REPUBLIC OF ZAMBIA
MINISTRY OF HEALTH

GLOBAL FINANCING FACILITY

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

ZAMBIA SYNTHESIS REPORT

DECEMBER
2023

Prepared by:

Zambia Countdown Country Collaboration

Choolwe Jacobs[1], Caren Chizuni[2], Chris Mweemba[1], Dennis Ngosa[1], Mwiche Musukuma[1], Brivine Sikapande[2], Ovost Chooye[1], Andrea Blanchard[3]

[1]University of Zambia, School of Public Health

[2]Zambia Ministry of Health

[3]University of Manitoba

Table of Contents

List of Tables

List of Figures

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. In Zambia, the proportion of deliveries in health facilities is at 84% with 80% being assisted by a skilled birth attendant. However, the places where births occur vary considerably and are not well understood. Simply increasing coverage of institutional births is unlikely to reduce mortality if facilities lack basic requirements for emergency obstetric and neonatal care, have inadequate staffing, or cannot refer emergency cases [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 cesarean 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 of 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.

---

[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.

This MNH analysis project aims to better characterize the environment of births over time, using quantitative analyses to describe trends over time including 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 the country's policies and health systems data related to the organization and integration of delivery care services at different levels and sectors.

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 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

1. To understand where women give birth, by what mode (vaginal, C-section), and who attends to them (nationally, sub-nationally, by socio-economic groups, and by facility sector/volume/level), using DHS/MICS and HMIS.

---

[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.

2. To understand health outcomes* (neonatal mortality, stillbirths) by place, attendant and mode of birth (nationally, regionally, by socio-economic groups, and by facility sector/volume/level), using DHS/MICS & HMIS (*Maternal mortality data does not allow for disaggregated analyses).
3. To analyze the intended and actual health policy and system characteristics in place for the provision of safe delivery care, using documents/data.
4. To assess the extent to which countries with higher levels of safe, equitable and effective childbirth care also had favorable 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 2001, 2007, 2013/14 and 2018.
- Health Management Information System (HMIS): DHIS2 for 2022
- 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 version 17 and Excel. Results are primarily presented graphically.

Indicators for Demographic and Health Survey (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 professionals (e.g. clinical officers, medical licentiates etc.)
  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 whose 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 categorized as being in lower-level facilities
- **Cesarean section** is defined as the proportion of children who were delivered by cesarean section.

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

- **Neonatal mortality rate (NMR)** is defined as the number of deaths among children aged 0 to 28 days per 1000 live births. The reference period for NMR is 10 years preceding 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:

- Live births (OR all births) in facilities
- Caesarean section among live births (or among all births) in facilities

Optional indicators:

Mode of delivery: There are two main modes of childbirth, vaginal birth and cesarean 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

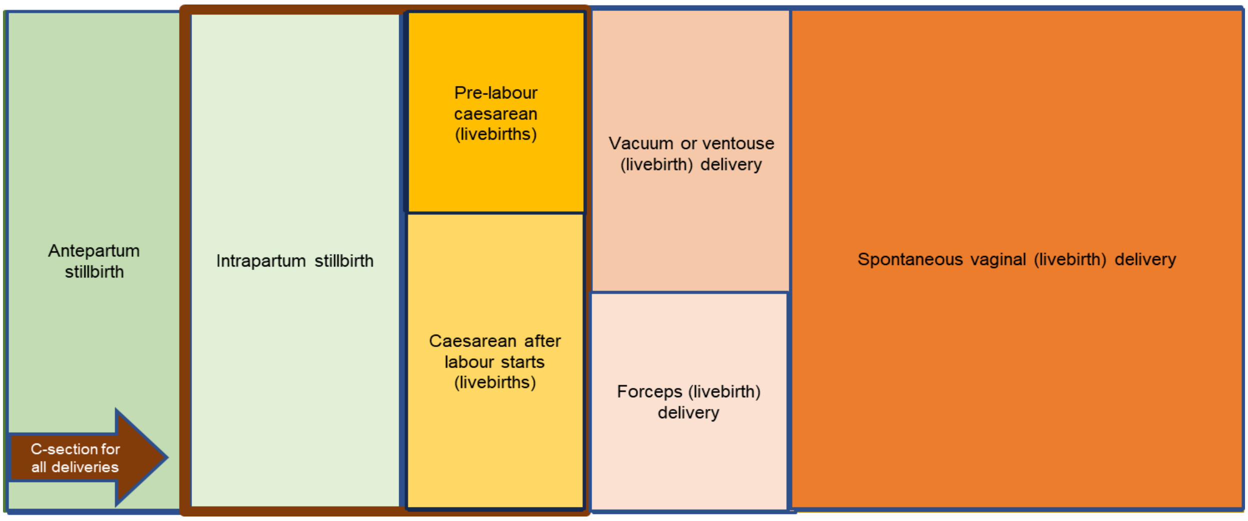
Birth outcomes: Births can be live or still

- Stillbirths (fresh or macerated):
    - Macerated stillbirths + fresh stillbirths = all stillbirths

- Antepartum stillbirths + intrapartum stillbirths = all stillbirths
  - Macerated ≠ Antepartum, but similar
  - Fresh ≠ Intrapartum, but similar

<u>Checks:</u>

- 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



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. In each spreadsheet all DHS surveys available were re-categorized 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 re-categorization, 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.
- 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 records joined to the MNH facility records.

Overall, a total of 2540 health facilities reported to be offering delivery care services based on both the administrative and the MNH facility indicator reporting records.

All health facilities in the MNH facility indicator records had a corresponding record in the administration records. However, 838 health facilities that were in the administrative records were not found in the MNH facility indicator records, i.e., 838 facilities were not reporting MNH indicators **(Table 7 in Annex1).**

This reflects 24.8% of the total 3378 facilities in the administrative records. The 838 might have been comprised of facilities that do not offer MNH services as well as facilities that were recently opened by the Government of Zambia which have not yet been integrated into the HMIS system.

The assessment of health facility data quality used the monthly facility reports and focused on 1) report completeness, 2) extreme outliers and missing data and 3) internal data consistency. Data quality adjustments for reporting completeness (yearly) and extreme outliers (monthly) were done before further analyses on annual data **(Table 8 in Annex 1)**. We:

- Checked for extreme outliers using the Hampel X84 Method with a cut-off 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 births, livebirths, and stillbirths

A mean overall data quality score of 85% was estimated and this was lower than the 90% data quality target score. A poor data quality score were estimated for the percentage of facilities with no missing monthly values in the year for stillbirths i.e., 2%. As stillbirths are a rare occurrence, most facilities record a frequency of 0 into HMIS. However, extraction of data from the HMIS replaces an observation of 0 with a missing value, thereby falsely increasing the number of facilities with missing values. It was not possible to identify and exclude these affected facilities during analysis **(Table 8 in Annex 1)**.

Incomplete reporting can have a major effect on levels and trends of deliveries and other statistics derived from health facilities. If completeness is not considered, it might be assumed that services on those indicators were not provided by the respective MNH health facilities. In order to solve this problem, adjustments were made while addressing the two levels of incompleteness (MNH facilities that did not report the indicator and the expected level of services among MNH facilities that did not report on the indicator). Therefore, for incomplete reporting by facility, variable over time, affecting trend assessment adjustment was made by multiplying the yearly volume by the reciprocal of the reporting rate **(Table 9 in Annex 1)**.

Extreme outliers were defined as a monthly value greater or smaller than 5 times the median absolute deviation (MAD) from the monthly median value. Wherever an extreme outlier was observed, adjustments were made by giving the median value for the same year to the extreme outlier **(Table 9 in Annex 1)**. This is because even though month-to-month variations are expected in the reported numbers, a lot of variations for which no proper explanation exists could have posed a serious data quality issue.

Missing values were addressed by the imputation of the median monthly value for the year in order to give the missing monthly value an assigned value **(Table 9 in Annex 1)**.

Results

Zambia is a landlocked country with an overall population of 19,610,769 (60% rural population) and a population density of 26.1 people per square kilometer 2022. Its population increased from 7.3 million (1990) to 19.6 million (2022) with an annual growth rate of 3.4 between 2010 and 2022. The population is culturally diverse with more than 72 ethnic groups, 10 provinces and 116 districts.[9]

This section is organised into five parts. The first part provides results based on health outcomes by delivery place and attendant. The second part provides results for the national policy and health system context for MNH. The trends in where and with whom women give birth are presented in the third part. The fourth part provides an understanding of sizes and volumes of facilities where women give birth (HMIS), while the fifth part describes transition model stages for maternal mortality, stillbirths and neonatal mortality.

Health outcomes by delivery place and attendant

Trends in national maternal mortality ratio (MMR)

The trends in national maternal mortality ratio (MMR) estimates are based on the UN estimates, over a 20-year review period from the year 2000 to 2020. An in-depth review of the MMR over the period shows that Zambia's MMR dropped from the year 2000 to 2003, then stagnated between 2000 to 2002. Between 2007 and 2009 MMR increased by 10% before going on a decreasing trend from 2010 to 2020. It is important to note, however, that the 2020 MMR of 135 deaths represents a 5% increase from the 2019 rate of 129 deaths per 100,000 live births.

Generally, MMR has been on the decline over the 20-year review period, with a reduction from an initial rate of 419 deaths per 100,000 live births to the current rate of 135 deaths per 100,000 live births in 2020, representing about 68% decline **(Figure 1).** Note that reaching the 2030 target of less than 70 MMR per 100,000 live births requires a further 49% reduction in MMR in the remaining 6 years.

[9] https://www.cia.gov/the-world-factbook/countries/

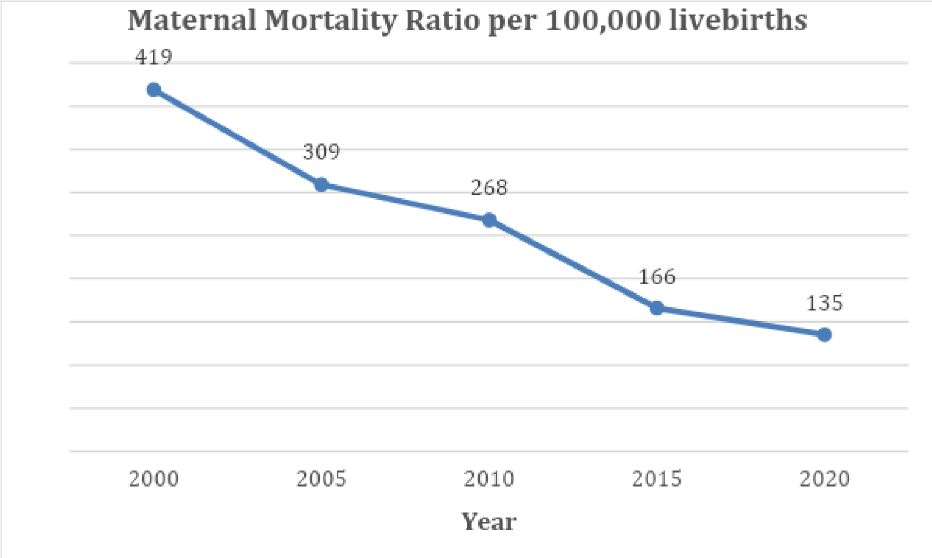


Figure 1: Maternal Mortality Ratio per 100,000

Estimates of country-level maternal mortality ratio (MMR, maternal deaths per 100,000 live births) 2000-2020
Source: WHO, UNICEF, UNFPA, World Bank Group and UNDP (MMEIG) - February 2023, https://data.unicef.org/topic/maternal-health/maternal-mortality/

Trends in national neonatal mortality rate (NMR)

Using UN estimates over a 21-year period from 2000 – 2021, a graph of the neonatal mortality rates is shown below (**Figure 2**). Zambia's NMR was sitting at 35 per 1000 live births in the year 2000, and the rate started dropping steadily up to 27 per 1000 live births in the year 2007. After that, the NMR stagnated around 27 deaths per 1000 live births for five years, from 2008 to 2012. In 2013, the NMR dropped to around 26 deaths per 1000 live births and remained constant for 5 more years until the year 2019 when it dropped slightly to 25 deaths per 1000 live deaths, and has remained constant at that rate until the end of the reporting period in 2021. Overall, the NMR has declined from the initial 35 deaths per 1000 live births in 2000 to 25 deaths per 1000 live births in 2021, representing a 29% overall reduction. To reach the NMR 2030 target of around 12 deaths per 1000 live births, the current NMR has to be reduced by half, i.e. representing a reduction of 52% in the next 6 years.

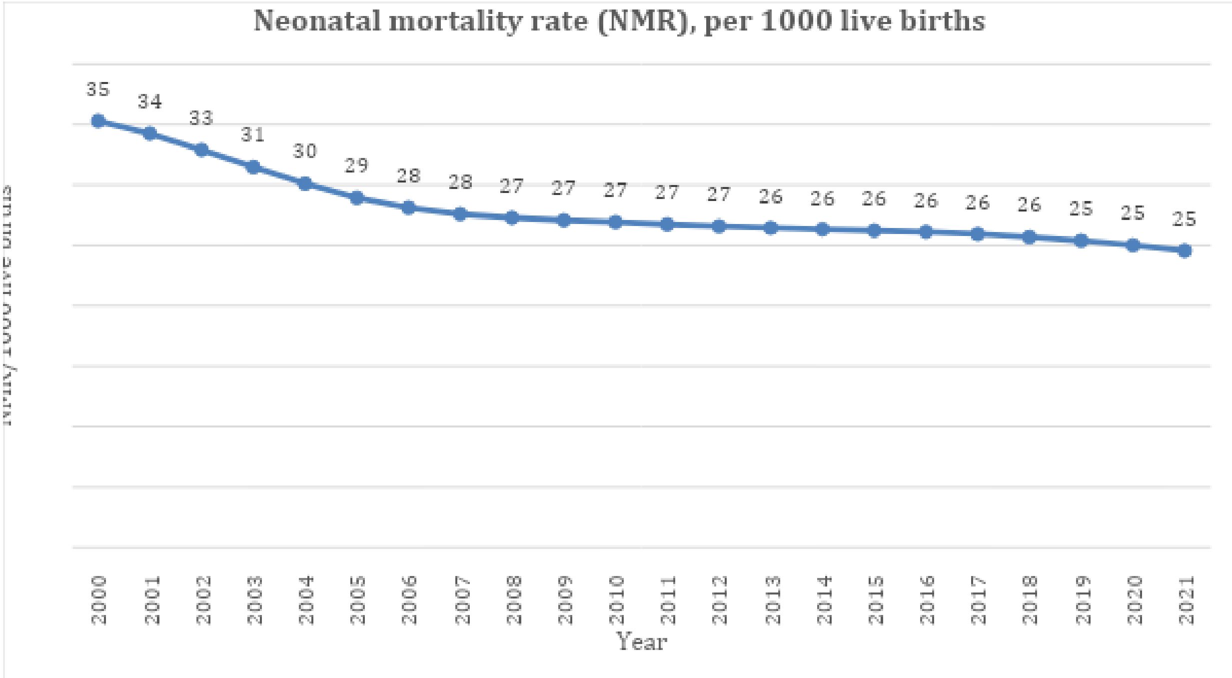


Figure 2: Neonatal Mortality Rate, per 1000 live births

Estimates of country-level Neonatal Mortality Rate (NMR, maternal deaths per 1,000 live births) 2000-2020
Source: WHO, UNICEF, UNFPA, World Bank Group and UNDP (MMEIG) - February 2023,
https://data.unicef.org/topic/maternal-health/maternal-mortality/

Figure 3 (below) shows how much NMR has changed over time among births in hospitals, lower-level facilities, and among home or other places using data from the ZDHS 2001, 2007, 2013 and 2018 (among all births ten years preceding each survey). According to the data, Zambia's NMR did not reduce much in the past two decades. In fact, NMR increased slightly from 2013 to 2018, especially within the lower-level facilities and at home. For hospitals and lower-lever facilities, NMR increased from 2001 to 2007, then dropped in 2013 and later increased in 2018. Yet the pattern was different for NMR for births that occurred at home or other places, where the NMR was highest in 2001 then reduced in 2007 and further reduced in 2013 but later increased in 2018 **(Figure 3).** The inconsistent patterns could also reflect the declining number of deaths reported, making the estimates less stable. The current NMR is far higher than the 2030 target of reducing NMR to 12 per 1000 live births or lower (SDG Target 3.2).

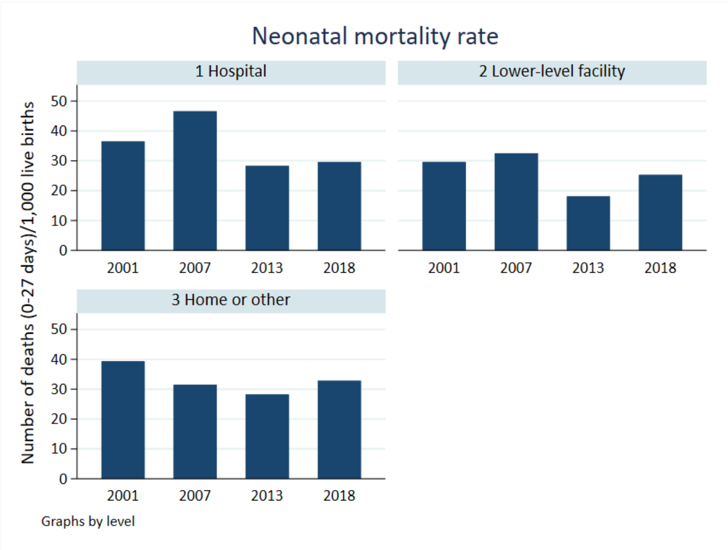


Figure 3: Neonatal Mortality Rate by place of birth, ZDHS 2001 to 2018

Trends in national stillbirth rates

Using the UN estimates on stillbirth rates, the graph below (**Figure 4**) shows a decline in stillbirths from 21.9/1,000 births in 2000 to 14.2/1,000 in 2021. Between 2000 and 2021, stillbirth rates decreased by 7.7/1,000. To achieve the 'Every newborn action plan' target of ≤ 12 stillbirths per 1000 births, Zambia needs to reduce its stillbirth ratio by 2.2 deaths/1,000 births.

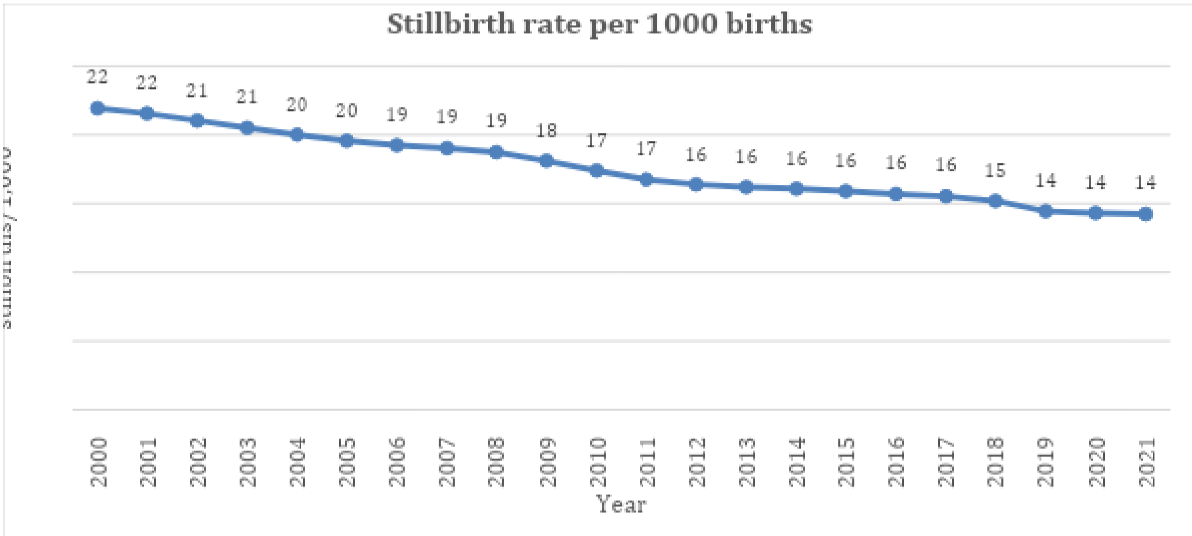


Figure 4: Stillbirth rate per 1000 births, UN estimates 2000-2021

Source: WHO, UNICEF, UNFPA, World Bank Group and UNDP (MMEIG) - February 2023, https://data.unicef.org/topic/maternal-health/maternal-mortality/

Stillbirth volumes by facility level, volume and ownership in 2022

Figure 5 uses the HMIS 2022 data to look at the contribution of health facilities to the total stillbirths reported in the country in 2022. Among facilities reporting stillbirths, only 6.3% of facilities reported having 1-9 stillbirths each in 2022. The majority of health facilities (77%), each recorded 10-19 stillbirths in 2022, while 13.9% of the facilities each reported 20-49 stillbirths and 3.8% reported 50 or more stillbirths in 2022. With regards to the contribution of the facilities to the total stillbirths recorded in the country, the 3.8% of facilities that recorded ≧ 50 stillbirths for each facility contributed 28.8% to the total stillbirths reported in 2022. Approximately 48% of the stillbirths recorded in the country were from the 77% of facilities that each reported having 10-19 stillbirths total in 2022.

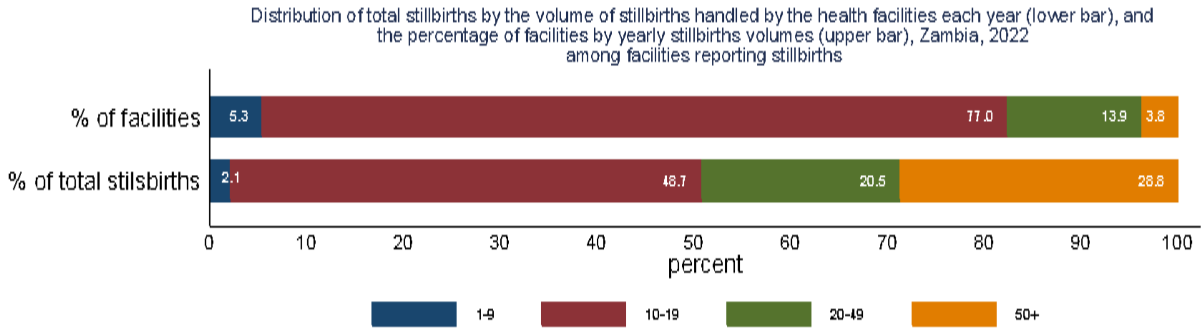


Figure 5: Distribution of stillbirths by the volume of stillbirth by the health facilities, HMIS 2022

Public hospitals reported higher stillbirth volumes compared to public clinics and private health facilities (**Figure 6**).

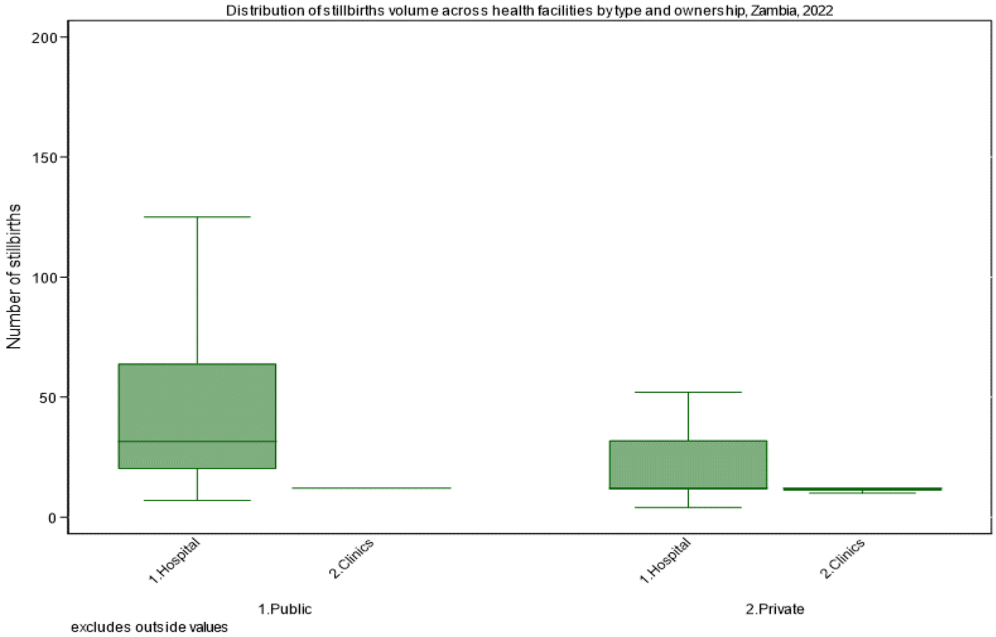


Figure 6*:* Distribution of stillbirth volume by facility type and ownership, HMIS 2022

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.[10,11,12,13,14] The data in this section is taken from the WHO 2018/19 SRMNCAH policy survey, and updated with additional information on policies that have come into place since 2018/19.

Governance for MNH

The 2022 - 2026 National Health Strategic Plan (NHSP) provides a strategic direction in the implementation of national health priorities in Zambia. The development of MNCH Program specific strategies and guidelines, informed by the NHSP 2022-2026, has been key in guiding program implementation at all levels of the health service delivery system. Some of the strategic documents developed for the MNH program include the National RMNCAHN Road map/ Strategy 2022-2026, National Newborn Scale up Plan 2016-2020, RMNCAHN Investment Case 2022-2024, Maternal and Newborn Quality of Care Standards (2023), Standards for the Small and Sick Newborn (2023), National Health Policy (2012), and the Zambia National Maternal and Neonatal Referral Guidelines 2018..= Another guideline is the Respectful Maternity Care (RMC) Guidelines 2020, which is a national policy/guideline on the right of every woman to have access to skilled care at childbirth. These documents are disseminated to all provinces and districts to provide strategic direction in RMNCAH Programme implementation and are integrated in the Operational Plans at the sub national level. The Inter Agency Coordinating Committee (ICC) established in 2018, serves as the National Coordinating Body that looks at RMNCAH. The ICC draws membership from key partners in RMNCAH to provide a platform for a coordinated approach in the provision of RMNCAH services.

---

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

[11] 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.

[12] 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.

[13] 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.

[14] 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.

Zambia has been implementing the Basic Health Care Package since 1994 through the Essential Health Care Package which was a component of the Basic Health Care Package. This package was reviewed in 2000 as part of the health care reforms. In 2009, the Ministry of Health engaged a consultant to review the 2000 Basic Health Care package that included RMNCAH interventions, and was advised to merge the Basic Health Care Package and Essential Health Care into a National Health Care Package (NHCP). In 2012, the package was combined with hospital interventions to form the National Health Care Package (NHCP). In February 2020, a costed benefit package for hospital-level interventions began to be implemented through the National Health Insurance Scheme. However, the NHCP has never been fully implemented as a whole. This is partially because the package did not comprehensively include interventions at primary health care especially those at community level. Review of the NHCP is currently underway, and is expected to be completed in 2025.

Health facilities and referral transport

The Zambia health system has designated health facilities at all levels to provide childbirth care for all women and children. Health Posts and Health centres provide Basic EmONC while and Level 1, 2 and 3 hospitals provide Comprehensive EmONC (i.e. C-sections). In addition, Level 2 & 3 Hospitals provide Specialized care for small, sick and vulnerable newborns. One of the key strategies and interventions to achieving optimal maternal and newborn survival is by strengthening the referral system. Triaging of obstetric cases done on admission and those that require special care are referred to higher level facilities immediately. The 2018 Maternal and Newborn Care Guidelines provide a platform for strengthened maternal and neonatal referral system will reduce referral delays, improve pre-referral care, triage, ambulance transportation, communication and enhance preparedness and feedback at the receiving health facilities (Table 2).

The 2018 National Maternal and Neonatal Referral Guidelines clearly outline the referral process including referral criteria, pre-referral care, referral checklists, communication, transfer and the maternal and neonatal referral forms that have provision for feedback from the receiving facility. These guidelines provide guidance on provision of MNH services.

Health workers

Human Resource for Health (HRH) is a key component of a functional Health System. The National Human Resources for Health Strategic Plan (NHRH SP) 2018-22 was developed to help improve the number of health workers in the right mix of skills. Different cadres are meant to be trained to attend each type of care. For instance, Midwives, Clinical Officers, Medical Licentiates, Medical Doctors, Gynecologists are trained to provide Basic EmONC and Comprehensive EmONC. Only Midwives and Gynecologists provide Specialized care for small/sick/ vulnerable newborns (Table 3). The NHRH SP is a guiding framework for HRH interventions in the health sector and helps coordinate the collaborative efforts of the many stakeholders in health workforce planning, development and management.

Supplies, medicines and commodities

A well-functioning supply chain system is essential to health service delivery. Health Sector Supply Chain Strategy and Implementation Plan 2019-2021 outlines a framework for the supply chain and strategies for improving availability of essential medicines and medical supplies. Zambia has developed a list of tracer medicines and medical supplies list that defines availability of medicines and supplies in health facilities. Province, district and health facility staff have received training in medicines and supplies management and in the use of the Electronic Logistics Information System (eLMIS) for reporting which includes key tracers for childbirth care including oxytocin and misoprostol to address postpartum hemorrhage, self-inflating masks for newborns with birth asphyxia, and blood/blood products needed for C-sections.

In order to improve procurement and distribution of medicines and medical supplies, Zambia Medicines and Medical Supplies Agency (ZAMMSA), was established under the Zambia Medicines and Medical Supplies Agency Act 2019 and charged with the mandate to procure, store and distribute medicines and medical supplies to all public health facilities in Zambia.

Service delivery to improve quality of care

Good health services are those which deliver effective, safe, quality personal and non-personal health interventions to those that need them, when and where needed, with minimum waste of resources. Guidelines to support provision of MNH services have been developed and aligned to the WHO recommendations. The Zambia National Maternal and Neonatal Referral Guidelines 2018, the Quality Improvement Guidelines 2020, Respectful Maternity Care Guidelines developed in 2020 and the Performance Improvement and Quality Assurance Strategy 2019-2021 are used as reference materials to improve quality of care for women and the newborn for improving provision of quality MNH services.

Financing

The main sources of health financing are government, Cooperating partners (CPs) and out of pocket payments (OOP) by households [1]. Other sources include employer-financed schemes through health insurance companies. The 2017 – 2027 Health Financing Strategy outlines strategies and mechanisms for improving health care financing.

Zambia abolished the user fees for all primary health care services including those that covers pregnant women/newborn complications. Through this abolishment health services including management of birth complications (asphyxia, prematurity, sepsis, congenital anomalies) are provided free of charge at point of use in the public sector for women of reproductive age. In 2019 the National Health Insurance Scheme was introduced under the National Health Management Authority (NHIMA) in an effort to make health care services accessible to the larger segment of the population.

Information

Health Information Systems may be used to generate information that can enable decision-makers at all levels of the health system to identify problems and needs, make evidence-based decisions on health policy, and allocate scarce resources optimally.

The Government through the Department of National Registration, Passport and Citizenship (DNRPC) has in consultation with stakeholders drafted a Strategic plan for Civil Registration and Vital Statistics (CRVS) 2015. The Strategic Plan provides a framework for improving death and birth registration. While the Maternal Death Surveillance and Review 2013 updated in 2023 provides a framework reviewing all maternal deaths and stillbirths in the country (see Annex 2).

Zambia has conducted periodic health facility assessments such as the Service Availability and Readiness Assessment (SARA) and the 2021/2022 Harmonized Health Facility Assessment (HHFA) to provide information on services offered in health facilities. This is in addition to the information being collected through the routine health information system.

Table 1: 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					
Health Post	1482	1139 (76.9)	Health Post	Lower Facility	Health Centre and Level 1 Hospital
Health Centre and Clinic	1746	1283 (86.6)	Health Centre and Clinic	Lower Facility	Level 1 Hospital and Central Hospital
Level 1 Hospital	179	160 (10.8)	Level 1 Hospital	Hospital	Level 2 Hospital
Level 2 Hospital	13	2 (0.1)	Level 2 Hospital	Hospital	Level 3 Hospital
Level 3 Hospital	12	5 (0.3)	Level 3 Hospital	Hospital	Self
Private sector					
Health Post	24	13 (54.4)	Health Post	Lower Facility	Health Centre and Level 1 Hospital
Health Centre and Clinic	265	183 (69.1)	Health Centre and Clinic	Lower Facility	Level 1 Hospital and Central Hospital
Level 1 Hospital	77	6 (7.8)	Level 1 Hospital	Hospital	Level 2 Hospital
Level 2 Hospital	2	1 (50.0)	Level 2 Hospital	Hospital	Level 3 Hospital
Level 3 Hospital	0	0	Level 3 Hospital	Hospital	Health Centre and Level 1 Hospital

Table 2: 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?[15]
Public sector		
Routine (uncomplicated) childbirth care [16]	All Levels	Nurse, Midwives
Basic EmONC [17]	Health Post, Health Centre	Nurse, Midwives
Comprehensive EmONC (i.e. C-sections) [18]	Level 1, 2, 3 Hospitals	Midwives, Clinical Officers, Medical Licentiates, Medical Doctors, Gynecologists
Specialized care for small/ sick newborns [19]	Level 2 & 3 Hospitals	Midwives and Gynecologists
Private sector (if applicable and available, adapt levels or leave empty if not)		
Routine (uncomplicated) childbirth care [a]	**All Levels**	Nurse, Midwives
Basic EmONC [b]	**Health Post, Health Centre**	Midwives, Clinical Officers, Medical Licentiates, Medical Doctors, Gynecologists
Comprehensive EmONC (i.e. C-sections) [c]	**Level 1, 2, 3 Hospitals**	Midwives, Clinical Officers, Medical Licentiates, Medical Doctors, Gynecologists
Specialized care for small/sick/ vulnerable newborns [d]	**Level 2 & 3 Hospitals**	Midwives and Gynecologists

[15] Filled partially using WHO 2018/19 SRMNCAH survey responses for the country- edit as needed.
[16] 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
[17] 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)
[18] CEmONC signal functions includes BEmONC plus: Caesarean section and blood transfusion
[19] Care for small/sick newborns may include: Oxygen/CPAP, intravenous fluids, antibiotics, phototherapy and/or exchange transfusion

Health system inputs relevant to MNH care

With a total population of 19,610,769 in the 2022 Census of Population and Housing, the health facility to population ratio was estimated to be at 1.7 facilities per 10,000 population (using HMIS 2022 data, **Table 3**). Provincial estimates indicate the highest health facility to population in North-Western (3.34 health facilities), seconded by Western (2.75 health facilities) and Luapula (2.07 health facilities). The lowest health facility to population was estimated in Lusaka at 0.72 facilities per 10,000 population. Similarly, Lusaka has the lowest bed to population ratio of 4.22 beds per 10,000 population, i.e., 7.33 beds lower than the national average of 11.55 beds per 10,000. The highest bed to population ratio was estimated in Northwestern province at 20.23 beds per 10,000 population, followed by Luapula province (17.29 beds) and Northern Province (16.02 beds). The national average of the total health worker to population is estimated to be 15.47 health workers per 10,000 population while nurse to population ratio is estimated to be 14.69 nurses per 10,000 population. Northwestern province is estimated to have the highest total health worker to population ratio of 27.45 per 10,000, 11.98 health workers higher than the national average.

Comparing the current health infrastructure and human resources for health per 10,000 population to the UN targets, Zambia has not achieved any of the minimum requirements of 2 facilities per 10,000 population, 18 beds per 10,000 population, or 23 health workers per 10,000 population. However, Northwestern province has achieved all three UN targets, while Luapula and Western provinces have achieved the target of 2 health facilities per 10,000.

Table 3: 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	**18950657**	**1.67**	**0.10**	**1.46**	**6.97**	**11.55**	**15.47**	**14.69**
Central	1821547	1.75	0.05	1.69	6.92	8.27	19.81	21.61
Copperbelt	2795335	1.43	0.08	1.35	21.95	13.04	18.24	15.41
Eastern	2344785	1.72	0.08	1.64	2.73	13.94	9.40	10.53
Luapula	1374582	2.07	0.24	1.86	0.70	17.29	14.83	23.46
Lusaka	3456641	0.72	0.04	0.42	24.60	4.22	11.04	12.83
Muchinga	1033433	1.57	0.09	1.35	1.85	11.56	11.82	21.18
Northern	1592118	1.73	0.16	1.28	0.73	16.02	11.44	11.30
Northwestern	999051	3.34	0.17	2.92	3.59	20.23	27.45	16.81
Southern	2422200	1.82	0.08	1.58	4.08	10.91	17.98	8.90
Western	1110965	2.75	0.15	2.54	0.65	11.04	21.71	42.98

Source: Country Annual Meetings data 2023 (Excel: Health System Data CAM for 2022)
*Total health workers include physicians + nurses + non-clinical physicians

The Global Health Expenditure database of National Health Accounts provides the following information on the country's health expenditure from 2013 to 2020, including investments in maternal conditions (**Table 4**):

- Zambia's average health expenditure per capita between the year 2013 and 2020 stood at $66 (in US dollars 2020 constant). Note, however, that health expenditure per capita over the review period has been fluctuating, with 2013 having the highest per capita expenditure of $86.3 and 2020 having the lowest at $53.8.
- The expenditure data also reveal that, on average, 6.7% of the current health expenditure is allocated for maternal conditions.
- In terms of sources of financing for maternal conditions, the data shows that of the 6.7% health expenditure allocated for maternal conditions, 78% is financed by domestic government resources (i.e. 5.2% of the 6.7%).

- The rest of the health expenditure on maternal conditions is either financed by external sources (i.e. 1.1% of the 6.7% of the current health expenditure on maternal conditions) or by domestic private expenditure (i.e. 0.6% of the 6.7% of the current health expenditure on maternal conditions)
- Overall, funding for maternal conditions is mostly from domestic general government which has increased over the review period from an allocation of 3.6% of current health expenditure in 2013 to an allocation of 5.3% of current health expenditure in 2019. External sources follow next, with the domestic private expenditure allocating less than 1% of their health expenditure towards maternal conditions.
- Funding allocation towards maternal conditions, from both external and domestic private sources, has generally declined between 2013 and 2019. Funding for maternal conditions from external sources declined by 65% while funding from domestic private sources declined by about 38% between 2013 and 2019.

Table 4: 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$	86.3	66.0	58.0	56.0	65.8	74.6	67.5	53.8	66.0
Health Expenditure on Maternal Conditions as % of Current Health Expenditure (all sources)	6.7	8.2	6.1	6.4	6.7	6.5	6.5		6.7
Domestic General Government Health Expenditure on Maternal Conditions as % of Current Health Expenditure	3.6	6.2	5.9	5.0	5.3	5.1	5.3		5.2
External sources of funding on Maternal Conditions as % of Current Health Expenditure	2.3	1.3		0.7	0.7	0.8	0.8		1.1
Domestic Private Expenditure on Maternal Conditions as % of Current Health Expenditure	0.8	0.7		0.6	0.6	0.6	0.5		0.6

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

Trends in where and with whom women give birth

Understanding population trends in where women give birth and who is attending them (DHS)

The trends analysis of ZDHS data revealed that there has been a steady increase in the proportion of institutional deliveries, which approximately doubled from 40% in 2001 to 80% in 2018.

In 2001, at least 50% of the deliveries happened at home or other places (outside health facilities) and these were all attended by other skilled and unskilled individuals. This pattern kept on reducing from 2001 to 2018 such that by 2018, the proportion of deliveries that happen from home/other by other skilled and unskilled individuals accounted for less than 15% of all deliveries **(Figure 7).**

The largest increase was seen in the proportion of deliveries in lower-level facilities attended by a nurse/midwife. In 2001, about 18% of deliveries took place in lower-level facilities attended by a nurse/midwife. By the year 2018, approximately 50% of all deliveries were happening in lower-level facilities and attended by a nurse/midwife.

On the other hand, close to 20% of deliveries used to happen from hospitals attended to by a nurse/midwife in 2001, which only slightly increased to 25% in 2018. In 2001, less than 5% of all deliveries used to happened from hospitals attended to by doctors, this proportion also only slightly increased to about 8% by 2018. It was also noted that a small proportion of deliveries in the lower-level facilities were conducted by doctors in 2018, something that was not observed from 2001 to 2013.

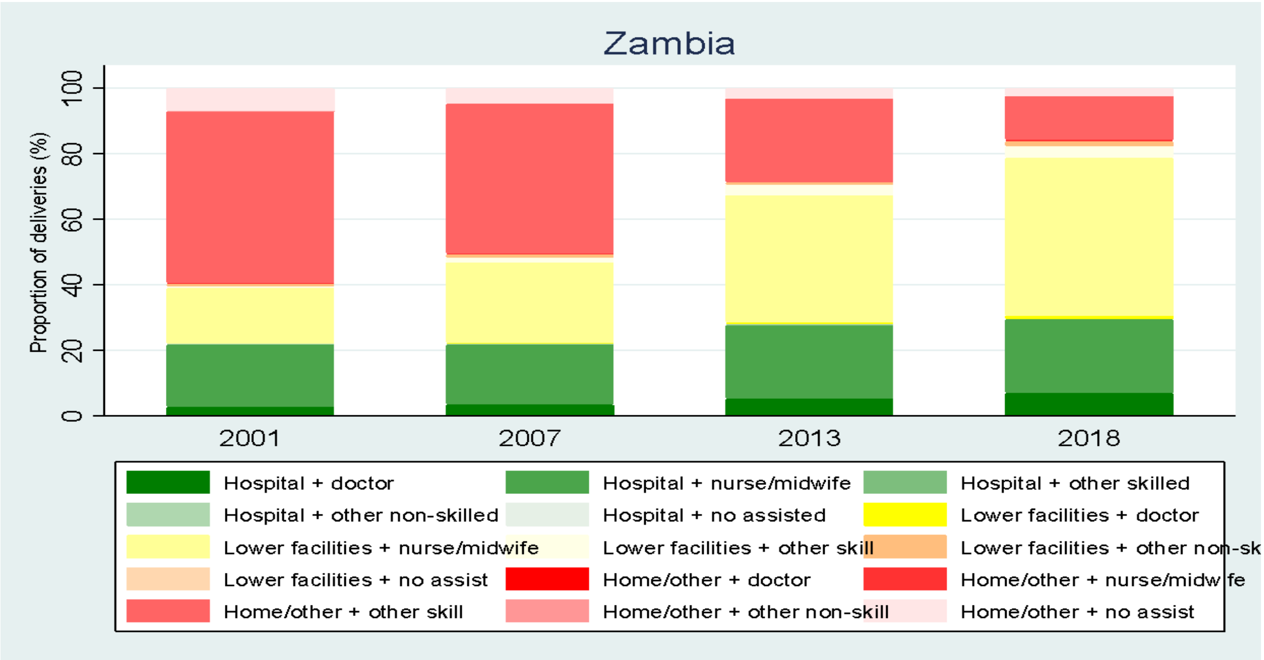


Figure 7: Institutional deliveries nationally by place of birth and type of birth attendant, ZDHS 2001-2018

For both rural and urban residents, the proportion of institutional deliveries by skilled personnel (nurse/midwife, doctor) increased from 2001 to 2018 for both women **(Figure 8)**. In 2001, more than 65% of all rural deliveries were attended by other non-skilled personnel. However, there has been a decline in the proportion of births attended by non-skilled personnel in both urban and rural areas, with a greater declined being observed in rural areas. By 2018, only about 20% of all deliveries in rural areas were conducted by other non-skilled personnel. In 2001, slightly less than 30% of all rural deliveries were conducted by a nurse/midwife. Yet by 2018, over 70% of all rural deliveries were conducted by a nurse/midwife. Between 2001 and 2018, the proportion of deliveries attended by a doctor in rural areas has also increased.

In urban areas, the majority of births were attended by a nurse or midwife in all the survey years. More specifically, in 2001, more than 65% of the deliveries were conducted by a nurse/midwife and by 2018, approximately 80% of all deliveries were conducted by a nurse/midwife. About 15% of urban deliveries were conducted by a doctor in 2018 compared to about 5% in rural areas.

This observed trend could be attributed to the fact the proportion of hospitals is much higher in urban areas as compared to rural areas.

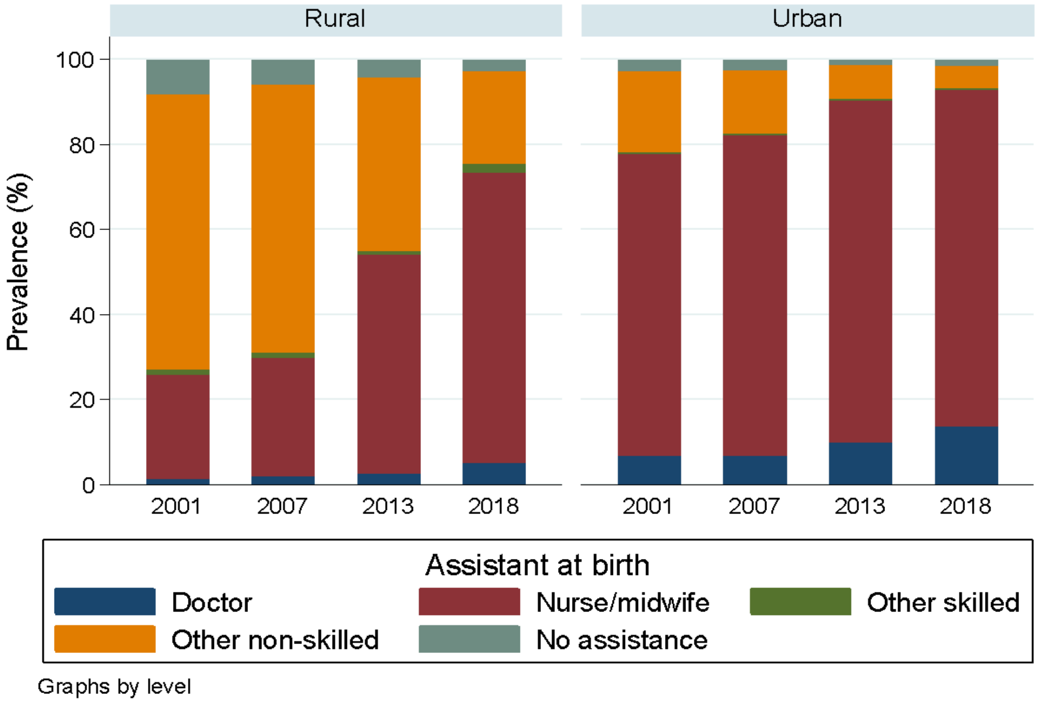


Figure 8: Assistance at birth by rural-urban residence, ZDHS 2001-2018

Trends analysis of institutional deliveries by subregion (province) **(Figure 9)** shows an increase in the proportion of institutional deliveries by skilled personnel (nurse/midwife, doctor) in all the 10 provinces of Zambia. In 2001, only Lusaka and Copperbelt provinces had more than half (50%) of the deliveries being attended by a nurse/midwife. However, by 2018 all the 10 provinces of Zambia had more than half (50%) of all deliveries being conducted by a nurse/midwife.

From 2001, there has been an overall decline in the proportion of births being attended by non-skilled personnel. By 2018 8/10 provinces had less than 30% of deliveries being conducted by other non-skilled personnel while Lusaka and Copperbelt provinces, had less than 10% of deliveries being conducted by other non-skilled personnel. This trend can be attributed to more births in Copperbelt and Lusaka provinces occurring in higher level facilities compared to other provinces and the two provinces being the most urbanized in the country. No statistics are presented for Muchinga province in 2001 and 2007 as the province was formed on 2011.

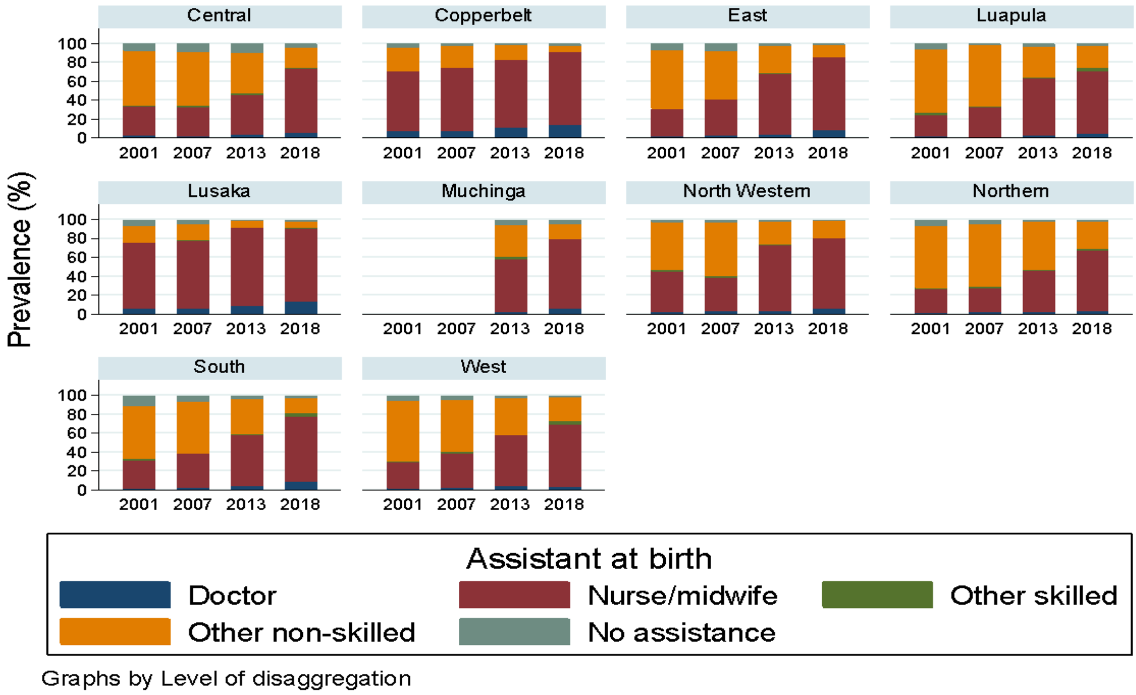


Figure 9: Assistance at birth by province, ZDHS 2001-2018

Based on the wealth quintiles **(Figure 10)**, there has been a steady increase in the proportion of institutional deliveries by skilled personnel (nurse/midwife, doctor) across all the five wealth quintiles. However, there has been variations across the quintiles as women in lower quintiles (Q1 & Q2) have always had lower proportions of institutional deliveries by skilled personnel as compared to women in higher wealth quintiles (Q4 & Q5). By the year 2018, more than 65% of all deliveries were conducted by skilled health providers (nurse/midwife or doctor) for women across all the wealth quintiles with Q3, Q4 and Q5 having proportions greater than 90%.

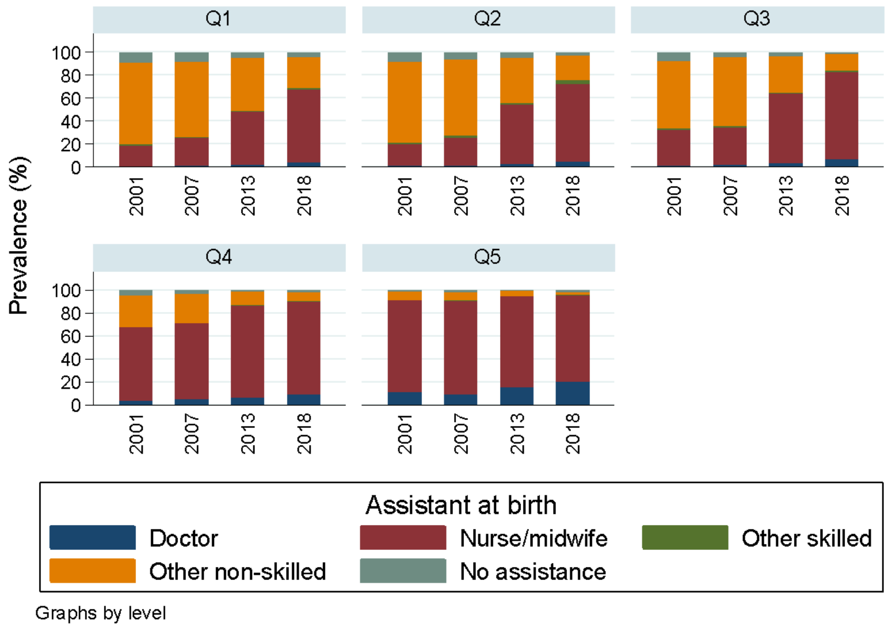


Figure 10: Assistant at birth by wealth quintile, ZDHS 2001-2018

Trends in Cesarean Section

Trends in C-section rates nationally

The national C-Section rate has been steadily increasing over the years according to the ZDHS from a rate of 2.3% in 2001 **(Figure 11)**. As of 2018 the C-section rate was estimated to be at 6.2% of all facility births. Despite the steady increase in C-sections, 6.2% is still below the WHO recommended threshold of 10-15% on average needed in case of emergencies.

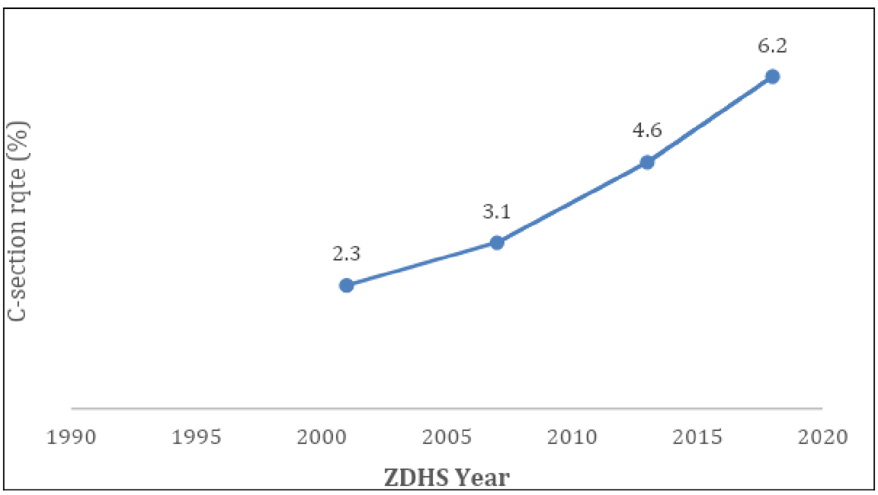


Figure 11: Cesarean section rates by year, ZDHS 2001-2018

Trends in C-section rates nationally by facility level/type

A disaggregated look at C-section rates by the place of delivery shows a noticeable increase in C-sections in hospitals and a small decrease in C-sections in lower-level facilities over the years. This is an expected trend, as c-sections are mainly performed by higher level facilities **(Figure 12).**

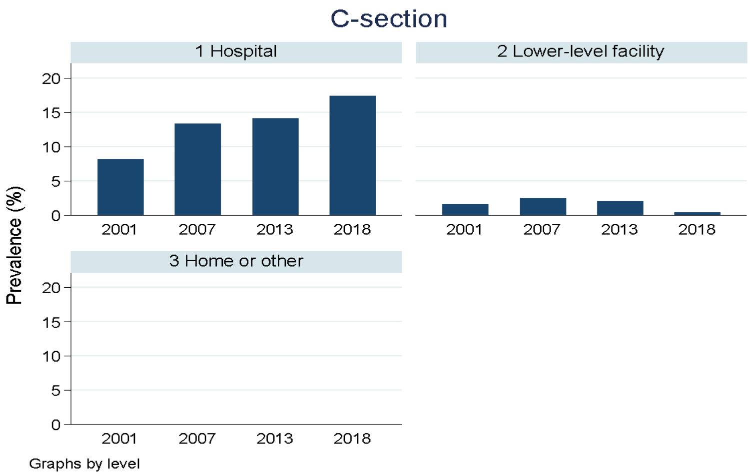


Figure 12: Cesarean section rates by health facility level, ZDHS 2001-2018

C-section rates (per 100 births) by wealth quintile

The C-section rates across the different wealth quintiles have generally been increasing but more so among the richest quintiles (**Figure 13).** As of 2018, C-section rates among the poorest, poor and middle quintile was below 5% and approximately 7% among the rich quintile. Cesarean sections were highest among the richest quintiles at approximately 14%. The c-section rates among the richest can be said to be double the rate among the poor and the poorest. The richest quintile has achieved the WHO target of 10-15% while all the other quintiles have not achieved this target.

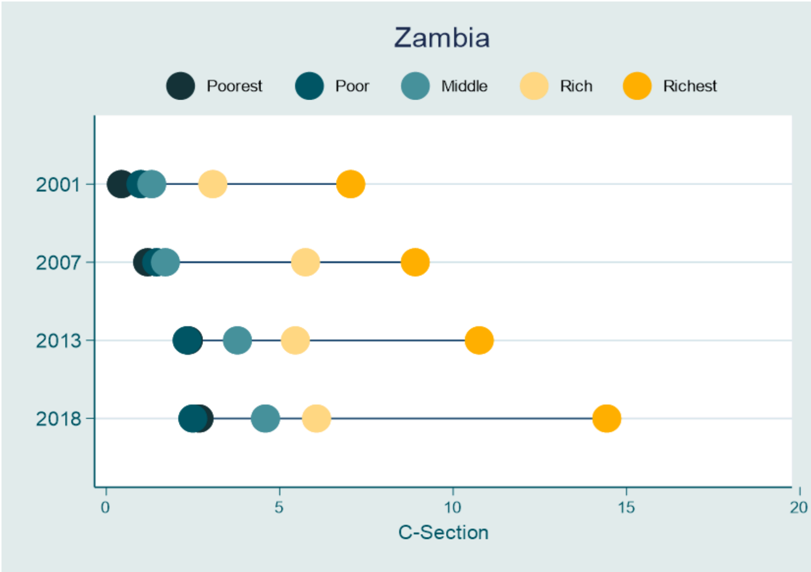


Figure 13: Cesarean section rates by wealth quintile, ZDHS 2001-2018

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

Distribution of facilities offering delivery services by type and ownership

Child delivery services in Zambia are conducted by health posts, health centers (referred to as clinics), 1st, 2nd and 3rd level (referred to as hospitals). Of all the health facilities providing child delivery services in Zambia that report to the HMIS, only 4.2% are public hospitals and 89.4% are public clinics (health centers and hospitals) **(Figure 14)**. Few private facilities report to HMIS, hence, out of all facilities reporting into HMIS, only 2.5% private hospitals and 3.9% private clinics are reported to be offering delivery services.

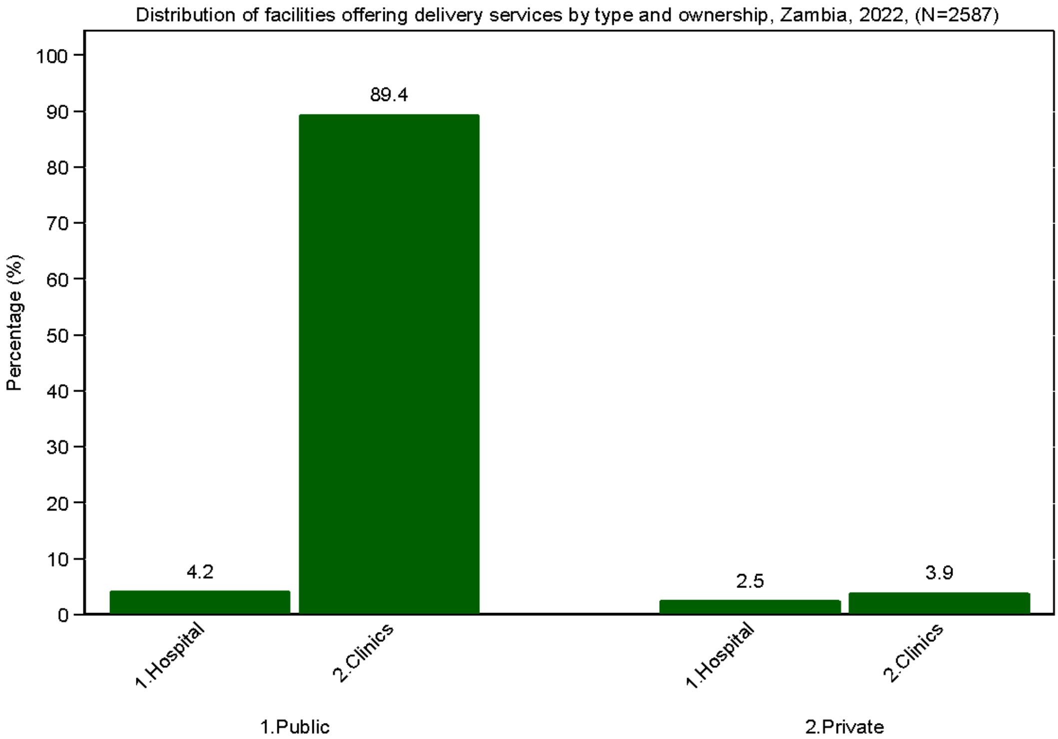


Figure 14: Distribution of health facilities by type and ownership, HMIS 2022

Volume and percentage of births by facility type & ownership (public/private)

While only 4.2% of facilities offering child delivery services are public hospitals, the majority of child deliveries take place in the public hospitals as shown in the box plot below **(Figure 15)**. Approximately, 1000 median births occurred in each health facility in each hospital in 2022, however, some facilities reported birth volumes of above 11,000. The second highest median volume was recorded among private hospitals while the median volume of births in public and private clinics was comparable.

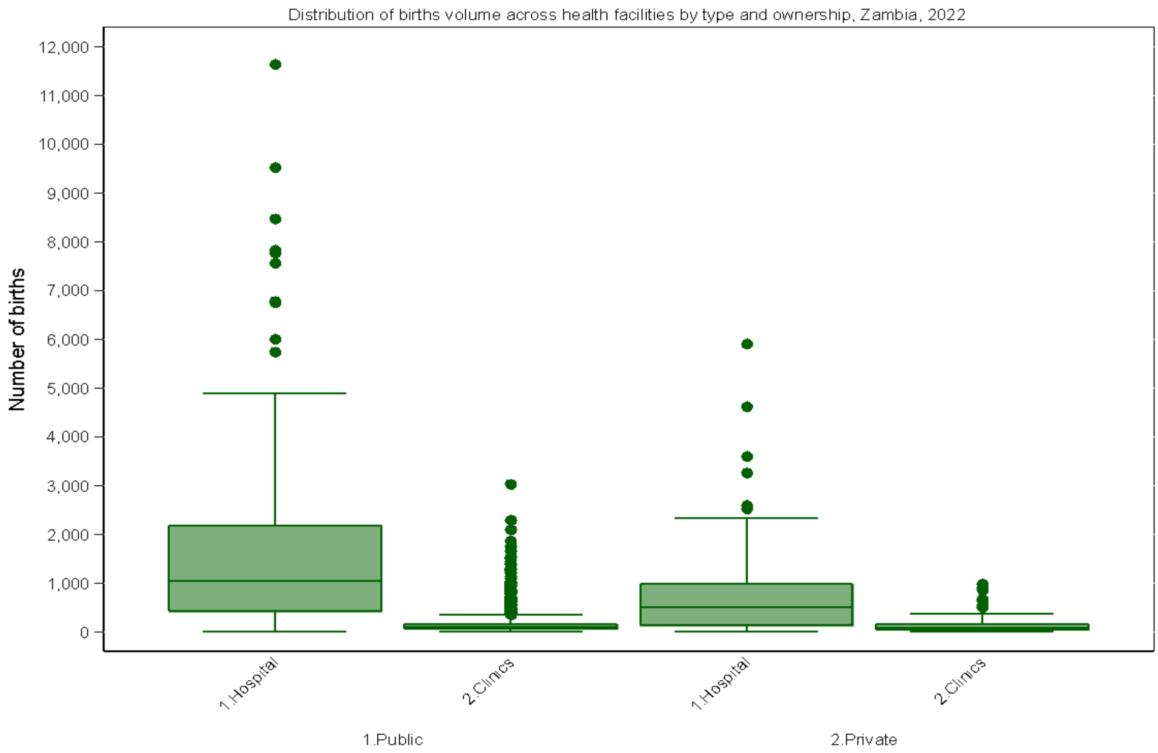


Figure 15: Distribution of birth volume across health facilities by type and ownership, HMIS 2022

Distribution of total births by volume indicates only 6.1% of facilities recorded 400 or more deliveries each in 2022 **(Figure 16)**. However, these facilities contributed 27.5% towards the total child deliveries recorded in 2022. Approximately 13% recorded 200-399 births each, 25.4% of facilities recorded 50-99 deliveries, and 24.7% recorded 100-199 deliveries. Thirty percent of the health facilities recorded only 1-49 deliveries each.

Approximately 27% and 26% of the total births in 2022 came from facilities that record 200-399 births and 100-199 birth respectively, reflecting the majority of births in the country per year. The 6% of high-volume facilities doing 400 or more yearly births accounts for nearly a third of all births per year in Zambia.

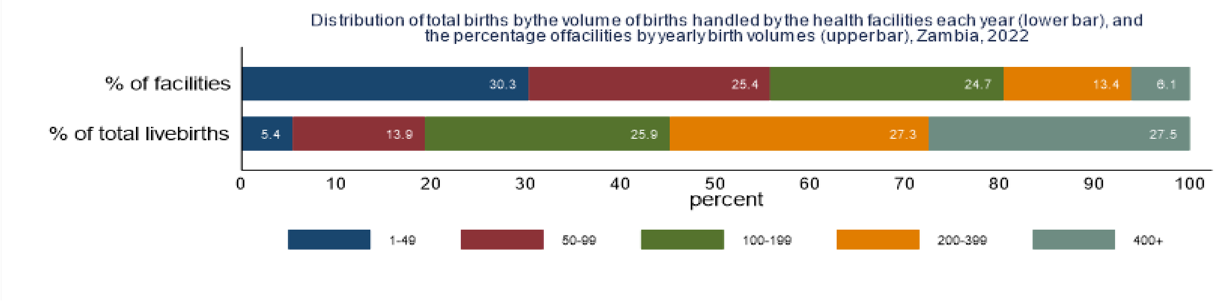


Figure 16: Distribution of total birth volume handles by health facilities, HMIS 2022

Distribution of facilities offering C-section services by type and ownership

In 2022, the majority of the country's c-sections took place in public hospitals with a median of 300 c-sections per facility **(Figure 17)**. The second highest number of c-sections was recorded in private hospitals with a median of approximately 200 c-sections.

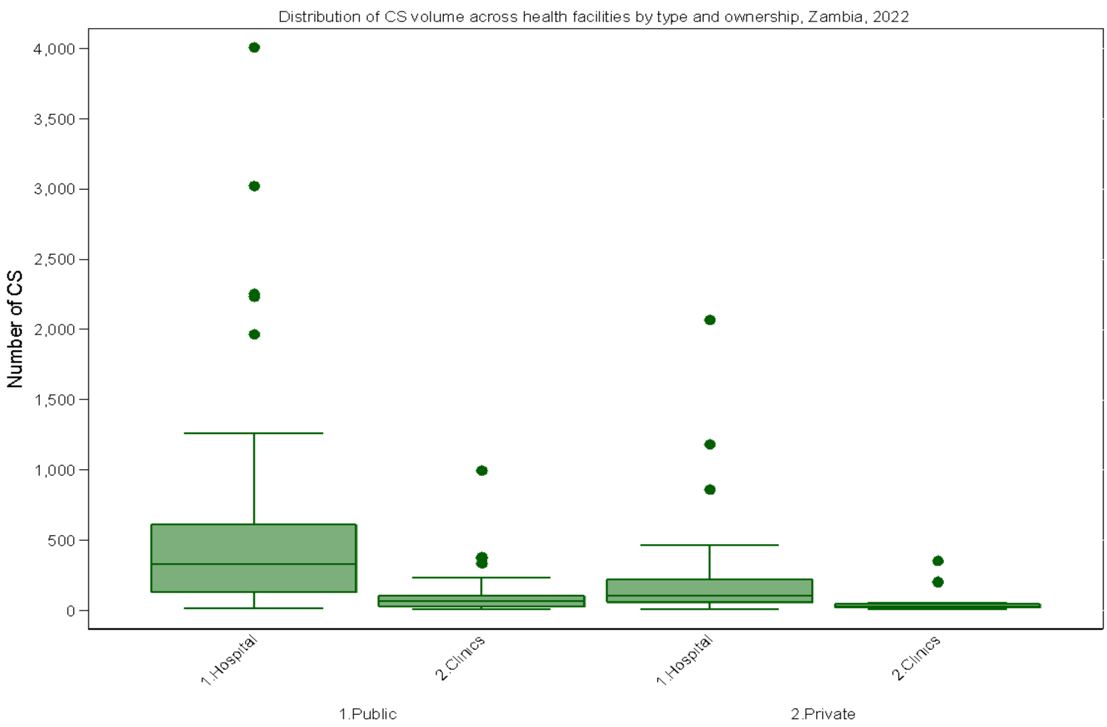


Figure 17: Distribution of cesarean section volume across health facilities by type and ownership, HMIS 2022

The boxplot below **(Figure 18)** shows the c-section rates among institutional births for each facility type. Public hospitals recorded a median institutional c-section rate of 20% while public clinics and private hospitals recorded a median institutional c-section rate of approximately 25%. However, c-section rates in some public clinics were higher than 100%. However, this observation could be a data reporting issue as some facilities reported much higher c-section volumes in certain months. The highest median c-section rate of 50% was recorded among private clinics.

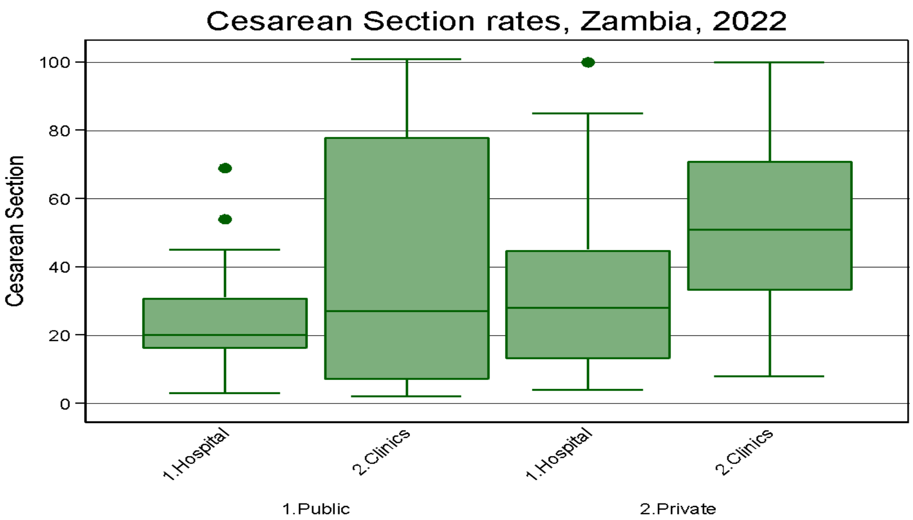


Figure 18: Cesarean section rates by facility level and ownership, HMIS 2022

Approximately 18.4% conducted 100-199 c-sections each, and 18.9% conducted 200-399 c-sections each **(Figure 19)**. Twenty-one percent of the health facilities recorded 400+ c-sections and contributed 67.3% to the total c-sections in 2022. The majority of health facilities (24.4%) recorded 1-49 c-sections each and these facilities contributed only 1.7% to the total c-sections, while another 17% conducting 50-99 per year accounted for only 4% of the annual c-sections. Meanwhile, the 21% of facilities doing 400 or more c-sections accounted for over 67% of c-sections in the country per year.

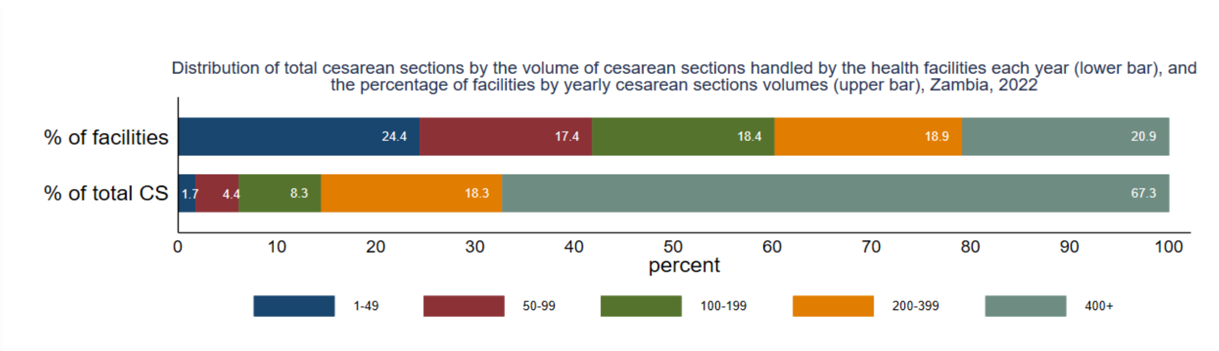


Figure 19: Distribution of total cesarean sections handled by health sections, HMIS 2022

Maternal mortality, stillbirths and neonatal mortality transition model stages

Table 5 shows the maternal mortality, stillbirth and neonatal mortality transition model stages (stage 1 being highest mortality and stage 5 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.[20]

Table 5: Summary of mortality transition stages and their characteristics[21]

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
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 unpreventable health status related deaths remain
Fertility transition					
Total fertility rate	Very high	High	Moderate	Moderate to low	Low
Abortion policy	Most restrictive				Most permissive

[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.

[21] 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.]

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

Zambia transitioned to stage III in 2020, from stage II in 2000 **(Table 6)** based on the mortality levels in each year.

Table 6: Mortality transition stages since 2000

	NMR	SBR	MMR	Transition phase based on mortality levels in Table 6
2000 (or similar year)	35	22	419	Stage II
2020 (or similar year)	25	14	135	Stage III

Regarding MNH interventions, the transition phase in 2020 was stage III for all the interventions with an interquartile range of 57-88% for institutional deliveries, 28-68% for hospital deliveries and 15% for the overall C-section deliveries with a range of 2-11% for C-section deliveries among the poorest.

For the health systems inputs, in 2020 there was a major increase in health worker density, although the nurse to physician ratio was declining. Regarding health financing, in 2020, there was an increasing health expenditure per capita, but still relatively low government share as % of GDP.

Policies in Zambia have increasingly aimed to improve demand generation, access, as well as quality and equity among the populations in Zambia. There is a need for expanding +BEmONC, especially CEmONC to prevent and manage complications and ensure universal access to CEmONC and specialized small/ sick newborn care to progress to stage IV. While existing policies and guidelines have been crucial in improving access to services and quality health services including protecting the health or life of the women and their children, there is need for continuous updating and dissemination of policies and guidelines to ensure optimal quality health services.

Synthesis of findings

Zambia has made substantive improvements in the provision of childbirth care for all interventions since 2000 with an interquartile range of 57-88% for institutional deliveries, 28-68% for hospital deliveries and 15% for the overall C-section deliveries with a range of 2-11% for C-section deliveries among the poorest. Generally, MMR has been on the decline over the past 20 years, with a reduction representing about 68% decline. However, we observe that NMR remained far higher at 25 per 1000 live births in 2021 (23 per 1000 in ZDHS 2018) than the 2030 target of 12 per 1000 live births or lower (SDG Target 3.2).

Neonatal deaths were also higher in 2018 within the lower-level facilities and at home than at hospitals. Further, we observed high rates of stillbirths in public hospitals compared to public clinics and private health facilities. This report's analysis of HMIS data also suggests that most stillbirths occur at a small proportion of facilities which are mainly.

In the past two decades, there has been an increase in coverage of facility deliveries, with the greatest increases in the proportion of deliveries occurring at lower-level facilities being attended by a nurse/midwife. While approximately half of all deliveries are happening in lower-level facilities, with a small proportion of deliveries were conducted by doctors in 2018. One fifth of all deliveries in lower level facilities in rural facilities were conducted by other non-skilled personnel.

Our observation that the Lusaka and Copperbelt provinces and the richer had more deliveries being conducted by a nurse/midwife demonstrates existing disparities in childbirth care with poor communities being disadvantaged. C-section rates across the different wealth quintiles have generally been increasing but more so in public hospitals. However, C-section rates in some public clinics were higher than 100%.

We also analysed the intended and actual health policy and system characteristics in place for the provision of safe delivery care. According to HMIS data in 2022, we found that the UN targets for health infrastructure and human resource per 10000 population of 2 facilities per 10,000 population, 18 beds per 10,000 population, or 23 health workers per 10,000 population has not been achieved in Zambia. However, we observed regional differences in health system characteristics with Northwestern province doing better than other sub regions such as Luapula and Western provinces.

Regarding the progress that Zambia has made in the past two decades in the maternal and newborn health outcomes between 2000 to 2020, Zambia has transitioned from stage II to state III for MMR, NMR (and SBR) levels. All the interventions including institutional deliveries, hospital deliveries and the overall C-section deliveries suggest which could be explained by the health systems inputs, observed in 2020 when there was a major increase in health worker density, although the nurse to physician ratio was declining. Health financing equally increased in 2020, with an increasing expenditure and low government share.

Last but not the least, this analysis has observed improvements in coverage of most maternal and newborn interventions and mortality ratios despite existing disparities by region, residence and socio-economic status which could be explained by a supportive MNH policy context. However, despite this finding, more targeted efforts that are responsive to existing disparities are needed to address the inequalities to access of quality childbirth care and maternal and newborn outcomes and by ensuring that services are equitable, safe and effective.

Recommendations for future strategies

Based on the findings, we suggest the following:

- We have observed that most policies focused more on increasing uptake of institutional delivery at facilities (which has happened, but at lower level facilities/ by nurses/midwives most). However, we also recommend development and updating of more policies and guidelines to cover CEmONC referrals and quality improvements to further address birth/newborn complications and emergencies (when a large number of the deaths occur)
- There is also need to ensure that all lower-level facilities across the country are more equipped to provide care BEmONC.
- There is need for proper referral systems of complicated cases
- There is a need to expand the number of rural facilities that are able to provide caesarean sections.
- Ensure increased access and quality CEmONC services, especially to the women in the poorer wealth quintiles (Q1 to Q3)
- Need to strengthen primary and secondary care for women with complications as well as sick newborns.

Annexures

Annex 1: Data quality assessments

Table 7: Summary of the health facility data quality assessment for 2018-2022

	Metric		2022
1	Indicators vs Reporting datasets	Number of facilities merged	2,540
		Number of facilities from Indicators not merging with Reporting data	0
		Number of facilities from Reporting not merging with Indicators data	1,854
2	Admin and Indicators reporting	Number of facilities merged	2,540
		Number of facilities from Admin not merging with indicators data	838
		Number of facilities from indicator not merging with Admin data	0
3	Facilities with 0 births per year	Number of facilities with 0 births per year	0

Table 8: Summary of the health facility data quality assessment for 2022

	Metric		2022
1	Completeness of monthly facility reporting for deliveries	a) % of expected monthly facility reports (national)	88
		b) % of facilities with 12 data points (100	60
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	84
		b) Livebirths	83
		c) Stillbirths	2.2
		d) Mean percentage of the individual percentages	56
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)	100
4	Extreme outliers over time	a) % of monthly values that are not extreme outliers	99
		b) % of facilities with no monthly extreme outliers in the year	95
5	**Overall data quality score (mean)**		85

Table 9: 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

Annex 2: Health policy tracker table

Table 10: Country tracker of national policies, guidelines, plans or strategies for MNH care

Topic	Yes or No? – WHO survey 2018/19	If yes, what is the name and years (and any related documents)?	If no, anything new in place since 2018/19 (name, year, documents/ URL)?	Add a comment on the strength or intensity of implementation of this policy/ law/ guideline
Governance: How are services meant to be governed to provide childbirth care for all women and newborns?				
Which national strategies/plans for the areas of Maternal and Newborn Health does your country currently have?	National RMNCAHN Road map/ Strategy 2013-16, RMNCAHN Communication Strategy 2018-21, National Health Strategic Plan 2017-21, Community Health Strategy 2017-2021, National Newborn Scale up Plan 2016-2020, RMNCAHN Investment case 2022-2024, National Health Policy (2012), Zambia National Maternal and Neonatal Referral Guidelines 2018			All these guidelines were disseminated to provinces during national dissemination meetings, and were used as reference documents during annual planning meetings These documents provide strategic direction in RMNCAH Programme implementation and are integrated in the Operational Plans at the sub national level
1. Is there a national coordinating body that looks at RMNCAH or its components? (indicator)	Yes	Inter-agency Coordination Committee (ICC)		Committee meets quarterly and guides the implementation of RMNCAH activities

				including resource mobilization Committee draws membership from key partners in RMNCAH to provide a platform for integration in the provision of RMNCAH services
2. Is there a national law or provision to guarantee universal access to primary health care to all?	Yes	Health in All Policy 2017-2021, Community Health Strategy 2017-2021		Both documents were disseminated to the provinces and other stakeholders
3. Are there national policies/guidelines on childbirth?	Yes	Zambia National Maternal and Neonatal Referral Guidelines 2018 Pregnancy, Childbirth, Postnatal and Newborn Guidelines 2020		Both documents were disseminated to the provinces, part of the mandatory documents necessary for improving quality of care for labor and delivery
4. Does the country have a national policy/guideline on the right of every woman to have access to skilled care at childbirth?	Yes	Respectful Maternity Care (RMC) Guidelines 2020		Training of health care providers in RMC undertaken

5. Is there any policy or legislation on abortion care in cases to protect the health or life of the woman? [22]	Yes	Termination of Pregnancy Act 1972, Zambia Standards and Guidelines for Comprehensive Abortion Care 2017		Standards and Guidelines disseminated and distributed to all facilities providing abortion services
6. Is there a national guideline on post-abortion care?[23]	Yes	Zambia Standards and Guidelines for Comprehensive Abortion Care 2017		Document disseminated to all provinces
Organization and resources: How are services organized and resourced (with facilities, health workers, and supplies) to provide childbirth care for all women and newborns?				
Health facilities				
7. If in place, does the national policy/guideline indicate designated health facilities as the preferred place of childbirths?	Yes	Zambia National Maternal and Neonatal Referral Guidelines 2018		Triaging of obstetric cases done on admission and those that require special care are referred to higher level facilities immediately
8. Are there national policies/guidelines on postnatal care for mothers and newborns?	Yes	Essential Newborn Care Guidelines 2014		Guidelines have been disseminated to all provinces

[22] Any document to specify if any legal grounds for abortion to preserve the health or life of a pregnant woman [https://bmcinthealthhumrights.biomedcentral.com/articles/10.1186/s12914-018-0183-1]. Data from Data from WHO Global Abortion Policies database: https://abortion-policies.srhr.org/

[23] Data from WHO Global Abortion Policies database: https://abortion-policies.srhr.org/

9. Does the national policy recommend length of stay under observation of skilled attendant for mother and the baby after normal childbirth at facility? If yes, how long?	Yes, 24-48 hrs	Essential Newborn Care Guidelines 2014 Postnatal Care Home Visits Guidelines 2019		Guidelines have been disseminated to all provinces
10. Is there any guideline in place for ensuring transport and/or emergency referrals specifically for childbirth?		Zambia National Maternal and Neonatal Referral Guidelines 2018		Provinces have been guided to prioritize maternity cases needing referral
Health workers				
11. Are there national policies/guidelines that set forth a competency framework for maternal and/or newborn health care?	Yes	Human Resources for Health Strategic Plan 2018-22		Training of health care providers in Emergency Obstetric and Newborn Care (EmONC) in order to enhance skills in managing maternal and newborn cases
12. Is there a continuous professional education system in place for primary health care clinicians and/or nurses to receive maternal and newborn health specific training?	Yes	Human Resources for Health Strategic Plan 2018-22		Continuous professional development (CPD) linked to renewal of license for professional staff
Supplies, drugs and commodities				

13. Are there national policies/guidelines on essential medicines and equipment?	Yes	Health Sector Supply Chain Strategy and Implementation Plan 2019-2021, Zambia Essential Medicines List		Strategy and implementation plan disseminated to sub-national level
14. If present, does the national childbirth policy/guidelines recommend the use of any of the following specific drugs (oxytocin or misoprostol) for the prevention and treatment of postpartum hemorrhage?	Yes	Pregnancy, Childbirth, Postnatal and Newborn Guidelines 2020 Emergency Obstetric and Newborn Care (EmONC) training package 2016		Reference made during EmONC training and mentorship
15. Does the country have a national policy/guideline on the availability of essential equipment in facilities where births take place?	Yes	Performance Improvement and Quality Assurance Strategy 2019-2021		Used as a reference document during service quality assessment
16. Are self-inflating bags (newborn size) with neonatal and pediatric masks of different size and valve included in the national list of commodities indicated for use in pregnancy, childbirth and postpartum care?	Yes	Essential Newborn Care Guidelines 2017		Document disseminated and used as a reference during the establishment of Neonatal Intensive Care Units
17. Are blood and blood products included in the national list of commodities indicated for use of pregnancy, childbirth and postpartum care?	Yes	Zambia Essential Medicines list 2020		Document available for public use

Service delivery: What supports are meant to improve the quality of childbirth care (technical competence and experiences of care)?				
18. Is there a national policy/guideline to improve quality of care (QoC) for health facilities?	YES	(Zambia National Maternal and Neonatal Referral Guidelines 2018) Performance Improvement and Quality Assurance Strategy 2019-2021 Quality Improvement Guidelines 2020		Used as reference materials to improve quality of care for women and the newborn
19. Does the national policy/guideline to improve quality of care address maternal health?	NA		Guidelines on a positive pregnancy experience Guidelines for implementation of people-centered health care	
20. Does the national policy/guideline to improve quality of care address newborn health?	NA		Maternal and Newborn Care Quality of Care Standards developed in 2023 Quality of Care standards for the small and sick newborn	
21. Are there mechanisms in place at the facility level to solicit feedback on quality and access from	Yes	Suggestion boxes placed		

community members (e.g. users, family?)		in health facilities Exit interviews		
22. If present, does the national childbirth policy/guidelines recommend the presence of a companion of choice during labor and birth?	No		Respectful Maternity Care Guidelines developed in 2020	
23. If present, does the national childbirth policy/guidelines recommend for the woman to choose the birthing position?	No		Respectful Maternity Care Guidelines developed in 2020	
24. Does the country have a national policy/guideline on the availability of clean water and sanitation in the facilities where the births take place?	Yes	National Health Strategic Plan 2017 - 2021 Respectful Maternity Care Guidelines developed in 2020		
Financing: how are childbirth care for mothers and newborns meant to be financed?				
25. Is there a national policy/legislation on free access to health services in the public sector at the point of use for newborns (0-4 weeks)?	Yes	User Fee Removal Policy 2006, Basic Health Care Package, Health Care Financing Policy 2017-2027		Policy disseminated to sub-national level
26. Are the following health services provided free of charge at point of use in the public sector for women of reproductive age: Cesarean section?	Yes, for all women	User Fee Removal Policy 2006, Basic Health Care Package, Health Care		Policy disseminated to sub-national level

		Financing Policy 2017-2027		
27. Are the following health services provided free of charge at point of use in the public sector for women of reproductive age: Management of other birth complications?	Yes, for all women	User Fee Removal Policy 2006, Basic Health Care Package, Health Care Financing Policy 2017-2027		Management of birth complications free at Primary Health Care level, other services such as investigations, C-section attract a charge at higher levels of care
28. Are the following health services provided free of charge at point of use in the public sector for newborns: Management of birth complications (asphyxia, prematurity, sepsis, congenital anomalies)?	Yes, for all newborns	User Fee Removal Policy 2006, Basic Health Care Package, Health Care Financing Policy 2017-2027		
Information: What data are meant to inform action, accountability, or advocacy on childbirth care for mothers and newborns?				
29. Is there a national policy/ law that requires every birth to be registered?	Yes	Strategic plan for CRVS 2015		Plans underway to start birth registration at health facilities
30. Is there a national policy/ law that requires every death to be registered?	Yes	Strategic plan for CRVS 2015		Needs strengthening because some community deaths are not registered
31. Is there a national policy/guideline/law requiring all maternal deaths to be reviewed?	Yes	Maternal Death Surveillance and Review 2013		Guidelines updated in 2023 awaiting approval

32. Is there a national policy/guideline/law requiring all stillbirths (fresh or macerated) to be reviewed?	Yes	Maternal Death Surveillance and Review 2013		Guidelines updated in 2023 awaiting approval
33. Is there a national policy/guideline/law requiring all neonatal deaths (0-28 days) to be reviewed?	No		Plans underway to develop a policy on this	
34. Have any SARAs or SPAs been conducted in the country, and in what year?	Yes (SARA)	SARA report (2016) HHFA 2017 and 2021		