Appendix 1 Malnutrition

Malnutrition affects large numbers of South African children. It contributes substantially to the burden of childhood disease. It is both a direct cause of mortality in children and an underlying synergistic factor in other major causes of death such as pneumonia, diarrhoea and HIV/AIDS. Furthermore, maternal malnutrition is an important cause of low birth weight and related perinatal problems, another major childhood disease burden.

Prevalence

The National Food Consumption Survey[1] found that nearly one out of five South African children are stunted (height for age that is less than the international reference value by more than 2 standard deviations). Stunting indicates long-standing dietary inadequacy. It remains by far the most common nutritional disorder in the country. On commercial farms nearly one in three children are stunted, while in tribal rural areas one in four children are affected.

Table: The anthropometric status of children aged 1 – 9 years nationally and by area of residence: South Africa 1999[2]

Anthropometric parameter	Area of Residence						
	Com/rcial Farms	Formal Urban	Informal Urban	Tribal	Urban	Rural	RSA
Number (n)	288	1019	290	1016	1309	1304	2613
% H/A < - 2SDs	30.6 25.2-35.9*	16.0 13.7-18.3	19.3 14.7-23.9	25.3 22.6-28.0	16.7 14.7-18.8	26.5 24.1-28.9	21.6 20.0-23.2
% W/A < - 2SDs	18.1 13.5-22.5	7.8 6.1-9.4	7.6 4.5-10.7	11.3 9.4-13.3	7.7 6.3-9.2	12.8 11.0-14.6	10.3 9.1-11.4
% W/H < - 2SDs	4.2 1.8-6.5	2.6 1.6-3.5	2.1 0.4-3.7	5.1 3.8-6.5	2.4 1.6-3.3	4.9 3.7-6.1	3.7 3.0-4.4
% H/A < - 3 SDs	12.5 8.7-16.3	4.9 3.6-6.2	3.8 1.6-6.0	7.2 5.6-8.8	4.7 3.5-5.8	8.4 6.9-9.9	6.5 5.6-7.5
% W/A < - 3SDs	4.9 2.4-7.4	1.1 0.4-1.7	1.0 0.0-2.2	0.9 0.3-1.5	1.1 0.5-1.6	1.8 1.0-2.5	1.4 1.0-1.9
% W/H < - 3SDs	1.4 0.0-2.7	0.5 0.0-0.9	0.0 0.0-0.0	1.3 0.6-2.0	0.4 0.0-0.7	1.3 0.7-1.9	0.8 0.5-1.2
% W/H > + 2SDs	2.4 0.6-4.2	8.1 6.5-9.8	5.9 3.1-8.6	4.9 3.6-6.3	7.6 6.2-9.1	4.4 3.3-5.5	6.0 5.1-6.9

* Confidence interval

The children least affected by stunting (17%) were those living in urban areas. Here stunting disproportionately affects children living in informal urban areas (20%) in comparison with those living in formal urban areas (16%).

[1] SA Health Info. *The National Food Consumption Survey (NFCS): Children aged 1-9 years, South Africa, 1999.* http://www.sahealthinfo.org/nutrition/foodconsumption.htm [accessecd 18 January 2007]
[2] SA Health Info. *The National Food Consumption Survey (NFCS): Children aged 1-9 years, South Africa, 1999.* [tables]. http://www.sahealthinfo.org/nutrition/food4tables1-30.pdf. [accessed 18 January 24, 2007]

Severe stunting (height for age that is less than the international reference value by more than 3 standard deviations) affects 6.5% of South African children. As with stunting, severe stunting was also higher in children living on commercial farms (12.5%), rural (8%) and tribal (7%) areas when compared to the national average (6.5%), (Table 4.1).

A similar pattern emerged for the prevalence of underweight (weight-for-age that is less than the international reference value by more than 2 standard deviations), with one out of ten children being affected at the national level (Figure 4.1; Table 4.1). Nationally, less than 1.5% of children were severely underweight (W/A = < - 3SDs), except on commercial farms where the prevalence was 5% (Table 4.1).

Wasting (weight-for-height that is less than the international reference value by more than 2 standard deviations) reflects acute malnutrition. Wasting was less prevalent, affecting one out of twenty children living in rural and in tribal areas as well as on commercial farms. Severe wasting (W/H = < - 3SDs) affected fewer than 1% of children at the national level.

By contrast, the prevalence of overweight (weight-for-age more than 2 standard deviasions above the international reference value) was higher (7.5%) in the urban areas (Figure 4.2; Table 4.1) than the national average (6%) and this was true for children living in the formal urban areas. The lowest prevalence of children being overweight was found on commercial farms (2.5%).

Although the Western Cape is relatively well off in the South African context, the survey found that 15 percent of Western Cape children were stunted.[3]

In a cross-sectional study of micronutrient status in urban infants in disadvantaged urban black and 'coloured' communities in the Western Cape, [4] Oelofse and others found that stunting and underweight were more prevalent in coloured infants (18% and 7%, respectively) than in black infants (8% and 2%, respectively). The dietary intake of micronutrients, however, was in general lower in black infants than in coloured infants.

Anaemia was prevalent in 64% of coloured and 83% of black infants. Iron-deficiency anaemia was found in 32% of coloured infants and in 46% of black infants. Zinc deficiency was prevalent in 35% and 33% of the coloured and black infants, respectively. Marginal vitamin A deficiency was observed in 23% of black infants compared with 2% of coloured infants. Overall 42% of black infants and 6% of coloured infants were deficient in two or more micronutrients.

The overall psychomotor development, assessed by the Denver Developmental Screening Test, was different between the two groups. The coloured infants scored higher in three out of the four categories as well as in their overall score.

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[3] Department of Human Nutrition, University of Stellenbosch. *The National Food Consumption Survey: Children Aged 1-9 Years in South Africa. 1999.* http://academic.sun.ac.za/nutrition/nfcs.html [accessed 12 January 2007]

[4] Oelofse A, Van Raaij JM, Benade AJ, Dhansay MA, Tolboom JJ, Hautvast JG. Disadvantaged black and coloured infants in two urban communities in the Western Cape, South Africa differ in micronutrient status. *Public Health Nutr.* 2002 Apr;5(2):289-94.

This study shows that information on the micronutrient status, independent of wasting and stunting, is necessary to design nutrition programmes for different communities.

Malnutrition and child morbidity and mortality

Malnutrition adds to child morbidity and mortality both through its direct, non-synergistic effects and through its synergistic effects on mortality from infectious disease.

Direct non-synergistic effect

Globally deaths directly attributable to nutritional deficiencies are estimated to be about 300,000 of total under five deaths (approximately 3% of total deaths in children under five).5

Synergistic effects

The contribution of malnutrition to child deaths through its synergy with infectious disease particularly childhood diarrhea and acute respiratory illnesses is far greater than its non-synergistic effects. Nemer and colleagues summarized the evidence for this in a WHO Working Paper ([6]). Pelletier and colleagues (1994) estimated that malnutrition contributes to about half of all deaths among children in poor countries, where most child deaths are due to infectious diseases. Pelletier's estimate is based on eight prospective studies which showed a remarkable consistency in relative risk across different grades of malnutrition[7]. The risk of death is increased even with mild and moderate malnutrition, and not just the most severe cases. The mean and standard error of relative risk for death was 8.4 ± 2.1 for severe malnutrition, 4.6 ± 0.9 for moderate malnutrition, and 2.5 ± 0.3 for mild malnutrition.

Mason and colleagues, who estimated the burden of disease attributable to malnutrition with data from 55 studies on relative risk of mortality as a function of the standard deviation of nutritional status, calculated that burden of disease attributable to malnutrition and its effects in children in Sub-Saharan Africa is 33%.

Such estimates suggest that substantial health gains are possible if the nutritional status of children could be improved.

Malnutrition and HIV/AIDS

The contribution of malnutrition to HIV/AIDS deaths is an emerging area of research. While nutritional status appears to affect HIV-related disease progression and mortality, current understanding of the potential impact of nutritional interventions is incomplete.

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[5] Nemer LE, Gelband H, Jha P. The Evidence Base for Interventions to Reduce Malnutrition in Children Under Five and School-age Children in Low and Middle-Income Countries. CMH Working Paper Series WG5:11. WHO, Geneva. June 5, 2001.] (pp 9-10).

[6] Nemer LE, Gelband H, Jha P. The Evidence Base for Interventions to Reduce Malnutrition in Children Under Five and School-age Children in Low and Middle-Income Countries. CMH Working Paper Series WG5:11. WHO, Geneva. June 5, 2001.]

[7] Pelletier DL, Frongillo EA, Jr., Schroeder DG, Habicht JP. A Methodology for Estimating the Contribution of Malnutrition to Child Mortality in Developing Countries. J Nutr 1994; 124(10 Suppl) :2106S-2122S. [Cited in: Nemer LE, Gelband H, Jha P. *The Evidence Base for Interventions to Reduce Malnutrition in Children Under Five and School-age Children in Low and Middle-Income Countries.* CMH Working Paper Series WG5:11. WHO, Geneva. June 5, 2001.]

Piwoz (2004) summarized the evidence in a recent brief prepared for USAID.[8] The salient points in the brief are listed below.

- HIV infection increases energy requirements through increases in resting energy expenditure[9], reduced food intake, nutrient malabsorption and loss, and metabolic alterations that lead to weight loss and wasting. Asymptomatic HIV-positive individuals need 10% more energy than HIV-negative individuals of the same age, sex and physical activity. The needs of symptomatic individuals are 20 to 30% above normal.
- Micronutrient deficiencies may contribute to disease progression, but more studies are needed in this field.
- Both HIV exposure and HIV infection exacerbate child malnutrition. Children living with HIV or born into families affected by HIV are a high-risk group with special needs. HIV-positive women have a higher incidence of preterm and low birth weight deliveries, and, as a result, HIV-exposed infants may start life with impaired nutrition.37-38 HIV-positive infants experience slower growth and are at greater risk of severe malnutrition.39-40 Studies show that severe malnutrition in HIV-positive children can be reversed with hospital and home-based therapeutic feeding, though the time to recovery is longer than with uninfected children.41 Studies also indicate that periodic vitamin A supplementation reduces morbidity and mortality in HIV-positive children and improves their growth. 42-44

An earlier review by Piwoz and Preble (2000) examined preliminary evidence that improving nutrition status may improve some HIV-related outcomes. Early longitudinal observational studies found that low blood levels of several nutrients, and low hemoglobin, were associated with faster HIV disease progression and reduced survival after controlling for various conditions such as antiretrovirals use, dietary intake, and CD4 cell count, an indicator of HIV disease progression (7).

Several other reviews examine the role of micronutrients in HIV disease progression and mortality (8-12). These reviews concluded that “micronutrient deficiencies associated with HIV vary across populations according to disease stage, are associated with an accelerated progression of HIV infection to AIDS and are predictive of AIDS-related mortality”.

This review by Piwoz and Preble suggests a vicious cycle where HIV affects nutritional status while nutritional status in turn affects HIV-related disease progression and mortality. Improving nutrition status (particularly of the key nutrients reported here) may improve some HIVrelated outcomes. The benefits of nutrition interventions are likely to be greatest early on – to reverse underlying deficiencies and to prevent nutritional depletion. Once metabolic abnormalities are playing a leading role, the impact of nutritional intervention is likely to be limited (7).

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[8] Piwoz E. *Nutrition and HIV/AIDS: Evidence, gaps, and priority actions.* USAID, April 2004. www.fantaproject.org/downloads/pdfs/SARA_Nutrition&HIVbrief.pdf (Accessed 13 April 2004.)

[9] Batterham MJ. Investigating heterogeneity in studies of resting energy expenditure in persons with HIV/AIDS: a meta-analysis. American Journal of Clinical Nutrition, 2005, 81(3): 702-13. www.ajcn.org/cgi/content/full/81/3/702 [accessed 13 January 2007]

Piwoz and Preble found that results from micronutrient supplementation trials are mixed. The role of specific micronutrients in HIV progression and mortality are summarized in table 2:

Determinants of childhood malnutrition

Malnutrition is the result of interrelated factors that range from immediate causes (inadequate dietary intake and disease) through underlying causes at the level of the household and family; the community; and health and environmental conditions and services to more basic upstream causes operating at societal level. [see diagram 1 for details of this conceptual framework.] [more text from Milla]

Immediate, proximal determinants

Inadequate dietary intake and household food consumption

The 1999 National Food Consumption Survey in children aged 1 – 9 years showed that the mean energy intake of children in all Provinces, including the Western Cape was below that recommended for age.10

Within households the food security of young children often depends on power relationships in the house, and on the status of the women in particular. This may also happen if there are a large number of people in the house and small children have to fend for themselves at meals.

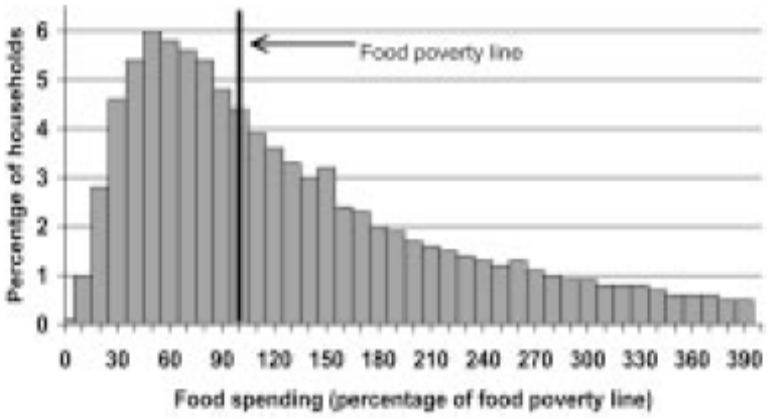
Food intake also depends on infant and child feeding practices. Growth faltering frequently arises during the weaning period. Parents may not know that young children need frequent feeding to meet their energy requirements. Additionally, foods given to young children may not be sufficiently energy-dense; consequently a long-term energy deficit may occur. This situation may arise when the mother or caregiver does not have enough time to give frequent feeds or lacks knowledge of infant and child feeding practices. Moreover, correct micronutrient content of food is also essential for the well-being and development of the child.[11]

Food poverty

The concept of *food poverty* provides a quantitative, objective tool to measure food insecurity [12]. A survey carried out in October 1995 showed that households representing 43 percent of South Africans live in food poverty. Almost a quarter (23,9%) of households in the Western Cape live in food poverty [12].

[10] Vitamin Information Centre. *National Food Consumption Survey in children aged 1 – 9 years: South Africa 1999.* Labadarios D (Ed) et. al. Stellenboosch.
[11] Steyn NP, Labadarios D, Huskisson J. *Chapter 1: General Introduction.* Technical Report. National Food Consumption Survey (NFCS): Children aged 1-9 years, South Africa, 1999.
[12] Rose D, Charlton KE. Prevalence of household food poverty in South Africa: results from a large, nationally representative survey. Public Health Nutrition 2001;5(3):383-389.

Figure 1 shows the distribution of South African households in relation to food spending as a percentage of the food poverty line in 1995.



Source: Rose & Charlton

Inadequate care for women and children

Factors that may impact adversely on the care of women and children include women's workload and time constraints; insufficient access to information about breastfeeding and infant feeding practices; and the status of women in households, families, relationships and communities, in particular their status in making autonomous decisions regarding their children.

Maternal and child care practices

Breast Feeding

Early initiation, degree of exclusivity and duration of breast feeding are among the most important child care practices affecting infant and young child health and nutrition. Exclusive breast feeding in the first 4 – 6 months of life provides optimal nutrition and protection.

The 1998 Demographic and Health Survey found that the median duration of breastfeeding in South Africa varies between 10 months in the Western Cape to 20 months in the Northern Province. The other provinces show a median duration of about 14-17 months. The Western Cape therefore has the shortest median duration of breast feeding.

The duration of breastfeeding varies widely according to population group. The longest durations occur among children whose mothers are African (17 months) or coloured (11 months). Asian and white mothers breast feed for shorter periods with median durations of 5 months and less than 1 month, respectively.[13]

Breastfeeding duration in South Africa does not vary consistently with education level of the mother, and ranges between 15-17 months for all levels of education. The one exception occurs among mothers who have higher than Std.10 education, whose median duration of breastfeeding is 7 months.

[13] www.doh.gov.za/facts/1998/sadhs98/chapter8.pdf

More distal determinants

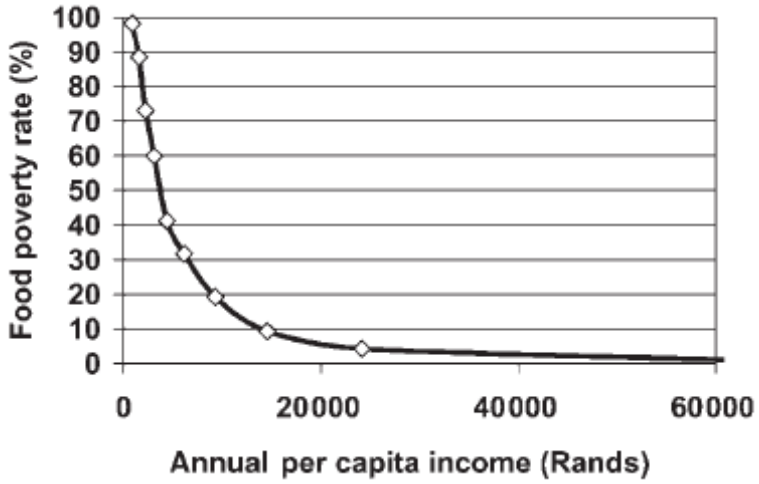
Soco-economic status

Socio-economic status is a powerful determinant of the distribution of malnutrition in South Africa. Both household food poverty rates and the prevalence of stunting and underweight among children vary strongly according to socio-economic status.

As already mentioned, food poverty is an objective measure of food insecurity. A household is in food poverty when the amount of money it spends on food is inadequate to purchase a basic, nutritionally adequate diet.

Rose and Charlton looked at food poverty in relation to per capita income in a large nationally representative survey [12]. They found that food poverty varies inversely with per capita income, rising steeply with per capita incomes below 20 000 Rands per annum (figure 2).

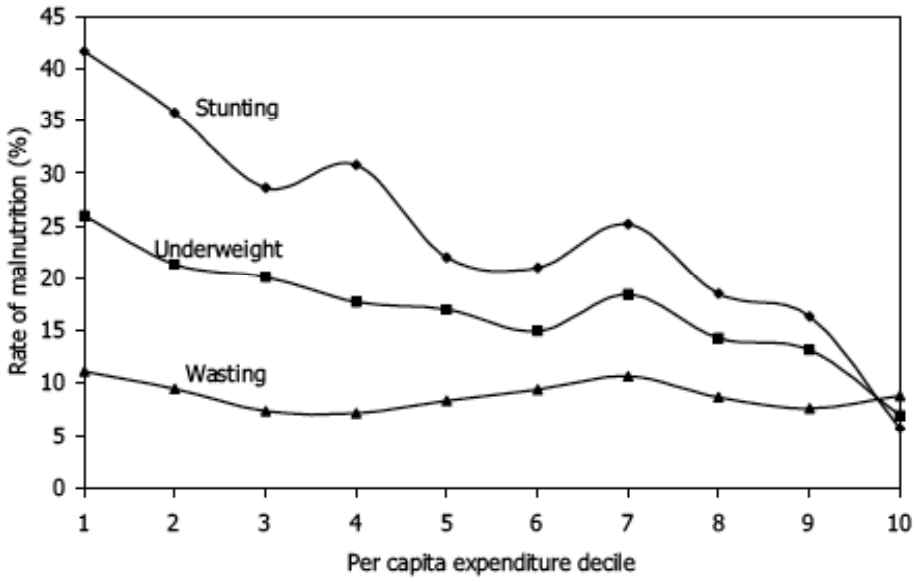
Figure 2: food poverty rates by decile of per-capita income



Source: Rose & Charlton [12]

If food poverty varies according to socio-economic status it is not surprising that under-nutrition does the same. Zere and McIntyre analysed data on 3765 children under 5 years old derived from the Living Standards and Development Survey[14]. They found that stunting was 8 times more common in children from the poorest 10 percent of households than in those from the richest 10 percent. On the other hand, wasting did not show significant socio-economic differentials.

Figure 2: Child malnutrition by per capita expenditure decile.



[14] Zere E, McIntyre D. Inequities in under-five child malnutrition in South Africa. International Journal for Equity in Health 2003;2:7 http://www.equityhealthj.com/content/2/1/7 [accessed 18 January 2007]

Rates of stunting and underweight were highest among the African population group, and most prevalent among children in the Eastern Cape and the Northern Province, the 2 provinces with the highest rates of poverty.

Though Western Cape children overall show a lower prevalence of stunting (15%), Zere & McIntyre showed that disparities in malnutrition between income groups in the Western Cape (and Gauteng) were greater than in provinces with higher rates of stunting [14]. This finding shows the importance of disaggregating pooled data that hide critical information about the situation of populations.

Illness concentration curves showed clear and statistically significant pro-rich inequalities in the distribution of stunting and underweight. Among the 3 indices of malnutrition stunting (and, therefore, chronic malnutrition) showed the strongest income-related inequality. The prevalence of stunting is associated with poor socio-economic conditions and the WHO regards it as a reliable indicator of measure of social deprivation.

Multiple deprivation

Noble, Babita and others identified five *domains of deprivation* using indicators in the 2001 census:

- Income and Material Deprivation
- Employment Deprivation,
- Health Deprivation
- Education Deprivation
- Living Environment Deprivation.

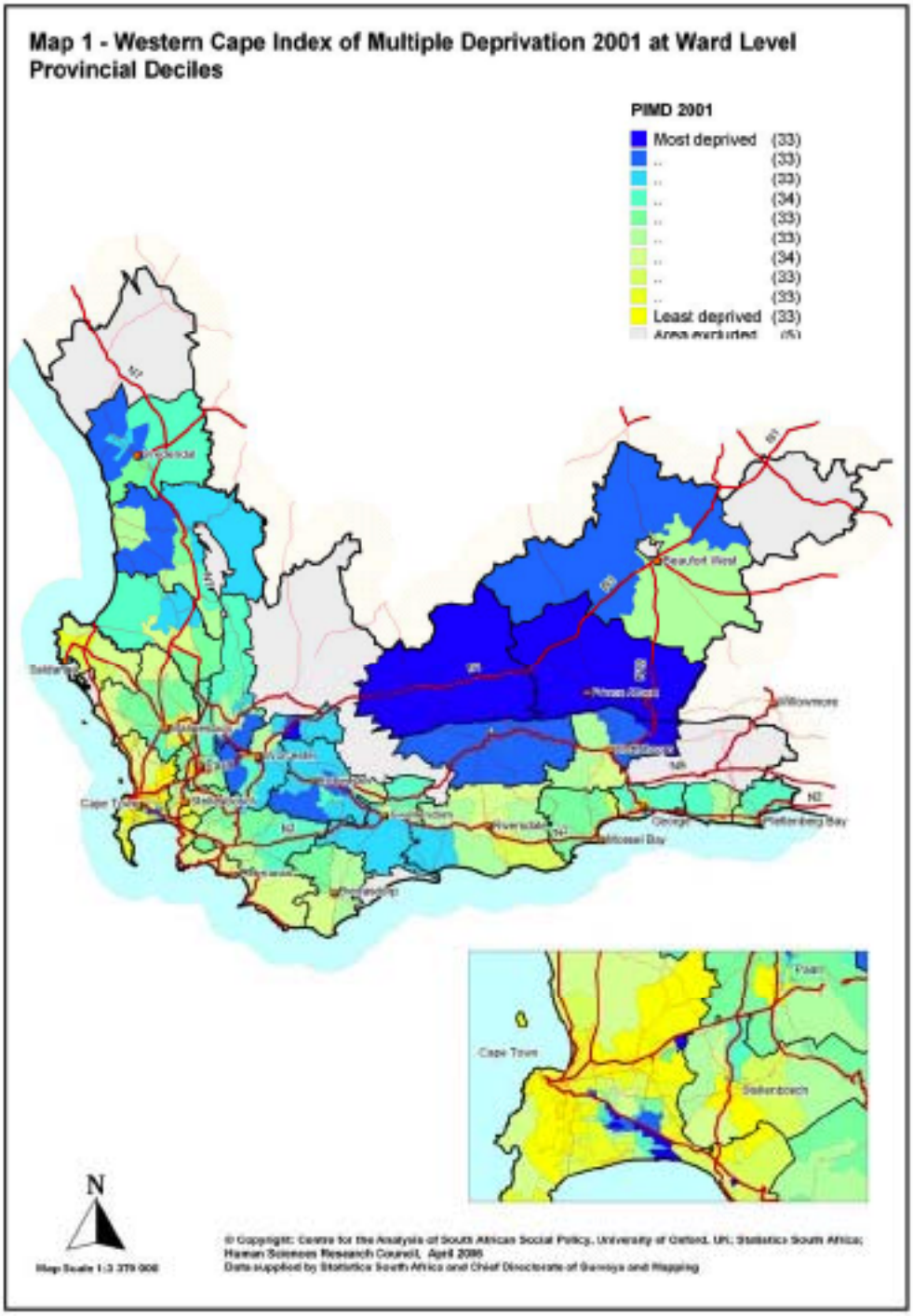
By combining these domains they constructed a Provincial Index of Multiple Deprivation (PIMD) for each province. [15]

The PIMDs are not comparable across provinces; each provincial PIMD provides information about the geographic distribution of deprivation within that province. This may be useful at small area level in directing interventions and programmes to the areas in greatest need.[16]

The map shows the Western Cape PIMD at ward level. The ward are divided into deciles of deprivation. The most derived 10% of wards are in dark blue and the least deprived 10% in bright yellow.

[15] Noble, M., Babita, M., Barnes, H., Dibben, C., Magasela, W., Noble, S., Ntshongwana, P., Phillips, H., Rama, S., Roberts, B., Wright, G. and Zungu, S. (2006) *The Provincial Indices of Multiple Deprivation for South Africa 2001*, University of Oxford, UK.

[16] Anonymous. *The Western Cape Provincial Index of Multiple Deprivation 2001: Summary*. The University of Oxford, Statistics South Africa, HSRC. http://www.casasp.ox.ac.uk/docs/PIMD%20WC%20Summary.pdf [Accessed 21 January 2007]



The most deprived wards are in Beaufort West, Breede Valley, the City of Cape Town, George and the Knysna municipality. Six wards – 3 in George and one each in Witzenberg, City of Cape Town and Prince Albert – are in the most deprived 25% on all five domains.

The map shows the PIMD at ward level for the Western Cape.

Interventions

Interventions to combat the effects of malnutrition range from those aimed at simply correcting nutritional deficiencies (proximal interventions), through those that address the causes at more basic level to addressing more fundamental determinants that operate at political and ideological levels.

Global Experience in Nutrition Interventions

Proximal interventions

IMPROVING DIETS

Complementary feeding

Complementary feeding, if practiced inadequately, can result in both inadequate nutrient intake and diarrhoeal disease as a consequence of contamination. The latter can be substantially prevented by improved water supply, sanitation and hygiene practice. These have been dealt with in the background paper on Diarrhoea (Appendix 3). Increasing the nutrient density of complementary foods will depend on both improved knowledge (through health and nutrition education) and greater access to nutritious foods. The latter, essentially improved household food security, is in turn dependent on reduction of poverty and its determinants. Increasingly, global food trade patterns are influencing diets, including those of young children. This issue is dealt with by the background paper on Non-communicable Diseases.

Micronutrient supplementation

Iodine supplementation. Several trials have shown that iodine supplementation in the prenatal or neonatal period prevents infant and child deaths. A 1999 Cochrane review found that iodine supplementation before or during pregnancy in geographic areas of iodine deficiency reduced the risk of endemic cretinism at age four by 73% (95% C.I. 40-78%) and resulted in better psychomotor development scores in children between 4 to 25 months old. Iodine supplementation was associated with a 29% (95% C.I. 10-44%) reduction in risk of death during infancy and early childhood.[17]

Iron supplementation. Decades of research and intervention studies have shown that anaemia is a widespread and serious problem in poor countries, and that iron supplements are effective in reducing the prevalence of anaemia in areas where iron deficiency is prevalent. (6*)*

The groups most likely to benefit are young children from about l6 months to 2 years, and pregnant women who should also receive folic acid for prevention of neural tube defects. These groups have the highest physiological demands for iron and are lat greatest risk of iron deficiency anaemia. Where helminth infection is common and contributes to iron deficiency, other segments of the population may also benefit. Adolescent girls may benefit considerably from supplementation that improves their iron stores for future pregnancies.

[17] Nemer LE, Gelband H, Jha P. *The Evidence Base for Interventions to Reduce Malnutrition in Children Under Five and School-age Children in Low and Middle-Income Countries.* CMH Working Paper Series. Paper No WG5:11. WHO, Geneva, June 5, 2001

WHO/UNICEF/International Nutritional Anemia Consultative Group (INACG) recommend daily supplementation (12.5 mg iron + 50 ug folic acid) starting at 6 months (2 months for low birthweight infants) for all children where anaemia is prevalent. Where the prevalence in children is <40%, the recommendation is to continue until 1 year of age, and where it is higher, until 2 years of age. Above 2 years, supplementation is still valuable where there is a continued significant prevalence of anaemia[18].

However, as a recent INACG symposium found, the place of routine iron supplementation is far from clear.[19] Dr Khatry reported a large randomised population-based trial involving 25,718 children from poor rural communities in Nepal. The trial showed no differences in overall mortality between groups receiving iron and folate, iron-folate and zinc, and placebo, even though the treatment groups had higher haemoglobin and ferritin levels, and a lower incidence of severe anaemia[20]. At the same symposium Dr Dijkhuizen cautioned delegates about a growing concern about possible negative effects of routine iron supplementation. Iron supplementation may increase morbidity of infectious disease, and decrease linear growth in iron replete children. It may also have a negative effect on zinc status.

Vitamin A supplementation.

Three meta-analyses of vitamin A supplementation found decreases in overall mortality risk of 23-30% among children under five from supplementation [21][22][23]. Vitamin A reduces mortality from diarrhoea, respiratory infections, measles and other causes. Vitamin A capsules providing 200,000 international units (IU) have been found to have at least 90% prophylactic efficacy for 4-6 months against developing mild xeropthalmia and corneal disease[24].

FOOD SUPPLEMENTATION FOR TREATMENT OF PEM.

Evidence of the impact of food supplementation in reducing under five mortality is scarce but points to the fact that targeting malnourished children for a limited time period may be more effective than overall food supplementation programs (Nemer & Gelband p 23 (6).

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[18] Stoltzfus RJ, Dreyfuss ML. Guidelines for the use of iron supplements to prevent and treat iron deficiency anaemia. International Nutritional Anemia Consultative Group. ILSI Press, International Life Sciences Institute, 1126 Sixteenth Street, N.W. Washinton D.C. 20036-4810. [Undated]

[19] INACG. *Iron Deficiency in Early Life: Challenges and Progress.* Report of the 2004 International Nutritional Anemia Consultative Group Symposium. Lima, Peru, November 2004. http://inacg.ilsi.org/file/INACGPeru-FINALREPORT.pdf [Accessed 23 January 2007].

[20] Khatry S. *Mortality Risk Is Not Affected by Iron-Folate Supplementation among Preschool Children in Nepal.* [Report in reference 19.]

[21] Beaton GH, Martorell R, Aronson KJ, Edmonston B, McCabe G, Ross AC et al. *Effectiveness of Vitamin A Supplementation in the Control of Young Child Morbidity and Mortality in Developing Countries*- ACC/SCN State-of-the-Art Series Nutrition Policy Discussion Paper No.13. 1993. Geneva, Switzerland. [Cited in Nemer *et al* (6)].

[22]Glasziou PP, Mackerras DE. Vitamin A supplementation in infectious diseases: a metaanalysis. BMJ 1993; 306(6874):366-370. [Cited in Nemer *et al* (6)].

[23] Fawzi WW, Chalmers TC, Herrera MG, Mosteller F. *Vitamin A supplementation and child mortality. A meta-analysis.* JAMA 1993; 269(7):898-903. [Cited in Nemer *et al* (6)].

[24] Gillespie S, Mason JB. *Controlling Vitamin A Deficiency*- ACC/SCN State-of-the-Art Series Nutrition Policy Discussion Paper No. 14. 1994. Geneva, Switzerland. [Cited in Nemer *et al* (6)].

INTERVENTIONS TO IMPROVE THE CARE OF MOTHERS & CHILDREN

Breast feeding is the most important intervention in terms of care of the infant and young child. The background papers on Diarrhoea and the Prevention of Mother to Child Transmission of HIV (Appendices 3 & 5) have dealt adequately with breast feeding and its promotion.

INTERVENTIONS TO IMPROVE HEALTH AND ENVIRONMENTAL SERVICES

The key interventions to reduce exposure to infections and infestations that most directly impact on nutrition status include control of intestinal parasites, improved water and sanitation, and vaccination against common childhood infectious diseases.

Immunisation

Vaccination, including against measles – the vaccine-preventable disease that has most impact on nutritional status – is currently provided as part of the EPI programme, but coverage , even in the Western Cape, remains suboptimal. Suggestions are made later in this paper, as well as in the Executive Summary, regarding key measures to extend coverage of basic health services at community and household level.

Anthelminthic drugs.

While parasitic infections in children under five and school-age children are not responsible for high rates of mortality (about 2% of total deaths), the burden of parasitic infections is sufficient to have an impact on child growth and development. The administration of anthelminthic drugs to individuals with the highest degree of exposure and the heaviest worm burdens is an effective strategy for treatment of helminth infections (6).

Though regular deworming does not appear to improve cognitive development, there is growing evidence that it improves growth. A systematic review of randomised trials published in 2000 found limited evidence that regular de-worming children improves growth, and concluded that that there was insufficient evidence as to whether it improves cognitive performance [25] . A more recent (2006) cluster randomised controlled trial in Uganda involving some 28,000 children showed that providing periodic albendazole treatment as a part of child health services resulted in an increase in weight gain of about 10% (166 g per child per year, 95% confidence interval 16 to 316) above expected weight gain when treatments were given twice a year, and an increase of 5% when the treatment was given annually [26].

POVERTY

Addressing poverty, inequality and their underlying determinants will require the implementation in particular of social and labour policies that create employment and

[25] Effects of treatment for intestinal helminth infection on growth and cognitive performance in children: systematic review of randomised trials. Rumona Dickson, Shally Awasthi, Paula Williamson, Colin Demellweek, Paul Garner. BMJ 2000; 320:1697-1701. doi:10.1136/bmj.320.7251.1697.

[26] Harold Alderman, Joseph Konde-Lule, Isaac Sebuliba, Donald Bundy and Andrew Hall. Effect on weight gain of routinely giving albendazole to preschool children during child health days in Uganda: cluster randomised controlled trial. *BMJ* 2006;333;122-; BMJ, doi:10.1136/bmj.38877.393530.7C (published 21 June 2006) originally published online 21 Jun 2006;

improve welfare, land policy, and micro- and macro-economic policies, including trade policy.

Below we consider the most important welfare interventions to protect child health, namely old age pensions and the Child Support Grant. Trade policy related to food and diets is dealt with in the background paper on Non-communicable Diseases.

Land reform is not addressed in this paper, but is clearly a key issue in terms of both employment and household food security.

International examples of integrated and comprehensive national and community programmes

Since the threat to childhood from poverty is multifactorial the response has to be all embracing. [27] There are several examples of successful comprehensive programmes around the world.

Mexico

Progresa-Oportunidades, now known as Oportunidades, the principal anti-poverty program of the Mexican government has helped more than five million poor families break out of poverty since its creation in 1997 by former Mexican Deputy Minister of Finance Santiago Levy. With its comprehensive focus on human capital through nutrition, health, education and evaluation, the programme is being considered for replication in other countries and cities seeking effective ways to help end the cycle of poverty.[28] [29]

Oportunidades provides monetary educational grants to participating families for each child under 22 years of age who is enrolled in school between the third grade of primary and the third grade of high school. Cash transfers are also linked to regular health clinic visits.

Several key aspects of the programme are central to its success.[30]

- Firstly, *it is large and growing in scale*, and strong government commitment ensures sustainability. It operates in more than 70000 localities, and its financial allocation represents almost half (46,5%) of Mexico's annual anti-poverty budget. In addition, only 6% of its budget goes to operating costs.

- Secondly, *it targets poor and marginalised communities*. Ninety six percent of it localities are in marginalised rural areas. In urban areas it focuses on cities of under 1 million inhabitants with significant levels of marginalisation.

- Third, it has a *strong gender focus* and has made the improvement of the condition of women a priority. About 98% of heads of households that get

[27] The State of the World's Children 2005. Childhood Under Threat. Carol Bellamy. United Nations Children's Fund, New York.
[28] Anonymous. Mexico's *Oportunidades* Program. Shangai Poverty Conference: Case Study Summary. http://info.worldbank.org/etools/docs/reducingpoverty/case/119/summary/Mexico-Oportunidades%20Summary.pdf [accessed 18 January 2007.]
[29] The Brookings Institution. Social Policy. Progress Against Poverty: Sustaining Mexico's Progresa-Oportunidades Program. 18 January 2007. http://www.brook.edu/comm/events/20070108.htm [accessed 18 January 2007.]
[30] State of the World's Children 2005. [pp 32-33]

cash benefits are women. It also has a strategic focus on youth. The monetary value of scholarships increases as learners enter higher grades where school dropout rates are higher.

- Finally, it has an effective *review mechanism* with clear indicators for regular evaluation of programme management, results and impact.

Results have been excellent. A recent ransomized effectiveness study showed that Progresa was associated with better growth in height among the poorest and younger infants. Age- and length-adjusted height was greater by 1.1 cm (26.4 cm in the intervention group vs 25.3 cm in the crossover intervention group) among infants younger than 6 months at baseline and who lived in the poorest households. After 1 year, mean hemoglobin values were higher in the intervention group (11.12 g/dL; 95% confidence interval [CI], 10.9-11.3 g/dL) than in the crossover intervention group (10.75 g/dL; 95% CI, 10.5-11.0 g/dL) who had not yet received the benefits of the intervention (P = .01). There were no differences in hemoglobin levels between the 2 groups at year 2 after both groups were receiving the intervention. The age-adjusted rate of anemia (hemoglobin level <11 g/dL) in 1999 was higher in the crossover intervention group than in the intervention group (54.9% vs 44.3%; P = .03), whereas in 2000 the difference was not significant (23.0% vs 25.8%, respectively; P = .40).[31]

In addition to improved nutrition status, rural areas covered by the schemesaw a 57 per cent rise in visits to health clinics and a 12% reduction in under-5 morbidity. School attendance and completion have also been boosted. For example, an 85 per cent increase in first year upper secondary school attendance in rural areas (79 per cent for girls and 90 per cent for boys).

Madagascar

The Madagascar Family Health Programme, a comprehensive child survival programme, aims to mobilize communities and link them with quality services for reproductive and child health.

The program addressed routine childhood immunization; a package of “essential nutrition actions” (ENA); reproductive health (RH) including family planning (FP) and adolescent RH; sexually transmitted infections (STIs); and prevention and case management of sick children using Integrated Management of Childhood Illnesses (IMCI) as a framework.

The technical interventions were implemented through program components that cut across the intervention areas: a scale strategy, a community mobilization approach, health systems strengthening, and communications and IEC (Information, Education & Communication).

[31] Rivera JA, Sotres-Alvarez D, Habicht J-P, Shamah T,Villalpando S, Impact of the Mexican Program for Education, Health, and Nutrition (Progresa) on Rates of Growth and Anemia in Infants and Young Children. A Randomized Effectiveness Study. *JAMA.* 2004;291:2563-2570. http://jama.ama-assn.org/cgi/content/full/291/21/2563 [accessed 25 January 2007].

The Madagascar program included some key elements that may have contributed to its success:

- A consistent pattern of substantial commitments to community mobilization and systems strengthening. The program was an integral part of national strategies for immunization, nutrition, reproductive health, and care of sick children. This appears to have helped maintain the direction of the program long enough to see improved outcomes.
- Actions at the community level were supported in tandem by improved management and quality of services, including attention to supplies, better skills and performance by health providers, and systematic use of data.
- Existing community networks were tapped for volunteers to reach families. Personal contacts were reinforced with the same messages being heard through numerous other communication channels such as radio, press, and television. Community volunteers were actively linked with health providers.
- The core content of all interventions was simplified for rapid expansion; and interventions were sequentially introduced in manageable clusters to assure that families received a package of services.
- Ongoing evidence of progress, or the lack of such evidence, helped tailor program components to achieving results, and helped maintain a focus on the most effective approaches.
- Partnerships and "champions" played strategic roles in bringing about changes in policies and processes, and increased the pool of available resources.[32]

Brazil[33]

The state of Ceará is in the poor north-eastern area of Brazil. Early in the 1980s the infant mortality rate was more than 100 per 1,000 and malnutrition was very common. In 1986 the new state government requested UNICEF support to help improve child health, and a statewide survey of child health and nutrition was commissioned. Based on the results of this survey, new health policies were implemented, including the GOBI strategy of growth monitoring, oral rehydration, breastfeeding promotion, immunisation, and vitamin-A supplementation

Since lack of access to healthcare facilities was a major problem, a large new programme for community health workers was established and another programme for traditional birth attendants was expanded

Responsibility for health services was decentralised to rural municipalities – the ones with the worst health indicators. A social mobilisation campaign for child health was implemented, which included the use of the media and small radio stations to broadcast educational messages. Similar surveys were repeated in 1990 and 1994, and after each one the results were incorporated into health policy. This process was sustained by four consecutive state governors who all give high priority to improving

[32] USAID. *Madagascar Case Study. Improving Family Health Using an Integrated, Community-based Approach.* Published by the Basic Support for Institutionalizing Child Survival Project (BASICS II) for the United States Agency for International Development. Arlington, Virginia, February 2004. http://www.aed.org/upload/madagascarcasestudy.pdf [accessed 21 January 2007]

[33] Chopra M, Sanders D. Child Health and Poverty. CHIP Report No. 10. Childhood Poverty Research and Policy Centre. 2004. www.childhoodpoverty.org

child health

All these public health interventions resulted in considerable advances in the population coverage of child health interventions. By 1994 the use of oral rehydration solution had increased to more than 50 per cent in children with diarrhoea; nearly all children had a growth chart and half had been weighed within the previous three months; immunisation coverage was 90 per cent or higher; and median breastfeeding duration – a difficult indicator to improve – had apparently increased from 4.0 to 6.9 months

Disease frequency and mortality outcome indicators for the whole population also showed considerable improvement between 1987 and 1994. The prevalence of low weight-for-age (below -2 z scores of the National Center for Health Statistics) fell from 12.7 per cent to 9.2 per cent; low heightfor- age from 27.4 per cent to 17.7 per cent; and reported episodes of diarrhoea in children in the previous two weeks from 26.1 per cent to 13.6 per cent. Infant mortality rates improved from 63 per 1,000 live births in 1987 to 39 per 1,000 in 1994 – a 37 per cent reduction

The proportion of child deaths due to diarrhoea – a priority for the health programme – fell from 48 per cent to 29 per cent; whereas perinatal causes of infant deaths increased from 7 per cent to 21 per cent and respiratory infections from 10 per cent to 25 per cent. Deaths due to other causes, including infections other than diarrhoea and respiratory infections, fell from 35 per cent to 25 per cent (Victora et al, 2000)

Interventions SA

Poverty SA

The impact of Old Age Pensions

Over a quarter of Black South African children under 5 years old live with a pension recipient. Duflo studied the effects on the expansion of the Old Age Pension programme in the early 1990s on child health. She examined the question of whether it led to an improvement in child nutritional status, and whether this is affected by the gender of the recipient.

Her estimates suggest that pensions received by women had a large impact on the anthropometric status of girls (it improved their weight-for-height by 1.19 standard deviations, and their height-for-age by 1.16 standard deviations), but had little effect on boys. She found no similar effect for pensions received by men.

Her findings show that an increase in income can improve child health. Direct transfers of income to poor households can contribute to an increase in human capital. They also suggest that households may not function as a unitary entity, and that the efficiency of public transfer programs may depend on the gender of the recipient, providing a further rationale for prioritizing women in interventions.

The Child Support Grant (CSG)

The South African Child Support Grant transfers cash to families unconditionally, unlike the Oportunidades programme in Mexico, which makes grants conditional

upon school and clinic attendance. In light of research that has cast doubt on whether nutrition responds at all to income increases amongst poor families, Agüero, Carter and Woolard used the continuous treatment method of Hirano and Imbens (2004) to estimate the impact of the CSG, an unconditional cash transfer, on child nutrition as measured by child height-for-age[34]. They found that large dosages of CSG treatment early in life significantly boosted child height.

They also quantified the gains in height-for-age (z -scores) in terms of adult wages. They then use these monetary figures to calculate private to CSG payments. Drawing on literature that examines the impact of adult height on wages, they estimate that these height gains in turn suggest large adult earnings increases for treated children and a discounted rate of return on CSG payments of between a 160% and 230%.

Conclusions & recommendations

Young child malnutrition remains both a direct and an indirect cause of mortality in South Africa and the Western Cape. The key interventions to address this problem at all levels of causation are

- Promotion of exclusive breast feeding up to six months and continued breast feeding up to at least 12 months
- Improved complementary feeding in terms of composition, frequency and hygiene, including fortification and/or supplementation with key micronutrients
- Prevention and improved management of common childhood illnesses, especially diarrhoea and HIV/AIDS and intestinal helminths
- Improved household food security through nutrition education combined with improved access to land, welfare grants, employment
- Improved care of women and children, including reduction in physical work during and after pregnancy and adequate maternity leave
- Improved quality and coverage of key health service interventions, especially growth monitoring & promotion and immunization
- Increased access to adequate water supplies and safe sanitation combined with soap and hygiene education

[34] Agüero JM, Carter MR, Woolard I. The Impact of Unconditional Cash Transfers on Nutrition: The South African Child Support Grant. Center for Global Development. July 2006. http://www.cgdev.org/doc/events/11.07.06/unconditional%20cash%20transfers.pdf [accessed 24 January 2007].

- Addressing poverty, inequality and their underlying determinants through social and labour policies that create employment and improve welfare. Here improved coverage of told age pensions and the Child Support Grant are key

- Address inequalities in access to land, and those micro- and macro-economic policies, including trade policy, that are impacting negatively on employment, incomes and diets.