

The South African Index of Multiple Deprivation for Children 2007 at Municipality Level

Gemma Wright, Michael Noble, Helen Barnes and Stefan Noble

September 2009

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¹ Strengthening Analytical Capacity for Evidence-based Decision-making.

Contents

1 Introduction.....	3
2 Methodology	4
2.1 <i>Income and Material Deprivation Domain</i>	5
2.2 <i>Employment Deprivation Domain.....</i>	5
2.3 <i>Education Deprivation Domain.....</i>	6
2.4 <i>Living Environment Deprivation Domain</i>	6
2.5 <i>Biological Parent Deprivation Domain.....</i>	6
2.6 <i>Constructing the SAIMDC 2007</i>	7
3 Child deprivation in South Africa in 2007	8
4 How has child deprivation changed between 2001 and 2007?	16
5 Concluding remarks.....	22
Appendix 1 Indicators used in the SAIMDC 2007	23
A1 <i>Income and Material Deprivation Domain.....</i>	23
Numerator	23
Denominator.....	24
A2 <i>Employment Deprivation Domain</i>	25
Numerator	25
Denominator.....	25
A3 <i>Education Deprivation Domain</i>	25
Numerator	25
Denominator.....	25
A4 <i>Living Environment Deprivation Domain.....</i>	25
Numerator	25
Denominator.....	26
A5 <i>Biological Parent Deprivation Domain</i>	26
Numerator	26
Denominator.....	27

1 Introduction

This report presents the South African Index of Multiple Deprivation for Children 2007 (SAIMDC 2007) at municipality level. The SAIMDC 2007 is a composite index reflecting five dimensions of deprivation experienced by children aged 0-17 inclusive: income and material deprivation, employment deprivation, education deprivation, biological parent deprivation and living environment deprivation.

This project builds on several recent studies about child deprivation in South Africa that have been undertaken by a team from the University of Oxford's Centre for the Analysis of South African Social Policy (CASASP). First, in collaboration with the Human Sciences Research Council (HSRC) and funded by Save the Children Sweden, a South African Index of Multiple Deprivation for Children 2001 (SAIMDC 2001) was produced at municipality level using data from the publicly available ten percent sample of the 2001 Census (Barnes *et al.*, 2007; Barnes *et al.*, 2009).

This was further developed by producing the SAIMDC 2001 at a much smaller area level – datazone level – using the full 2001 Census (Wright *et al.*, 2009). The datazones are small area level statistical geographical units (Avenell *et al.*, 2009) and enabled a much more fine-grained analysis of child deprivation to be developed for 2001.

Prior to this, a team comprising members of CASASP, HSRC and Statistics South Africa (StatsSA) developed a ward level measure of multiple deprivation for each province in the country, called the Provincial Indices of Multiple Deprivation (PIMD) (Noble *et al.*, 2006, 2009 forthcoming). The PIMD refers to deprivation experienced by the total population (i.e. all ages including children). Additionally a South African Index of Multiple Deprivation (SAIMD) has been produced at datazone level for 2001, again relating to all ages including children (Noble *et al.*, 2009).

The SAIMDC 2007 that is presented in this report has been constructed using data from the 2007 Community Survey (Statistics South Africa, 2007). It is therefore a more up-to-date profile of child deprivation across South Africa than has hitherto been produced. **Section 2** of this report presents the domains and indicators for the SAIMDC 2007 and summarises the methodological approach that was used. **Section 3** provides an overview of the SAIMDC 2007 at municipality level and **Section 4** explores the extent of change in the levels of child deprivation between 2001 and 2007.

2 Methodology

The SAIMDC 2007 was constructed on the basis of a model of child deprivation comprising a series of uni-dimensional domains of deprivation which each contain one or more indicators relating to that domain of deprivation. The domains were each constructed as a separate domain index and then combined into a single measure of multiple deprivation – the SAIMDC 2007. Operating within the constraints of the data available in the 2007 Community Survey, the SAIMDC 2007 was an attempt to operationalise the model of child poverty developed by Noble *et al.* (2006). It complements an analysis of children in low income households that was recently undertaken using the Community Survey (Barnes, 2009).

The 2007 Community Survey was conducted in February 2007 and covered 274,348 dwelling units across all of the provinces, and attained a response rate of 93.9% (Statistics South Africa, 2007: 10-11). It was a nationally representative large-scale household survey intended to provide information about the profile of the South African population between the 2001 and 2011 Censuses.

The domains and constituent indicators included in the SAIMDC 2007 are almost identical to those used for the SAIMDC 2001 (Barnes *et al.*, 2007). Any differences are noted below, and were caused by slight changes in the wording of questions between the 2001 Census and the 2007 Community Survey or the absence of questions in the Community Survey that were present in the 2001 Census.

Five domains of deprivation were produced using the 2007 Community Survey to form the SAIMDC 2007²:

- Income and Material Deprivation
- Employment Deprivation
- Education Deprivation
- Biological Parent Deprivation
- Living Environment Deprivation.

A total of 12 indicators were used in the SAIMDC 2007 and unless specified otherwise they relate to children aged 0-17 inclusive. The intention was that the indicators should:

- be 'domain specific' and appropriate for the purpose (as direct as possible measures of that form of deprivation);
- measure major features of that deprivation (not conditions just experienced by a very small number of children or areas);
- be statistically robust.

² Please see Barnes *et al.* (2007) for a discussion of other domains that were considered but which could not be included (pages 50-51).

The rest of this section provides information about the domains and their constituent indicators, as well as how the SAIMDC 2007 was constructed. Appendix 1 contains further details about each of the indicators in terms of how they were constructed using the Community Survey data.

2.1 Income and Material Deprivation Domain

The purpose of this domain is to capture the proportion of children experiencing income and/or material deprivation in an area.

- **Number of children living in a household that has a household income (need-adjusted using the modified OECD equivalence scale) that is below 40% of the mean equivalent household income (approximately R1003 per month in February 2007 Rands)³; or**
- **Number of children living in a household without a refrigerator; or**
- **Number of children living in a household with neither a television nor a radio.**

A simple proportion of children living in households experiencing one or more of the deprivations was calculated (i.e. the number of children living in a household with low income and/or without a refrigerator and/or without a television and radio divided by the total child population).

2.2 Employment Deprivation Domain

This purpose of this domain is to measure the proportion of children living in workless households in an area.

- **Number of children living in households where no adults aged 18 or over are in employment.**

A simple proportion of children living in households experiencing this type of deprivation was calculated (i.e. the number of children living in a household with no employed adults divided by the total child population).⁴

³ This indicator is used in the analysis of child income deprivation in South Africa undertaken by Barnes (2009), where it is set alongside a range of other income poverty lines and types of equivalence scales.

⁴ Children over the age of 15 are legally allowed to be in certain forms of income generating employment. This means that there might be a very small overestimation of workless households (if any children in the household aged 16 or 17 are in paid employment). However, as a child is defined as aged 0-17 inclusive, the domain does capture children in households where there are no working *adults*.

2.3 Education Deprivation Domain

The purpose of this domain is to capture the extent of children's educational deprivation in an area⁵.

- **Number of children (7-15 years inclusive) who are not in school.**

This domain was calculated as a simple rate for 7-15 year olds.

2.4 Living Environment Deprivation Domain⁶

The purpose of this domain is to identify children in an area living in poor quality environments.

- **Number of children living in a household without piped water inside their dwelling or yard⁷; or**
- **Number of children living in a household without a pit latrine with ventilation or flush toilet; or**
- **Number of children living in a household without use of electricity for lighting; or**
- **Number of children living in a shack; or**
- **Number of children living in a household that is crowded⁸.**

A simple proportion of children living in households experiencing one or more of the deprivations was calculated (i.e. the number of children living in a household without piped water and/or without adequate toilet and/or without electricity for lighting and/or that is a shack and/or that is crowded divided by the total child population).

2.5 Biological Parent Deprivation Domain⁹

The purpose of this domain is to capture children in an area whose biological parents have both died, or who live in a child-headed household.

⁵ This domain in the SAIMDC 2001 additionally had an indicator measuring children in the wrong grade for their age. As the CS only captured children's ages and not their dates of birth, it was not possible to adequately construct an indicator for 2007.

⁶ This domain in the SAIMDC 2001 additionally had an indicator measuring children in households without access to a telephone; this was not asked about in the same way in the CS and so the indicator was dropped.

⁷ The equivalent indicator in the SAIMDC 2001 additionally captured children who had access to piped water within 200 metres of their dwelling – this was not asked in the CS and so was not included.

⁸ The indicator had to be constructed in a different way to the indicator in the SAIMDC 2001 - see Appendix 1 for details.

⁹ This domain name is the same as for the datazone level SAIMDC 2001 (Wright *et al.*, 2009) but had been called the 'Adequate Care Domain' in the municipality level SAIMDC 2001 (Barnes *et al.*, 2007).

- **Number of children whose mother and father are no longer alive¹⁰;**
or
- **Number of children living in a child-headed household.**

A simple proportion of children experiencing either of the deprivations was calculated (i.e. the number of children whose mother and father are no longer alive or who are living in a child-headed household divided by the total number of children).

2.6 Constructing the SAIMDC 2007

Once the domain scores had been created as described above, district management areas and municipalities containing less than a thousand children were deleted.

The domain indices were then standardised by ranking, and were transformed to an exponential distribution. The exponential distribution was selected for the following reasons. First, it transforms each domain so that they each have a common distribution, the same range and identical maximum/minimum value, so that when the domains are combined into a single index of multiple deprivation the (equal) weighting is explicit. Second, it is not affected by the size of the municipality's population. Third, it effectively spreads out the part of the distribution in which there is most interest, i.e. the most deprived municipalities in each domain. Each transformed domain has a range of 0 to 100, with a score of 100 for the most deprived municipality. The exponential transformation that was selected stretches out the most deprived 25% of municipalities in the country (See Barnes *et al.*, 2007 for further details).

For the SAIMDC 2007, equal weights were assigned to the exponentially transformed domains in the absence of evidence suggesting differential weights should be used.

The SAIMDC score is therefore the (equally) weighted sum of the exponentially transformed domain rank of the domain scores. The larger the SAIMDC score, the more deprived the municipality. However, because of the transformations applied, it is not possible to say, for example, that a municipality with a score of 44 is twice as deprived as a municipality with a score of 22. In order to make comparisons between municipalities using the SAIMDC the municipality ranks should be used.

¹⁰ This indicator is different from the SAIMDC 2001 as the 2001 version also captured children whose parents were alive but both lived elsewhere which was not asked about in the CS 2007.

3 Child deprivation in South Africa in 2007

The national picture

What are the levels of child deprivation across South Africa as a whole in 2007? For all five of the domains it is possible to provide a simple percentage of children¹¹ experiencing each type of deprivation:

- 78% of children live in households that are income and/or materially deprived;
- 41% of children live in households that are employment deprived (i.e. no working adults);
- 5% of children aged 7-15 are education deprived (i.e. not in school).
- 72% of children experience living environment deprivation;
- 5% of children experience biological parent deprivation (i.e. living in a child-headed household and/or having no live parents);

As we have seen, more than three-quarters of children are in income or materially deprived households. In fact, if we just select children in low income households (defined as living in households with incomes below 40% of the mean equivalised (modified OECD) income), we capture exactly three-quarters (75%) of all children (Barnes, 2009: 21). This means that only a further 3% of children are captured by the other indicators in the domain (lacking a fridge or lacking both a television and a radio).

Though a lower percentage of children (41%) are captured in the workerless households measure, it is nevertheless very striking that two children in every five do not have any working adults in their household.

More than seven children in ten experience living environment deprivation. One in twenty children have no live parents or are in a child-headed household and one in twenty children aged 7-15 are not attending school.

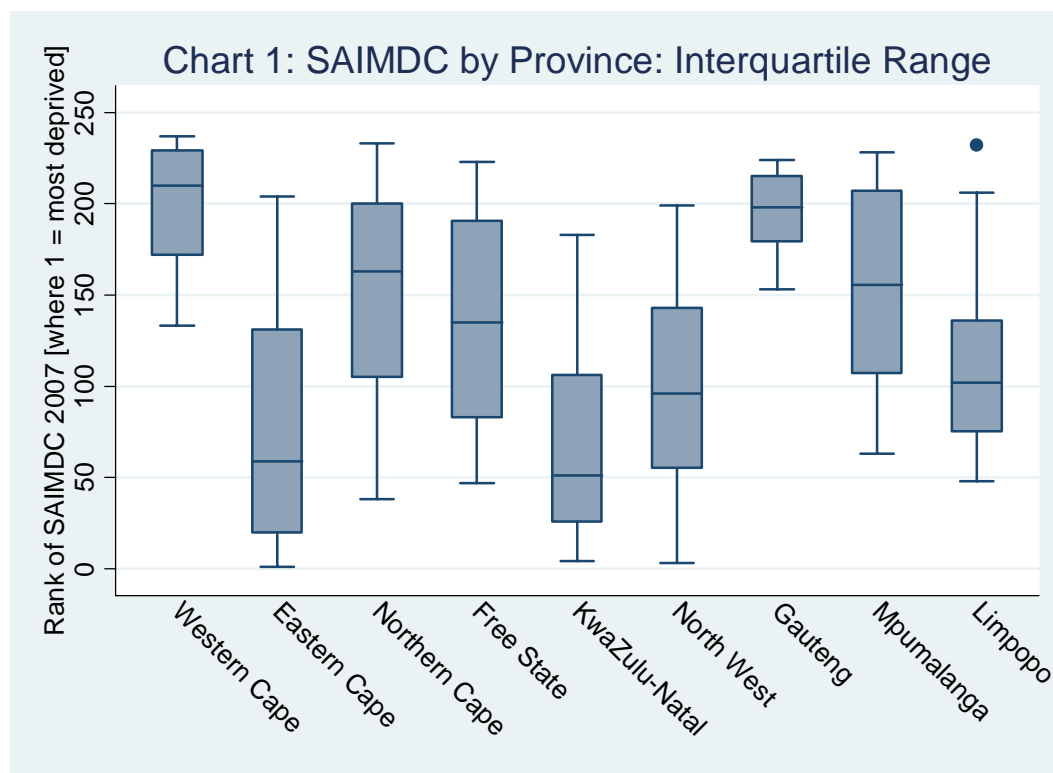
Province level

Levels of child deprivation vary greatly by province. Chart 1 shows the spread of the SAIMDC 2007 ranks by province. In the chart the vertical line and end bars indicate the range of the ranks of the municipalities in each province on the SAIMDC 2007. The most deprived municipality in the country is ranked 1 and is in the Eastern Cape, and the least deprived municipality is ranked 237 and is in the Western Cape. The box for each province shows the range of the SAIMDC 2007 ranks for the middle 50% of municipalities in the province (the

¹¹ Apart from the Education Deprivation Domain, the other four domains relate to children aged 0-17 inclusive.

interquartile range¹²), and the horizontal line within the box represents the rank of the median municipality within the province. If the box is relatively short this indicates that municipalities are ranked in a narrow range, with similar SAIMDC 2007 ranks (and therefore similar levels of deprivation). If this box sits towards the bottom of the chart it tells us that the SAIMDC 2007 ranks of the municipalities in the province are concentrated in the most deprived part of the national distribution. If the box sits towards the top of the chart it tells us that ranks of the municipalities in the province are concentrated in the least deprived part of the national distribution.

For both the Western Cape and Gauteng, municipalities are tightly grouped in the least deprived part of the national distribution. On the other hand in the Eastern Cape, KwaZulu-Natal, North West and Limpopo provinces the municipalities tend to be ranked towards the deprived part of the distribution which reflects much higher levels of child deprivation.



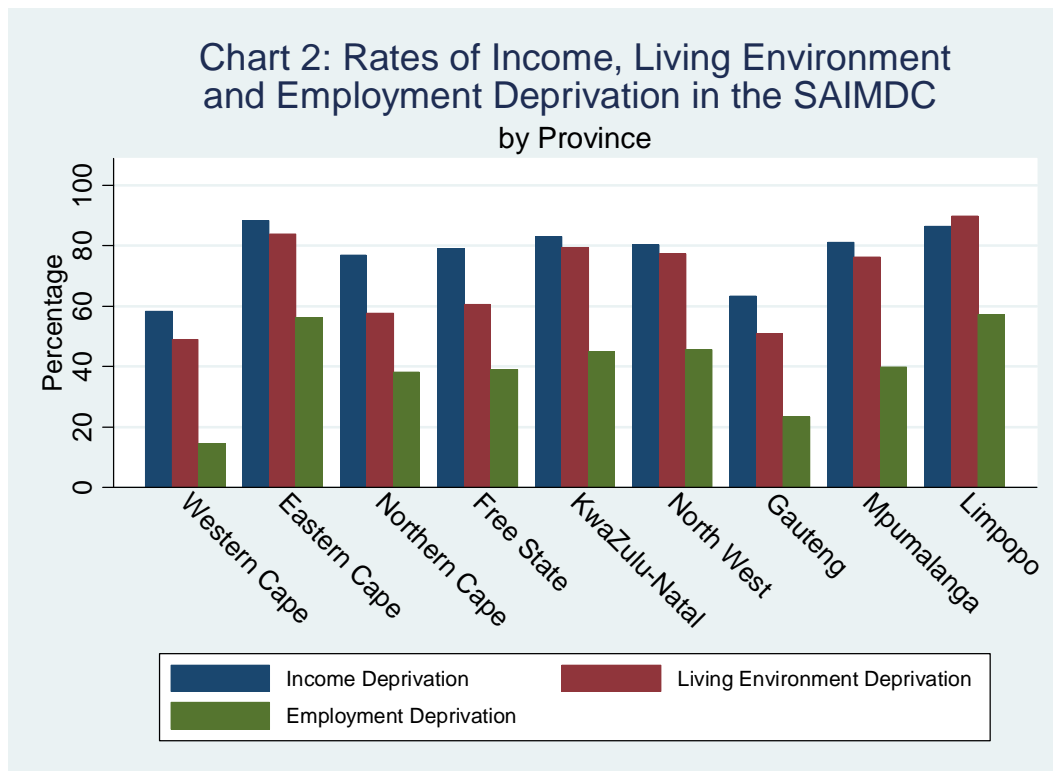
In terms of the Income/Material Deprivation Domain, the Eastern Cape has the highest levels of children living in households that are income and/or materially deprived (88%) followed by Limpopo (86%) and KwaZulu-Natal (83%). The least deprived province for this domain is the Western Cape (58%).

¹² The interquartile range (IQR) is 'a measure of dispersion calculated by taking the difference between the first and third quartiles (that is, the 25th and 75th percentiles). In short, the IQR is the middle half of a distribution' (Vogt, 1999: 143).

Limpopo has the highest percentage of children experiencing living environment deprivation (90%), followed by the Eastern Cape (84%) and KwaZulu-Natal (79%). The Western Cape is the least deprived province (49%) followed by Gauteng (51%).

For the Employment Deprivation Domain, the highest rates of children living in households with no adult workers are in Limpopo (57%), the Eastern Cape (56%) and KwaZulu-Natal and North West Province (both at 45%). The least deprived province for this domain is again the Western Cape (14%) followed by Gauteng (23%).

Chart 2 shows the percentages of children experiencing income/material deprivation, living environment deprivation, and employment deprivation, by province in 2007.

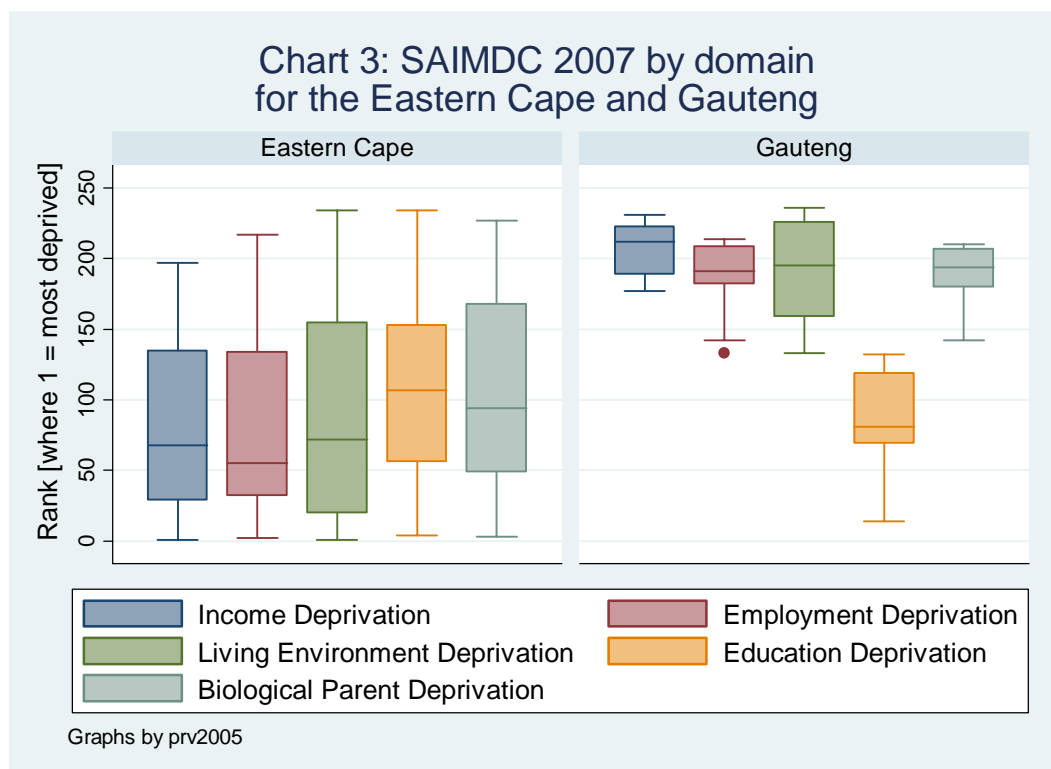


The percentage of children aged 7-15 who are education deprived (not in school) ranges from just 3% in Limpopo, to nearly 6% in the Western Cape. The Western Cape, Northern Cape, North West and Gauteng all have education deprivation rates over 5% while Free State, Mpumalanga and Limpopo all have education deprivation rates around 3%.

The highest rates of biological parent deprivation (living in a child-headed household and/or having no live parents) are in the Free State and KwaZulu-Natal (both at 7%), followed by the Eastern Cape and North West Province (both at 6%), with the lowest rate in the Western Cape (2%).

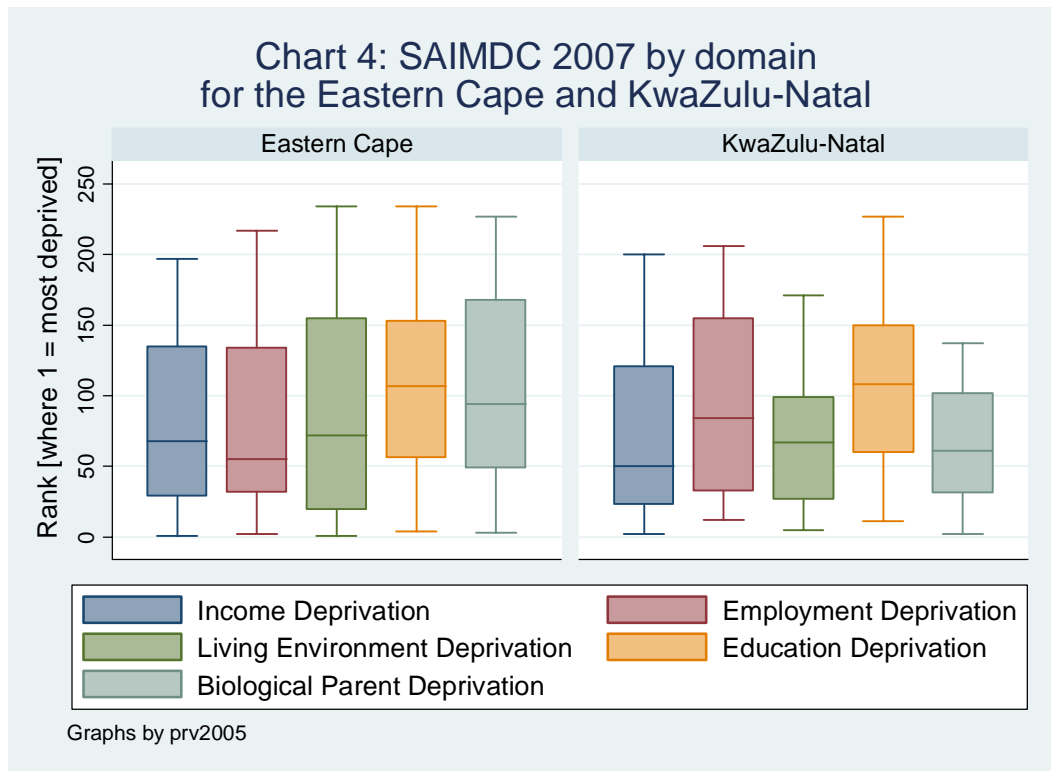
Charts 3 and 4 below show the spread of the municipality ranks for each domain of the SAIMDC 2007 in the Eastern Cape and Gauteng provinces, and the Eastern Cape and KwaZulu-Natal respectively.

Chart 3 shows that municipalities in the Eastern Cape are generally much more deprived than those in Gauteng across all domains of deprivation. Within Gauteng, municipalities tend to be more deprived on the education domain than on other domains, in terms of the national ranking.



By contrast Chart 4 shows that there are much greater similarities in terms of child deprivation at municipality level within the Eastern Cape and KwaZulu-Natal provinces. Both provinces contain some of the most deprived municipalities nationally on each of the five domains. The most notable difference between the provinces is the way in which KwaZulu-Natal's municipalities are grouped more tightly at the deprived end of the spectrum for

the living environment deprivation domain and the biological parent deprivation domain than in the Eastern Cape.



Municipality level

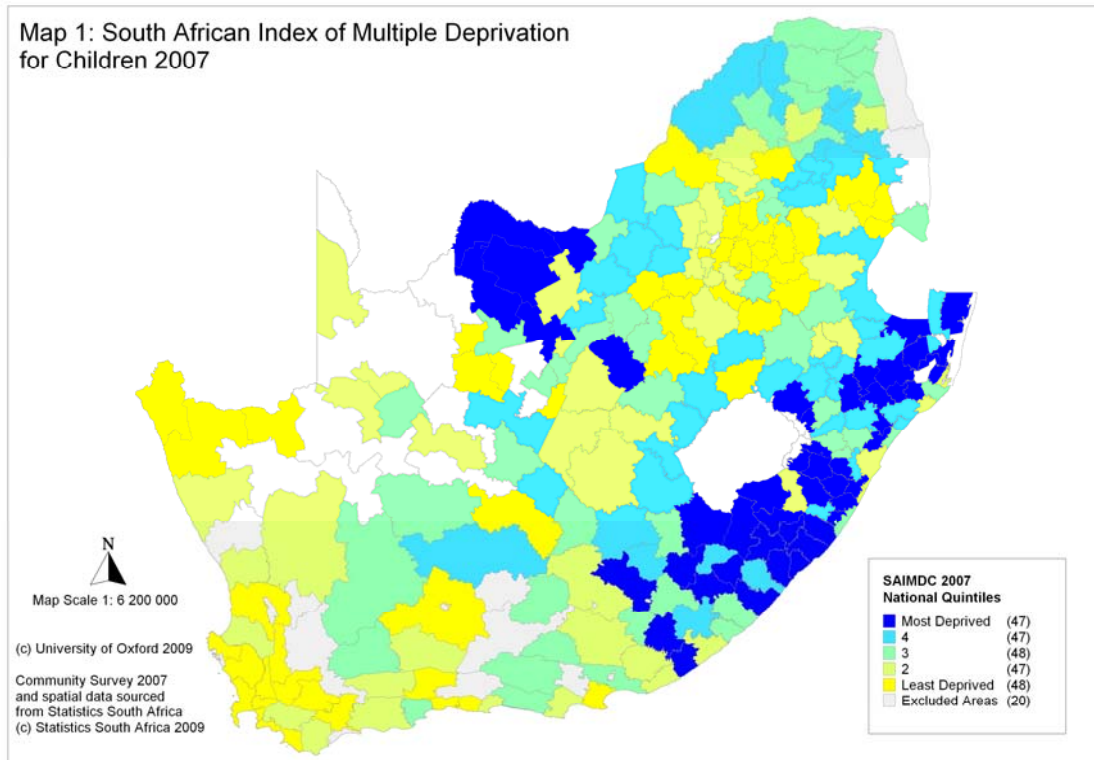
There are six municipality level measures: five domain measures (which were combined to make the overall SAIMDC) and one overall SAIMDC. These six measures are each assigned a rank. As stated above, the most deprived municipality for each measure is given a rank of 1, and the least deprived is given a rank of 237. The ranks show how a municipality compares to all the other municipalities in South Africa.

Table 1 lists the 20 most deprived municipalities in South Africa based on the SAIMDC 2007. Ngqushwa municipality is the most deprived in the country, located within the Eastern Cape, followed by Ntabankulu (also in the Eastern Cape) and Ratlou (in North West province). Apart from Ratlou the other municipalities in this table are all in the Eastern Cape or KwaZulu-Natal.

Table 1: The 20 municipalities in South Africa with the highest levels of child deprivation based on the SAIMDC 2007

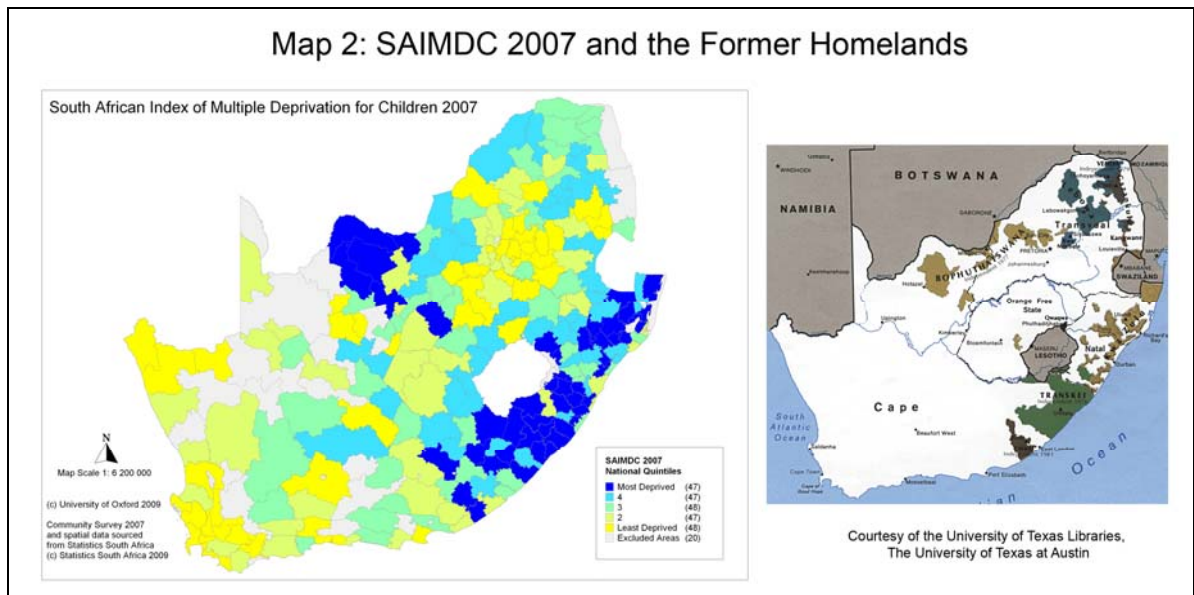
Rank (1=most deprived)	Municipality code 2005	Municipality name
1	215	EC126: Ngqushwa Local Municipality
2	231	EC152: Ntabankulu Local Municipality
3	606	NW381: Ratlou Local Municipality
4	552	KZN435: Umzimkhulu Local Municipality
5	501	KZN211: Vulamehlo Local Municipality
6	535	KZN274: Hlabisa Local Municipality
7	233	EC154: Port St Johns Local Municipality
8	222	EC135: Intsika Yethu Local Municipality
9	530	KZN265: Nongoma Local Municipality
10	503	KZN213: Umzumbe Local Municipality
11	542	KZN286: Nkandla Local Municipality
12	539	KZN283: Ntambanana Local Municipality
13	210	EC121: Mbhashe Local Municipality
14	546	KZN294: Maphumulo Local Municipality
15	230	EC151: Mbizana Local Municipality
16	249	EC441: Matatiele Local Municipality
17	227	EC142: Senqu Local Municipality
18	224	EC137: Engcobo Local Municipality
19	510	KZN224: Impendle Local Municipality
20	235	EC156: Mhlontlo Local Municipality

The geography of child deprivation across South Africa is now presented for the SAIMDC 2007. The municipalities have been divided into *national* (i.e. South Africa wide) quintiles of deprivation - five equal groups. On the map, the thin grey lines depict the municipality boundaries. The most deprived 20% of municipalities *nationally* are shaded in a strong blue colour and the least deprived 20% of municipalities are shaded in bright yellow (areas left white are municipalities that were excluded due to small numbers, as explained in Section 2).



The most deprived municipalities, based on the SAIMDC 2007, are prominent in the Eastern Cape, KwaZulu-Natal and the North West. On the other hand relatively little of the most severe deprivation is present in Gauteng or the Western Cape.

The highest levels of child deprivation occur in the former homeland areas of South Africa. This is graphically shown in Map 2 which presents the SAIMDC 2007 at municipality level (on the left) and a map of the former homelands in South Africa (on the right). Deprivation is most prominent in the former Transkei, Ciskei, KwaZulu and Bophuthatswana homelands. High levels of deprivation are also evident in the former homelands within Limpopo, Mpumalanga and the Free State.



Metropolitan areas and the importance of taking population size into account

The combined presence of deprivation and the lack of it within the metropolitan areas¹³ means that they tend to be much less deprived *on average* than most non-metropolitan areas. For example, eThekweni has a rank of 183, the City of Johannesburg has a rank of 197 and the City of Cape Town is ranked 210. This should not disguise the fact that there are very large numbers of deprived children (as well as non-deprived children) within the metros. Indeed, the five municipalities with the largest *number* of children in income/materially deprived households are the metropolitan areas of eThekweni (778,000), the City of Johannesburg (708,000), the City of Cape Town (620,000), Ekurhuleni (521,000) and the City of Tshwane (420,000). These are far greater numbers of deprived children than in any of the non-metropolitan municipalities which, as well as being smaller in overall population size, often have higher rates of deprivation due to the lack of affluent areas that exist in some parts of the major cities.

It is therefore very important that the numbers of deprived children are taken into account alongside the proportions, particularly when using geographical units with such varied population sizes.

¹³ Metros 'are conurbations featuring high population density; intense movement of people, goods and services; extensive development; and multiple business districts and industrial areas. Other features include a complex and diverse economy, a single area where integrated development is desirable, and strong interdependent social and economic linkages between its constituent units' (Statistics South Africa, 2004).

4 How has child deprivation changed between 2001 and 2007?

This final section explores the extent to which child deprivation has changed between 2001 and 2007. In order to undertake this analysis it is necessary to produce a *matching set of variables* for 2001 and 2007 because the variables in the SAIMDC 2007 presented above differ from those in the municipality level SAIMDC 2001 (Barnes *et al.*, 2007) in a number of small ways which were highlighted in Section 2 above. These changes are caused by small differences in wording between the 2001 Census (which was used to develop the SAIMDC 2001) and the Community Survey (which was used for the SAIMDC 2007).

It is also necessary to have a *matching set of geographical boundaries*: the SAIMDC 2007 was produced on boundaries relating to 2007, whereas the SAIMDC 2001 was produced on 2001 boundaries. In order to analyse change between the two time points it is preferable to keep the boundaries constant. As it is not possible to infer 2007 boundary codes for the 2001 data, we applied 2001 boundaries to both time points.

Therefore, for the purposes of the analysis in this section a new SAIMDC 2001 was created (still on 2001 boundaries) with variables that matched the SAIMDC 2007. For the sake of clarity, in this section the original municipality level SAIMDC 2001 (Barnes *et al.*, 2007) is referred to as 'SAIMDC 2001(original)' and the revised version (with variables that match the SAIMDC 2007) as the 'SAIMDC 2001(2007vars)'.

In addition, a new version of the SAIMDC 2007 was created on 2001 boundaries, in order for there to be a common geography. Again, for the sake of clarity, the SAIMDC 2007 that has been presented in the previous sections of this report is referred to in this section as the 'SAIMDC 2007(original)' and the version used for analysis of change over time is referred to as the 'SAIMDC 2007(2001boundaries)'.

This section is therefore an analysis of change between the especially-created SAIMDC 2001(2007vars) and the especially-created SAIMDC 2007(2001boundaries). These two indices have been constructed with a matching set of indicators and domains (i.e. those used in the SAIMDC 2007(original)) on a common set of boundaries (i.e. the 2001 Census' municipality boundaries, which were used in the SAIMDC 2001(original)).

The national picture

How has child deprivation changed across the country as a whole between 2001 and 2007? Using the SAIMDC 2001(2007vars) and the SAIMDC 2007(2001boundaries) we find that there have been some improvements (see Table 2), though child deprivation rates still remain very high. The only indicator to 'change with the times' is the income deprivation indicator, which measures the percentage of children below 40% modified OECD income for each time point (2001 and 2007 respectively); all the other indicators are constant, or have been amended to be constant in order to enable change to be analysed between the two time points (see footnote relating to biological parent deprivation).

Table 2: Levels of child deprivation in 2001 and 2007

	2001 (%)	2007 (%)
Income/material deprivation	81	78
Employment deprivation	50	41
Living environment deprivation	75	72
Biological parent deprivation ¹⁴	3	5
Education deprivation	6	5

The percentage of children experiencing income/material deprivation has fallen by three percentage points, and living environment deprivation has fallen by five percentage points. Employment deprivation has fallen the most, by nine percentage points: that is, whilst half of children aged 0-17 lived in households with no working adults in 2001, this dropped to two children out of every five in 2007 (41%). The percentage of children aged 7-15 not in school fell by one percentage point. The percentage of children experiencing biological parent deprivation increased from 3% to 5%.

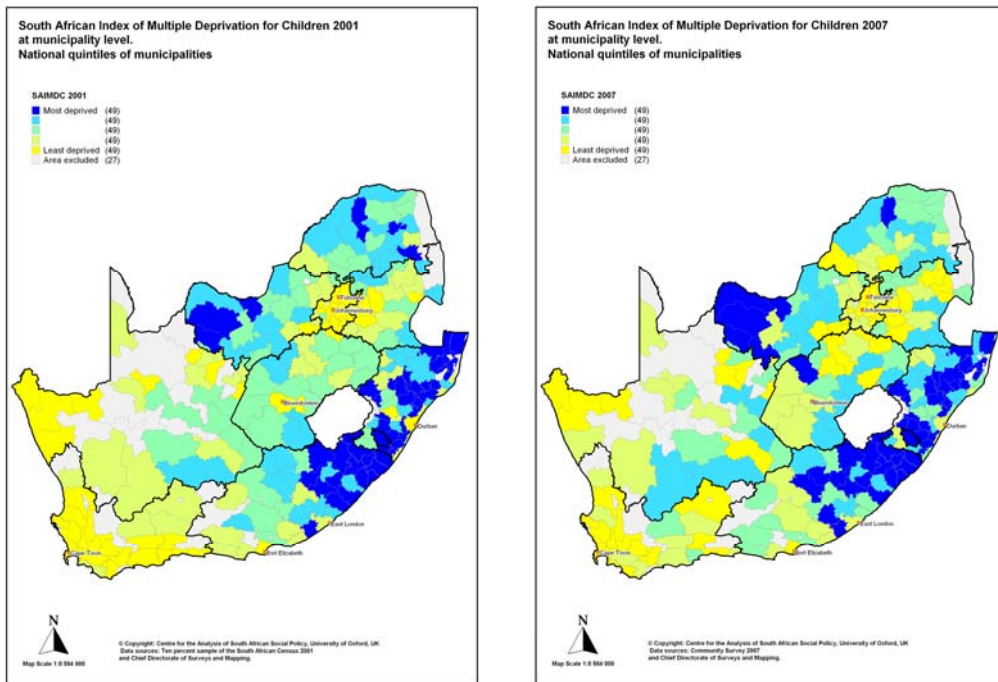
Municipality level change

Map 3 compares the geographical profile of child multiple deprivation in 2001 and 2007. The map on the left is the SAIMDC 2001(2007 vars), and the map on the right is the SAIMDC 2007(2001 boundaries), and so a common set of variables are being compared on a common set of boundaries for the two time points. The prominence of deprivation in the former homeland areas described in the previous section is evident for both time points, and it is striking the extent to which the highest rates of child deprivation remain in the same areas even in the context of some absolute improvement (i.e. reduction

¹⁴ Barnes *et al.* (2007) found that 25% of children were deprived on the Adequate Care Deprivation Domain. That domain additionally captured children who were not living with either of their biological parents, as well as those in child-headed households and children whose parents had both died. The measure of parents living elsewhere could not be created using the CS and so the SAIMDC 2001(2007vars) Biological Parent Deprivation Domain was created using the same variables as for the SAIMDC 2007(2001 boundaries).

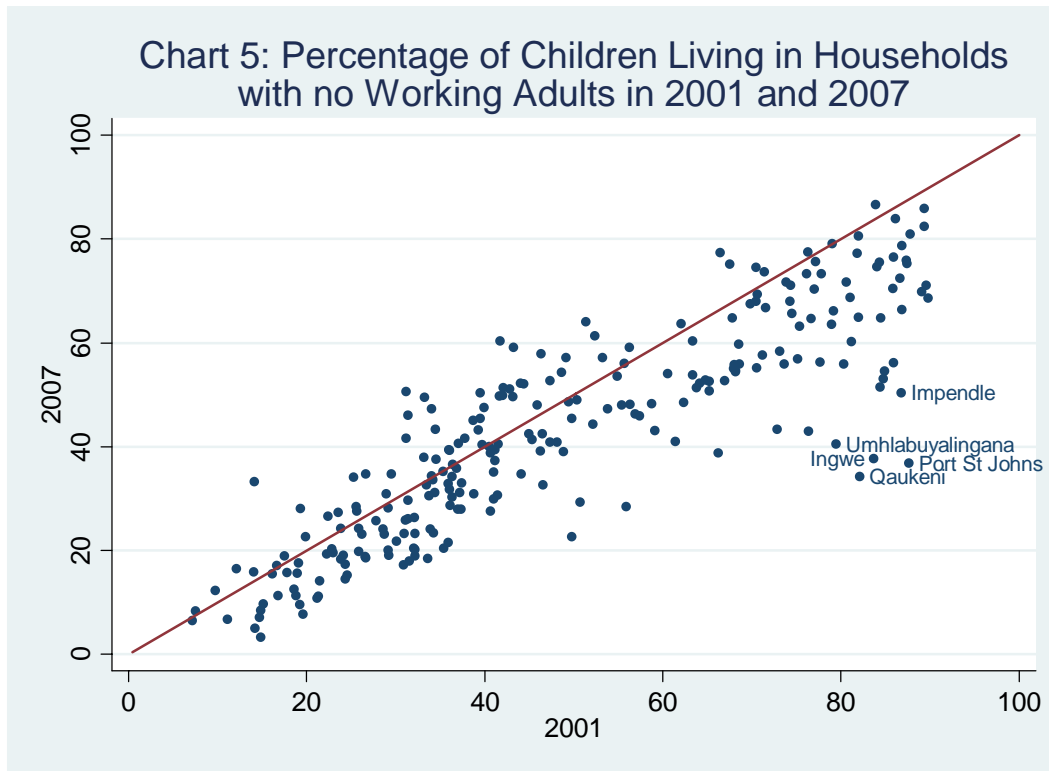
in child deprivation) in all but one of the domains. Though there has been only a small amount of change in terms of the municipalities' relative positions between the two time points, it can be seen for example that (based on 2001 boundaries) there are more areas in the most deprived national quintile in the North West in 2007 than in 2001, and conversely the number of municipalities in this most deprived quintile in Limpopo has fallen.

Map 3: Relative Change in Child Deprivation between 2001 and 2007 at Municipality Level (2001 Municipality boundaries)



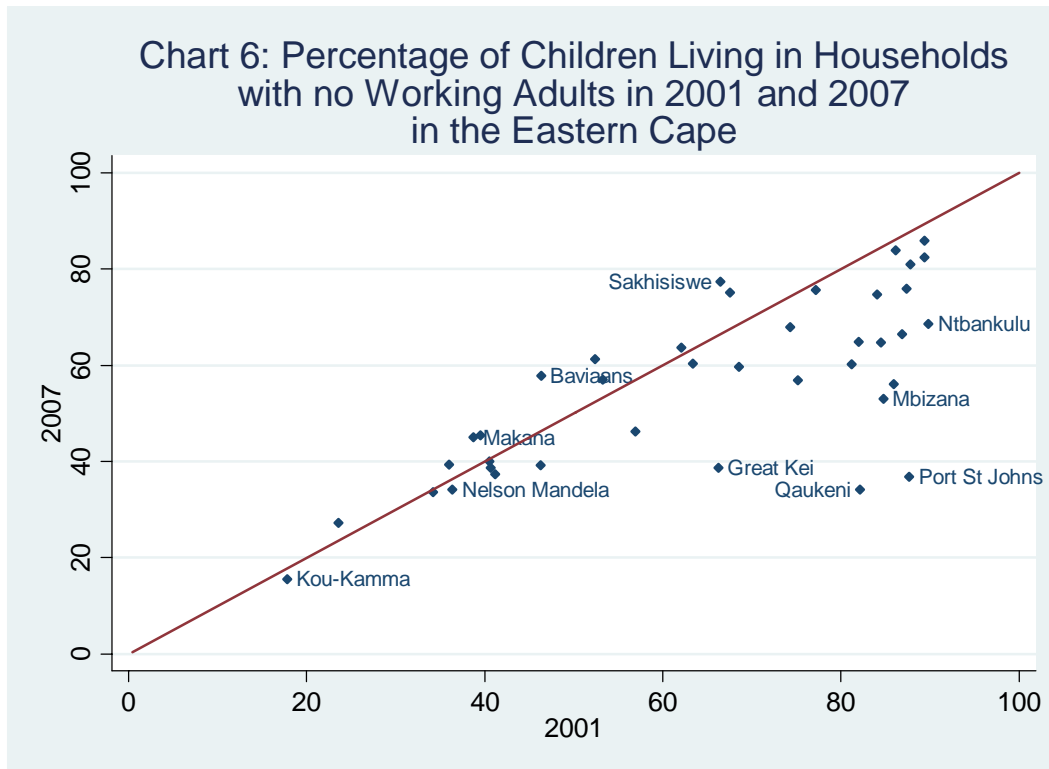
The Employment Deprivation Domain had the largest percentage point fall between 2001 and 2007 at a national level, but have all municipalities improved over this time period in terms of the percentage of children living in households where no adults are in paid employment? Chart 5 shows how the deprivation rate for this domain has changed between 2001 and 2007 for each municipality.

If the deprivation rate for this domain had remained constant for each municipality, all the municipalities would be located on the diagonal line. Municipalities located below the diagonal line have seen an improvement: they have a lower percentage of children in households without working adults in 2007 than in 2001. Some municipalities are markedly below the diagonal line, depicting a large drop in the percentage of deprived children for this domain: for example, Port St Johns (EC), Impendle (KZN), Ingwe (KZN), Qaukeni (EC) and Umhlabuyalingana (KZN) have much lower rates in 2007 than in 2001.



NB. Using SAIMD 2001(2007vars) and SAIMD 2007(2001 boundaries), i.e. a common set of variables and common boundaries.

In Chart 6 only the Eastern Cape is considered, and it is possible to identify which municipalities have had the greatest improvement in employment deprivation between 2001 and 2007. In addition to Qaukeni and Port St Johns, there has been a sharp fall in deprivation rates in Mbizana, Ntabankulu and Great Kei.

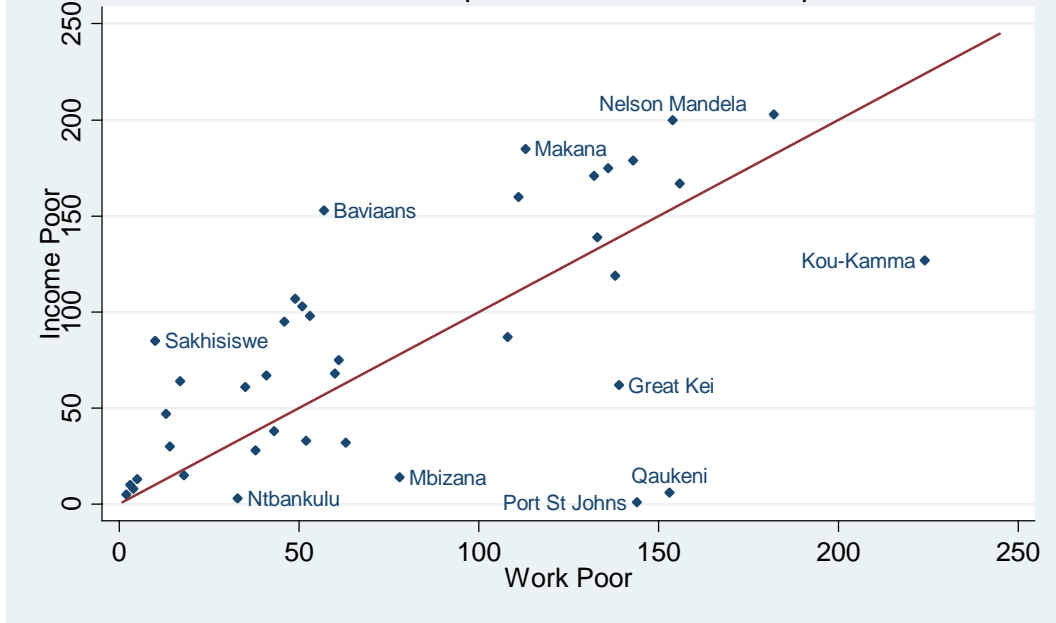


NB. Using SAIMDC 2001(2007vars) and SAIMDC 2007(2001 boundaries), i.e. a common set of variables and common boundaries.

Notwithstanding these improvements in 2007 relating to children in workless households, the following scatter plot (Chart 7) of deprivation ranks for the Income/Material Deprivation Domain and Employment Deprivation Domain for municipalities in the Eastern Cape in 2007 demonstrates that municipalities which have had a sharp fall in employment deprivation between 2001 and 2007 are still ranked as amongst the most deprived in the country in relation to child income/material deprivation.

Chart 7: Children in Income Poor and Work Poor Households in the Eastern Cape in 2007

Ranks of Municipalities where 1= most deprived



NB. Using SAIMDC 2007(2001 boundaries).

5 Concluding remarks

The SAIMDC 2007 at municipality level provides information about the geographical distribution of child poverty and deprivation across South Africa. The geographical profile of child poverty and deprivation has not changed much between 2001 and 2007, with the highest rates of child poverty and deprivation occurring mainly in the former homeland areas, as in 2001.

However, there have been small improvements in terms of the national percentage of children experiencing some types of deprivation. Most notably there has been a reduction in the percentage of children living in households where no adults are in employment (from 50% to 41% of children between 2001 and 2007). Conversely, there has been a small rise in the percentage of children experiencing biological parent deprivation (i.e. where both parents have died and/or the child is living in a child-headed household), from 3% to 5% of children between 2001 and 2007.

There is clearly much more that needs to be done to help to address child poverty and deprivation across the country, and this challenge cannot be addressed in isolation from the living conditions of the rest of the population.

It will be important to continue to monitor change in child poverty and deprivation in South Africa over time, particularly after the release of the forthcoming Living Conditions Survey 2008/09 and the 2011 Census of Population.

Appendix 1 Indicators used in the SAIMDC 2007

This Appendix gives further details of the indicators that were used in the SAIMDC 2007. All indicators were derived from the 2007 Community Survey (CS) (Statistics South Africa, 2007). Information on the CS question used and the responses (codes) selected to define a child as deprived are provided below. All numerators and denominators exclude children living in institutions. For all domains the score was calculated as a simple rate: i.e. the percentage of children experiencing deprivation on one or more of the indicators in that domain. Unless otherwise indicated, the indicators (numerators and denominators) listed below take into account children aged 0-17 years, derived from CS question p03_age (“What is (the person’s) age in completed years?”).

The Statistics Council produced a ‘cautionary note’ about the CS. We have considered these concerns and where possible taken steps to reduce them (see especially the section in Appendix 1 about the income/material deprivation domain). The note specifically cautions against using municipality level age breakdowns of variables (which is undertaken here). However, we have undertaken empirical Bayesian shrinkage estimation in order to test the robustness of the domains at municipality level and obtained a ‘pre-shrinkage’ and ‘post-shrinkage’ Spearman rank correlation coefficient of 0.9999, which rounds to 1.0 ($p=0.0000$).

A1 Income and Material Deprivation Domain

Numerator

Number of children living in a household that has a household income (need-adjusted using the modified OECD equivalence scale) that is below 40% of the mean equivalent household income

The CS 2007 question P52_Income_Category (“What is the income category that best describes the gross monthly or annual income of (the person) before deductions and including all sources of income?”) was used to calculate a household income. A household equivalent income was calculated using this variable, the modified OECD equivalence scale, and CS 2007 question p03_age (“What is (the person’s) age in completed years?”). The cut-off used was a household below 40% mean household equivalent income.

Missing and implausible income data in the CS 2007 was imputed using sequential regression multiple imputation (SRMI) techniques (see Barnes (2009) for details about how the technique was applied to the CS 2007 income data).

Statistics Council’s cautionary note about the CS 2007 states that “The income includes unreasonably high income for children due to

presumably misinterpretation of the question, e.g. listing parent's income for the child." We explored this issue in the dataset and found that almost 92% of children (0-18 years) have no income or very low income (i.e. less than R400), which seems reasonable. Another 4% have no value, either because a response was not given, or Stats SA's logical imputations gave the code for no response. This leaves approximately 4% of cases where the income could be regarded as 'unreasonably high', although where to draw the threshold is debatable, and could depend on the age of the child (i.e. older children might have a part-time job but very young children are unlikely to be carrying out any income-earning activities).

This was dealt with in SRMI of the income variable where under 15s with a high income (greater than R400) were set to missing (1.64% of all cases in the dataset) and therefore imputed. The imputation procedure employed allows values reclassified as missing to be imputed back into the data as the original value if the data support such an imputation.

Number of children living in a household without a refrigerator

This indicator used CS question H10A_Fridge ("Does the household have any of the following: radio, television, computer, *refrigerator*, telephone in the dwelling, cell-phone?"). Children were selected who lived in a household without a refrigerator (code 2).

Number of children living in a household with neither a television nor a radio

This indicator used CS question H10C_Television and H10B_Radio ("Does the household have any of the following: *radio*, *television*, computer, refrigerator, telephone in the dwelling, cell-phone?"). Children were selected who lived in a household with neither a radio nor a television (code 2 for both radio and television).

Ten versions of the income domain's numerator were averaged (using income data from each of the ten imputations) before producing the income score.

Denominator

This domain used the total child population as the denominator.

A2 Employment Deprivation Domain

Numerator

Number of children living in households where no adults aged 18 or over are in employment

Children were identified for this domain if there was nobody in their household aged 18 or over who was in employment. Adults were defined as not in employment if they were aged 18 or over and DER01_Veso was not equal to one (a derived variable about employment status, where 1=employed).

Denominator

This domain used the total child population as the denominator.

A3 Education Deprivation Domain

Numerator

Number of children who are not in school

This indicator used CS questions p03_age (“What is (the person’s) age in completed years?”) and p26_attendance (“Does (the person) presently attend an educational institution?”). Children (aged 7-15 inclusive) not in school (p26_attendance, code 2) were selected.

Denominator

This indicator used children aged 7-15 as the denominator.

A simple domain score was calculated of the percentage of 7-15 year olds who are not in school.

A4 Living Environment Deprivation Domain

Numerator

Number of children living in a household that has no piped water inside the dwelling or yard

This indicator used CS question h03_water_access (“In which way does this household obtain water for domestic use?”) and selected children in households that did not respond ‘piped water inside the dwelling’ (code 1) or ‘piped water inside the yard’ (code 2).

Number of children living in a household that has no use of electricity for lighting

This indicator used CS question h09_lighting (“What type of energy/fuel does this household mainly use for lighting?”) and selected children in households that did not respond ‘electricity’ (code 1).

Number of children living in a shack

This indicator used CS question h01_hu (“Which of the following types best describes the main dwelling unit that this household occupies?”) and selected children in households that responded ‘informal dwelling/shack in back yard’ (code 6), or ‘informal dwelling/shack not in back yard e.g. in informal/squatter settlement’ (code 7).

Number of children living in a household that has neither a pit latrine with ventilation nor a flush toilet

This indicator used CS question h06_toilet_facil (“What is the main type of toilet facility available for use by this household?”) and selected children in households that did not respond ‘flush toilet (connected to sewerage system)’ (code 1), ‘flush toilet (with septic tank)’ (code 2), or ‘pit toilet with ventilation (VIP)’ (code 4).

Number of children living in a household that is crowded

This indicator was calculated using CS question h_02rooms (“How many rooms, including kitchens, are there for this household? Count all rooms in all dwellings. Exclude bathrooms, sheds, garages, stables, etc. unless persons are living in them.”)

It was not possible to apply the Canadian National Occupancy Standard which had been used in the SAIMDC 2001 as there was insufficient information in the CS. Instead, overcrowding was more crudely defined as taking place if the number of people in the household (of any age) divided by the number of rooms was greater than or equal to two.

Denominator

This domain used the total child population as the denominator.

A5 Biological Parent Deprivation Domain

Numerator

Number of children whose mother and father are no longer alive

This indicator used CS question p48_mother (“Is (the person)’s own biological mother still alive?”) and p50_father (“Is (the person)’s own biological father still alive?”) Children were selected whose mother was not alive (question p48_mother, code 2) and whose father was not alive (question p50_father, code 2).

Number of children living in a child-headed household

This indicator used CS question p03_age (“What is (the person’s) age in completed years?”) and p07_relation (“What is (the person)’s relationship to

the head or acting head of the household?”). Children in households with a head of household under the age of 18 were selected.

Denominator

This domain used the total child population as the denominator.

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