



**National and Subnational Coverage and Other Service Statistics for
Reproductive, Maternal, Newborn and Child Health from Health
Facility Data and Surveys**

An analysis of Health facility data

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Background

This synthesis describes the data, methods, and results of an analysis of the health facility data for selected indicators of Reproductive, Maternal, Newborn and Child Health, supported by survey analyses and health system data where available. It focuses on national and subnational (counties) administrative units in the country. The analyses aim to provide a national and global review of progress and performance against the national strategic plan (KHSSP) and the Kenya RMNCAH Investment Framework strategy for RMNCH. A clean data set was created from the Kenya Health Information System (KHIS) for review. This was done through a systematic approach, with ample attention paid to facility data quality assessment and adjustment, denominator selection, joint assessment of surveys, facility results and consideration of other biases.

This report has the following sections:

1. Description of the data sets
2. Data quality assessment and adjustment
3. Denominators or target populations
4. Survey coverage trends and equity
5. Facility data derived coverage trends and inequalities
6. Private sector bias
7. Analysis of subnational progress and performance Potential additional indicators

Table 1: Description of Datasets

Indicator	
Administrative organization	
Number of provinces	8
Number of counties	47
Health facilities	
Number of health facilities in the country	12102
Data on core health professionals	No
Data on hospital beds	No
Facility data analysis period	
First month and year with health facility data	January, 2017
Last month and year with health facility data	December, 2021
Indicators with facility data for the analysis	Has data
Antenatal care first visit	Yes

Antenatal care 4th visit	Yes
IPT 2nd dose (malaria)	Yes
Institutional delivery or skilled birth attendant	Yes
Caesarean Section	Yes
Postnatal care	Yes
Family planning new and revisits	Yes
BCG vaccination	Yes
Pentavalent first dose	Yes
Pentavalent third dose	Yes
Measles vaccination	Yes
Stillbirths (fresh / macerated)	Yes
Maternal deaths in health facilities	Yes
OPD visits children under 5 years	Yes
IPD admissions children under 5 years	Yes
Under 5 deaths in health facilities	No

Population-Based surveys (2 most recent health surveys)

Table 2: Population-Based Surveys

Name of survey	Year
Census	2019
KDHS	2014

Population projection data in DHIS2

Table 3: Population projection

Indicator	Year
Total population for every year	Yes
Live births for every year	Yes

Population under 1 year for every year	Yes
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Overall Data Quality Assessment and Adjustments

There was a steady increase in reporting rate (%) by year (National average of ANC, delivery, vaccination, OPD) with 2017 having the lowest rate at 81.8%. The percentage of counties with reporting rate $\geq 90\%$ by year (National average of ANC, delivery, vaccination, OPD) was extremely low in 2017 but had a steady increase in the following years up to a high of 96%. The low reporting rate in 2017 could be due to the nationwide healthcare worker strike. The improvement in reporting can be attributed to a series of training conducted to capacity build the Health Records and Information Officers on the KHIS.

The percentage of counties with no missing monthly values by year (National average of ANC1, ANC4, delivery, Penta1, Penta3, OPD) has remained consistent at 100% throughout the five years under review. This shows improved capacity in data entry to the KHIS in all the counties. The percentage of monthly values that are not extreme outliers increased slightly from 2017, peaked in 2019 at 99.9% but had a small drop to 99.3% in 2021. This has remained above 95% indicating good data quality in the KHIS. The percentage of counties with no extreme outliers in the year had a steady increase from 79.5% in 2017, to a high of 98.6% in 2019 and finally a small drop to 94.1% in 2021.

The overall data quality score (%) by year for the four indicators (ANC, delivery, vaccination, OPD) had a steady increase from 78.2% in 2017 to 96.5% in 2021. This signifies increasingly reliable routine statistics.

Table 4: Data quality score card for national and subnational levels, 2017-2021

Data Quality (all services)	2017	2018	2019	2020	2021
Reporting rate (%) by year (National average of ANC, delivery, vaccination, OPD)	81.8	92.5	93.8	95	96
Percentage of counties with reporting rate $\geq 90\%$ by year (National average of ANC, delivery, vaccination, OPD)	33.9	73.4	80.2	89.1	96.4
Percentage of counties with no missing monthly values by year (National average of ANC1, ANC4, delivery, Penta1, Penta3, OPD)	100	100	100	100	100
Percentage of monthly values that are not extreme outliers	96.2	99.7	99.9	99.4	99.3
Percentage of counties with no extreme outliers in the year	79.5	97.6	98.6	93.8	94.1
Percentage of counties with adequate ratio between ANC1 and Penta1 (between 1.0 and 1.5) by year	56.3	64.6	68.8	95.8	91.7
Percentage of counties with adequate ratio between Penta1 and Penta3 (between 1.0 and 1.5) by year	100	91.7	93.8	89.6	97.9
Overall data quality score (%) by year (Average DQ11a, DQ1b, DQ1c, DQ2a, DQ3a, DQ3b - National - average of ANC, delivery, vaccination, OPD)	78.2	88.5	90.7	94.7	96.5

Key

Scoring Range	0 -<=40%	41 -<=60%	61 - <=80%	81 - <=100%
Color Code	Red	Amber	Yellow	Green

Looking at each form separately, reporting rate was generally low in 2017 for all forms but improved to over 90% for the all the from 2018 to 2021. The low reporting rates in 2017 could be attributed to the extended Nurses strike.

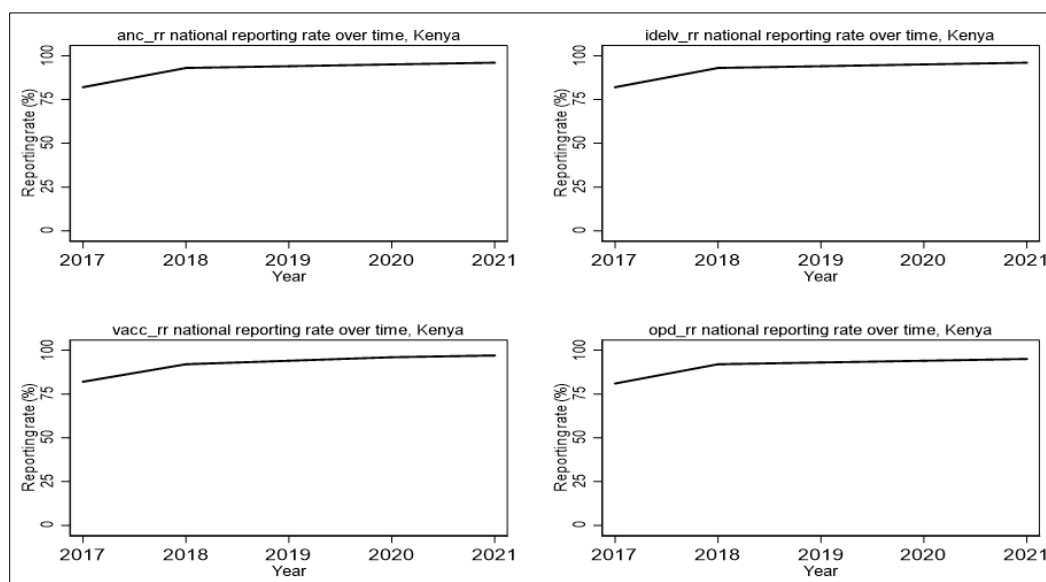


Figure 1: Completeness of Reporting rate for ANC, delivery, vaccination and OPD over time, Kenya

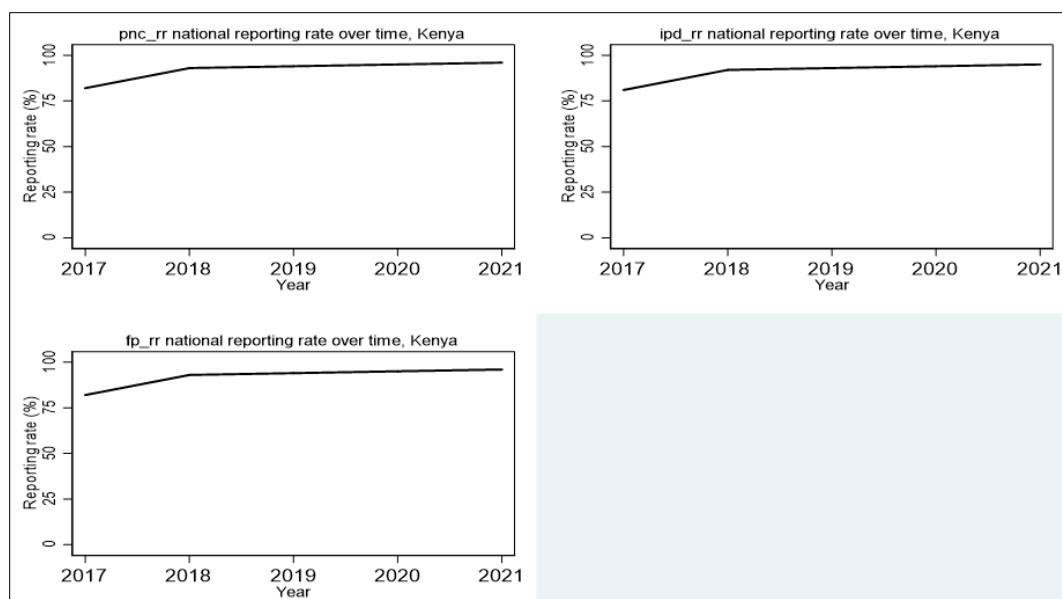


Figure 2: Completeness of Reporting rate for PNC, IPD admission and Family Planning over time

Several Counties had very low reporting rates in 2017 (below 75%) including Isiolo which had less than 60%, Baringo, Elgeyo Marakwet, Kwale, Kericho, Marsabit and Samburu. Majority of the counties have been consistent in reporting from 2018. Only two counties (Kakamega and Bomet) have maintained high reporting rates over the years, while a few counties (Kisii and Garissa) are still having low reporting rates

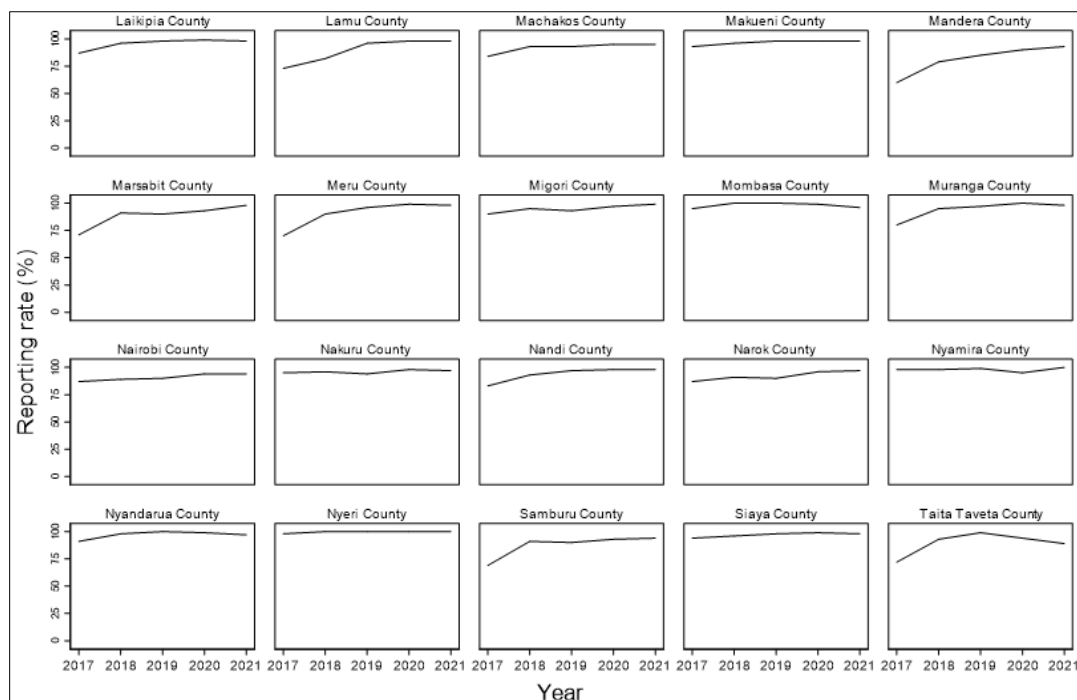


Figure 3: Completeness of reporting rate for ANC over time by county

The percentage of counties with low reporting rates has been declining over the years since 2017 for all the six reporting forms. The year 2017 had the highest proportion of counties with low reporting rates due to the nationwide healthcare workers' strike. For the analysis, we made an adjustment factor of 0.25 assuming only some services (about 25%) were provided in the non-reporting facilities. Because reporting rates are high, the impact on the overall trends is small but it may make a difference in some counties where reporting rates have improved considerably over time.

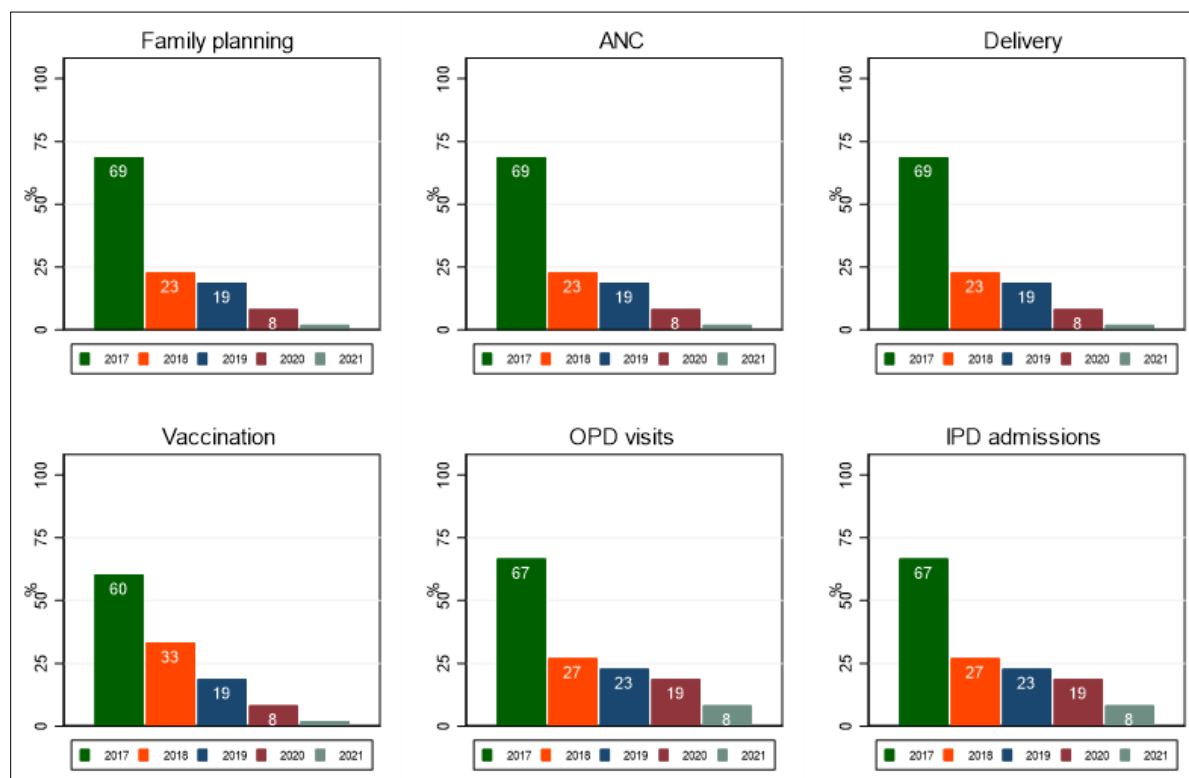


Figure 4: Percentage of counties with low reporting rate (<90) by service and by year

Most of the counties had internal consistency between ANC1& Penta 1 and Penta 1& Penta 3 since the goodness of fit statistic (R-squared) was close to 1.

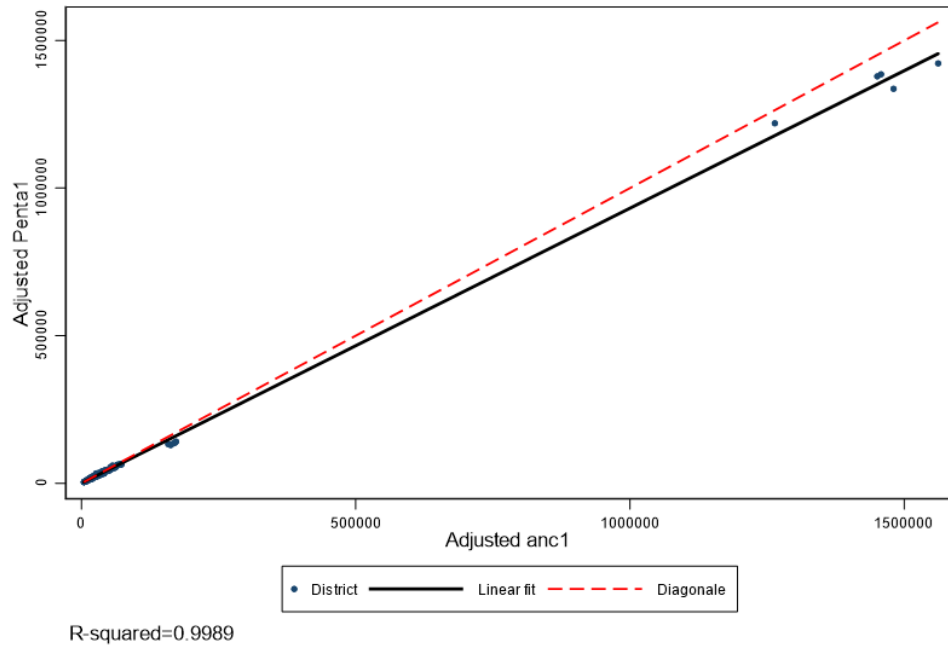


Figure 5: Comparison of adjusted numbers of anc1 and Penta1

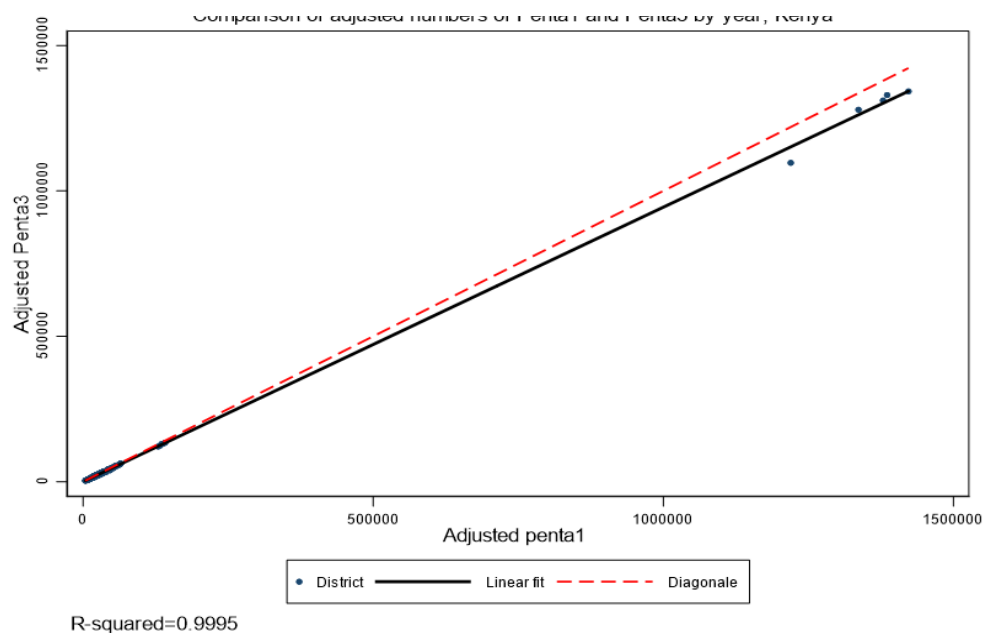


Figure 6: Comparison of adjusted numbers of Penta1 and Penta3 by year

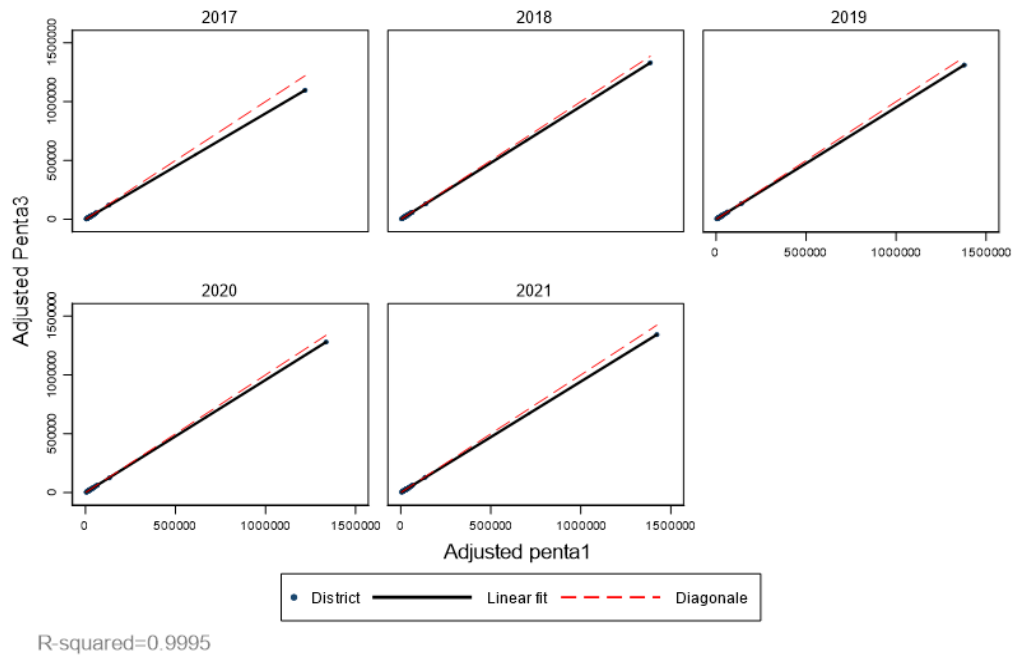


Figure 7: Comparison of adjusted numbers of Penta1 and Penta3 by year

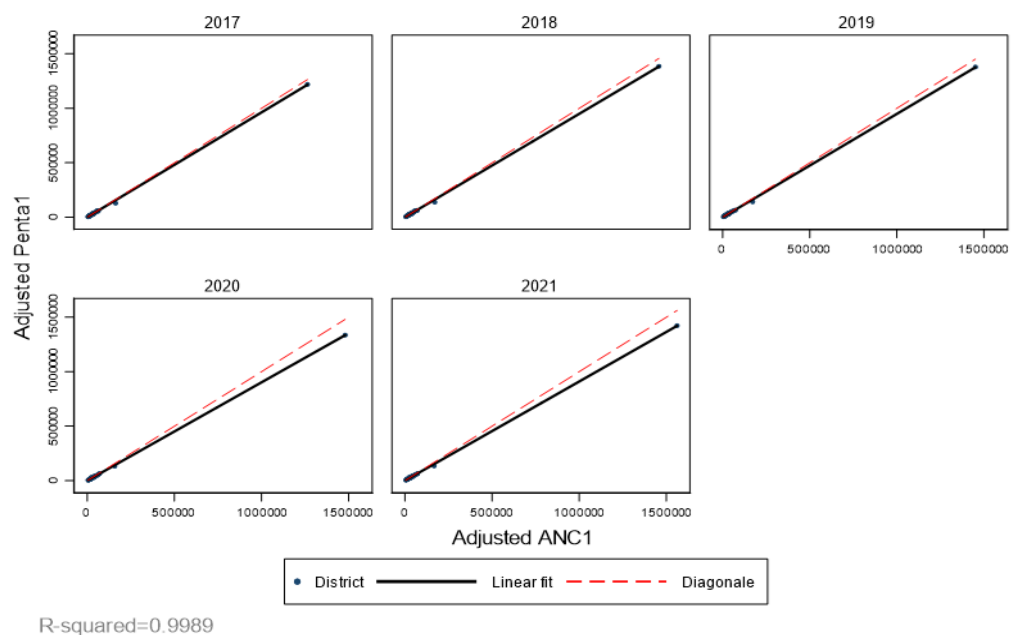


Figure 8: Comparison of adjusted numbers of ANC1 and Penta1 by year

Outliers were identified by looking at the values that were outside the standard deviations upper and lower bounds. During the period under review, majority of the counties did not record any outliers for ANC1. However, Kwale and Laikipia Counties recorded extremely high outliers, while Kilifi, Kisii and Makueni counties recorded some outliers.

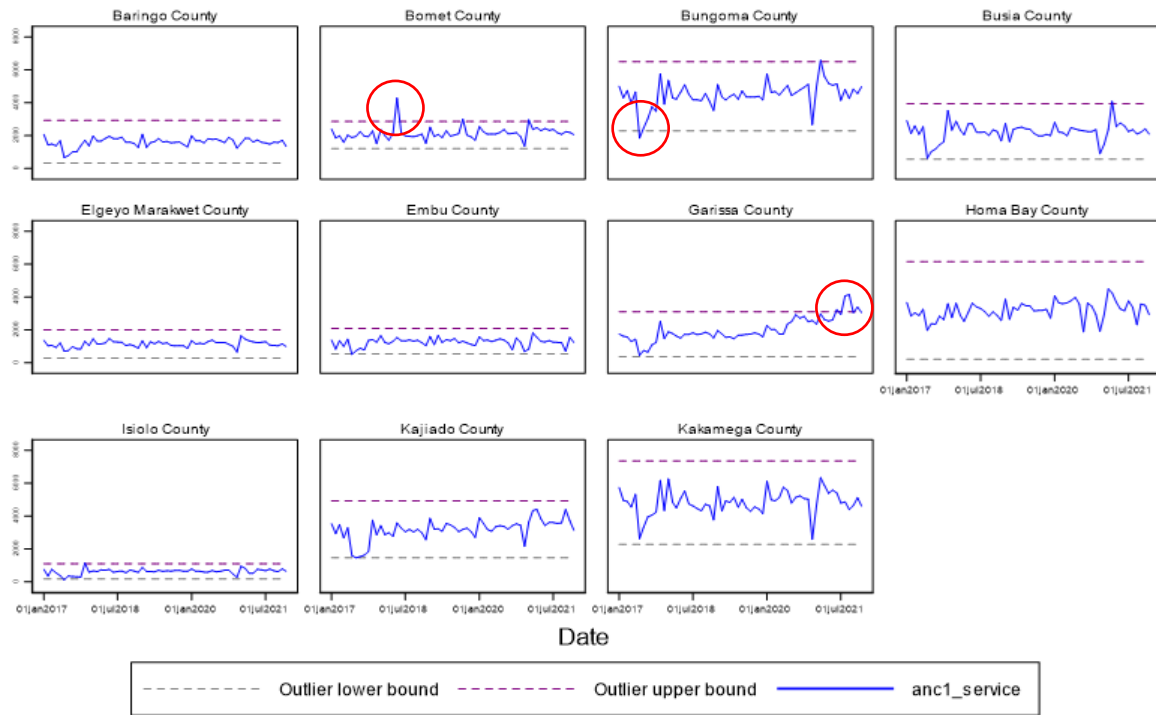


Figure 9: Assessment of ANC outliers over time by Counties

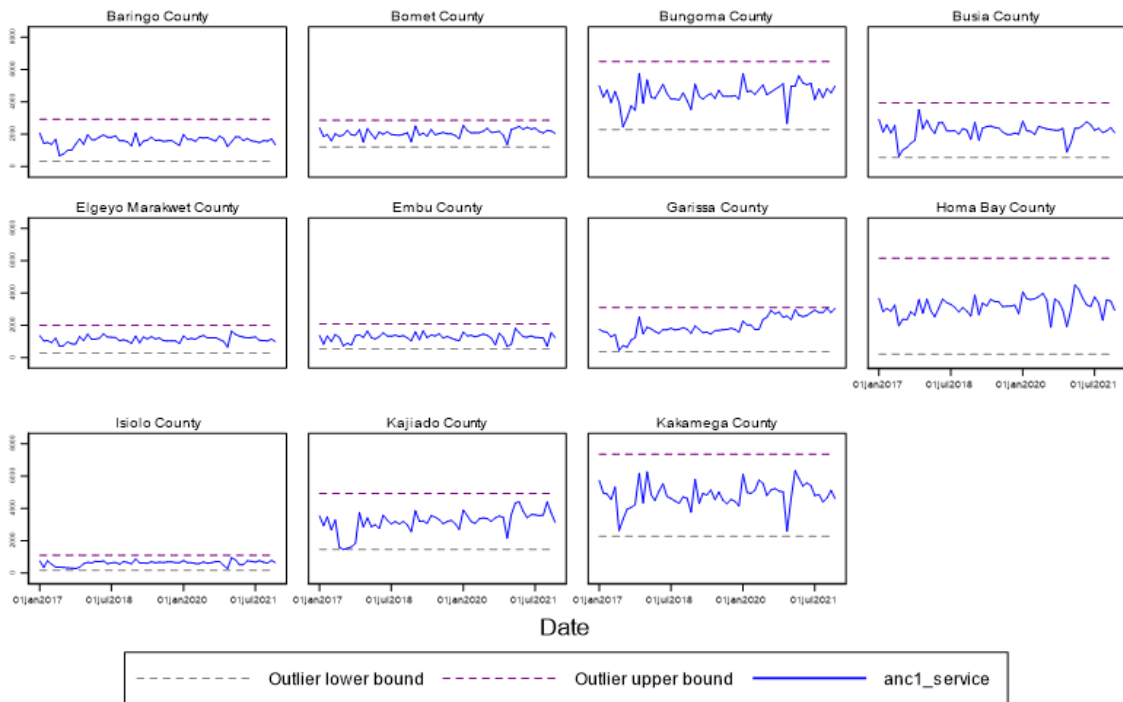


Figure 10: ANC1 after correcting outliers over time by County

Denominators or target populations

Assessment of the population projections in DHIS2

A comparison of Kenya DHIS2 estimates shows that for all population categories UN estimates are much lower than DHIS population estimates for all denominators including total population. DHIS estimate before 2020 was based on the census 2009 projections. In the year 2020, the results of the 2019 population census were used which showed a much lower number than the projections which were in use for DHIS denominators. UN estimates of the Kenya population denominator have been consistently lower than the Kenyan projections.

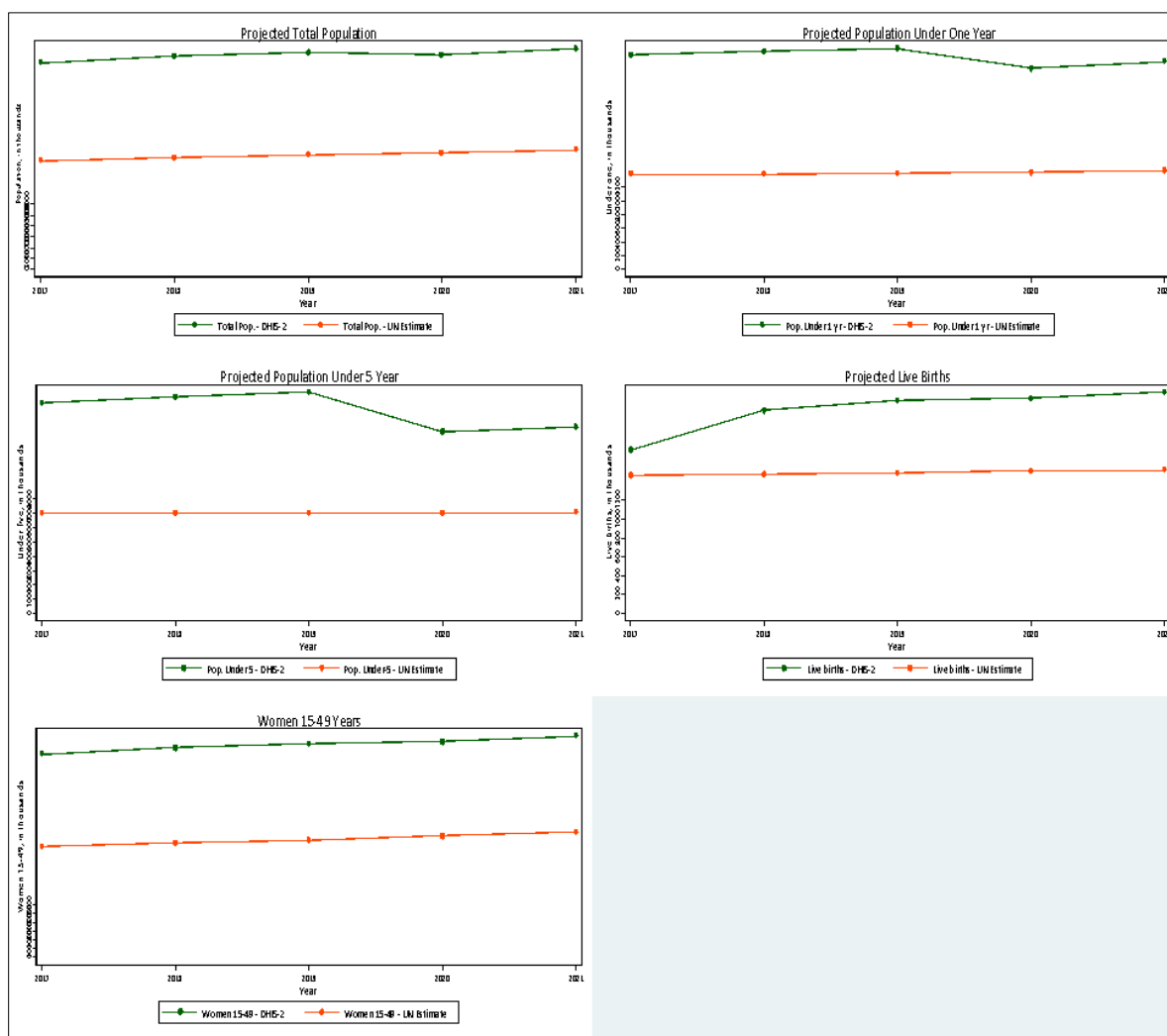


Figure 11: Denominator Assessment

The population dropped from 49.9M in 2019 to 49.3M in 2020, hence a negative growth rate seen in figure 13.

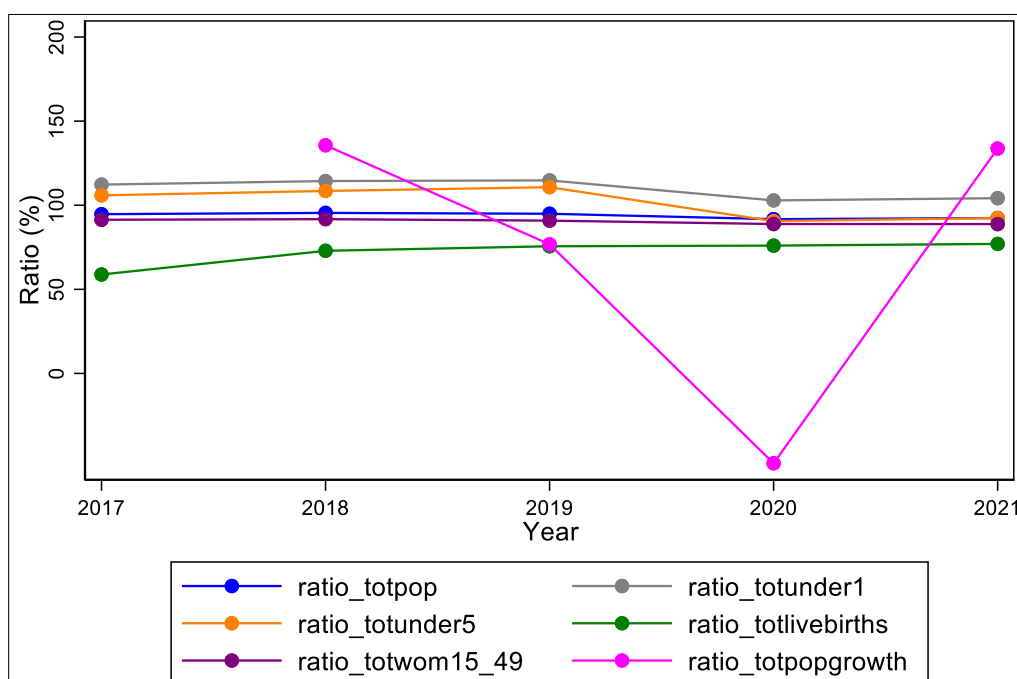


Figure 12: DHIS-2 to UN Estimates ratio

Testing facility data derived denominators / Facility data derived coverage trends and equity

Denominators Derived from ANC-1

ANC-1 numbers were used to generate estimated number of infants eligible for DPT1 and other vaccinations. To get the number of eligible children for DPT1 from ANC1, the calculation steps are as below with estimated proportions as follows: ANC coverage as per Kenya Demographic Survey 2014 96%, Pregnancy loss 0.03%, Twining rate 0.015%, Still birth rate 0.02%, NMR 0,03%.

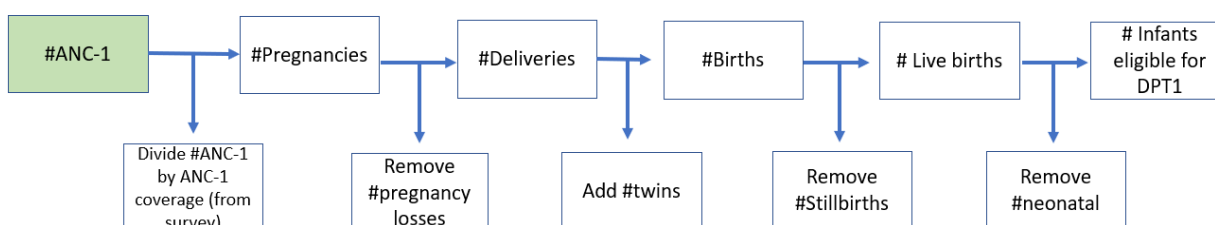


Figure 13: Steps in Immunization Coverage

The immunization coverage shows a reduction in the years 2020 and 2021 compared to the previous years, likely due to disruption of essential services including facility and outreach immunization services (figure 13).

BCG vaccine has remained lower than Penta 1 throughout the years except for 2017. BCG coverage is expected to be higher than Penta 1 coverage but, in most countries, it has shown instability from health facility data likely due to missed documentation and some children not getting the vaccine immediately after birth. Penta 1 coverage is higher than Penta 3 which is expected hence showing internal consistent.

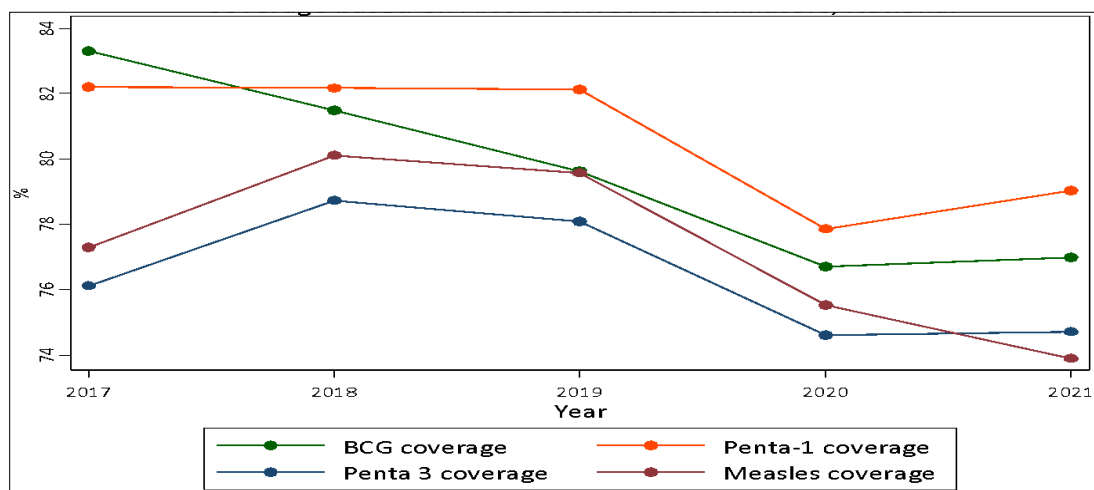


Figure 14: Coverage based on ANC1 derived denominators for BCG, Penta1,Penta3 and Measles coverage

ANC-1 can also be used to estimate pregnancies for use as the denominator for ANC-4, IPT2 coverage and skilled deliveries. This is by dividing the number of ANC-1 clients seen by the KDHS 2014 survey ANC-1 coverage of 96%. Using this estimate of pregnancies generated from ANC-1 visits, the coverage estimates are only slightly lower than the values generated in KHIS using the projected population estimates as the denominator (fig 15)

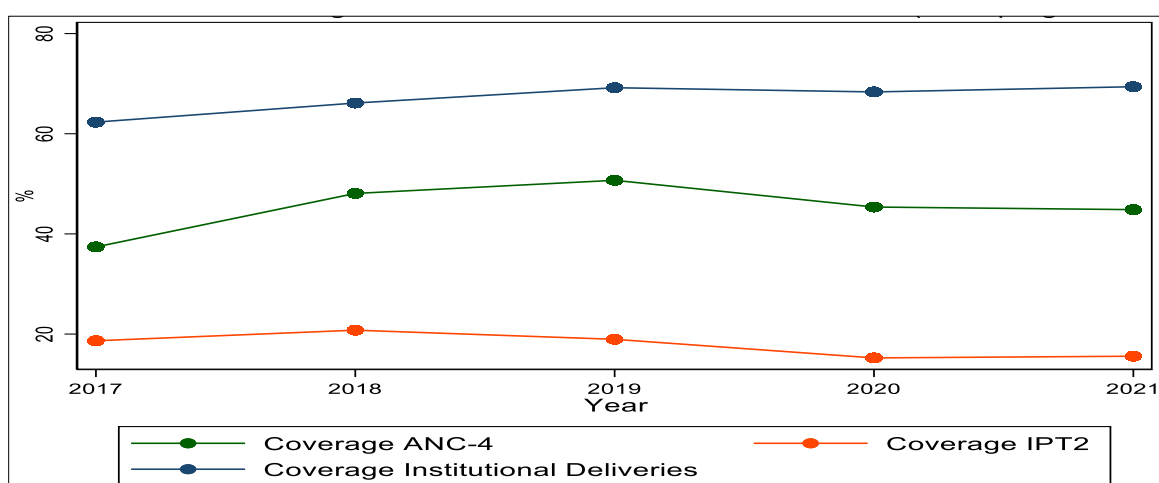


Figure 15: Antenatal care coverages based on ANC1- derived denominators for ANC-4, IPT2 and Coverage institutional deliveries

Denominators Derived from DPT1

DPT1 is used to derive estimated pregnancies for use as the denominator to estimate ANC 4, Skilled deliveries and the IPT2. This was done based on the estimates and formula below. Pregnancy loss 0.03%, twinning rate 0.015%, Still birth rate 0.02% NMR0.03%

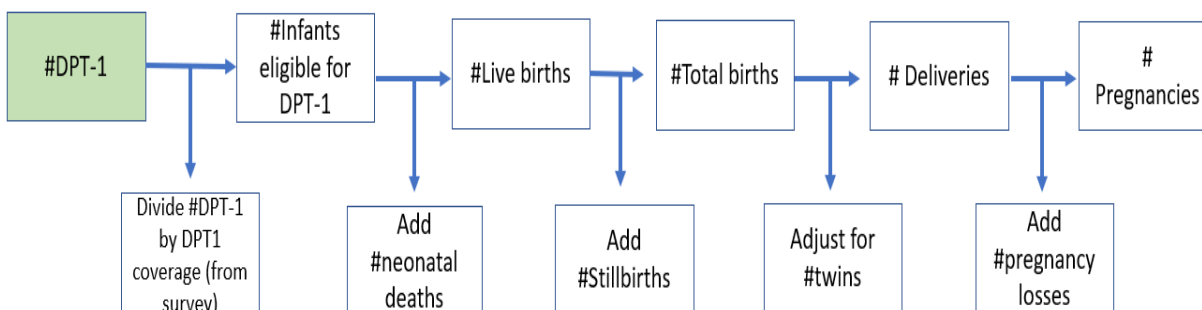


Figure 16: Steps to generate Pregnancy Estimates

Use of DPT1 to estimate denominator (number of pregnancies) and therefore calculate coverages above is accurate and provides internal consistency with ANC1 coverage being highest followed by institutional deliveries, ANC4 and IPT2. The values generated by the use of DPT1 to generate no of pregnancies are higher but closer to the values generated in KHIS using the projected number of pregnancies compared to the coverage estimates derived from the use of ANC-1 to generate pregnancy estimates (Fig 16).

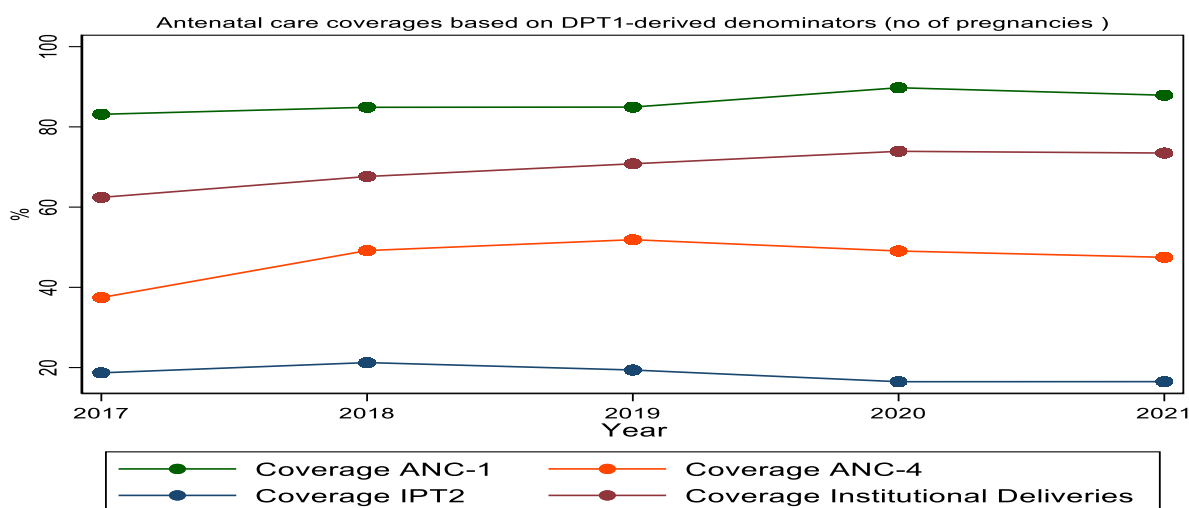


Figure 17 Antenatal care coverages based on DPT1- derived denominators for ANC-1,ANC-4,IPT2 and Coverage Institutional Deliveries

To estimate the number of children eligible for DPT1, the number of children who received DPT-1 was divided by the Survey coverage for DPT1 that was 98% according to the KDHS 2014. The immunization

coverages as estimated using the DPT1 estimates are as below and are comparable to the KHIS immunization estimates.

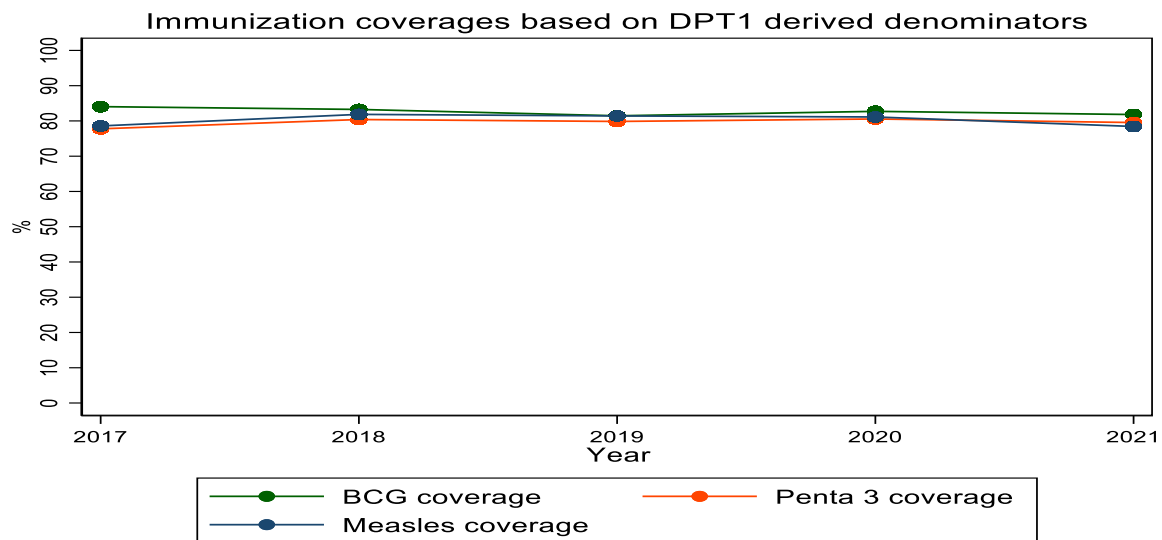


Figure 18: Immunization coverages based on DPT1 derived denominators for BCG, Measles and Penta3 coverage

Regional Analysis of Immunization Coverages based on ANC-1 Derived Denominators Vs DPT-1 Derived Denominators

Analysis of regional performance using ANC-1 derived denominators for immunization shows high dropout rates between vaccine antigens in Nairobi and Northeastern regions where children get the initial vaccinations but a significant proportion miss the follow-up vaccines. In Nairobi, this might be due to children being born in Nairobi but living or being moved to the rural areas. The population in the Northeastern region are nomadic hence high dropout rates.

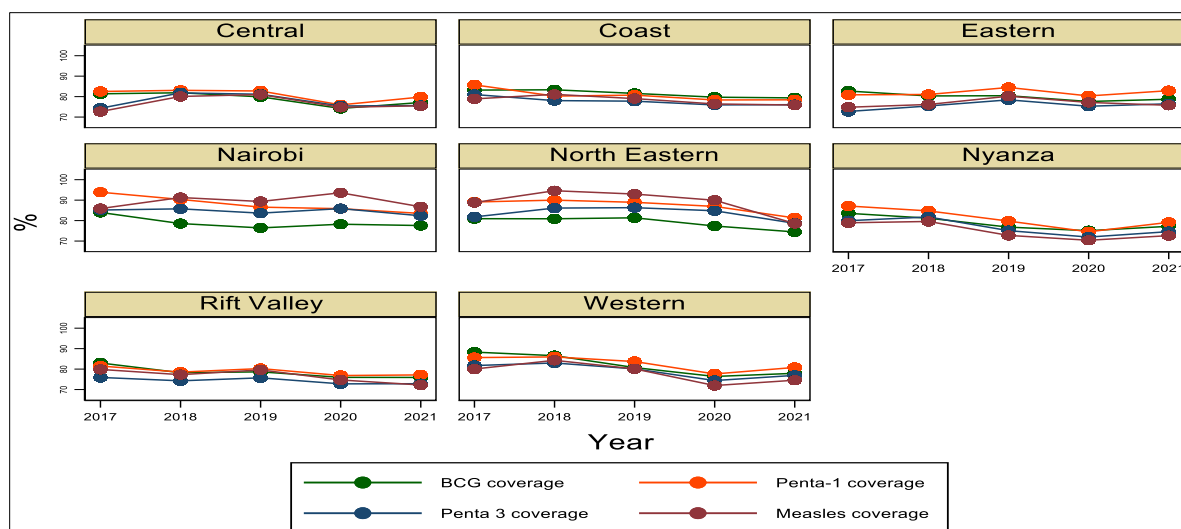


Figure 19: Coverage based on ANC1 derived denominators for BCG, Penta1, Penta3 and Measles coverage

Estimating denominator coverage for immunization using DPT-1 is less accurate and gives more variation in the regional estimates compared to using ANC-1 derived denominators

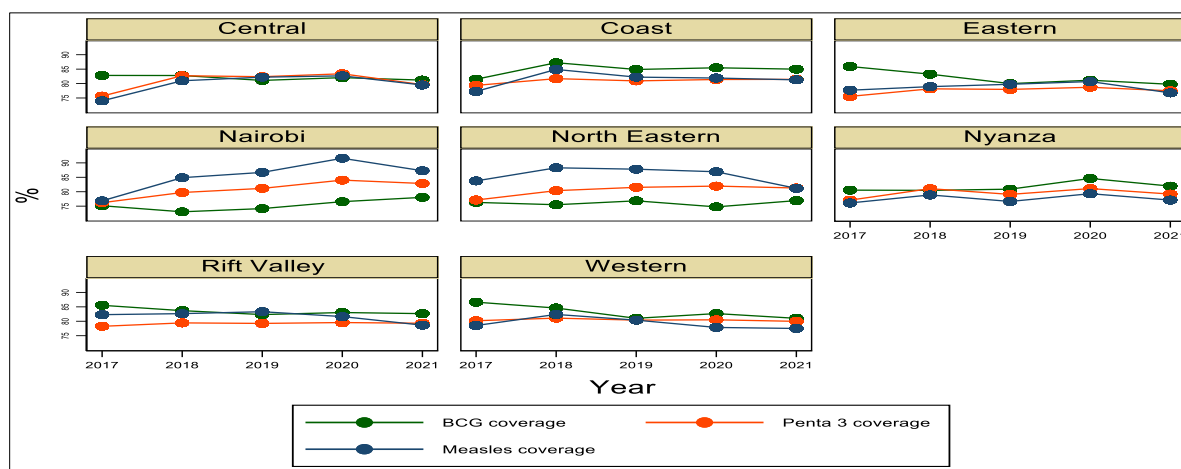


Figure 20: Coverage based on DPT1 derived denominators for BCG, Penta3 and Measles Coverage

Regional Analysis of Antenatal Care and Delivery Coverages based on ANC-1 Derived Denominators Vs DPT-1 Derived Denominators

Based on ANC1 derived denominators, regional coverages are accurate and have internal consistency with institutional deliveries having higher coverage than ANC4, an IPT 2 that is lowest, especially in non-malaria endemic zones like Nairobi and Rift Valley. Fig 20

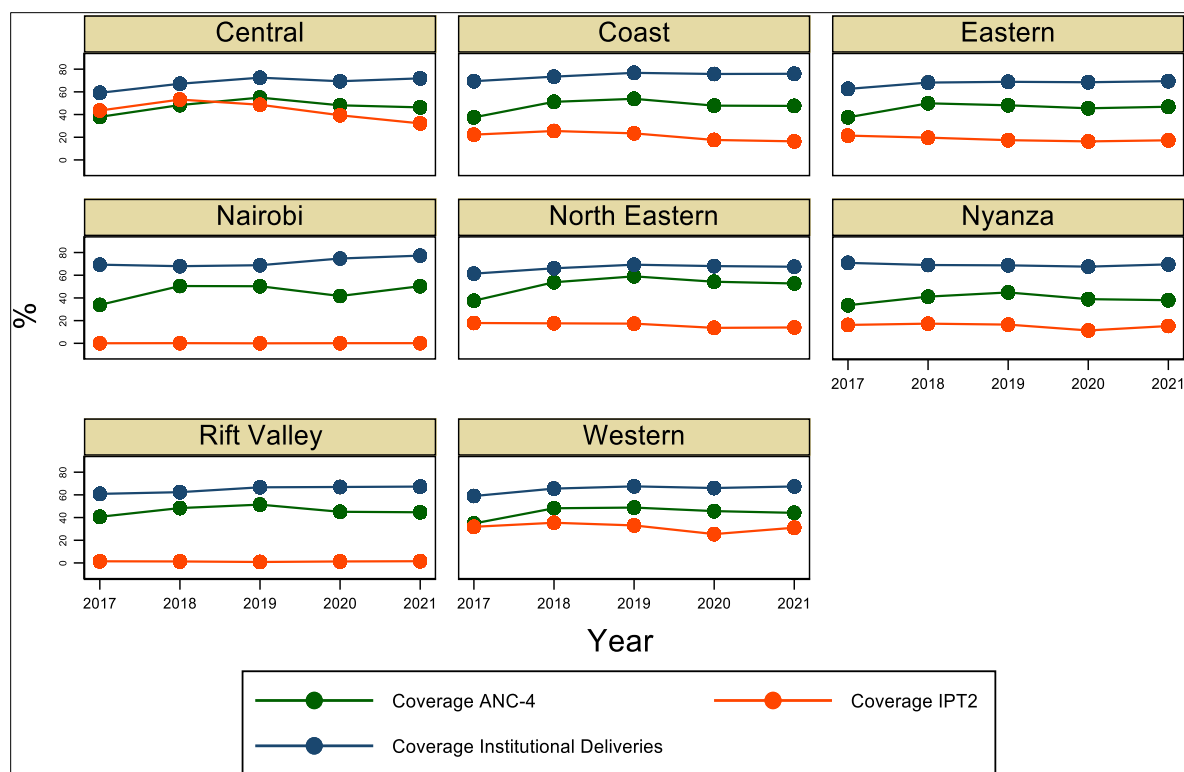


Figure 21: Coverage based on ANC1 derived denominators for Coverage Institutional Deliveries, ANC-4 and IPT2

Use of DPT- 1 derived denominators give estimates closest to KHIS estimates compared to using ANC-1 derived denominators. Coverage estimates for ANC services and skilled deliveries derived from DPT1 are accurate and show internal consistency with ANC-1 having almost 100% coverage in all regions, followed by institutional deliveries, ANC-4 visits and IPT-2 being the lowest (Fig 21). Institutional deliveries coverage is lowest in North Eastern and Eastern regions.

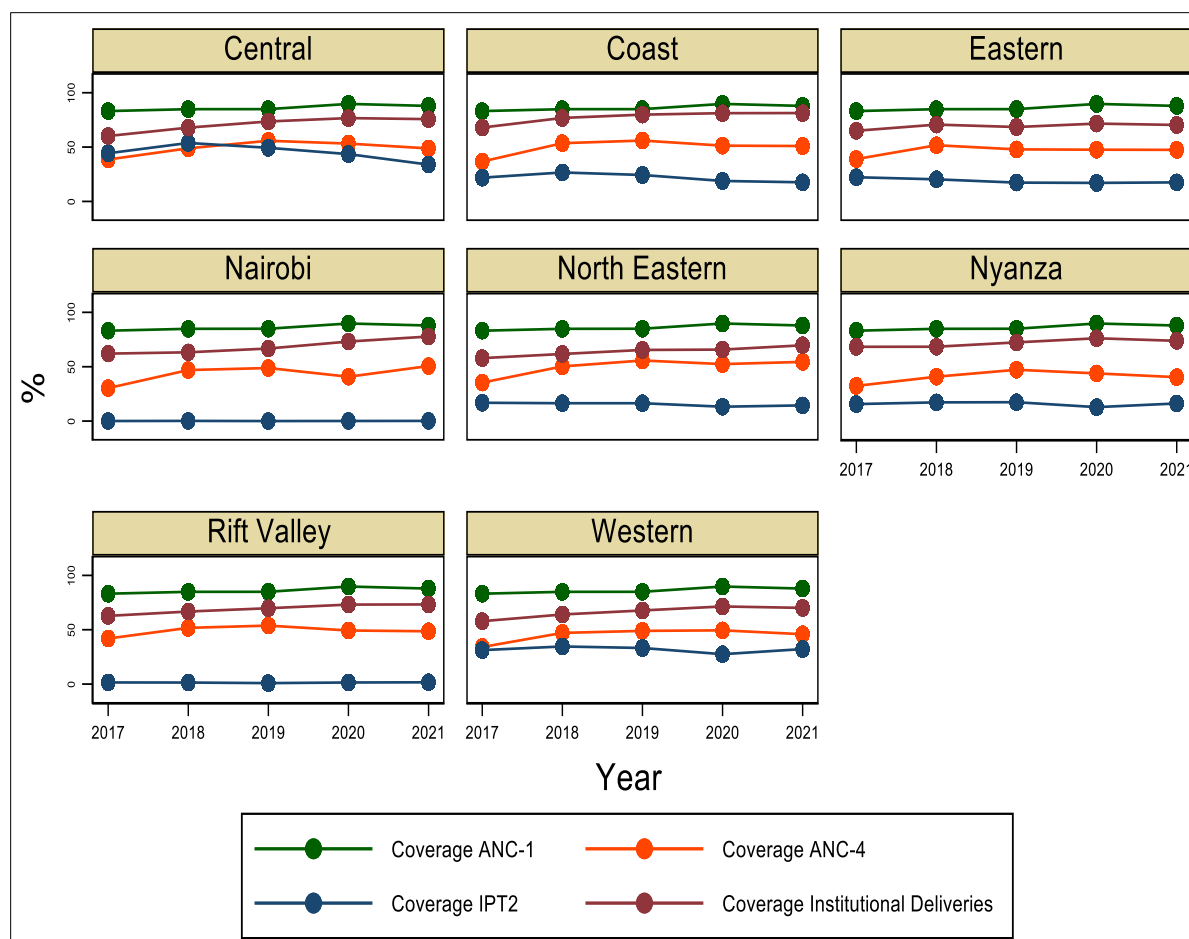


Figure 22: Coverage based on DPT-1 derived denominators for Coverage Institutional Deliveries, ANC-1, ANC-4 and IPT2

Overall, ANC-1 derived denominators are better for estimating immunization coverage while those derived from DPT-1 are best for estimating ANC services and institutional deliveries coverage.

Survey coverage trends and equity

Counties in the central, East and Nairobi regions had the highest coverages while Counties in the northeastern region had low coverages for all indicators apart from ORS that was lowest in the Western region. Family Planning coverage had the highest inequality gap, with Northeastern region being much lower than all other regions. Skilled Births Attendance also had significant inequality between the lowest region (North Eastern) and the highest (Nairobi). Coverage for BCG had the lowest inequality and coverage was high in all regions. On the other hand, ORS, Care for pneumonia and ANC4 had a low inequality but coverage was low in all regions. These patterns show a preference for prioritizing children's health in the North Eastern region, while women's health not adequately prioritized.

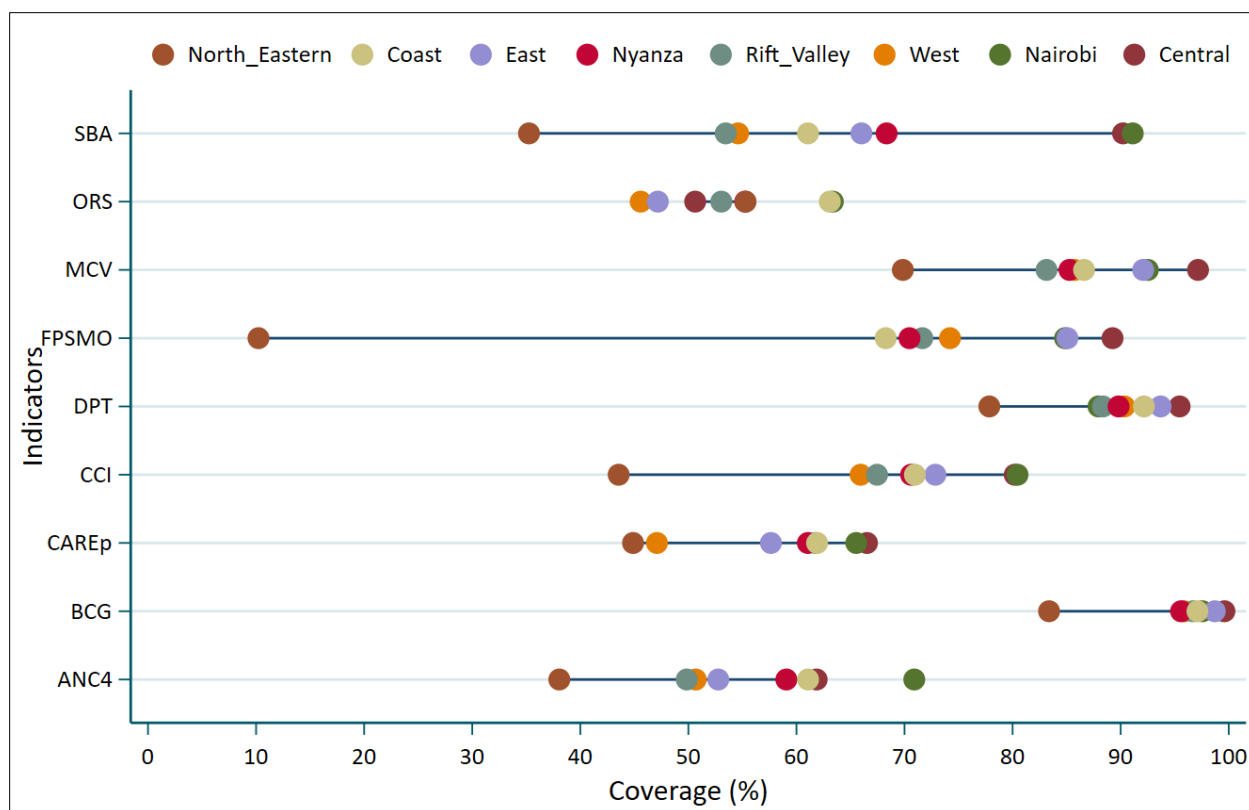


Figure 23: Equiplot for survey coverage trends and equity on the regions

Private sector bias

Most private health facilities in Kenya are listed in the Master Health Facility List (KMHFL). In 2013, a third of health facilities were private while about half were public (49%). Most of the private facilities were medical clinics and stand-alone facilities such as pharmacies, and laboratories while most maternity homes were likely to be private.

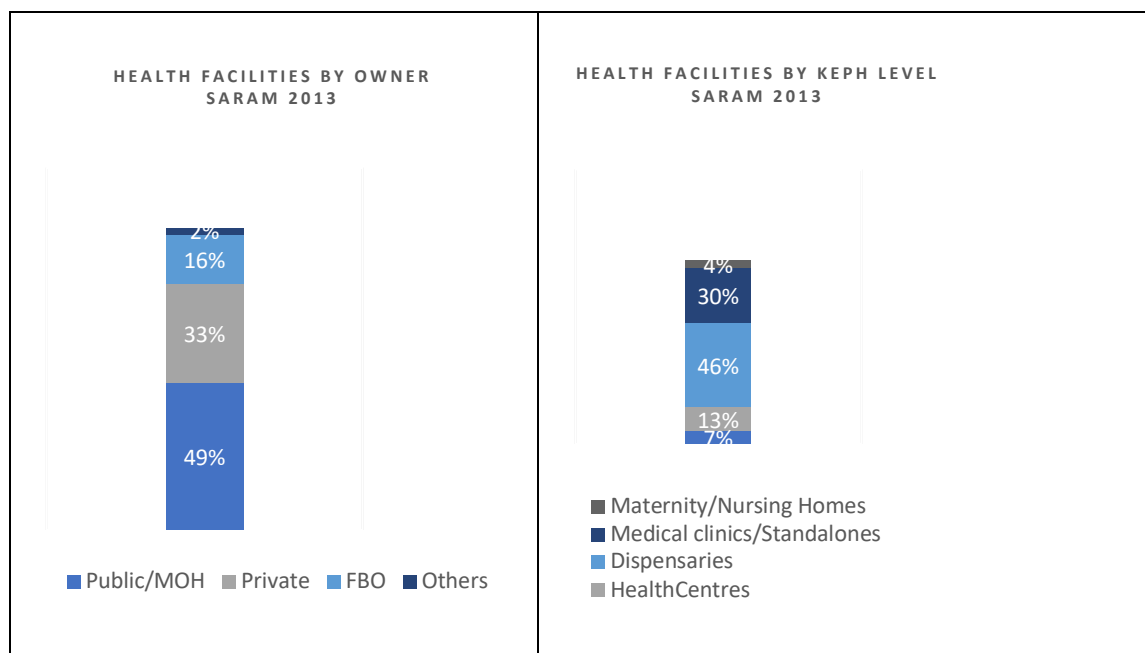


Figure 24: Health Facilities percentage distribution by owner and KEPH level

The share of private facilities in the Kenyan health sector has increased from 33% in 2013 to 42% in 2021. In 2013, private facilities provided a significant proportion of services especially outpatient RMNCH services. Two of every three mothers got their family planning commodities from the private sector while about half of children with ARI are attended at private facilities. The proportion of deliveries that were done in private health facilities was low (15%). It is expected that the same pattern of share of service applied in 2021. While private health facilities were not reporting in 2013, reporting rates have since improved significantly with almost all private facilities reporting in 2021.

In 2014, the contribution of the private sector (about 33%) may have been missed in the overall estimation of coverages of health indicators using routine data as these facilities were not reporting within the nation reporting database. In 2021 however, routine coverages are likely to include the share of private facilities and hence the results are unlikely to be biased.

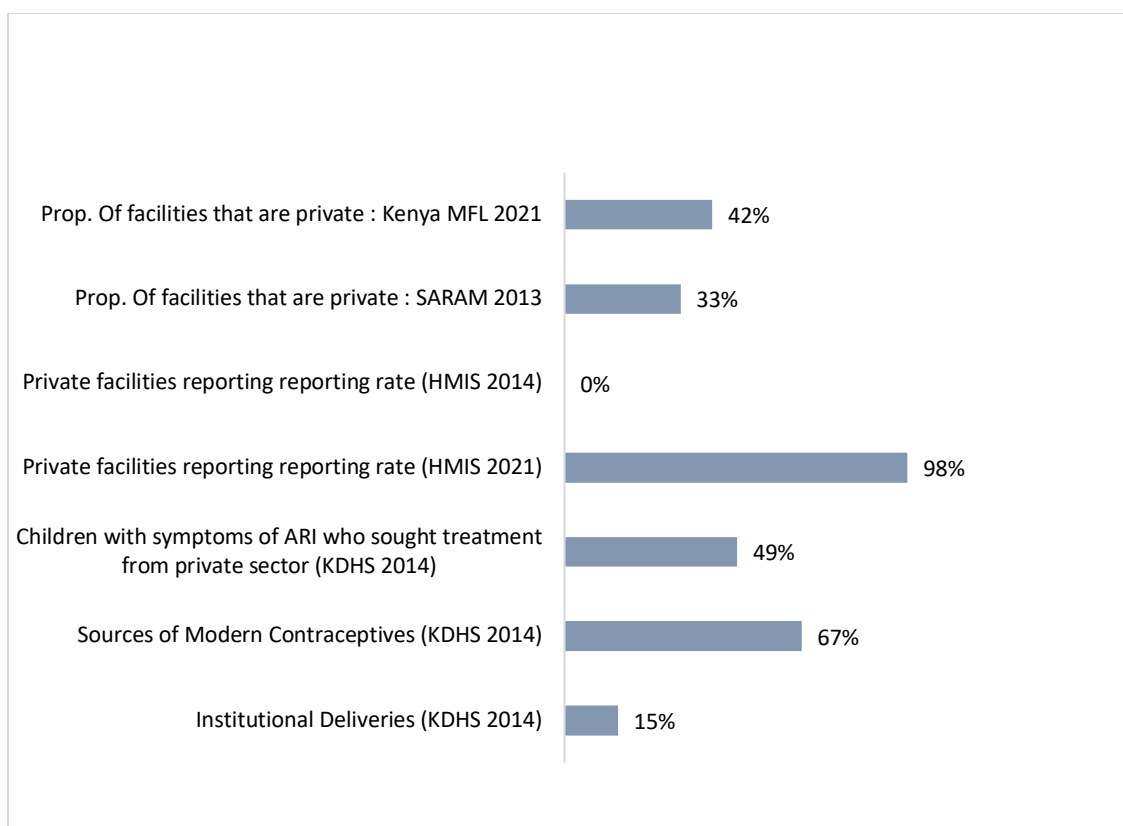


Figure 25: Service share percentages as provided by the private sector