mother-to-child transmission of HIV (PMTCT) are covered elsewhere in this Review. Although important, topics such as child abuse prevention, vision and hearing screening, school health promotion, and adolescent issues are not discussed in this chapter.

For each health promotion and disease prevention intervention / strategy / programme described in this chapter, an attempt has been made to provide an overview of the intervention and to answer the following questions:

- ◆ What has been accomplished and learned in the past three to five years?
- ◆ What evidence is there that the intervention works in the South African setting?
- ◆ What have been / are the challenges in implementing and institutionalising the intervention?
- ◆ What are the actions needed to strengthen the delivery of this intervention in the future?

Most of the information provided in this chapter originates from publications and reports available on the Internet and occasionally in peer-reviewed journals. Data available in the national District Health Information System (DHIS) for the different key components have been extracted, analysed and discussed. However, DHIS data needs to be treated with caution as the system is still under development. Hopefully DHIS will provide better trends as its data quality improves. Where data were unavailable or unpublished, 'personal communication' was used to strengthen the review.

## NATIONAL GOALS

In 2001, the national Department of Health (DoH) set goals and targets for 2005 for many health promoting or disease preventing activities. Some selected targets are outlined in Table 1.<sup>2</sup> Subsequent sections of this chapter reflect on the processes for achieving these targets and whether they have indeed been accomplished.



TABLE 1:  
Selected 2005 Department of Health targets related to child health promotion and disease prevention

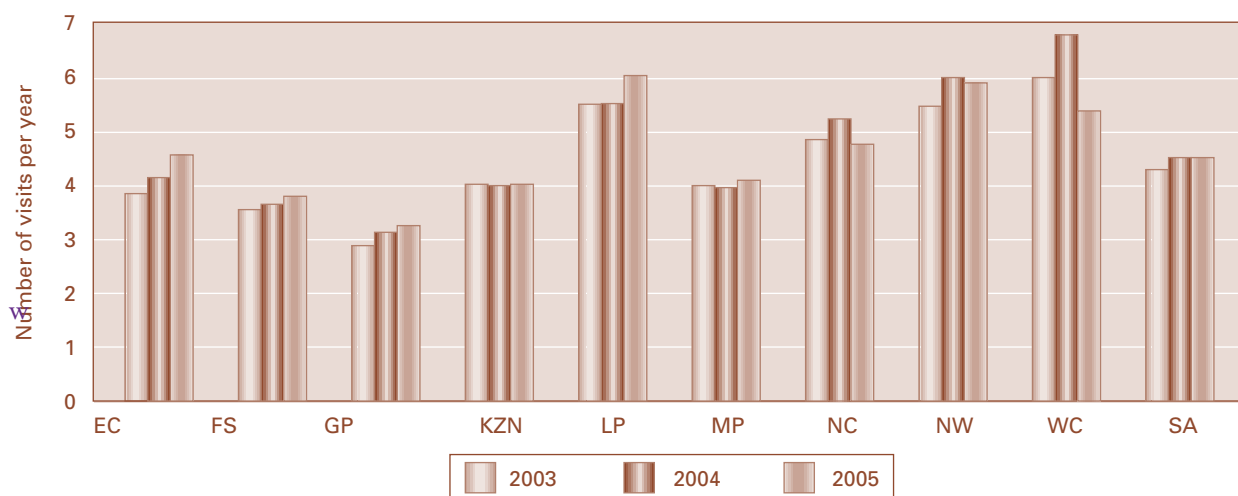
Activity	Target
Immunisation	Attain 90% immunisation coverage in the first year of life for all vaccines Vaccinate 90% of children against measles
Disease eradication / reduction	Eradicate polio by 2005 Detection and investigation of at least 1 AFP case per 100 000 children under-15 years of age Eliminate measles Eliminate neonatal tetanus Reduce the incidence of diarrhoeal disease in children less than five years by 20% from 2001 to 2005 Reduce the incidence of HIV infection in children by 20% by 2005 and by 50% by 2010
Antenatal	Increase the proportion of deliveries supervised by trained birth attendants to 90% Increase antenatal attendance for care to 95%
Neonatal / infant health	Reduce the prevalence of low birth weight (<2.5 kg) to less than 10% of all live births by the year 2005 Ensure that 15% of all health facilities are "baby-friendly" by 2005
IMCI	Ensure that all facilities implementing IMCI have 60% of health workers trained in IMCI by 2005
Accidents and injuries	Reduce intentional and unintentional injuries including teenage suicide by 10% from the 2000 level
Oral Health	Increase the percentage of children at age 6 years who are free of caries to 50% Reduce the mean number of decayed, missing and filled teeth (DMFT) at age 12 years to 1.5

Source: DoH, 2001.<sup>2</sup>

## UTILISATION RATES OF PHC FACILITIES AMONG CHILDREN UNDER FIVE YEARS OF AGE

Visits to PHC facilities by children under-5 years of age provide a major opportunity for health service interventions targeting this age group. The number of such visits is also an important indicator of health service accessibility. Ideally, every child should visit a PHC facility at least twice a year (for immunisations and / or vitamin A) after infancy. Utilisation of PHC facilities rates for the period 2003-2005 is shown in Figure 1.

FIGURE 1:  
Primary health care clinic utilisation rates for children under-5 years, South Africa, 2003-2005



Source: DHIS, DoH, May 2006.

The data include sick and well-baby visits. There is no marked change over the three years with a national mean of 4.5 visits per child aged under-5 years annually. This compares favourably with many developing countries where the mean sometimes is less than a single visit per year. The data does not distinguish between visits by children younger than one and those older than one, but it would be anticipated that most visits occur during the first year of life, particularly for ‘well baby’ visits. There is no obvious explanation for the provincial differences in the number of visits (e.g. six annual visits in the Western Cape vs three visits per year in Gauteng).

## IMMUNISATION

The World Health Organization (WHO) states: “The two public health interventions that have had the greatest impact on the world’s health are clean water and vaccines.”<sup>3</sup> Immunisation is responsible for saving three million lives globally each year. The South African Expanded Programme of Immunisation (SA-EPI) aims to decrease childhood morbidity and mortality from vaccine-preventable diseases. It follows the WHO recommended immunisation schedule and guidelines. SA-EPI has various programmatic dimensions that include vaccine procurement and distribution; cold chain management; daily immunisation services at maternal and child health clinics and surveillance (immunisation coverage, vaccine adverse events,

incidence rates of acute flaccid paralysis, measles and neonatal tetanus).

Currently, eight childhood vaccines are offered by SA-EPI at various intervals between birth and nine months, with further booster doses following thereafter, until five years of age (Box 1). Vaccines offered by the SA-EPI programme include Bacillus Calmette Guerin (BCG) (for TB); oral polio; diphtheria, whooping cough (pertussis) and tetanus (DPT); hepatitis B, *Haemophilus influenzae* type b (Hib) and measles. Most vaccines are administered at no cost at the ‘well-baby’ clinics; although a number of private practitioners and clinics also offer the service.<sup>4,a</sup>

Box 1:  
Recommended South African childhood vaccination schedule

Birth	TOPV 0	BCG		
6 weeks	TOPV 1	DPT 1	HBV 1	Hib 1
10 weeks	TOPV 2	DPT 2	HBV 2	Hib 2
14 weeks	TOPV 3	DPT 3	HBV 3	Hib 3
9 months				Measles
18 months	TOPV 4	DPT 4		Measles
5 years	TOPV 5	DT		

BCG = Bacillus Calmette Guerin, TOPV = trivalent oral polio vaccine, DPT = diphtheria, pertussis and tetanus vaccine, DT = Diphtheria and tetanus vaccine, HBV = hepatitis B vaccine, Hib = *Haemophilus influenzae* type b vaccine

a About 21% of vaccine recipients in Gauteng accessed immunisation through private practitioners in 2002.



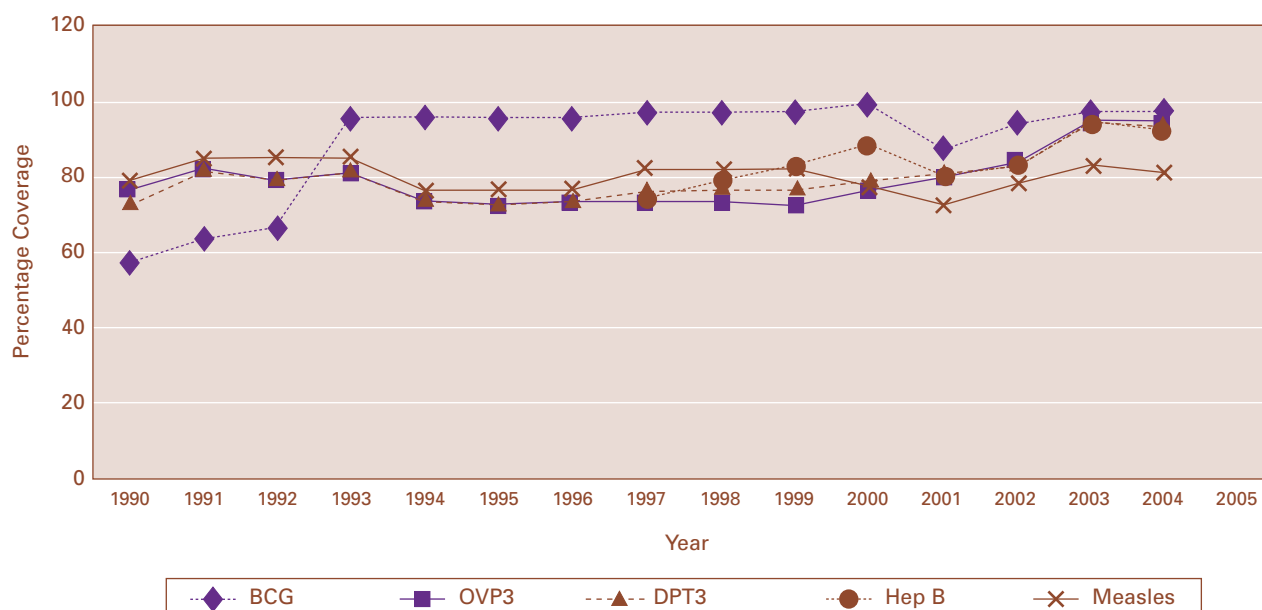
Key indicators of immunisation in the DHIS include:

- ◆ BCG coverage. BCG immunisation is chiefly performed at hospital level in South Africa (SA). Hospital data have only recently been incorporated into the DHIS; as a result low BCG coverage in some areas most likely reflects inadequate capturing of hospital data rather than true low coverage.
- ◆ Completion of all immunisations due at 14 weeks. Failure to complete immunisations usually administered between 6 and 14 weeks of life is expressed as the DPT1-DPT3 drop out rate.
- ◆ Completion of primary course of immunisation by one year.
- ◆ Drop out rate from Measles 1 (administered at 9 months) to Measles 2 (administered at 18 months).

Immunisation coverage rates in the country have been calculated using various data sets over the years. Figure 2 shows SA immunisation coverage data for the past 15 years based on WHO / United Nations Children's Fund (UNICEF) statistics.<sup>5</sup> While data for 2005 are unavailable from this source, the graph highlights the improvements in OPV3 and DPT3 completion rates (i.e. vaccine coverage at 14 weeks) but the lack of substantial improvement in measles vaccine coverage over the past decade.

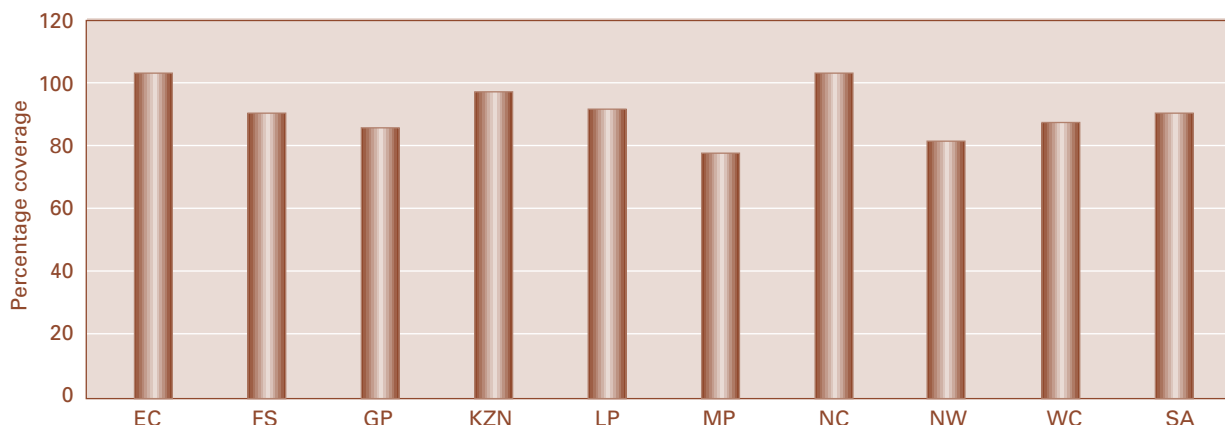
The goal of the SA-EPI was to attain 90% immunisation coverage in the first year of life for all vaccines by 2005. Current DHIS data suggest that this target was achieved nationally in 2005, despite four of the nine provinces failing to attain the target (Figure 3). The DHIS statistics are substantially higher than rates described in the 1998 South African Demographic and Health Survey (SADHS) (63% of children fully immunised). This is encouraging, but the improved figures should ideally be confirmed using a similar methodology to the SADHS.

FIGURE 2:  
Immunisation coverage in children, South Africa, 1990-2004



Source: WHO / UNICEF, 2005.<sup>5</sup>

FIGURE 3:  
Full immunisation coverage in children aged less than one year, South Africa, 2005

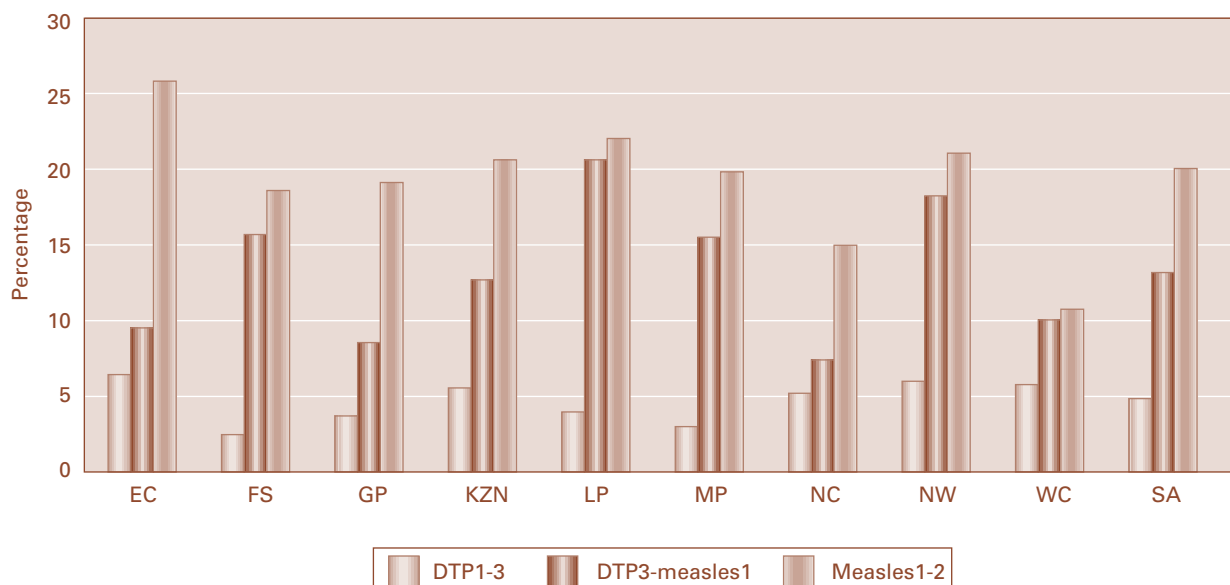


Source: DHIS, DoH, May 2006.

Figure 4 shows vaccine dropout data. The following should be noted:

- ◆ Most children complete the initial course of immunisation (by 14 weeks). This reflects the fact that attendance at PHC facilities in the early months of life is embedded within most communities in SA.
- ◆ Drop out rates between DPT3 (administered at 14 weeks) and Measles 1 (administered at 9 months) are relatively high.
- ◆ Drop out rates between Measles 1 and Measles 2 are very high (20% nationally). This leaves many children at risk of acquiring measles.
- ◆ Drop out rates per se do not provide information regarding the reasons for children not being fully immunised. The relative contribution of failure of care-givers to present for immunisation as opposed to the failure of health workers to identify and immunise children requiring immunisation (missed opportunities) is not captured.

FIGURE 4:  
Immunisation dropout rates, South Africa, 2005



Source: DHIS, DoH, May 2006.



An important indicator of the success of the immunisation programme is the decrease in the number of notifications of infections that are vaccine-preventable. While the notification system depends on passive surveillance, and is subject to under-reporting, trends over the past decade suggest real decreases in vaccine-preventable diseases (Table 2).

TABLE 2:  
Notification of vaccine-preventable and other related conditions, South Africa, 2001-2005.

Condition	2001	2002	2003	2004	2005
Acute flaccid paralysis	150	177	242	209	246
Congenital syphilis	139	55	33	12	1
Diphtheria	0	1	5	0	2
<i>Haemophilus influenzae</i> type b	8	3	13	6	0
Measles*	8	30	251	830	616
Poliomyelitis	0	0	0	0	0
Tetanus	13	39	21	8	3
Tetanus neonatorum	5	6	10	2	1
Tuberculosis (total)	120 715	122 486	78 007	52 353	44 231
Viral hepatitis type B	261	309	117	170	167
Whooping cough	24	9	8	15	0

Source: Health Systems Research, Research Coordination and Epidemiology, DoH, SA 2005.

\* Measles – only serology confirmed cases represented.

The impressive reduction in the number of *Haemophilus influenzae* type b cases in the country since the introduction of the vaccine in 1999, mirrors the success of vaccination programmes against this disease in developed countries (>95% reduction in cases).<sup>6</sup> Disturbingly, however, the vaccine appears to be less effective in HIV infected children (approximately 55% reduction of pneumonia).<sup>7</sup> Vaccine failure in HIV infected children may be due to a poor primary immune response or loss of immunity one to three years post-immunisation.

While no case of wild oral polio has been reported in SA since 1989, the country remains to be declared polio-free by the WHO. The failure to achieve this status is

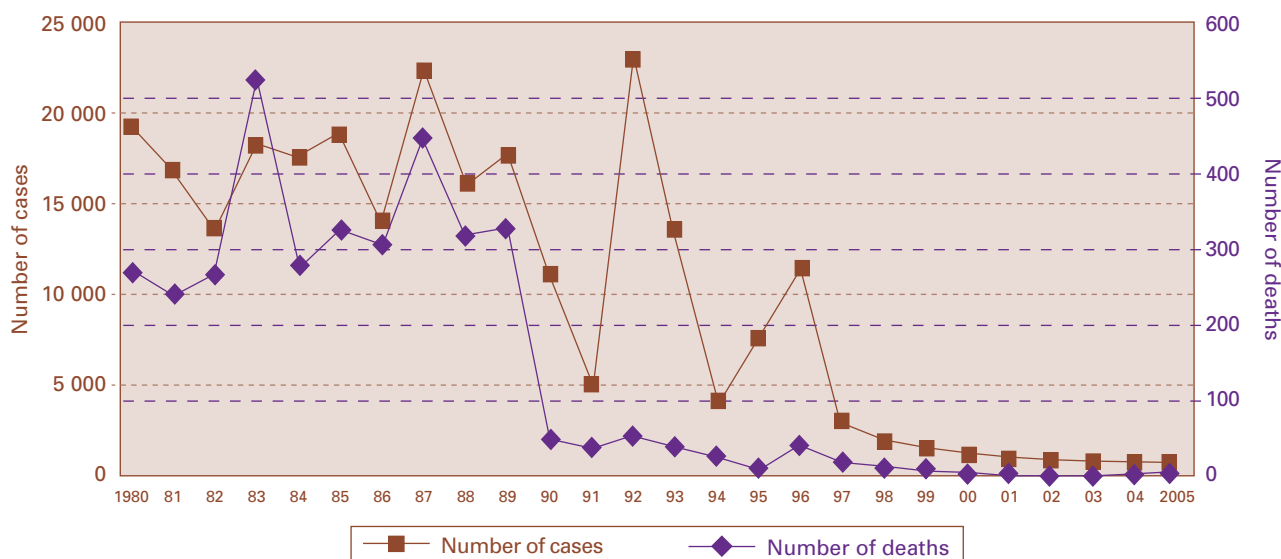
related to inadequate polio surveillance systems in the country. This depends on the notification of all cases of acute flaccid paralysis (AFP) in children younger than 14 years of age and adequate investigation of the stool specimens for presence of the virus. The increasing notification of AFP is a positive sign that reflects improvement in monitoring. In 2005, about 95% of the AFP notifications and investigation targets were met.

The dangers of complacency regarding maintaining high child vaccine coverage is highlighted by the recent polio outbreak in Namibia, where over two hundred cases were reported (with about 30 cases confirmed with at least 15 deaths). Most victims were aged over 20 years and had missed out on under-5 vaccination campaigns carried out since 1990, when Namibia gained independence. The polio virus is suspected to have spread from Angola, although the strain originated in India, stressing the easy exportability of disease with increasing globalisation.<sup>8</sup>

In addition to routine childhood vaccine administration, the SA-EPI has adopted further strategies for the elimination of polio and measles. Between 1996 and 2000, regular annual mass immunisation campaigns were conducted in an attempt to reach all under-5 year-old children for polio and all children younger than 14 years for measles vaccination. Over 7 million doses of measles and 4 million doses of polio vaccine were administered annually. In 2004, following a countrywide measles outbreak, a mass immunisation campaign was repeated in most provinces.<sup>9</sup> Another national mass immunisation campaign is scheduled for 2007.

Following the mass immunisation campaigns from mid-1990 to 2000, there was a dramatic drop in measles from around 16 000 cases annually in the early and mid-1990s to a low of only eight confirmed cases in the country in 2001. However, the high measles coverage in young children was not sustained and in 2003 there was an epidemic initially in Gauteng and Mpumalanga, and later spreading to other parts of the country. This was attributed to high numbers of susceptible children. Since 2000, about 20% of children failed to receive measles vaccine either through the routine EPI services or mass immunisation campaigns. Measles was largely imported from neighbouring countries, through cross

FIGURE 5:  
Number of measles cases in South Africa and case-fatality rate (CFR) from 1980 to 2005



Source: Measles surveillance system: Sub-directorate, EPI, Cluster: Maternal, Child and Women's Health and Nutrition, DoH Disease notification system, Health Monitoring and Evaluation, DoH.

border movements of immigrants. The number of reported cases has once again decreased following a national measles mass immunisation campaign in 2004 in children aged 9 months to 5 years (Figure 5).

An immunisation uptake of around 80 per cent can often be obtained with relatively little difficulty, but considerable effort and skill is required to ensure the last 15 or 20 per cent of children are immunised.<sup>10</sup> A number of persistent challenges have prevented the achievement of >90% vaccine coverage rates in one-year olds. Many health workers still treat immunisation as a vertical programme rather than integrating it into all aspects of child health care delivery, for example through the IMCI strategy. Other major limitations to maximal uptake may include:

- ◆ Lack of weekend or after-hours services at clinics which would enable working parents to access vaccination services for their children;
- ◆ Limited family practitioner or paediatrician involvement in vaccine administration;
- ◆ Unavailability of vaccines at hospitals (to allow immediate catch-up for unvaccinated sick children);
- ◆ Health workers citing false contra-indications in denying children vaccinations; and

- ◆ Exposure of better educated parents to the global anti-vaccination lobby's messages through the internet and mass media.

The success of the immunisation programme in the country ultimately rests with improvements in the availability and delivery of routine services at the primary care level, including aspects of quality assurance such as vaccine availability and maintenance of the cold chain. This, together with improvements in public health through better housing, water and sanitation should ensure the virtual elimination of many of these preventable diseases.

## INTEGRATED MANAGEMENT OF CHILDHOOD ILLNESS

The IMCI strategy which was launched by the World Health Organization (WHO) in 1995<sup>11</sup> represents an integrated approach to reducing mortality and morbidity in children under-5 years in developing countries. IMCI includes both preventive and curative elements that are implemented by families and communities as well as by health facilities (Box 2).



**Box 2:**  
**The IMCI Strategy**

IMCI implementation involves the participation of the community, the health service sector and the family. The IMCI strategy has three components, namely:

**Component One: Improving health worker skills**

The IMCI guidelines outline a process which primary level health workers can use to assess and manage ill children. The guidelines outline how and where an ill child should be treated, how the caregiver should be counselled and how the child should be followed-up. The immunisation and nutritional status of each child is also assessed. Health workers are taught to use the guidelines during an 11-day training course.

**Component Two: Improving the health system**

This component aims to ensure that the health system provides adequate support for implementation of IMCI in primary level health facilities, and focuses on the availability and functioning of key inputs and processes both within facilities and at district level (such as drug availability).

**Component Three: Improving household and community practices**

The Household and Community Component (HCC) of IMCI aims to initiate, reinforce and sustain household practices that are important for child survival, growth and development within an overall framework of community capacity development.

Source: WHO / UNICEF 2005.<sup>11</sup>

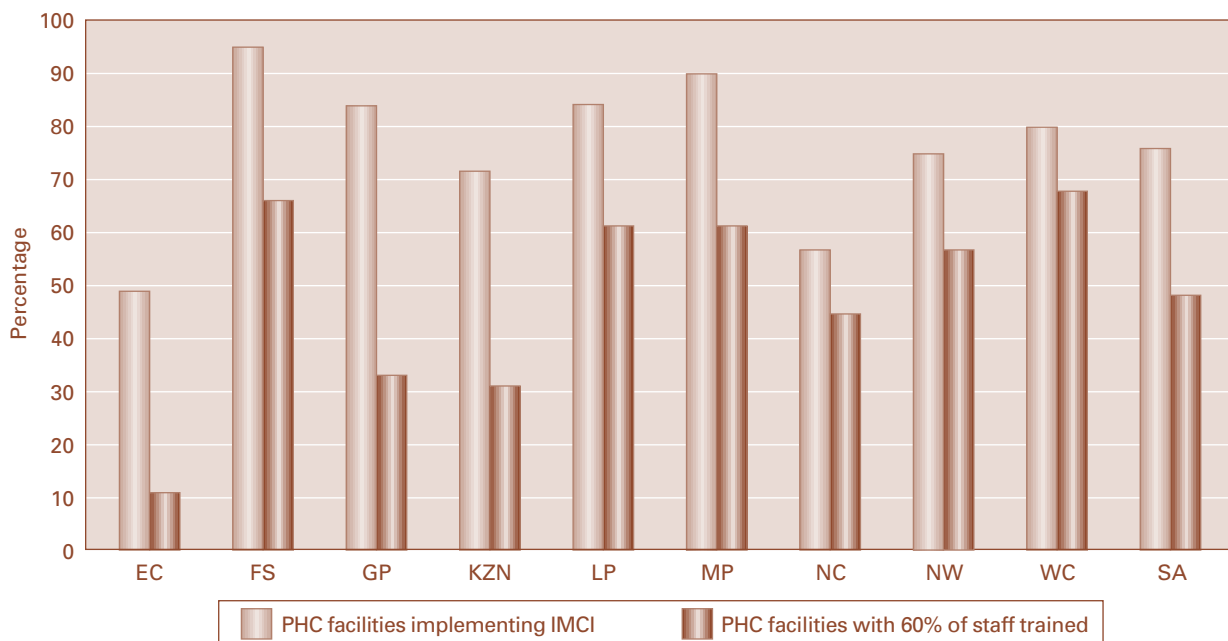
IMCI became a SA government policy in 1998, with the DoH aiming to ensure that all districts were implementing the case management component of IMCI by 2005. Data from the DoH for March 2006 show that this target has been achieved. IMCI principles have also been included in other policy documents such as the Comprehensive Plan for HIV and AIDS Care, Management and Treatment, whilst other policies guidelines, such as the Essential Drug List (EDL), have been adapted to ensure their compatibility with the IMCI guidelines. Overall, there is evidence to suggest that IMCI has become institutionalised as a key component of PHC service delivery in SA.

Major achievements relating to the implementation of the IMCI strategy in SA are outlined below:

- ◆ Over three-quarters (76%) of PHC facilities nationally are now implementing IMCI, whilst 48% of PHC facilities have achieved the WHO target of having 60% of professional nurses working at the facility IMCI-trained. Provincial breakdowns are shown in figure 6.
- ◆ More than half (58%) of all districts are implementing the Household and Community component in at least one site.

IMCI incorporates prevention and health promotion as an integral part of care. Thus, it helps increase vaccination coverage and improve knowledge and home care practices for the under-5 years, subsequently contributing to growth and healthy development. It also reduces missed opportunities by offering earlier detection and treatment of diseases or conditions such as growth failure and anaemia that can escape the notice of both caregivers and health workers, with the consequent risk of the illness becoming worse and complications arising.

Figure 6:  
IMCI coverage by province, March 2006



Source: DoH, 2006.

During the initial phase of IMCI implementation, training of professional nurses working at PHC level was scaled-up relatively rapidly. The current rate of training is insufficient to achieve high coverage in the near future. Major constraints to scaling-up include the limited availability of trainers, the cost of training courses, and the need to take health professionals workers away from clinics for up to 11 days. Slow and piecemeal implementation restricts the potential effectiveness of IMCI and other child health delivery strategies.<sup>12</sup>

Whilst inclusion of IMCI in the pre-service training of both doctors and nurses was recognised as a key strategy for ensuring sustainability of IMCI implementation, progress in this regard was initially slow. However, a review of pre-service IMCI training undertaken in 2006, revealed that IMCI is being taught in approximately half of the country's medical schools and in most nursing colleges.<sup>b</sup> The South African Nursing College has decreed that training in IMCI should be included as a component of both pre-service and post-basic PHC training. IMCI has also been included in the training curriculum of other categories of health workers such as home based carers.

The South African IMCI guidelines have been adapted to include the diagnosis and management of HIV infection. Despite relatively low sensitivity (67%), the current HIV algorithm is relatively specific (82%),<sup>13</sup> and should provide opportunities for early identification of children with HIV at PHC level. This should facilitate early intervention at PHC level and referral to centres for care including provision of antiretroviral therapy when appropriate.

A number of health IMCI facility surveys that aim to measure the quality of IMCI implementation at facility level have been undertaken. Provincial departments are currently undertaking their own health facility surveys with support from the national DoH. Key findings from the IMCI Health Facility Surveys undertaken in 2001 and 2002 are shown in Box 3.<sup>14</sup>

<sup>b</sup> Personal communication Clara Mathosa, IMCI coordinator, DoH, 7th July 2006.

**Box 3:****Key findings from National Health Facility Surveys**

- ✦ Antibiotics were correctly prescribed to 74% (first National Health Facility Surveys [NHFS]) and 62% (second NHFS) of children who needed them.
- ✦ 88% and 83% of children not needing antibiotics left the facility without one.
- ✦ The first NHFS found that only 43% of children under the age of two were assessed for feeding, and only 37% of caregivers of children with low weight were counselled on feeding.
- ✦ During the second NHFS, 63% of children with low weight were correctly identified. Of those identified, 80% received correct counselling on feeding.

Source: DoH, UNICEF and WHO, 2001.<sup>14</sup>

Demonstrating the impact of IMCI on childhood mortality and morbidity is difficult, especially in the face of the HIV epidemic in SA. Likewise aggregated data on the number of visits to PHC facilities with specific childhood illnesses are difficult to interpret. Improvements in weighing rates and provision of Vitamin A to children at PHC level are encouraging to note – whilst these trends cannot easily be attributed directly to implementation of IMCI, there is no doubt that IMCI contributes towards and facilitates the provision of routine preventive measures during children visits to the health facilities.

The key challenges facing IMCI are to ensure that the gains in terms of coverage are maintained and expanded, and that the quality of implementation is sustained throughout the country.

High attrition rates amongst PHC staff, as well as rotation of staff, underscore the need for ongoing training of all levels of staff in IMCI. Supportive supervision and updating of staff have been identified as key strategies to ensure that the quality of IMCI implementation is maintained, but are difficult to implement where district management structures are absent or weak.

Despite progress in increasing the number of districts that are implementing the IMCI's household and community component of the strategy, coverage

remains relatively low. This is in line with international experience – a multi-country evaluation reported that “efforts to implement interventions at family and community levels have been too slow and widely dispersed to achieve even minimal coverage”.<sup>14,15</sup>

It would appear that many PHC nurses are not making use of the HIV algorithm with the result that opportunities for early identification and management of children with HIV are missed.<sup>13</sup> Research is currently underway in an effort to understand the barriers to correct identification and management of these children.

Implementation of IMCI has been an effective means of identifying and highlighting key capacity and other constraints at primary and district levels, but has been less effective in addressing and overcoming these obstacles.<sup>15</sup>

## INFECTIOUS DISEASES

More than two-thirds of under-5 year olds deaths in developing countries are infection-related. This statistic is equally true for SA, despite the profile and contribution of individual infections differing (e.g. HIV is much more important while diarrhoeal disease makes a smaller contribution). As such, substantial health gains can be achieved by reducing the impact of infectious diseases. This section uses the example of diarrhoeal disease to highlight approaches, achievements and ongoing challenges in the control of childhood infectious diseases in SA.

Diarrhoeal disease accounted for 10.2% of deaths in under-5 year old South African children in 2000.<sup>16</sup> A marked seasonal cycle is evident in diarrhoeal disease mortality rates for African and Coloureds with peaks occurring from December to March – the summer rainy season. No seasonal effect on mortality is evident in Whites and Indians.<sup>15</sup> Individual risk factors for diarrhoea in young children (<5 years) were identified by the 1998 SADHS.<sup>17</sup> All the proxies of hygienic living conditions, including quality of water, types of toilet facilities, and material of dwelling floor were associated with the risk of diarrhoea. Older maternal age (>28 years), higher maternal education (>Grade 6) and greater household wealth reduced the risk of diarrhoea. After adjusting for all confounding factors,

only three variables were significantly associated with the risk of diarrhoea – race, age of child, and province where resident. White children were 6.5 times less likely to experience diarrhoea compared to African and Coloured children. The risk of diarrhoea peaked at the age of 12-23 months (odds ratio=2.7, 95% CI 1.8-4.1). Living in KwaZulu-Natal or Mpumalanga significantly increased a child’s risk of diarrhoea (odds ratio=1.9, 95% CI 1.5-2.4).

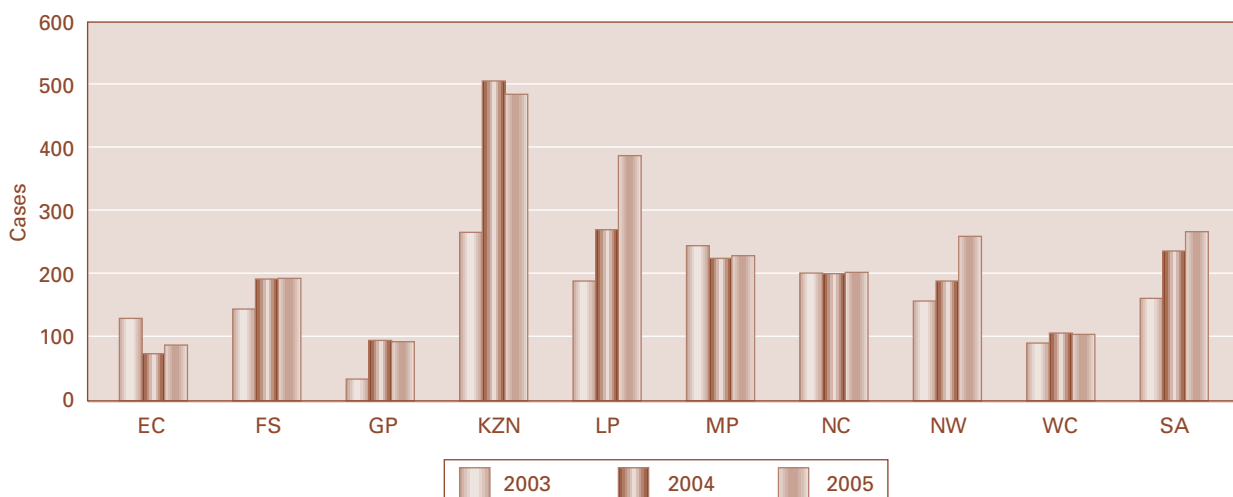
In the 2003 SADHS of children less than 5 years of age, 8% of mothers reported their children having diarrhoea in the previous two weeks compared to 13% in the 1998 survey.<sup>18</sup> Noteworthy is that this survey was conducted during low diarrhoeal disease months. DHIS data show that a quarter of all young children (250 children per 1 000) sought treatment for diarrhoea from PHC facilities in 2005 nationally (Figure 7). This indicates that the health department’s target of a 20% reduction in the incidence of diarrhoeal disease in children less than 5 years from 2001 to 2005,<sup>2</sup> has not been achieved.

In the 1980s and early 1990s many countries, including SA, implemented Control of Diarrhoeal Diseases (CDD) programmes. This vertical programme was phased out with the introduction of the IMCI strategy. Nevertheless, many of the programme components remain critical today. A review by Victora and others,<sup>19</sup> provides evidence that the CDD strategy, and

particularly oral rehydration therapy (ORT), influenced the outcome of dehydrating diarrhoea. Globally, use rates of oral rehydration salt solution (ORS) or recommended home fluids have reached 49%.<sup>18</sup> In the 2003 SADHS just under two-thirds (63%) of children were treated with some sort of ORT, with about 39% receiving ORS and a similar proportion (40%) receiving a home made solution.<sup>19</sup> The South African Paediatric Association (SAPA) has long advocated the use of Sorol, a pre-mixed sachet that can be added to a litre of water. ORS use did not differ significantly among provinces. Case studies show a dramatic reduction of diarrhoea mortality as ORT use rates increase. Data from Brazil and Egypt suggest that even relatively low ORT use rates can positively affect mortality, because ORT use tends to be much higher for severe illness.<sup>19</sup>

Human faeces are the primary source of diarrheal pathogens. Poor sanitation, lack of access to clean water, and inadequate personal hygiene are responsible for an estimated 90% of childhood diarrhoea.<sup>20</sup> These factors are often markers of socio-economic disadvantage. There have been significant improvements in water and sanitation structures in SA over the past decade. However, the 2001 South African census revealed extensive variations in living conditions. Over two thirds of households had formal homes, 16% were informal and 14% traditional. The census showed that the majority (85%) of households had access to piped

FIGURE 7:  
Diarrhoea incidence per 1 000 children < 5 years of age, South Africa, 2003-2005



Source: DHIS, DoH, May 2006.



water – whether it was in the home, the yard or a public facility. Fourteen per cent of households had no toilet facility. Just over half the households had regular refuse removal services.<sup>21</sup>

Because of the faecal-oral transmission of enteric pathogens, improving the supply of safe water and the ability to dispose of faecal waste safely are the best ways to reduce the burden of diarrhoeal morbidity and mortality. The South African government is committed to providing safe water to all by 2008 and adequate sanitation by 2010.<sup>22</sup> In addition, eradication of the bucket system is to be achieved by 2007. Over 27 million people already benefit from the government's Free Basic Water Policy that guarantees 6 000 litres at no cost to every household per month.<sup>23</sup> The sustainability of water and sanitation projects has been of concern in SA and internationally, i.e. the ability of communities to maintain and repair the facilities that have been constructed.

Preventive strategies – such as exclusive breastfeeding, improved complementary feeding, using micronutrient supplementation or fortification (e.g. zinc and vitamin A), and increasing coverage of the EPI vaccines (particularly measles vaccination) – are all useful and effective diarrhoeal disease control strategies.<sup>24</sup> A further challenge is to achieve high coverage and good practice in the health system with ORT and correct diarrhoea case management, including antimicrobial and nutrition interventions. Interventions to integrate health care through programmatic initiatives, such as the IMCI strategy, could be essential to ensure this high coverage. Some concern remains that in low-resource settings, targeted vertical programmes (such as control of diarrhoeal disease) may or have been abandoned, resulting in the failure to achieve the goals that they were established for (such as reduction of diarrhoeal disease).

Progress toward the development of other interventions, such as vaccines against rotavirus, *Shigella* (*an important cause of bloody diarrhoea*), and cholera is encouraging. Two new rotaviral vaccines (Rotateq™ and Rotarix™), both with excellent protective efficacy against severe disease and hospitalisation particularly, are now being marketed.<sup>25</sup> While these vaccines will soon be available to children in the private health sector, most South African children will have to wait for the manufacturers

to offer the vaccine at a price that is affordable to the public health sector.

## ANTENATAL CARE AND NEONATAL HEALTH

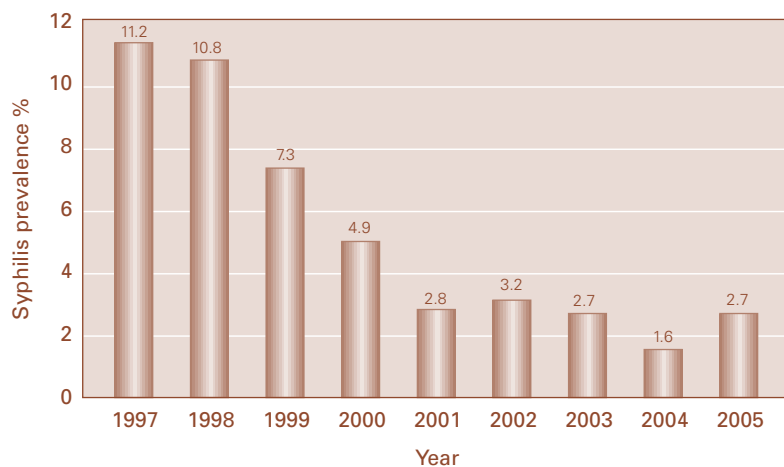
Globally, under-5 year old and infant (under-1 year) mortality rates have declined substantially in the past three decades. In spite of this overall decline, neonatal mortality levels have declined less readily and now make up 40% of all deaths in children under-5 years of age globally and more than half of infant mortality. Rates are highest in sub-Saharan Africa and Asia.<sup>26</sup> SA is no different, with over one-quarter of under-5 deaths occurring in neonates (aged  $\leq 28$  days).<sup>16</sup> To reduce child mortality further, the focus of many programmes will have to converge on reducing neonatal deaths, particularly those in the first week of life.

In South African settings, preterm deaths account for almost one-half of neonatal deaths, with perinatal asphyxia and infections (such as sepsis and pneumonia) being responsible for a further 30% and 15% of deaths, respectively. Congenital abnormalities account for the final 10% of deaths.<sup>27</sup> The large urban-rural, private-public and racial inequities in the availability of child health resources are most profound for neonatal care. The serious lack of neonatal intensive- and high-care facilities in rural and distant settings partially explains the lack of improvement in national neonatal mortality rates. Other indirect causes of perinatal and neonatal death include inability to recognise severe illness in a newborn and poor care-seeking behaviour by caregivers.<sup>28</sup>

Prevention of many neonatal disorders depends on the adequate delivery of antenatal and peripartum care. A sentinel marker of the delivery of antenatal services is the number of pregnant women who have been tested for syphilis.

This indicator has only recently been introduced to the National Indicator Data set; 2005 data from four provinces (Free State, KwaZulu-Natal, Mpumalanga and Northern Cape indicate monthly annualised coverage rates between 67 and 94%. Simple, inexpensive on site methods of screening for syphilis are available and full antenatal testing coverage is an achievable goal. The 2005 national antenatal survey found a syphilis

FIGURE 8:  
Antenatal syphilis prevalence, South Africa, 1997-2005



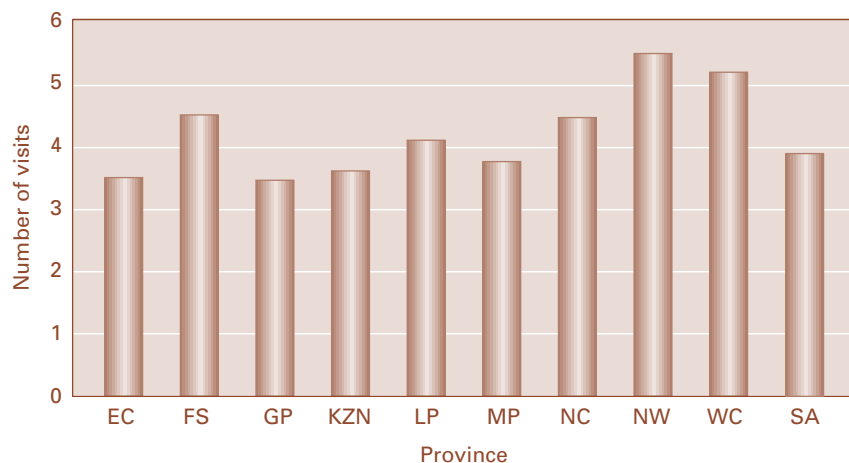
Source: DoH, 2006.<sup>17</sup>

prevalence rate of 2.7%.<sup>29</sup> While the prevalence rate has fluctuated between 1.6-3.2% between 2001 and 2005, this represents a significant decline compared to the preceding five years (e.g. the seroprevalence rate was 11.2% in 1997) (Figure 8). This decline may be attributed to a number of intervention activities and in particular the syndromic management of sexually transmitted infections at public health facilities. The validity of this data are confirmed by the reduction in number of cases of congenital syphilis notified in the same period (Table 1).

It has been recommended that each pregnant woman have at least four antenatal visits. DHIS data suggest that this target is being achieved (Figure 9).

Although clinical screening of all neonates is widely believed to be worthwhile, the evidence base is weak and the precise content and nature of the procedures used need further study. There has been no South African research on this topic. This is particularly pertinent since in most settings mothers are discharged within six hours of delivery, leaving little time for a proper screen and few opportunities to use this service as a health promoting exercise (i.e. to provide anticipatory guidance).

FIGURE 9:  
Antenatal visits per client, South Africa, 2005



Source: DHIS, DoH, May 2006.



Identification of problem areas through a computer-based Perinatal Problem Identification Programme (PPIP) at sentinel sites; provider education through the Perinatal Education Programme and neonatal resuscitation training; and the promotion of the Baby-Friendly Hospital Initiative (BFHI) and 'Kangaroo Mother Care (KMC) units' are interventions aimed at improving neonatal health. Prevention of mother-to-child transmission of HIV activities have also focused on the perinatal period.

The Baby Friendly Hospital Initiative launched in 1991 by UNICEF and WHO aims to improve breastfeeding practices at birthing centres. A maternity facility can be designated 'baby-friendly' once it has implemented ten specific steps to support successful breastfeeding. There are over 15 000 'baby-friendly' hospitals and clinics globally. There has been a doubling of such facilities in SA since 2003 with 178 centres certified as BFHI by September 2005.<sup>30,c</sup> This represents 37% of all birthing centres in the country.

The KMC initiative is gaining popularity country-wide. This programme, focusing on preterm and low birth weight babies, aims to prevent the separation of mother and baby in the first few weeks after birth, and thereby improve outcomes. The mother swaddles her baby directly to her chest for most of the day and night, providing warmth, nutrition and comfort. The benefits for the baby include lower mortality, fewer infections, better weight gain and earlier discharge from hospital.<sup>30-32</sup> A local study has shown that KMC can be implemented at all levels of care.<sup>33</sup> Its implementation is supported in principle by the national and provincial health departments. There are no available data on the number of such units countrywide.

The PMTCT programme, which started in 2001, is available in more than 3 064 public hospitals and community health centres throughout the country.<sup>34</sup> Services offered by the programme include voluntary counselling and testing for HIV; advice on infant feeding, including the use of milk formula, and continuous counselling, education and support for 18 to 24 months for mothers. The PMTCT programme had 75% geographical access coverage with 55% uptake by HIV-positive pregnant women in 2004.<sup>34</sup> Data

from the national PMTCT programme indicate that the HIV transmission rate among the 55% of children participating and followed to 12 months of age was 18%, pointing to a  $\pm 28\%$  reduction in mother-to-child transmission (MTCT) of HIV.<sup>35</sup>

Each year, about 60 million mothers in the developing world give birth at home without a skilled person to help.<sup>36</sup> In SA, it is estimated that less than 8% of births occur at home.<sup>18</sup> Thus, training of traditional birth attendants probably has limited benefits in SA. However, the role of a community health promoter is increasingly being recognised globally, and the creation of this cadre of health worker could have an important role in neonatal health promotion. Her / his role would include evaluation of knowledge, attitudes and beliefs regarding neonatal health among family members and the implementation of a package of simple practices for the routine postpartum care of neonates in the community. These could include proper thermal control; promotion of early and exclusive breastfeeding; optimal skin and hygienic cord care; monitoring for jaundice and signs of sepsis; and promotion of immunisation.

## DEVELOPMENTAL SCREENING

Despite international consensus about the importance of monitoring children's development, there has been little consensus on when such monitoring should be performed, what form it should take and the tool(s) needed. The favoured method for developmental monitoring in many developing countries, including SA, is developmental screening.<sup>37</sup> This involves the detection of disability in apparently healthy children within the primary health care setting, usually during immunisation visits. The tests check on developmental milestones such as sitting, standing, crawling, walking, talking and handling objects. The child's vision and hearing ability is also checked. Children are thereafter separated into high and low risk groups. If there is a problem, the child is referred to a specialist clinic or a rehabilitation professional, such as a physiotherapist, depending on the problem and the needs of the child.

c Personal communication, S. Mabasa, Department of Health, 21 July 2006.

Developmental screening has been conducted in an ad hoc manner, using non-standardised and non-validated instruments, in many primary care settings for many years.<sup>38</sup> Development screening is not viewed as a priority child health service in the country and supporting guidelines and training material are lacking. Thus, for example, an instruction was circulated in 1993 to the provinces from the national DoH stating that developmental screening should be undertaken in newborns, at 3, 6, 9, 12, 15 and 18 months, and also at 3 and 5 years, without providing any guidelines for screening or referrals.<sup>37</sup>

In 1996, at a national workshop on developmental screening, consensus was reached that screening for moderate and severe disability should be carried out as part of comprehensive PHC service delivery.<sup>38</sup> In 1999, a developmental screening programme was adopted as formal policy by the Western Cape DoH and the province has been providing developmental screening through PHC clinics.<sup>38</sup> Other provinces have been reticent to follow suit based on concerns that their PHC services were not sufficiently developed to support such a programme.

Despite enthusiasm by health workers for the introduction of developmental screening in the Western Cape, and strong support from the provincial authority with protocol and guideline development, and with health worker training during the introductory phase, the implementation of the programme was only moderately successful. Deficiencies identified during a formal evaluation of the programme included:<sup>38</sup>

- ◆ Few children with developmental disability were identified and accessible intervention remained a problem.
- ◆ Almost a quarter of facilities were not delivering any developmental screening.
- ◆ Only one of nine facilities evaluated conducted screening according to protocol.
- ◆ Findings were not always recorded appropriately, neither were they transcribed to the Road-to-Health Card.
- ◆ Referrals patterns often did not follow protocol, e.g. 30% of children were still referred directly to tertiary level. Standard referral forms were often not used.

- ◆ There was inadequate monitoring of the programme.

Barriers to implementing developmental screening include: nurses' heavy workloads, lack of facilities and human resources for the management of children with developmental disability, particularly at a PHC level.<sup>39</sup> In provinces where immunisation coverage is below target, developmental screening is viewed as a 'luxury' and its delivery has not been addressed.<sup>38</sup>

## OTHER PROGRAMMES

There are a host of other child health promoting and disease prevention activities that are being undertaken in the country. These range from growth and nutrition promotion to child abuse prevention. In an attempt to be inclusive, two of these are briefly summarised below.

## ACCIDENTS AND INJURIES

Daily, children are exposed to environmental hazards that lead to injury and death. Accidents and injuries including poisoning are the foremost cause of mortality in children over five years of age in SA.<sup>16</sup> About ten children under the age of 15 die from accidents and injuries daily. In the 1 to 4 year-old age group, trauma-related injuries account for 25% of deaths and in the 5 to 19 year-old group, 60%. International and South African research confirms that children living in low-income settings are more likely to be injured.<sup>39</sup>

Road traffic accidents account for a third of deaths in the 5-9 year age group. Children are rarely the cause of road traffic accidents but suffer as pedestrians, cyclists and passengers. Much of this mortality is preventable; environmental hazards such as lack of pavements, pedestrian crossings and poor lighting; poor driver education and vehicle maintenance; and lack of law enforcement being the most easily identifiable hazards. Recent interventions include the 'Drive Alive' campaign and the use of reflector material by children to increase child visibility. Two million reflector bands were recently distributed to children across South Africa by the Soul Buddyz programme.<sup>40</sup>

Paraffin is a fuel commonly used for cooking, lighting and warmth in poorer households. It is accidentally



ingested by an estimated 20 000 children each year. Poisoning rises steeply during the summer months when children are thirsty. Simple interventions such as child resistant safety caps on paraffin bottles can effectively decrease ingestion rates (by 47%),<sup>41</sup> and are cost-effective,<sup>42</sup> but are not widely used because of cost constraints.

Various child safety educational campaigns have been developed to educate the public, including schoolchildren, about safe behaviour and the prevention of childhood injuries. Organisations such as the Child Accident Prevention Foundation of Southern Africa (CAPFSA), the Medical Research Council (MRC), the Paraffin Safety Association and emergency services have initiated programmes to increase injury awareness and prevention.<sup>43</sup> Safe housing and improved housing standards, fire-breaks between informal dwellings, access to water, etc. could all significantly reduce childhood injuries. Examples of legislation currently in place to protect children from injury include mandatory use of seatbelts, specifications for child restraints in motor vehicles, firearms control and South African Bureau of Standards specific mandatory regulations for many products.<sup>43</sup>

## ORAL HEALTH

The 1999-2002 National Children's Oral Health Survey reveals a picture of widespread and high (31-60%) caries levels across the different provinces and age groups, much of which is untreated.<sup>44</sup> Just under 40% of the 6-year old children were caries free, which is below the goal of 50% set by the DoH for the year 2000. Based on the Unmet Treatment Need Index more than 80% of caries in children is not treated.<sup>45</sup>

The prevalence of carious permanent and primary teeth is expressed by the decayed, missing, and filled teeth (DMFT) index. A positive finding was that the DMFT for the 12-year old group decreased from 2.5 in 1982 to 1.1, which was below the 1.5 target set by the DoH for this group for 2000. SA has re-set its goals for dental caries for 2010 for 6- and 12-year olds including that 50% or more of 5 to 6-year olds should be caries free, and that average DMFT by 12 years of age should not exceed 1.5.<sup>46</sup>

Over 20% of the 12-year olds in the 1999-2002 National Children's Oral Health Survey presented with definite signs of dental fluorosis (the white 'mottled' appearance seen in permanent teeth in cases where excessive amounts of fluoride were ingested while the teeth were still forming). Nevertheless, the evidence for water fluoridation is strong. Although legislation for the implementation of water fluoridation was gazetted in 2000; owing to capital costs, controversy surrounding water fluoridation, and lack of infrastructure and capacity in SA, the process of fluoridating public water supplies has yet to begin.

## CONCLUSIONS

There have been impressive improvements in the delivery of some interventions – meeting the 90% full immunisation coverage goal for under-1 year olds, extension of IMCI services to all districts in the country and continued decline in the rates of many notifiable diseases. Other activities have shown modest gains such as the number of birthing centres certified as being 'baby-friendly' in the country and caregiver's use of oral rehydration therapy, while there is lack of adequate progress for example in implementation of developmental screening and the PMTCT of HIV.

Although the evidence is incomplete, four important themes emerge from this review. Firstly, the majority of constraints identified in the delivery of health promoting and disease prevention programmes are systemic (relating to the health system) rather than programme-specific in nature. Failure to achieve targets in most instances is less the result of problems with the individual programme / strategy itself than of the multiple constraints and barriers within broader health care provision. Health system constraints extend well beyond the area of child health and cannot be addressed, by themselves, by DoH staff working on programmes such as IMCI. Systemic factors including the restructuring of the health services, referral systems, staff and capacity issues, training and continuing professional development, and challenges with monitoring and health information systems have all been cited as constraints in the delivery of health promotion programmes.

Secondly, the current emphasis on curative care has significantly detracted from the provision of preventive services, including immunisation, growth promotion and developmental screening. This is evident from both the stagnation in measles immunisation coverage as well as the limited delivery of preventive services.

Thirdly, health facility-related factors play a role in limiting the efficient delivery of services, such as immunisation at a PHC level. Although the provision of dedicated services at dedicated times by dedicated staff is contrary to the 'one stop shop' philosophy of the DoH, this approach contributes positively to the delivery of quality services, including developmental screening.<sup>38</sup> At least two local studies, have shown that some activities (such as immunisations and developmental screening) were better organised and ran more smoothly when dedicated health workers carried out these services at set times rather than when they were simultaneously providing a range of other services.<sup>38,46</sup> Children received superior and more prompt care when they were attended to by a dedicated health worker. Strong sub-district and facility management infrastructure and a strong physical infrastructure (including a child-friendly environment) have a positive effect on service delivery.<sup>38,47</sup>

Finally, there are sound arguments for providing a universal or core programme of preventive and promotive health care, accessible to every child. The content of this core in a South African setting has yet to be defined, but would likely include neonatal screening, immunisation, growth monitoring, oral hygiene, hearing and vision screening, cognitive development and IMCI services. Health care programmes outside the structure of the core programme could be targeted according to need. Ultimately, what is required is greatly expanded capacity at service-delivery level, combined at all levels with the necessary will, stamina, and appropriate incentives and resources.

## RECOMMENDATIONS

### GENERAL

- ◆ Provincial and district health authorities should actively develop plans on how best to discharge their responsibility for the provision of health care to all children resident within their catchment areas and make these explicit.
- ◆ Resources will always be insufficient to do all that is possible; therefore health promotion activities such as screening, surveillance and community (family) support should be prioritised based on effectiveness, where possible. Better tools to support policy and decision makers in estimating the costs and impact of their choices should be developed.
- ◆ Combined delivery and technical integration of interventions can lead to greater efficiency, increasing cost-effectiveness and potential effectiveness through synergies between interventions. Improved integration of child health and reproductive health services is likely to help to increase effectiveness and should be practised.
- ◆ Services should be planned to improve equity of provision and the reduction of inequalities in health. There is good evidence that the inverse care law applies in preventive health care. Resources should be allocated according to equity principles; thus, poorer or less-resourced districts should receive more resources.
- ◆ Alternative delivery strategies need to be assessed. An issue that has not received sufficient attention is whether achieving high coverage with a few selected interventions is more efficient than reaching inadequate coverage with several interventions. Often, the same children receive several interventions while others fail to receive any. Innovative delivery strategies must make sense within local epidemiological, health system, and cultural contexts.
- ◆ The provision of quality care depends on recruitment and retention of well-trained staff, continuing professional development, strong leadership and adequate supporting services. Continued capacity development and support is particularly pertinent considering the rapid staff turnover and rotation of staff through the PHC services.



- ◆ Problems with the referral system, including the lack of standardised referral protocols and feedback between levels of care warrant intervention. Referrals of children identified with problems such as developmental disabilities or failure to thrive is hindered by the lack of resources for further assessment and / or intervention, together with transportation problems. These issues should be addressed.
- ◆ Systems need to be in place to monitor, on an ongoing basis, the implementation and outcomes of some of these programmes (such as IMCI or developmental screening). Further, there should be a plan for using information to undertake audits and monitoring of activities and outcomes, particularly at a local level (such as immunisation rates). This recommendation is one that is often made in programme reviews, but remains largely neglected. Health managers, therefore, lack a comprehensive picture of child health interventions across the province or within the various health regions and districts. Moreover, as routine (monthly report) data are often meaningless and as targets have not been set, there is little accountability on the part of health workers in the delivery of the programmes.
- ◆ Some effort at combating the small but vocal anti-vaccination lobby's distorted messages through targeted health promotion activities (e.g. targeting wealthier suburbs or crèches, or particular religious, cultural and culinary groups – such as vegetarians).

#### IMCI

- ◆ Emphasis must be placed on maintaining high levels of IMCI coverage. This will require ensuring that all health workers receive training in IMCI at the pre-service level, and that training capacity at provincial and district levels is developed and maintained.
- ◆ Regular updating and supervision of IMCI trained practitioners' needs to be addressed.
- ◆ Barriers to use of the adapted guidelines which facilitate the identification and management of HIV affected children need to be identified and addressed.
- ◆ The Household and Community component requires further investment and strengthening.

#### DIARRHOEAL DISEASE

- ◆ Communities should hold government accountable for its water and sanitation provision promises. Public accountability at all levels can bring delivery bottlenecks to the attention of all, and encourage rapid action to address them.
- ◆ Promotion and use of diarrhoea severity reducing actions, such as zinc supplementation and promotion of feeding (during diarrhoeal episodes) at health centres deserve attention.

#### NEONATAL HEALTH

- ◆ Priority antenatal interventions include efficient screening for syphilis and HIV.
- ◆ Training of health workers in neonatal resuscitation could reduce subsequent mortality and morbidity.
- ◆ Improvements in basic neonatal care delivery (such as promotion of exclusive breastfeeding, early detection of jaundice and prevention of nosocomial sepsis) are needed.

## SPECIFIC

### IMMUNISATION

- ◆ Increasing uptake at one-year to >90% will require the implementation of innovative strategies such as offering immunisation services at weekends or after-hours services at clinics, greater use of mobile outreach services, encouraging family practitioner and paediatrician participation in vaccine administration and ensuring availability of vaccines at hospitals (to allow immediate catch-up for unvaccinated sick children).
- ◆ Minimising missed opportunities requires training of health workers about false contraindications. Technology-based solutions such as the Mindset network that offers satellite based, 'on-tap' educational services in the users' immediate environment at more than 110 of the most rural or distant clinics and hospitals in South Africa offers attractive opportunities.<sup>49</sup>

- ◆ Research on the role of community child (or specifically neonatal) health promoters is warranted in the local setting, based on international experience.

#### DEVELOPMENTAL SCREENING

- ◆ Community and parent awareness of the benefits of developmental screening, and early identification and intervention are necessary.
- ◆ Guidelines on the various procedures, role of various health professionals and referral mechanisms must be developed to assist with implementation.
- ◆ Training mechanisms need to be clarified i.e. who should provide ongoing training and support for developmental screening and in what way.
- ◆ Referral pathways in each district and region, together with supportive services at the next level are vital for the success of this programme.
- ◆ Regular monitoring and evaluation is particularly important for developmental screening.
- ◆ The benefits of developmental screening in the country need to be defined. On-going research about the ability of health professionals to successfully perform this task and identify deficiencies, referral mechanisms, follow-up and long-term outcomes of children identified with developmental disability are necessary.

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