

Introduction and Overview

Background

The District Health Barometer (DHB), was developed by the Health Systems Trust (HST) in response to a need for accessible management information in South Africa. The DHB provides a snapshot of the overall performance of the public health sector across the provinces and health districts in South Africa by means of an annual publication. The DHB, which has been available on an annual basis since 2005 and which draws data from the District Health Information System (DHIS), StatsSA, the National Treasury (BAS data) and the national TB register, seeks to highlight inequities in health outcomes, health resource allocation and outputs as well as track the efficiency of health processes between provinces and between all districts in the country, with particular emphasis on rural and urban (metropolitan) districts.

The report also functions as a tool to monitor progress towards strategic health goals such as the Millennium Development Goals (MDGs) and to support the improvement of provision of primary health care and the improvement of the quality of routinely collected health data. The analysis and comparison of health and socio-economic indicators between districts (across provinces) in the DHB, assists in identifying successes, gaps and potential corrective measures within the health system.

The DHB is guided by an advisory committee made up of managers from the Departments of Health at national, provincial and district level, and also includes experts and stakeholders from the academic and research arenas.

The indicators chosen are all based on secondary data that are either readily available, or on available raw data that needed manipulation. Where the data are not publicly available, such as with the DHIS and Treasury data, HST has requested and received written permission to use the data.

Indicators¹ used in this DHB

The DHIS indicators in the DHB, which make up about half of the indicators featured in the report, are relevant and locally appropriate. They have to a large degree been determined by the range and quality of data available. The indicators chosen generally have been the ones that are linked to measuring the MDGs, or those which measure some important aspect of health policy such as access to health services, equity in provision, or efficiency of provision of health services.

The socio-economic and demographic indicators (such as household access to water, access to private medical schemes, population figures and deprivation data) provide insight into some of the social determinants of health in the districts.

Methodology and Data Sources

Population data

Indicators that require population denominators use the mid-year population estimates for the relevant year that were available at the time of calculation. The district population estimates that were developed by the Department of Health for 1995-2009 (based on the best available information from the Census 2001 and mid-year estimates) are still in use and were used in this DHB. The release of the Community Survey 2007 showed substantial differences in the populations of certain municipalities (districts) compared to these estimates, and these differences can have substantial effects on a range of indicators that use population-based denominators. The population figures by district and province used in the DHIS and the Community Survey and the difference between them are shown in Appendix 4.

The Community Survey also confirmed that the number of children was under-estimated in both the previous censuses. This will have resulted in an overestimation of indicators using denominators derived from these estimates such as immunisation and delivery coverage.

The Excel data summary tables provided on the CD of this publication provide the population estimates from the StatsSA Community Survey 2007 as well as those estimated by the Department of Health for 2005, 2006 and 2007.

¹ A table with definitions, references and terms for each indicator used in this report is available in the appendices.

Deprivation indices

The deprivation index is a measure of relative deprivation across districts within South Africa. Just as any index, the deprivation index is a composite measure derived from a set of variables².

Variables included in the analysis are considered to be indicators of material and social deprivation. The deprivation indices for this report were generated using StatsSA's 2006 General Household Survey (GHS) data and the 2007 Community Survey data and has been calculated in such a way that the indices are directly comparable to the deprivation indices generated from the 2005 GHS data. This therefore provides 3 years of deprivation trend data. Although the 2001 deprivation index was generated using a similar methodology and the relative positions (ranks) and socio-economic quintiles are districts can be compared, the deprivation index scores for 2001 are not directly comparable.

To simplify interpretation, the deprivation index was normalised, such that the district that is least deprived has a deprivation index of 1. **Districts with higher values are relatively more deprived than districts with lower values.** The score itself does not have any intrinsic meaning, but the relative scores show which districts are more deprived than others and can be used to rank districts. Each district was thus ranked according to levels of deprivation and categorised into socio-economic quintiles (SEQs). Districts that fall into quintile 1 (lowest quintile) are the most deprived districts. Those that fall into quintile 5 are the least deprived (best-off).

In addition to district level deprivation indices, this report has provided deprivation indices for **sub-districts**³. These indices calculations were based on similar variables used in generating a deprivation index at the district level. One of the spin-offs of the DHB has been that these deprivation indices were part of the data used by the National Department of Health to identify 18 sub-districts across the country with high levels of deprivation in order to provide additional support to them.

Further details on the deprivation index and its calculation can be seen in the appendices.

Other measures of socio-economic status

Since there is no official consensus on a single measure of poverty or deprivation, an additional indicator is included with the deprivation index. This is the percentage of households with access to piped water (both the General Household Survey data and the Community Survey data).

District health financing indicators

This year the district level estimates of expenditure per capita on non-hospital PHC have been updated. Updated data were extracted from the BAS for 2007/08 and the calculations for the 2005/06 and 2006/07 financial years were adjusted (due to having new district-level medical aid estimates and thus adjustments to the estimated uninsured population denominator). Therefore there are small differences between the values shown here and those published in the previous reports.

For the purposes of these calculations of per capita expenditure (PCE) we have divided public sector expenditure by the uninsured population. It is however noted that the GHS and other sources indicate that there is significant use of the private sector by the uninsured population and also some use of the public sector by the insured population.

Data from the Basic Accounting System (BAS) financial database for all provinces except North West were obtained in June 2008 from Vulindlela. Summarised data from North West were obtained from the chief financial officer of the province. Provincial expenditure was coded according to the programmes and sub-programmes published by National Treasury. Expenditure from sub-programmes 2.1-2.5 (District management, Community health clinics, Community health centres, Community-based services and Other community services) constitute the non-hospital PHC expenditure under District Health Services.

Additional data sources included:

- Data on local government (LG) expenditure on primary health care from National Treasury. Net expenditure was used, i.e. expenditure less income (which includes transfers from provinces to LG).
- Factors for inflation adjustments based on CPIX were obtained from National Treasury to convert all values to real 2007/08 prices.

² The deprivation index used in this report was generated using principal components analysis (PCA). PCA identifies the underlying process that has the most influence in determining the outcome of each variable included in the analysis. Each variable is weighted based on its linear association with the underlying process. The weighted variables are then used to construct the deprivation index.

³ Note all District Municipal Areas are omitted from the analysis.

- Population data from the DHIS, based on extension of StatsSA figures to sub-district level. It is acknowledged that for recent years these estimates may not be an accurate reflection of actual population size per district, which will affect the accuracy of the per capita expenditure estimates.
- Medical scheme coverage from the StatsSA General Household Surveys was used to calculate the uninsured population. The 3-year average medical scheme coverage from 2005-2007 was used to calculate the uninsured population denominator for the 2005/06, 2006/07 and 2007/08 expenditure per capita calculations, to reduce variability due to sampling changes at district level.
- Geographic information determining district boundaries from the Municipal Demarcation Board.
- Data on health facilities from the DHIS.

All expenditure was allocated to districts using information from various fields in the financial database. The DHIS facilities file was used to code all entries linked to individual health facilities. Expenditure which could not be allocated to a specific district was subsequently allocated to all of the districts within the relevant province in proportion to the total population share of each district. Expenditure that was allocated to a region including 2 districts was similarly allocated to each district within that region according to population share. Finally, expenditure for cross-boundary districts was combined and included as one item in the province that the district is located in according to the new demarcation boundaries. This means that for the purposes of analysis of per capita expenditure at district level, some expenditure which is originally recorded in one province may be shown under a different province.

Net local government expenditure on health services was added to provincial expenditure on non-hospital PHC, and this total was divided by the uninsured population to obtain expenditure on non-hospital PHC per capita.

The figures have all been adjusted to take the effect of inflation into account and are presented in **REAL** 2007/08 prices. This means that increases in expenditure over time reflect greater availability of resources rather than just increases to cover the increasing cost of health care due to inflation. The values for PCE are also included in **NOMINAL** terms (not adjusted for inflation) in the electronic version (CD).

A matter of concern is that for some provinces, expenditure is still not clearly allocated to districts and in some provinces district coding had errors. This suggests that financial management does not focus at district level. It is suggested that cost-centred accounting become standard practice. It is also difficult to get verifiable information of transfers to local government.

The indicator 'Cost per patient day equivalent' was calculated for all district hospitals, by dividing the total expenditure attributable to each facility (from the BAS and NW expenditure data) by the number of patient day equivalents⁴ for each facility (from DHIS). This indicator was then aggregated to district, provincial and national level by weighted averages.

Health facilities and beds

The information on private hospitals has been obtained from the Wilbury and Claymore 2008 database, and does not include state-aided private hospitals or private public partnerships.

Data on public sector health facilities were extracted from the DHIS 2007 data file. It should be noted that with the categorisation of facilities to the new definitions (e.g. from District Hospital to Level 1 Hospital) there may be some incorrect allocations of facilities. There may also be some duplication where private units or other operational units within public facilities are not coded at the correct level and are counted as facilities.

Indicators from the District Health Information System (DHIS)

The DHB has increased the focus and attention on DHIS data quality, analysis, feedback and use. In the past, apart from combining data for cross-boundary districts, the DHB followed the principle not to change the data from the DHIS, even if it was obviously incorrect, as that would create the additional problem of multiple 'versions' of the same data source.

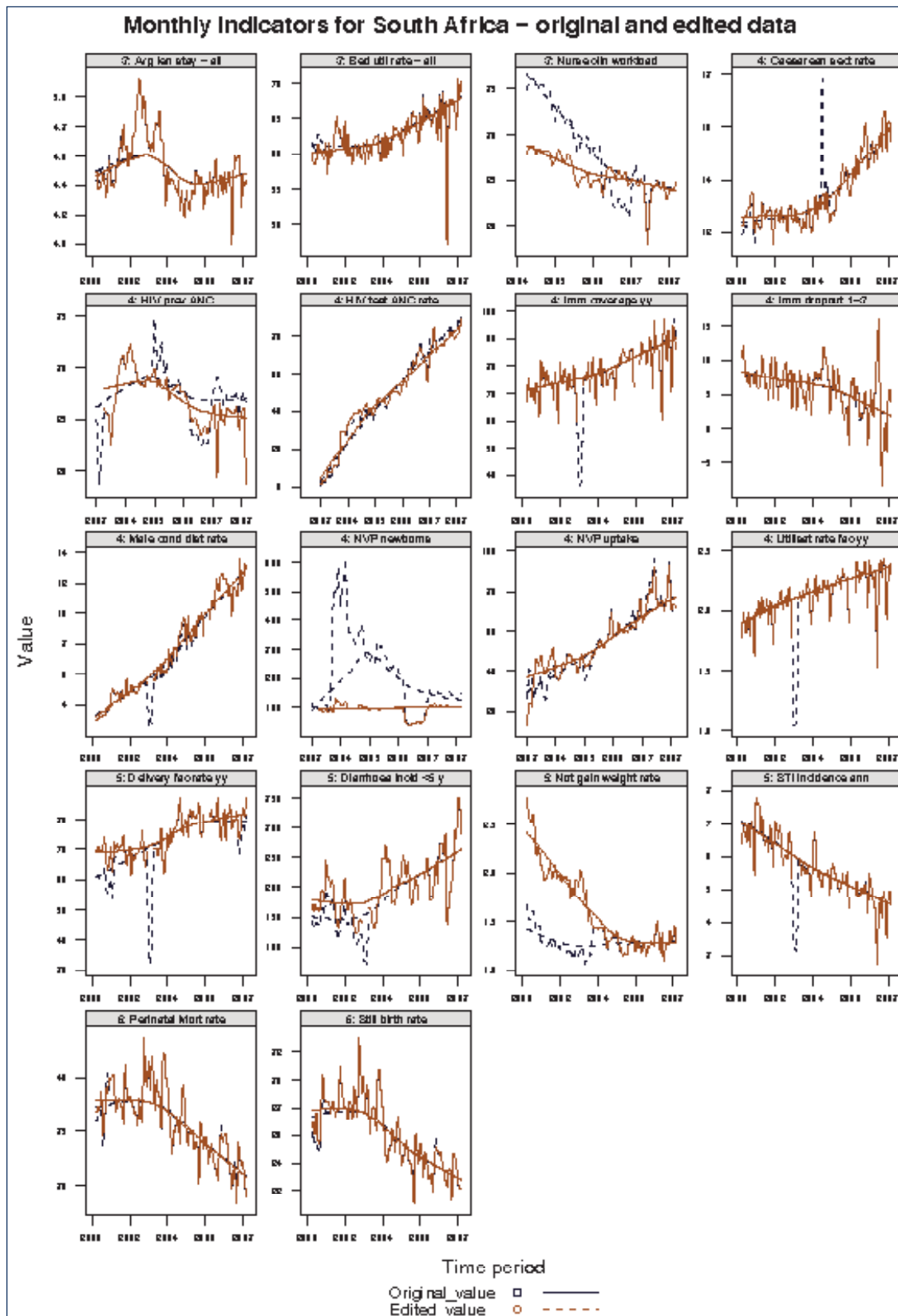
However, this year data from the DHIS were extracted for the last eight years up to the period ending March 2007/08. Firstly, retroactive changes and corrections have been made to the data by DHIS administrators and thus the figures may differ from previous DHB publications and versions of the DHIS. In addition, **for the first time, in order to portray trends in a more accurate way, outliers and data with major missing numerators or denominators have been removed.** Where there were major data quality problems, we tried to highlight this in the accompanying text with the view to explaining this and improving the quality in subsequent years.

⁴ Patient day equivalents (Inpatient days + 1/2 Day patients + 1/3 outpatient and ER visits).

Examples of the overall effect of these changes to the national data are shown in Figure A. In general there was little impact on the national values. However the changes may have a much greater impact at district level, where leaving data with apparent errors would have resulted in unlikely trends. Examples of this are shown in Figure B.

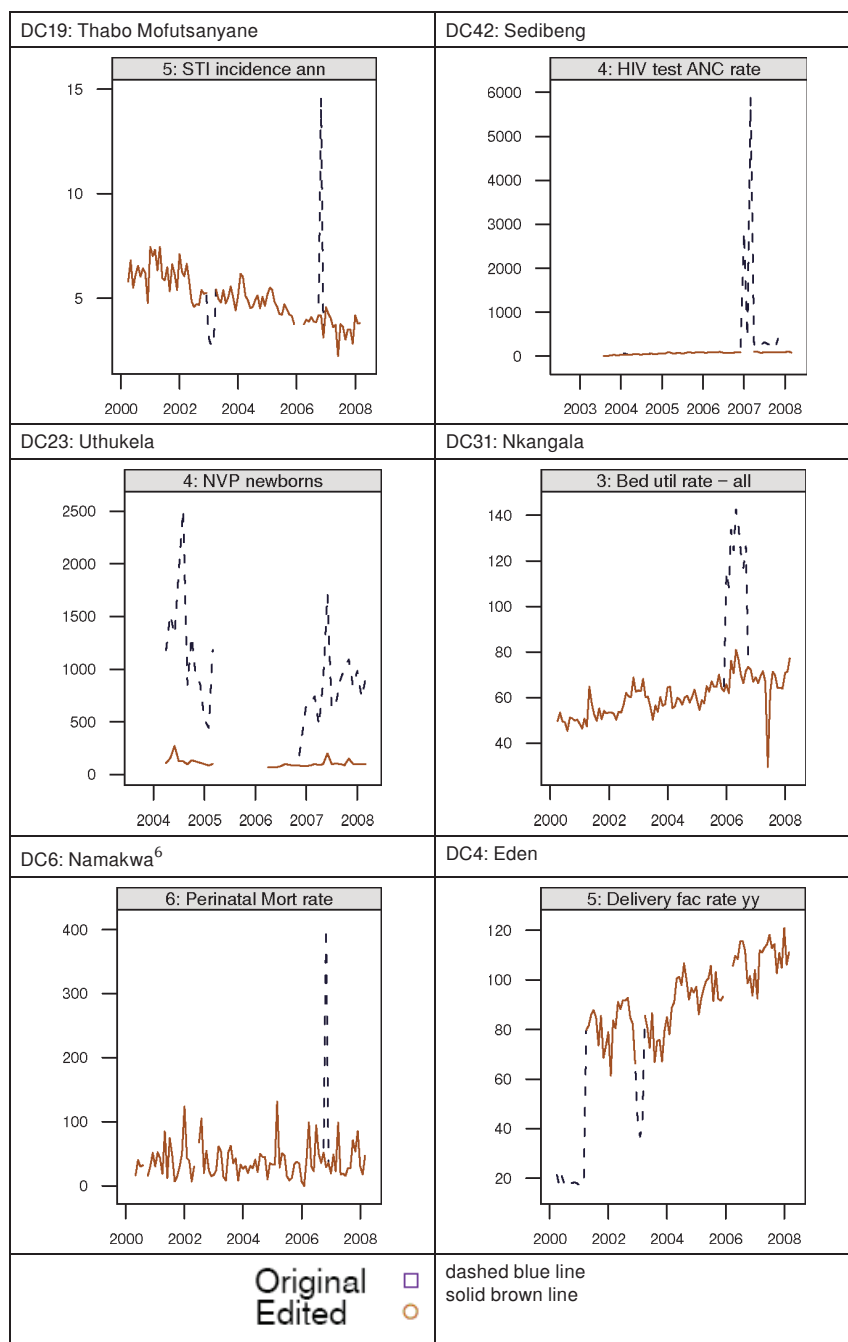
The dotted line represents the original data as received from the Department of Health (DoH). The solid line represents edited data that remains after removal of outliers and unlikely values as described. The trend lines are generated by loess regression (R Project for Statistical Computing).

Figure A: Example of data editing: removal of outliers in DHIS data trends at national level⁵



⁵ monthly data with loess regression line

Figure B: Selected examples of removing outlier data at district level



Most of the indicators in this report have been obtained from the DHIS data files at facility level (NDoH5) for the financial years ending March, for 2000/01 up to 2007/08, received in October 2008. Data for the indicators of interest were exported into a single MS Access database to facilitate uniform coding of districts and trend analysis across the entire period. Therefore data for all DHIS indicators previously published were replaced with this recently extracted data; only manually calculated indicators such as the clinic supervision rate for 2006/07 were not revised. As in previous reports, data for selected indicators are given for **district hospitals only** (average length of stay, bed utilisation rate, Caesarean section rate, cost per PDE).

Gaps in the completeness of the DHIS data affect the general completeness of this report, national averages, interpretation, analysis and trends. Some indicators had major data completeness problems and data were obtained directly from provinces (e.g. WC PMTCT indicators and GP ANC 1st visits denominator).

There is inadequate monitoring of indicators throughout the system, from facility to national levels. This has resulted in some districts having indicator values that are clearly implausible.

⁶ Explains why in the NC the 2006 data showed such a high PNMR and how one major outlier can so distort the annual value and affect the entire province's value.

Averages

It is important to note that all averages (provincial, national, metro and ISRDP) are WEIGHTED AVERAGES, based on the total numerator and denominator for all the sub-areas included, and are thus not averages of the district indicator values. Therefore, these averages may appear 'skewed' for any indicator in any province where there are districts of very different sizes or workloads and where a bigger district has a very different value from the other smaller districts in a province.

Clinic supervision rate

The data elements for this indicator are collected by the DHIS, but the calculated indicator was not available from the system and was calculated manually:

- The number of supervisor visits per facility per month were extracted from NDoH5. Since some facilities recorded more than one visit per month the data were recoded so that all entries ≥ 1 were set to 1.
- These data were then summarised by district to give the total number of supervisor visits for facilities in that district for the year, from which the average number of visits per month was calculated.
- The average visits per month (x100) were then divided by the number of facilities to obtain the supervision rate.

Since there are discrepancies between the number of PHC facilities in the database and the number reporting any data on supervision (even zero visits), there may be some inaccuracies comparing trends in this indicator.

Antenatal HIV and syphilis sero-prevalence survey

This is the second year that the results of this survey have been released at district level. The DHIS routine data for the HIV prevalence indicator can be validated against the HIV prevalence survey results. Both sets of data are displayed in the district profiles, for 2006/07 and 2007/08. The correlation of the national antenatal sero-prevalence survey with the DHIS data can be seen in Appendix 1 and has improved from the previous year, with a 94% correlation for the current data⁷. There is a systematic bias between the two data sources, with the survey values on average about 5 percentage points higher than the routine data estimates.

Data Display

As in previous District Health Barometer reports, health districts are ranked, classified and analysed by various groupings e.g. metropolitan districts, ISRDP⁸ (rural development node districts) and provinces, on the basis of these indicators.

Financial year and calendar year

The indicators from DHIS and the BAS financial system cover the 12 month period April - March, which is the financial year of the Department of Health. Only the TB data (TB cure rate and smear conversion rate) cover a calendar year. Indicators from StatsSA and the antenatal sero-prevalence data are for the period of the census, or survey.

Indicator ranking - is first always best?

The districts are ranked from 1 to 52 (for the various indicators in the league table graphs with number 1 representing the best performance and number 52 the worst performance). However, with some indicators such as nurse clinical workload and Caesarean section rate, being in the number 1 position does not mean best performance; best is usually in the middle range close to the South African average.

In the district profiles and the data file, a simple colour coding and a rank number has been added to facilitate understanding:

- green 1-17 (best)
- yellow 18-35 (middle)
- orange 36-52 (worst).

⁷ An addendum to the antenatal survey results was released on 12 May 2009, revising the methodology and values of the survey results with no age weighting. These new values have been included in the Excel data file that is included in the CD that comes with this publication, but it was too late to update all the graphs and figures in this publication. The correlation coefficient using the new values remained very similar. The addendum for published 2007 HIV and Syphilis prevalence survey report can be found at URL: <http://www.doh.gov.za/docs/adendum-tables-f.html>

⁸ <http://isrdp.dplg.gov.za/>

Change graphs and values

The change values as shown in the DHB are absolute differences (usually expressed in percentage points), which are the arithmetic difference of two percentages. So for example if a district in 2007 had a TB smear conversion rate of 50% and in 2008 the smear conversion rate was 75% then the improvement is represented as a 25 percentage point increase i.e. the 2007 value of 50 subtracted from the 2008 value of 75.

Trend graphs

In this year's publication, graphic illustrations of trend data allow for a clearer picture of the indicator to emerge. In many instances these graphs have replaced the year-on-year change graphs. Examples of the typical trend graphs displayed in this report are illustrated below.

1) Annual indicator trends by district within a province.

These graphs can be found in Section B: Province and District Profiles. They illustrate each indicator individually by each district within a particular province. These graphs compare districts within a province and show variation over a certain time period with respect to a particular indicator (e.g. the delivery rate in facility and the Caesarean section rate in Nelson Mandela Metro have been consistently higher than in any of the other Eastern Cape districts since 2000). The graphs also reflect if there are wide fluctuations in the data, such as in the immunisation drop out rate and nevirapine uptake in newborns.

2) Annual trends of an indicator comparing districts and provinces

These graphs help the reader explore how an indicator varies over a number of years across districts and provinces. For instance, figure D shows that the Caesarean section rate in most of the districts in the Western Cape are higher than those in the Northern Cape and North West. As the scale of the y axis is the same for all the graphs, one can easily notice differences. It also shows variation and change within the districts in a particular province over time. For example the difference in the rates between iLembe district and other districts in KwaZulu-Natal. This difference has diminished in the two most recent years.

These graphs are used in Section A: Indicator comparisons by district.

Cross-boundary districts

The existence of cross-boundary sites continues to complicate analysis at the district level, although the scale of the problem is diminishing. Currently indicators in a number of health districts that cross provincial boundaries are affected because the data on which these indicators are based are collected by two provinces with differing information systems. This is a fluid situation, which is also going to be affected by proposed changes to provincial boundaries as the Department of Provincial and Local Government has gazetted the Cross-Boundary Municipalities Laws Repeal Bill for public comment. For the current DHB data for cross boundaries have been allocated as follows:

Cross-boundary district	Data from:	Data incorporated into:
Tshwane metropolitan municipality	Gauteng/North West	Gauteng
Frances Baard district municipality	Northern Cape/North West	Northern Cape
Kgalagadi district municipality	Northern Cape/North West	Northern Cape
West Rand district municipality	Gauteng/North West	Gauteng

As detailed in the government Gazette Nr. 28363 of 23 December 2005⁹, the cross-boundary municipality of Bohlabela, has been divided between Limpopo and Mpumalanga provinces and thus no longer exists¹⁰. However some sources still provide data according to the old demarcation, and where no detailed underlying data are provided it is not possible to reallocate the indicators according to the new demarcation. For example, in the case of the TB indicators, the TB cure rates are evaluated a year after the commencement of treatment, and Bohlabela district's results are still being evaluated for the TB cure rate 2006 and the TB smear conversion rate 2007.

9 Available from http://www.demarcation.org.za/documents/Legislation/2006Jan17_1/Cross_Boundaries_Repeal_Act.pdf.

10 Bushbuckridge sub-district has become part of DC32 Ehlanzeni district in MP and Maruleng has become part of DC33 Mopani district in LP.

Figure C: Annual indicator trends by district within a province

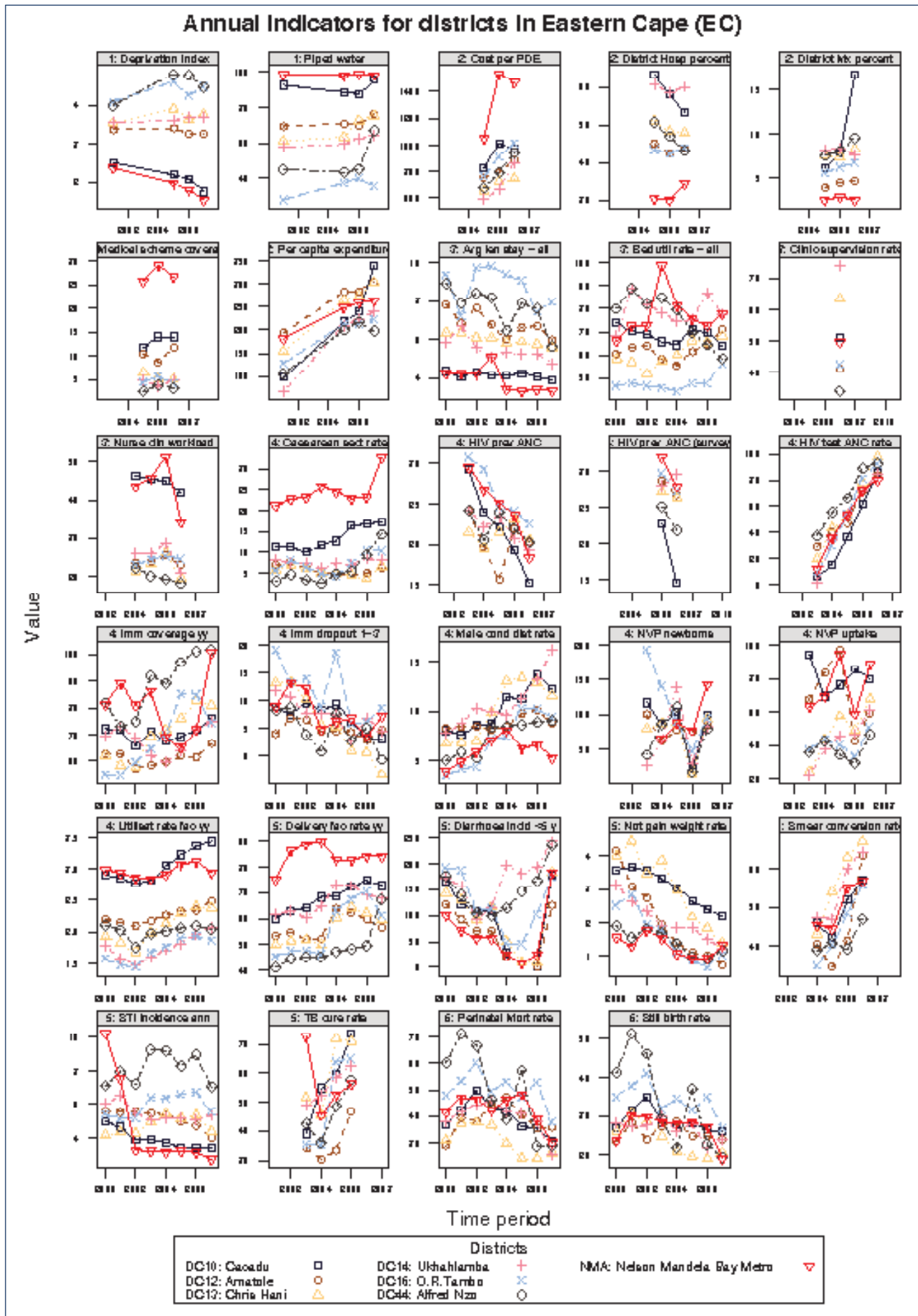


Figure D: Annual trends of an indicator comparing districts and provinces

