Federal Ministry of Health

GLOBAL FINANCING FACILITY

APHRC
African Population and Health Research Center

Countdown to 2030
Women's Children's & Adolescent's Health

Maternal and Newborn Health (MNH) Strategies for Essential and Emergency Obstetric and Newborn Care

Countdown to 2030 Multi-country Analysis Project

NIGERIA SYNTHESIS REPORT

DECEMBER

2023

Maternal and Newborn Health (MNH) strategies for essential and emergency obstetric and newborn care

Countdown to 2030 multi-country analysis project

Phase 1 Synthesis Report for NIGERIA

December 2023

Prepared by:

Nigeria Countdown Country Collaboration

PI: Prof Adebola E Orimadegun, University of Ibadan

Background

Good-quality obstetric and newborn care in health facilities is central to reducing maternal and neonatal deaths and stillbirths, and to improving future health of women and children. Globally, institutional births have increased dramatically, but places where births occur vary enormously and are not well understood. Simply increasing coverage of institutional births is very unlikely to reduce mortality if facilities lack basic requirements for emergency obstetric and neonatal care, have inadequate staffing, or cannot refer in emergencies.[1 2] In many parts of sub-Saharan Africa, births have mostly increased in lower-level facilities, probably because these facilities are closer to where women live.[3] These facilities tend to have low volumes of births (few births each month) and to have lower "readiness" to provide care, in part because they are lower-level, so for example, they are not expected to perform certain procedures such as caesarean section.[4] In addition, such facilities are often less ready to perform even those functions they are meant to, may be less supplied with commodities and drugs and are often less supervised.

Larger facilities, notably hospitals, are fewer but have larger volumes, more and better trained staff and equipment, and are more likely to be able to provide emergency care. Poor-quality obstetric care in lower-level facilities has led some to recommend a policy hospital births rather than in dispensaries or clinics, though there is no global consensus on where women should deliver.[5] Country and cross-country evidence is needed to understand the tension between Maternal and Newborn Health (MNH) care provided at physically close but low-capacity facilities, versus further-away but higher capacity facilities and to inform national and global decisions on future strategies for MNH service organization and resourcing.

This MNH multi-country analysis project aims to better characterize the environment of births over time, using quantitative analyses to describe trends over time in where and with whom women deliver by level and public/private sector, by what mode (vaginal or C-section) nationally, and by rural-urban, wealth, region/province, as well as neonatal mortality and stillbirths. This will be contextualized by assessing country's policies and health systems data related to the organization and integration of delivery care services at different levels and sectors.

This report is on Nigeria. The synthetic analyses in this report will position the study results within a maternal, stillbirth and neonatal mortality transition model to aid comparative analysis and

---

[1] Elmusharaf, K., et al., *Patterns and determinants of pathways to reach comprehensive emergency obstetric and neonatal care (CEmONC) in South Sudan: qualitative diagrammatic pathway analysis.* BMC Pregnancy and Childbirth, 2017. **17**(1): p. 278.

[2] Cavallaro, F.L. and T.J. Marchant, *Responsiveness of emergency obstetric care systems in low-and middle-income countries: A critical review of the "third delay".* Acta obstetricia et gynecologica Scandinavica, 2013. **92**(5): p. 496-507.

[3] Kruk, M.E., et al., *High-quality health systems in the Sustainable Development Goals era: time for a revolution.* The Lancet Global Health, 2018. **6**(11): p. e1196-e1252.

[4] Kruk, M.E., et al., *Quality of basic maternal care functions in health facilities of five African countries: an analysis of national health system surveys.* The Lancet Global Health, 2016. **4**(11): p. e845-e855.

[5] Fink, G. and J. Cohen, *Delivering quality: safe childbirth requires more than facilities.* The Lancet Global Health, 2019. **7**(8): p. e990-e991.

benchmarking at national and subnational levels.[6] The transition model looks at key indicators among countries that have reached one of five phases of maternal, and neonatal and stillbirth mortality. Countries can compare their performance to those of others in the same phase, and seek to understand what is needed to move to a phase with lower mortality. The country report's recommendations can be used to inform strategic discussions on where to prioritize investments in the health system for accelerated reduction of maternal and newborn mortality, including the balance of routine, basic and comprehensive Emergency Obstetric and Newborn Care (EmONC) services across primary to tertiary facilities to adequately provide respectful and life-saving care based on their maternal mortality, stillbirth, and neonatal mortality transition stage.[7] [8] It will also point to areas for future research to inform strategic planning for safe, effective, equitable, accessible and high-quality MNH service provision.

Study objectives

- To understand where women give birth, by what mode (vaginal, C-section), and who attends them (nationally, regionally, by socio-economic groups, and by facility sector/volume/level), using DHS/MICS and HMIS.
- To understand health outcomes* (neonatal mortality, stillbirths) by place, attendant and mode of birth (nationally, sub-nationally, by socio-economic groups, and by facility sector/volume/level), using DHS/MICS & HMIS (*Maternal mortality data does not allow for disaggregated analyses).
- To analyse the intended and actual health policy and system characteristics in place for the provision of safe delivery care, using documents/data.
- To assess the extent to which countries with higher levels of safe, equitable and effective childbirth care also had favourable MNH-related policy and systems characteristics, and identify where related adjustments or additions in future plans and investments are needed to reach the next transition stage(s).

Data sources and indicators

Data sources

- Population-level household surveys: DHS or MICS for years…
- Health Management Information System (HMIS): DHIS2 for 2022

[6] Boerma T, Campbell OMR, Amouzou A, et al. Maternal mortality, stillbirths, and neonatal mortality: a transition model based on analyses of 151 countries. The Lancet Global Health 2023;**11**(7):e1024-e31 doi: https://doi.org/10.1016/S2214-109X(23)00195-X.

[7] Campbell OMR, Calvert C, Testa A, et al. The scale, scope, coverage, and capability of childbirth care. The Lancet 2016;**388**(10056):2193-208 doi: https://doi.org/10.1016/S0140-6736(16)31528-8.

[8] Boerma T, Campbell OMR, Amouzou A, et al. Maternal mortality, stillbirths, and neonatal mortality: a transition model based on analyses of 151 countries. The Lancet Global Health 2023;**11**(7):e1024-e31 doi: https://doi.org/10.1016/S2214-109X(23)00195-X.

- Health policy document review (WHO policy database 2018/19 and country updates)
- Health facility/HRH density in 2022 from CAM reports 2023
- Health financing data on current health expenditure overall and for maternal conditions since 2013 (WHO Global Health Expenditure database)

Data were analyzed using Stata and Excel and are primarily presented graphically.

Indicators for DHS analysis

- **Assistant at birth** is defined as the proportion of women 15-49 years of age whose last birth was assisted by:
    1. Doctor
    2. Nurse or midwife
    3. Other skilled professional
    4. Other non-skilled (health provider or friend/relative)
    5. No assistance
- **Place of birth** is defined as the proportion of women 15-49 years of age who last birth was at:
    1. Hospital
    2. Lower-level health facility
    3. Home or other place
    - Note that births in private sector facilities may not be possible to stratify by level so private sector births are located as being in lower-level facilities
- **Caesarean section** is defined as the proportion of live births that were delivered by caesarean section.

The reference population (denominator) for the above indicators was **women in reproductive age (15-49 years old) who had a birth in the last 2/3 years before the survey (last birth)**. MICS considers children under 2 and DHS under 3.

- **Neonatal mortality rate (NMR)** is defined as the number of deaths among children aged 0 to 30 days per 1000 live births. The reference period for NMR is 10 years before the survey.

All indicators were estimated for the whole country, and stratified by the following characteristics (as available in each survey):

- Wealth quintiles, based on an asset index provided with the surveys, based on asset ownership and on household characteristics, divided in five groups (poorest, poorer, middle, wealthier, wealthiest);
- Area of residence (urban, rural);
- Assistant at birth (doctor, nurse/midwife, other skilled, other non-skilled, no assistance)
- Place of birth (hospital, lower level facility, home birth) – for comparing Caesarean (C-) section rate and NMR

Indicators for HMIS analysis

Essential indicators:

- Livebirths (OR all births) in facilities
- Caesarean section among livebirths (or among all births) in facilities

Optional indicators:

Mode of delivery: There are two main modes of childbirth, vaginal birth and caesarean birth. Note that these can be recorded for all births (live and still) or only for live births. If it is unclear and you are unable to find out what was recorded, look at the number of recorded stillbirths. If these are low, it is best to assume that C-sections etc. were only reported for *live births* and use this term in the results.

- Vaginal births: Further divided into spontaneous (non instrumental) + assisted (instrumental) vaginal births
    - Spontaneous (non instrumental) vaginal birth, which sometimes involves manual maneuvers or episiotomy
    - Assisted (instrumental) vaginal live births, involving forceps live births + vacuum or ventouse
- Caesarean (C-) section births:
    - Pre-labour caesarean + caesarean after labour starts = C-sections among all live births

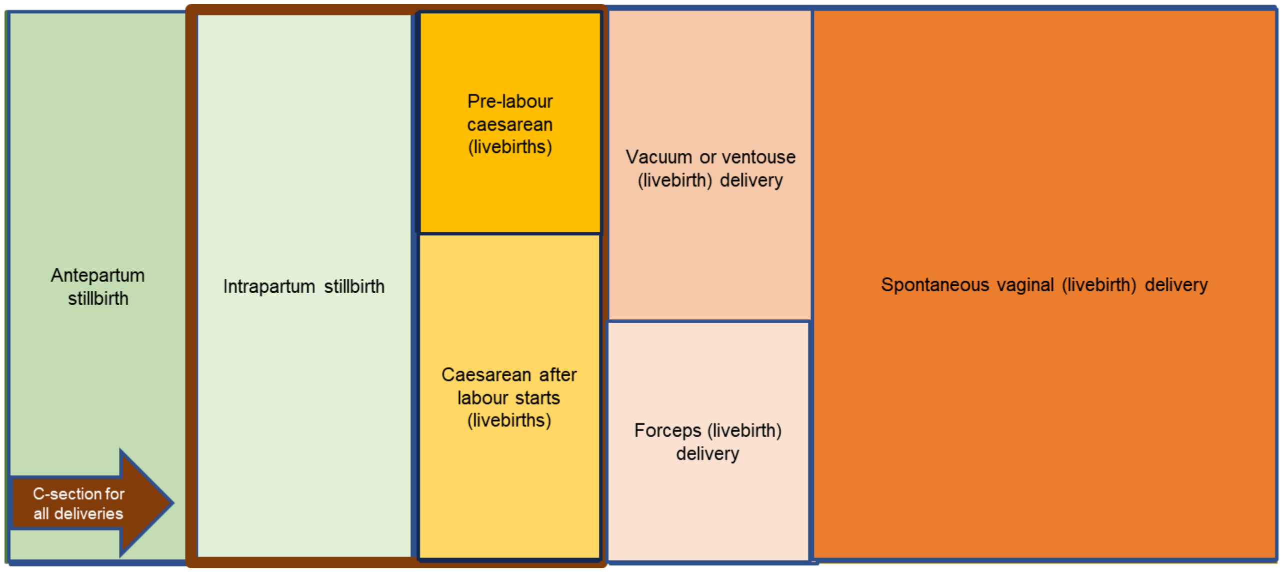
Birth outcomes: Births can be live or still

- Stillbirths (fresh and/or macerated):
    - Macerated stillbirths + fresh stillbirths = all stillbirths
    - Antepartum stillbirths + intrapartum stillbirths = all stillbirths
        - Macerated ≠ Antepartum, but similar
        - Fresh ≠ Intrapartum, but similar

Checks:

- C-section deliveries for intrapartum stillbirths + C-sections for live births (pre-labour caesarean + caesarean after labour starts) = C-sections among all deliveries
- Assisted vaginal live births + spontaneous (normal) vaginal live births = all vaginal live births
- Stillbirths + live births = all births

Figure 1a: MNH indicator definitions



Data management and quality

DHS and MICS

- Before the analyses, original categories for place of delivery and professional assistance during labor were listed and organized into Excel spreadsheets (one for each country). In each spreadsheet all MICS and DHS surveys available for each country were added to ask country teams to recategorize into the new categories.
    - Place of delivery: home, lower-level facility, or hospital
    - Professional: doctor, nurse or midwife, other skilled professional, other non-skilled, which can be a health provider or a friend/relative, or no assistance
- After countries recategorization, the new place of delivery variable was compared to the standardized institutional delivery indicator from the international Center for Equity in Health (ICEH) mega database. Consistency was evaluated by adding the lower-level and hospital categories and comparing it to the institutional delivery coverage. Differences larger than 2 pp were individually assessed.
- A similar process was conducted for assistance at birth, for which the doctor, nurse, and other skilled categories were combined and compared to the standardized skilled birth attendance (SBA) indicator from the ICEH mega database.
- For countries with at least 3 surveys available, trend analyses were performed to check consistency of estimates throughout time. Any peaks or valleys that were incompatible with what was expected were individually evaluated.

- The prevalence for the c-section indicator was compared to the place of delivery and a face validity check was performed in which the prevalence should be zero (or very close to zero) in home births and the highest prevalence in hospital deliveries.
- Additionally, face validity checks were also performed for place of delivery and assistance at birth according to wealth quintiles and area of residence. It was expected that a higher share of hospital deliveries would happen in wealthier quintiles and in urban areas. Similarly, a higher share of births assisted by doctors would also happen in these extracts.

DHIS2/HMIS

- In preparing the HMIS/DHIS2 data, the first step was to merge the Administrative and MNH facility records in order to have information on the district, level and ownership of the health facilities, which comes from the Administrative recorded joined to the MNH facility records.

Using Table 1a, please complete the following sentences:

- There were 39220 number of facilities on the Administrative list and 304638 facilities that reported MNH indicators (MNH facilities).
- There were 265,418 number of facilities recorded in the Administrative list that did not report any deliveries.
- There were 20995 facilities that report births or deliveries that matched with the Administrative data, reflecting that 53.5% of facilities in DHIS2 database merging with the facilities Master list.
- There were 18106 facilities that report MNH services only but there is no facility recorded in the admin datasets that did not report MNH Service.
- Reasons for why some facilities reporting births were not on the Admin list may include:
    1. There are repetition or duplications of facilities names and entries.
    2. Typographical errors or incorrect data entry during facility registration could result in discrepancies between the reported facilities and the admin list.
    3. Facilities may have undergone status changes (e.g., closure, relocation, or merger) that were not accurately updated in the admin list or reporting system.
    4. Newly established facilities may not yet be included in the admin list if there are delays in the registration and updating process.
- The XX number of facilities on the Admin list but not reporting births (%) were the following: (for e.g. specialist, labs, lower level not providing deliveries etc.).
    1.

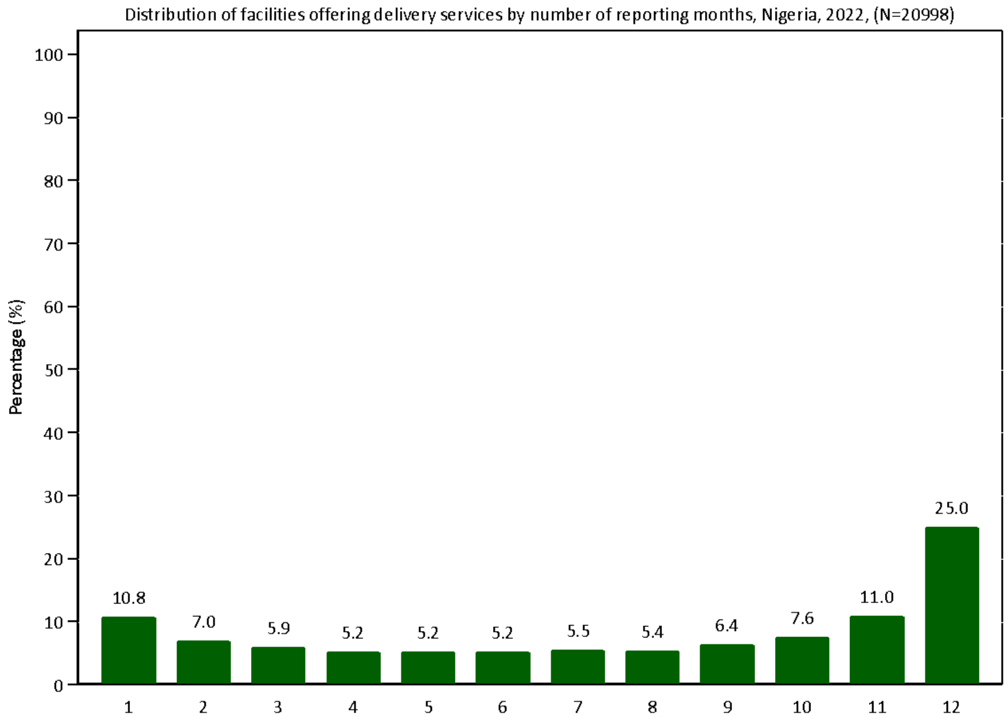


Figure 1: Distribution of facilities offering delivery services by number of reporting months, Nigeria, 2022, (N=20998)

The graph above (Figure 1) presents a bar chart of the distribution of 20998 facilities that reported offering delivery services in Nigeria by the number of reporting months in 2022. This demonstrates the operational consistency of facilities that provide delivery services over a year. The majority of institutions (25%) reported being open for all twelve months of the year. This shows a high concentration of institutions that consistently provide delivery services throughout the year. There is a distinct trend in which the percentage of facilities drops as the number of reporting months grows, with a major decline occurring after the first month. This could indicate that certain facilities are not continuously operating throughout the year or do not consistently disclose their operational status. The percentages of facilities reporting operational status for 2 to 10 months are relatively low (varying from 5.2% to 7.6%), implying difficulties in maintaining service or reporting regularly throughout the year. The second-highest percentage of facilities (11%) reported over 11 months. It is unclear why there is an increase after 11 months, however it could be due to seasonal closures or other variables influencing service availability or reporting standards. The lowest percentages are observed in the 3-8 month category, indicating that few facilities fall into these intermittent reporting categories. Understanding the underlying causes of these patterns is critical for informing initiatives targeted at enhancing service availability and reporting uniformity. Considerations may include resource restrictions, administrative challenges, or external events affecting facility operations. For healthcare planning, it is critical to guarantee that delivery services are continuously accessible to satisfy the demands of the population, and this graph provides insight into their stability across the country.

Table 1a: Summary of the health facility data quality assessment for 2022 (Stata code #1a output)

	Metric		2022
1	Indicators vs Reporting datasets	% (#) facilities merged (= 20995/54736)	38.4%
		% (#) facilities from Indicators not merging with Reporting data	0%
		% (#) facilities from Reporting not merging with Indicators data	61.6%
2	Indicators vs Admin datasets	% (#) facilities merged	53.7%
		% (#) facilities from Admin not merging with indicators data	46.3%
		% (#) facilities from indicator not merging with Admin data	0%
3	Facilities with 0 births per year	Number of facilities with 0 births per year	424

Table 1a shows the percentages of facilities merged and not merged across various data sets. 38.4% of facilities were successfully incorporated into the Indicators and Reporting databases. There were no facilities in the Indicators data collection that did not integrate with the Reporting data. However, 61.6% of facilities from the Reporting data did not blend with the Indicators data. When comparing Indicators and Admin datasets, 53.7% of facilities merged successfully. However, 46.3% of the facilities in the admin dataset did not combine with the Indicators data. There were no facilities in the Indicator data set that did not combine with the Administration data. Furthermore, the research revealed that there were 424 facilities with no births per year. This table gives information about the alignment and differences between various health facility data sources, which is important for data integrity and healthcare planning..

The findings in Table 1a have significant implications for Nigeria's healthcare system. First, it highlights data integration issues. The fact that a considerable proportion of health facility data could not be combined across different databases suggests possible problems with data harmonisation and standardisation. This could have an impact on the validity of health data analytics and policymaking.

Second, there are significant reporting inconsistencies. The disparities between the Indicators, Reporting, and Admin datasets may indicate variances in reporting techniques or criteria across health institutions, resulting in an underestimation or overestimation of health service delivery capabilities. This was also backed by the fact that 25% of facilities regularly reported delivery statistics over the 12 months of 2022, as seen in Figure 1. The third implication is one of resource allocation. Facilities with no recorded births may either not provide delivery services or not report them. This could affect resource allocation and programme execution in maternity and child health services. Another issue is the detrimental effect of service delivery gaps. If facilities do not provide data consistently, gaps in service delivery may go unnoticed, hurting the overall assessment of healthcare services and planning. These challenges could have far-reaching consequences for health-care delivery, planning, and monitoring, emphasising the need for better data management systems and practices.

The assessment of health facility data quality used the monthly facility reports and focused on 1) report completeness, 2) extreme outliers and missingness and 3) internal data consistency. Data quality adjustments for reporting completeness (yearly) and extreme outliers (monthly) were done before further analyses on annual data. We:

- Checked for extreme outliers using the Hampel X84 Method with a cutoff of 5 standard deviations from the median and adjusted the outlying points and missing data with the monthly median.
- Adjusted for incomplete reporting using the yearly data points.
- Checked for inconsistencies between 1) births, livebirths, and stillbirths, 2) livebirths, C-sections (CS), vaginal births and assisted vaginal deliveries (AVD), and 3) Stillbirths, fresh stillbirths (FSB) and macerated stillbirths (MSB)
- Complete Table 1b with relevant Stata code #2 output below
- If there was any check that was a problem, please add any explanation for this here:

Table 1b: Summary of the health facility data quality assessment for 2022 (Stata code #1a and 1b output)

	Metric		2022
1	Completeness of monthly facility reporting for deliveries	a) % of expected monthly facility reports (national)	63%
		b) % of facilities with 12 data points	25%
2	Percentage of facilities with no missing monthly values in the year (*facilities which reported at least one delivery in the year)*	a) Total births	97%
		b) Livebirths	95%
		c) Stillbirths – fresh; macerated	6%; 4%
		d) Caesarean section*	12%
		d) Mean percentage of the individual percentages	30%
3	Percentage of facilities with no inconsistencies between stillbirths, live births and total births (*Births=Stillbirths + Livebirths (monthly))*	% with no inconsistency at 2- standard deviations cut-off (monthly)	49%
4	Percentage of facilities with no inconsistencies between livebirths, CS, vaginal births and AVD *(Livebirths= CS+ vaginal births+AVD) (monthly)*	% with no inconsistency at 2- standard deviations cut-off (monthly)	57%

5	Percentage of facilities with no inconsistencies between stillbirths, FSB and MSB (Stillbirths = FSB + MSB) (monthly)	% with no inconsistency at 2- standard deviations cut-off (monthly)	100%
6	Extreme outliers over time	a) % of monthly values that are not extreme outliers	98%
		b) % of facilities with no monthly extreme outliers in the year	94%
7	**Overall data quality score (mean)**		67%

*Includes all facilities, not possible to isolate those meant to perform CS in the check so excluded from overall score.

Add text to interpret Table 1c on the summary of adjustments made to the raw health facility data using code 1b:

- For each metric, is there a data quality pattern for which there is an explanation?
- Are there any optional indicators (i.e. AVD, stillbirths) with quality problems that should be excluded from analysis/results?

Only 63% of expected monthly facility reports were submitted at the national level, which indicates that data collection is not adequately complete. Just 25% of facilities have submitted data points for all 12 months of the year, suggesting a significant issue with consistent data reporting. Percentage of facilities with no missing monthly values in the year (facilities which reported at least one delivery in the year indicate high percentages for total births (97%) and live births (95%) show good reporting where data exists. There is a lower reporting quality for stillbirths (6% fresh, 4% macerated), and caesarean sections (12%). The mean percentage of these individual percentages is 30%, indicating that certain categories of data are being reported with less consistency. Nearly half of the facilities (49%) reported consistent data within two standard deviations monthly. This suggests that there is some level of discrepancy in reporting across many facilities. Over half (57%) of facilities reported consistent data within two standard deviations monthly. This indicates a moderate level of data reliability but also shows room for improvement in data consistency. Percentage of facilities with no inconsistencies between stillbirths, FSB (Fresh Still Births) and MSB (Macerated Still Births) shows a 100% consistency rate within two standard deviations, which indicates excellent data quality for this indicator. Overall data quality score (mean) is 67%, which is a moderate score. It reflects the combined effect of the different data quality issues highlighted in the individual metrics.

Regarding data quality patterns, there is a clear pattern that less critical data, or data that may be subject to higher variability or definition issues (such as distinguishing between fresh and macerated stillbirths, or categorizing caesarean sections), have lower quality scores. This may be due to a variety of factors, including lack of training or inconsistent definitions across facilities. The high completeness of reporting for live births and total births indicates that these data points are prioritized and likely have clearer definitions and established reporting mechanisms.

In comparison to other optional indicators, the data quality for caesarean sections and stillbirths is relatively poor. They might be removed from further review. There exist numerous plausible explanations for the substandard data quality about caesarean sections and stillbirths documented in health facility reports in Nigeria. Particularly, the social stigma or emotional distress associated with disclosing stillbirths contributes to their underreporting. Cultural or religious sensitivities pertaining to the reporting of stillbirths may potentially impact the inclination of personnel or families to recognise and disclose such occurrences. Misclassification of fresh and macerated stillbirths may also occur as a result of divergent interpretations of these terms or differences in the timeline of death in relation to delivery. Additionally, human error is a potential source of error during data collection and entry, particularly in health facilities that do not have electronic reporting systems and instead rely on manual data entry. It is worth mentioning that the majority of the DHIS data contained in the Nigeria database originated from primary health facilities, which do not regularly perform caesarean sections. Finally, regarding stillbirths and caesarean sections in particular, some health professionals fail to recognise the practical utility of the DHIS 2 data collection and are consequently less motivated to ensure its accuracy and completeness.

Table 1c: Summary of adjustments made to the raw health facility data in preparation of a clean data set for the endline analysis

Problem	Action	Adjustment
Incomplete reporting by facility, variable over time, affecting trend assessment	If a facility did not have all the 12 reports for the year, an assumption was made about the volume of services provided for the missing data points	Adjustment was made by multiplying the yearly volume by the reciprocal of the reporting rate
Extreme outliers can greatly affect coverage trend assessments	If a monthly value was greater or smaller than **5 times the median absolute deviation (MAD) from monthly median** value, an adjustment was made	Extreme monthly outliers are corrected and given the median value for the same year
Missing values	If there is a missing value, data were imputed	Median monthly value for the year was imputed for the month with missing value

Add text to comment on adjustments:

- Explain why these changes were made and how this will improve the quality of the data

When facilities do not report data consistently over time, it leads to gaps that make it difficult to assess trends accurately. The yearly volume is multiplied by the reciprocal of the reporting rate to estimate missing monthly reports. This method extrapolates the available data to account for the missing months, allowing for a more comprehensive analysis of trends across the entire year. Outliers can skew the data, leading to incorrect assumptions and decisions based on the data. Extreme monthly outliers are replaced with the median value for that year. This reduces the impact of extreme values that may be due to errors or atypical events, thus stabilizing trend assessments and making the dataset more robust for statistical analysis. Missing data can create bias or reduce the statistical power of the analysis. Imputing missing values helps to maintain the dataset's integrity, allowing for more accurate analysis. The use of the median is a common approach because it is less affected by outliers than the mean.

Health outcomes by delivery place and attendant

Trends in national maternal mortality ratio (MMR)

Maternal mortality ratio nationally in 2000 and 2020 (using UN estimates Excel sheet “MMR SBR NMR UNEstimates 2000-2021” from your country in Dropbox: Workshop 4 - For countries Data and Codes Mortality estimates, any or all the years if you want to include, and/or your own data source, like DHS to compare - any available time points near 2000 and 2020):

- Add graph of how MMR has changed in this time period.
- Add related interpretation about how much MMR has changed over time
- Include data sources and years for data that you included

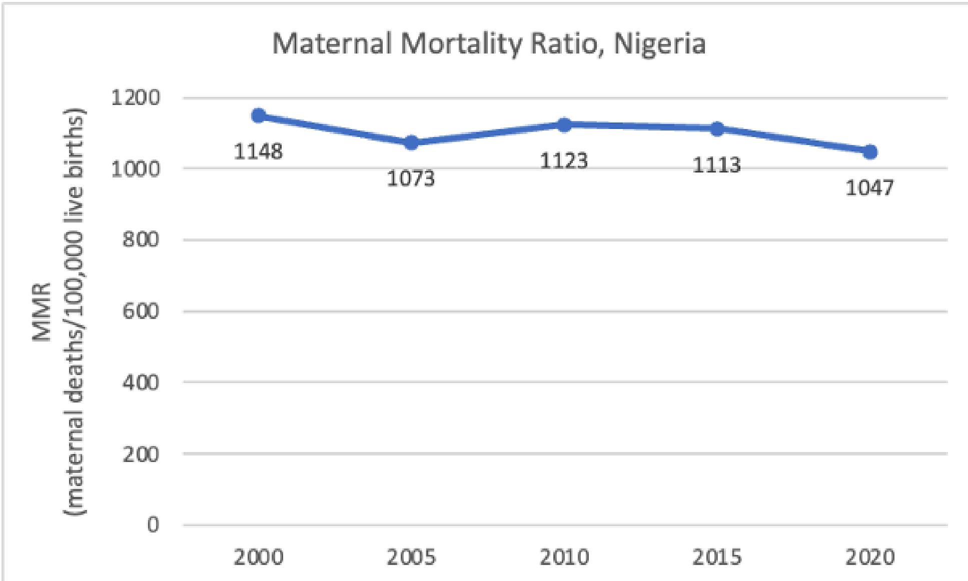


Figure 2: Maternal Mortality Ratio based on Nigeria DHS Data

The line chart depicted in Figure 2 illustrates the Maternal Mortality Ratio (MMR) in Nigeria, utilising NDHS data, spanning the years 2000 to 2020. Maternal mortality is expressed as a number of fatalities per 100,000 live births. There is evidence to suggest that the Maternal Mortality Ratio in Nigeria has experienced a marginal decline during the period spanning two decades. The MMR peaked on the graph in 2000, when it stood at 1148 maternal deaths per 100,000 live births. By 2005, there had been a substantial decline to 1073, which suggests that maternal health or health services had improved. Nevertheless, the MMR experienced a marginal resurgence in 2010, reaching 1123, indicating the possibility of a partial reversal of the preceding gains. Another decline in the MMR occurred between 2010 and 2015, reaching 1113, indicating a marginal improvement. The MMR had decreased to 1047 by 2020, the lowest rate depicted on the graph.

There is evidence of a gradual decline in maternal mortality as the prevailing trend. The progress, nevertheless, has not been gradual or consistent. The variability observed in the MMR suggests that the determinants impacting maternal health may have undergone changes throughout this time period. Potential determinants may encompass the accessibility and calibre of maternal health care services, alterations in health policies, the prevalence of confounding infectious diseases that arise during pregnancy, or socioeconomic circumstances that impede care provision.

The discoveries have substantial ramifications for both clinical practice and public health policy in Nigeria. Positively, the decline in maternal mortality rate (MMR) suggests that some interventions may be having an impact. However, the sporadic increases and the rapidity of the decline indicate that a substantial amount of progress remains. To address the direct and indirect causes of maternal mortality, more consistent and effective healthcare policies, enhanced healthcare infrastructure, and targeted interventions are required.

Additional research is warranted to ascertain the fundamental factors contributing to the fluctuations in MMR. Gaining an understanding of these causes may result in the development of more efficacious interventions. Furthermore, it is recommended that community outreach and educational initiatives targeting health literacy and encouraging health-seeking behaviours among women of childbearing age be informed by these results.

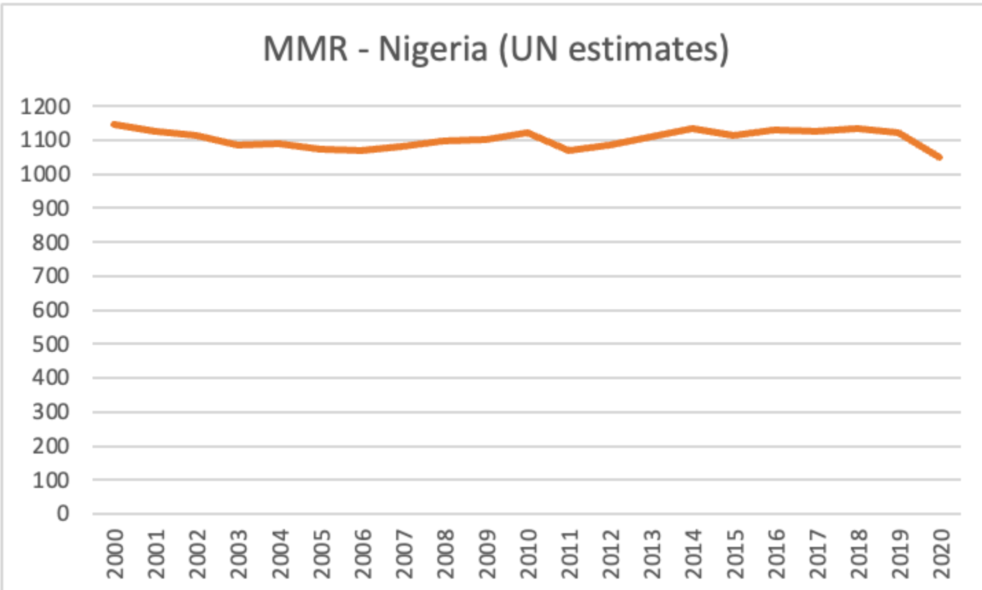


Figure 3: Maternal Mortality Ratio based on Nigeria UN Data

The graph (Figure 3) shows the trend of the Maternal Mortality Ratio (MMR) in Nigeria from the year 2000 to 2020 based on UN estimates. Throughout the twenty-year span, the MMR remains above 800 deaths per 100,000 live births, which is quite high. The MMR demonstrates relatively small fluctuations over the years, rather than a clear downward or upward trend. There is a slight increase in the early 2000s, with the peak around 2005, after which the MMR appears to stabilize somewhat. After 2005, the MMR maintains a range between approximately 900 to 1000 deaths per 100,000 live births, with minor ups and downs but no significant long-term decrease or increase. The interpretation of these results could suggest that while there have been no dramatic increases in MMR, there has also been no substantial progress in reducing maternal mortality rates in Nigeria over this period. The relatively flat trend indicates that efforts to decrease the MMR have not led to significant improvements, or that gains in some areas may have been offset by setbacks in others.

This trend may be a reflect systemic issues within the healthcare infrastructure that have not been adequately addressed, such as a shortage of skilled healthcare providers, poor healthcare facilities, or lack of access to maternal and reproductive health services. The stable but high MMR could indicate that existing public health policies and interventions are not effectively targeting the main causes of maternal mortality or are not being implemented at scale. Persistent high MMR could also be linked to socioeconomic determinants, such as poverty, education, and gender inequality, which influence access to healthcare services and maternal health outcomes. When compared to global efforts and progress made in other countries in reducing MMR, the situation in Nigeria may require intensified national and international support and targeted interventions that are culturally appropriate and resource-sensitive.

Comparison of MMR fron DHS and UN Data

The DHS data show a modest decline in MMR from 2000 to 2020, with noticeable fluctuations in the rate of maternal deaths while the UN data, on the other hand, shows more stability in the MMR with less pronounced year-on-year changes and the rates staying within a narrower range. The estimates displayed on both graphs indicate a high MMR throughout the two decades, which remains a major public health concern. The UN estimates consistently show a lower MMR than the DHS estimates, suggesting some discrepancies between the methodologies or data sources used by these organizations. Both graphs indicate that despite some variations, Nigeria has a high maternal mortality rate that does not show substantial improvement over time. Neither graph shows an MMR that approaches the Sustainable Development Goals (SDG) target for maternal mortality, which is less than 70 per 100,000 live births by 2030.

The difference in the estimates might reflect differing methodologies. For example, DHS often uses direct surveys and sentinel surveillance systems which might capture more acute fluctuations, while UN estimates typically involve statistical modeling that integrates multiple data sources and estimates. If policymakers and healthcare providers are using these figures to gauge progress and allocate resources, the discrepancies might lead to misalignment in policy implementation or resource allocation. Despite methodological differences, the overall high rates in both graphs call for urgent and sustained interventions in maternal health. The consistent indication of high MMR by both estimates suggests that Nigeria faces significant challenges in reducing maternal mortality, which may include issues related to healthcare infrastructure, access to care, and socio-economic barriers.

Recommendations

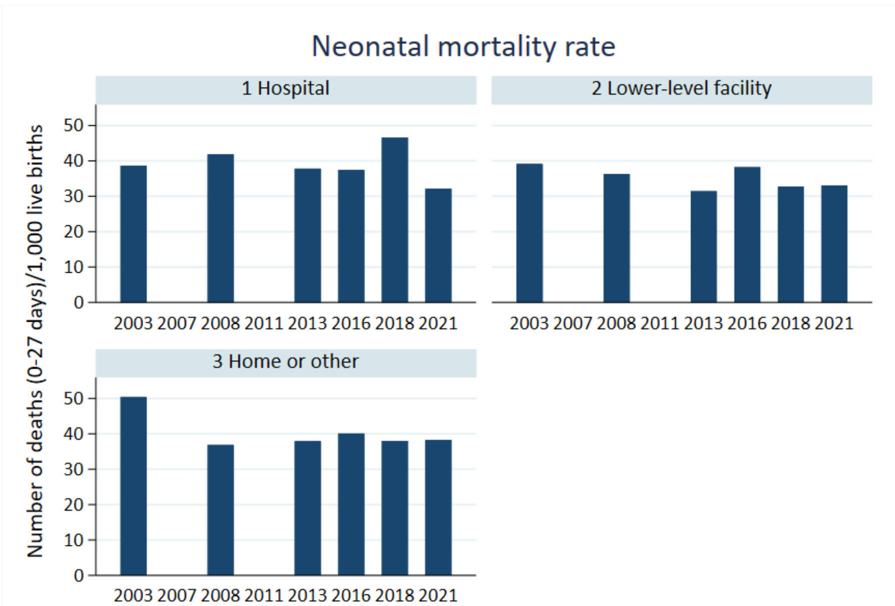
1. There is the need for a critical review of the strategies being employed to tackle maternal mortality in Nigeria.
2. As both estimates point to an MMR that is significantly higher than the global targets, there is a clear need for enhanced efforts. These could include improving access to reproductive health services, investing in healthcare infrastructure, training healthcare providers, and addressing socio-economic determinants of health.
3. The lack of substantial progress highlighted by both sources could prompt a deeper examination of current health policies, the effectiveness of maternal health programs, and the need for strengthened health system surveillance and data collection practices.
4. To better understand and address the factors contributing to high MMR, there is a need for more robust data collection and research into the specific barriers to improving maternal health in Nigeria.

Trends in national neonatal mortality rate (NMR)

Neonatal mortality rates nationally over time (using UN estimates from Excel sheet "MMR SBR NMR UNEstimates 2000-2021" from your country in Dropbox: Workshop 4 - For countries Data and Codes Mortality estimates, any or all the years if you want to include, and/or your own data source, like DHS to compare):

- Add graph and related interpretation on how much NMR has changed over time.
- Include data sources and years for data that you included

Neonatal mortality rates by place of birth:



Hospital NMR began at a high level in 2003, reaching its peak that year. There seems to be variation over the years, although there is a general decline. The NMR in hospital settings appears to have significantly decreased by 2021 compared to the 2003 number. at 2003, the NMR at lower-level facilities was lower than at hospitals. The infant death rate in this context is evidently decreasing steadily throughout the years. The decline is more consistent and noticeable compared to hospitals. The neonatal mortality rate for home or other non-facility births peaked in 2003 compared to the other two categories. There is a notable decline across the 18-year period, with the most dramatic reduction happening at the beginning. The general trend is declining, however it seems that the rate of decline has either decreased or stabilised in recent years.

Neonatal mortality has decreased in hospital settings, although the change has been inconsistent, indicating sporadic advances in neonatal care or varying data collecting quality. Basic healthcare institutions have demonstrated a more steady and notable enhancement in infant survival rates, maybe attributed to improved availability of fundamental care or enhancements in care standards at these facilities. Home births and births outside of medical facilities initially had the greatest neonatal mortality rate (NMR) but have shown improvements. However, the data does not clearly explain the reason for the slowdown in the rate of reduction.

The overall decline in NMR indicates enhancements in prenatal care, public health efforts, and maybe mother health. The research suggests that reducing infant mortality may be more successful at lower-level facilities than in hospitals and home settings. This may indicate a deficiency in the quality of care or distribution of resources. The elevated initial neonatal mortality rate in home or similar settings highlights the dangers of non-facility births and suggests a requirement for improved postnatal care and assistance in non-hospital settings. Although there have been reductions, there is still significant potential for improvement, particularly in hospitals and home environments. These trends can guide the focus of interventions, including enhancing hospital care, aiding lower-level facilities, and promoting safe home birth practices.

Trends in national stillbirths

Stillbirth rates over time (using UN estimates Excel sheet "MMR SBR NMR UNEstimates 2000-2021" from your country in Dropbox: Workshop 4 - For countries Data and Codes Mortality estimates, any or all the years if you want to include)

- Add bar graph from UN estimates and related interpretation on how stillbirth rates changed over time
- Include data sources and years for data that you included

Stillbirth volumes by facility level, type and ownership in HMIS 2022:

- Add graph and related interpretation on the volume of stillbirths recorded at facilities (all, and if available, macerated or antepartum versus fresh or intrapartum) by facility level or volume (higher or lower numbers of births) and facility ownership (private, public etc.) in the most recent year.

National policy and health system context for MNH

This section covers the national policy and health systems context for MNH care in the areas of 1) health governance, 2) organization and resources for MNH (facilities, human resources, and supplies); 2) service delivery processes (to improve quality of skilled and respectful care); 3) financing; and 4) information systems. These areas of focus align with previous global evidence and conceptual frameworks for

MNH.[9,10,11,12,13] The data in this section is taken from the WHO 2018/19 SRMNCAH policy survey (https://platform.who.int/data/maternal-newborn-child-adolescent-ageing/national-policies), and can be updated with additional information you know about policies that have come into place since 2018/19.

Health policy context for MNH

Please review the provided Table 1 MNH policy and systems tracker tool found in Dropbox□Workshop 4 – for countries □ Data and codes □ Health policy and systems □ (choose your country folder) □ Country MNH policy and systems tables FINAL ENG – (your country name), and update the far right two columns where any new policy(-ies) may have been introduced since 2018/19 in the country.

- Using Table 1, add some summary sentences or paragraphs here on what national policies, laws, plans, guidelines, or strategies related to MNH have been put in place or not, in what years (and whether updated), and how strong the implementation has been, related to the following topics:

Governance for MNH

In Nigeria, a robust framework of national policies, laws, plans, guidelines, and strategies has been established to enhance MNH. These include the National Health Policy and Strategy to Achieve Health for All Nigerians (launched in 1988), National Strategic Health Development Plan (NSHDP) (2018-2022), and the Saving One Million Lives Initiative (started 2012), among others. A significant milestone was the National Health Act of 2014, which aimed to guarantee universal access to primary health care for all Nigerians, thereby enhancing the reach and effectiveness of MNCH services. Policies specific to childbirth include the Essential Equipment for Newborn Health (2015) and the Essential Medicine List (2018). Additionally, the IMNCH Strategy, National Reproductive Health Policy, and Emergency Obstetric and Newborn Care (EmONC) Guidelines are focused on ensuring that every woman has access to skilled care at childbirth. Nationally, all maternal and stillbirths are required to be reviewed as per guidelines like the National Guideline on Maternal Perinatal Death Surveillance and Response (MPDSR) 2015 and the Community MPDSR Tool 2016. These comprehensive efforts, however, face challenges in implementation, particularly in rural and remote areas, due to limited public awareness and logistical difficulties.

However, the effectiveness of these policies is subject to significant regional variation. While some areas, especially urban centers, may demonstrate strong adherence to national guidelines, rural and underserved areas often face challenges due to resource constraints, infrastructural limitations, and

---

[9] World Health Organization (WHO). Monitoring the building blocks of health systems: a handbook of indicators and their measurement strategies. Geneva, Switzerland: WHO;2010.

[10] Koblinsky M, Moyer CA, Calvert C, et al. Quality maternity care for every woman, everywhere: a call to action. The Lancet 2016;**388**(10057):2307-20 doi: 10.1016/S0140-6736(16)31333-2.

[11] Chou D, Daelmans B, Jolivet RR, Kinney M, Say L. Ending preventable maternal and newborn mortality and stillbirths. BMJ : British Medical Journal 2015;**351**:h4255 doi: 10.1136/bmj.h4255.

[12] Singh NS, Blanchard AK, Blencowe H, et al. Zooming in and out: a holistic framework for research on maternal, late foetal and newborn survival and health. Health Policy and Planning 2021 doi: 10.1093/heapol/czab148.

[13] Raven JH, Tolhurst RJ, Tang S, van den Broek N. What is quality in maternal and neonatal health care? Midwifery 2012;**28**(5):e676-e83 doi: https://doi.org/10.1016/j.midw.2011.09.003.

workforce shortages. Despite the existence of policies aimed at promoting facility-based deliveries and skilled childbirth care, effectiveness is hindered by issues such as accessibility, cultural acceptance, quality of care, and availability of resources. These challenges are particularly pronounced in rural and underserved areas, reducing the overall impact of these policies.

Health facilities and referral transport

The National Health Act, enacted in 2014, is a landmark legislation ensuring basic healthcare services for all Nigerians. It supports the National Health Insurance Scheme (NHIS), which aims to expand coverage, especially for vulnerable populations. However, implementation has faced challenges like bureaucratic delays, limited resources, and infrastructural constraints. In 2015, Nigeria introduced policies like the Essential Equipment for Newborn Health and the Essential Medicine List, updated in 2018. These policies guide the availability of infrastructure and medicines but face challenges in coordination, community engagement, and consistent policy implementation across regions. The implementation of these policies varies regionally and is often influenced by factors such as cultural practices, healthcare infrastructure, and prevailing health policies. Some areas show strong adherence, while others face significant challenges due to resource constraints, infrastructural limitations, or workforce shortages.

Health workers

The National Health Policy, National Strategic Health Development Plan (NSHDP), Integrated Maternal Newborn and Child Health Strategy (IMNCH), Saving One Million Lives Initiative, and Every Woman Every Child Nigeria Strategy have their key components addressing issues relating to health workers in the disciplines of MNH domains. Moreover, specific guidelines like the Essential Equipment for Newborn Health (2015), Essential Medicine List (2018), and the National Health Act (2014) have been implemented to ensure universal access to primary health care. The impact of these policies and guidelines has varied, with some progress noted in areas such as resource allocation and training. However, implementation strength has been challenged by factors like bureaucratic delays, limited resources, and infrastructural constraints. Despite these challenges, the National Health Act supports the National Health Insurance Scheme (NHIS), which has been crucial in expanding healthcare coverage, especially for vulnerable populations. Furthermore, the legal framework in Nigeria, particularly concerning abortion care, reflects the complex socio-cultural, religious, and ethical contexts of the country. The implementation of national these guidelines and policies varies significantly across regions and facilities, often influenced by local healthcare delivery systems, cultural practices, and resource availability. While there are indications of progress in certain areas, consistent policy implementation and coordination remain challenging, particularly in rural and underserved regions.

Supplies, medicines and commodities

The National Health Act, enacted in 2014, is particularly notable for its commitment to universal access to primary health care, including maternal and newborn services. Additionally, policies like the Essential Equipment for Newborn Health (2015) and Essential Medicine List (2018) focus on ensuring the availability of crucial medicines and equipment. The strength of implementation of these policies varies, with some progress in resource allocation and training, but challenges in coordination, community engagement, and consistent policy implementation across regions remain. The effectiveness of these policies in improving MNH care depends on factors such as resource allocation, healthcare infrastructure, workforce capacity, and governance structures. Despite these challenges, there are indications of implementation efforts, with health workers in Nigeria generally aware of these guidelines and reasonable efforts at their implementation in facilities where deliveries take place.

Service delivery to improve quality of care

In Nigeria, several national policies, laws, plans, guidelines, and strategies have been implemented to enhance and improve quality of MNH. Specific to childbirth, policies like the Essential Equipment for Newborn Health (2015), Essential Medicine List (2018), and National Guidelines for Safe Motherhood have been established. These guidelines focus on facility-based deliveries, emphasizing the importance of skilled care at childbirth, and designate certain health facilities as equipped for comprehensive emergency obstetric and newborn care. However, the implementation of these policies faces challenges. Regions vary in their adherence to these policies, affected by resource constraints, infrastructural limitations, and workforce shortages. The National Health Insurance Scheme (NHIS) has been expanded to cover a larger portion of the population, but its effectiveness depends on the implementation strength, which is influenced by factors like financial allocation, healthcare infrastructure, and cultural views.

Concerning post-abortion care, national guidelines exist but are limited by access issues, leading to many unsafe abortions. The success of these guidelines depends on their implementation, influenced by societal views towards abortion. The National Ambulance Service or Referral System, part of the EmONC Guidelines, addresses transport and emergency referrals for childbirth, but its implementation remains minimal, relying heavily on traditional transportation structures. There are also guidelines for essential medicines and equipment, including the Essential Medicine List 2018 and the Essential Equipment for Newborn Health 2015. However, the availability of funds and resources for these devices is limited, although capacity building is ongoing.

The National Health Policy, National Health Care Quality Strategy, and Accreditation and Regulation of Health Facilities aim to improve the quality of care in health facilities. The effectiveness of these policies depends on factors like resource allocation, healthcare infrastructure, workforce capacity, and governance structures. Regarding free healthcare services, the National Health Act and Basic Health Care Provision Fund (BHCPF) provide free access to health services for newborns. However, the actual implementation can be inconsistent, and out-of-pocket expenses remain a significant barrier, especially in under-resourced areas.

Furthermore, the National Civil Registration and Vital Statistics (CRVS) System mandates the registration of every birth and death, but implementation challenges exist, especially in remote rural and underserved areas. Policies like the National Guideline on Maternal Perinatal Death Surveillance and Response 2015 and MPDSR 2016 emphasize the need to review all maternal deaths, stillbirths, and neonatal deaths.

Financing

A significant legislative development is the National Health Act, enacted in 2014, guaranteeing universal access to primary health care for all Nigerians. Further, the Essential Equipment for Newborn Health policy was established in 2015, followed by the Essential Medicine List in 2018. These policies support the National Health Insurance Scheme (NHIS), focusing on expanding healthcare coverage, particularly for vulnerable and informal sectors.

Policies emphasizing the right of every woman to skilled care at childbirth include the IMNCH Strategy, National Reproductive Health Policy, and Emergency Obstetric and Newborn Care (EmONC) Guidelines. These guidelines promote facility-based deliveries as part of an integrated approach to maternal and newborn health. While there are regional policies on abortion care to protect the health or life of the woman, challenges exist in policy coordination, community engagement, and consistent implementation across regions. The National Guidelines for Safe Motherhood emphasize the importance of skilled care at childbirth, but their effectiveness is affected by factors like accessibility, cultural acceptance, and resource availability, particularly in rural and underserved areas.

Transport and emergency referral guidelines for childbirth, such as the EmONC Guidelines and National Ambulance Service, face limitations due to reliance on traditional transportation structures and inefficient public ambulances. Furthermore, the Infection Prevention and Control Guidelines and National Health Policy address the availability of clean water and sanitation in birthing facilities, but challenges persist in resource allocation, infrastructure development, and governance, especially in rural or underserved areas

Lastly, the National Health Act and Basic Health Care Provision Fund (BHCPF), along with State-Level Health Insurance Schemes, legislate free access to health services for newborns (0-4 weeks). However, the implementation of these policies and the availability of free services can be inconsistent. Despite efforts to reduce costs, out-of-pocket expenses remain a significant barrier for many, especially in under-resourced areas..

Information

Key policies include the National Health Policy, National Strategic Health Development Plan (NSHDP), Integrated Maternal Newborn and Child Health Strategy (IMNCH), and the Saving One Million Lives Initiative. The National Health Act, enacted in 2014, is a notable law that guarantees universal access to primary healthcare for all Nigerians. This Act supports the National Health Insurance Scheme (NHIS), aimed at expanding healthcare coverage, especially for vulnerable populations. However, challenges such as bureaucratic delays, limited resources, and infrastructural constraints have impacted the intensity of implementation.

Specific guidelines exist for childbirth, postnatal care, and emergency obstetric and newborn care (EmONC), including a national guideline on Kangaroo Mother Care (2018) and the National Policy on Infant and Young Child Feeding. The promotion of facility-based childbirth is part of Nigeria's commitment to reducing maternal and neonatal mortality. Despite these efforts, the effectiveness of these policies is influenced by factors like accessibility, cultural acceptance, quality of care, and resource availability, particularly in rural and underserved areas.

The National Health Policy, National Health Care Quality Strategy, and regulations of health facilities are geared towards improving the quality of care in health facilities, with a focus on both maternal and newborn health. The effectiveness of these policies depends on resource allocation, healthcare infrastructure, workforce capacity, and governance structures.

Organization of Health Facilities In Nigeria

Table 2 presents a comprehensive overview of the structural organization of childbirth health services and referral pathways in Nigeria, both in the public and private sectors. In the public sector, the primary level includes Health Posts, Primary Health (PH) Clinics, and PH Centres, all categorized as lower-level facilities. These primary facilities typically make emergency referrals to secondary hospitals, which include Secondary State Hospitals and Tertiary Hospitals. At the secondary level, facilities can refer to tertiary level institutions, which comprise Specialist Hospitals, Federal Teaching Hospitals, and other specialist institutions. Tertiary hospitals, being the highest level, do not have a referral pathway indicated, suggesting they are equipped to handle the most complex cases. In the private sector, a similar structure is observed. Primary level facilities, such as Health Posts and PH Clinics, refer to secondary hospitals. Secondary facilities, in turn, refer to tertiary hospitals. Like in the public sector, tertiary hospitals in the private sector do not have further referral pathways, indicating their comprehensive service capacity.

Table 2 also notes that some facilities, particularly at the tertiary level, have no referral pathways, implying their capacity to provide comprehensive care for complicated childbirth cases. This structure reflects an organized healthcare system with clear referral mechanisms, ensuring patients receive the appropriate level of care as needed. Overall, Table 2 effectively outlines the hierarchy and network of health facilities in Nigeria, emphasizing the systematic approach to managing childbirth-related health services across different levels of healthcare provision.

Also use data from the HMIS Admin files and merged Admin files to complete columns 2 and 3 in this table.

Table 2: Structural organization of childbirth health services and referral pathways

HMIS category *(change or remove levels as needed)*	**Number of facilities in Administrative database**	**Number (and % of total) facilities providing MNH services**	**Name of facility type**	**DHS category (hospital or lower level facility)**	**To which other levels should they make emergency referrals for complicated cases, if any?**
		Public sector			
Primary			Health Post	Lower-level facility	Secondary Hospital
Primary			PH Clinics	Lower-level facility	Secondary Hospital
Primary			PH Centres	Lower-level facility	Secondary Hospital

Secondary			State Hospital	Hospital	Tertiary hospital
Secondary			Specialist Hospital	Hospital	Tertiary hospital
Tertiary			Federal Teaching Hospital	Hospital	No referral
Tertiary			Specialist Hospital	Hospital	No referral
		Private sector *(if applicable and available, adapt levels or leave empty if not)*			
Primary			Health Post	Lower-level facility	Secondary Hospital
Primary			PH Clinics	Lower-level facility	Secondary Hospital
Primary			PH Centres	Lower-level facility	Secondary Hospital
Secondary			State Hospital	Hospital	Tertiary hospital
Secondary			Specialist Hospital	Hospital	Tertiary hospital
Tertiary			Federal Teaching Hospital	Hospital	No referral
Tertiary			Specialist Hospital	Hospital	No referral

Health resources – facilities and health workers

Table 3 outlines the health resources available for various types of childbirth care in Nigeria, focusing on both the public and private sectors. The table categorizes the care into routine (uncomplicated) childbirth care, Basic Emergency Obstetric and Newborn Care (BEmONC), Comprehensive EmONC (CEmONC), and specialized care for small/sick newborns. In the public sector, routine uncomplicated childbirth care is provided in Primary Health (PH) Centres and Hospitals by nurse midwives and medical assistants. Basic EmONC, which includes functions like parenteral antibiotics, oxytocin, anticonvulsants, manual removal of placenta, and neonatal resuscitation, is also available in hospitals and is attended by nurse midwives.

Comprehensive EmONC, which encompasses the functions of BEmONC along with Caesarean sections and blood transfusions, is provided in hospitals with nurse midwives, nurse midwives, and doctors. Specialized care for small/sick newborns, which may include oxygen/CPAP, intravenous fluids, antibiotics, phototherapy, and exchange transfusion, is offered in hospitals and attended by nurse midwives, nurse midwives, doctors, and obstetricians. The private sector mirrors the public sector in terms of the levels of care provided, with PH Centres and Hospitals handling routine childbirth care, and hospitals catering to Basic and Comprehensive EmONC as well as specialized care for small/sick/vulnerable newborns. The findings indicate a structured approach to maternal and newborn health care in Nigeria, with specific facilities and trained health worker cadres designated for each level of care. This structure reflects an organized system for addressing the varying complexities of childbirth, ranging from routine to emergency and specialized situations. However, the effectiveness of these arrangements is dependent on factors such as resource allocation, infrastructure, and the training and availability of healthcare professionals.

Table 3: Health resources – facilities and health workers for each type of childbirth care

Type of MNH care	**Facilities: what facilities are meant to provide each type of care?**	**Health workers: what cadres are meant to be trained to attend each type of care?**[14]
Public sector		
Routine (uncomplicated) childbirth care [15]	PH Centres and Hospitals	Nurse midwife, medical assistant
Basic EmONC [16]	Hospitals	Nurse, midwife, nurse midwife
Comprehensive EmONC (i.e. C-sections) [17]	Hospitals	Nurse, midwife, nurse midwife, Doctors
Specialized care for small/ sick newborns [18]	Hospitals	Nurse, midwife, nurse midwife, Doctors and Obstetricians
Private sector (if applicable and available, adapt levels or leave empty if not)		
Routine (uncomplicated) childbirth care [a]	PH Centres and Hospitals	Nurse midwife, medical assistant
Basic EmONC [b]	Hospitals	Nurse, midwife, nurse midwife

[14] Filled partially using WHO 2018/19 SRMNCAH survey responses for the country- edit as needed.

[15] Routine care refers to safe uncomplicated childbirth care, including water supply, continuous electricity, soap, latex gloves, 24 hour services or not, routine partograph use and infection prevention

[16] BEmONC signal functions include: parenteral antibiotics, parenteral oxytocin, parenteral anticonvulsants, manual removal of placenta, removal of retained products of conception, assisted vaginal delivery, and neonatal resuscitation (bag and mask, oxygen)

[17] CEmONC signal functions includes BEmONC plus: Caesarean section and blood transfusion

[18] Care for small/sick newborns may include: Oxygen/CPAP, intravenous fluids, antibiotics, phototherapy and/or exchange transfusion

Comprehensive EmONC (i.e. C-sections) [c]	Hospitals	Nurse, midwife, nurse midwife, Doctors
Specialized care for small/sick/ vulnerable newborns [d]	Hospitals	Nurse, midwife, nurse midwife, Doctors and Obstetricians

Health system inputs relevant to MNH care

Please review Table 4 containing data on infrastructure and health workers provided by the Countdown country collaboration team for the Country Annual Meeting 2023, and include in the report if available and of interest.

Table 4 presents an analysis of health system input variables about facilities and health personnel for different types of delivery care in various states of Nigeria as of 2023. The table presents information on many parameters, such as the overall population, the number of facilities per 10,000 individuals, the number of hospitals per 10,000 individuals, the number of health centres per 10,000 individuals, the proportion of for-profit facilities, and the number of beds per 10,000 individuals.

An important observation is the disparity in healthcare resources among various states. Abia state has a higher number of resources compared to Bayelsa state. Specifically, Abia state has 2.8 facilities and 0.99 hospitals per 10,000 population, whilst Bayelsa state has much fewer resources with only 0.4 facilities and 0.33 hospitals per 10,000 people. This signifies an inequality in the healthcare infrastructure among different locations. In addition, it is worth noting the ratio of for-profit facilities to all facilities, which varies from a maximum of 46.8% in Ogun to a minimum of 2.3% in Jigawa. This implies potential disparities in the accessibility of private healthcare alternatives across various states.

Overall, the data presented in Table 4 elucidates the disparate allocation of healthcare resources and infrastructure in Nigeria, which may have ramifications for the availability and quality of maternal and neonatal healthcare services. The disparity in health infrastructure and resources among different states indicates the necessity for focused actions to provide fair and equal access to high-quality healthcare for all individuals, particularly in states with limited resources.

Table 4: Health system input indicators for health resources (2022)

Year	Total population*	Facilities per 10000	Hospitals per 10000	Health centers per 10000	For-profit to all facilities (%)	Beds per 10000	Total health workers per 10,000	Nurse: physician ratio
National	**228,825,916**	**1.7**	**0.67**	**1.02**	**26.0**			
Abia	4,340,371	2.8	0.99	1.76	36.2			
Adamawa	5,005,471	1.8	1.07	0.74	9.8			

Akwa-Ibom	6,693,261	1.1	0.28	0.83	26.6			
Anambra	6,388,117	1.8	0.97	0.85	43.6			
Bauchi	7,984,472	1.6	0.80	0.78	8.8			
Bayelsa	6,770,647	0.4	0.33	0.12	14.5			
Benue	7,087,639	2.3	1.12	1.16	30.2			
Borno	2,691,237	1.6	0.84	0.77	11.1			
Cross River	4,564,448	2.6	1.24	1.33	9.6			
Delta	6,784,041	1.2	0.83	0.38	33.0			
Ebonyi	3,381,037	2.1	1.65	0.48	25.7			
Edo	4,928,991	2.1	0.94	1.17	40.8			
Ekiti	3,885,829	1.4	0.73	0.65	29.0			
Enugu	5,227,010	2.0	0.80	1.18	41.0			
FCT	2,326,020	2.6	1.13	1.43	46.7			
Gombe	3,896,361	1.7	0.73	0.99	10.4			
Imo	6,513,415	1.8	1.01	0.82	42.9			
Jigawa	6,870,690	1.1	0.13	1.01	2.3			
Kaduna	9,735,051	1.5	0.47	0.99	22.6			
Kano	5,278,367	2.8	0.55	2.25	14.3			
Katsina	15,775,331	1.2	0.14	1.10	4.0			
Kebbi	5,261,009	1.8	0.52	1.28	3.5			
Kogi	9,295,386	1.3	0.49	0.84	18.8			
Kwara	3,804,902	2.6	0.96	1.65	33.5			
Lagos	14,920,048	1.5	0.73	0.75	81.2			
Nasarawa	2,990,009	3.5	1.38	2.08	21.8			
Niger	6,744,554	2.3	0.57	1.75	12.6			
Ogun	6,267,473	1.9	1.20	0.73	46.8			
Ondo	5,521,836	1.5	0.55	0.94	19.8			
Osun	5,666,955	1.9	0.31	1.58	18.4			
Oyo	9,546,932	1.5	0.86	0.69	42.8			
Plateau	4,868,310	2.8	0.59	2.17	25.9			
Rivers	8,853,416	0.7	0.22	0.44	22.0			
Sokoto	5,932,599	1.4	0.36	1.05	4.2			
Taraba	3,603,070	2.6	1.50	1.12	14.9			
Yobe	4,025,608	1.4	0.46	0.99	2.7			
Zamfara	5,396,003	1.4	0.27	1.12	4.0			

Source: Country Annual Meetings data 2023 (Excel: Health System Data CAM for 2022)

*Total health workers includes physicians + nurses + non-clinical physicians

- Add summary interpretation on the national density of facilities, hospitals, lower level facilities, proportion that are for-profit, and comment on regional differences and relative performance using above table.
- Add summary interpretation on the national density of physicians, nurses (and nurse to physician ratio), and total health workers, and comment on regional differences and relative performance.
- Interpret health systems performance compared to global standards if desired, such as the WHO/UN targets (2 facilities per 10,000 population, 18 beds per 10,000 population, 23 (or 44) health workers per 10,000 population).

Please review and include the Table 5 on "Current health expenditure- maternal conditions" that was provided, containing financing data from WHO's Global Health Expenditure database if available and of interest.

Table 5 provides a detailed overview of the health system financing indicators for Nigeria from 2013 to 2020. It includes data on current health expenditure (CHE) per capita, health expenditure on maternal conditions as a percentage of CHE from all sources, domestic general government health expenditure on maternal conditions as a percentage of CHE, external sources of funding, and domestic private expenditure on maternal conditions as a percentage of CHE.

The current health expenditure per capita in constant 2020 US dollars shows a fluctuating trend, starting at $100.8 in 2013, peaking at $106.1 in 2014, and then declining to $65.7 in 2018, with a slight increase to $69.7 and $69.8 in 2019 and 2020, respectively. This indicates variability in health spending per person over the years. Health Expenditure on Maternal Conditions as a percentage of CHE from all sources generally increased over the period, starting from 6.8% in 2013 and reaching 10.0% in 2018, before stabilising around 9.2% and 9.3% in 2019 and 2020. This suggests a growing focus on maternal health in the overall health expenditure.

Domestic general government health expenditure on maternal conditions as a percentage of CHE experienced some fluctuations, with the lowest at 1.1% in 2017 and the highest at 2.0% in 2018 and 2019. The average across the years stood at 1.7%. This indicates the government's varying commitment to funding maternal health. External sources of funding for maternal conditions as a percentage of CHE remained under 1% throughout the years, highlighting a limited reliance on external funding for maternal health. Domestic private expenditure on maternal conditions as a percentage of CHE ranged from 5.1% to 7.3%, with an average of 6.1% across the years, showing a consistent contribution of the private sector to maternal health financing.

Put together, Table 5 demonstrates Nigeria's efforts in financing maternal health, with a noticeable increase in the allocation of resources towards maternal conditions over the years. However, the fluctuations in government spending and the relatively low external funding emphasise the need for more consistent and increased investment in maternal health to ensure sustainable improvements.

Table 5: Health system input indicators for financing

Indicator	2013	2014	2015	2016	2017	2018	2019	2020	Average across years
Current Health Expenditure (CHE) per capita in constant 2020 US$	100.8	106.1	96.3	78.2	72.8	65.7	69.7	69.8	82.4
Health Expenditure on Maternal Conditions as % of Current Health Expenditure (all sources)	6.8	7.6	8.2	7.9	7.1	10.0	9.2	9.3	8.3
Domestic General Government Health Expenditure on Maternal	1.7	1.5	2.0	1.6	1.1	2.0	1.7	1.7	1.7

Conditions as % of Current Health Expenditure									
External sources of funding on Maternal Conditions as % of Current Health Expenditure	<	0.8	0.7	0.6	<	0.7	<	<	0.7
Domestic Private Expenditure on Maternal Conditions as % of Current Health Expenditure	5.1	5.3	5.5	5.6	5.5	7.3	7.0	7.3	6.1

Source: Global Health Expenditure database of National Health Accounts (https://apps.who.int/nha/database/ViewData/Indicators/en)

- Add bullet points to interpret the table on the country's current health expenditure overall, and the proportion invested into maternal conditions (and whether this was higher among government, external or private sources)

Trends in where and with whom women give birth

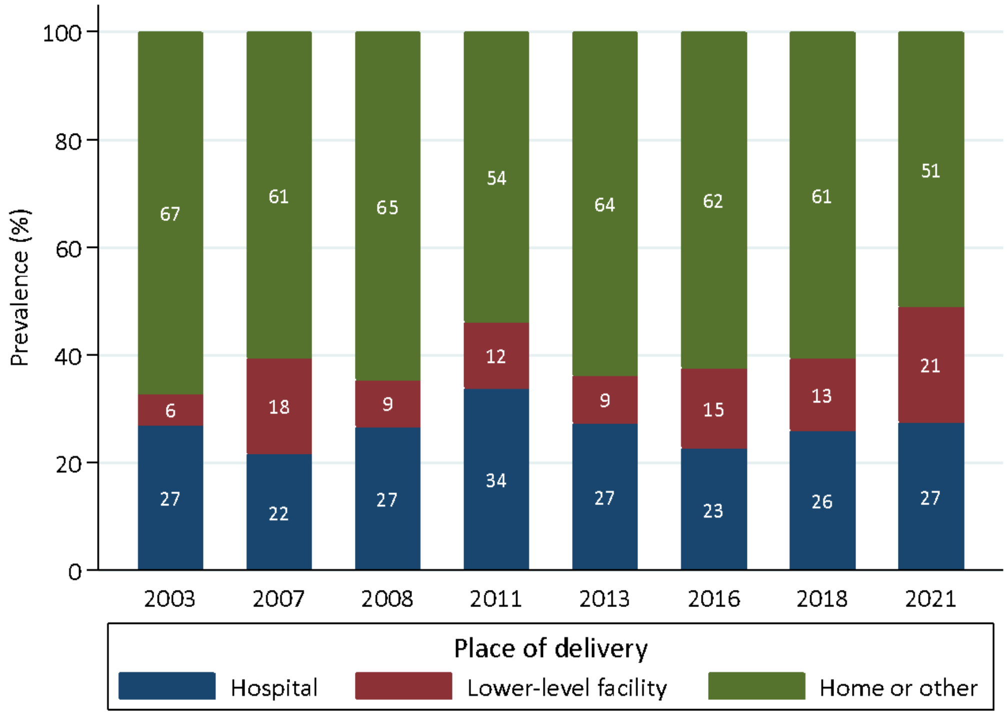


Figure Place of Delivery in Nigeria (2003-2021)

The stacked bar graph above illustrates the frequency of births based on the location of delivery from 2003 to 2021. The sites are classified into hospitals, lower-level facilities, and home or other non-institutional places. Hospital deliveries have exhibited variations throughout time. The percentage started at 27% in 2003, rose to 34% in 2011, saw a minor decline with occasional oscillations, and concluded at 27% in 2021. The percentage of hospital deliveries, following an early increase, reverts to the levels seen in 2003 by 2021. Deliveries to lower-level facilities have undergone substantial transformation. Starting at 6% in 2003, there is a significant rise to 18% in 2007. Subsequently, there was a decline to 9% in 2008 and 2009, followed by a gradual rise to 15% in 2018, and then a reduction to 13% in 2021. Home deliveries or deliveries in non-institutional settings decreased from 67% in 2003 to 54% in 2011, showing a notable decline in home births throughout this period. Starting in 2011, there has been a consistent rise in the preference for home or non-institutional deliveries, peaking at 61% in 2018 and then decreasing to 51% in 2021.

The ramifications of these findings are numerous. Between 2003 and 2011, there was a noticeable shift towards institutional deliveries, indicating potential enhancements in healthcare accessibility, heightened awareness of the advantages of institutional deliveries, or alterations in legislation or healthcare financing. The increase in home or non-institutional births in subsequent years could indicate obstacles to getting institutional care, such as financial constraints, remoteness, or distrust in the quality of healthcare institutions. The decrease in hospital deliveries in 2021 returning to levels seen in 2003, following an initial rise, may indicate challenges related to hospital capacity, quality of treatment, or socio-economic variables that deter hospital utilisation. The oscillations in lower-level facility use may be due to changes in distribution, accessibility, perceived quality, or appropriateness for birthing. The fluctuation and increasing preference for non-institutional births may suggest a necessity to reassess maternal healthcare approaches, particularly in advocating for secure, institutional delivery.

These findings highlight the importance of doing a thorough evaluation of the elements that impact the decision of where to give birth from a healthcare standpoint. Exploring the reasons behind the shift in institutional delivery trend is crucial for developing strategies to enhance maternal and newborn health results. It may be crucial to enhance the quality and public image of care in lower-level facilities to make sure they remain a feasible choice for pregnant women.

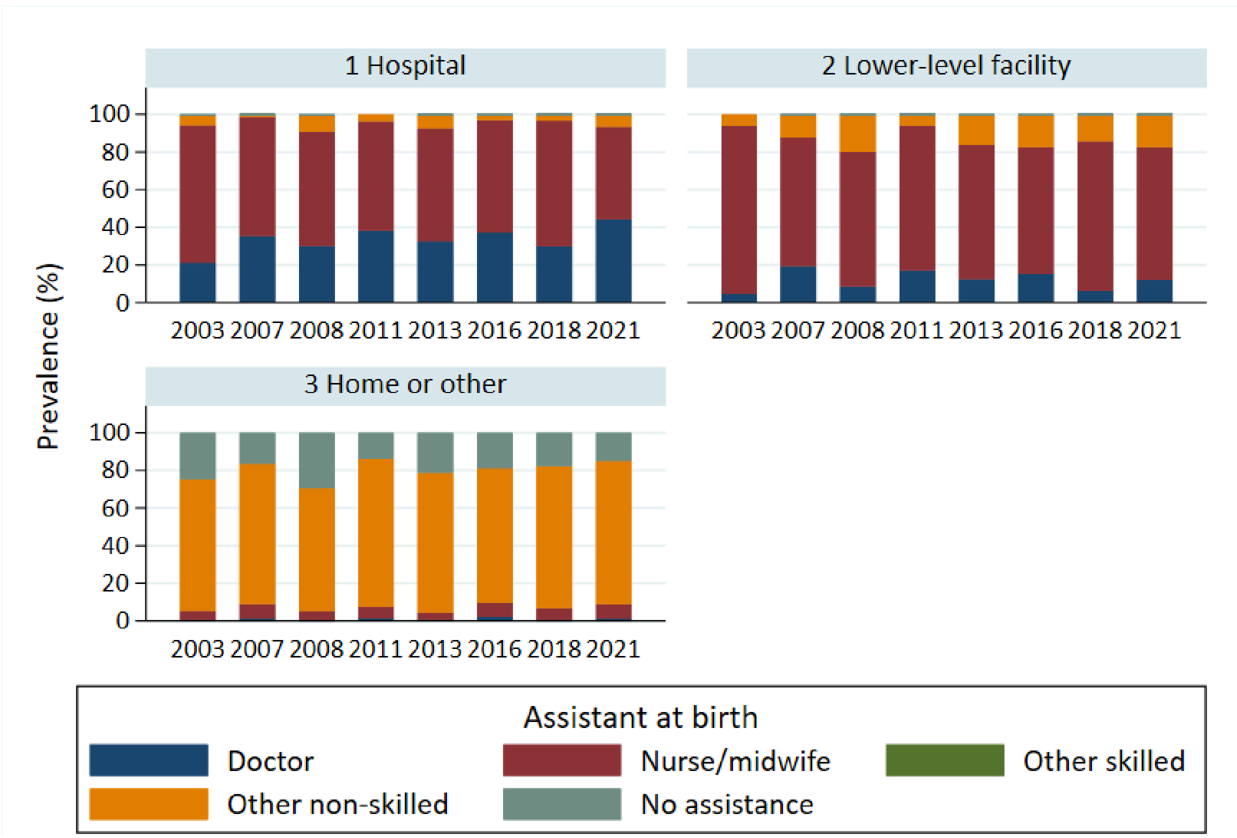
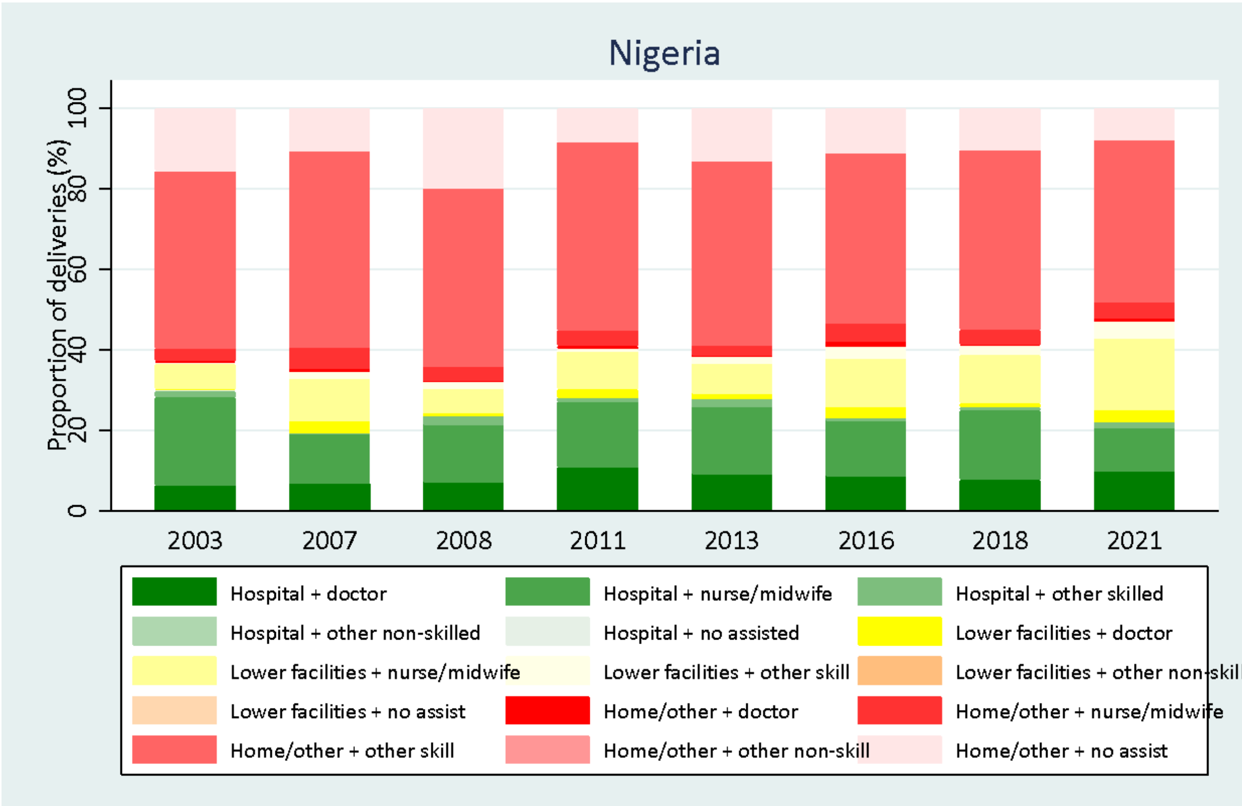


Figure Institutional deliveries nationally by place of birth and type of birth attendant

The stacked bar graph shows the distribution of births by type of birth helper in hospitals, lower-level facilities, and home or other non-facility settings from 2003 to 2021. There is a minor reduction in the percentage of hospital births attended by doctors with time, while the presence of nurses/midwives grows. This may indicate a shift in policy or procedure that has broadened the responsibilities of midwives in hospital deliveries. Hospital births typically have the largest rate of qualified experts in attendance, as one would anticipate in a hospital environment. The decline in doctor attendance may indicate a resource optimisation strategy, with doctors focusing on complex cases and midwives managing routine deliveries. Nurses and midwives primarily staff lower-level facilities and typically attend a high percentage of births each year, with minor variations. The low number of births attended by doctors in lower-level hospitals suggests that these facilities are likely intended to handle less complex situations that can be treated by nurses and midwives. The consistent attendance patterns indicate that lower-level hospitals have maintained a stable role in delivering maternity care over time. Home births and births in other settings have the greatest range in attendance, with a notable percentage of deliveries overseen by unskilled individuals or with no support provided. Over time, there has been a discernible decline in unassisted births, indicating that more births are now being attended by qualified or unskilled individuals. The percentage of deliveries occurring at home or other locations where professional workers like as nurses/midwives and other trained attendants are present is rising, although this increase is not as significant as the decline in unattended births.

The statistics indicate a good increase in skilled birth attendance in all environments, which is beneficial for the health outcomes of mothers and newborns. Hospitals are modifying their staffing patterns to optimise the utilisation of highly skilled workers such as doctors, as shown by the data. The stability of lower-level institutions indicates their crucial role in the maternal health system, perhaps improving access for women unable to reach hospitals. The decline in unattended home births indicates effective public health initiatives aimed at raising knowledge about the dangers of unattended deliveries and offering greater assistance for home births.



Figure

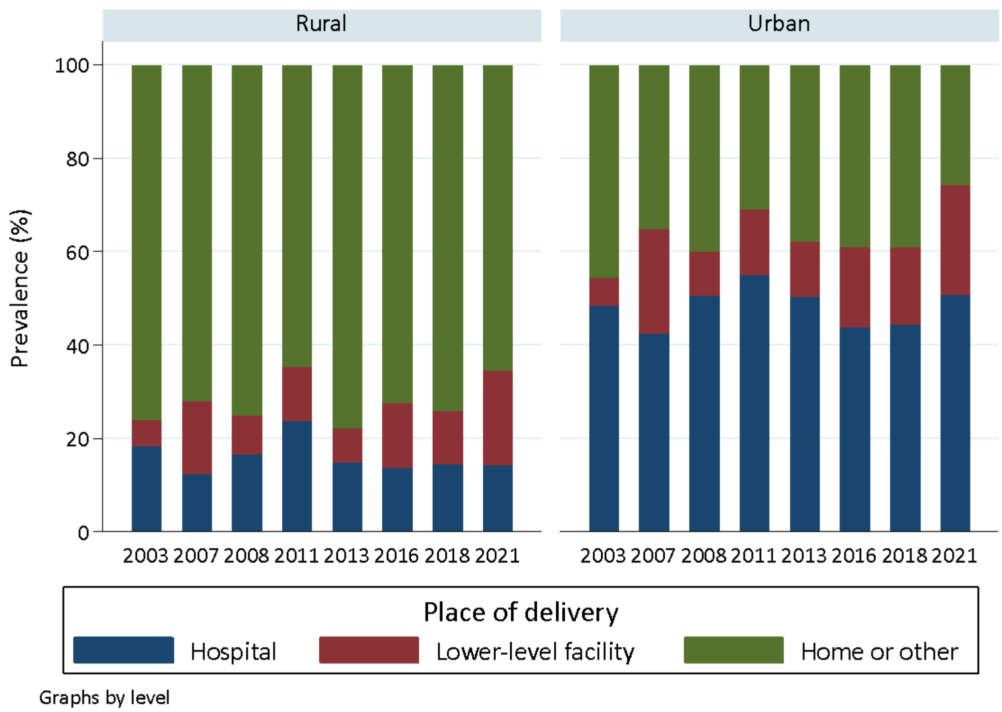
The stacked bar graph above provides data on the proportion of deliveries in Nigeria attended by different types of health personnel from 2003 to 2021. The proportion of hospital deliveries attended by doctors shows some decrease over the years. There is a significant representation of nurses/midwives in hospital deliveries, with some fluctuation but no clear trend. Deliveries in hospitals with other skilled personnel appear to remain relatively constant. A concerning observation is the presence of a small but consistent proportion of hospital births with no assistance, which could indicate system overload or administrative issues. Deliveries at lower-level facilities attended by nurses/midwives are significant, reflecting their essential role at these facilities. The presence of doctors in lower-level facilities is minor, indicating that these facilities may not be as well-equipped for complicated cases. Other skilled personnel also have a noticeable presence in these facilities. Home deliveries with no assistance have decreased, which suggests an improvement in the reach of healthcare services. Deliveries at home attended by nurses/midwives or other skilled personnel are represented, suggesting that skilled birth attendance is accessible in non-facility settings as well. However, a substantial proportion of home births are still attended by non-skilled personnel or have no assistance at all.

The findings suggest a need for continued investment in the training and deployment of skilled birth attendants, especially nurses and midwives, who play a critical role in both hospitals and lower-level facilities. The decrease in unassisted hospital deliveries, while positive, should be further investigated to ensure all hospital births have the necessary support. The presence of non-skilled attendants in home deliveries calls for policies that promote skilled attendance at every birth to improve maternal and neonatal outcomes. The trend of decreasing unassisted home deliveries is encouraging, but the ongoing presence of these cases indicates that access to and availability of skilled care in home settings should remain a priority in health policy. Public health strategies could focus on strengthening healthcare systems, ensuring all women have access to high-quality maternal care, regardless of the setting. Policy efforts should aim to bolster lower-level facilities, potentially making them more attractive to expecting mothers and reducing the strain on hospitals. This data can serve as a basis for further research on the quality of care and the outcomes of different birth attendances, guiding evidence-based policy-making.

- Institutional deliveries by subnational region, wealth and residence groups:
  - Add stacked bar graphs on place of delivery and birth attendant by rural-urban residence, wealth quintile and/or region (province, county etc.).
  - Add interpretation on how the proportion at hospitals and lower level facilities, and different birth attendant types, changed over time in rural versus urban areas.
  - Add interpretation on how the proportion at hospitals and lower level facilities, and different birth attendant types, changed over time among poorer groups (Q1 or Q2) and richer groups (Q4 or Q5).

Place of Delivery in Rural and Urban Nigeria (2003-2021)
This graph demonstrates the evolution of delivery locations in rural and urban areas in Nigeria from 2003 to 2021, revealing distinct patterns in the choice of delivery setting. The findings suggest a significant disparity in preference for delivery locations between rural and urban populations. In rural areas, the prevalence of hospital deliveries has seen a slight increase over the years, although it remains the least favoured option among the rural populace. The data from 2003 indicates that less than 20% of rural deliveries occurred in hospitals, and by 2021, this had increased marginally to approximately 25%. Deliveries in lower-level facilities have consistently been the most common in rural areas, maintaining a prevalence of about 60% throughout the study period. The rate of home or other non-institutional deliveries has seen a minor decrease but still constitutes a significant portion of rural deliveries, dropping from around 20% in 2003 to just under that by 2021. Conversely, urban deliveries exhibit a different pattern, with a higher utilisation of hospital facilities. Hospital deliveries have remained the predominant choice for urban dwellers, with a slight increase from around 70% in 2003 to approximately 75% in 2021. The preference for lower-level facilities in urban areas has seen a minor decline, hovering around 20% over the years. Home or other forms of non-institutional deliveries are the least prevalent in urban settings and have decreased slightly from 10% in 2003 to below 5% in 2021.

The graph does not provide explicit data on attendant types within each delivery location; however, the overall trends suggest an increasing inclination towards institutional deliveries, especially in urban areas. The sustained high rate of deliveries in lower-level facilities in rural areas may indicate barriers to accessing higher-level hospital care, which could be due to geographic, financial, or other systemic factors. The data suggests an urban-rural divide in delivery location preferences, with urban areas showing a stronger inclination towards hospital deliveries. The relatively steady rate of lower-level facility deliveries in rural areas may reflect an entrenched reliance on these facilities, possibly due to their accessibility or the perception of their adequacy. The decrease in home or other non-institutional deliveries in both rural and urban settings can be viewed as a positive shift towards more formalised healthcare environments, which are typically better equipped to handle complications. The slight increase in hospital deliveries in both rural and urban areas over the years may reflect improvements in healthcare infrastructure, increased healthcare-seeking behaviour among expecting mothers, or the impact of public health interventions aimed at promoting institutional deliveries. The data implies that there is still a need to address the disparities between rural and urban areas in terms of healthcare facility utilisation, with a particular focus on enhancing the capacity and accessibility of hospitals in rural regions.



- Trends in C-section rates nationally
- Add bar graphs of C-section rates over time (under Dropbox folder Data and codes DHS _C-section national trends)

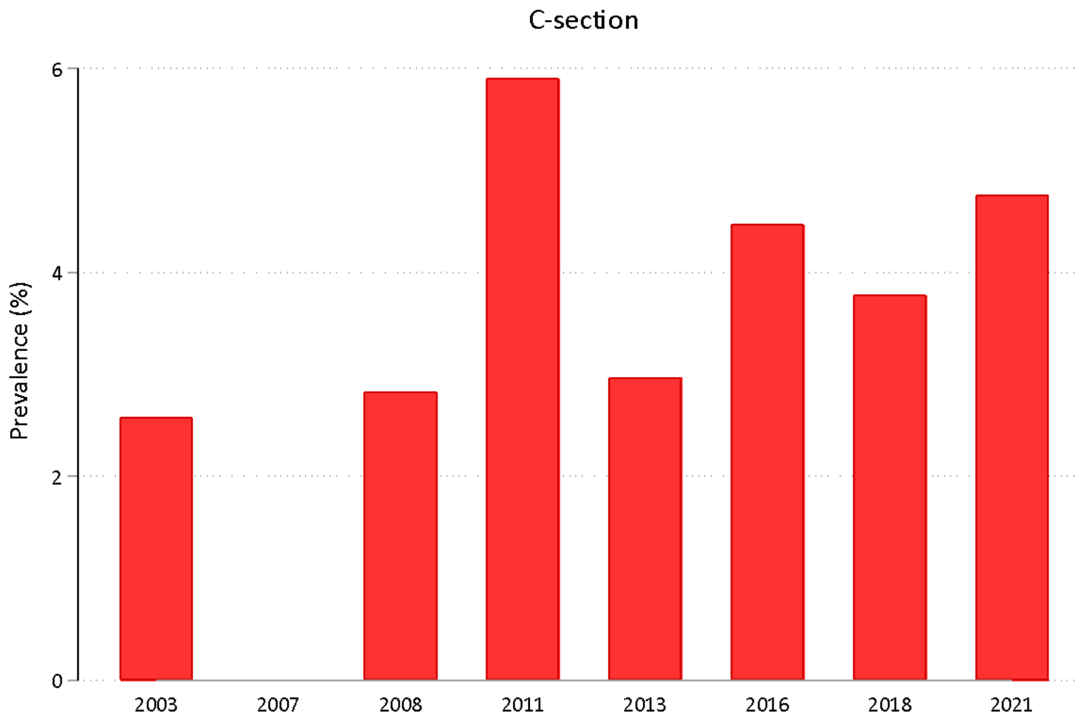


Figure : Trend in C-Section Rate in Nigeria (2003 to 2021)

The bar graph you provided represents the prevalence of cesarean sections (C-sections) in Nigeria as a percentage of all births from 2003 to 2021. Each bar shows the percentage of births in a given year that were delivered via C-section. There is a clear increase in the prevalence of C-sections from 2003 to 2011, with the highest percentage occurring in 2011. After 2011, there is a noticeable decline in 2013, followed by fluctuations in the subsequent years, with a general upward trend. In 2021, the prevalence of C-sections is higher than in 2003 but lower than the peak observed in 2011.

The initial increase in C-section prevalence could indicate improved access to maternal health services and surgical interventions, which are necessary for complications during childbirth that can threaten the life of the mother or child. The World Health Organization suggests that the ideal rate for C-sections is between 10-15%. The rates shown in the graph are well below this threshold, indicating that there might be underutilization of this life-saving procedure. This could suggest limited access to or availability of surgical delivery options. The peak in 2011 followed by a decline could suggest changes in clinical guidelines, health policy shifts, or variations in the factors influencing the decision to perform a C-section. Fluctuations after the decline might reflect inconsistencies in healthcare delivery, possibly influenced by changes in policy, healthcare infrastructure, or societal attitudes towards C-sections. The overall lower than recommended prevalence of C-sections might imply the need for policies that improve the availability and accessibility of emergency obstetric care, especially in settings where maternal and neonatal mortality rates are high due to lack of such services. There might also be a need to address potential barriers to C-sections, such as cultural beliefs, healthcare costs, or lack of trained surgical staff. These findings could inform public health initiatives aimed at standardizing care to ensure C-sections are available to women who need them, improving training for healthcare providers, and increasing resources allocated to maternal health services.

- Trends in C-section rates nationally by facility level/type:
  - Add bar graphs on C-section rates by delivery place.

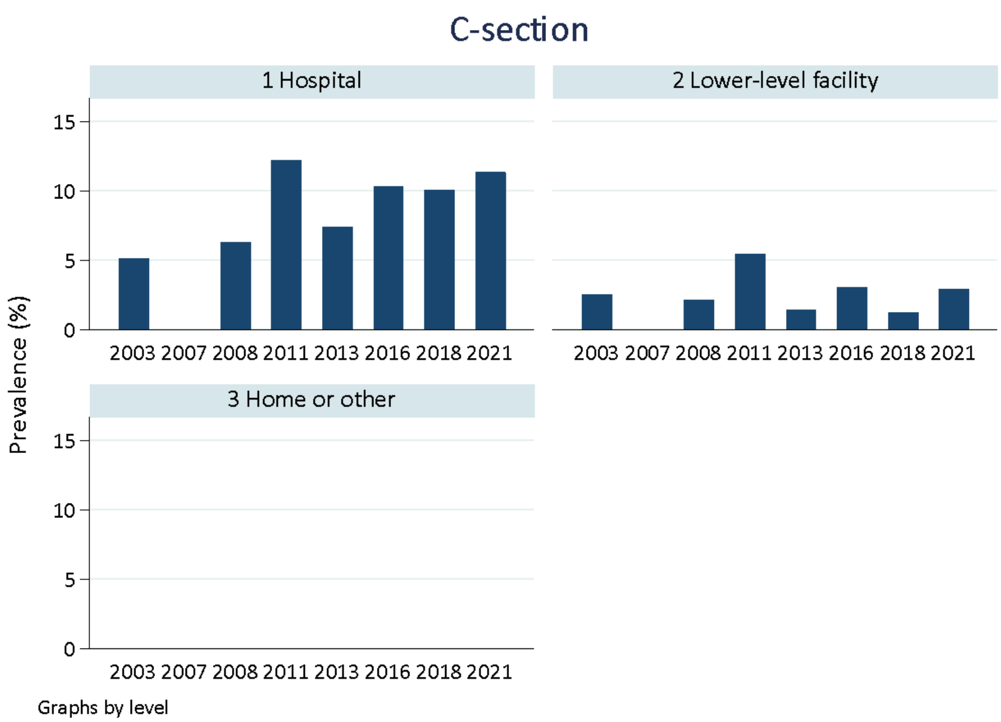
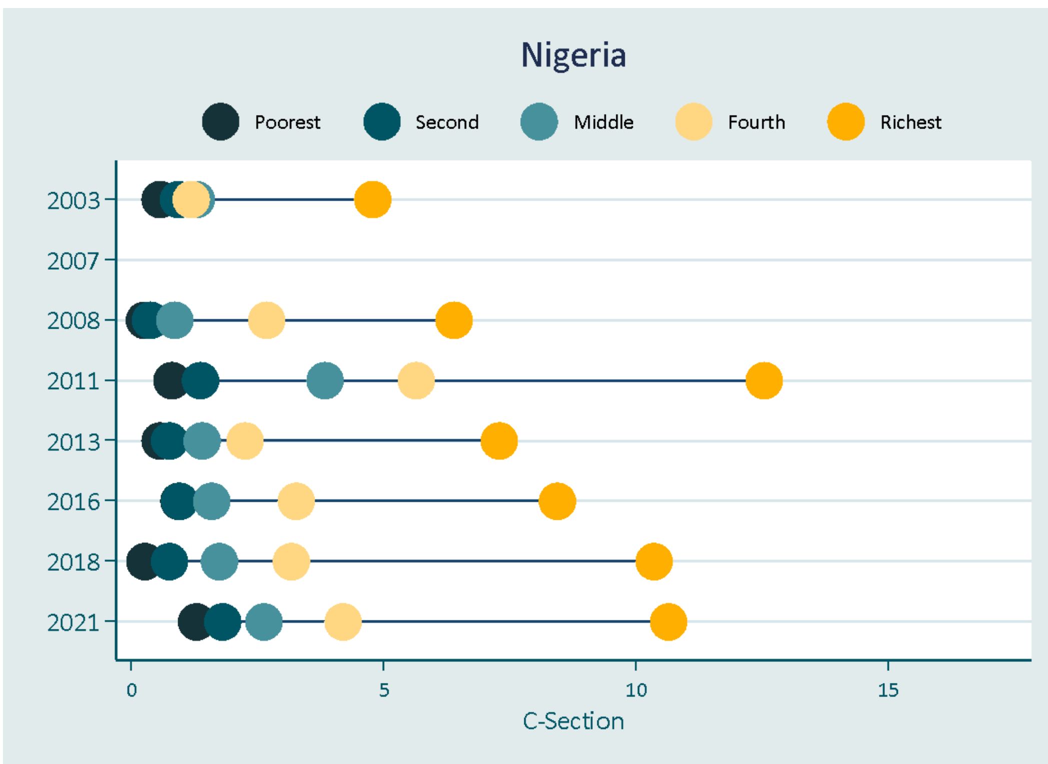


Figure : Trends in C-Section rates by delivery place in Nigeria (2003 to 2021)

The bar graph shows the prevalence of cesarean sections (C-sections) as a percentage of all births within three different settings: hospitals, lower-level facilities, and home or other locations, over a span of years from 2003 to 2021. The prevalence of C-sections in hospital settings is the highest among the three categories. There is an increasing trend in the rate of C-sections performed in hospitals from 2003 to around 2012, after which the rate appears to stabilize with slight fluctuations. C-section rates in lower-level facilities are present but considerably lower than in hospitals, which could be due to limited surgical capacity or resources. The rate of C-sections in these facilities remains relatively low and stable, with minor fluctuations over the years. There are negligible to no C-sections recorded in the home or other settings, which is expected since C-sections are surgical procedures that require a clinical environment.

The overall increase in C-sections in hospitals may reflect improved access to obstetric care and the availability of surgical options for complicated deliveries, which can be lifesaving for both mother and child. The relatively low and stable rate of C-sections in lower-level facilities suggests that these settings may not be equipped to perform surgical deliveries, highlighting a potential gap in the health care system that could be addressed by enhancing facilities and training staff. The absence of C-sections in home settings reinforces the need for effective referral systems to ensure that women requiring surgical interventions can be transported to adequately equipped facilities in a timely manner. Policymakers need to examine why C-section rates have stabilized in hospital settings and ensure that the rates reflect appropriate clinical decision-making rather than economic, cultural, or policy-driven factors. It is important for health policy to support the appropriate use of C-sections, ensuring that they are available to women who need them and that efforts are made to prevent unnecessary cesareans, which can pose risks to mothers and infants. Public health strategies would need to be focused on improving prenatal care to reduce the need for emergency C-sections, educating healthcare professionals on best practices for delivery, and ensuring that women have access to the full range of safe childbirth options.

- C-section rates (per 100 births) by wealth quintile equiplot:
  - o Add graph (equiplot) with C-sections rates by wealth.

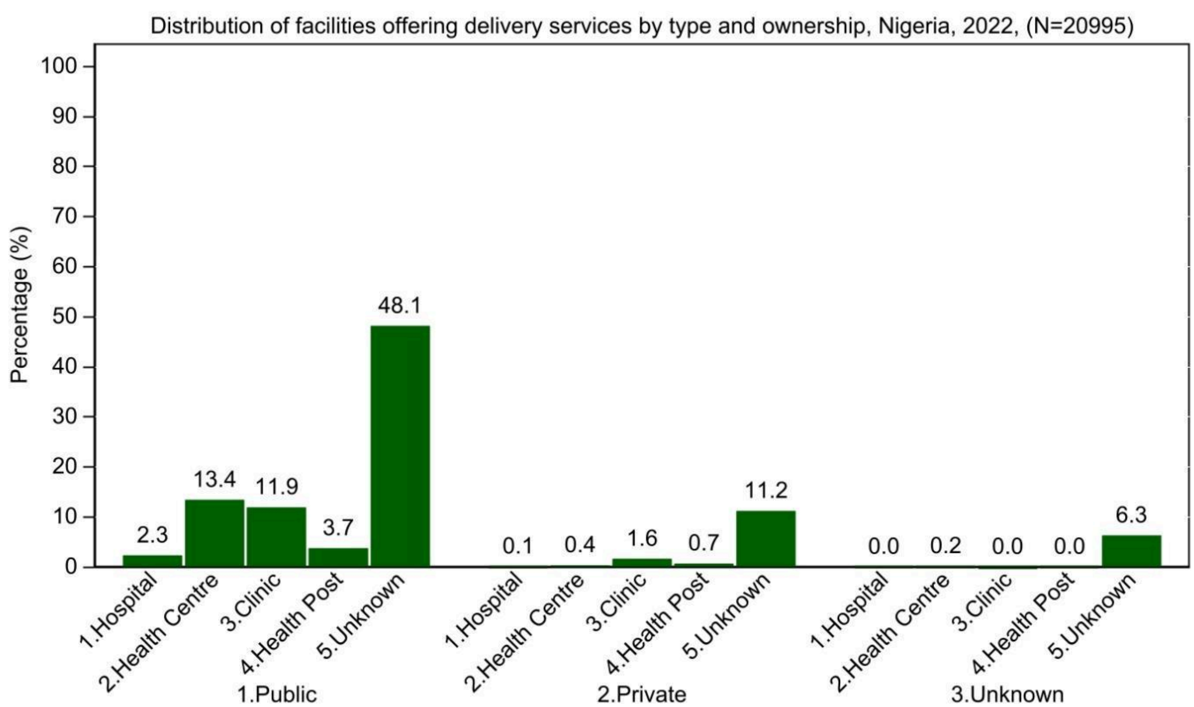


The prevalence of C-sections is consistently highest among the richest quintile throughout the years. There is a clear socioeconomic gradient with regard to access to C-sections, with each higher wealth quintile generally having a higher prevalence of C-sections. Over time, the prevalence of C-sections appears to increase across all wealth quintiles, but the gap between the poorest and the richest seems to persist or even widen. By 2021, the wealthiest individuals have a much higher prevalence of C-sections compared to the poorest, indicating substantial inequality in access to this type of maternal healthcare service. The findings highlights a significant inequality in access to C-sections, which are a critical healthcare service for managing complications during childbirth. The wealth-related disparity suggests that cost, availability of healthcare facilities, and access to skilled health personnel for surgical deliveries are major factors influencing the likelihood of receiving a C-section. The findings could inform policy actions to improve maternal health services by making C-sections more accessible across all socioeconomic groups, especially in aiming to reduce the maternal mortality ratio. Public health initiatives may need to focus on subsidizing the cost of C-sections, increasing the number of healthcare facilities capable of performing them, and ensuring that such facilities are distributed in a way that serves all segments of the population.

Given that the World Health Organization suggests an ideal rate of 10-15% for C-sections, the lower rates among the poorest quintiles indicate a potential unmet need for life-saving surgical intervention during childbirth. Policies may need to be implemented to ensure that decisions regarding C-sections are based on medical need and not on economic status, and that all women have the option of a safe delivery. There could also be a need to address indirect factors influencing access to C-sections, such as education on their benefits, transportation to healthcare facilities, and cultural perceptions of surgical intervention in childbirth.

Understanding sizes and volumes of facilities where women give birth (HMIS)

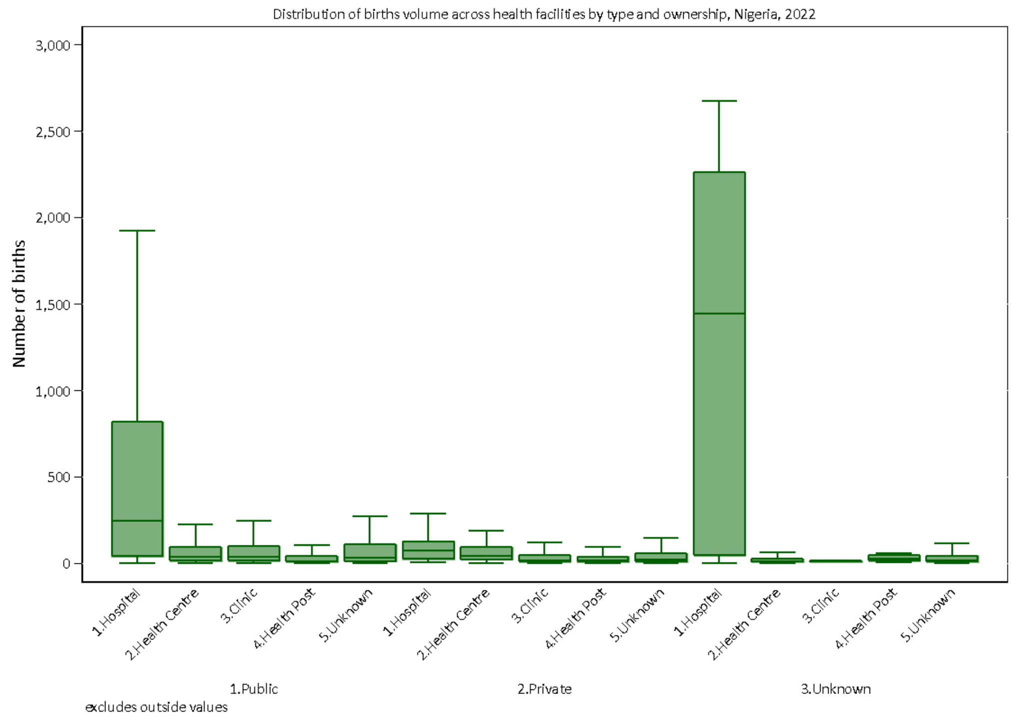
- Distribution of facilities offering delivery services by type and ownership
    - Add histogram graphs from Stata on distribution of facilities offering delivery services
    - Add interpretation on the patterns



The graph illustrates the distribution of delivery service facilities in Nigeria based on their kind and ownership as of 2022. The facilities are classified into hospitals, health centres, clinics, health posts, and unidentified types. They are additionally categorised based on ownership into public, private, and sectors of uncertain ownership. Public health centres account for the majority (48.1%) of delivery services, making them the main provider of such services. Public hospitals represent 13.4% of the total, public clinics provide 11.9%, and public health posts constitute a smaller proportion at 3.7%. Delivery services in the private sector are significantly underutilised, as private hospitals and clinics make up only 0.1% and 0.4% of the total, respectively. There is a significant proportion (6.3%) of facilities where the ownership is unspecified or unknown. The incidence of private health posts and centres providing delivery services is exceedingly low, nearly insignificant.

The extensive dependence on public health centres for delivery services indicates that public facilities are the fundamental support system for maternity healthcare services in Nigeria. This may indicate the level of accessibility or cost of various services within the public sector. The limited provision of delivery services in the private sector may suggest potential obstacles such as exorbitant expenses, restricted accessibility, or diminished public confidence in private healthcare services. The prevalence of public facilities may suggest the necessity for government regulations to guarantee that these centres are properly equipped, sufficiently staffed, and capable of managing the substantial demand for delivery services. The increased utilisation of health centres instead of hospitals for deliveries may also suggest that a significant number of deliveries are handled without substantial medical interventions, potentially impacting mother health outcomes. The presence of a significant "unknown" category indicates a deficiency in the collection or reporting of data. Comprehensive healthcare planning necessitates a thorough understanding of the capabilities and standards of these facilities. Public health programmes should prioritise enhancing the standard of care in health centres, as they play a vital role in the healthcare system for pregnant women. The results may lead to the implementation of policies aimed at enhancing the referral systems across various tiers of healthcare institutions, so ensuring the efficient transfer of more complicated cases to hospitals with superior resources. Increased investment in public health centres may be necessary to enhance their scalability and sustainability, considering their crucial role in delivering services.

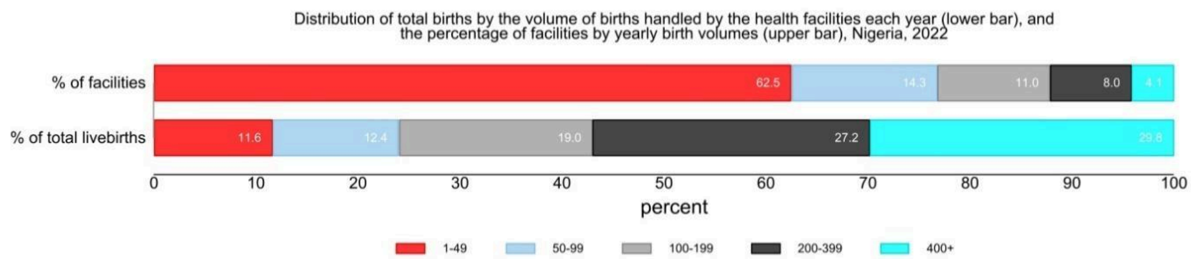
- Volume and percentage of births by facility type & ownership (public/private):
    - Add boxplot graphs from Stata on volumes of births annually (and median/range) by type of facility and ownership (decide whether your HMIS systems record all births or all live births, and label accordingly).
    - Add interpretation on the median (and range) of institutional births at each facility type.



The graph above is a box plot illustrating the distribution of birth volumes in various types of health facilities in Nigeria, categorised by ownership, specifically for the year 2022. Public hospitals exhibit the most extensive variation in the number of births they handle, as indicated by a notable median value. This implies that they manage a considerable quantity of newborns in comparison to other types of healthcare facilities. Public health centres exhibit a broad spectrum, albeit with a lower median, in contrast to public hospitals. This suggests that they may handle a modest volume of childbirth cases. Public clinics and health posts have narrower ranges and lower medians, suggesting a decreased frequency of births taking place in these establishments. Hospitals, health centres, and clinics in the private sector exhibit a very low number of births, whereas health posts and facility types that are not specified have an insignificant or zero birth rate. Facilities of undetermined ownership have a significantly low birth rate.

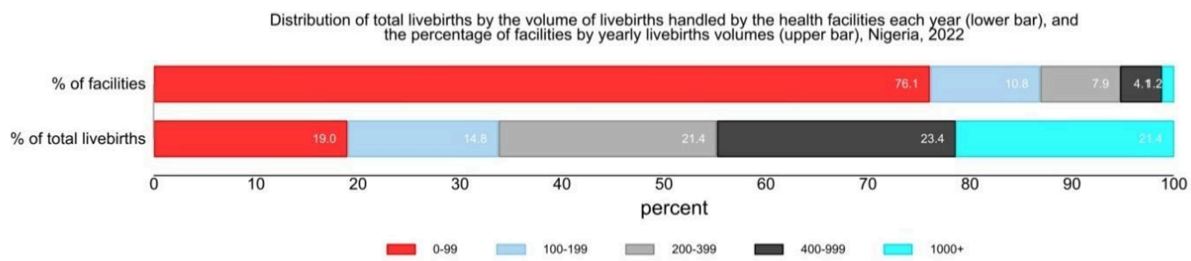
The results suggest a significant dependence on public hospitals for delivery services, which may put a burden on resources and affect the standard of care. The significant disparity in birth rates among public hospitals may suggest an inequitable allocation of healthcare services, with certain hospitals experiencing excessive strain. Public health policy should consider addressing the discrepancies in birth rates to guarantee that all healthcare institutions are capable of delivering sufficient treatment. Possible measures could encompass the reallocation of resources, augmentation of personnel at busier hospitals, or enhancement of facilities at health centres to accommodate a higher volume of deliveries. The limited number of births occurring in private facilities indicates the existence of possible obstacles to accessing these services, such as financial constraints, which may lead individuals to prefer public options. In order to promote the utilisation of private facilities, governmental interventions such as subsidies or partnerships could be implemented to enhance the affordability of private services. The low birth rates observed at clinics and health posts may indicate a requirement for improved or more easily accessible facilities, especially in rural regions. The presence of unidentified ownership facilities with low birth rates underscores the need for better data collection and facility classification to enhance the effectiveness of health policy planning.

- Distribution of total births by the volume of births handled by the health facilities each year (lower bar), and the percentage of facilities by yearly birth volumes (upper bar) in 2022:
  - o Add stacked horizontal bar graphs with % of facilities and % total live births by volume.
  - o Add interpretation based on the percentage of facilities by their annual volume of births (lower to higher).
  - o Add interpretation on the percentage of births occurring at lower to higher volume facilities.



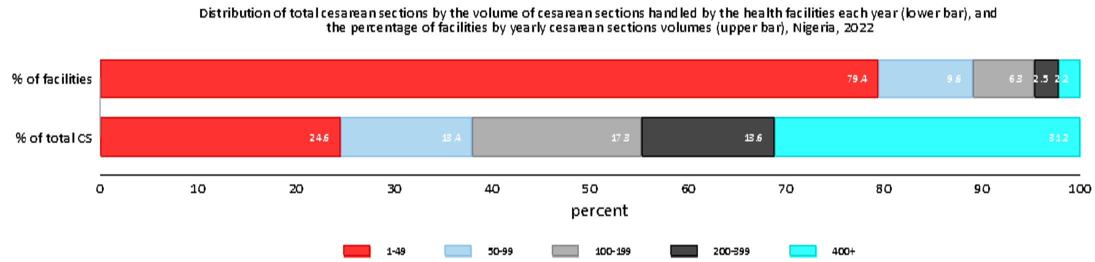
The graph above represents the distribution of total births by the volume of births handled by health facilities each year (lower bar) and the percentage of facilities by yearly birth volumes (upper bar) in Nigeria for the year 2022. Facilities that handle a smaller number of births (1-49 and 50-99 per year) make up a substantial percentage of all facilities (62.5% and 14.3% respectively). Despite this, they account for a smaller percentage of the total number of live births (11.6% and 12.4% of total births respectively). On the other end, facilities that handle a very large number of births (400+ per year) constitute a small percentage of facilities (4.1%) but account for a disproportionately large percentage of total live births (29.8%). Facilities handling 100-199 and 200-399 births per year also account for a significant percentage of total live births (19.0% and 27.2% of total births respectively) while making up a relatively small proportion of the facilities (10.0% and 8.0% respectively).

The findings suggest that a small number of high-volume facilities are responsible for a significant portion of all births, which could indicate that these facilities are specialized maternity centers or that they are located in densely populated areas. The reliance on a small number of facilities for a large proportion of births could mean that these facilities are at risk of being overburdened, which could affect the quality of care and maternal and neonatal outcomes. Facilities that handle fewer births could be smaller, possibly rural facilities that are critical for serving less populated areas. Ensuring that these facilities are adequately supported is important for maintaining access to maternal health services across diverse geographic locations. The findings suggest that health policy should consider strategies to balance the load on high-volume facilities, such as strengthening the capacity of lower-volume facilities or improving referral systems and transportation networks. There may also be a need to evaluate and ensure the quality of care across facilities of all sizes, as the volume of births could impact staffing, resource allocation, and the ability to manage complications. The findings highlight the potential need for targeted investment in healthcare infrastructure and workforce, particularly in regions where the volume of births is high.



The graph above illustrates the distribution of annual live births in Nigeria by the volume of live births attended to by health facilities in 2022. The percentage of facilities as measured by annual birth volumes is represented in the higher bar, while the percentage of total live births is denoted by the lower bar. Although a significantly lesser proportion of facilities (76.1%) attend to live births (0-99 per year), these births comprise a mere 19.0% of the total live births. Moderate-volume facilities (100-199 and 200-399) comprise a lesser proportion of the total facilities (10.8% and 7.9%, respectively), but a greater percentage of the annual live births (14.8% and 21.4%, respectively). Facilities that process between 400 and 999 live births per year continue the trend; despite comprising only 4.1% of all facilities, they contribute to 23.4% of all live births. A mere fraction of healthcare facilities (4.1%) manage an exceptionally high volume of live births (1000+ per year), yet they contribute significantly to the overall live birth count (21.4%). A significant proportion of births are attributed to a limited number of high-volume facilities, as indicated by the distribution. The increased demand may place a strain on resources and potentially compromise the quality of care delivered. The propensity for a significant number of births to be facilitated by a limited number of facilities may also indicate a concentration of specialised obstetric services in specific regions, which could result in geographically-based disparities in access and outcomes. The limited quantity of facilities responsible for the majority of births may serve as an indication of regional healthcare centres that necessitate additional infrastructure, personnel, and resources.

It may be necessary to prioritise policies that increase the capacity of low-volume facilities, improve the distribution of birth services, and ensure that all facilities have the support and apparatus necessary to provide quality care. Potentially necessary policies would aim to fortify healthcare networks in order to distribute the workload more evenly among various facilities, with the ultimate goal of enhancing maternal and child health outcomes nationwide. The significance of strategizing to ensure fair and equal access to maternal healthcare services is emphasised by the data. This may involve improving transportation and referral systems, as well as expanding facilities in underserved regions, in order to facilitate better connections between women and the care they require.

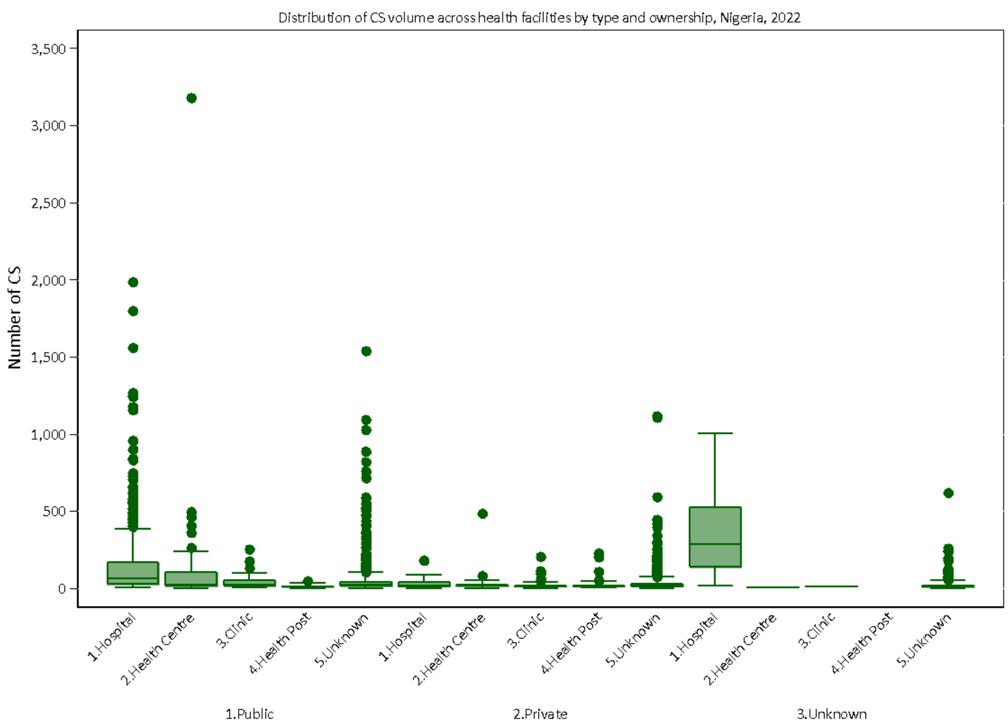


A significant proportion of facilities (24.5%) perform a comparatively low number of C-sections (1–49) annually, as shown in the figure above. An estimated 13.4% of healthcare facilities conduct between 50 and 99 C-sections each year. The proportion of facilities performing 100-199 and 200-399 C-sections, respectively, decreases as the volume of these procedures increases: 17.3% and 13.5%. A negligible proportion of medical facilities (3.12%) are responsible for performing C-sections in excess of 400. Although a smaller proportion of facilities perform the highest volume of C-sections, they account for a greater proportion of the total number of C-sections conducted, as indicated by the upper bar.

A large number of facilities appear to perform C-sections at a low volume, which may indicate a nationwide distribution of services that provides broad access to C-sections but also implies that a significant number of these facilities are not specialised high-volume centres. Potentially resulting in disparities in access to care, the high proportion of total C-sections performed by a limited number of facilities may indicate a preponderance of specialised maternal health services in specific regions. Extremely high-volume C-section facilities may be susceptible to overutilization, which could have adverse effects on the quality of care and outcomes for infants and mothers. Additionally, this may indicate an increased strain on the personnel and resources of these establishments. To guarantee high-quality care, policy initiatives may need to consider how to optimise the distribution of C-sections across facilities. This may entail enhancing the capacity of medical facilities that conduct a reduced number of caesarean sections to manage more intricate cases. Potential public health strategies could centre on enhancing referral systems, ensuring equitable access to safe and effective caesarean deliveries across regions, and increasing accessibility to C-sections in areas where they are performed less frequently. The results of this study can provide valuable insights for resource allocation, surgical staff training, and maternal health service planning in order to effectively address areas with the highest demand while preventing the strain on a limited number of facilities.

- C-section volumes by facility ownership (and type):
  - Add boxplot graph with C-section total volume by facility ownership (and type, if available).

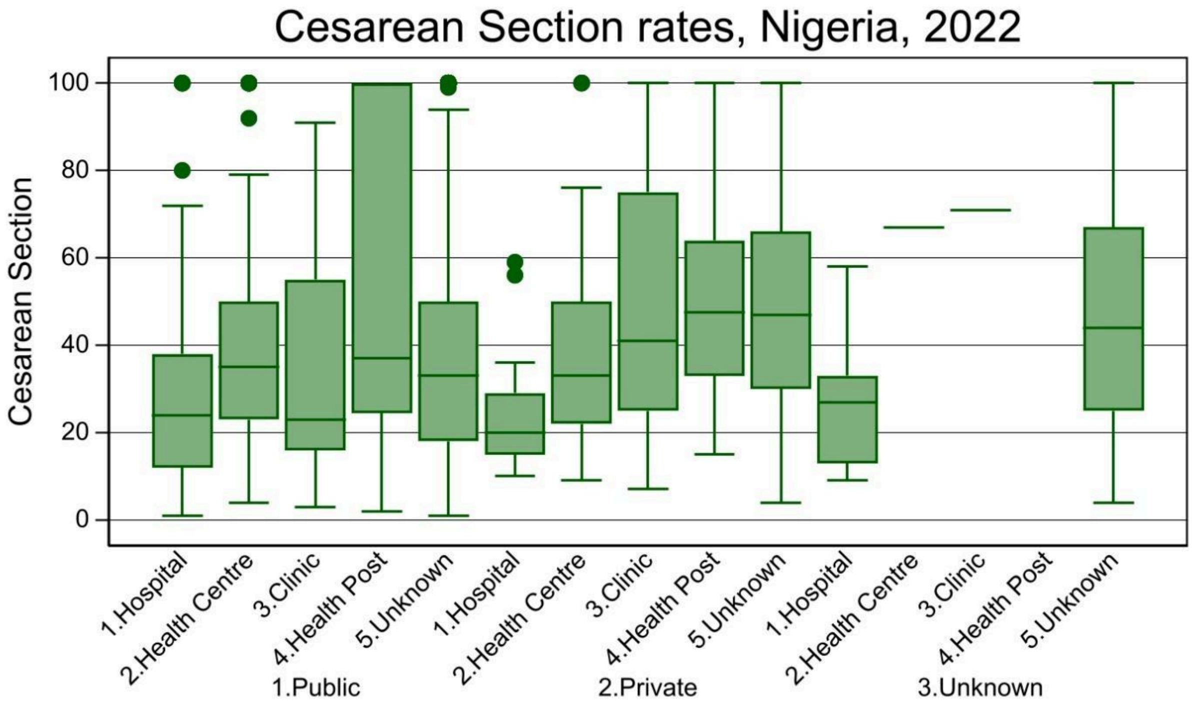
- o Assess the outputs showing if C-sections are higher than total births or more than 100%, and if so, look for any reasons for this (any facilities reporting much higher C-section volumes in certain months). Make any changes to that value only if reason is known, or leave it if not. Note any potential explanations for this. Check graphs with outliers, identify and address any unreasonable outliers in the raw data if possible, and choose the graph without outliers if it helps to see the patterns.
- o Add interpretation comparing the volumes of C-sections by facility ownership and type.



The above graph is a box-and-whisker plot that illustrates the volume distribution of caesarean sections (CS) performed in health facilities in Nigeria in 2022, classified by type and ownership. As signalled by the outliers and the upper limit of the box plot, the CS volumes of public hospitals vary considerably, with some facilities performing an exceptionally high number of procedures. A lower volume of CS procedures is generally performed at public health centres, clinics, and health posts; this is evidenced by interquartile ranges that are relatively small and a lack of outliers, which suggest less variation in the CS procedure volume. Private hospitals, despite their extensive variety, generally conduct a lower number of CS procedures in comparison to the busiest public hospitals. A few outliers in the box diagram indicate that a subset of private hospitals have significantly greater CS volumes. The limited number of CS procedures performed by private clinics and health posts is evident from the compact box plots that converge towards the axis. In the case of unidentified ownership facilities, the quantity of CS procedures performed is notably minimal, exhibiting minimal variability.

The considerable dispersion in CS volumes among public hospitals may indicate that certain facilities are experiencing excessive workloads, which may have adverse effects on care quality and result in limited resources. A potential consequence of the reduced volume of CS procedures in health centres and clinics is inadequate surgical capacity or resources, which may impede women in need from accessing emergency obstetric care. The existence of outliers in both the public and private sectors implies that certain facilities might specialise in CS deliveries. This could be attributed to factors such as patient demand, the repute of the facility, or a concentration of specialised expertise. In order to ensure that all facility types and locations have equal access to CS procedures, the results indicate that a policy review may be necessary. By increasing the capacity of lower-volume centres to perform surgical procedures, the strain on high-volume hospitals could be reduced. Additionally, the distribution indicates that infrastructure and training investments should be targeted in order to enable a wider variety of facilities to conduct CS procedures safely; this could reduce maternal and neonatal mortality associated with delivery complications. These findings may provide valuable insights for efforts aimed at enhancing referral systems, thereby assuring that women in need of a CS have prompt access to the necessary level of care.

- Facility C-section rates (per 100 livebirths) by facility type & ownership (public/private).
  - Add boxplot graph with yearly C-section rates (per 100 births) by facility type and ownership.
  - Add interpretation on the institutional rate of C-sections (per 100 births, or %) by facility type and ownership.

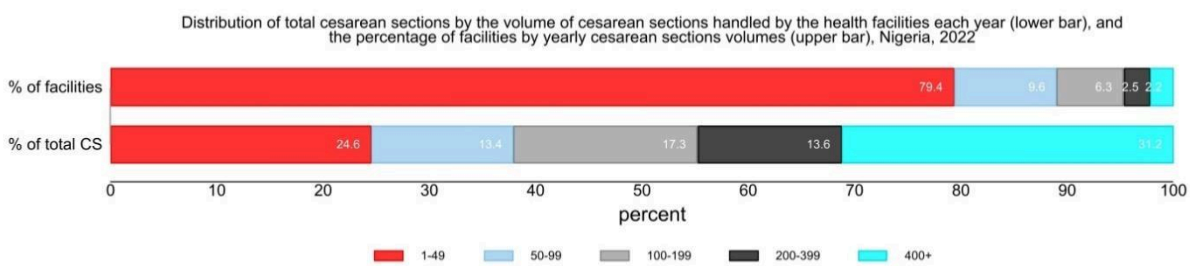


The graph presented above is a box-and-whisker diagram that illustrates the incidence of caesarean sections (CS) in Nigeria in 2022, categorised by ownership of various categories of healthcare facilities. The variability of caesarean section (CS) rates among public hospitals, with a higher median rate in comparison to health centres and clinics, implies that hospitals may have a greater propensity to conduct CS, potentially attributable to their greater resource availability or handling of more complex cases. In contrast to hospitals, public health centres and clinics exhibit a narrower and lower interquartile range for CS, suggesting reduced variability and overall lower CS rates. Additionally, private health facilities exhibit a spectrum of CS rates, as evidenced by the variation in lengths of the boxes and fringes. It seems that the median CS rate in private facilities is comparatively lower than that of public hospitals, although it may be higher than that of public health centres and clinics. The extremely low CS rates of health sites and facilities whose ownership status is unknown are denoted by the shorter whiskers and lower position of their boxes. The existence of outliers in both the public and private sectors signifies that certain facilities exhibit remarkably high rates of CS.

The elevated rates of caesarean sections (CS) observed in hospitals may be indicative of a concentration of specialised medical personnel and apparatus required for CS in these settings, or they may be the result of a greater volume of referred complicated pregnancies to these facilities. Reduced caesarean section (CS) rates observed at health centres and clinics may indicate inadequate staffing or resources for CS procedures, a circumstance that may pose a challenge for women without hospital access who are in need of a CS. Variability and outliers in CS rates, particularly in private facilities, may indicate disparities in patient demographics, clinical practices, or non-medical overutilization of CS in some facilities. It is worrisome for rural or remote populations that may depend on health posts for medical services whether these facilities are inadequately outfitted for surgical deliveries, as suggested by the extremely low CS rates observed at health posts.

In order to standardise caesarean delivery (CS) rates across various types of health facilities and guarantee that CS procedures are performed on the basis of medical necessity rather than facility capabilities or patient financial capacity, the results indicate that targeted policy interventions are required. It may be critical to improving maternal and infant health outcomes by ensuring that all types of facilities are adequately staffed and equipped to perform CS when required. Additionally, the results may inspire efforts to enhance healthcare provider training, specifically in public facilities at the lower echelons, and to verify the effectiveness of referral systems in promptly transporting patients to hospitals when necessary.

- Distribution of C-sections by the volume of CS handled by the health facilities each year (lower bar) and the percentage of facilities by yearly CS (upper bar) in 2022:
    - o Add stacked horizontal bar graphs with % of facilities and % total C-sections by annual total C-section volumes.
    - o Add interpretations on the percentage of facilities by their annual volume of C-sections (lower to higher).
    - o Add interpretation on the percentage of C-sections occurring at facilities with lower to higher C-section volumes.
    - o Also compare CS rates in latest DHS to facility CS rates in HMIS 2022



The provided figure illustrates the distribution of total caesarean sections (CS) in Nigeria for the year 2022, categorised by the percentage of facilities according to annual CS volumes (lower bar) and the volume of CS handled by health facilities annually (upper bar). Although a significant proportion of facilities (79.4%) perform one to forty-nine CS procedures per year, these procedures comprise a much lesser percentage (24.6%) of the total CS procedures. 9.6% of all facilities and 13.4% of all CS procedures are performed annually by facilities performing 50-99 CS procedures. An increasing proportion of total CS procedures are being executed in accordance with the rising volume of CS procedures per facility.

Although they handle a lesser proportion of facilities (9.6% and 6.3%, respectively), facilities that process 100-199 and 200-399 CS procedures annually perform a greater proportion of total CS procedures (17.3% and 13.6%, respectively). Although comprising only 2.5% of all facilities, these facilities conduct over 400 CS procedures annually and account for the largest proportion (31.2%) of all CS procedures.

Few facilities execute a disproportionate number of CS procedures, according to the data; this may indicate that these facilities are referral centres or specialised facilities that are better equipped to manage more complex cases. Significant strain may be placed on high-volume facilities, and the concentration of CS procedures in these few facilities may cause patient accessibility issues and healthcare provider burden concerns. Despite having a greater number, lower volume facilities are making a lesser contribution to the overall number of CS procedures. This may suggest that these facilities lack the necessary resources or capacity to perform more CS procedures. In order to promote equitable access and prevent certain facilities from being overburdened, public health policy may need to address the distribution of surgical capacity. Potential strategies could involve augmenting the surgical capacity at facilities with lower volume or improving referral systems in order to distribute the workload more equitably. It is important to ensure that the CS rates are medically justified in order to prevent the procedure from being underutilised or overutilized.

Maternal mortality, stillbirths and neonatal mortality transition model stages

The following table shows the maternal mortality, stillbirth and neonatal mortality transition model stages (stage 1 being highest mortality and stage with lowest mortality), with their median or interquartile range values using empirical data from around 150 countries for mortality levels and causes, fertility transition, childbirth intervention coverage, health system inputs and MNH care strategies. For more information on the source of this model, see related article and related appendix Table 6 below.[19] Many of these select characteristics of each mortality transition stage are useful to consider in the synthesis and recommendations from this study.

Table 6: Summary of mortality transition stages and their characteristics[20]

Transition stage	1 Highest mortality	2	3	4	5 Lowest mortality
Mortality trends					
MMR, per 100,000 live births	≥700	300-700	100-300	20-100	<20

[19] Boerma T, Campbell OMR, Amouzou A, et al. Maternal mortality, stillbirths, and neonatal mortality: a transition model based on analyses of 151 countries. The Lancet Global Health 2023;**11**(7):e1024-e31 doi: https://doi.org/10.1016/S2214-109X(23)00195-X.

[20] Boerma T, Campbell OMR, Amouzou A, et al. Maternal mortality, stillbirths, and neonatal mortality: a transition model based on analyses of 151 countries. The Lancet Global Health 2023;**11**(7):e1024-e31 doi: https://doi.org/10.1016/S2214-109X(23)00195-X. [Appendix, page 29.]

NMR, per 1000 live births	>45	30-45	15-30	<10-15	<5
SBR, per 1000 live births	35+	25-35	15-25	10-15	<10
Cause of death patterns	Infections, health status, and peri-partum complications all major causes	Infections and peri-partum causes decline, health status more important	Infections and peri-partum causes further decline, health status more important	Health status causes for mother/ baby decline but still important	Mostly unpreventabl e health status related deaths remain
Fertility transition					
Total fertility rate	Very high	High	Moderate	Moderate to low	Low
Abortion policy	Most restrictive				Most permissive
Intervention coverage (interquartile range)					
Institutional delivery	25-48%	43-75%	57-88%	88-99%	Nearly 100%
Hospital deliveries	11-28%	16-34%	28-68%	76-98%	98-100%
C-sections	Below 5%	7-10%	15%	20-30%	30% or more
C-sections among the poorest	0-2%	1-3%	2-11%	7-22%	14-29%
Health system inputs					
Health workforce (physicians, nurses, midwives)	Low density of health workers	Increase in nurses and midwives	Major increase in density, nurse to physician ratio declining	Continued increase in density, due to more physicians	Core health workforce over 100 per 10,000 population
Health financing	Low per capita expenditure, high out of pocket spending (OOPS)	Increasing expenditure, low government share as % of GDP, high OOPS	Same as phase II, continuing	Same as phase III, continuing	Very high health spending, low OOPS

Delivery of MNH care strategies					
Main challenges	Expanding access to all, demand generation	Access/ quality	Access/ quality	Quality	Quality and reaching poorest
Major MNH interventions	Infection control; primary/ essential MNH care	+BEmONC, expanding CEmONC for complications	+BEmONC, full CEmONC	+ specialized care; small, sick newborn	+Universal access to CEmONC and specialized small/ sick newborn care

Please indicate in the table below the MMR, NMR (and SBR) mortality levels that your country was at in 2000 and 2020, and what phase of mortality transition that corresponds in each year using Table 6 above.

Table 7: Mortality transition stages since 2000

	NMR	**SBR**	**MMR**	**Transition phase based on mortality levels in Table 6**
2000 (or similar year)				
2020 (or similar year)				

Please use the results in the earlier sections to comment here on the other characteristics of the country's transition phase in 2020, relative to the stages shown in Table 6 above, at national and subnational levels, for example:

- Intervention coverage:
    - o Institutional deliveries
    - o Hospital deliveries
    - o C-section deliveries (overall, and among the poorest)
- Health system inputs:
    - o Health worker densities – total and Nurse: Physician ratios
    - o Health financing for maternal conditions – and proportion government, external and private expenditure
- MNH service delivery strategies:

- o Policy guidance focuses most on demand generation, access, quality, equity?
- o Policy guidance includes routine childbirth, complications management, small/sick newborns?

Synthesis of findings

- Please add some text to summarize the study results on how safe, equitable and effective the provision of childbirth care has been in the country, including any reflections on the following:
  - o **Safe:** Is there sufficient institutional delivery and C-section rates, or appropriate volumes by facility levels (hospitals, lower level)/birth attendants who are meant to be providing routine or emergency care according to national policies/guidelines?
  - o **Equitable:** How similar is the institutional delivery care coverage (hospitals or lower level) and NMR levels between urban-rural residence, regions, and wealth quintile groups?
  - o **Effective:** Has NMR reduced among facility births, overall and at each place of delivery?
  - **o Mortality transition:**
    - ▪ Based on the changes in mortality levels, what phases have the country transitioned from since 2000? What is the next phase to reach?
    - ▪ To reach the next phase, what changes in mortality and other related characteristics should be pursued based on the country's transition phase table you have filled in the report (based on the last section)?
- Please write some text about how consistent the changes in mortality, coverage, and health system inputs seem to be with the country's health policies on the provision of MNH care.
- Please add any comments about what might explain the results. For example (replace with own text):
  - o If the mortality is high or coverage/volumes are low, but supportive or comprehensive MNH policies are in place – may this be related to broader health system or implementation gaps or issues, and in what areas?
  - o If mortality is high, coverage is low and the MNH policy context is not very comprehensive or supportive, are new policies, strategies or health system changes needed, and in what ways?
  - o If coverage is high, and the MNH policy context is comprehensive and supportive, but mortality is still high, what are next steps to further reduce mortality?
  - o If coverage is high, the MNH policy context is supportive, and mortality has reduced, what areas need further efforts could help continue the momentum?

Recommendations for future strategies

- Using the results and interpretations above, please add recommendations on what future strategies could be implemented in the country to best ensure safe, equitable and effective childbirth care is provided for mothers and newborns.

Drawing from the analysis and discoveries delineated in the "Maternal and Newborn Health" report for Nigeria, subsequent strategic suggestions may be suggested to augment the provision of childbirth care that is effective, safe, and equitable for both mothers and neonates.

Health Facility Capacity and Readiness

1. Strengthen Lower-Level Facilities: In light of the rise in deliveries occurring at lower-level facilities, substantial financial investment is required to improve the infrastructure of these facilities. This will guarantee that they remain adequately equipped to deliver critical and urgent obstetric and neonatal care.
2. Boost Training Initiatives: Establish all-encompassing training programmes designed for healthcare personnel, with an emphasis on critical obstetric care, neonatal care, and considerate maternity care protocols.
3. Quality Assurance and Accreditation: Establish and enforce quality standards pertaining to maternal and neonatal health services, encompassing accreditation of health facilities and routine audits.

Healthcare Workforce

1. One potential approach to mitigate the scarcity of proficient healthcare personnel, specifically in rural and marginalised areas, is to augment the healthcare workforce by implementing focused recruitment and retention tactics, as well as offering incentives.
2. Task-Sharing and Task-Shifting: In order to enhance the efficiency of the current workforce, incorporate task-sharing and task-shifting initiatives. This would enable midwives and nurses to manage straightforward prenatal care and deliveries.

Policy Implementation and Systemic Reforms

1. Enhance Policy Implementation: Ensure that all levels of the health system completely implement and adhere to established policies and guidelines concerning maternal and newborn health.
2. Advocate for the incorporation of maternal and neonatal health services alongside other primary healthcare services in order to establish a cohesive and uninterrupted provision of care.
3. Health Financing: Enhance allocations towards maternal and neonatal health, guaranteeing sufficient financial resources for the development of healthcare infrastructure, services, and personnel.

Community Engagement and Education

1. Community Health Education: To increase awareness regarding the significance of competent birth attendance, prenatal and postnatal care, and facility-based deliveries, implement community-based health education programmes.
2. Develop and fortify community health systems: Strengthen the capacity of community health workers to facilitate access to healthcare services, support families, and deliver maternal and neonatal health education.

Data, Research, and Technology

1. Enhance Health Information Systems: Ensure evidence-based decision making by improving the collection, analysis, and utilisation of maternal and neonatal health data to inform policy and practice.
2. Innovative Digital Health Solutions: Leverage innovation and technology, including telemedicine, mobile health applications, and electronic health records, to enhance access to healthcare services.

Addressing Equity and Accessibility

1. Targeted Interventions for Vulnerable Populations: To ensure equitable access to high-quality maternal and neonatal health services, implement targeted interventions that specifically target marginalised and vulnerable populations.
2. Enhance Referral and Transportation Systems: Establish streamlined transportation and referral infrastructures to guarantee prompt and appropriate access to advanced medical services, specifically for critical obstetric and neonatal situations.

Monitoring, Evaluation, and Continuous Improvement

1. Regular monitoring and evaluation should be implemented to assess the efficacy of interventions pertaining to maternal and newborn health. Modifications should be made in accordance with the discoveries.
2. Mechanisms for Feedback and Accountability: By establishing feedback mechanisms that permit healthcare workers and patients to provide input on the responsiveness of the system and the quality of treatment, accountability can be ensured at every level of the healthcare system.
3. Collaboration between international partners, government agencies, healthcare providers, non-governmental organisations, and community leaders is necessary to implement these recommendations in a comprehensive manner. Sustained dedication, inventive thinking, and ongoing investment are critical for attaining substantial and enduring enhancements in the health outcomes of mothers and newborns in Nigeria.

- Consider how the findings could inform global policy discussions about the optimal balance of providing routine, emergency and specialized MNH services -- at what type of facilities and with which health worker cadres.

The findings from the "Maternal and Newborn Health" report for Nigeria provide valuable insights that can contribute to global policy discussions on optimizing the provision of routine, emergency, and specialized maternal and newborn health (MNH) services. These discussions revolve around the types of facilities that should deliver these services and the composition of health worker cadres best suited for various levels of care. The findings could inform critical discussions in the following ways:

1. The findings underscore the significance of categorising MNH services into tiers comprising primary, secondary, and tertiary facilities. In order to optimise the provision of particular services at each level, policymakers ought to deliberate on the means by which primary facilities can manage routine cases, secondary facilities can attend to more intricate circumstances, and tertiary facilities can be outfitted to deliver specialised care.
2. There is a necessity to enhance lower-level facilities in order to offer a more comprehensive array of services, such as basic emergency obstetric and neonatal care (BEmONC), as indicated by the rise in births at these facilities. This methodology has the potential to decentralise healthcare, alleviate the strain on more advanced facilities, and enhance accessibility for neonates and mothers.
3. The results validate task-sharing and task-shifting approaches, in which specific MNH responsibilities are assigned to health professionals with less specialised expertise. This measure may mitigate the scarcity of personnel and guarantee the availability of proficient experts for more intricate legal matters.
4. Comprehensive training programmes are unequivocally required for all health worker cadres engaged in MNH services. In addition to clinical expertise, training should prioritise the development of soft skills in order to guarantee the provision of dignified and respectful care.
5. A holistic approach to maternal and child health could be ensured through the integration of MNH services with other primary healthcare services, which could facilitate a continuum of care from pre-pregnancy to postnatal stages.
6. In order to reduce disparities in access to and quality of care, policymakers must ensure that investments in MNH are adequately allocated across all levels of care, with priority given to areas with the greatest need.
7. By promoting community based MNH services and strengthening community health systems, early detection of complications can be improved, as can the utilisation of routine and emergency care.
8. In order to ensure timely access to care, policies should address the socioeconomic, cultural, and logistical barriers that prevent women from utilising MNH services. This includes transportation and referral systems.
9. Health Information Systems: Policy adjustments and resource allocation can be informed by the improvement of health information systems' capacity to collect and analyse data on MNH service delivery, outcomes, and patient satisfaction.
10. By adopting telemedicine and digital health solutions, MNH services can be made more accessible to a wider audience, especially in underserved or remote regions, thereby promoting healthcare accessibility.

11. It should be a priority in global policy discussions to ensure that all mothers and newborns, irrespective of socioeconomic status or geographic location, have equitable access to MNH services.
12. Policies ought to be firmly rooted in a human rights framework, guaranteeing that MNH services uphold, safeguard, and satisfy the rights of children and women, such as the right to health, informed consent, and dignified care.

Integrating these insights into global policy discussions can help shape more effective, equitable, and sustainable MNH services worldwide. Collaborative efforts among nations can facilitate the sharing of best practices, innovations, and lessons learned, driving progress toward the global goals of reducing maternal and newborn mortality and ensuring universal access to quality MNH care.

- Suggest any future research topics or questions could build on this study and further guide strategic planning for life-saving MNH service provision.

Building on the findings from the "Maternal and Newborn Health" report for Nigeria, future research can delve into several critical areas to further guide strategic planning and implementation of life-saving maternal and newborn health (MNH) services. The following topics and questions could provide valuable insights for enhancing MNH outcomes:

1. What are the long-term outcomes for mothers and newborns receiving care from different cadres of health workers due to task-shifting policies?
2. What are the socio-cultural, economic, and logistical barriers that prevent women from accessing facility based MNH services?
3. How do community perceptions and trust in healthcare systems influence decisions on the place of childbirth?
4. How does the integration of MNH services with broader primary healthcare impact maternal and newborn health outcomes?
5. What are the most effective models for integrating MNH services into existing health systems to ensure continuity of care?
6. How do different aspects of MNH service quality (clinical quality, interpersonal quality, facility environment) influence patient satisfaction and health outcomes?
7. What are the key drivers of positive and negative patient experiences in MNH care, and how can they be addressed?
8. What innovative financing mechanisms can be employed to ensure sustainable funding for MNH services, particularly in low- and middle-income countries?
9. How do different financing models (e.g., insurance schemes, public-private partnerships, conditional cash transfers) impact access to and quality of MNH services?
10. How can digital health interventions, including telemedicine, mobile health applications, and electronic health records, improve access to and quality of MNH services?
11. What are the challenges and opportunities in implementing digital health solutions for MNH in different contexts?

12. What are the most effective strategies for training and continuous professional development of health workers in MNH?
13. How does the training of health workers in emergency obstetric and neonatal care impact maternal and neonatal mortality rates?
14. What role do community health workers and community-based interventions play in improving MNH outcomes?
15. How do health education and community engagement strategies influence health-seeking behaviours among pregnant women and families?
16. How do disparities in access to MNH services contribute to differences in maternal and newborn health outcomes across different populations?
17. What strategies can effectively address inequities in MNH service provision, particularly for marginalized and vulnerable groups?
18. What are the long-term health outcomes for mothers and newborns who receive different levels of MNH care?
19. How do early MNH interventions impact the future health and development of children?

Annexures

Annex 1: Indicators and definitions

Put the DHS and HMIS indicator definitions from the methods section here if you choose.

Annex 2: Data quality assessments

Move Data Quality Tables 1a, 1b, and 1c here, and keep the explanations and main points in the text under the Methods data quality section, if you wish.

Annex 3: Health policy tracker table

Place the full "Table 1: Country tracker of national policies, guidelines, plans or strategies for MNH care" here from your Country MNH policy and system tables FINAL country document and reference that within the report main text.