National and subnational coverage and other service statistics for reproductive, maternal, newborn and child health from health facility data and surveys

Rwanda

Brief synthesis of the analyses

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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 in Rwanda, supported by survey analyses and health system data where available. It focuses on national and district level administrative units.

The aim of the analyses is to inform national and global reviews of progress and performance of the national plan and strategy for RMNCH. From the health facility data (kept in DHIS2 software) a clean data set is created for the endline review. This is done through a systematic approach, with ample attention for facility data quality assessment and adjustment, denominator selection, joint assessment of surveys and facility results and consideration of possible 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

Part #1

Description of the data sets

Indicator	
Administrative organization	
Number of provinces -	5
Number of districts	30
Health facilities	
Number of health facilities in country	525 Public health facilities and 11 private health facilities
Data on core health professionals	No
Data on hospital beds	Yes
Facility data analysis period	
First month and year with health facility data	Jan 2019 (some)
Last month and year with health facility data	July 2021 (all)
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 / DPT first dose	Yes
Pentavalent / DPT 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	Yes

Population-based surveys (3 most recent health surveys)

Name of survey	Year
DHS	2019-2020
DHS	2014/2015

Population projection data in DHIS2

Indicator	Year
Total population for every year	Yes
Live births for every year	Yes
Population under 1 year for every year	Yes

Part #2

Data quality assessment and adjustments

Overall, data completeness is high for the indicators that were assessed for Rwanda. However, the Data Quality report flagged problems with the internal consistency of the data. This requires further investigation to understand what may be causing this inconsistency.

Data quality was analysed at national level and by service level as shown in table 1 and table 2 below.

Table 1: Data quality scores all services

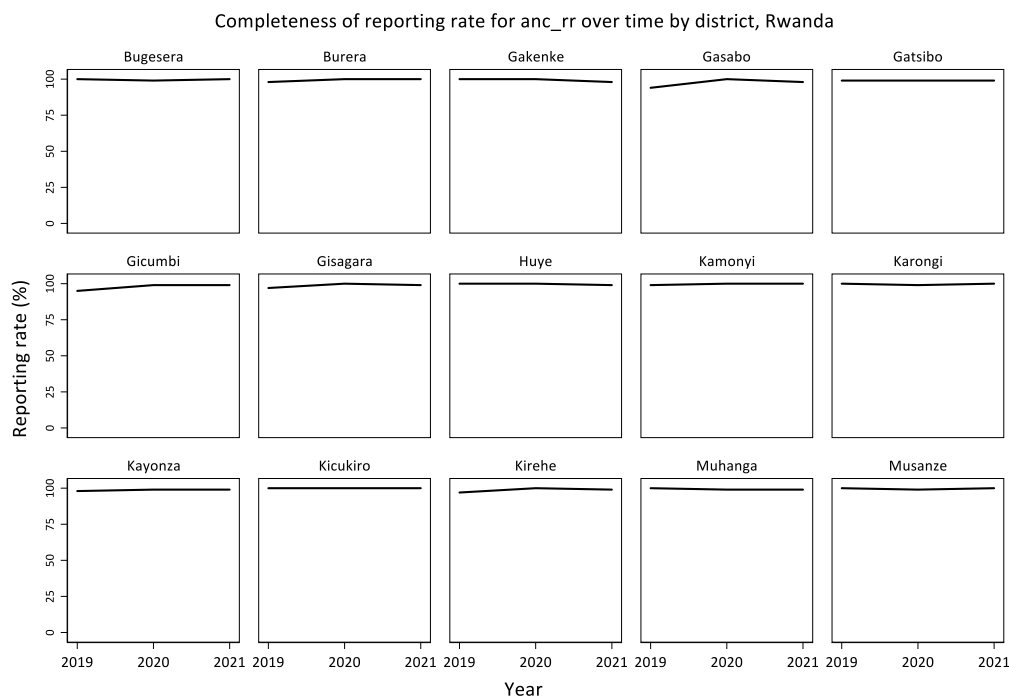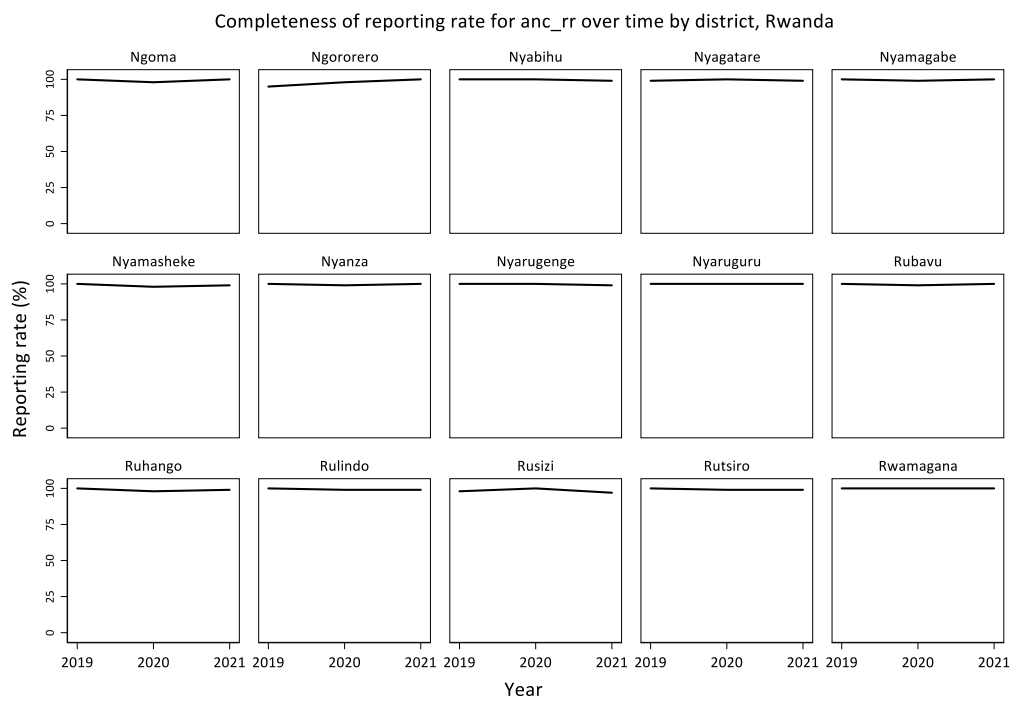| Data Quality Scores (all services)	2019	2020	2021
Reporting rate (%) by year (National average of ANC, delivery, vaccination, opd)	99	99	99
Percentage of districts with reporting rate >= 95% by year (National average of ANC, delivery, vaccination, opd)	98	98	100
Percentage of districts with no missing monthly values by year (National average of ANC1, ANC4, delivery, Penta1, Penta3, opd)	84	100	100
Percentage of monthly values that are not extreme outliers	100	99	98
Percentage of districts with no extreme outliers in the year	99	94	88

Table 2: Data quality scores by services

Services	Reporting rate (%) - by service			% of districts with reporting rate >= 95% by service		
	2019	2020	2021	2019	2020	2021
ANC all	99	99	99	97	100	100
Delivery all	99	99	99	97	100	100
PNC all	95	96	96	80	63	63
Vaccination all	99	99	100	97	97	100
OPD all	99	99	99	100	97	100
IPD all	96	97	98	53	90	93
FP all	99	99	99	93	100	100
ANC1	99	99	99	97	100	100
ANC4	99	99	99	97	100	100
Delivery	99	99	99	97	100	100
Penta1	99	99	100	97	97	100
Penta3	99	99	100	97	97	100
IPT2	99	99	99	97	100	100
C-section	99	99	99	97	100	100
BCG	99	99	100	97	97	100
Measles	99	99	100	97	97	100
PNC 48h	95	96	96	80	63	63
SBA	99	99	99	97	100	100

OPD under5	99	99	99	100	97	100
IPD under5	96	97	98	53	90	93
FP new	99	99	99	93	100	100
FP revisits	99	99	99	93	100	100
Stillbirth all	99	99	99	97	100	100
Stillbirth fresh	99	99	99	97	100	100
Stillbirth macerated	99	99	99	97	100	100
Under 5 death	99	99	99	100	97	100
Maternal death	99	99	99	97	100	100

An assessment of the completeness of Health Management Information System (HMIS) data was conducted by the Rwanda team, showing high completeness of reporting both for public (99.9%) and private facilities (97%). Some districts had lower reporting in 2019 (e.g. Ngororero), but targeted training at end of 2019 appears to have contributed to improvements in completeness. The graph below shows reporting completeness for ANC4 for all districts.
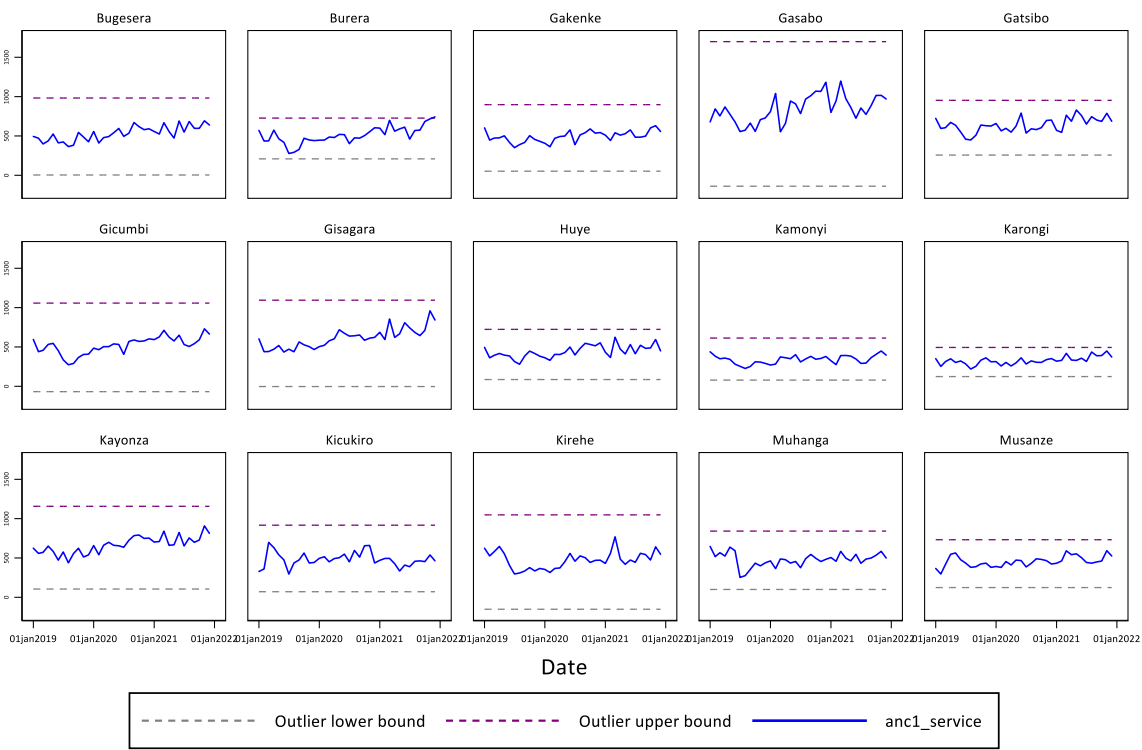
(Please note, the K factor was set at 0.25 for these calculations as there are few non-reporting facilities, and non-reporting is largely in private facilities with high service coverage.)

Completeness of reporting rate for anc_rr over time by district, Rwanda

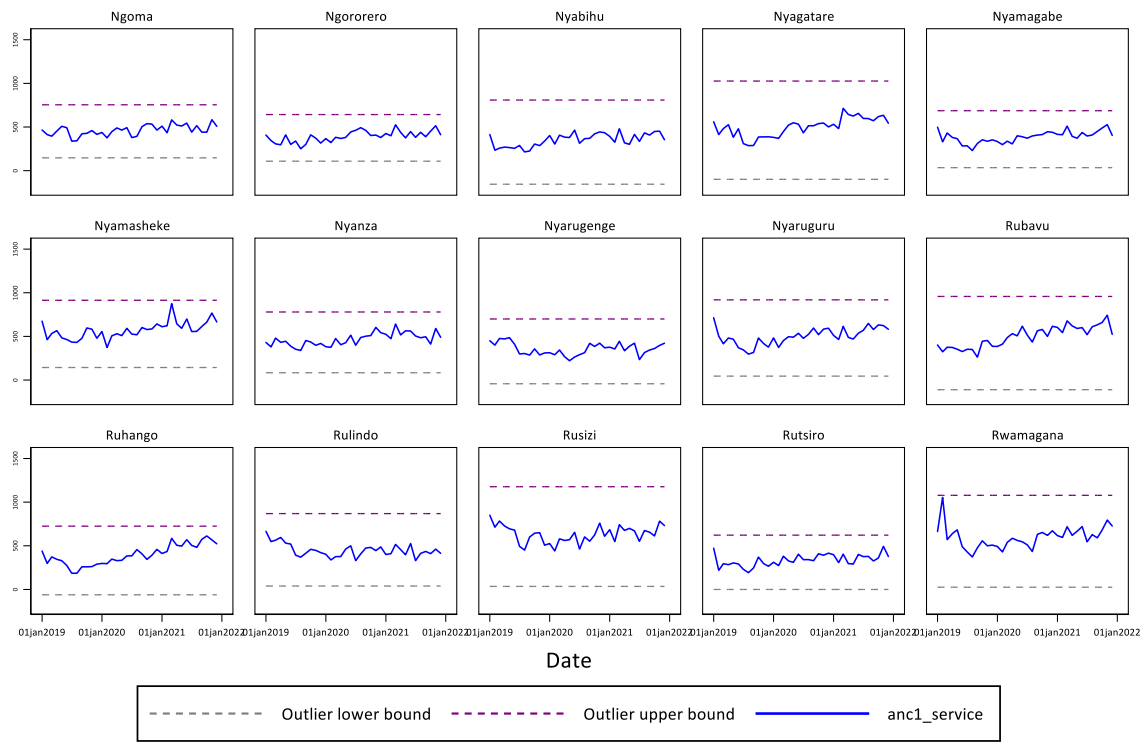Completeness of reporting rate for anc_rr over time by district, Rwanda

No outliers were identified when analysing ANC1, Penta 1 and Penta 3 by district. To illustrate, the graphs below show analysis of outliers for ANC1 by district.

Assessment of anc1 outliers over time by district, Rwanda

Bugesera, Burera, Gakenke, Gasabo, Gatsibo, Gicumbi, Gisagara, Huye, Kamonyi, Karongi, Kayonza, Kicukiro, Kirehe, Muhanga, Musanze

Date

- - - - - Outlier lower bound   - - - - - Outlier upper bound   ——— anc1_service

Assessment of anc1 outliers over time by district, Rwanda

Ngoma, Ngororero, Nyabihu, Nyagatare, Nyamagabe, Nyamasheke, Nyanza, Nyarugenge, Nyaruguru, Rubavu, Ruhango, Rulindo, Rusizi, Rutsiro, Rwamagana

Date

- - - - - Outlier lower bound   - - - - - Outlier upper bound   ——— anc1_service

Internal consistency of HMIS data between indicators that expect to have a high correlation, such as ANC 1 and Penta 1, was also observed. When comparing ANC 1 and Penta 1, there was internal inconsistencies across all years, suggesting to dig deep into the data to know the reason, or if it is not a data quality issue . The numbers of ANC services reported appear much lower than expected. Generally, it would be expected that the number of ANC services received should be higher or equal to the numbers of children receiving the Penta 1 vaccine given the high coverage of the two indicators from DHS survey (100% for ANC1 and 99.6% for Penta1).

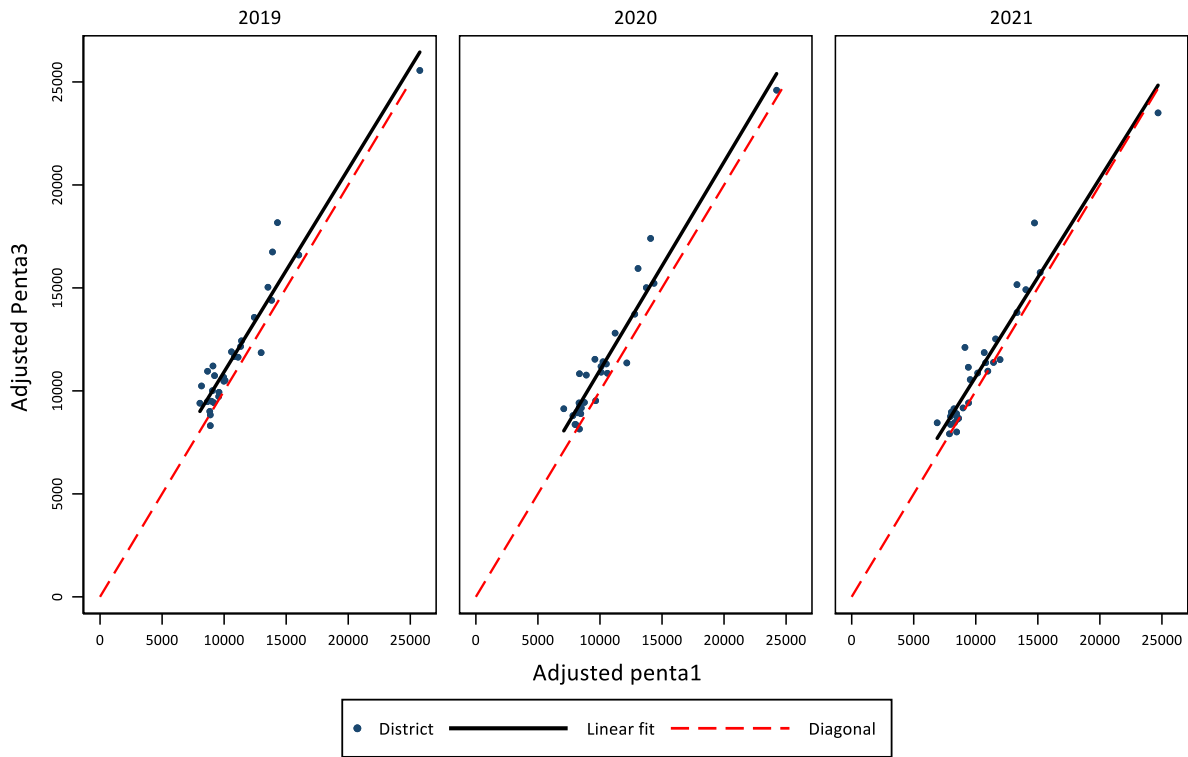Comparison of adjusted numbers of ANC1 and Penta1 by year, Rwanda
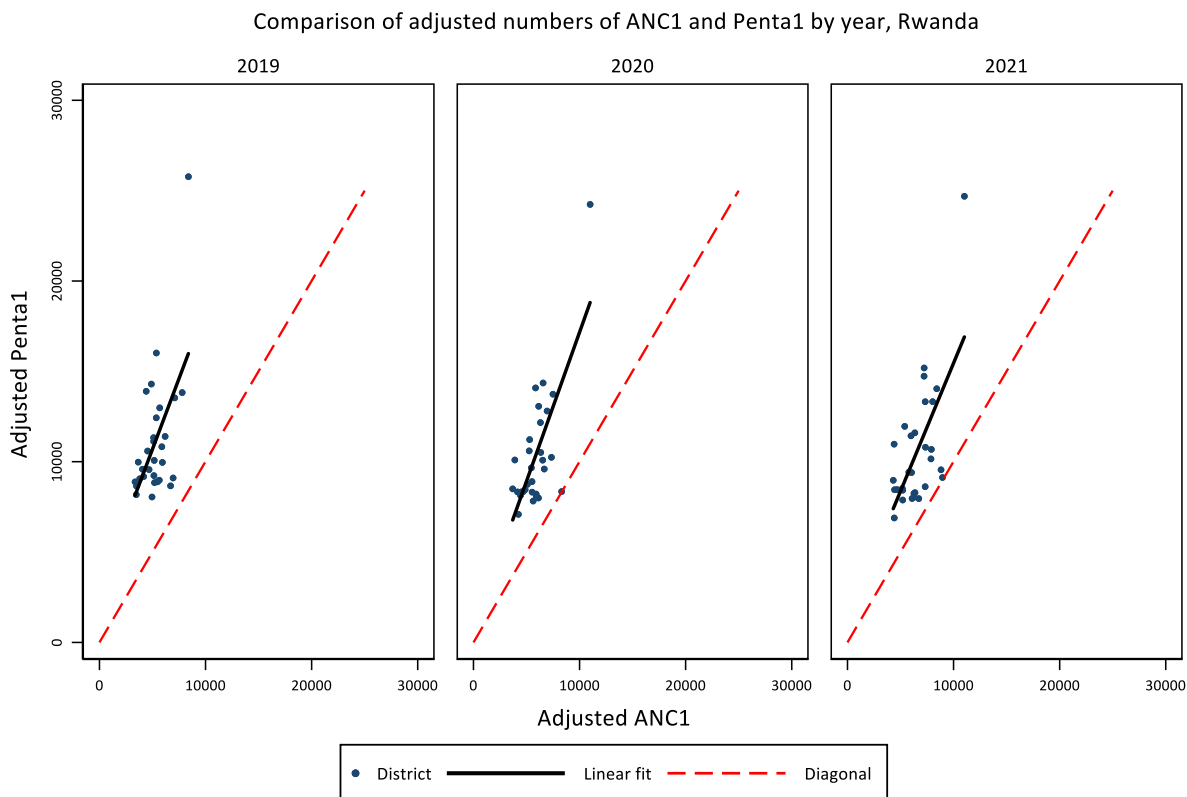
R-squared=0.3387

When comparing Penta1 and Penta3, there appears to be internal consistency across all years.

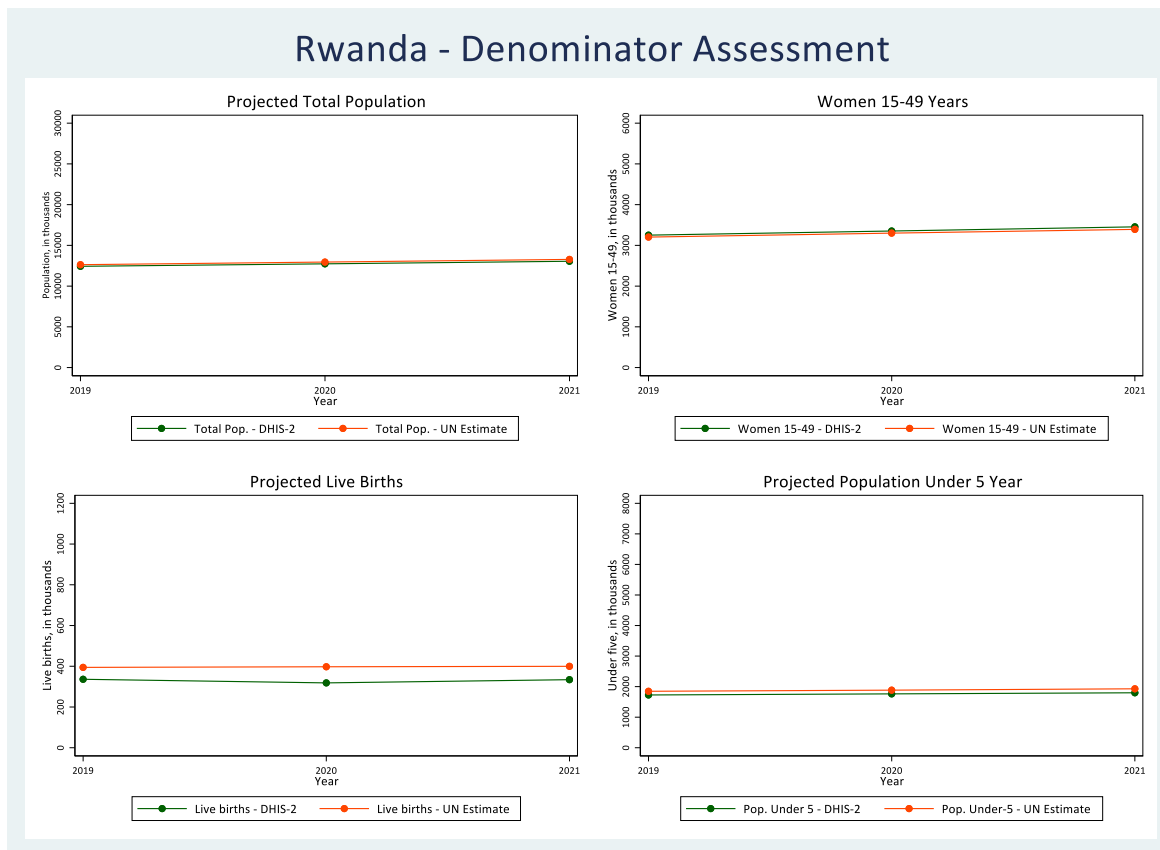Comparison of adjusted numbers of Penta1 and Penta3 by year, Rwanda

R-squared=

Part #3

Denominators or target populations

Population estimates based on the last Rwanda census (2012), which is currently used in the HMIS, were compared with UN-based estimates. The total projected population trends and numbers were very similar, as well as for all age brackets.

Small differences in total numbers were seen for the projected live births.

Testing facility data derived denominators

The Rwanda team explored how to estimate the target population denominators using coverage of DPT1 indicators. For these estimations, the following parameters were used in the calculations:

- The stillbirth default for Rwanda is **0.02,** but was adjusted to include the twinning rate based on latest survey data of **0.0142.** For pregnancy loss, the default rate of **0.03** was used due to absence of available data to inform this.
- For the neonatal mortality rate, the rate of **0.017** was used, based on the recent DHS (2019/20)
- For the post-neonatal mortality rate, the rate of **0.014** was used, based on the recent DHS (2019/20).

When using denominators derived from DPT1, the general trends observed reflect expected trends using DHIS2 data.

Coverage based on DPT-1 derived denominators by region
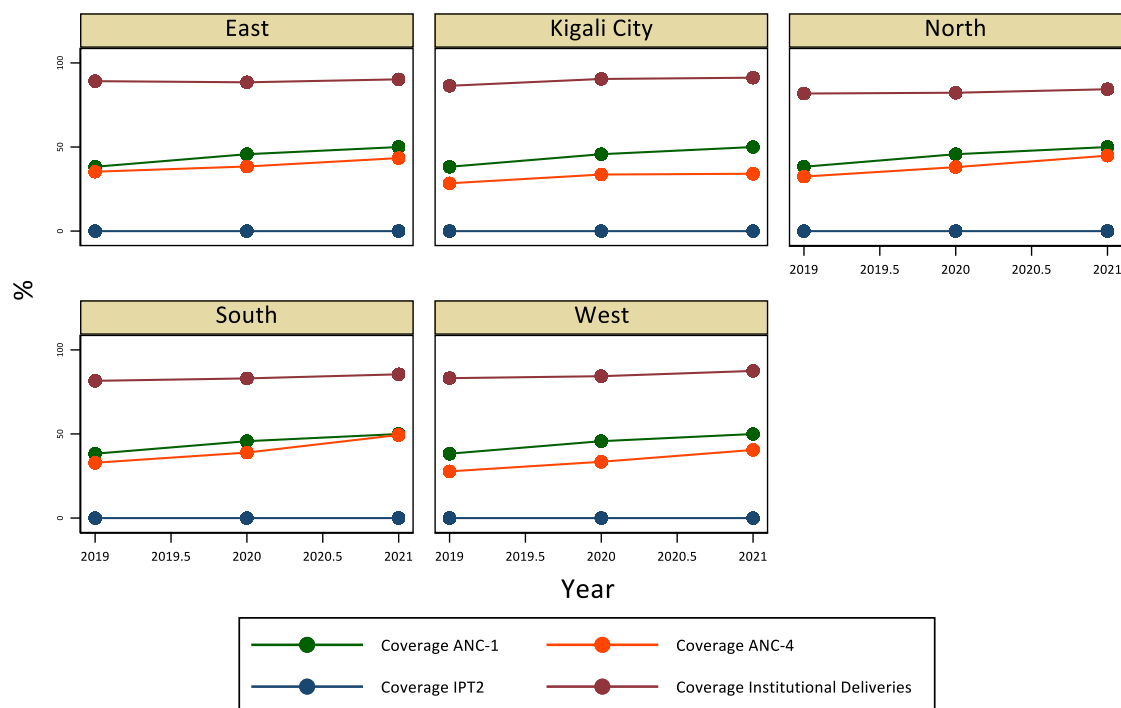
Part #4

Survey coverage trends and equity

The Rwanda team carried out equity analyses on a selection of core indicators to explore differences in coverage trends between countries participating in the workshop.

The graph displayed below shows a comparison of the sub-national differences (the difference between the regions with highest and lowest coverage within a country) for all countries. It also shows the inequality ratio for each country (as an orange dot), which takes into account the target population size.

By comparison with other countries, Rwanda has low levels of inequality when analysing ANC4 and other maternal and child health indicators. It is likely that this is, in part, due to the community-based health insurance that enables access to health services for the Rwandan population.

Inequality country comparison for 4 anetanal care 4 visits:
a) Difference between highest and lowest region
b) Ratio
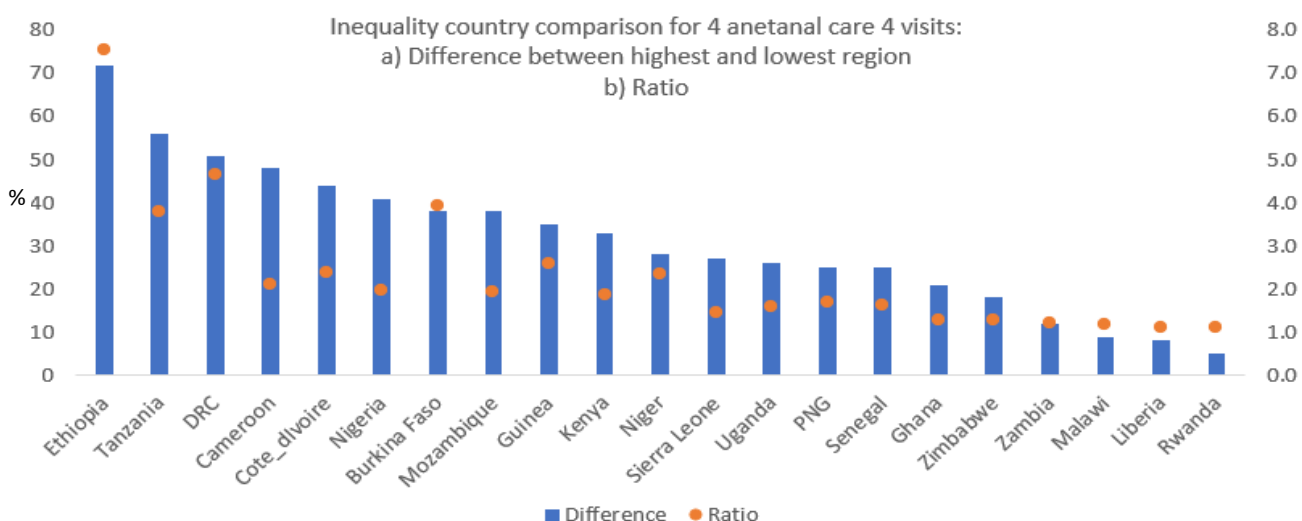
The Rwanda team also analysed equity trends between Rwanda's five regions. By using 2014-2015 and 2019-2020 DHIS data, the graph below shows a comparison of coverage of a range of RMNCAH indicators per region. The graph below also shows low levels of inequality across regions internally. This pattern was seen for all the indicators analysed, although there were slightly higher levels of inequality for care seeking, use of ORS and family planning satisfied by modern methods.

Equiplot: Analysis of inequality across regions within Rwanda for core RMNCAH indicators