Introduction and Overview

Background

The 2016/17 *District Health Barometer* (DHB) provides an overview of the delivery of primary health care (PHC) in the public health sector across the provinces and districts of South Africa. The DHB has been issued every year since 2005, and draws data from the District Health Information Software (DHIS), the Ideal Clinic Realisation and Maintenance system, Statistics South Africa (StatsSA), the National Treasury Basic Accounting System (BAS), the National Health Laboratory Service (NHLS), the national Electronic Tuberculosis (TB) Register (ETR.Net) and the Electronic Drug-resistant Tuberculosis Register (EDRWeb). The publication seeks to highlight inequities in health outcomes, health-resource allocation and delivery, and to track the efficiency of health processes across all provinces and districts.

Compilation of the DHB is guided by a technical work group made up of managers from the National Department of Health (NDoH) and Health Systems Trust (HST).

The district chapters are aligned to the District Health Plan (DHP) format of the NDoH. Its publication timed to coincide with the planning cycle, the 2016/17 DHB will serve as an important resource for the completion of the DHPs by the 52 districts.

The DHB is available at http://www.hst.org.za and on CD from the HST.

Methodology and data sources

Indicators used in the 2016/17 DHB

The indicators[a] featured in this edition of the *District Health Barometer* are linked to the measurement of the NDoH's Annual Performance Plan (APP), provincial APPs and DHPs. Indicators linked to measuring aspects of the burden of disease have also been included. All the indicators in this publication are categorised according to the 2013 National Indicator Data Set (NIDS); where applicable, the indicator names are also replicated from the NIDS.

This year, eleven new indicators have been added. These are:

- Percentage of assessed PHC facilities with 90% of tracer medicines available
- Infant PCR test positive around 10 weeks rate
- Infant exclusively breastfed at DTaP-IPV-Hib-HBV 3rd dose rate
- School Grade 8 screening coverage
- TB symptom 5 years and older screened in facility rate
- TB client loss to follow up rate (ETR.Net)
- TB client initiated on treatment rate
- TB Rifampicin Resistant confirmed treatment initiation rate
- TB DR client death rate (EDRWeb)
- TB DR client loss to follow-up rate (EDRWeb)
- Clients remaining on ART rate.

The following indicators which are usually reported on per programme have been removed from this edition:

- Percentage of assessed PHC facilities with patients that have access to a medical practitioner
- Delivery by Caesarean section rate (district hospitals)
- Stillbirth in facility rate
- HIV PCR birth testing coverage
- HIV intrauterine transmission rate
- Vitamin A coverage 12–59 months
- Inpatient death under 5 years rate
- Incidence of TB (all types)

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

- TB cure rate (new pulmonary smear-positive)
- TB loss to follow up rate (new pulmonary smear-positive)
- Percentage of TB cases with known HIV status
- Prevalence of hypertension.

Please note however that some of these indicators are included in the district tables in Section B.

A new chapter on environmental health is also included.

Most of the indicators in this report, excluding the socio-economic, financial, non-communicable disease (NCD) and TB indicators, were updated from the DHIS data files at facility level (NDoH5) for the financial years ending March, up to 2016/17, and received in June 2017. Data for the selected indicators were exported into a single MySQL database to facilitate uniform coding of districts and trend analysis for the last 10 years. As in previous reports, data for selected indicators are given for district hospitals only in the Indicator Comparisons per programme section. These are: Average length of stay, Bed utilisation rate, OPD new client not referred rate and Expenditure per patient day equivalent. However, data for these indicators are included in the district tables for regional and tertiary/central hospital in section B.

District health expenditure indicators

Provincial health expenditure up to 2016/17 was extracted from the National Treasury BAS database. Expenditure allocated to specific health facilities (under the 'Responsibility level' code) was coded to the latest DHIS facility information. All other expenditure that could not be clearly allocated to a specific district was allocated to each district in proportion to the population share of the areas involved. For example, provincial-level expenditure was allocated to each of the districts in the province.

Provincial expenditure was coded according to the programmes and sub-programmes published by the National Treasury. Expenditure from sub-programmes 2.2–2.7 (community health clinics, community health centres, community-based services, other community services, and HIV and nutrition) constitutes the non-hospital PHC expenditure under District Health Services. Total District Health Services expenditure includes all sub-programmes under Programme 2: District Health Services, except sub-programme 2.8 (Coroner services).

Additional data sources used include:

- Data on local government expenditure on PHC from the National Treasury. Net expenditure was used, i.e. expenditure less revenue (which includes transfers from provinces to local government).
- Factors for inflation adjustments based on CPIX (StatsSA) were used to convert expenditure for all years to real 2016/17 prices. This means that increases in expenditure over time reflect greater availability of resources rather than merely increases to cover the increasing cost of health care due to inflation.
- Medical scheme coverage was updated using modelled estimates provided by Daniel Shapiro of Insight Actuaries and Consultants. The uninsured population was calculated using these coverage estimates and the population time series estimates in DHIS for all years. Overall, the coverage level has remained remarkably static at around 16% ± 1%. Therefore, for the purpose of this analysis, it was considered adequate to apply a single-year estimate of medical scheme coverage to the time series population, since the variation in coverage between districts is more relevant than changes in coverage over time.
- A model of the number of medical scheme beneficiaries in households was built based on the 2015 General Household Survey (GHS) data. The model was used to estimate medical scheme membership for the 2011 Census data, for which medical scheme membership was not recorded. The model was a Generalised Linear Model (GLM) in which socio-demographic factors contained in both datasets were used as factors. Alternative models were considered for the GLM, including a linear regression model, a zero inflated Poisson model and a zero-inflated negative Binomial model. Predicted values were inspected with residual plots and models were compared in terms of the sum of absolute and squared residuals. Despite expected advantages for the zero-inflated models, the linear regression provided the best overall fit and a better fit for low-income households in particular. The linear regression model was therefore used.
- The model was used as a predictive model for the number of medical scheme beneficiaries for households in the Census data at the small area level. The predicted number of medical scheme beneficiaries was aggregated and checked for reasonability against statistics of the number of medical scheme beneficiaries in the Council for Medical Scheme's 2015 annual report and in the 2015 GHS data. The predicted number of beneficiaries as well as the distribution among provinces and metros were found to be broadly consistent.
- The number of medical scheme beneficiaries in small areas was scaled so that when small areas were aggregated, provincial estimates were consistent with the number of medical scheme beneficiaries by province reported in the Council for Medical Scheme's 2015 annual report.
- Data on health facilities, population, patient day equivalents and PHC headcount from the DHIS.

Per capita expenditure indicators use public sector expenditure divided by the uninsured population. However, the GHS and other sources indicate that the uninsured population makes significant use of private sector services, and the insured population also makes some use of public sector services. As such, it is acknowledged that there is a wide range of uncertainty surrounding the true size of the population that is dependent on public sector services, which affects the accuracy of the per capita expenditure indicators.

Population data

Indicators requiring population denominators were assigned mid-year population estimates for the relevant year, as available at the time of calculation. The district population estimates (five-year age groups) developed by StatsSA for 2002–2018 (based on the best available information from Census 2011 and other sources of demographic information) were modified by the NDoH to single-year age groups. These are the same population estimates currently included in the DHIS.

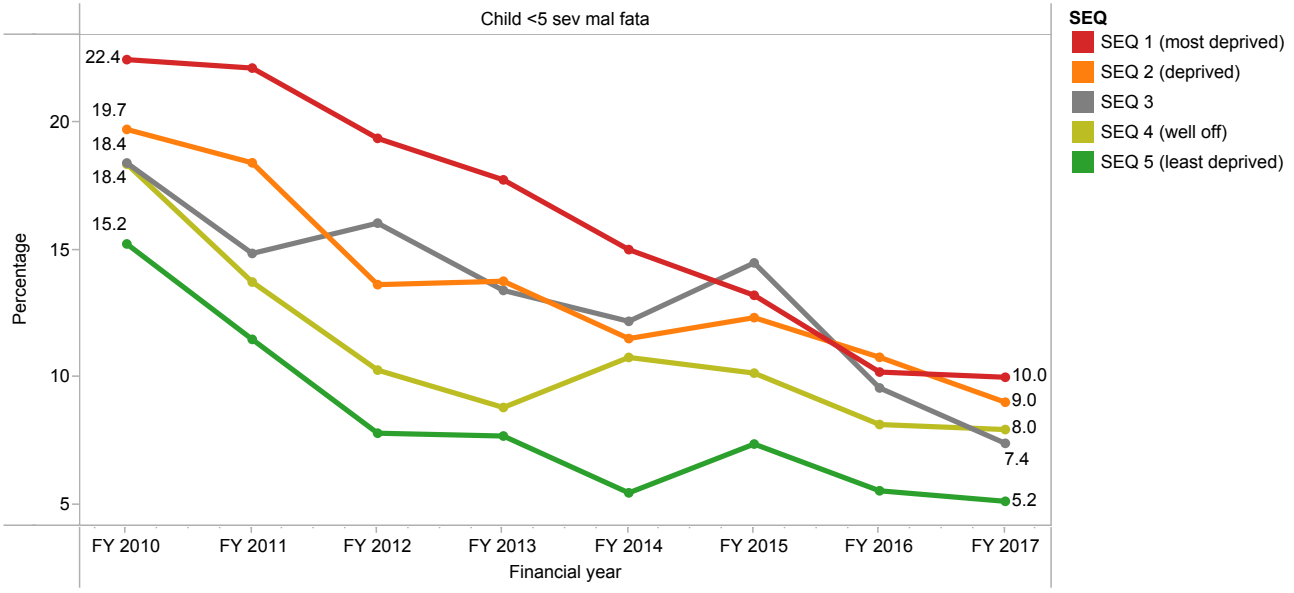
Deprivation index and socio-economic quintiles

The composite indicator of deprivation was replaced in the 2013/14 year with a new index of multiple deprivation developed by Noble et al,[b] based on a basket of variables from Census 2011. This South African Index of Multiple Deprivation (SAIMD) includes indicators from four domains: income and material deprivation, employment deprivation, education deprivation, and living environment deprivation, measured at either the individual or household level according to the indicator. The overall SAIMD combines these individual domains of deprivation using equal weights. The results were produced at ward level, with the most deprived ward given a rank of 1 and the least deprived a rank of 4 277. The population-weighted average rank of the wards was then calculated at local municipality, district municipality and provincial levels.

The SAIMD therefore provides a measure of relative deprivation across districts within South Africa. Each district was ranked according to level of deprivation and categorised into a socio-economic quintile (SEQ). 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). Since the SAIMD has not been calculated for any other censuses or community surveys according to the current boundaries and deprivation index methodology, the 2011 deprivation ranks have been assumed to remain constant over the time period included in the DHB. Although not ideal, comparison between the latest findings and findings from the previous analyses suggests that although there have been reductions in the level of deprivation, there has been little change in the relative amount of deprivation (i.e. the spatial distribution of deprivation has remained quite similar).

The DHB indicators have been calculated by SEQ (at district level) to assess trends in inequities. The values have been calculated as the weighted average of all data within each SEQ (Figure 1).

Figure 1: Example of indicator by socio-economic quintile trends



b Noble M, Zembe W, Wright G, Avenell D. Multiple Deprivation and Income Poverty at Small Area Level in South Africa in 2011. Cape Town: Southern African Social Policy Research Institute and Southern African Social Policy Research Insights (SASPRI). 2013.

TB indicators

TB indicators based on the ETR.Net and EDRWeb were calculated from the individual records in the registers after coding all the facilities to the 2011 district boundaries by mapping the ETR facility names to DHIS facility names. In the case of EDRWeb, where the treatment facility was missing, the drug-resistance unit was used to assign the patient records to districts.

The indicator TB Rifampicin resistance confirmed client rate, which gives an indication of what proportion of TB cases are drug resistant, was calculated from NHLS data on GeneXpert tests. These data do not represent all tests for drug susceptibility, although the scale-up of this diagnostic tool has been rapid and probably represents the majority of testing. The TB Rifampicin resistant confirmed treatment start rate was calculated from the TB Rifampicin resistant confirmed clients started on treatment (EDRWeb clients where GeneXpert RIFRESULT01=Resistant) as a proportion of TB Rifampicin resistant confirmed clients (based on NHLS GeneXpert results).

The indicator TB client initiated on treatment rate was calculated using TB client (with GeneXpert results) started on TB treatment (ETR.Net) for the numerator, divided by the number of TB tests with Mycobacterium TB detected (NHLS GeneXpert data).

District boundaries and maps

Geographical information from the Municipal Demarcation Board was used to define district and provincial boundaries; the same boundaries are used in the DHIS. Sub-district boundaries, which aggregate selected local municipalities in the Eastern Cape (EC) and break some of the metros into smaller management units, are used in the DHIS and were obtained from the NDoH. Indicators in this DHB have been aggregated and presented according to the boundaries that came into effect in May 2011.

Averages

All averages (provincial and national) are weighted averages, based on the total numerator and denominator for all the sub-areas included, and are, therefore, not averages of the district indicator values. 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.

Data display

Financial year and calendar year

Indicators from the DHIS and the BAS financial system cover the 12 months from April to March, which is the financial year of the NDoH. Indicators for financial years are annotated as 2016/17 or FY 2017. Other sources, such as the TB data from ETR.Net, and the burden of disease (death) data cover a calendar year. Data from the StatsSA surveys correspond with the period of the survey. In the Excel file produced with the DHB, the single year indicated for summary purposes is the one including the majority of the data.

Indicator ranking – is first always best?

The districts are ranked from 1 to 52 (for the various indicators in the league table graphs where number 1 represents the best performance and number 52 the worst performance). However, with some indicators such average length of stay and expenditure, an indicator in the number 1 position does not mean best performance; 'best' is usually in the middle range close to the South African average. For these indicators, order from top to bottom should therefore not necessarily be considered as best to worst. Individual indicators are therefore ranked as either ascending (low values are best, for example Maternal mortality ratios), descending (high values are best, for example Immunisation coverage), or central (neither low nor high values are good and the optimal values are approximately central, approximated by the South African average for the indicator).

In the DHB data file, the indicator ranks for all districts are coloured from green to orange to red. It must be noted that this is only a crude indication of performance and is based on the position of a district relative to the other 51 districts and not based on a target or fixed standard. Therefore, it is possible that an indicator may improve in a district, but it could drop in rank (i.e. go from green to red) if other districts have improved to a greater extent.

ArcView was used to generate the thematic or choropleth maps of indicator values by district and sub-district. Most of the maps were created using 'natural breaks',[c] with five categories as the default. In some cases the distribution was heavily

c This is the default classification method in ArcView, using the Jenks Optimisation algorithm to group values within a class, resulting in classes of similar values separated by breakpoints. This method works well with data that are not evenly distributed and not heavily skewed towards one end of the distribution.

skewed at the sub-district level and manual breaks were chosen to better illustrate areas of public health importance. For all indicators, low indicator values are represented by light shades and high indicator values by darker shades, regardless of whether high values are 'best' or 'worst'. Therefore, dark shades are not always best, and each indicator map should be interpreted in terms of the desired target range for that indicator.

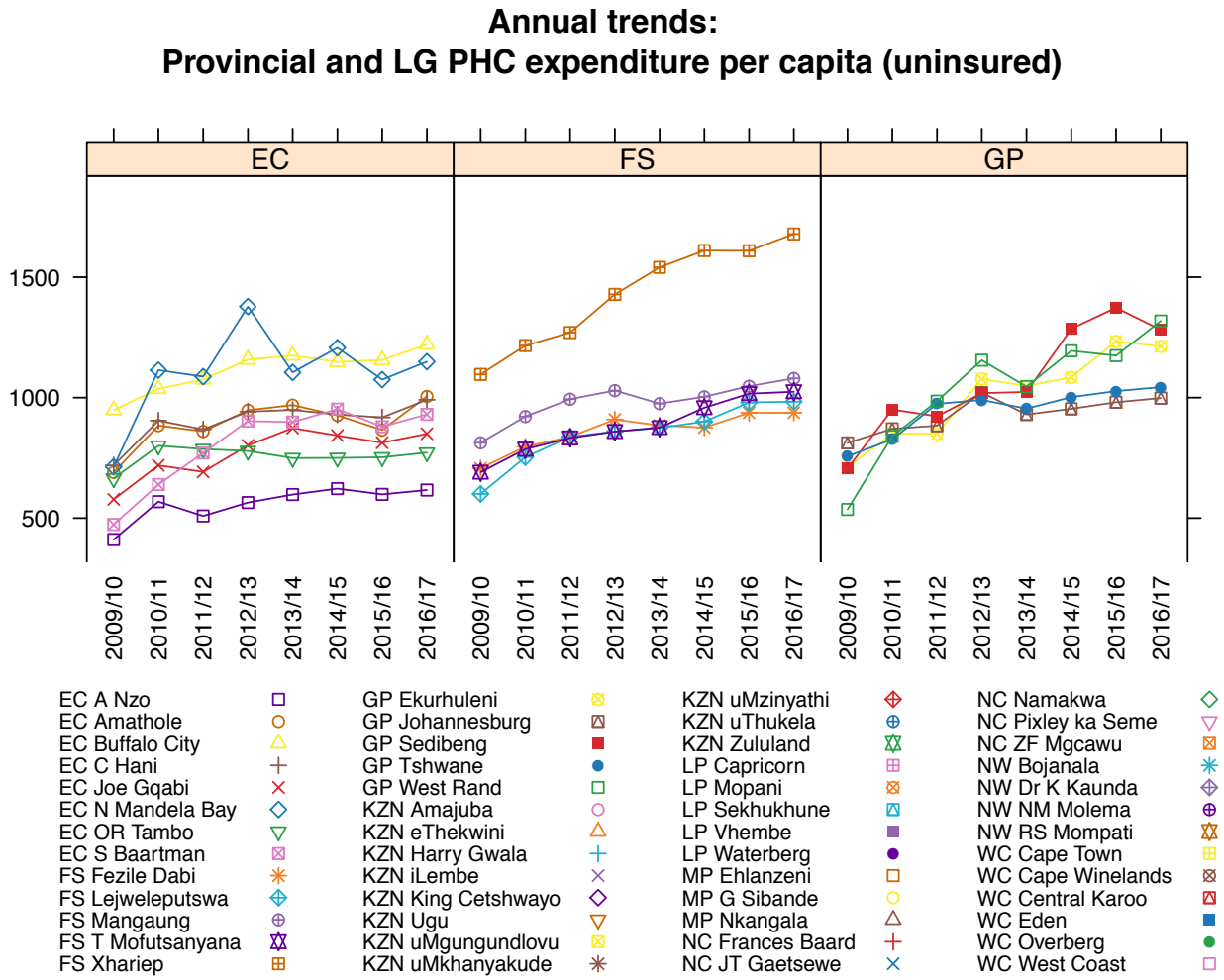
Indicators by level of care

Some of the hospital indicators included in the DHB are filtered for district hospitals only, since inclusion of higher-level hospitals (which provide services to a wider catchment area) may distort assessment of availability of services at district level. However, to interpret the district-hospital values of the indicator, it may be necessary to consider the context (availability of services at other levels) within the district and province.

Trends

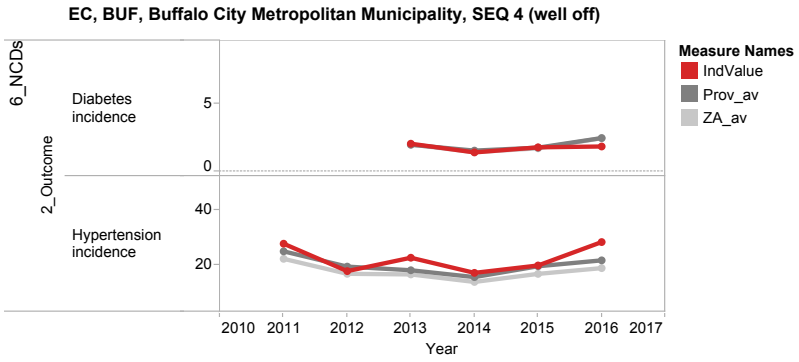
Annual indicator trends (district and provincial) are included in some chapters in section A (Figure 2). Indicator comparisons by district help the reader to explore how an indicator varies over a number of years across districts and provinces. As the scale of the y-axis is the same for all the graphs, one can notice differences easily. Annual trends also reveal variation and change within the districts in a particular province over time.

Figure 2: Example of annual indicator trends over a number of years across districts and provinces



In section B of the report, composite graphs show annual trends for all districts for all the indicators included in Section A of the DHB. The district indicator value (IndValue) is shown together with the relevant provincial averages (Prov_av) and national averages (ZA_av) (Figure 3).

Figure 3: Example of annual indicator trends for districts



Burden of disease profiles

Graphs have been adapted this year to provide a snapshot of each district's burden of disease profile (Figure 4). In order to make the disaggregated results more robust, data were consolidated for the 2010–2015 period (six years) as in some smaller districts there were limited deaths by single cause in certain age groups. A specific section for Female 15–49 years was added to show the main causes of maternal deaths in this age category.

Figure 4: Example of burden of disease profile by district