7 Immunisation

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Immunisation is one of the most effective health care interventions for preventing serious illnesses and death in young children. Immunising all children against measles has been one of the targets used in monitoring progress towards achieving Millennium Development Goal 4. It was estimated that measles deaths reduced globally from 535 000 in 2000 to 139 000 by 2010.[a]

South Africa has invested substantially in immunisation in recent years, most notably through the inclusion of pneumococcal and rotavirus immunisation into the routine Expanded Programme on Immunisation (EPI) in 2009. Average vaccine expenditure during 2014/15 was R1 148 per child under 1 year of age.

However, the key to a successful immunisation programme lies in ensuring that all children, including and especially the most vulnerable children, receive all routine immunisations.

As immunisation coverage indicators are population based, with the number of children in the community forming the denominator of the indicator, changing the population estimates can impact significantly on the indicator. After the last census, Statistics South Africa (Stats SA) revised the population figures, especially the under-1 figures, which led to a substantial downward correction of routine immunisation figures. For example, the 2012/13 District Health Barometer reported that 90% of children under 1 year had been fully immunised; after using the revised population figures this indicator was recalculated to 83.6%. This revision has necessitated an increased focus on ensuring that all children are reached, especially in districts with low coverage.

7.1 Immunisation coverage under 1 year

Immunisation coverage under 1 year measures the percentage of children under 1 year old who have received the primary schedule of immunisations, which includes the following:

At birth: OPV (oral polio vaccine) (0), BCG (bacille Calmette-Guérin) vaccine

6 weeks: OPV (1), Pentavalent vaccine (1), Hepatitis B vaccine (1),[b] RV (Rotavirus vaccine) (RV) (1), PCV (Pneumococcal vaccine) (1)

10 weeks: Pentavalent vaccine (2), Hepatitis B vaccine (2)

14 weeks: Pentavalent vaccine (3), Hepatitis B vaccine (3), RV (2), PCV (2)

9 months: Measles vaccine (1), PCV (3)

Immunisation under 1 year coverage for the country was 89.8% during 2014/15. This is below the national target of 95%, but shows an improvement over the figures reported in recent years (see Table 1). Immunisation coverage increased during the period from 2007/08 to 2009/10, but then dropped due to recalculation of population estimates based on the 2011 Census as described above. The substantial increase in coverage from 84.4% in 2013/14 to just below 90% in 2014/15 suggests that efforts to strengthen the immunisation programme have achieved some success.

Table 1: Immunisation coverage under 1 year, 2007/08 – 2014/15

	Immunisation coverage under 1 year %
2007/08	84.6
2008/09	87.0
2009/10	88.8
2010/11	80.8
2011/12	83.9
2012/13	83.6
2013/14	84.4
2014/15	89.8

Provincial coverage is shown in Figure 1. Gauteng (GP) reported the highest coverage of 107.7%. It should be noted that coverage above 100% is due to an underestimation of the target population, and that the true coverage for the province is difficult to determine, possibly because of in-migration.

a Simons E, Ferrari M, Fricks J, et al. Assessment of the 2010 global measles mortality reduction goal: Results from a model of surveillance data. Lancet. 2012;379(9832):2173-8. http://dx.doi.org/10.1016/S0140-6736(12)60522-4.

b Against diphtheria, pertussis, tetanus, polio, and Haemophilus influenzae type B infection.

Two further provinces (Western Cape (WC) and Free State (FS)) achieved coverage above 90% (90.9% and 90.1% respectively). While it is encouraging to note that all provinces achieved coverage above 80%, the coverage in four provinces (Mpumalanga (MP) (80.1%), Eastern Cape (EC) (80.9%), North West (NW) (82.1%) and Limpopo (LP) (82.2%)) remained substantially below the national target of 90%.

Coverage at provincial level for the past five years is shown in Table 2. Most provinces have shown a similar pattern, i.e. a slow increase between 2010/11 and 2013/14 followed by an accelerated increase in 2014/15. The reversal of a longer downward trend in Limpopo and the accelerated increase in provinces with lower coverage (EC, MP and NW) in 2014/15 is encouraging.

Table 2: Immunisation coverage under 1 year by province (percentage)

	2010/11	2011/12	2012/13	2013/14	2014/15
Eastern Cape	69.2	71.7	72.3	72.3	80.9
Free State	94.1	96.6	96.2	86.6	90.1
Gauteng	105.3	106.5	102.6	109.0	107.7
KwaZulu-Natal	77.8	87.5	85.6	85.8	89.9
Limpopo	76.9	74.7	71.1	70.3	82.2
Mpumalanga	58.3	58.9	67.8	71.1	80.1
Northern Cape	85.8	88.5	86.6	84.9	85.4
North West	66.5	68.2	72.4	74.2	82.1
Western Cape	85.0	86.2	88.8	84.9	90.9
South Africa	80.8	83.9	83.6	84.4	89.8

A league graph with district rankings is shown in Figure 2. District coverage ranged from 112.7% in Xhariep (FS) to 63.4% in Waterberg (LP). Ten districts achieved the national target of 90% (although this included all five districts in Gauteng where problems with the population denominator have already been noted). Three of the remaining five districts that achieved the target were also metros, namely eThekweni (KwaZulu-Natal) (KZN), Cape Town (WC) and Buffalo City (EC). Possible reasons for this are: problems with the population estimates in these areas, children living in metropolitan areas being easier to reach, or in-migration of pregnant women to the cities to have their babies. Eighteen (mostly rural) districts reported coverage below 80% (Map 1).

As would be expected, immunisation coverage improved in the majority of districts between 2013/14 and 2014/15, although a decline was recorded in 11 districts (Figure 3). The largest decline (8.3%) was reported by Tshwane (GP), which nevertheless continued to report a rate above 100%. Five districts reported increases in coverage of 20% or more between 2013/14 and 2014/15. These were: OR Tambo (EC) (29.3%), Xhariep (FS) (24.8%), Amathole (EC) (24.4%), Central Karoo (WC) (24.2%) and Sekhukhune (LP) (23.1%).

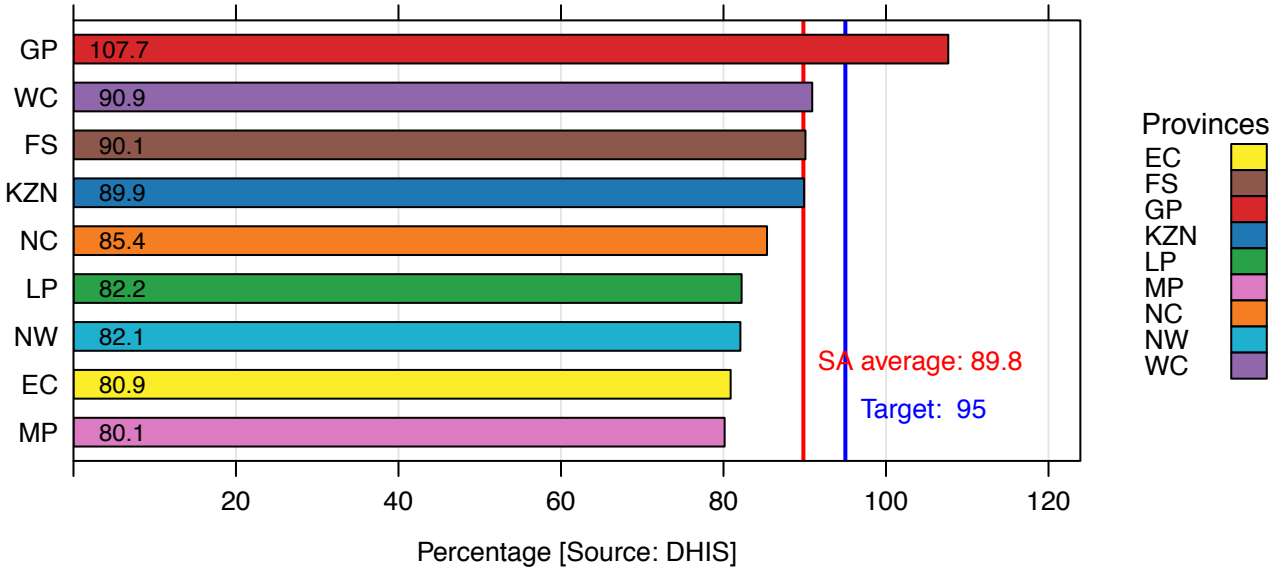
Immunisation coverage was lower in non-metro districts (83.3%) than metro districts (103.1%). There was no difference in coverage between National Health Insurance (NHI) and non-NHI districts.

Immunisation coverage by socio-economic quintile (SEQ) is shown in Table 3. Coverage was highest in SEQ5 (which includes all the metros) and lowest in SEQ1. Inequities between SEQs are shown in Figure 4. Although there is a reduction in the difference between the best and worst performing quintiles over time, it is of concern that coverage in the most deprived socio-economic quintile has decreased over time.

Table 3: Immunisation coverage by socio-economic quintile, 2014/15.

	SEQ1	SEQ2	SEQ3	SEQ4	SEQ5	Total
Immunisation under 1 year (%)	79.8	85.9	81.2	89.1	101.6	89.8
Measles 2nd dose (%)	78.7	84.6	75.6	83.6	87.2	82.8

Figure 1: Immunisation coverage under 1 year by province, 2014/15



Map 1: Immunisation coverage under 1 year by sub-district, 2014/15

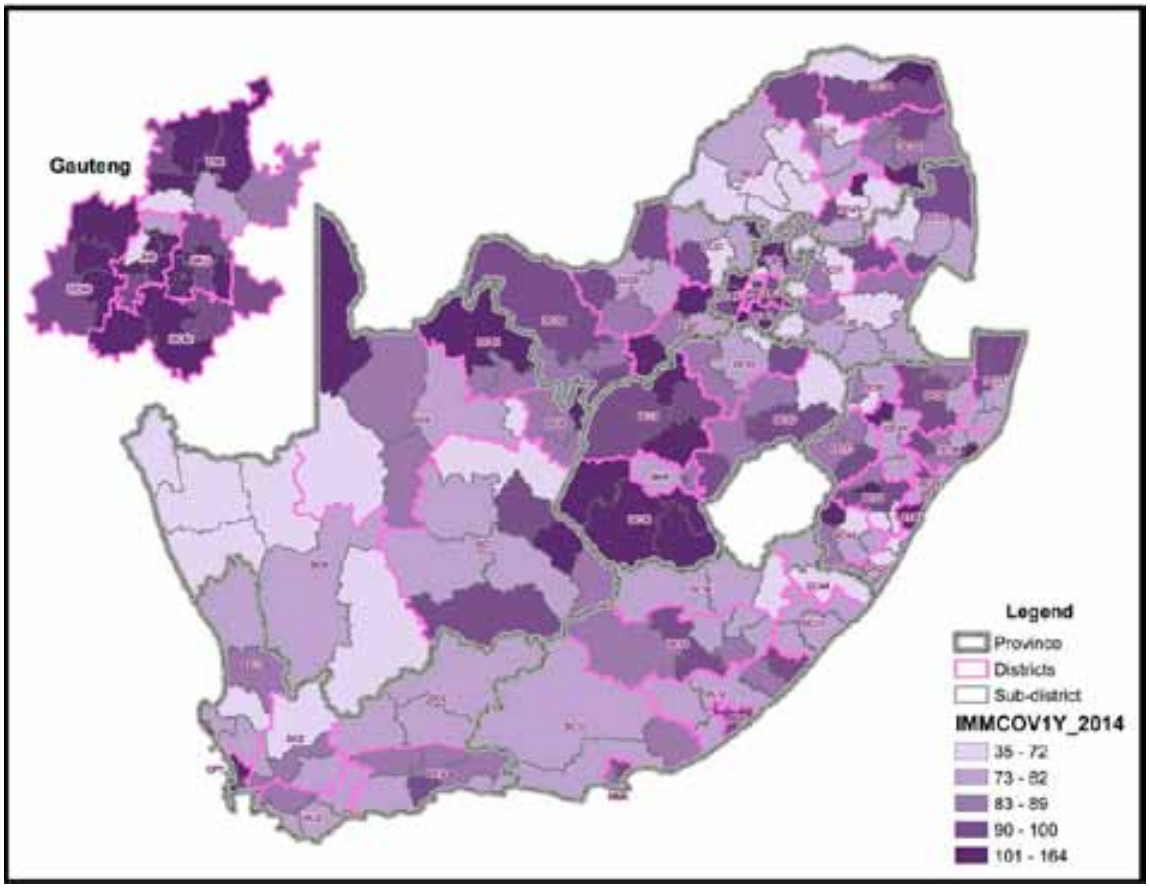


Figure 2: Immunisation coverage under 1 year by district, 2014/15

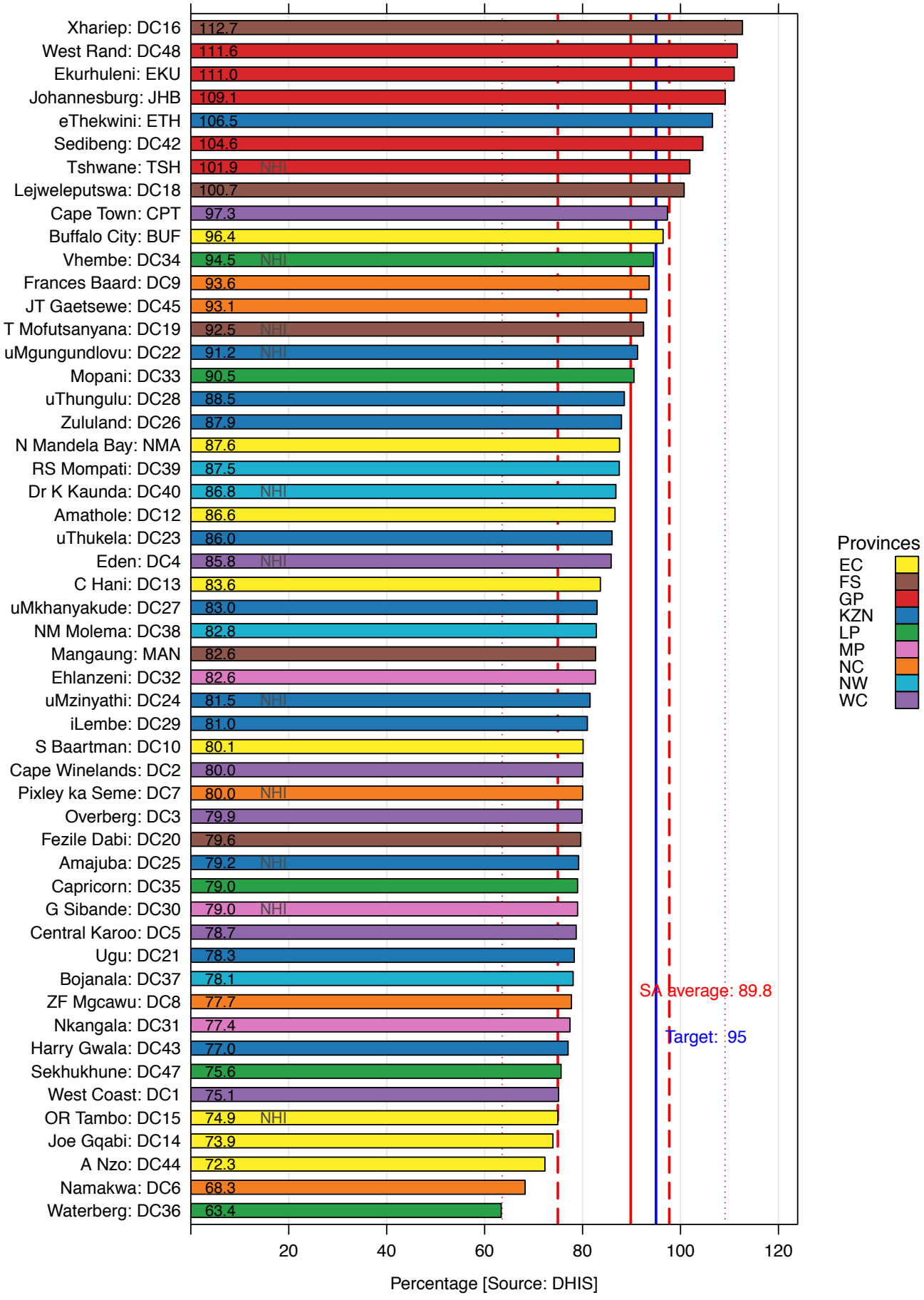


Figure 3: Annual trends: Immunisation coverage under 1 year

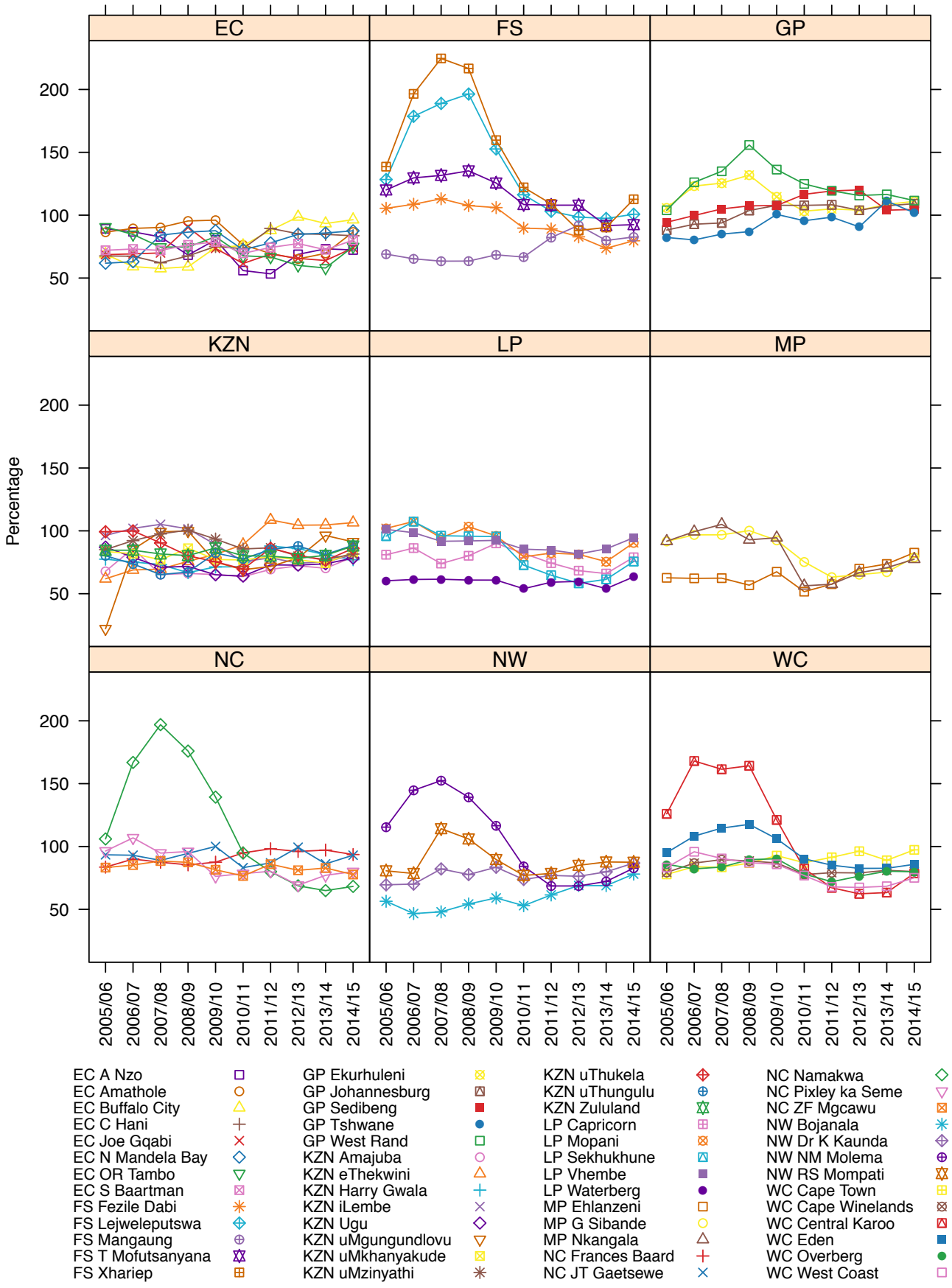
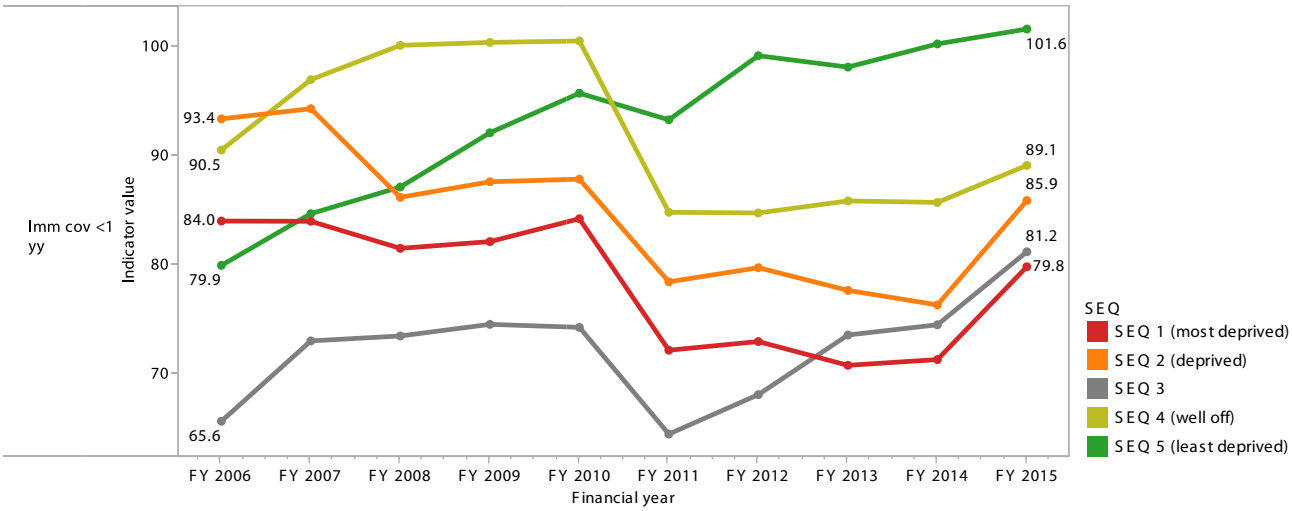


Figure 4: Trends in average district values by SEQ for immunisation coverage under 1 year



7.2 Measles 2nd dose coverage

During 2014/15, 82.8% of eligible children received the second dose of measles vaccine. This is below the national target of 85%, but shows an improvement over the figures reported in recent years (see Table 4). The substantial increase from 75% in 2013/14 to 82.8% in 2014/15 indicates the success of efforts to improve coverage with this dose, especially through catch-up campaigns.

Table 4: Measles 2nd dose coverage, 2007/08 to 2014/15

	Measles 2nd dose coverage (%)
2007/08	70.7
2008/09	78.0
2009/10	89.8
2010/11	81.3
2011/12	85.4
2012/13	74.9
2013/14	75.0
2014/15	82.8

Provincial coverage is shown in Figure 5 and Table 5. Gauteng recorded the highest coverage of 94.9%, with KwaZulu-Natal (86.3%) also achieving the national target of 85%. Coverage in two provinces (Eastern Cape and Mpumalanga) was below 75%, with coverage of 73.6% and 74.6% respectively. Coverage in three further provinces was between 75% and 80%. These were the Western Cape (76.3%), Northern Cape (NC) (77.1%) and North West (77.7%) provinces. The low figure in the Western Cape is surprising given the relatively high immunisation coverage in children under 1 year (90.9%).

Table 5: Measles 2nd dose coverage by province, 2010/11 to 2014/15 (percentage)

	2010/11	2011/12	2012/13	2013/14	2014/15
Eastern Cape	78.1	80.0	65.6	67.6	73.6
Free State	75.4	82.4	85.8	80.0	81.3
Gauteng	91.4	91.3	86.8	85.1	94.9
KwaZulu-Natal	76.8	90.5	78.1	77.0	86.3
Limpopo	91.2	94.2	72.4	73.5	83.3
Mpumalanga	74.3	76.2	67.0	69.6	74.6
Northern Cape	82.5	83.1	77.2	75.7	77.1
North West	73.7	74.1	62.9	66.3	77.7
Western Cape	78.7	77.0	70.1	71.2	76.3
South Africa	81.3	85.4	74.9	75.9	82.8

A league graph ranking districts is shown in Figure 6. The highest coverage (118%) was reported in West Rand (GP), and the lowest in Waterberg (LP) (61.4%) (Map 2). Sixteen districts achieved coverage in line with the national target of 85% or above. As with fully immunised under-1 coverage, this included all the districts in Gauteng, but in contrast the remaining

11 districts included only one metro, eThekweni (KZN). Five districts achieved coverage below 70%. These were Waterberg (LP) (61.4%), Namakwa (NC) (62.4%), Alfred Nzo (EC) (67.7%), Mangaung (FS) (68.9%) and Joe Gqabi (EC) (69%).

Between 2013/14 and 2014/15, coverage improved in all but seven districts (Figure 7). Only one district, Alfred Nzo (EC 14.3%), recorded a drop of 10% or more. Ten districts achieved improvements of 20% or more. The most improved districts were Amajuba (KZN) (67% increase), Bojanala (NW) (26.6% increase) and Zululand (KZN) (26.5% increase).

Measles 2nd dose coverage was lower in non-metro districts (87.8%) than metro districts (80.3%). There was no difference between NHI (82.9%) and non-NHI districts (82.8%).

Coverage trends by socio-economic quintile are shown in Figure 8. Coverage was highest in SEQ5 (87.2%), with coverage over 80% also being reported in SEQ2 (84.6%) and SEQ4 (83.6%). Coverage was lowest in SEQ3, with only 75.6% of children receiving the second dose of measles vaccine. Differences between socio-economic quintiles appear to be reducing over time.

Figure 5: Measles 2nd dose coverage by province, 2014/15

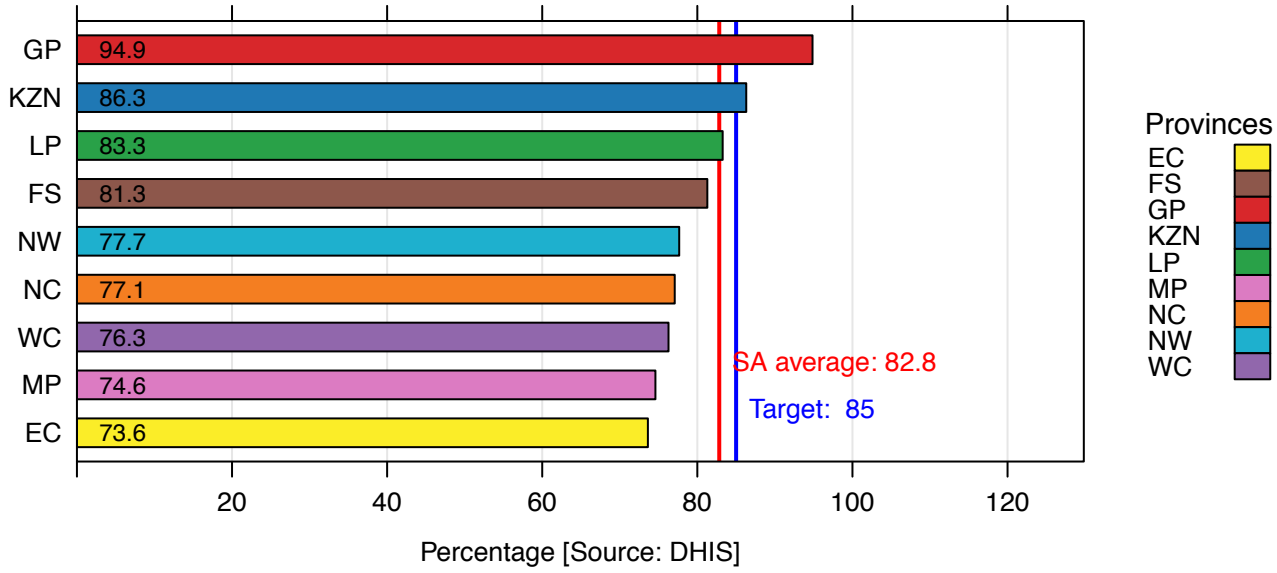
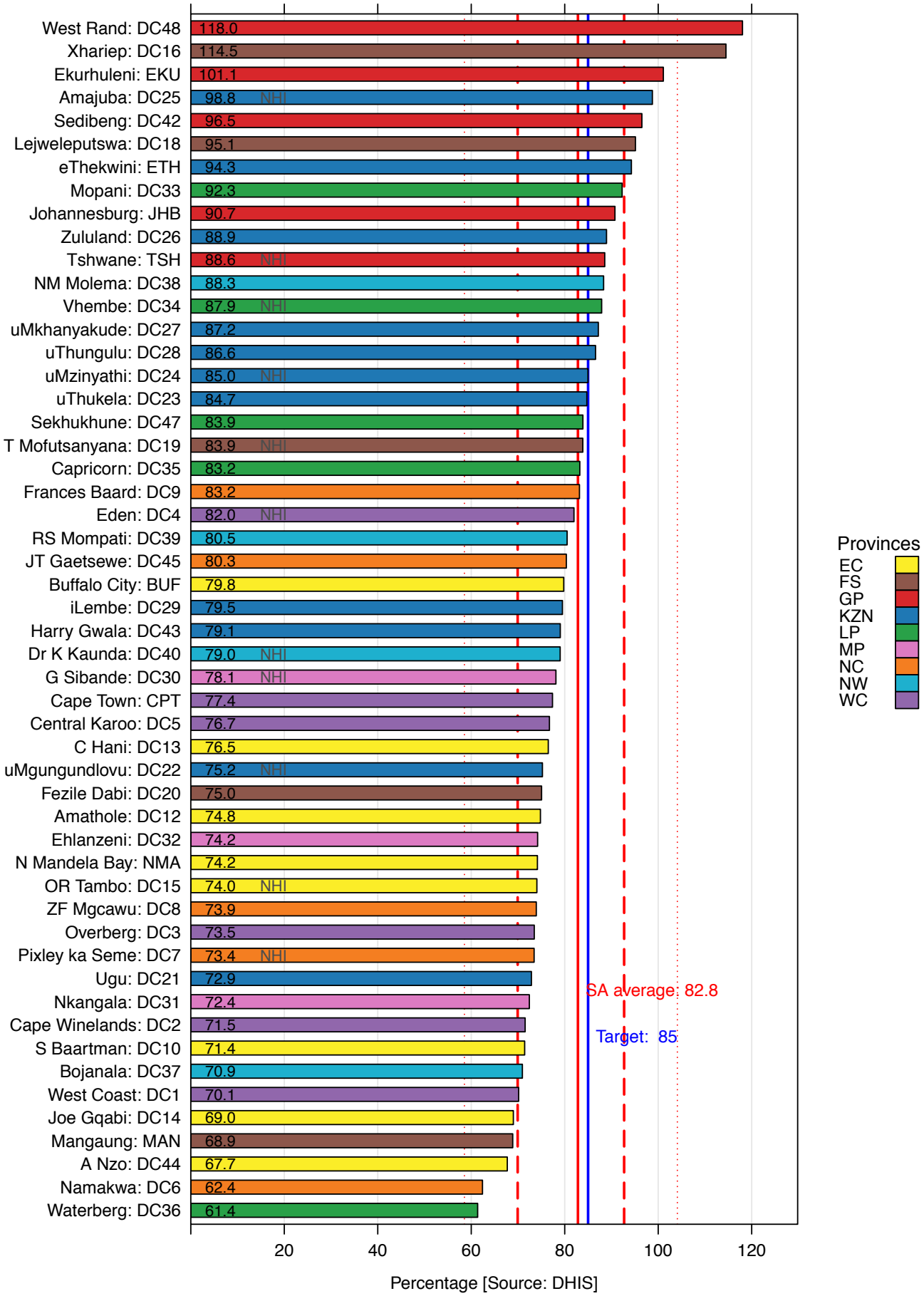


Figure 6: Measles 2nd dose coverage by district, 2014/15



Map 2: Measles 2nd dose coverage by sub-district, 2014/15

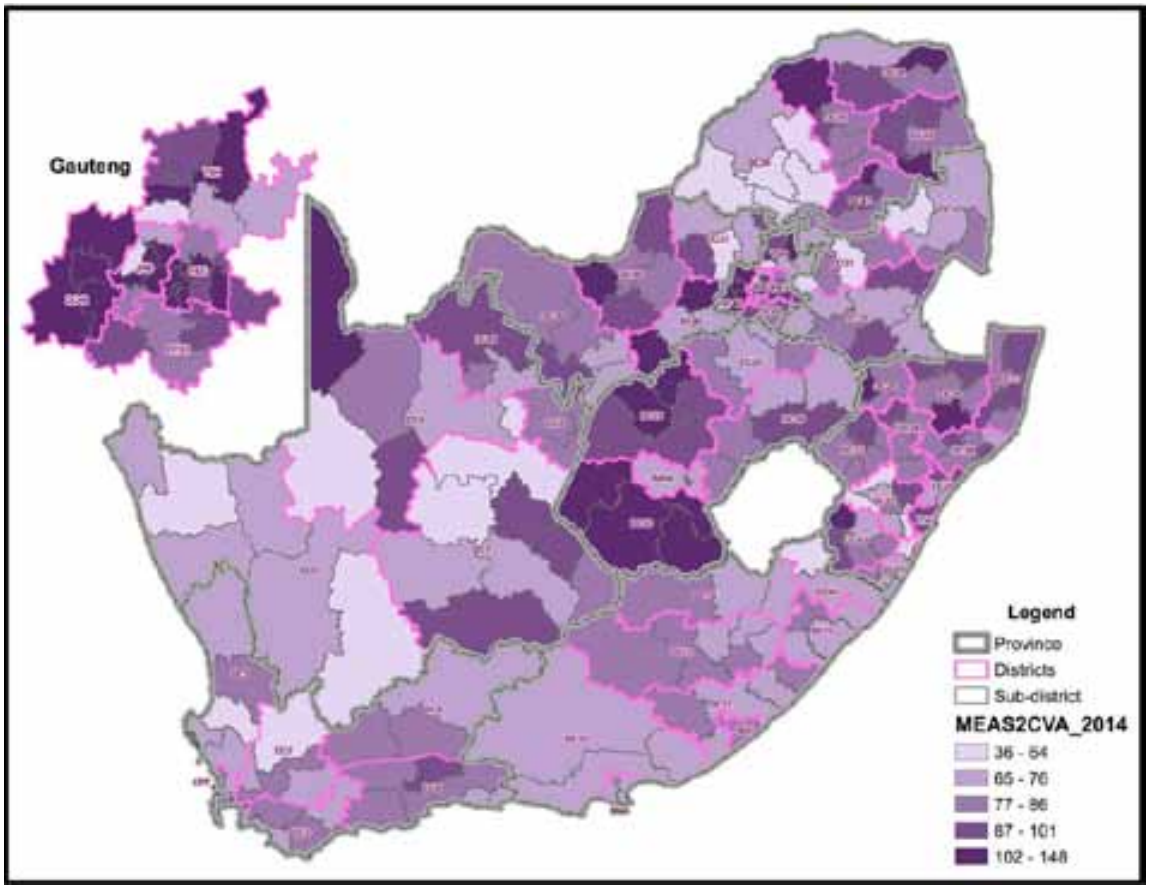


Figure 7: Annual trends: Measles 2nd dose coverage

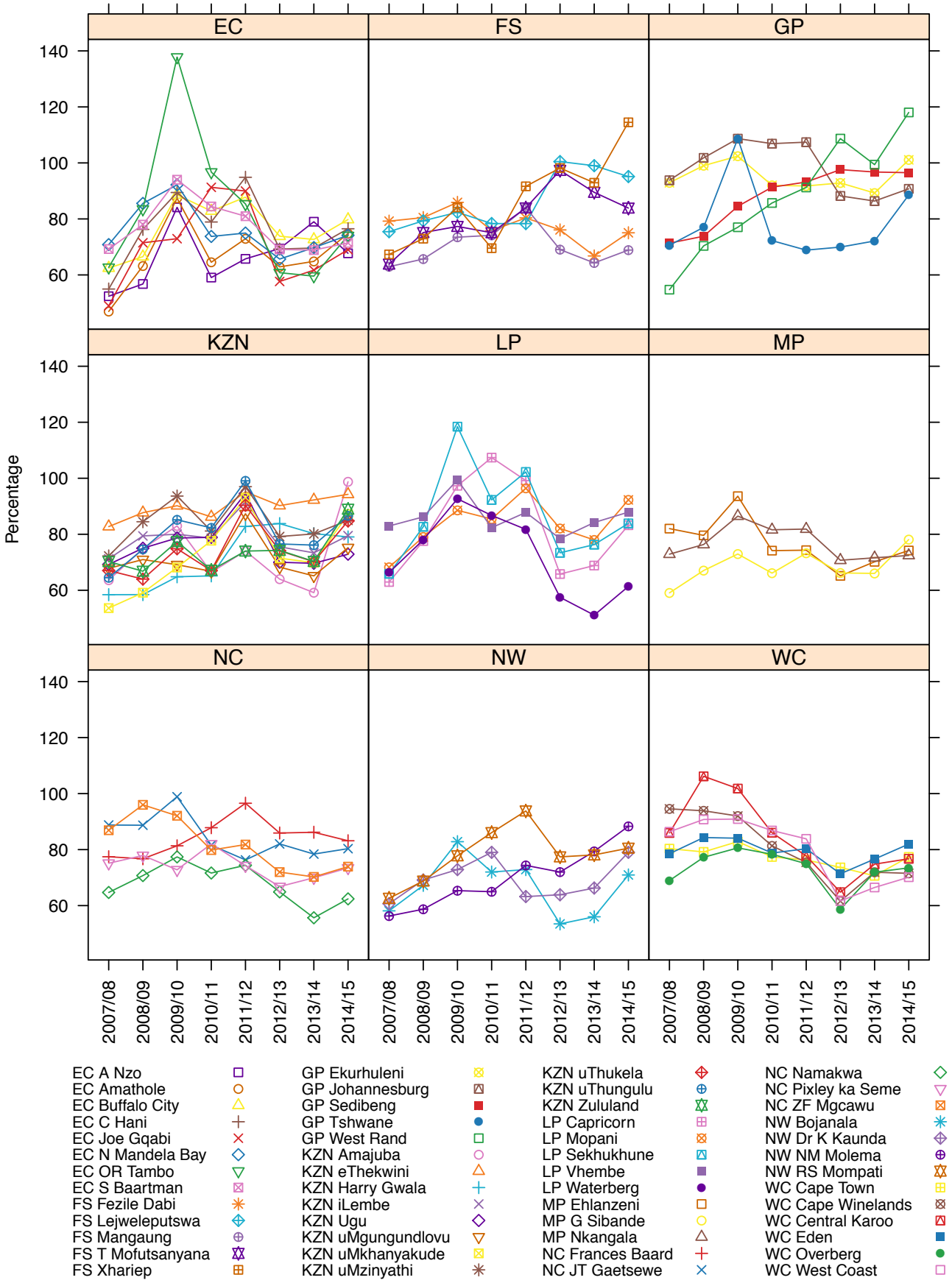
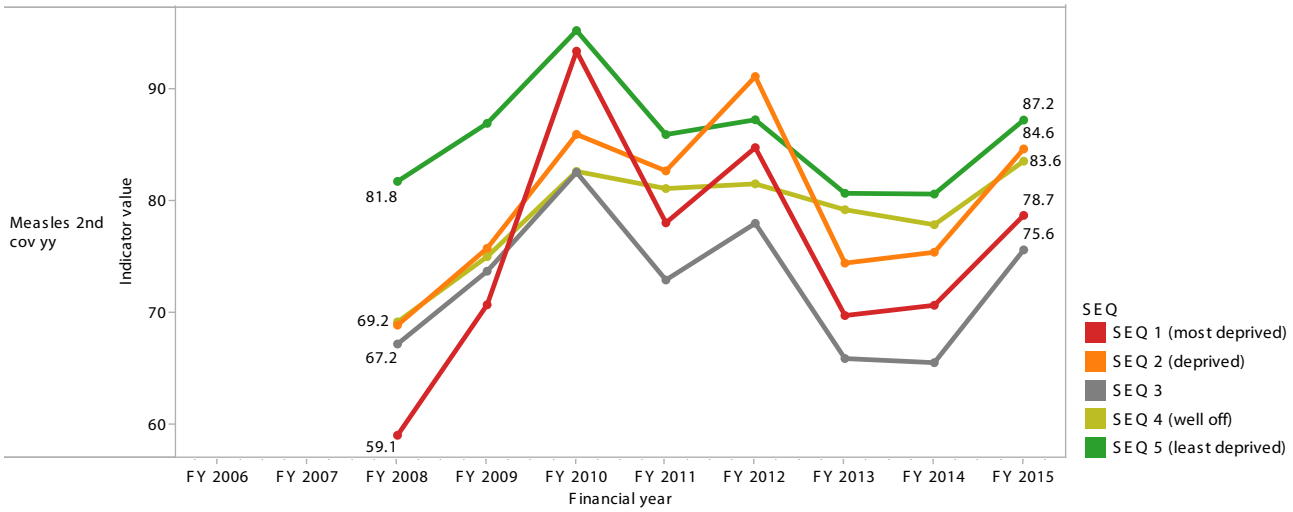


Figure 8: Trends in average district values by SEQ for measles 2nd dose coverage



Discussion

Immunisation coverage rates remain a controversial issue in South Africa, with the World Health Organization continuing to report rates much lower than the District Health Information Software (DHIS) figures used by the Department of Health. Resolution of this controversy is dependent on the availability of good-quality population-based data on immunisation coverage collected through an immunisation coverage survey and/or demographic and health survey. Both of these studies are planned, and will provide the EPI with robust data for evaluation and planning purposes.

Submission of incomplete or incorrect immunisation data and limited use of data to monitor programme performance at health facility, sub-district and district levels remains a problem. An audit of immunisation data in 25 sub-districts in the Eastern Cape undertaken in 2012, revealed that significant over and under-reporting existed in all facilities. Interviews with role-players revealed that audit discrepancies related mainly to: availability and use of registers; poor verification processes; inadequate training; and communication issues.[c] Changes to the EPI schedule will come into effect during 2015/16, which increases the risk of incorrect reporting, and particular attention will need to be paid to ensure correct reporting. A further shortcoming of DHIS data on immunisation is that most immunisations administered in the private sector are not included.

Further improvements in immunisation coverage will require interventions on both the supply and demand side. Anecdotal evidence suggests that local vaccine stock-outs remain an important problem in some areas of the country; provincial depots are seldom (if ever) out of stock and local shortages generally reflect poor ordering practices and/or other supply chain shortcomings. One exception to this relates to availability of BCG; during 2014/15 South Africa has suffered shortages due to a global shortage of the vaccine. This is likely to result in a drop in the fully immunised coverage under 1 year during 2015/16.

Other critical interventions to increase immunisation coverage include ensuring that all contacts with health services (including hospitals) are used as an opportunity to immunise children and that opportunities for reaching children outside of health facilities are also identified and exploited. The former requires that the child's Road-to-Health Booklet is checked at every visit, and that catch-up immunisation doses are given immediately. Ward-based outreach teams can play an important role in identifying unimmunised children, and outreach services should be provided to hard-to-reach communities and to early childhood development centres. These interventions are of particular importance for the second dose of measles as this dose is frequently forgotten by caregivers.

Demand side interventions have historically been relatively limited and have mainly focused on local social mobilisation during campaigns. Immunisation reminders have formed an important part of the messages sent to mothers of infants through the MomConnect[d] initiative.

c Jamin A-M, Kaposhi B, Schopflocher D, Mqoqi N. Strengthening health systems through improved reliability of health information: An evaluation of the expanded programme on immunisation data management in Eastern Cape, South Africa. Strengthen Health Sys 2014. E-pub ahead of print: DOI:10.7196/shs.10

d http://www.rmchsa.org/momconnect/

Recommendations

On-going attention needs to be paid to improving the completeness and quality of data submitted by facilities. This includes:

- Facilities should know their target population and monitor immunisation coverage in their catchment population.
- Data verification visits aimed at improving completeness and correctness of data should be undertaken by sub-district, district and provincial programmes and primary health care supervisors/managers.
- Mechanisms for ensuring that private sector data are incorporated into the routine data collected by the DHIS should be developed and fully implemented.

Immunisations must always be available and offered at all facilities during all hours of opening. Every child's Road-to-Health Booklet must be checked at every contact with the health service, and any outstanding immunisation given. All hospitals must provide catch-up immunisations and these immunisations must be captured on the DHIS.

Primary health care facilities should develop systems for tracing children who have missed vaccines. Identification of children who have missed vaccine doses must be regarded as a key function of ward-based outreach teams (WBOTs) and/or community caregivers.

Increased demand for immunisation should be created through mobilisation around the importance of immunisation, as a key component of promotive and preventive child health interventions. All of these are contained in the child's Road-to-Health Booklet.