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African Population and
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Countdown to 2030
Women's Children's & Adolescent's Health

Analysis of reproductive, maternal, newborn, child and adolescent health indicators

2019-2023

chartbook with main results and interpretations



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General Introduction

This Chartbook summarizes the results for key indicators of reproductive, maternal, newborn, child and adolescent health (RMNCAH) that were produced by the country team at a Countdown analysis workshop in Kigali, April 22-26, 2024.

The analysis is based on routine district health facility data for 2019-2023, recent national surveys, health system data and global estimates, much attention is paid to data quality.

This Chartbook describes and interprets the results, which should be a critical input for the monitoring of country RMNCAH and health sector plans.

For each of the sections there are selected graphs and tables on key indicators with interpretations made by the country team during the workshop.





Table 1: Summary of reported health facility data quality, DHIS2, 2019-2023

Data quality metrics	2019	2020	2021	2022	2023
1 Completeness of monthly facility reporting (mean of ANC, delivery, immunization, OPD)					
1a % of expected monthly facility reports (national)	92	86	92	96	95
1b % of districts with completeness of facility reporting $\geq 90\%$	71	57	77	88	87
1c % of districts with no missing values for the 4 forms	95.34	95.22	99.42	99.6	99.68
2 Extreme outliers (mean of ANC, delivery, immunization, OPD)					
2a % of monthly values that are not extreme outliers (national)	86.7	96.5	98.26	99.08	98.74
2b % of districts with no extreme outliers in the year	75.49	84.27	84.27	84.27	84.27
3 Consistency of annual reporting					
3a ANC1 to penta1 ratio in the reported data (national)	1.34	6.07	1.35	1.07	1.03
3b Penta1 to penta3 ratio in the reported data (national)	1.03	1.03	1.03	1.04	1.05
3c % of districts with ANC1-penta1 ratio in expected range	55.2	48.3	62.1	58.6	48.3
3d % of districts with penta1-penta3 ratio in expected range	79.3	65.5	72.4	86.2	89.7
4 Annual data quality score (mean 1a, 1b, 2a, 2b, 3c, 3d)	77	73	81	85	84

- Excluding 2020, the overall data quality score is progressing. For the year 2021-2023 was above 80%.
- Completeness of reporting data is good ranging from 92-96%. Facility reporting $\geq 90\%$ has shown a positive trend ranging from 71% in 2019 to 87% in 2023
- Districts are doing well, between 2019-2023 “% of monthly and year data NOT extreme outliers” has improved by 86.7%-98.7% and 75.5% and 92.4%
- Data for ANC1 and Penta1 ratios demonstrate fluctuations, but ranges from 48-62% of the districts had a good ratio between 1 – 1.5
- Data for Penta and Penta3 ratios demonstrate fluctuations, but ranges from 72-89% of the districts had a good ratio between 1 – 1.5

Figure 1a: Percentage of districts with low reporting rate (<90%) by service & year

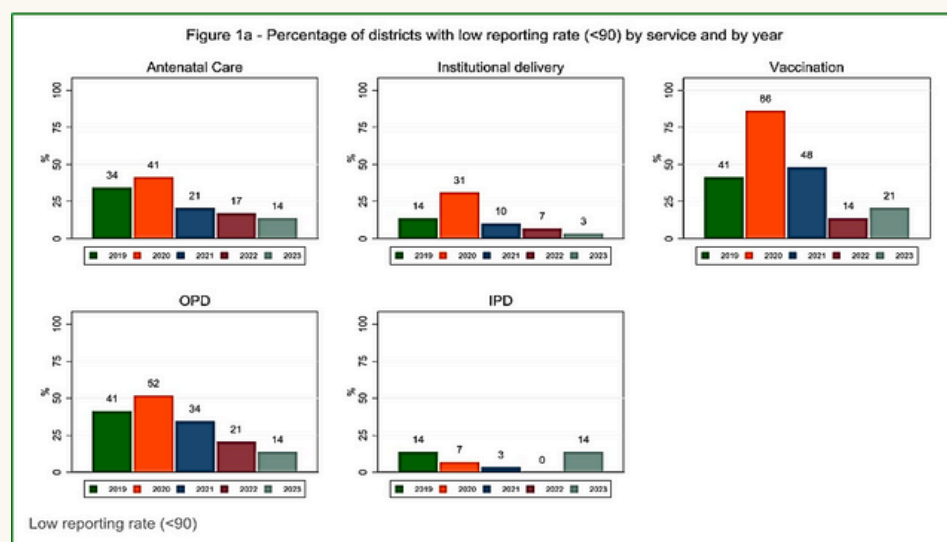


Figure 1b: Ratio of number of facility reported ANC1 to penta1, and penta1 to penta3, compared to expected ratios

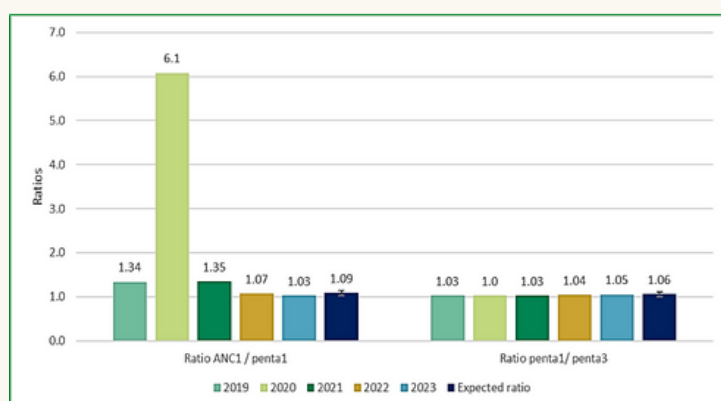
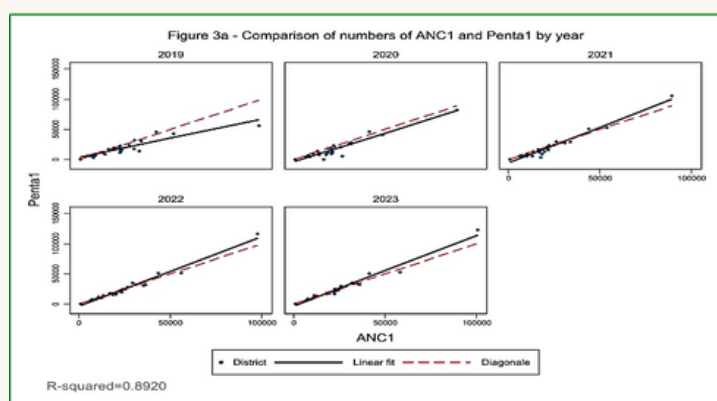


Figure 1c: Comparison of numbers of ANC1 and penta1 reported by health facility, by year





- For consistency ratio of ANC1/penta1 was plausible during 2022-2023 but not during 2019-2021 when ANC1 was much higher than expected. For the ratio of penta1 and penta3, the ratio was plausible ranging from 1.03 in 2019 to 1.06 in 2023. The recent ratios of ANC1/penta1 and penta1 and penta3 are within the recommended range (1-1.5) for Malaei
- The percentage of districts that have ANC1 to penta1 ratio in the expected range is above 80%. For the penta1 to penta3 ratio the districts in the expected range is 99%.

Health facility data adjustment: numerators

Figure 1b: Comparison of live births before and after adjustment for completeness and outliers

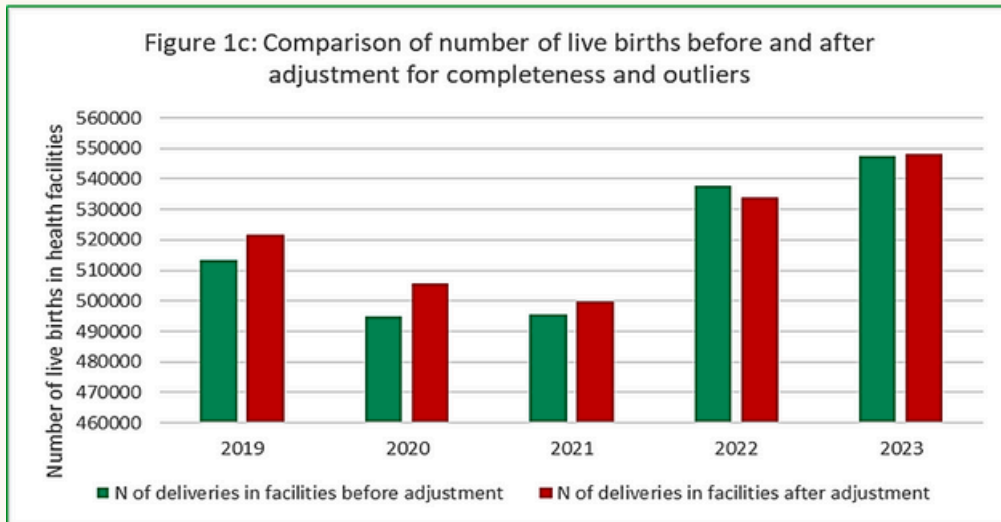
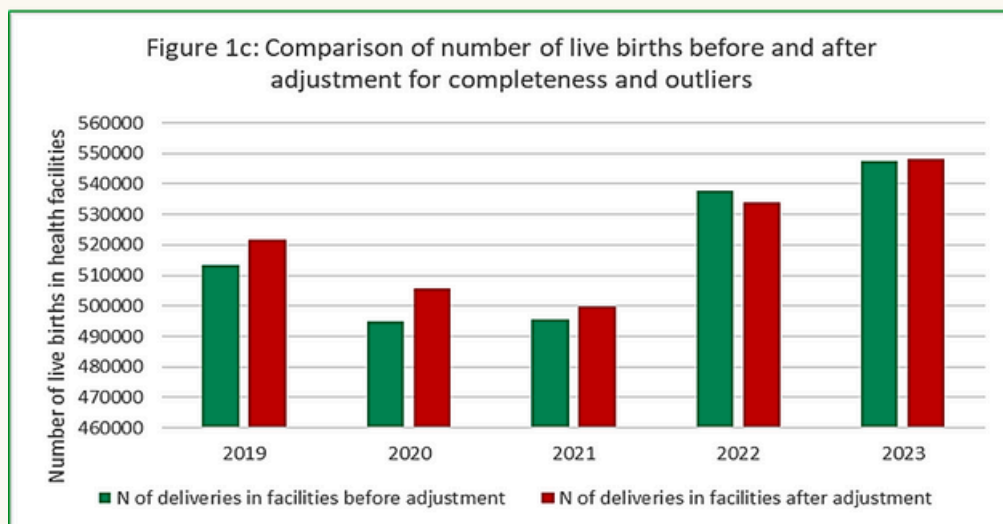


Figure 1c: Comparison of penta1 vaccination before/after adjustment for completeness and outliers



- In comparing the completeness and outlier for live births before and after adjustment($k=0.25$) between 2021 to 2023, the trend seems to be consistent throughout except for the year 2019 and 2020, suggesting underreporting in the DHIS2 for this years. This is most likely linked to health system challenges during the COVID-19 pandemic.
- In comparing the completeness and outlier for penta 1 vaccination before and after adjustment between 2021 to 2023 seems to also be consistent throughout except for the year 2019 and 2020, we believe it may be because of the same reasons as above.

Figure 2a: Annual population, DHIS2 and UN



Fig 2a: Total Population (in thousands), DHIS2 and UN projections

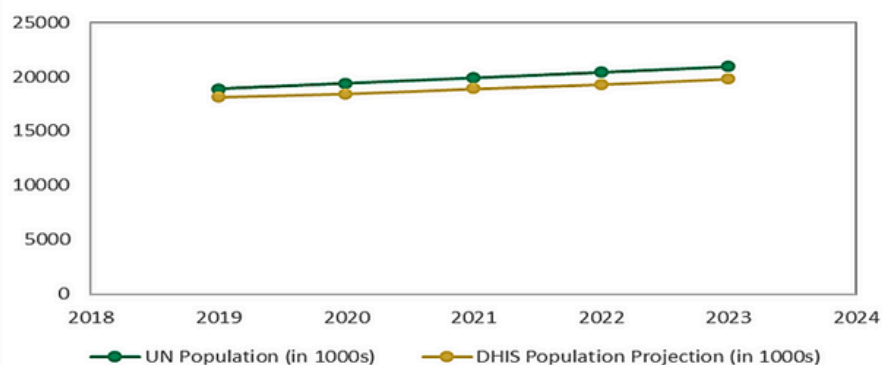
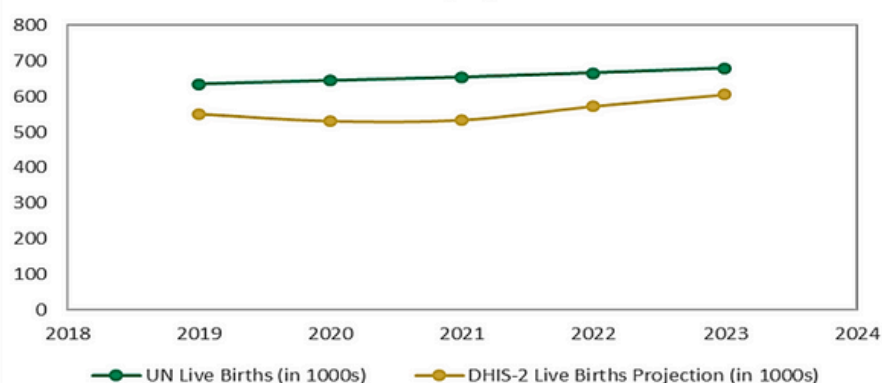


Figure 2b: Live births, DHIS2 and UN

Fig 2b: Total Live Births (in thousands), DHIS2 and UN projections



- The DHIS2 population projection was increasing with time from 18146 in 2019 to 19800 in 2023 as well as the growth rate increased from 1.6 to 2.6
- The DHIS2 live birth projection slightly increases over time
- The relative difference of the total population estimate of DHIS2 and UN is between the acceptable range 4-5% with a regular trend. However, the relative differences for live births estimates between DHIS2 and UN are way above the accepted range > 5% ranging from -11% -18%. The trend is also inconsistent, with a drop between 2020-2022
- The CBR in DHIS2 and in UN was increasing with time. The CDR in DHIS2 is fluctuating between 3.7-12, with 2020 having the highest CDR; whilst UN estimates are constant.

Fig 2c: Institutional birth coverage, DHIS2-based with different denominators, and survey coverage

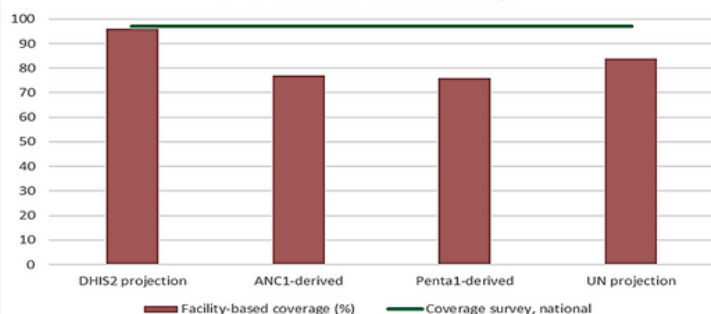
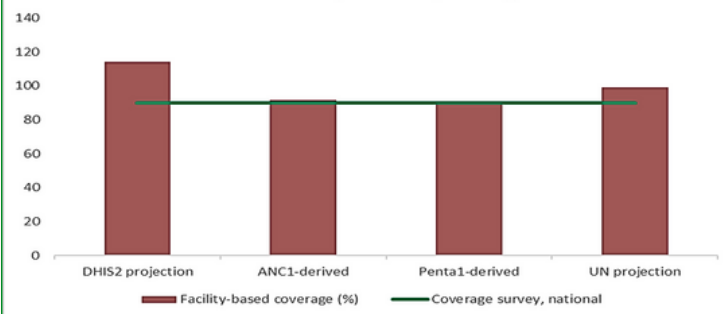
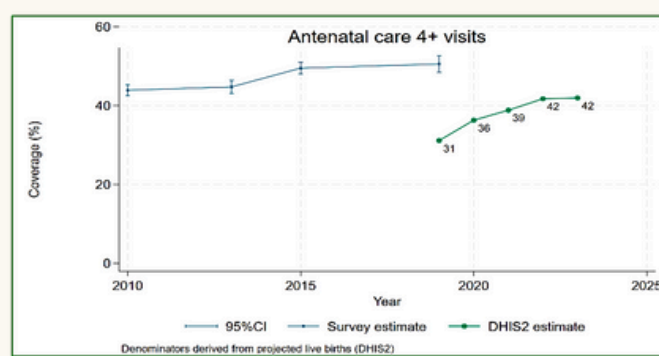
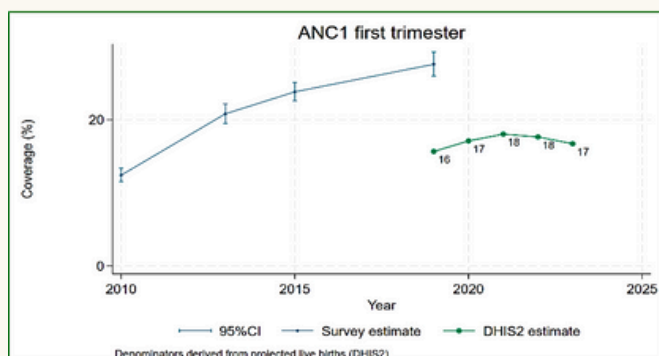


Fig 2d: Penta3 coverage, DHIS2-based with different denominators, and survey coverage



- For institutional birth coverage the DHIS2 projection performed the best with a gap of 10, indicating reliability of the DHIS2 data compared to the UN estimates. For the Penta 3 Immunisation coverage, Penta 1-derived performed the best with a gap of 0.
- The Penta3 immunization coverage indicator performed best using the penta1 derived denominator at a median gap of 4%. This is similar between the national and subnational.
- DHIS2 Projection appears to be the best denominator to use for MNH indicators; penta1 was better for vaccinations

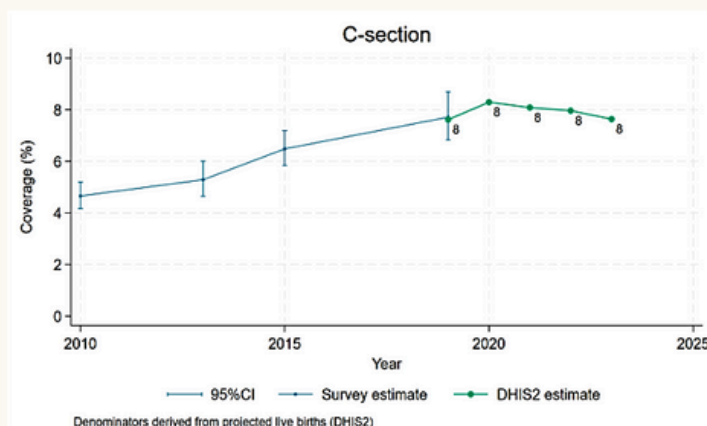
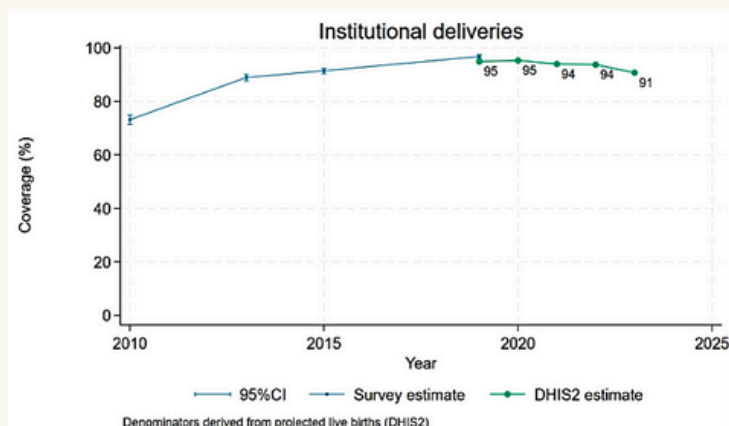
Figures 3a and 3b: Coverage trends in selected antenatal care indicators



- The facility level data is almost half the estimate of the Survey estimate (underreporting) for both ANC1 first trimester and Antenatal care 4+ visits. The quality of the DHIS2 data of ANC1 first trimester is of concern; estimates range between 12-15 overtime. The quality of the antenatal care 4+ visits is also of concern for the same regions; estimates range from 26.6 – 37.2. The trends have remained constant between 2020-2023 for both indicators most likely because of no policy or incentives to facilitate a positive trend.
- The observed levels are under reporting the coverage. The observed levels and trends in the DHIS2 for the indicators would be firstly for ANC1 first trimester, would be because women don't usually present to the hospital before 12 weeks GA; usually present at second trimester. Therefore we automatically expect the number of women having four or more antenatal visits to decrease. For the high survey estimates we speculate that women would report high rates due to recall bias and social desirability bias.



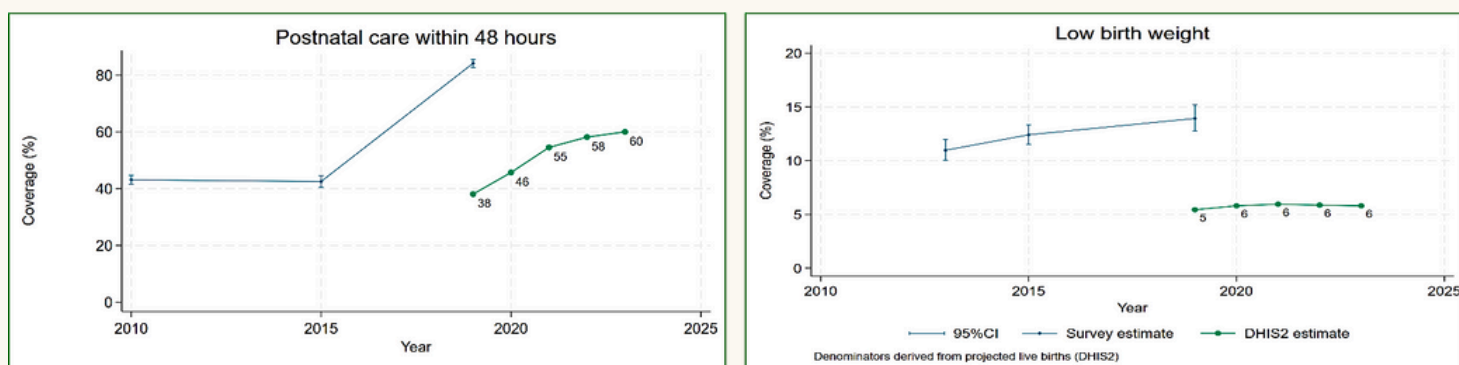
Figures 3c and 3d: Coverage trends in selected delivery care indicators



- There is perfect concordance between the survey and the DHIS2 data estimates for Institutional deliveries, including caesarean sections. Therefore, the trends are plausible.
- We have confidence for the institutional deliveries from the DHIS2 data.

3 National coverage trends: postnatal care and low birth weight

Figures 3e and 3f: Coverage trends in postnatal care, and percent of newborns with low birthweight



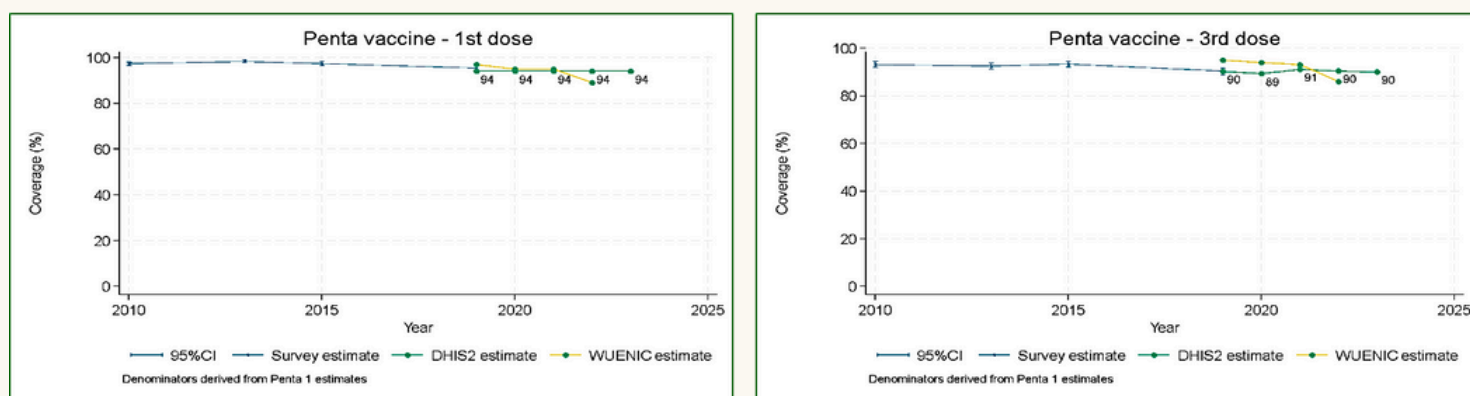
- Postnatal care variable is being underestimated by the DHIS2 by as compared to the Survey data, with a positive trend from 38 in 2019 to 60 in 2023. Low birth weight is also being underestimated in the DHIS2 compared to the survey with a consistent trend 6 from 2020-2023.



- We have reservations with the DHIS2 estimates and believe it might be underestimating the postnatal care within 48 hours and "low birth weights". We know that caesarean sections will spend more time at a facility compared to an SVD and therefore will have more time to be assessed and recorded postnatally. However, the postnatal period for the SVD deliveries may be swift. This may be the reason for missingness in the variable for Postnatal care and low birth weight.

3 National coverage trends: immunization indicators

Figures 3g and 3h: Coverage trends in selected child immunization indicators

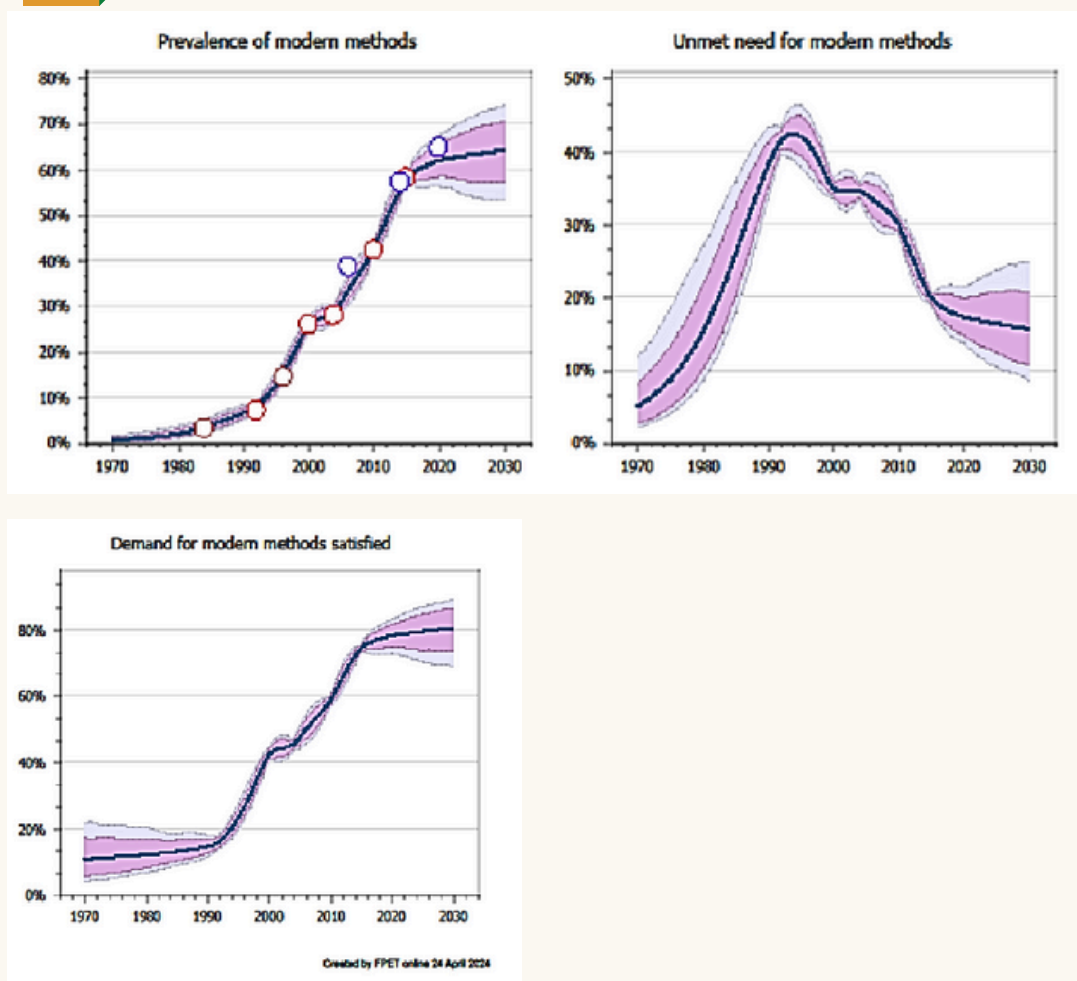


- There is concordance between Survey and DHIS2 data for the Penta Vaccine 1st and 3rd dose.
- The levels of pentavalent dose 1 and dose 3 are high - >90% for dose 1 and >89% for dose 3. The high level of vaccine is maintained since 2019. More investigation can be done, looking at these trends by equity to determine the profile of the 10% of children not vaccinated in order for targeted outreach.





- For Malawi, there has been survey data to inform prevalence of modern contraceptive methods since 1980S to 2020, but no DHIS2 data on the topic. However, FPET projections show that prevalence of modern methods is above 60% at approximately 68% .



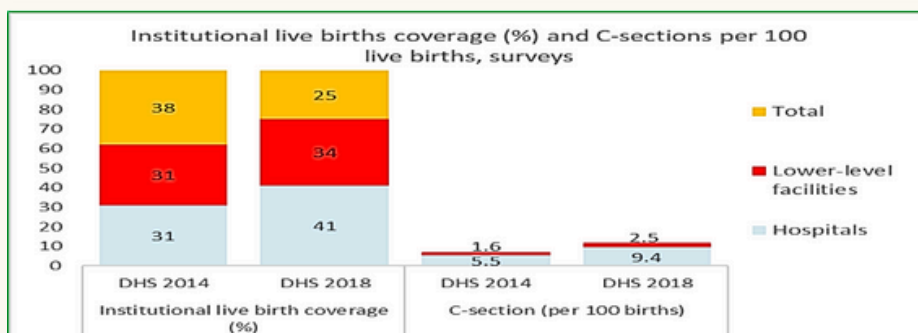
3 National coverage trends: delivery care by place and volume



Table 3e: Key characteristics of delivery care by place of delivery, and volume of births by facility in 2022

Percent distribution of place of live births and median number of live births by type of facility (2022)					
	Hospitals	Lower-level facilities	Total	Public	Private
Institutional deliveries among all live births (population - DHS/MICS)					
DHS, 2015	35.2	56.2	91.4	78.7	12.7
MICS, 2019	51.7	45	96.8	83.6	3.1
C-sections among all live births (population - DHS/MICS)					
DHS, 2015	15.1	1.7	6.5	6.6	9.4
MICS, 2019	13.7	1.4	7.7	7.7	6.4
Volume of (live) births by type of health facility (DHIS2, 2022)					
Median number of (live) births (2022)	1734.00	307.50	497.00	497.00	497.50
% of facilities with 1-100 (live) births per year	6.59	21.43	7.01	6.03	9.74
% of facilities with any C-sections	74.73	14.29	22.74	19.72	31.17
% of facilities with 1-49 C-section per year	1.47	0.00	3.01	2.35	4.17

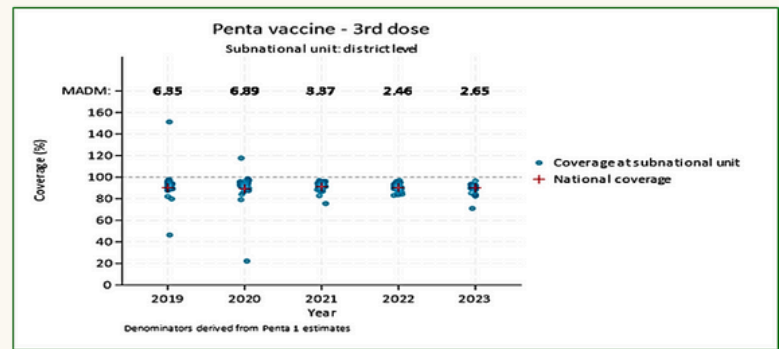
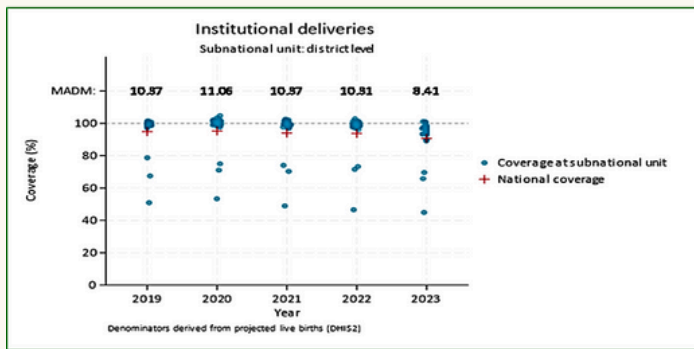
Figure x: Proportion of births by place of delivery... (DHS/MICS)



- Institutional live birth coverage increased from 35.2% to 51.7%**, indicating an improvement in institutional deliveries. Meanwhile, C-section rates per 100 live births in DHS 2015 and MICS 2019 are relatively stable (15.1 to 13.7 in hospitals and 1.7 to 1.4 in lower-level facilities), which is plausible given the short time span between the surveys. The proportion of institutional versus home births has increased, which is seen in the rise of institutional live birth coverage from 35.2% to 51.7%.
- Birth volume increased the most in hospitals** from 31 to 41% from 2014 to 2018. Lower level facility birth volumes stayed constant. C-sections increased in hospitals from 5.5-9.4 per 100 live births.

Equity: subnational coverage trends: delivery care and penta3 coverage by admin1 (region), 2019-2023

Fig 4c: Institutional deliveries by district Fig4b: Penta3 coverage by district



- The levels and trends are plausible and as previously shown there is good consistency between the survey and facility level data for institutional deliveries and pent3 vaccines. For institutional delivery, there are three districts that have significantly lower coverage according to the facility data and this is consistent over time. For penta 3, in 2019 and 2020 only, there two districts that have much higher and much lower coverage but in the following years are closer to the median. Because of the inconsistency over time, these could be a data quality issues.
- For institutional deliveries, the geographic inequalities persist over time and those districts should be investigated to determine the reasons for the low institutional delivery rates. For penta 3, the inequalities improved dramatically from 2020 to 2021 but this measured improvement could be due to improvements in data quality. Otherwise for both indicators, the district estimates are close to the national indicating geographic equality for these two indicators.

Equity - wealth quintiles and female education from survey data

Fig 4g: Equiplot of the Composite Coverage Index (CCI) by wealth, recent surveys

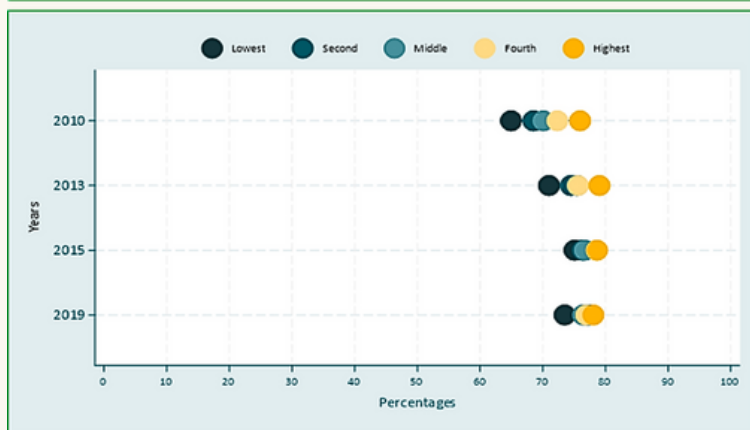
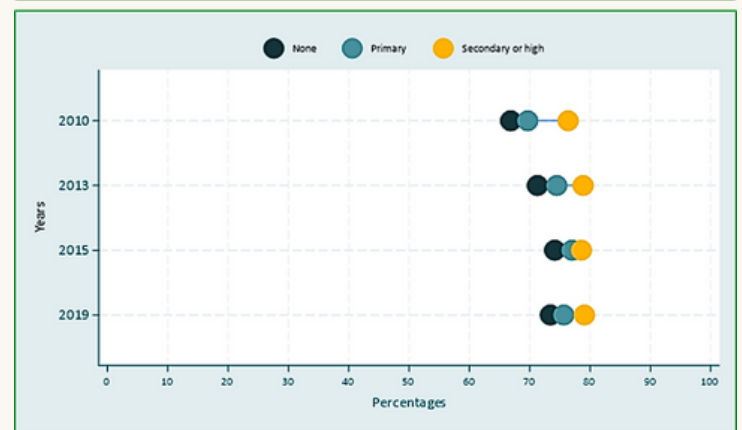


Fig 4h: Equiplot of the CCI by level of education of the mother, recent surveys



- The equiplot of the CCI by wealth shows some inequity in coverage in 2010 but the differences are minimal, ranging from about 65-75%. The inequity was present but with smaller gaps by 2013 and very little inequity in 2015 and 2019.
- CCI by maternal education shows a similar pattern as by wealth. There is top inequity in 2010 and the gap is closed by 2015. Higher maternal education is associated with better intervention coverage, but also associated with household wealth.

5 Maternal mortality in health facilities

Figure 5a: Maternal mortality per 100,000 live births in health facilities, based on the reported data in DHIS2, 2019-2023, national (red line) and regions (blue dots)

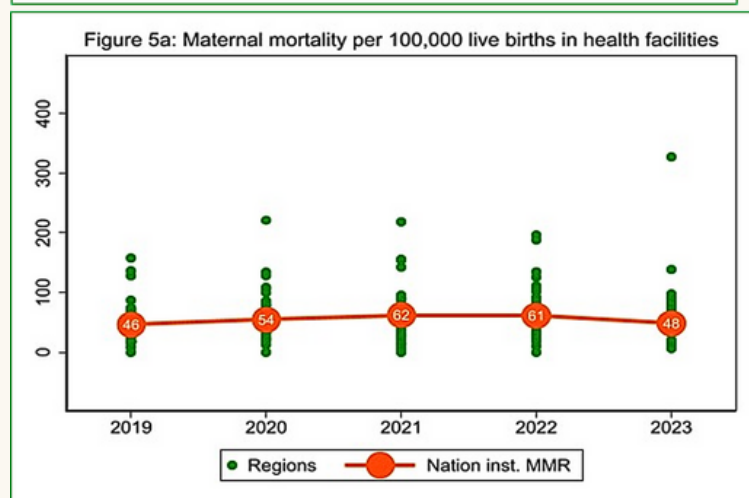
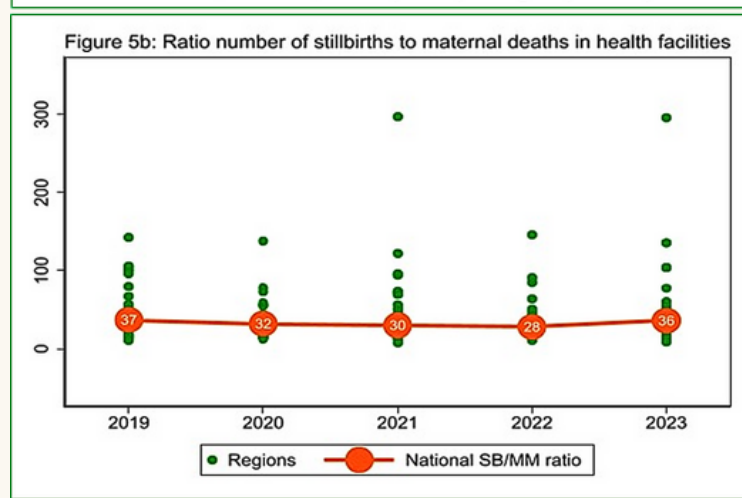


Figure 5b: Ratio of stillbirths to maternal deaths in health facilities, based on the reported data in DHIS2, 2019-2023, national (red line) and regions (blue dots)



- The level and trend of MMR from facilities is as expected and there appears to be minimal regional variation with the exception of a few districts that have extremely high MMR - these may be outliers
- National institutional MMR is very low (48 in 2023); Likoma district has MMR more than 300 - this is an outlier
- There is notable variation by district; over the years, 17%-31% of districts have very low MMR (<25); and for SBR, 0% of the districts have very low SBR (<6); this means there is severe under-reporting for MMR but not for SBR
- The ratio of stillbirth to maternal deaths is on average 28-37 over the years; it is outside of the 'normal' range of 5-15; this suggests there is severe underreporting of maternal deaths

5 Stillbirth rates in health facilities

Figure 5c: Stillbirths per 1,000 births in health facilities, based on the reported data in DHIS2, 2019-2023, national (red line) and regions (blue dots)

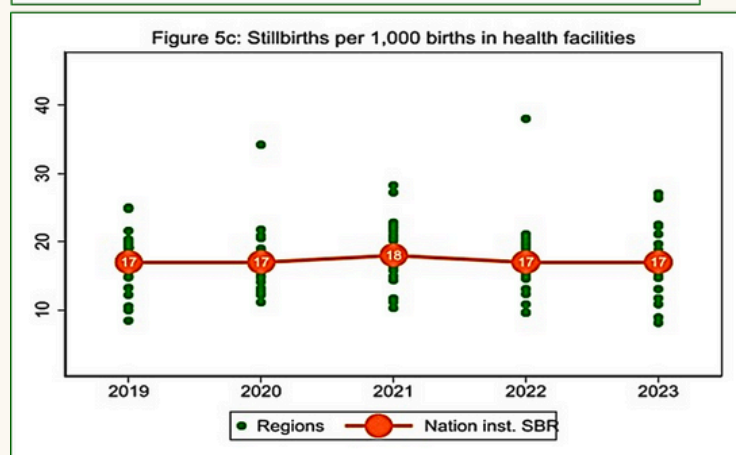
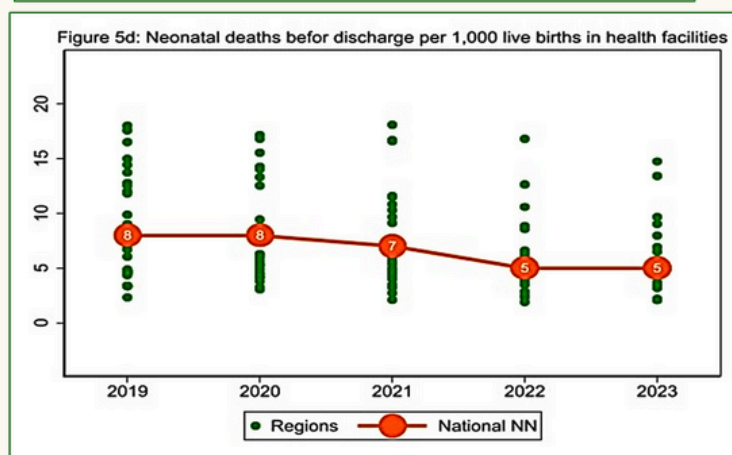


Figure 5d: Neonatal mortality before discharge per 1,000 live births in health facilities, based on the reported data in DHIS2, 2019-2023, national (red line) and regions (blue dots)



- The level of institutional stillbirth rates appear to be as expected ranging on average to be about 17/1000 live births from 2019-2023
- There is some regional variation from about 8 - 25 across the districts
- There are no districts with low stillbirth rates (<6) but there is one with very high >30 in relation to other districts
- The neonatal mortality before discharge is declining over time from 2019-2023 from 8/1000 live births to 5/1000 live births; The national NMR from UN estimates in 2022 is 18.7/1000 live births (95%CI=11.03-31.47) – if we assume that about 50% of neonatal deaths occur in the first two days, we could expect an institutional NMR of about 9-10 per 1,000 live births. The facility NMR appears to be plausible given that it's only before discharge and covers facilities alone

Fig 5e: Completeness of facility maternal death reporting (%), based on UN MMR estimates and community to institutional ratio

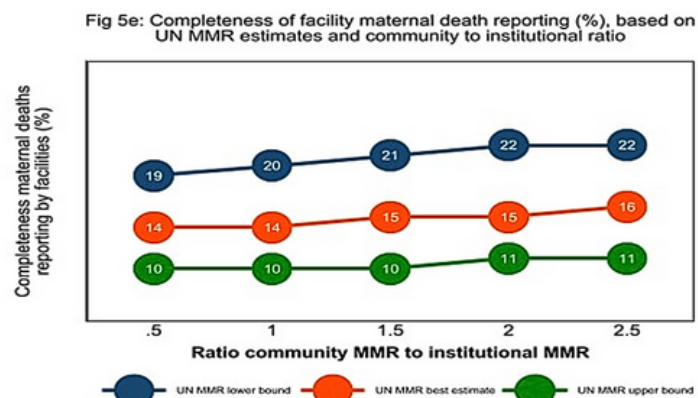
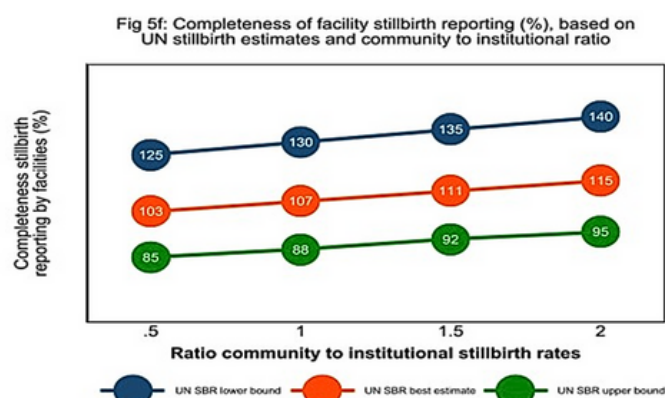


Fig 5f: Completeness of facility stillbirth reporting (%), based on UN stillbirth estimates and community to institutional ratio



- The different scenarios based on the observed MMR in health facilities, the UN estimates of the population MMR and the ratio community to institutional MMR all suggest low levels of completeness of reporting of maternal deaths in health facilities.
- The estimated level of completeness reporting of stillbirths appears to be much higher (using the lower UN bound and C:I ratio of 1.5-2.0), in fact, the observed is higher than the expected results in a completeness reporting range of 135-140%; this suggests that the DHIS is over-reporting stillbirths. There are several factors that contribute to SBR in community; for example, self-selection of mothers in that those that are healthier and have fewer complications, may deliver outside of facility. However, risk is higher in community given fewer resources available to mothers. Overall, in the Malawi context, the SBR risk in the community may be slightly higher than in the facility - we believe it might be about 1.5. Near complete reporting of stillbirths is plausible.

Figure 6a: OPD service use by children and all ages, national, 2019-2023

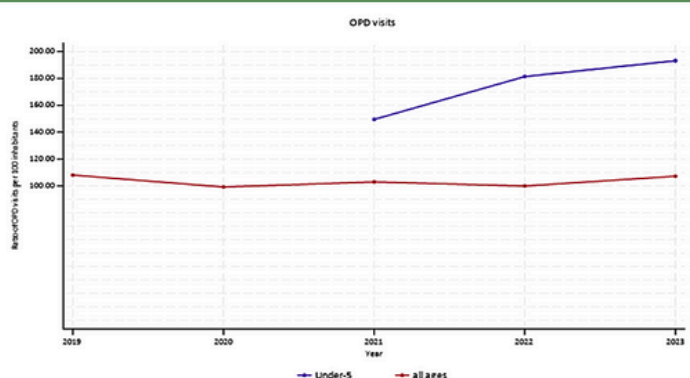
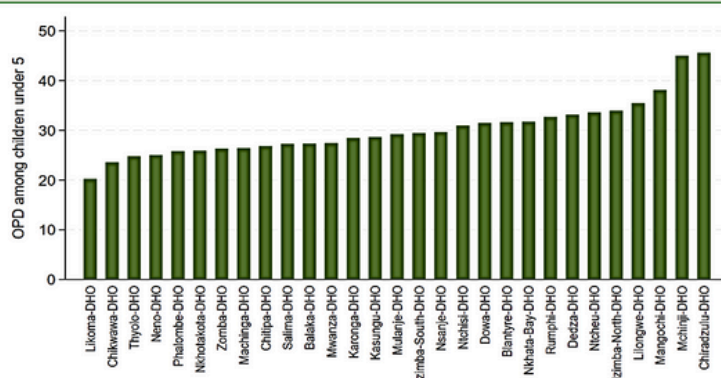


Figure 6b : Bar chart with OPD service use by children, by region, 2023



- The data quality for OPD visits appears to be fine since between 2021-2023, the % of OPD visits that are children under 5 years is 25%-31% which falls into the expected range (15-45%). There appears to be an increase in the reported number of under-5 OPD visits over time but the % is still within the expected range
- Between 2021-2023, the number of OPD visits per 100 children increased from 150 to about 190 suggesting that children had better access to OPD and also potentially higher disease burden over time; this makes sense in the Malawi context given the post-Covid recovery of access to health services and potentially sicker children
- The mean OPD rate is higher than 1 suggesting fair access to OPD services
- The mean OPD for children under 5 is approximately 5 in Neno and Likoma districts but these are small district with very few facilities (n=2 in Likoma and n=15 Neno). Outside of these the mean OPD ranges from 3 to about 1 annually.

Figure 6c: Admissions per 100 children and case fatality rates per 100 admissions under-5, national, 2019-2023

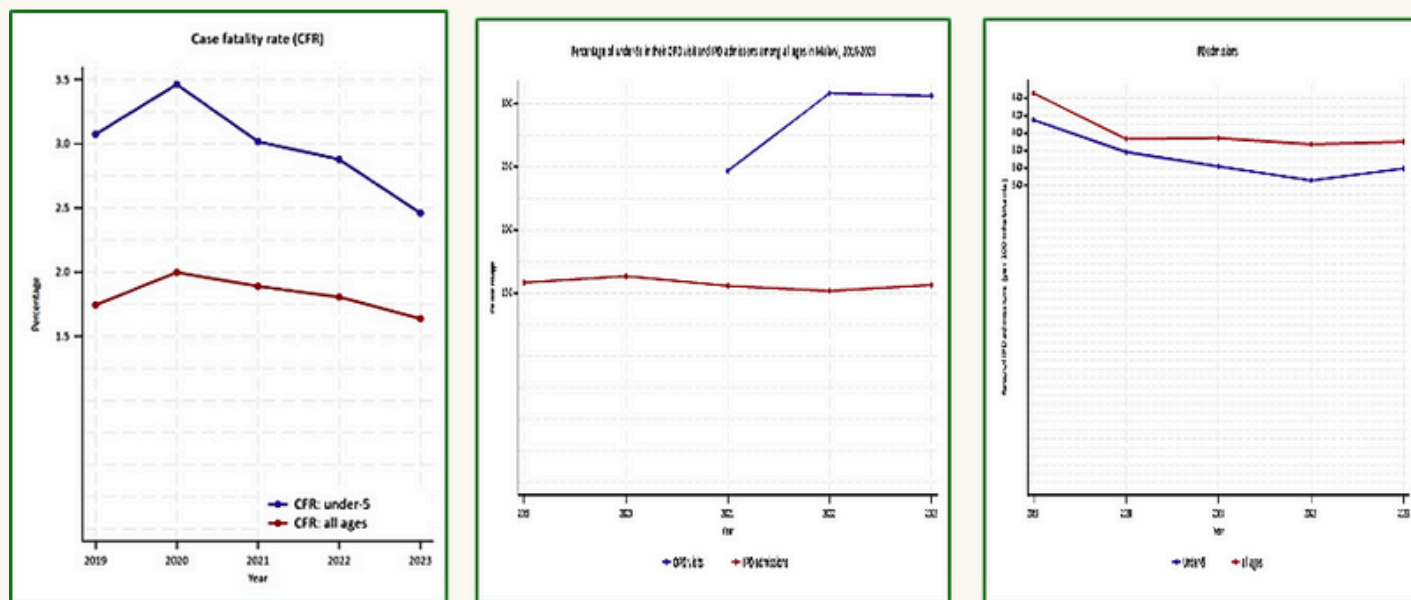
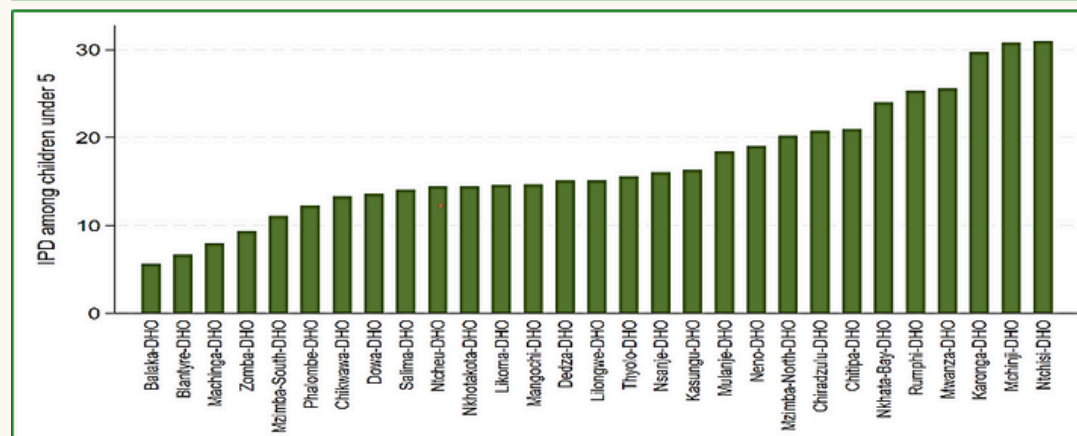


Figure 6d : Admission rates per 100 children under-5, by region, 2023



- The % admissions that are under-5 ranges from 15%-16% between 2019-2023 - which is within the expected range (15%-45%) however its on the lower bound so we must be cautious as any lower might indicate a data quality issue; the number of under-5 IPD visits is fairly consistent over time
- The number of under-5 children per 100 admitted steadily declined from 2019-2023 ranging from 3.5-4.2 over the years; this value is higher than 2 indicating that Malawi does not have low under-5 admission rates but rather is at the sub-Saharan African average levels (4.5).
- The case fatality rate among under-5 children admitted declined steadily from 2021-2023 but peaked at 3.5 in 2020; it ranged from 2.3-3.5 over the years. This decline suggests that quality of care is improving since 2020.
- There appears to be variation across districts in terms of IPD admission rates per 100 children; the rate is lowest in Balaka district (5 per 100 children) and is highest in Ntchisi district (30 per 100 children)

Figure 7a: Number of hospital beds per 10,000 population by region, year

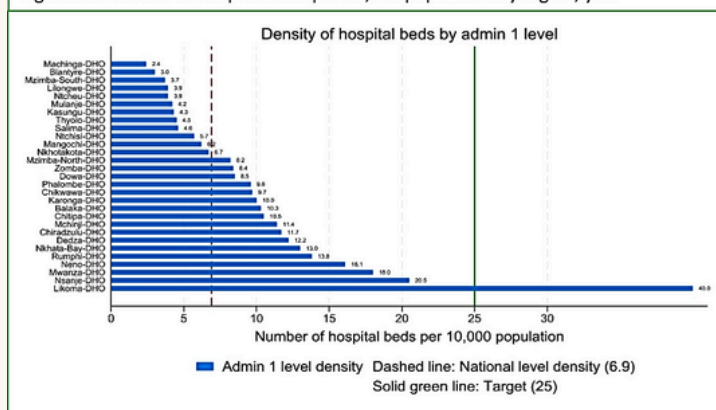
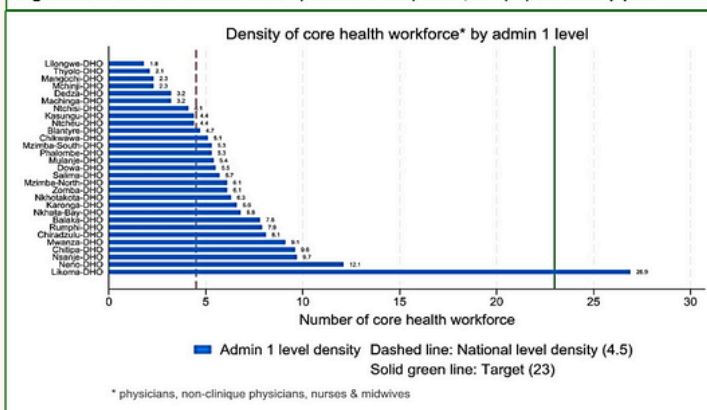


Figure 7b : Number of core health professionals per 10,000 population by year



- With regards to density of hospital beds, the national average is 7/10,000 populations which is well below the WHO recommendation of 25/10,000; only one district (Likoma - 40/10,000 population) is above the threshold. A total of 12 districts are below the country average - this is expected because these are higher population districts.
- For density of health workforce, Likoma district, again, is above the WHO threshold (23/10,000 population). Likoma is a very small district and it appears to be well-equipped in terms of health resources. The majority of districts are well below the WHO threshold and will require attention to meet the needs of the population.

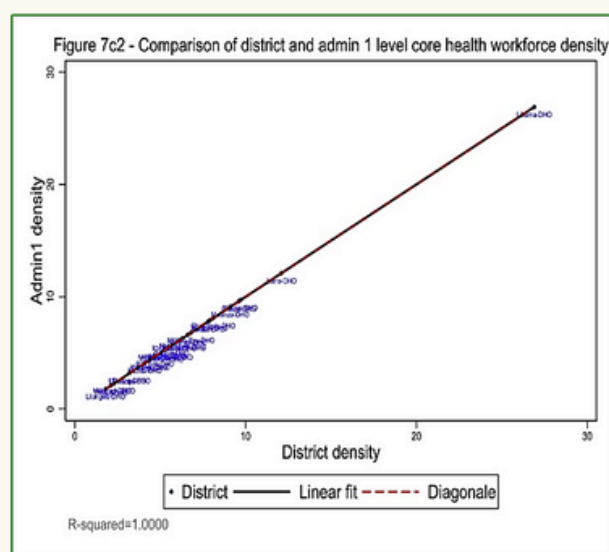
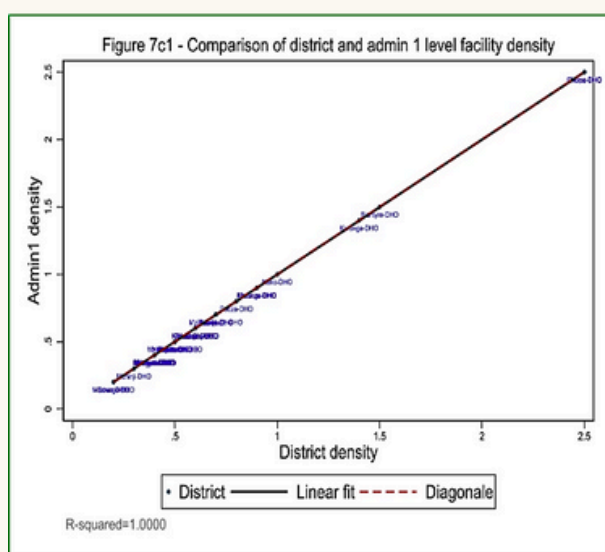
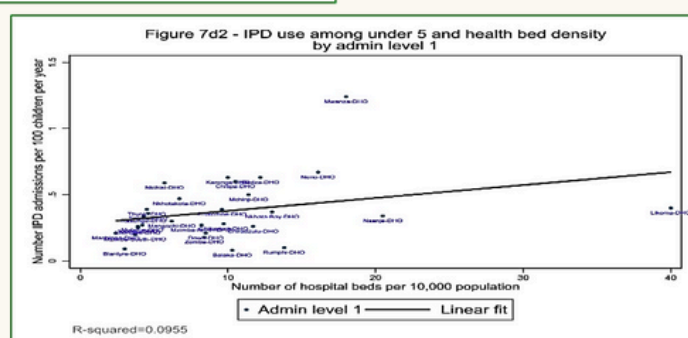
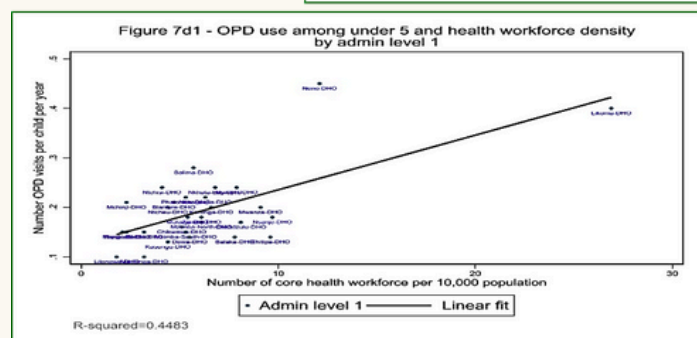
Figure 7c: Scatter plot of service utilization by health system inputs for regions, year
(e.g. OPD use among under 5 and health workforce density, or admission rates among under-5 and beds density)

Figure 7d: Scatter plot of service utilization by health system inputs for regions, year



- The data quality of health system inputs appears to be very good as all districts fall onto the line of best fit
- A few districts such as Likoma are outliers in the service utilization relative to health system inputs whereby Likoma is very well resourced in terms of beds however has low IPD admissions. Mwanza also has lower density of hospital beds but higher IPD admissions, and Neno has high OPD visits but lower health workforce density, suggesting both these districts may need more resources.
- Most other districts are clustered together in the bottom left quadrant which suggests they have lower resources but also lower OPD and IPD utilization.

Stakeholders	Format	Venue/Dissemination Mechanism
GoM – Leadership at RH directorate and Clinical Directorate	Policy Paper Technical findings	Sr Mgmt Meeting Presentation
Relevant Technical Working Groups – Service Delivery, M&E, Safe Motherhood	CAM slide deck (4-5 summary slides)	- TWG meeting presentation - TWG workshop/deep dive day (if a funder will pay for it)
HMIS officers, Program Coordinators	- More detailed presentation/pre read by indicator and interactive discussion on data quality, complete data sets, timeliness, etc - Jointly develop way forward	Review meetings where they present district data HMIS quarterly review meetings
Health Sector Wkg Group (Country Platform) (oversees TWGs)	More structured	Meeting Presentation
Health Donor Group	CAM slide deck (4-5 summary slides)	Donor Group Meeting Presentation
CMED	- Technical Findings, discussion about data gaps - Jointly develop way forward to address key issues	Discussion between CMED management and CAM Malawi team representative(s)

Barriers
- Time from the people who need to be champions - Funding for convenings
Approach
Kenasi push to get on agendas along w/ support from Gerald
TA Needed
- Funding for more in depth studies to answer more of the questions - Support in finding other funding resources - Understanding context of some of the gaps - Co-creating work products with global and local partners to ensure that skills are gained and strengthened within the country



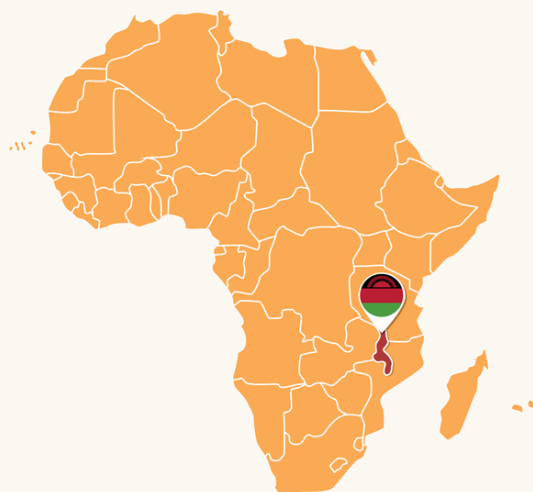
African Population and
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Countdown to 2030
Women's Children's & Adolescent's Health

Analysis of reproductive, maternal, newborn, child and adolescent health indicators

2019-2023



About Countdown 2030 in Malawi

The countdown to 2030 national collaboration in Malawi is a partnership between the Kamuzu University of Health Sciences School of Global and Public Health; Ministry of Health Reproductive Health Directorate; Ministry of Health Central Monitoring and Evaluation Department; Global Financing Facility and Johns Hopkins University School of Public Health. This project is tailored to the needs of Malawi government that is to build and strengthen analytical capacity and synthesis of health data to inform national and local reviews of progress and performance with a focus on reproductive, maternal, neonatal and child health (RMNCH).

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