The Republic of Uganda
MINISTRY OF HEALTH

SITUATION ANALYSIS OF THE NATIONAL NEWBORN HEALTH IN UGANDA

2023 UPDATE

REPORT

Image on front cover: Mother breastfeeding daughter at health clinic in Buyende, Uganda.

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SITUATION ANALYSIS OF THE NATIONAL NEWBORN HEALTH IN UGANDA – 2023 UPDATE

REPORT

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FOREWORD

Over the past decade, Uganda has made significant strides in enhancing healthcare services, particularly in maternal and newborn health. However, despite the recent reduction in newborn mortality from 27/1,000 live births (UDHS 2016) to 22/1,000 live births (UDHS 2022), the number of newborns dying remains unacceptably high, underscoring the need for intensified efforts and strategic interventions. This report provides a detailed assessment of our current challenges and opportunities.

The findings of this analysis are both enlightening and motivating. They highlight the critical areas where our healthcare system must evolve to meet the needs of our youngest and most vulnerable citizens. By focusing on community-level practices, health facility readiness, and the integration of new policies and guidelines, we can chart a course toward substantial improvements in newborn health.

This report also aligns with our national and international commitments, including the Sustainable Development Goals, and the National Development Plan III to reduce Neonatal Mortality Rate to less than 12/1,000 live births by 2030. It serves as a foundation for policymaking, program development, and resource allocation, ensuring that we are well-equipped to address the needs of newborns across the country.

I extend my heartfelt gratitude to all the partners, stakeholders, and researchers who contributed to this vital work. Your dedication and expertise are invaluable as we strive to create a healthier future for Uganda's newborns.

Together, let us commit to the recommendations outlined in this report and work collaboratively to achieve the targets set forth for newborn health in Uganda.

Dr. Henry G. Mwebesa

DIRECTOR GENERAL,
HEALTH SERVICES

ACKNOWLEDGEMENTS

The completion of the "**Situation Analysis of the National Newborn Health in Uganda – 2023 Update**" is a testament to the collaborative efforts of numerous individuals and organizations committed to improving newborn health in our nation. I would like to express my sincere appreciation to the Centre of Excellence for Maternal, Newborn and Child Health at Makerere University School of Public Health, the National Planning Authority, and the Child and Family Foundation Uganda for their leadership and coordination in conducting this study. Your tireless efforts and expertise have been crucial in providing an in-depth understanding of the current state of newborn health in Uganda.

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I am also grateful to our partners and funders, including ELMA Philanthropies, UNICEF, USAID through the USAID MCHN Activity by FHI 360, that provided financial and technical support for this study. Your contributions have been invaluable in making this analysis possible. Let us use the findings and recommendations of this report to drive forward our collective efforts in improving newborn health in Uganda. Together, we can ensure a healthier start for all newborns in our country.

Dr Richard Mugahi

COMMISSIONER, REPRODUCTIVE AND CHILD HEALTH DEPARTMENT

ACRONYMS AND ABBREVIATIONS

AFHS	Adolescent Friendly Health Services
ANC	Antenatal Care
EGH	Exemplars in Global Health
EmONC	Emergency Obstetric and Neonatal care
GH	General Hospital
HC	Health Centre
IMTF	Integrated Mortality Transition Framework
KMC	Kangaroo Mother Care
MaKSPH	Makerere University School of Public Health
MNH	Maternal and Newborn Health
MNCH	Maternal, Newborn and Child Health
MPDSR	Maternal and Perinatal Death Surveillance Review
MoH	Ministry of health
NICU	Neonatal Intensive Care Unit
NCU	Neonatal Care Unit
NMR	Neonatal Mortality Rate
NPA	National Planning Authority
NRH	National Referral Hospital
PNC	Post Natal Care
RRH	Regional Referral hospital
SITAN	Situation Analysis
SCU	Special Care Unit
SDG	Sustainable Development Goals
UNICEF	United Nations Children's Fund
WHO	World Health Organisation

OPERATIONAL DEFINITIONS

Neonatal period: commences at birth and ends at 28 completed days after birth

Neonatal Mortality Rate (NMR): The number of deaths during the first 28 days of life per 1,000 live births.

Early neonatal mortality refers to a death in the first week of life.

Late neonatal mortality refers to deaths between 7 and 28 days of life.

Infant Mortality Rate (IMR): The number of deaths between birth and one year of age per 1,000 live births.

Under-five mortality (U5MR): The number deaths between birth and five years of age per 1,000 live births.

Maternal mortality: This is the death of a woman in pregnancy or within 42 days of the termination of pregnancy.

Maternal Mortality Ratio (MMR) is expressed as maternal deaths per 100,000 live births.

Stillbirths: Pregnancy losses occurring after seven completed months of gestation are referred to as stillbirths and are expressed per 1,000 total births.

Integrated Mortality Transition Framework (IMTF): Based on research from a partnership between EGH and Countdown to 2030, the IMTF categorizes countries into five phases based on mortality levels, with phase 1 representing the highest mortality and phase 5 the lowest, assessing overall performance and progress through maternal mortality, neonatal mortality, and stillbirth rates, and highlighting specific characteristics for advancing to lower mortality levels.[1,2]

1 *Boerma T, Campbell OMR, Amouzou A, Blumenberg C, Blencowe H, Moran A, Lawn JE, Ikilezi G. Maternal mortality, stillbirths, and neonatal mortality: a transition model based on analyses of 151 countries. Lancet Global Health 2023;11:e1024-31. https://www.thelancet.com/pdfs/journals/langlo/PIIS2214-109X(23)00195-X.pdf*

2 *Campbell OMR, Amouzou A, Blumenberg C. The Countdown to 2030 Exemplars Collaboration, et al. Learning from success: the main drivers of the maternal and newborn health transition in seven positive-outlier countries and implications for future policies and programmes. BMJ Global Health 2024;9:e012126. https://gh.bmj.com/content/9/Suppl_2*

EXECUTIVE SUMMARY

1. The Aim of the SITAN

The overarching goal of this evaluation was to assess the current national situation of newborn health and the changes over time in Uganda to offer an evidence-based foundation to inform policy, programs, newborn strategies and future research in Uganda. Specifically, the objectives the assessment included;

1. To determine the trends and causes of neonatal mortality at the regional level
2. To assess the community level capacity to care for newborn babies, including:
    I. To evaluate capacity of community level health systems to deliver newborn care (including to conduct community sensitization, mobilization, continuity of care and referral of maternal and newborn emergencies)
    II. To assess the community level newborn health care practices
3. To assess the capacity of health facilities to provide care that ensures newborn babies survive and thrive, including:
    I. To assess health facility readiness for intrapartum care and care for the sick and small newborn babies
    II. To assess current newborn clinical care practices, including follow-up care, for small and sick newborns at facility level and adherence to quality of care standards
4. To document the existing policies and programmes for newborn care, and their coverage across the country
5. To map out critical stakeholders' and their contribution to newborn care
6. To provide evidence-based recommendations to improve newborn care and referrals.

2. How the SITAN was done

This was a mixed-method cross-sectional survey conducted in all 15 regions of Uganda, incorporating a variety of methodologies to comprehensively analyze the newborn health care situation in the country. A scoping review was conducted to establish a broad understanding of the existing newborn literature, context, policies, and guidelines. The analysis included secondary data analysis from the Uganda Demographic and Health Survey (UDHS) 2022, DHIS2, and a community survey that reached 3,542 households in different parts of the country. To gain deeper insights, 29 key informant interviews (KIIs) were conducted with stakeholders at the national, district, and health facility levels. The study also involved 9 focus group discussions (FGDs) with Village Health Teams (VHTs) and 90 detailed case studies, providing a thorough qualitative dimension to the analysis. In addition, a health facility-based readiness survey which was done at 43 public healthcare facilities that included the 2 national referral hospitals, all the 16 regional referral hospitals, 12 district hospitals, and 13 high-volume Health Center IVs (HCIVs).

3. Why Newborn Health In Uganda Matters Now

High Number of Newborn Deaths

Uganda's last SITAN was conducted 15 years ago. Since that time, there have been regional and national epidemiological and mortality transitions and changes in best practices for newborn care. Since the previous SITAN, Uganda neonatal mortality rate had stagnated at around 27 deaths per 1,000 live births. The recent UDHS 2022 revealed a nearly 20 percent reduction to reach 22 deaths per 1,000 live births. This shows that efforts put in place by the government, partners, and society are beginning to bear some fruits. However, Uganda remains off track to meet SDG 3.2 (NMR of 12 deaths per deaths per 1000 live births) and the aligned National Development Plan III (NDPIII), Sharpened Plan II and Health Strategic Plan (HSP) 2020/25 target of 19 deaths per deaths per 1000 live births unless it doubles its efforts (MOH, 2020, 2022; UN, 2015; NPA, 2020).

However, according to the latest UN estimates, Uganda experienced 62,000 deaths per year around the time of birth (4,800 maternal deaths, 26,000 stillbirths, and 32,000 neonatal deaths). With 1.7 million births per year and 250000 neonates needing special newborn care services each year, Uganda has a huge burden yet the investment is so far limited. Additionally, Uganda has not yet achieved the 2020 set joint targets for better care that included at least 80% of babies and mothers receiving postnatal care (PNC), and 80% districts with one or more WHO level 2 newborn care units (UNICEF & WHO, 2020). Currently, Uganda is in its early phase III NMR (30-16) of the integrated mortality transition framework (described in the next section), indicating an improvement in maternity and mild improvement in special neonatal care with 50% relative reduction. To make further progress in reducing perinatal mortality, Uganda needs a transition to intensive neonatal care which entails universal coverage for intensive care units.

Benchmarking Uganda in the Integrated Mortality Transition Framework

Based on work emerging from a partnership between the Exemplars in Global Health program and Countdown to 2030, Uganda was benchmarked along an Integrated Mortality Transition Framework (IMTF), the results of which can help prioritize activities to accelerate reductions in maternal and neonatal mortality.

Between 2000 and 2020, Uganda advanced from Phase II into early Phase III of the integrated mortality transition framework (IMTF), discussed in more detail within a chapter of this report.[1] The IMTF categorizes countries into five phases by mortality levels, with phase I representing the highest mortality levels and phase V representing the lowest. Progress across the framework highlights phase-specific characteristics linked to mortality decline, such as fertility decline in stages I and II, increased healthcare access in stages II and III, shifting causes of death from stages II to IV, improved care quality in stages III and IV, and reduced inequities in stages IV and V. Uganda being in phase III indicates declines in fertility and improvements to health service coverage. This progression indicates that although Uganda has experienced declines in fertility and increases in health service coverage, efforts are needed to further reduce fertility rates, continue narrowing equity gaps, and expand health service coverage to increase accessibility while improving quality of care for key MNH services.

To further contextualize Uganda's historical progress and guide efforts for further mortality reductions into lower phases of the transition, four indicators (total fertility rate, antenatal care coverage, institutional delivery rate, and c-section rate) were benchmarked nationally and sub-nationally using results from the Uganda 2022 DHS survey. These indicators were compared to ranges typically seen in countries with similar mortality rates within Phase 3. Uganda was broadly on track (indicator is within the typical coverage level ranges) for most indicators but was notably not on track (indicator is not within typical coverage level ranges) for total fertility rate (TFR), with the exception of Kampala.

At the subnational level, although most regions are generally on track across the four benchmarked indicators, Karamoja, Acholi, Busoga, and Buganda are regions that are mostly on track but at risk of becoming off track.

Results from this analysis indicate that targeted efforts may be warranted in the four benchmarked areas to further reduce mortality and promote accelerated reductions. As TFR in Uganda is broadly not on track for most regions with rates typically higher than what would be expected for a country in Phase 3, additional efforts to prioritize women's empowerment initiatives, especially among younger women, such as increasing female education rates and increasing availability and demand for family planning services, may be necessary. For health services, although coverage for key MNH services (e.g., institutional delivery, antenatal care coverage, and c-sections) has increased, and most regions in Uganda are on track for Phase 3, further efforts may be required for sustained improvement. These efforts could include targeted subnational initiatives to mitigate financial and logistical barriers to improve coverage and, at the national level, continued prioritization of improving the quality of care of key MNH services now that coverage levels have improved.

Uganda needs to double its annual rate of reduction in NMR if it is to achieve the SDG targets

To achieve the UN SDG 3.2, Uganda needs to have a neonatal mortality rate of less than 12 deaths per deaths per 1000 live births by 2030 and 19 deaths per 1000 live births by 2025 to realize its targets set in national health plans.

However, Uganda is in her early phase III integrated maternal, neonatal, and stillbirth mortality transition framework (IMTF), with huge subnational variations in total fertility rate. According to Countdown 2030 data, a total of 1,714,000 babies are born annually in Uganda; translating to 4,695 babies per day- indicative of very high fertility rates. Of these births, ***32,000 end up as newborns deaths***; ***26,000 stillbirths***; and **250,000** newborns ***needing newborn special*** **care** annually.

Although some progress in improving systems for maternal and newborn care has been recorded in the past few years, Uganda needs to ***move twice as fast*** with an annual reduction rate of neonatal mortality of 4.7% to achieve the SDG 3.2 target NMR of 12/1000 live births by 2030 as well as the National Development Plan III target of 19/1000 live births by 2025.

Furthermore, to realize these targets by 2030, joint support for national acceleration plans for maternal and newborn health is needed, with a special focus on humanitarian context and areas showing substantial inequalities.

Source: UDHS 2000, UDHS 2006, UDHS 2011, UDHS 2016, UDHS 2022.

New evidence and WHO standards For Newborn Care

In the recent past, the World Health Organization (WHO) has come up with new recommendations for newborn care, especially around the care of small and sick newborns. WHO now recommends at least 80% of districts with one or more level 2 newborn care units. To achieve these targets, Uganda will have to make significant investments.

In addition, WHO also recommends KMC as an important intervention for small and sick newborns at both community and health facility settings. Given the above recommendations, it is paramount to understand the current situation of newborn health in the country in order to prioritize investments and required proven impactful interventions.

KEY FINDINGS FROM THE SITAN

Policies, standards and guidelines

The Government of Uganda and partners has made efforts in the last decade to contextualize global policies and programs into national essential maternal and newborn clinical care guidelines and standards of care. Efforts have been made to align or revise national policy guidelines to WHO recommendations.

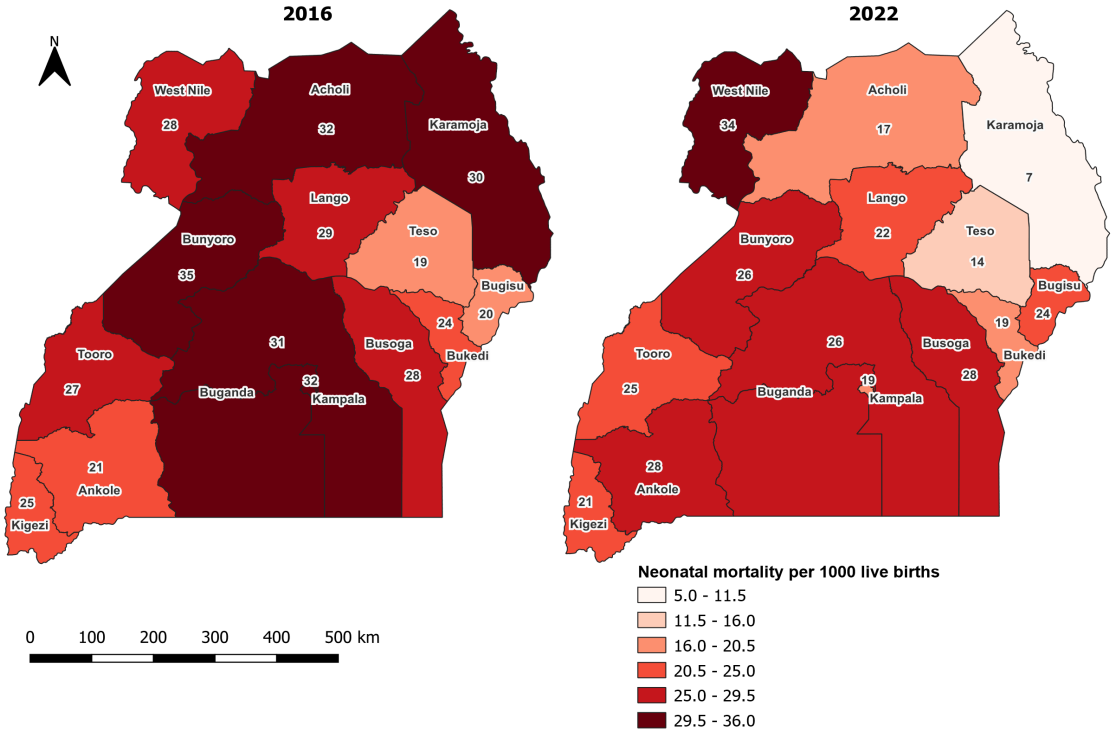
These current key guidelines guiding newborn care in Uganda include: Reproductive, Maternal, Newborn, Child, Adolescent And Healthy Aging-Sharpened Plan II 2020/21-2025/26; Clinical Protocols for Managing Small and Sick Newborns 2023; Uganda MOH Essential Maternal and Newborn Clinical Care (EMNC) Guidelines 2022; National Standards for Improving the Quality of Maternal and New Born Care 2018; MOH Integrated Management of Pregnancy and Childbirth Pregnancy, Childbirth, Postpartum; Newborn Care: A guide for essential practice 2016 and, National Integrated Early Childhood Development Policy (2016). Despite the adoption of these guidelines, dissemination and implementation is still sub-optimal.

On the other hand, Uganda is missing PNC guidelines, partly impeding the realization of the ENAP target of 80% postnatal coverage for both mothers and their babies.

Neonatal Mortality

Based on the recent UDHS, it was reported that Uganda's NMR is still unacceptably high at a rate of 22 deaths per 1000 live births (UBOS, 2022). Sub-national variations in mortality still exist, with the highest in West Nile (34 deaths per 1000 live births) and the lowest in Karamoja (7 deaths per 1000 live births). The NMR of 7 deaths per 1000 live births in Karamoja is a surprise given past rates and needs to be investigated further. Based on MPDSR findings, birth asphyxia was the leading cause of newborn deaths (60% of deaths), followed by prematurity and related complications (23%) and neonatal sepsis (7%). Birth asphyxia is preventable and therefore this high percentage of deaths due to asphyxia point to challenges in intrapartum care especially neonatal resuscitation.

While some regions have shown notable progress, neonatal mortality in Busoga has remained relatively high, showing no change or reduction within the same period, suggesting potential challenges in healthcare delivery. A reduction in Kampala (from 32 deaths per 1000 in 2016 to 19 deaths per 1000 in 2022) has been noted. West Nile experienced a setback with an increase in neonatal mortality rates from 28 deaths per 1,000 live births in 2016 to 34 deaths in 2022.



Source: UDHS 2023

Coverage and Equity Gaps in Essential Newborn Care

Fertility and Teenage Pregnancy Rates

Uganda's total fertility rate (TFR) remains high in Uganda, and is not on track relative to peers that have reduced mortality for phase III of the integrated mortality transition framework in the majority of the regions other than Kampala. In 2022 ***Karamoja and Bukedi had the highest TFR rates***, at 6.7 and 6.5 respectively.

According to UDHS 2022, the teenage pregnancy rate has virtually stagnated from 25% in 2016 to 24%. Strategies aimed at keeping young girls in school, women empowerment with improved contraceptive access are some of the strategies to tame the high fertility and teenage pregnancies.

ANC 4+ Coverage In Uganda

There was a marked improvement in antenatal care (ANC) attendance (four visits and above) from the previous SITAN from 47% to 67.8% in 2023. Of those that attended ANC, 32% had their first ANC attendance in the first trimester of pregnancy. ANC4+ coverage in Uganda is on track nationally, rising from 39.7% in 2000 to 67.8% in 2022, demonstrating strong coverage increases over time, with some subnational variation. Conversely, Buganda is not on track for phase III of integrated mortality transition framework with ANC4+ coverage of 49.9%. Bunyoro is on track but at risk of lagging with 60.3% ANC4+ coverage. Six regions, Lango, Karamoja, and Ankole, Bugisu, Kigezi and West Nile are ahead of track, above the expected ANC4+ coverage for regions in phase 3. While regional variation is large, urban/rural gaps are narrowing, indicating improvements in equitable access to healthcare.

Birth Preparedness

Birth preparedness is a strategy to promote the timely use of skilled maternal and neonatal care especially during delivery/childbirth. Birth preparedness is usually carried out by the pregnant mother and her spouse/family. The key elements in birth preparedness include identification of a facility where delivery will take place and a skilled attendant, arranging transportation, preparation of the items that will be used during delivery, preparation of the baby's clothes, and identification of a companion/attendant during the labour process.

From the survey, almost all (90%) of the mothers made some form of preparation for birth. This was similar across all age groups with no urban-rural difference. The only exception was in Karamoja region where only 35% of the women prepared for birth. This could be because of its nature as a nomadic community and high poverty levels. Special programs should be designed, and extensive sensitization carried out to counteract this.

Institutional Deliveries

Over the years, institutional delivery rate in Uganda has improved from 37% in 2000 to 90% in 2023. Institutional delivery and skilled birth coverage facilitate the provision of interventions at the most crucial time points. Despite the notable improvement in health facility deliveries, home deliveries are still common, especially among non-educated women, women 40 years and above, and those living in rural areas. Regional variations in home deliveries showed the highest in Islands (32.8%), Lango/Acholi (20.3%), South Buganda (16.9%) and Bugisu (19.3%) regions Regional equity gaps decreased from 38.1% in 2016 to 14.8% according to the 2022 UDHS. Government run facilities handled most deliveries (83.4%), 40.7% in health centres and 42.7% in hospitals while 7.3% delivered from private facilities (PNFPs and PFPs).

Notably 33.8% of teenage mothers could not identify signs of labour. However, delays 1 (the delay to make a decision to seek care) and 2 (the delay to reach the facility) still exist within the community because of insufficient birth preparedness and lack of proper transport means. Postnatal coverage for mother and baby was still very low at 59.9% and 10.5% respectively.

C-Section Rates

C-section rates in Uganda increased from a national average of 2.6% in 2000 to 13.5% in 2023. The highest prevalence of caesarian sections was noted in South Buganda region (22.6%) followed by Tooro (16.7%) and Greater Kampala Metropolitan (15.1%). The regions with the lowest prevalence of C-sections were Karamoja, Islands, Lango/Acholi, Bunyoro and Bugisu regions. Karamoja and island areas are not on track for phase 3 with a C-section rate of 4.3% and 4.5 respectively.

Role of Community Health Workers

Community Health Workers (CHWs), known as Village Health Teams (VHTs) in Uganda, are vital in enhancing neonatal health. These community-based workers were introduced to provide preventive and curative services, focusing on maternal, newborn, and child health at the community level. For maternal and newborn health care, they are expected to aid in identification of high-risk pregnancies, conducting home visits to encourage essential newborn care, educating mothers and caregivers on newborn health, conducting community-based surveillance, and promoting maternal and child health services. Despite their critical contributions, VHTs face challenges such as poor motivation, insufficient tools and supplies, and lack of transportation.

The role of community health workers or VHTs in improving newborn care and linking families with health services and the opportunities to introduce newborn care in iCCM have been well documented

in Uganda. However, the process for building VHTs programs needs to be adapted to the local setting, including the process of VHT selecting, training, deployment, supervision, and motivation within the context of a responsive and available health system. Although iCCM and IMNCI programs are highly well appreciated to improve health outcomes of sick newborns by stakeholders including community, evidence at countrywide implementation and impact is still limited. The contributions of VHTs in referral of sick newborns to health facilities and follow-up on referrals as per the iCCM policy are minimal. To maximize their effectiveness, it is crucial to ensure they receive adequate training, supervision, and resources.

Male Involvement during Pregnancy, Labour and Delivery

In Uganda, male involvement in maternal health still remains a big challenge despite the critical roles men play in decision making and providing financial, emotional and physical support. Traditionally, maternal, newborn and child health care is seen as a women's issue. However, over time, there has been some improvement with regards to male involvement in maternal, newborn and child health care. Involvement in this survey referred to presence of men during ANC, labour/delivery and helping out mothers during the postpartum period.

Only about a third (36.8%) of pregnant women were accompanied by male partners for antenatal care. Of these, majority (64.3%) participated in 1-2 visits. Regional disparity of male involvement was evident in antenatal care with greatest support in Ankole (80.7%), Bugisu (77.2%) and Greater Kampala Metropolitan (69.3%). The least male support during ANC was seen in Teso (26.2%) followed by Lango/Acholi/Acholi (37.8%) and South Buganda (40.8%).

Newborn Care Practices at Community Level

Essential newborn care practices were assessed as composite indicators (including optimal breast-feeding practices, optimal thermal care, and optimal cord care practices). **Overall adoption of beneficial optimal essential newborn care practices was only 15%** countrywide. We found optimal (all practices correct) cord care was 45%, optimal thermal care was 27% and optimal breast-feeding practices was 69%. Although Kangaroo Mother Care (KMC) was practiced widely for preterm and low birth weight babies at community level, the duration and number of times KMC was practiced per day varied with an average total duration of 2 hours a day. Furthermore, only 20% of babies who started KMC in health facilities were followed up at community level. There is still a maternal knowledge gap in the community on essential newborn care practices especially time for bathing (27.2% of mothers citing correct practices), breast feeding (69.2%), cord care (44.6%), newborn danger signs (62.7%) and postnatal care timing and duration.

With a national average of 15.1%, optimal newborn care index was generally poor across all regions. Regional variation in newborn care practices was evident, with Bugisu and Busoga with the highest percent practicing essential newborn care (20%) and Kigezi as the lowest at 3%.

Knowledge of newborn danger signs

Dangers signs awareness: About 6 in 10 mothers (62.7%) were able to correctly state 3 or more newborn danger signs while 24.7% correctly mentioned 2 signs and 12.6% mentioned one or did not mention any danger sign. Furthermore, 3 or more danger signs were mostly mentioned by adolescent/teenage mothers aged 15-19 years (70.3%) and mothers aged 45-49 years (77.5%). Interestingly, the regions that had highest proportion of mothers who knew 3 or more newborn danger signs included Islands (87.1%), Karamoja (77%), Busoga (72.7%), Greater Kampala Metropolitan (65.2%) and Bugisu (81.7%). The most commonly mentioned signs included fever (78.7%), baby less active than usual (62%), difficulty in breathing (33.7%), convulsions (28%), failure to feed (24.2%), pus from the cord (11%), vomiting (10%) and, yellowing of eyes/palms (6.1%).

Care Seeking for sick newborns

Care seeking varied depending on the perceived severity of the newborn illness. The decision to seek care was taken by immediate family, especially the mother. Generally, care seeking for newborn illnesses was frequently delayed because of presence of home remedies as the first option for care. When this failed, care was sought from health facilities, often with referrals from one facility to another (higher level) due to inadequate health worker skills in managing sick newborns at the lower level facilities. It was found that 47% of the babies that fell ill were given home treatment first and only sought care at facilities when the baby did not improve. The most common type of remedies used at home included giving western medicines like syrups that were already at home (56%), tepid sponging (7.0%), herbs (7.0%) and cold water baths (1.2%). Home remedies were more likely to be used in rural areas (51%) compared to urban areas (45%). It was also noted that cultural beliefs and practices influenced the care of sick newborns. From the survey, 65% mothers sought care for their babies outside home after trying home remedies. Of these, the first level of care seeking for the majority (44%) was from a health facility, 39% from a drug shop/nearby clinic, and 12% from a hospital.

Newborn Referral

Functional ambulances were available at hospital level facilities and in 54% HC IVs. However, there was a notable challenge with provision of fuel for ambulances. For onboard thermal care maintenance, transportation incubators were generally unavailable across board. Thermal care during transportation was mainly provided by using blankets or skin to skin.

Congenital Anomalies (CA)

The burden of congenital anomalies is not well known in Uganda but is estimated to be at a prevalence of 6.6%. There is no national registry of birth defects. Findings from a hospital based survey in Kampala showed that the most prevalent defects in Uganda per 10,000 births are hypospadias (23.4/10,000), clubfoot (14.0), neural tube defects (10.3) and cleft lip and palates (7.6). Diagnosing congenital abnormalities in Uganda is challenged by several factors including affordability, accessibility to advanced diagnostic technologies, insufficient funds in healthcare, limited healthcare capability and structure and a shortage or non-existence of trained healthcare professionals. Therefore, there is a need for efforts to address CAs in Uganda through multi-sectorial and multidisciplinary approaches, healthcare development, awareness campaigns, prenatal and perinatal care programs, and capacity-building initiatives.

Health Facility Readiness and Quality of Care

Availability of NICUs by level of care: All National Referral Hospitals (NRHs) met the standards for level 3 Neonatal intensive Care Units (NICU) in terms of infrastructure to care for sick and small newborn babies. However, the Kawempe NRH NICU was found to be overcrowded to offer quality services. Only 4 of the 16 (25%) assessed Regional Referral Hospitals (RRHs) met level 2 care requirements, and only one district hospital met the standard for a level 2 NICU (8.3%), which is far below the WHO recommended target of 80%. Surprisingly, many NCUs lacked one or so equipment to meet the desired standard. There was also a lot of broken equipment in the hospitals assessed. Overall, newborn care infrastructure is insufficient at lower health facilities handling the highest number of deliveries.

Human resources for newborn care: Overall, no hospital was found to meet the MOH staffing norms for newborn care. None of the facilities had specialized neonatal care nurses, and we found only 3 neonatologists present in the facilities assessed. The RRH were found to be sufficiently equipped with

pediatricians while on the contrary, 50% of the GHs lacked pediatricians. In most places, newborns are managed by general nurses and midwives.

Commodities and Equipment: Chlorhexidine for cord care was available at NRHs and only present in about half of the remaining facilities per level with least availability at RRHs (43.8%). Seven health facilities reported to have never received chlorhexidine gel. Tetracycline eye ointment and vitamin K were present at almost all levels of care during the facility assessment Caffeine citrate which is the preferred and recommended medicine for management of apnea of prematurity (AOP) was only found at the NRHs, 6/16 RRHs and 2/12 GHs. Overall, the readiness in terms of commodities for essential newborn care was excellent at NRHs and good at RRHs, GHs and HC IVs.

Although the two hospitals at the highest level of newborn care (Kawempe NRH and Mulago women and neonatal specialized hospital) had almost all the equipment, medicines and supplies needed for neonatal resuscitation, Kawempe NRH lacked oxygen blenders to deliver safe oxygen and effectively manage respiratory distress. On the other hand, more than half of the assessed RRHS and GHs lacked critical equipment including patient monitors, suction devices, and oxygen blenders critical for newborn resuscitation. Only 1/12 district hospitals had the necessary equipment, supplies and commodities to offer level 2 neonatal care. The assessment revealed non availability of functional CPAPs and patient monitors in 7 RRHs and 6 GHs respectively. It is worth mentioning that all RRHs and GHs had the recommended level 2 neonatal care equipment, however most of this equipment were non-functional and required repairing.

Kangaroo Mother Care (KMC): The adherence to quality KMC practices/standards was inadequate at all levels. Best KMC performance was seen at RRHs (61.1%) while the worst performance was at HC IV level (12.5%). NRHs and GHs almost had similar performance at 50% and 56.3% respectively.

Infection prevention and control (IPC): Seven domains of IPC were assessed including Personal Protective Equipment (PPE), facility hygiene, and hand hygiene, running water, waste management, equipment processing /disinfection /sterilization and IEC materials. Overall, the IPC readiness was excellent at NRHs (95.2%) and good at the other levels [RRH (88.3%), GH (80.8%), and HCIV (77.4%)]. The poorest IPC performance was in the domain of equipment processing/disinfection/sterilization with NRH (80%) and HCIVs (79.5%) scoring well while RRH (50%) and GH (45%) scored poorly. Many facilities lacked cidex while 3/9 of the GHs lacked a functional autoclave. Although PPE including masks, surgical and examination gloves were available in almost all facilities assessed, 2/16 (13%) of RRHs did not have face masks. Similarly, access to running water was not available in 1 RRH, 2 GHs, and 3 HCIVs.

In as much as readiness for IPC was found to be good at all levels of care, the quality of the IPC processes conducted was found to be fair at RRH (75.2%) and GH (77.2%) level but very poor at NRH (47.5%) and HCIV level (53.9%). At NRH level, proper waste disposal recommendations including waste segregation was not observed. There was also poor processing and sterilization/autoclaving of equipment at NRH level.

Recommendations

There is urgent need faster systems change. This requires leadership, investment and innovation at all levels of governance.

Uganda has made some modest progress in improving newborn health after almost two decades of stagnation. Despite this, Uganda is not on track to achieve the set national and SDG targets for newborn health. In order for Uganda to achieve targets, it needs to do much more, to move twice as fast. To do so, Uganda will need focused leadership, investment, and innovation in implementation to achieve high coverage equitably. It will require packages of interventions, more than one system change, more than one level of care, and change beyond the ward into communities. The country should adopt a national plan and the MoH should ensure that all partners adhere to it. Based on the findings of the SITAN, here below are the major recommendations. Their implementation should be linked to the RMNCAH Sharpened Plan while also ensuring the mother-baby dyad.

1. **Urgently address the high fertility rate, including efforts to reduce rates of teenage pregnancy**

    - Improve awareness and uptake of family planning methods, by leveraging the community health workforce and available social media platforms, to aid in demand generation
    - Ensure sufficient and equitable access to quality contraceptive commodities by strengthening supply chain, HRH capacity, and monitoring systems to reduce stockouts

2. **Improve health service uptake and quality that links the mother and the baby**

    - Antenatal care: Sub-nationally ensure targeted efforts to mitigate financial and logistical barriers to improve coverage in specific regions (e.g. Karamoja and Buganda). At the national level, prioritize quality of care for key MNCH services now that coverage levels have improved
    - Increase amount of CEmONC facilities and upgrading of lower-level facilities to perform C-sections and other emergency procedures, especially bridging coverage gaps in regions such as Karamoja, Acholi and Busoga that are lagging behind. Nationally, there is urgent need to improve the quality of C/S and other CEmONC services.
    - Strengthen referral systems from lower-level to higher-level facilities including developing an innovative referral systems for sick and vulnerable newborn babies.

3. **Operationalize quality maternal and newborn care in hospitals:**

    - Scale up small and sick newborn care at national and regional referral hospitals and at least 80% of general hospitals as recommended by WHO/UNICEF.
    - Ensure implementation of quality standards for newborn care, including resuscitation and infection prevention and control.
    - Adopt new neonatal intensive care unit (NICU) designs that meet updated standards and support kangaroo mother care (KMC) practices.
    - Ensure quality of care, particularly key for CPAP, + safe oxygen use
    - Ensure sufficient items are in place (right people, products and data collection tools) to aid in data monitoring and metric tracking for quality of care monitoring

4. **The findings show that most births and most of the care for small and sick newborns occur in communities or in the PHC setting. Therefore, Uganda should develop and implement a package of care for newborns within the primary healthcare context:**

- Develop guidelines for newborn care at community level and within primary healthcare facilities.
- Define standards for newborn care at primary healthcare facilities, including referral and follow-up protocols.
- Implement an aggressive engagement and education strategy for community members on maternal and newborn care with a special focus on Karamoja, Buganda, and islands and other hard to reach populations.

5. **Review human resources for newborn care:**

   - Adopt or develop human resource norms for newborn care at different levels of the health-care system.
   - Consider introducing specialized cadres for newborn care, such as neonatologists and neonatal nurses, to improve skills mix.
   - Standardize pre-service training in newborn care and enhance ongoing professional development opportunities

6. **Develop evidence-based policies and programs to address emerging areas of newborn health such as congenital abnormalities:**

   - The Ministry of Health should collaborate with stakeholders to develop evidence-based policies and programs to address emerging areas of newborn health such as congenital abnormalities, integration with HIV/AIDS and sickle cell disease prevention, post-NICU discharge follow-up, and management of neurological complications. These initiatives must prioritize prevention, early detection, and equitable access to high-quality care for all newborns in Uganda.

7. **Foster Data-Informed Decision-Making:**

   - Strengthen data utilization mechanisms to enhance the use of routine data for maternal and newborn health.
   - Provide training and capacity-building initiatives for healthcare providers and decision-makers on data analysis and interpretation.
   - Develop user-friendly dashboards, reports, and policy briefs to present key findings in a clear and accessible manner.

8. **Enhance mechanisms for partner coordination, management, and accountability:**

   - Strengthen national and subnational reproductive, maternal, newborn, child, and adolescent health and nutrition (RMNCAH/N) networks.
   - Establish transparent frameworks for partner coordination, participation, contribution, and accountability.
   - Foster organizational commitments to shared network goals and accelerate capacity for strong, equity-based RMNCAH/N programming.

9. **Future research:**
   Prioritize implementation research (IR) in routine programming:

   - Embed implementation research into all routine programming to facilitate the scale-up of effective and scalable programs.
   - Ensure that program implementation is informed by evidence, including IR, to develop successful models for wider scale-up.

Review curriculum content, knowledge, and skills of the training institution.

- Whereas these institutions produce the country's workforce, they have not been a target for capacity building as most initiatives focus on in-service training.

Conduct research on maternal and newborn care in the private sector as they provide most of the care in urban settings.

Promote dialogue and action between academic, policy, and budgetary realms to capitalize on Uganda's existing expertise and address healthcare transitions effectively.

These recommendations aim to address the identified gaps and challenges in newborn care in Uganda and provide a roadmap for improving implementation and outcomes at various levels of the healthcare system. By prioritizing these recommendations, stakeholders can work together towards achieving the Sustainable Development Goal targets and ensuring equitable access to quality maternal and newborn healthcare services across the country.

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CHAPTER

01

BACKGROUND

Globally, the highest burden of neonatal mortality is in Sub-Saharan African with a rate of 27 deaths per 1000 live births. Countries in this region including Uganda have to double or triple their efforts if they are to achieve the highly ambitious Sustainable Development Goal target of reducing neonatal mortality to less than 12 per 1000 live births by the year 2030.

In Uganda, the neonatal mortality has had a slow rate of reduction over the past 15 years with estimates of 29/1000 in 2006, 27/1000 live births in 2016 and 22/1000 live births in the most recent Uganda demographic health survey of 2022 (1, 2) despite improved inclusion of newborn health in the government's national development efforts since 2006. According to Countdown 2030 data, a total of 1,714,000 babies are born annually in Uganda; translating to 4,695 babies per day (3). Currently, newborn deaths contribute to about 42% of under-five mortality in the country (4). The leading causes of newborn deaths include preterm birth, birth asphyxia and infections (5). This high rate of newborn mortality has been attributed to poor maternal and newborn care practices at both community and facility levels, including poor access, utilization and quality of health services provided (6).

Documents such as the five year Sharpened Plan for 2016 highlighted the roadmap of government strategies to achieve improved newborn survival(7). Such strategies included wider coverage of implementation of high impact maternal and newborn health (MNH) interventions along the continuum of care, addressing quality inequities and geographical disparities, scale up of community-based service delivery and demand creation through the Village Health Team scheme, addressing skills' capacity of health workers, and improving partner and multi-sectoral coordination for better MNH service

delivery. However, there is a newly developed sharpened plan II for 2021-2026 which builds on the previous sharpened plan and focuses on increasing productivity of the population for better quality of life for all through ending preventable maternal, newborn, child, and adolescent deaths; and promoting the health and development of all children, adolescents, and women(8).

Trends in demographic and socio-economic indicators of Uganda

Over the last two decades, there has been an overall positive trend in most of the reproductive health demographic indicators despite the rapid population increase. However, there is sluggish improvement in some indicators such as neonatal mortality, teenage pregnancy and contraceptive use as seen in the table 1 below.

Table 1: Demographic and socio-economic indicators of Uganda

	Year				
Indicator	**2000**	**2006**	**2011**	**2016**	**2022**
Total population (millions)[1]	24.02	28.773	33.295	38.748	47.249
Growth rate (%)[1]	3.19	2.98	2.95	3.39	3.04
Total Fertility rate (%)	6.9	6.7	6.2	5.4	5.2
HIV Prevalence (%)	7.6	6.4	6.3	5.9	5.2
Teenage pregnancy rate (%)	31	25	24	25	24
Contraceptive Use (all methods)(%)	14	18	26	35	37
Under 5 mortality rate (per 1000 live births)	151	128	90	64	52
Infant Mortality rate (per 1000 live births)	88	71	54	43	36
Neonatal Mortality rate (per 1000 live births)	33	27	27	27	22
Maternal Mortality rate (per 100,000 live births)	524	418	438	336	189
Health facility delivery rate (%)	37	42	57	73	91
Delivery by skilled provider (%)	37	42	58	74	91
ANC (4+ visits) (%)	42	47	48	60	72
ANC by skilled provider (%)	90	93	95	97	95
GDP per capita (in USD)[1]	258	347	837	754	964
Literacy rate (%)	68.14	71.37	73.21	73.21	79

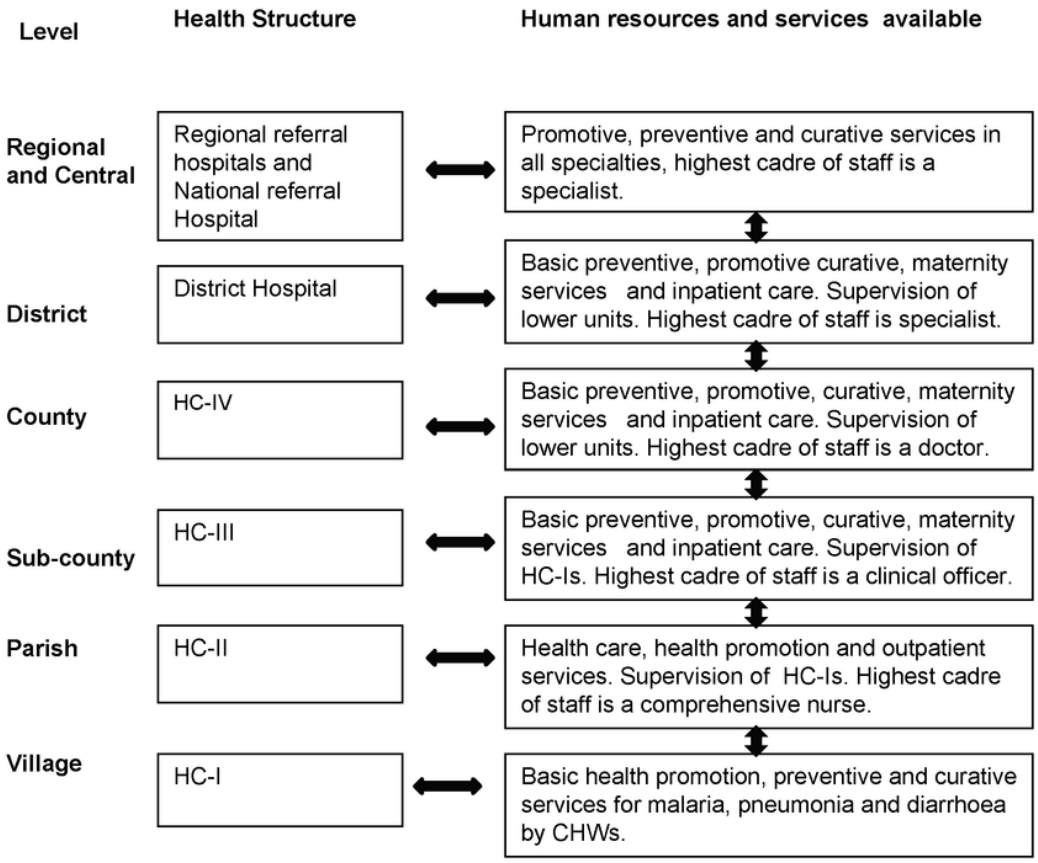
Sources: Uganda demographic Health Surveys- UDHS 2000, UDHS 2006, UDHS2016, UDHS 2022

Overview of the health system in Uganda

The health system in Uganda is decentralized and hierarchical in nature with a mix of both private and government health care providers. In the government/public health sector, the lowest level of care is at the village level through the Village Health Teams. This is followed by health Centre II level then Health Centre III level to Health Centre IV level to District hospitals to Regional Referral hospitals and finally the National Referral hospitals which are the highest level of care in the tier as depicted in Figure 1. Different services are provided at each level. The private sector which includes Private Not for Profit, Private for Profit facilities provides 45% of health care according to the Ministry of Health.

1 https://www.macrotrends.net/countries/UGA/uganda/population-growth-rate. Accessed on 09th November 2023

Figure 1: Healthcare system hierarchy in Uganda



Source: Extract from Nanyonjo et.al 2013

Role of Community Health Workers in neonatal health

Evidence both globally and locally in Uganda has shown that Community Health Workers (CHWs) also known as Village Health Team members play a critical role in improving neonatal health in Uganda(9-16). These frontline health workers are trained and equipped to provide a range of preventive and curative services at the community level, including maternal, newborn and child health services. In Uganda, CHWs are organized into a national program known as the Village Health Teams (VHTs), which are made up of volunteer community members who are selected by their peers and trained to provide basic health services in their communities. The VHTs are typically responsible for health promotion, disease prevention, and community-based care for pregnant women, newborns, and children under five years of age. The VHTs play a big role in improving neonatal health by Identifying and referring high-risk pregnancies, conducting home visits to promote essential newborn care practices such as breastfeeding, warmth, hygiene, and recognition of newborn danger signs; Providing health education to caregivers on essential newborn care practices and danger signs to promote early detection and prompt referral of sick newborns; Conducting community-based surveillance to identify and report cases of neonatal illness, including infections and birth asphyxia, to health facilities for appropriate management; Promoting the uptake of maternal and child health services by sensitizing community members on the importance of seeking care at health facilities during pregnancy, childbirth, and postpartum. VHTs are essential in expanding access to essential newborn care services and improving neonatal health outcomes in Uganda. However, this important category in health care faces many challenges including poor motivation, insufficient tooling (job aides and supplies), and lack of transport means to facilitate their movement in the villages. Therefore, to maximize their impact, it is

important to ensure that the VHTs are adequately trained, supervised, and supported with the necessary tools and resources to perform their duties effectively.

Therefore, the goal of this study/newborn health situation analysis is to assess the current national situation of newborn health in Uganda including levels of newborn care practices and mortality, coverage of implementation including availability and adherence to standards, implementation strength and gaps, and a mapping of partners and opportunities for improved implementation.

This study was co-designed by ELMA philanthropies and partners including Makerere University School of Public Health, the Ministry of Health the National Planning Authority, USAID Maternal Child Health and Nutrition (MCHN) Activity /FHI360 and UNICEF. Study findings will aid government in partner mobilization, intervention design and implementation, and resource allocation. The study will provide findings for the development of a focused national strategy and implementation plan aligned to the new Sharpened RMNCAH/N plan.

Justification

Uganda has set targets in the National Development Plan 2020–2025 (NDP III) to reduce Infant Mortality Rate from 43 to 34 per 1000 live births and neonatal mortality from 27 to 19 per 1000 live births by 2025(17). With the ambitious SDG targets of a Neonatal Mortality Rate (NMR) of less than 12/1000 live births and a revised focus on the survive, thrive and transform agenda (18, 19), Uganda is unlikely to achieve this target at the current rate of implementation. There is a need to understand the current bottlenecks to improved neonatal outcomes. A previous newborn situation analysis was conducted about fifteen years ago in 2008(20). This is now outdated and there is critical need to understand why improved focus on newborn policy, advocacy and implementation has not resulted in a reduction in neonatal mortality. This must be done before contextualized solutions can be generated and applied. In addition, there are new global strategies for newborn and child health aimed to support countries to achieve quality services and universal health coverage. Some of those strategies include: the WHO recently released standards for improving quality of care for the sick and small newborn babies at health facility level(21), the WHO/UNICEF strategy on child health redesign following the life course from preconception to adolescence, and the nurturing care framework to ensure children achieve their developmental potential (22). It is important to understand to what extent these guidelines are informing and or integrated in the national level implementation plans, and what more requires to be done to improve newborn outcomes.

Evaluation objectives

Overall objective

The overall objective of this evaluation was to assess the current national situation of newborn health and the changes over time in Uganda. Specifically, we assessed the levels of newborn care practices and mortality, barriers and facilitators in the care of the small and sick newborns. delays in care re In addition, we also assessed the coverage of implementation of newborn interventions including availability and adherence to quality-of-care standards, implementation strength and gaps, and a mapping of partners and opportunities for improved implementation.

Specific objectives:

1. To determine the trends and causes of neonatal mortality at regional level
2. To assess the community level capacity to care for newborn babies

    I. Evaluate capacity of community level health systems to deliver newborn care (including to conduct community sensitization, mobilization, continuity of care and referral of maternal and newborn emergencies)
    II. Assess the community level newborn health care practices

3. To assess the capacity of health facilities to provide care that ensures newborn babies survive and thrive

    I. Assess the health facility readiness for intrapartum care and care for the sick and small newborn babies
    II. Assess the current newborn clinical care practices, including follow-up care, for small and sick newborns at facility level and adherence to quality of care standards

4. To document the existing policies and programmes for newborn care, and their coverage across the country
5. To map out critical stakeholders' and their contribution to newborn care
6. Provide evidence based recommendations to improve newborn care and referrals.

CHAPTER 02

METHODS

Study Design

This was a mixed methods study employing a cross sectional design and utilizing both qualitative and quantitative study methods.

Study Area

The study was conducted in 2 national referral and 16 regional referral hospitals in the 15 regions of Uganda according to the UDHS 2016 regions described. In addition, we selected 15 district hospitals randomly in districts that do not have regional referral hospitals. Furthermore, 15 high volume Health Centre IVs were purposively selected in each of the 15 districts selected. Kampala was considered as a special urban area, to bring out uniqueness of an urban setting. The selected districts are indicated in Table 2 below.

Table 2: Study areas/regions for the situation analysis of newborn health in Uganda

UDHS Region	Districts	National referral hospitals	Regional referral hospitals	General hospitals	Health Centre IVs
South Central	Masaka, Rakai,		Masaka RRH	Rakai hospital	Kakuuto HC IV
North Central	Mubende, Kayunga		Entebbe RRH	Kayunga hospital	Bbale HC IV
Kampala	Nakawa, Kawempe Divisions	-Mulago women and neonatal hospital -Kawempe hospital	-China-Uganda Friendship hospital		Kisenyi HC IV
Busoga	Iganga, Jinja		Jinja RRH	Iganga hospital	Bugono HC IV
Bukedi	Tororo			Tororo hospital	Nagongera HC IV
Bugisu	Mbale, Bududa		Mbale RRH	Bududa hospital	Bufumbo HC IV
Teso	Soroti, Kumi		Soroti RRH	Kumi/Ongino hospital	Kumi HC IV
Karamoja	Moroto		Moroto RRH	Amudat hospital	Nabilatuk HC IV
Lango/Acholi	Lira		Lira RRH	Apac hospital	Amach HC IV
Acholi	Gulu, Nwoya		Gulu RRH		Awach HC IV
West Nile	Arua, Yumbe		Arua RRH Yumbe RRH	Koboko hospital	Oli HC IV
Bunyoro	Masindi		Hoima RRH	Masindi hospital	Bwijang HC IV
Tooro	Kabarole		FortPortal RRH		Kataraka HC IV
Kigezi	Kanungu		Kabale RRH	Kambuga hospital	Kanungu HC IV
Ankole	Mbarara Bushenyi?/ Ntungamo		Mbarara RRH	Ishaka hospital	Kitwe HC IV

Study population

The study population included respondents at national, district and community levels as shown in table. At national level, the respondents included Ministry of Health staff (commissioners, permanent secretary), program managers, and representatives from relevant organisations/stakeholders. At district level, the district health team, facility/hospital in-charges, neonatal care unit in charges, and maternity ward in-charges were interviewed. At community level, the respondents included mothers, fathers, other care providers and community leaders. All mothers aged 15-49 years with newborns (0-6 months) located in the sampled study districts were eligible for the study. These respondents were drawn from the catchment areas of the hospitals.

Table 3: Summary of the Study objectives and methodology for the situation analysis of newborn health in Uganda.

Study objective	Data collection methods	Study population/Data sources	Sample size
Document the existing policies and programmes for newborn care	Desk review National level Key informant interviews	Policies and programme reports Ministry of Health personnel, stakeholder e.g WHO, UNICEF	5 KIIs
Determine the trends and causes of newborn mortality at regional level	a)Desk review Secondary data analysis b)Heath Facility survey c) community survey	Grey and published literature DHIS data, etc. Health facilities Mothers who delivered in the past 6 months	DHIS trends from 2018 to 2022
Assess the health facility readiness (including the private sector) that ensures newborn babies survive and thrive, and the quality of care services	a)Health facility survey; b)Quality of care observations c)health worker interviews	Health facilities and health workers in targeted districts	45 health facilities: 2 National Referral hospitals, 16 regional referral hospitals, 15 General hospitals, 15 high volume health Centre IVs 29 KIIs: Hospital directors,medical superintendents, Health facility in charges, maternity and neonatal unit in charges
Assess current newborn clinical care practices at facility level and adherence to standards	Interviews Observations	Health facility managers and health workers	
Evaluate the capacity of community level health systems to conduct community sensitization, mobilization, and referral of maternal and newborn emergencies	FGD guides Case studies	VHTs, Community opinion leaders, parents and care takers, etc.	3,542 Households 9 FGDs with VHTs. 90 case studies
Assess community level newborn health care practices	Community survey	Mothers who delivered in the past 6 months	
Document the stakeholders' contribution to newborn care and establish the critical actors	Stakeholder mapping	Stakeholders' published and unpublished programme reports	

Sample size and sampling strategy

Hospital/health facility readiness and Quality of care survey

A census or exhaustive sampling of all the national and regional referral hospitals (RRHs) was conducted. Therefore, all the NRHs and RRHs were included in the study.

Purposive sampling was conducted to obtain district hospitals. Districts which did not have RRHs were pooled per region, then one district was randomly selected in each region and after which one hospital in that district was selected. High volume health centre IVs in each selected district were pooled and one HCIV purposively selected based on the volumes of patients seen.

A readiness survey as well as a Quality of Care assessment using observation methods was conducted in all the selected facilities.

Community component

The population was stratified into homogeneous subgroups based on population characteristics, utilizing the known 15 sub-regions of the country to form new strata (see Table 4). Within each stratum, a minimum sample of households was determined using the Leslie Kish 1965 sampling procedures (23). The following formula in the computation of the sample size, n, was used:

$$n = \frac{z(\alpha/2)^2 p(1-p)}{\varepsilon^2}$$

Where: n is the sample size per stratum; z $(\alpha/2)$ is the z score of 95% confidence interval (z=1.96); is the proportion (50%), =margin of error (5%). Adjustments were made for the sampling design, incorporating a design effect of 1.25 and accounting for non-response at 5%, as well as missing values, resulting in a minimum sample size of 506 households. This number was allocated to each surveyed sub-regional grouping, ensuring diversity within the sample. The total minimum sample size for the study encompassed 3,542 households. For each stratum, two districts were chosen, a combination of purposive and random selection. If a grouping contained districts that had participated in previous SITAN surveys, those districts were automatically included. Any remaining districts were randomly selected to achieve a total of two districts per group/stratum. From each selected district, a subcounty was chosen randomly. Villages or clusters, serving as enumeration areas (EAs), were selected within each stratum using probability proportional to size. Within these clusters or villages, a fixed number of households were systematically chosen. All women aged 15-49 residing in the selected households were eligible to participate in the survey.

Table 4: Table showing sub-regional grouping and sample size from each strata

	Sub-regional grouping	No. Districts	Sample
1	Greater Kampala Metropolitan	2	506
2	Bukedi	2	506
	Bugisu		
	Teso		
3	West Nile	2	506
	Acholi		
	Lango/Acholi		
4	Karamoja	2	506
5	South Buganda	2	506
	Busoga		
6	Ankole	2	506
	Kigezi		
	South West		
7	Bunyoro	2	506
	Tooro		
	Total	14	3,542

Qualitative component:

Data was obtained from different in-depth, key Informant interviews and focus group discussions.

Case studies: A total of 90 case studies were conducted among mothers, fathers and caretakers for the newborns within the sampled districts. Ten case studies/narratives were conducted in each study region. The respondents were selected purposively and interviews conducted in the local language spoken in that area.

Key Informant interviews: A total of 34 Key Informant Interviews (KIIs) were conducted with Ministry of Health staff (commissioners, permanent secretary), program managers, and representatives from relevant organizations /stakeholders; and district staff including the district health team, facility/ hospital in-charges, neonatal care unit in charges, maternity ward in-charges, and the political wing.

Focus group discussions: A total of 9 FGDS were conducted with VHTs in the selected regions for the community survey (one FGD per region). Each FGD comprised six VHTs.

Data Collection

We used both quantitative and qualitative methods of data collection. The data collection methods included primary data collection at health facility and community levels through surveys, observations for the process and quality of service delivery at facility level using a checklist, key informant interviews at national, district, health facility and community levels; and case studies from the community. In addition, secondary analysis of DHIS 2 data, and a desk review of published and grey literature was carried out. Triangulation of data was conducted to improve on validity and reliability of the study findings.

Data collection tools

Data collection tools included i) structured health facility assessment tools ii) Observation guide iii) Key informant guide iv) Data abstraction tool for secondary data vi) guide for literature review vi) Case narrative guides vii) Focus group discussion guide

All the tools were pretested in Kasangati, an area that was not part of the selected study area. The pre-test was part of the training activities for the research assistants in order to enable the team understand the flow of questions and make modifications in the questionnaires and guides where necessary. Pre-testing also enabled the study team to ascertain if the intended study participants were able to understand and respond to the questions appropriately; and also if the expected responses were obtained.

Data collection methods

Methods used for data collection included:

Secondary data analysis of DHIS2 data

Secondary data analysis of DHIS 2 data was carried out. We assessed the quality of data across the selected RMNCH indicators using the monthly district data extracted from the DHIS-2 from January 2018 to December 2022 across different health facilities in the country. These included overall neonatal mortality, referrals, disease specific mortality, quality of care indicators.

Quantitative survey

Primary data collection was conducted to complement and or triangulate the information obtained during the scoping review and secondary data analysis. Three types of surveys conducted included:

a) A community survey was conducted to assess the capacity of community level health systems to deliver newborn care (including conducting community sensitization, mobilization, and referral of maternal and newborn emergencies) and community care practices including illness recognition, care seeking, home treatment and continuity of care. The community survey tool was translated to the local language mainly used in the selected districts for data collection.
b) A health facility readiness assessment was conducted to assess the capacity to provide quality in patient care for newborns. This tool was an adapted version of the UNICEF tool for inpatient care of infants. This tool involved looking at the infrastructure, human resource, services provided, equipment and supplies.
c) Quality of Care assessment within the health facilities was conducted using an observation checklist that included standards for the different care practices from care around delivery to postpartum care and management of high risk newborns.

Qualitative interviews: Key Informant interviews, case studies/narratives, and focus group discussions

Qualitative data to explore barriers, delays, and experiences related to newborn care, referrals, access to care, newborn priorities and stakeholders involved was obtained. These interviews were held at 3 levels: national, district and community levels. The respondents were purposively selected as follows:

- **At national level**: Ministry of Health together with newborn health stakeholders such as UNICEF, WHO, Save the Children etc and relevant institutions and departments with programs related to newborn health were interviewed. At this level, we explored issues government newborn strategies/guideline/policies, programs, plans, priorities and funding available for newborn health.
- **At the District level:** The respondents included the district health team, medical superintendents, facility in-charges, neonatal care unit in charges, and maternity ward in-charges. At this level, we obtained insights on funding for newborn health at district and hospital/health facility level, challenges, newborn health programmes and priorities at district level etc
- **At the community level:** The respondents included mothers, fathers, other care providers and community leaders. The interviews focused on examining the experiences, roles as well as practices regarding newborn health. Tools used at this level were translated to the local language majorly used in the selected districts for data collection.

In addition, Focus group discussions were held with VHTs in the selected districts to understand their roles in newborn care at community level, challenges and suggestions for improvement.

Stakeholder mapping

We conducted a country wide stakeholder mapping to know who is doing what in newborn health and in which geographical area.

Desk review/scoping review of published and grey literature

The scoping/literature review for neonatal health encompassed a systematic contextual analysis of peer- and grey-literature on current and prior interventions, guidelines, evaluations and related reports at global, national, regional and local contexts with 2010 as the base year. A methodological framework proposed by Arksey and O'Malley 2005 was adopted(24).

Research questions were developed with focus on Uganda's neonatal health and care services plus associated impact on survival, growth, infection and neurodevelopment. A series of questions were developed to guide title and abstract screening and the eligibility criterion was used to ensure that the content of the included information is relevant to the research question. Existing documents and information both published and unpublished (grey) were sourced and reviewed.

This study was conducted in two phases: Phase 1 involved a desk review of grey and published literature relating to newborn health and secondary data analysis, and Phase 2 comprised of primary data collection to complement and or triangulate the information obtained from phase 1. The information obtained from phase 1 highlighted the gaps to be addressed during phase 2.

Quality assurance

The following measures were undertaken to ensure that the process of data management maintains the integrity and quality of the data:

- The tools were pretested and tools adjusted accordingly to ensure validity and reliability.
- Completed questionnaires were cross checked immediately after data collection and during the nights of each successive fieldwork to ensure thorough assessment and that each relevant question had been asked and response properly recorded.
- Research assistants were comprehensively trained before data collection, drawing special attention to demonstrating interviewing techniques, recording of responses, probing and ethics. The research assistants for the community component were sourced from the districts which have been sampled for the survey and thus were fluent in the local language in which the survey was conducted.
- Qualitative tools for the community were translated to the respective local language and back translated to English to ensure that the meaning of the questions asked was maintained and not altered.
- Data entry and analysis was done by two people to check for accuracy. This was overseen by the study technical team.
- Meetings were held after each field day to review the day's activities and plan for the following day.

Data management

This included data processing, entry and analysis.

Data Processing

Data collected was standardized using various quality control measures, including checking for consistency, completeness and outliers before the data entry process. Trained data entrants were used and double data entry will be conducted. Each questionnaire was given a unique identification number. Data was stored in password protected soft copies only accessible to the study team.

Data Entry and Analysis

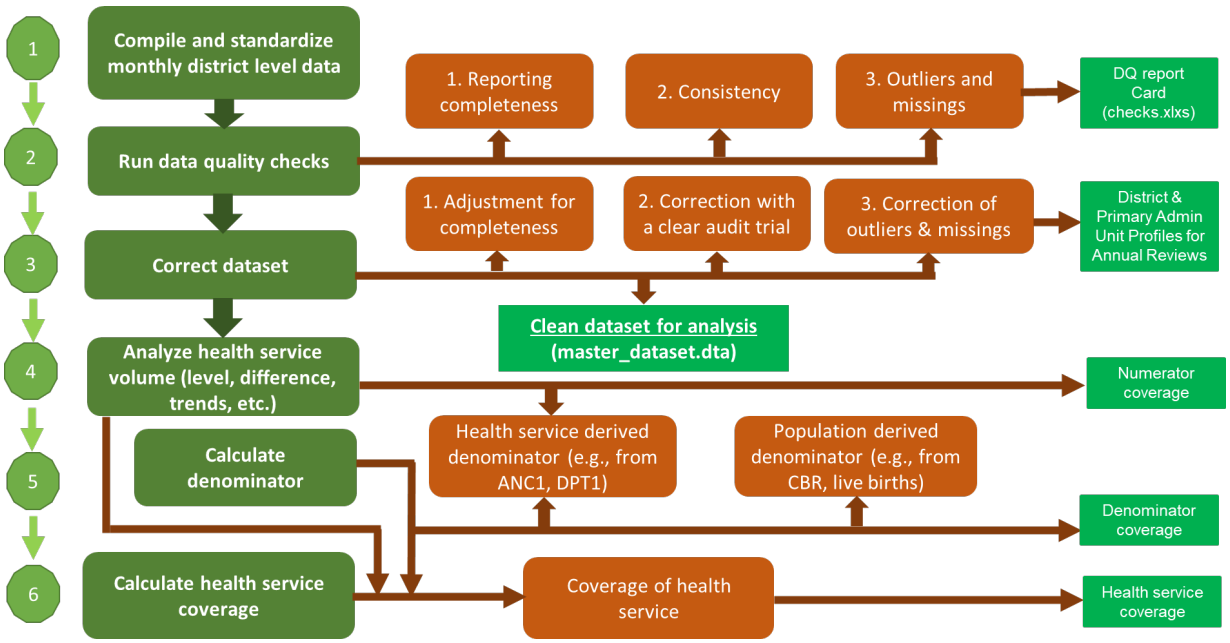
Quantitative data was entered using CSPro7.0 software and analyzed using STATA version 14 for frequencies, trends, etc. Basic descriptive analysis was conducted.

Data was disaggregated according to rural or urban location and regional differences, to identify the most vulnerable population groups. Analysis was used to compare existing situation with desired standards as prescribed by Ministry of health and World Health Organization.

Quantitative data analysis

For the analysis of routine health facility data, we assessed and adjusted for the quality of facility data following the steps highlighted in figure 2. Our assessment primarily focused on three key areas: report completeness, identification and handling of extreme outliers, and internal data consistency.

Figure 2: Health facility data analysis steps



To address incomplete reporting, we applied a formula designed to adjust for reporting gaps:

$$N_{adjusted} = N_{reported} * \left(\frac{1}{c} - 1\right) * k$$

Where N represents the number of service outputs, c denotes the reporting completeness, k is an adjustment factor (set to 0.25) representing the expected level of service at non-reporting facilities.

Regarding extreme outliers, we first identified them using district-level annual data, considering any values outside 5 standard deviations from the median absolute deviation (MAD) calculated over the preceding three years. These outliers were corrected by imputing values based on the median value of the respective calendar year.

The internal consistency assessment was conducted in two steps. First, we evaluated the relationship between related interventions, such as ANC1 to Penta1 and Penta1 to Penta3. The ideal ratio between these interventions should fall between 1.0 and 1.5. Additionally, we calculated the absolute differ-

ence between the expected and reported ratios, with larger differences indicating lower data quality. A difference below 5 indicates good quality, while differences between 5 and 14.9 suggest moderate quality, and 15 or above indicate poor quality.

Mortality analysis

Indicator	Numerator	Denominator
Institutional maternal mortality ratio (iMMR)	Number of maternal deaths	N of live births* 100,000
Institutional stillbirth rate (iSBR)	Number of stillbirths	Number of births* 1,000
Institutional neonatal mortality rate	Number of neonatal deaths before discharge	Number of live births* 1,000

Five indicators were employed to evaluate data quality, as outlined in Table 5. Each metric has predefined cutoff values that categorize the results as Acceptable, Questionable, or Problematic, as specified in the table. Furthermore, by leveraging information on the number of births occurring in health facilities, we can estimate community mortality based on institutional mortality and population mortality estimates. This estimation involves a series of steps:

Let

M_P = maternal mortality ratio in the population; M_i = institutional mortality maternal mortality ratio; M_c = maternal mortality ratio in the community; P_i the proportion of live births in institution, the population maternal mortality ratio can be estimated by:

$$M_p = P_i * M_i + (1 - P_i) * M_c \quad \text{This implies that } M_c = \frac{(M_p - P_i * M_i)}{(1 - P_i)}$$

The ratio is M_c / M_i can then be computed. Similar computations apply for stillbirths.

Table 5: Assessing the quality of maternal mortality and stillbirth health facility data

Subject	Quality metric	Acceptable	Questionable	Problematic
Completeness of monthly health facility reporting of delivery data including death	Percentage of monthly health facility reports received out of expected	>90%	75-90%	<75%
Consistency overtime of annual number of deliveries, maternal deaths, and stillbirths in health facilities	Relative difference between annual number and median for the 5-year period * 100	<25%	25-49%	>50%
Consistency between the reported number of stillbirths and maternal mortality	Ratio of the number of stillbirths to maternal mortality as reported by the health facility	Ratio >=4 and <10	Ratio of 10-14 or 3	Ratio of >14 or 3
Intrapartum/fresh stillbirth as percentage of total stillbirth	Percentage of stillbirths that were reported as stillbirths	35-60%	25-34% or 60-69%	>70% or <25%

Health facility readiness

To evaluate health facility readiness for intrapartum care, care for sick and small newborn babies, and adherence to newborn clinical care practices, our analysis adopted a descriptive approach. Each domain was scrutinized separately, with facilities coded as 1 if the indicator within the domain was operational and available, and 0 otherwise. We provided a descriptive summary highlighting the number of facilities with each indicator within the identified domains.

Subsequently, a final score for each domain was computed. This score represented the average number of operational indicators within health facilities, expressed as a percentage of the total number of tracers in that specific domain. The analysis was stratified by facility level to ensure a comprehensive understanding of the readiness and adherence to quality-of-care standards across different healthcare settings.

Quality of care

Our approach to analyzing quality of care was descriptive and focused on the facility level. Utilizing an observation checklist, each facility was assigned a code of 1 if a specific indicator, encompassing standards for various care practices ranging from delivery care to postpartum care and management of high-risk newborns, was observed. Conversely, a code of 0 was assigned if the indicator was not observed or if there was uncertainty (no or don't know). We presented a summary detailing the number of facilities at each level where the particular indicator was observed. Subsequently, a final score was calculated for each domain. This score represented the average number of observed indicators within health facilities, expressed as a percentage of the total number of tracers in that specific domain. This approach allowed for a comprehensive assessment of quality-of-care practices at the facility level.

Community survey

Data were weighted to ensure its representativeness both nationally and at the sub-national level, with the detailed methodology outlined in the appendix. The analysis primarily utilized descriptive methods, presenting results in frequencies and percentages, and included the computation of composite indices for key aspects. Initially, an index was computed for all Antenatal Care (ANC) components, involving averaging scores across various metrics such as blood pressure, urine testing, HIV testing, tetanus injection, folic acid administration, fancidar tablet distribution, and medication for intestinal worms, expressed as a percentage. Additionally, the care practices Index was calculated based on adherence to specific practices post-delivery. These practices encompassed using clean instruments to cut the umbilical cord, employing a clean thread to tie the cord, refraining from applying substances to the cord, ensuring skin-to-skin contact with the newborn at birth, wrapping the newborn, delaying the first bath for six or more hours, initiating breastfeeding within the first hour, and practicing exclusive breastfeeding. The maternal health service utilization index was derived from indicators like ANC4+ visits, facility-based delivery, and Postnatal Care attendance. An overall newborn care practices index was computed, reflecting adherence to all the recommended practices listed above, with scores ranging from 0 to 100%.

In addition to these indices, mothers were surveyed regarding their preparations for their most recent delivery. This assessment involved ten items, including finance, transport, food, identification of a birth attendant, selection of a health facility for delivery, preparation of clean clothes, provision of a kaveera for delivery, preparation of gloves, cotton gauze, and Mama kit. An index was then calculated as the average score across all these indicators, ranging from 0% to 100%.

Qualitative data

The qualitative component included KIIs, FGDS and case narratives. Data analysis was ongoing and iterative throughout study. Each step of exploratory interviewing shaped the questions in the subsequent steps and guided by theoretical saturation of themes. The audios from the interviews were transcribed and coded according to the grounded theory method, a rigorous procedure for identifying themes in text and for developing theoretical models of the relationships among themes. Quotes were included in the qualitative report.

The study's strengths and limitations

Strengths

The mixed-methods approach enabled exploration of nuanced aspects of newborn health, such as healthcare provider and community perspectives, which allowed for a holistic understanding of the newborn care cascade in the country, including policy, infrastructure, equipment, medicines, and newborn care items and stuffs, including their availability and the quality of newborn care services offered at various levels of care in Uganda.

The study utilized diverse data sources, including health facility and community/household surveys, qualitative interviews (key informant interviews, focus group discussions, in-depth interviews, and case studies with mothers and caretakers), and secondary data analysis to comprehensively inform the newborn care situation in Uganda. The approach further allowed a wide nationwide coverage, reaching all the 15 UDHS regions and special areas, including Karamojja and the Islands, ensuring a representative sample from diverse geographical areas hence improving the generalizability of findings to the entire country's population.

Overall, the methodology-rich data set and primary and secondary data analysis of DHIS2 and UDHS 2022 data enhanced the study's robustness by leveraging existing datasets and providing context to the primary research findings.

Limitations of the Methods

Resource constraints could not allow reaching lower-level health care facilities, including most health center IVs and HCIIIs, which handle the highest number of deliveries in the country. Additionally, the study reached only 23 out of the 135 districts in the country. The study was prone to survivorship and selection bias due to the limitation of some survey questions to only mothers with a live baby aged 6 months and below, in underrepresented groups, and among self-selected participants for the interviews, respectively. Health facility records were poor or incomplete in most cases, which have implications for the quality and availability of essential data. We also do not have good data yet on the private sector and on newborn mortality, and on stillbirths.

Ethical consideration

Ethical approval was sought from the Uganda Christian University Research and Ethics Committee (UCUREC-2023-570) and the Uganda National Council of Science and Technology (HS3123ES). In addition, permission was obtained from the Ministry of Health, the District Health Officer in each district, and from the superintendents/in-charges of the various hospitals/health facilities. Written informed consent was obtained from each of the participants in this community survey. Throughout the study, the privacy, confidentiality and security of data were maintained.

CHAPTER

03

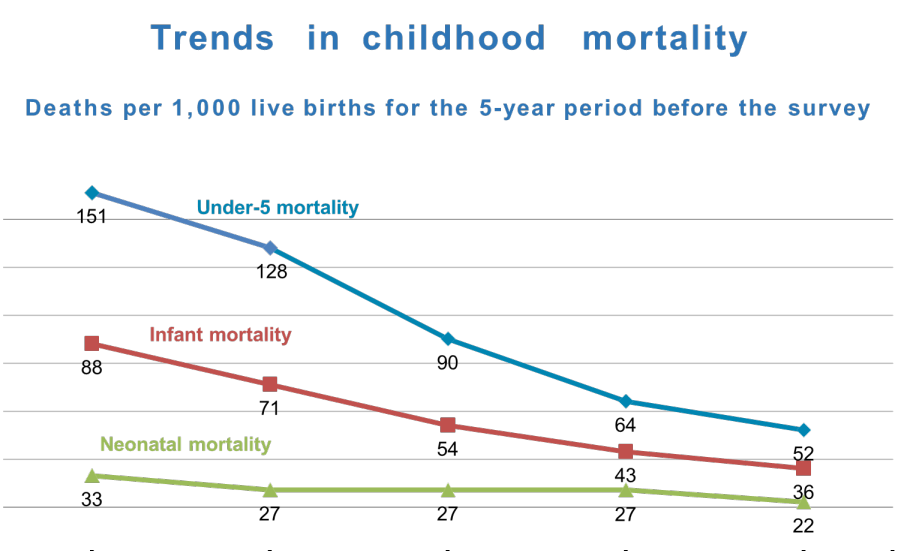
NEONATAL MORTALITY

FINDINGS

Burden of Neonatal Mortality in Uganda

Neonatal mortality rate in Uganda has stagnated at 27/1,000 live births for last two decades (figure 3) although the recent Uganda Demographics Health Survey (UDHS) 2022 (25) revealed minimal reduction by 5/1,000 to 22/1,000 live births.

Figure 3: Trends in childhood mortality in Uganda in the last two decades

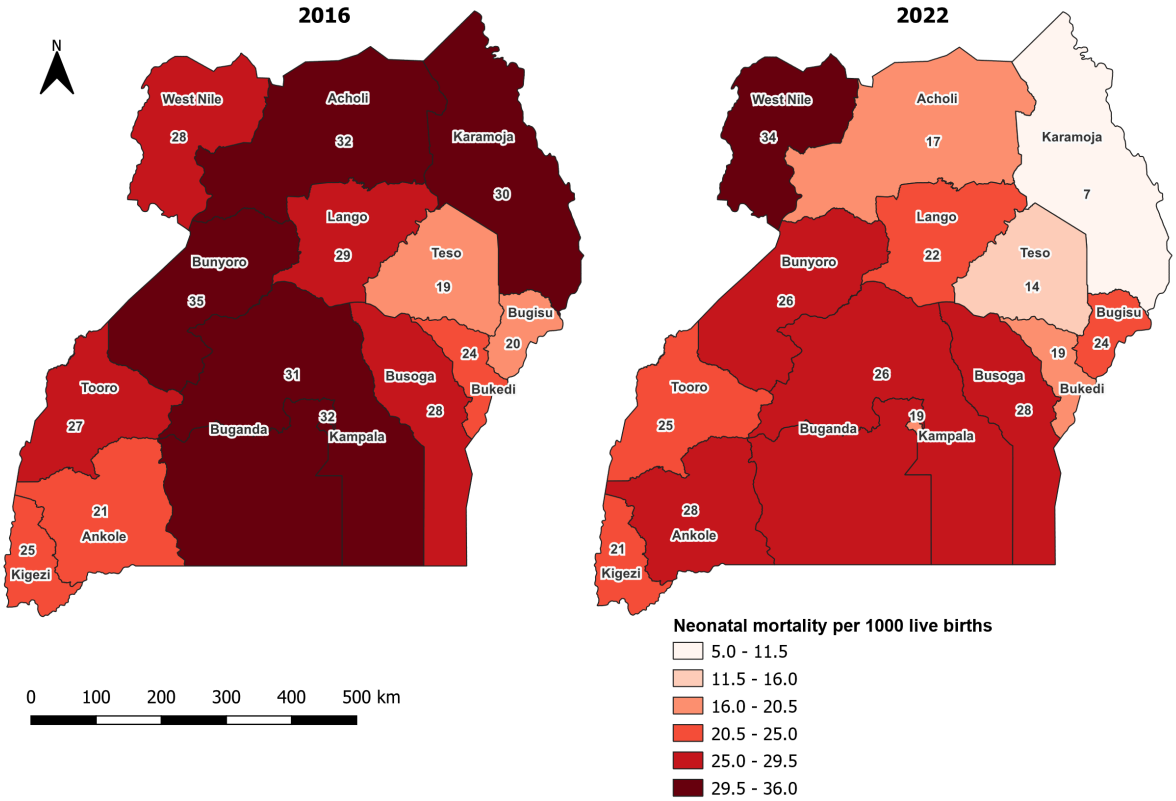


The burden is still unacceptable and above the World Health Organization/Every Newborn Action Plan target of less than 12 stillbirths per 1,000 total births and less than 12 newborn deaths per 1,000 live births. Globally, the annual reduction rate in neonatal mortality is 2.7%. However, Uganda needs to move at twice this rate (4.3%) if we are to achieve the ENAP targets. Based on the UN estimates, there are about 1.7million births in Uganda each year with about 32,000 newborns deaths; 26,000 stillbirths; and almost 250,000 newborns need special care (26).

Regional variation in neonatal mortality

From 2016 to 2022, Uganda has witnessed a notable decline in mortality rates, particularly evident in the lower neonatal and post-neonatal mortality rates recorded in 2022 compared to 2016. Despite this tremendous progress, substantial regional variations persist. As of 2022, neonatal mortality ranges between 7 deaths per 1,000 live births in Karamoja to 34 per 1,000 live births in West Nile as seen in figure 4. Similarly, post-neonatal mortality is lowest in Teso and Bugisu regions at 8 and 11 deaths per 1,000 live births respectively, while it is highest in West Nile and Ankole, with 21 deaths per 1,000 live births as shown in figure 4b.

Figure 4: Regional differences in neonatal mortality

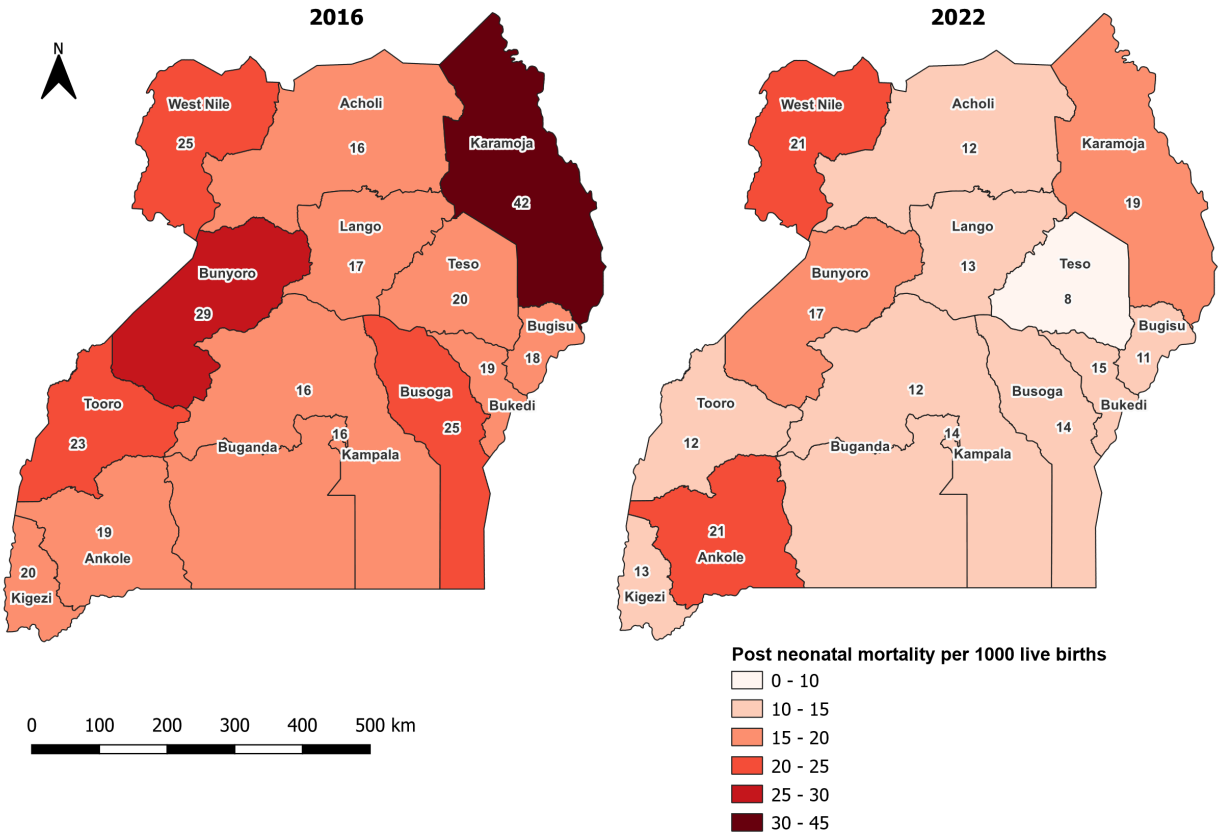


While some regions have shown notable progress, others continue to face challenges. For instance, Kampala has witnessed a substantial decrease in mortality rates from 32 per 1,000 live births in 2016 to 19 in 2022. Similarly, Buganda, Bunyoro, Ankole, Teso, and Kigezi have also experienced decreases in mortality rates.

However, neonatal mortality in Busoga has remained relatively high, with this region showing no change or reduction within the same period, suggesting potential challenges in improving healthcare (figure 5). Similarly, West Nile experienced a setback with an increase in neonatal mortality rates from 28 deaths per 1,000 live births in 2016 to 34 deaths in 2022. Results also indicate that Karamoja demonstrated a remarkable decline from 30 in 2016 to 7 in 2022, indicating significant enhancements in its healthcare.

Post-neonatal mortality

Figure 5: Regional variation in post neonatal mortality



In 2016, Karamoja exhibited the highest post-neonatal mortality rate, with a staggering 42 deaths per 1000 live births, while Bugisu boasted the lowest rate at 18 deaths per 1000 live births. By 2022, Karamoja's post-neonatal mortality rate had dramatically decreased to 19 deaths per 1000 live births, representing a substantial improvement. Conversely, Bugisu's rate experienced a slight decrease to 11 deaths per 1000 live births, solidifying its position as one of the regions with the lowest post-neonatal mortality rates.

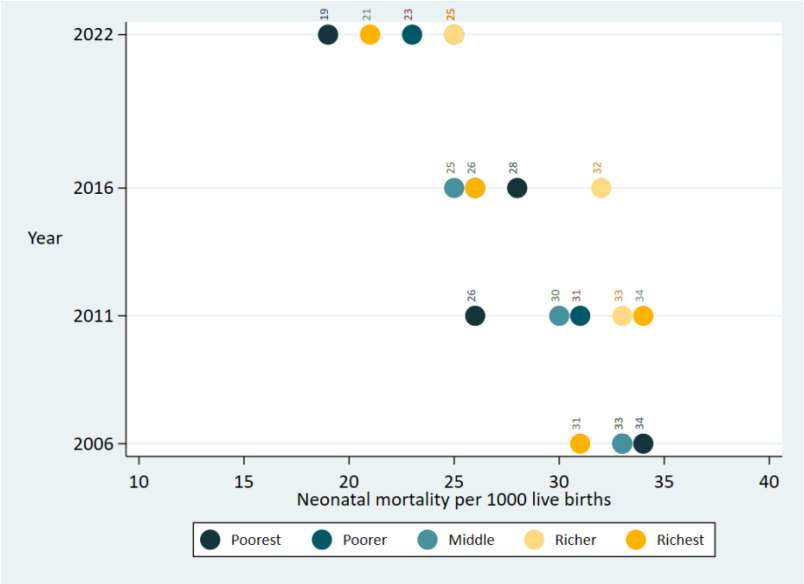
In 2016, Busoga reported a post-neonatal mortality rate of 25 deaths per 1000 live births, which had decreased to 14 deaths per 1000 live births by 2022. However, this improvement is overshadowed by the fact that Busoga still maintains one of the highest neonatal mortality rates in the country.

In conclusion, while Uganda has witnessed overall improvements in neonatal mortality rates, addressing regional disparities remains crucial to ensure equitable access to healthcare and foster better health outcomes nationwide. Efforts should be directed towards implementing targeted interventions aimed at addressing the specific healthcare needs and challenges faced by different regions in the country.

Trends and inequalities in neonatal and post-neonatal mortality rates

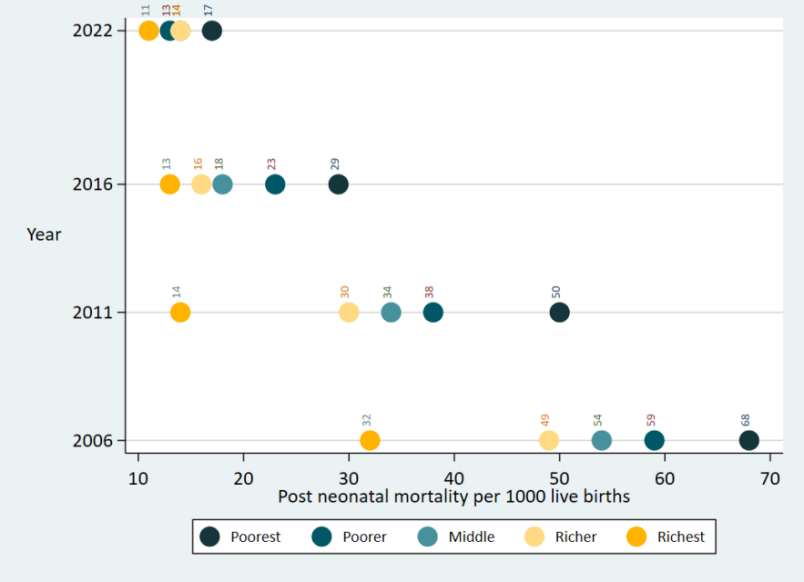
Figures 6 and 7 show the trends and inequalities in neonatal and post-neonatal mortality rates across different wealth quintiles from 2006 to 2022. From 2006 to 2022, there has been a decline in both neonatal and post-neonatal mortality rates across all wealth quintiles. However, disparities persist, with higher post neonatal mortality rates observed among the poorest quintiles compared to the wealthiest. Further, there is no much difference between the rich and the poor in the year 2022 for neonatal mortality despite the poor having a slight advantage by year 2022 (Figure 6).

Figure 6: Trends and inequalities in neonatal mortality stratified by wealth



Source: UDHS 2006-2022

Figure 7: Trends and inequalities in post neonatal mortality stratified by wealth



Source: UDHS 2006-2022

In 2022, the neonatal mortality rates (per 1000 live births) among the poorest were at 19, and the richest at 21 deaths per 100 deaths. This represents a slight improvement from 2006, where rates were generally higher (34 deaths among the poorest vs 31 deaths among the richest).

Similarly, the post-neonatal mortality rates (per 1000 live births) in 2022 among the poorest were at 17, and the richest at 11. Again, this reflects a positive trend compared to previous years.

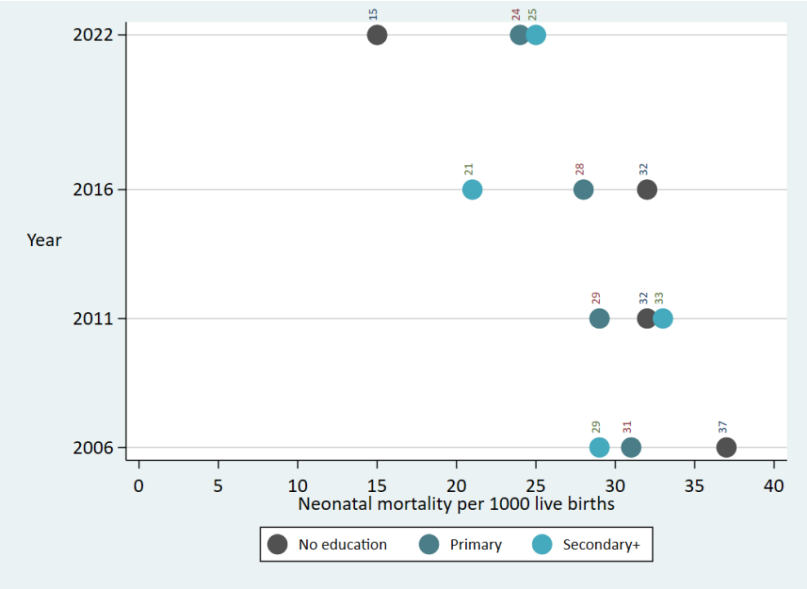
Results also reveal persistent inequalities in mortality rates. from 2006 to 2016, for instance, there were significant gaps between the poorest and richest quintiles, with higher post-neonatal mortality rates among the poor. However, by 2022, efforts to reduce these disparities have led to improvements across all quintiles and almost closed the gap.

Neonatal and post neonatal mortality stratified by maternal education

Children born to mothers with secondary or higher education have exhibited the lowest rates of neonatal and post-neonatal mortality as seen in figures 6 and 9. However, a concerning trend emerged by 2022, as neonatal mortality rates were higher among children born to mothers with secondary or higher education levels.

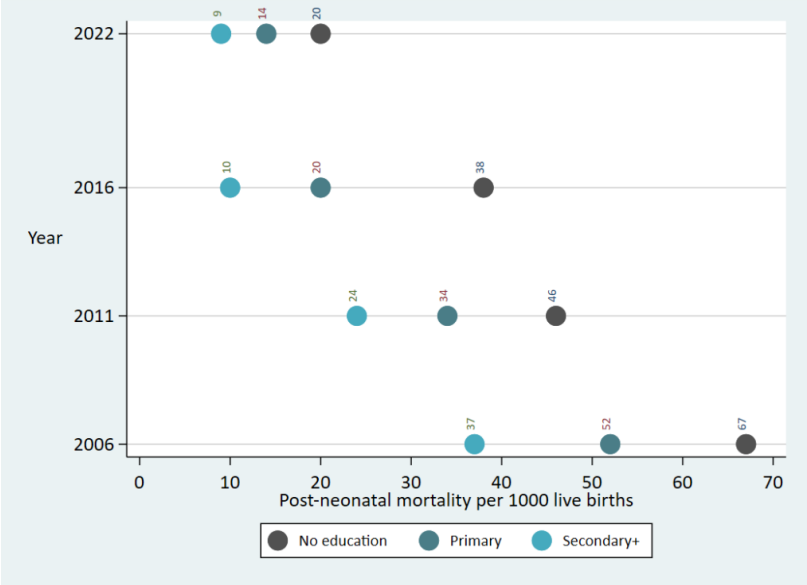
Despite progress in reducing neonatal and post-neonatal mortality, inequality between children born to mothers with no education and those with secondary or higher education remains evident. From 2006 to 2022, there has been a significant closing of the gap in post-neonatal mortality rates between children born to mothers with no education and those with secondary or higher education levels. However, this progress has not extended to neonatal mortality rates, emphasizing the need for targeted interventions to address these disparities.

Figure 8: Neonatal mortality trends stratified by maternal level of education



Source: UDHS 2006-2022

Figure 9: Post-neonatal mortality stratified by level of maternal education



Source: UDHS 2006-2022

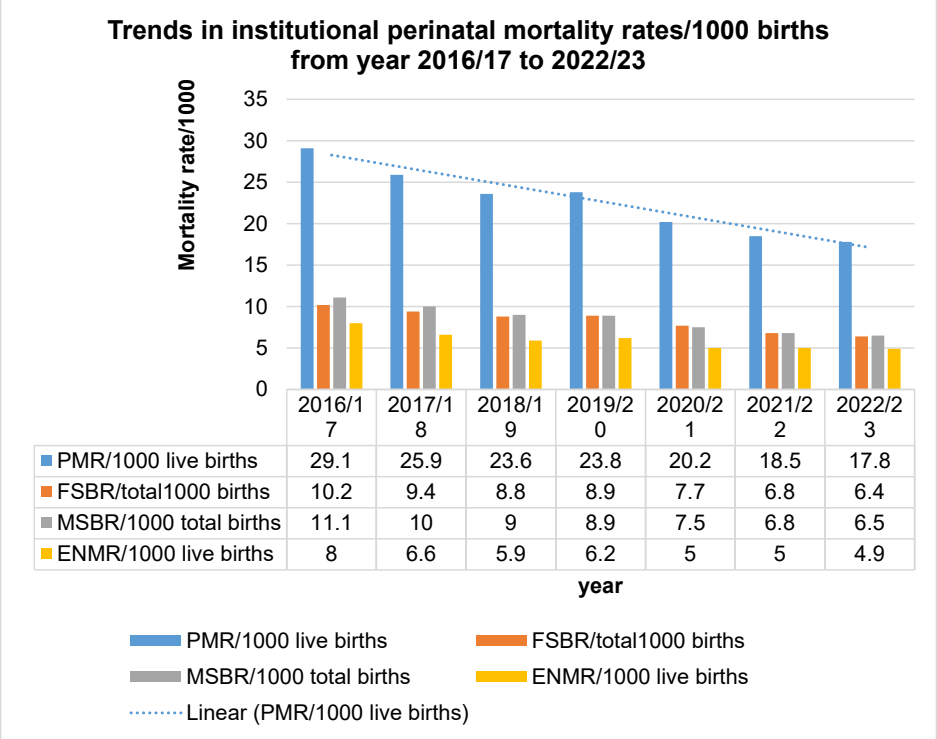
Institutional Perinatal Mortality Rate (source: National Annual MPDSR Report 2022-23 (27)

The institutional perinatal deaths in Uganda are still persistently high. Through perinatal death surveillance, Uganda collects perinatal death data from all health facilities that conduct deliveries. During the FY 2022/23, the institutional births reduced by 3.13% (45,677) from 1,459,434 (FY 21/22) to 1,413,757 (FY 2022/23) while the number of perinatal deaths reduced by 6.67% (1,800) from 26,999 deaths (FY 21/22) to 25,199 (FY 2022/23). This translates into a 3.7% reduction in Institutional Perinatal Mortality Ratio (IPMR) from 18.5/1,000 total births registered in the previous year (FY 2021/22) to 17.8/1,000 total births (FY 2022/23).

Review of the National MPDSR Report 2021/2022 (28) revealed that the FY2021/22 total births increased by 131,604 (9.9%) from 1,327,830 (FY20/21) to 1,459,434 (FY21/22) while the number of perinatal deaths increased by 0.55% from 26,851 (FY20/21) to 26,999 deaths (FY21/22); translating into an institutional Perinatal Mortality Ratio (IPMR) of 18.5/1,000 total births. As seen in figure 10, over the past seven financial years (FY 2016/17-FY 2022/23), the IPMR has reduced by 38.8% (from 29.1 to 17.8 per 1,000 total births). The greatest reduction has been registered among the Macerated still births (41.4%) followed by Early Neonatal Deaths (38.8%) and Fresh Still Births (37.3%) A 3.8% reduction (from 18.5/1000 to 17.8/1000 total births) in IPMR was noted between FY 2021/22 and FY 2022/23

The downward trend in institutional perinatal mortality rate can be attributed to various factors: i) Health facility related factors including improved monitoring of labour using a partograph, strengthened perinatal death reviews in facilities, skilling of health workers on essential newborn care, resuscitation and care for small and sick newborns; timely and appropriate referral; strengthened efforts to conduct perinatal death reviews in facilities ii) Community related factors such as sensitization of communities on importance of antenatal care, birth preparedness and health facility delivery.

Figure 10: Trends in Institutional perinatal mortality in Uganda from 2016/17 to 2022/23

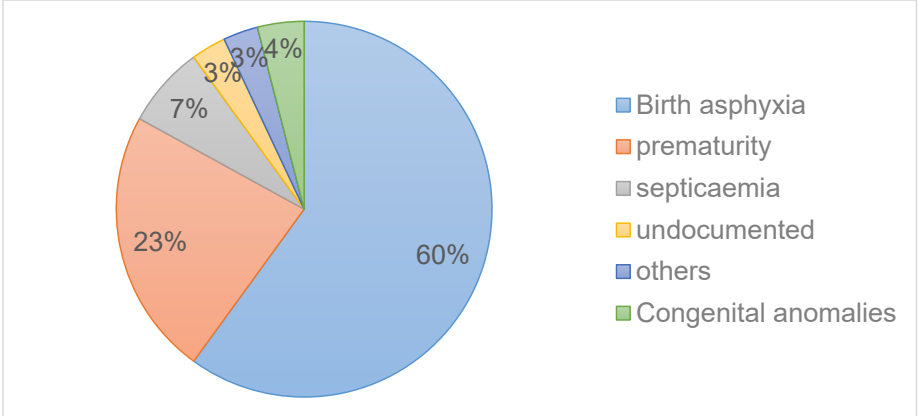


Source: National Annual MPDSR Report 2022-23 (27).

What are the Causes of Neonatal mortality/newborn deaths?

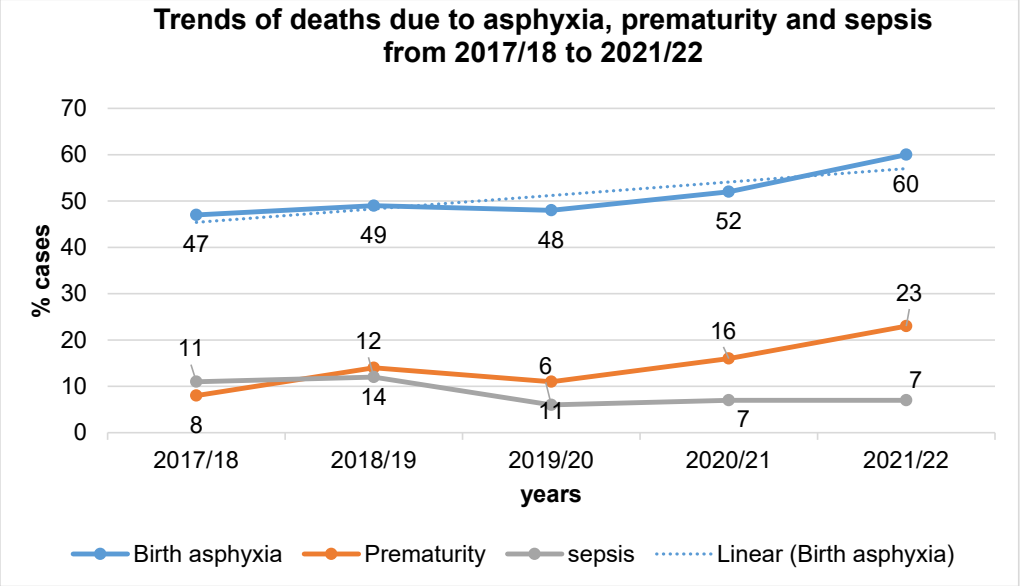
In Uganda, the highest contributors to newborn death are birth asphyxia, followed by prematurity and its complications and then neonatal sepsis as seen in figure 11. These are largely preventable thus providing opportunities for prevention and reduction strategies. The National MPDSR report 2022/23 revealed that birth asphyxia accounted for 60% of Early Neonatal Deaths (ENNDs) followed by pre-maturity complications (23%) and septicemia at 7%. Birth asphyxia is preventable and therefore this high percentage of deaths due to asphyxia point to challenges in intrapartum care especially neonatal resuscitation.

Figure 11: Causes of Reviewed Early Neonatal Deaths During FY2021/2022 (source: MPDSR report 2022/23)



There is data from DHIS2 showing increasing cases of deaths due to asphyxia and prematurity related complications over the past 5 years, with almost constant cases of sepsis (figure 12).

Figure 12: Trends of deaths due to Asphyxia, Prematurity and sepsis from 2017/18 to 2022/23



A case study on newborn causes of death from a population level perspective

Few studies have investigated newborn deaths at population level. However, in one study Kizito et al https://bmjpublichealth.bmj.com/content/2/1/e000682 employed a social and verbal autopsy approach to identify the causes, settings and health accessibility challenges surrounding neonatal deaths in the Luuka district, a rural hard to reach district in east central Uganda from 1 January 2017 to 31 December 2019. They analyzed data from 172 neonatal verbal and social autopsies (VASA) conducted over 3 years from the entire district with dead newborns identified by CHWs. Cause of death coding was done by two independent medical officers using WHO-ICD-10 guidelines to ascertain the causes of death. They found that among the 172 neonate deaths, 95.9% occurred in the early neonatal period (0–6 days) and 4.1% in the late neonatal period (7–27 days). The primary causes of death were birth asphyxia (42.4%), low birth weight/prematurity (18.6%), other perinatal causes (12.8%) and neonatal sepsis (9.3%). Delays in getting appropriate care at the facility (delay 3) and delays in seeking care (delay 1) (51.2% and 44.2%, respectively) were linked to newborn mortality.

In Uganda, neonatal mortality has had a slow progress in the last two decades, and the rate of reduction is inadequate to achieve the SDG targets. Neonatal and perinatal deaths are caused by mainly birth asphyxia, prematurity and its complications, infections, birth trauma, and congenital anomalies. The persistent causes of perinatal deaths in Uganda are largely preventable thus providing opportunities for prevention and reduction strategies

Birth asphyxia is the leading cause of neonatal death in Uganda. This depicts gaps in intrapartum care, neonatal resuscitation, and sub-optimal referral systems. However deaths due to asphyxia can be greatly reduced by skilling health workers in resuscitation, adequately equipping facilities with the requisite equipment, improved intrapartum care and sensitization of mothers/community on prevention of delays 1 and 2.

When do newborns die?

From existing literature, about 75% of the neonatal deaths occur in the first week of life with almost 50% occurring in the first 24 hours. In the recent few years, there have been deliberate efforts by the Ministry of Health and partners to strengthen and support the implementation of the 2017 MPDSR guidelines countrywide. This has led to improved notifying, reviewing and reporting of perinatal deaths as well as follow-up of responses by the health facilities. A comparison of the MPDSR reports for FY 2021/22 and FY 2022/23, notification of perinatal deaths improved from 52.9% to 63.4% and reviews improved from 42.2% to 43.1%.

Why do newborns die?

The three delays model proposes that neonatal mortality is associated with delays in:

1) Deciding to seek care
2) Reaching the healthcare facility
3) Receiving care at the health facility.

The Uganda National MPDSR FY2021/22 report revealed that the biggest contribution of avoidable factors to perinatal deaths at lower health facilities were due to delay 1 (HC II 50.7% and HC III 45.1%) and delay 2 (HC II 33% and HC III 40.1%), suggesting that mothers come in or present late. At higher-level facilities where most babies die from, the biggest contribution was delay 3 and worse at RRHs. Delay to provide care was highest at RRH (4.4%) followed by HC IV at 2.4% while absence of critical human resource was highest at RRH (5.3%). Lack of resuscitation equipment was highest at clinics (10.0%) but also affected HC IIs and HC IIIs. Inappropriate interventions, as a contribution to perinatal death was highest at higher facilities (general hospital to NRH), with NRH leading at 7.1%. Lack of supplies and drugs including blood products were contributors to the perinatal deaths at RRH and NRH.

The neonatal mortality rate in Uganda stands at 22/1000 live births with the major cause of death being asphyxia, followed by prematurity. Almost 75% of neonatal deaths occur in the first week of life with about half of these in the first 24 hours.

Neonatal death notification and reviews have improved in the last one year (FY 2021/22 and FY 2022/23) from52.9% to 63.4% and 42.2% to 43.1% respectively.

However there are still delays reported. Delay to seek care at facilities suggests lack of birth preparedness and inadequate community sensitization. Findings suggest the need to scale up community level interventions to raise awareness on the importance of birth and emergency preparedness, early health seeking behavior, and identification of danger signs at individual, family and community level.

Delays in receiving care (delay 3) at the health facilities could be due to a number of health system factors such as staffing gaps, limited skills, poor attitude of health workers etc, There is need for concerted effort to address gaps in human resource (limited numbers, absenteeism, and skills), essential medicines, equipment and supplies, and transportation from the lower health units to the higher levels of care.

CHAPTER 04

NEWBORN CARE PRACTICES AT HOUSEHOLD AND COMMUNITY LEVEL

This section presents newborn care and practices at community level along the continuum of care from pregnancy through delivery to post-natal period. We also look at male involvement, care for the vulnerable newborns including preterm babies/low birth weight babies as well as the small and sick newborns. Findings were obtained using a community household survey, case study narratives with caregivers and focus group discussions with VHTs.

Antenatal care

Timely and appropriate evidence based Antenatal Care (ANC) services is very critical for a safe pregnancy. Antenatal care is one of the pre-requisites for a positive pregnancy experience and serves as a platform for communication with and support to women and their families during pregnancy. Uganda has adopted the required 8 visits during antenatal care as proposed by the 2016 WHO guidelines on antenatal care.

From the community survey findings, there's generally an improvement in ANC attendance. Almost all women (93.1%) attended ANC at least once during their last pregnancy with 92% of these visits occurring in government health facilities. Of these that attended ANC, 32.2% had their first ANC attendance in the first trimester of pregnancy (verified by ANC cards)-figure C2. However, overall, only 3.6% made the required 8 visits as per the current MoH and WHO antenatal care guidelines although 67.8% attended four or more times (figure C1). This falls short of the MoH targets for first trimester

attendance of 50% and four or more ANC visits of 80%.This depicts a gap that requires more community sensitization on the importance of antenatal care in pregnancy.

Figure C 1: Antenatal care attendance

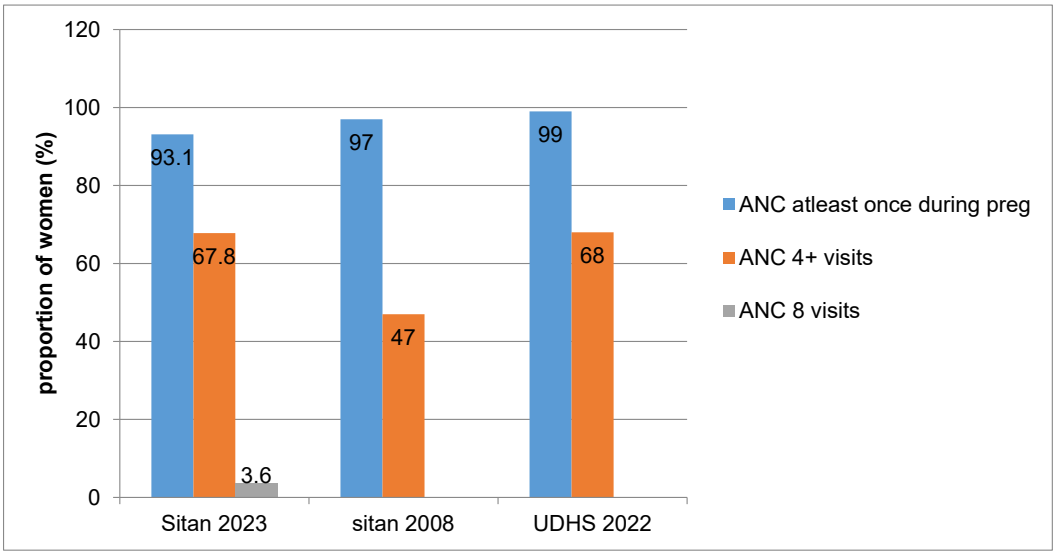
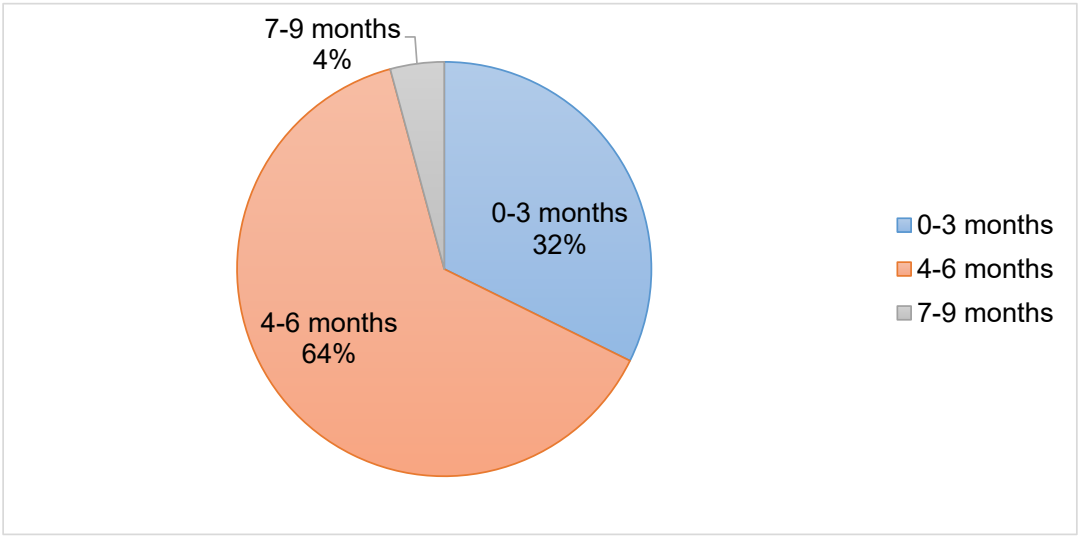


Figure C 2: Timing of first antenatal attendance



Further analysis of ANC attendance shows no relation with woman's age, education level, place of residence (table C2). Compared to other age groups, teenagers ANC attendance is 87.7%. However, there is regional variation with Kampala and Karamoja regions lagging behind in antenatal attendance as seen in table C2.

Table C 1: Antenatal care stratified by demographics

	Number of visits for the ANC			
	1 visit	**2-3 visits**	**4+ visits**	**8+ visits**
	%	**%**	**%**	**%**
Woman's age				
15-19	5.9	47.7	46.4	3.2
20-24	1.2	26.8	72	2.5
25-29	0.7	27.1	72.2	2.6
30-34	0.4	35.7	63.9	7
35-39	2	13.8	84.2	6.6
40-44	5.9	9.5	84.5	1.5
45-49	0	45.5	54.5	0
Total	**1.8**	**30.4**	**67.8**	**3.6**
Woman's education level				
None	1	23.2	75.8	0
Primary	3.5	33.3	63.2	6.3
Secondary	0.9	30.5	68.6	1.7
Tertiary/University	0	22.6	77.4	3.8
Total	**1.8**	**30.4**	**67.8**	**3.6**
Place of residence				
Urban	1.6	31.5	67	0.4
rural	2.2	28.8	69	8.4
Total	**1.8**	**30.4**	**67.8**	**3.6**
Region				
Ankole	0	16.3	83.7	19.9
Bugisu	4.9	15.8	79.2	9.1
Bunyoro	3.7	36	60.3	11.1
Busoga	1.7	30.9	67.3	4.2
Greater Kampala Metropolitan	1.8	32	66.1	0.2
Karamoja	0	15.8	84.2	5
Kigezi	8	15.5	76.5	3
Lango/Acholi	0	12.6	87.4	25.7
South Buganda	1.8	48.3	49.9	4.5
Teso	0	33.2	66.8	0
Tooro	6.1	24.4	69.5	3
West Nile	0	19	81	7.8
Total	**1.8**	**30.4**	**67.8**	**3.6**
Special area				
Kampala	1.5	32.1	66.4	0.2
Islands	4.9	31.4	63.7	0
Karamoja	0	15.8	84.2	5
Total	**1.8**	**31.3**	**66.9**	**0.4**

Qualitative findings showed that acceptance of pregnancy enabled women to initiate ANC attendance as early as the first trimester. More than half of the respondents revealed that they had unintended pregnancy at the time of conception but chose to accept it, especially the older married women. The unmarried young women hid their pregnancies to avoid implications like gossip and took longer to accept the pregnancy. The majority of the respondents reported that they started ANC at 3 months and attended 4 times or more. Most of the women that attended more than four times said they were compelled to do so due to complications throughout pregnancy such as bleeding, UTIs and malaria as shown by the quotes below.

> *“I first told the owner of the pregnancy, before my parents knew anything. And we went to the hospital together with him and we were the first to know and thereafter the parents got to know later when the pregnancy was about four months old. ”. (19-year-old twin mother)*

Mothers who have had complications previously were more likely to attend ANC four or more times:

> *“I got a problem when the pregnancy was two months old, I started bleeding, so I rushed to the health centre IV and they gave me some treatment and later because my case wasn’t easy to handle, they sent me to the main hospital. I then had to attend ANC every month to make sure things were ok”.(mother who lost her baby previously)*

Content of antenatal care visits

Most women reported having received most of the components of ANC especially blood pressure monitoring (96.3%), provision of iron and folic acid (95.2%), counseling or receiving information on HIV/AIDs (93.3%), and provision of fansidar for malaria prophylaxis (91%). Further analysis of malaria prophylaxis (IPTp) by number of doses showed that more than half of the mothers (60.8%) that got IPTp received 3 doses while 17.6% received 2 doses and 12.7% received one dose. The components that were sub-optimally provided during ANC included Urinalysis (74.3%), provision of dewormers (72.7%), tetanus vaccination (87.2%), counseling on danger signs in pregnancy (85.5%), and counseling on birth preparedness (83.9%) as seen in table C2. Similar findings were seen qualitatively as explained by one mother,

> *when I went for ANC they gave me folic acid, fansidar, and azithromycin because I had urinary tract infections(mother, sick newborn)*

Ideally, all these components should be provided universally to all mothers. Lack of this depicts a key area for improvement in antenatal care for pregnant women.

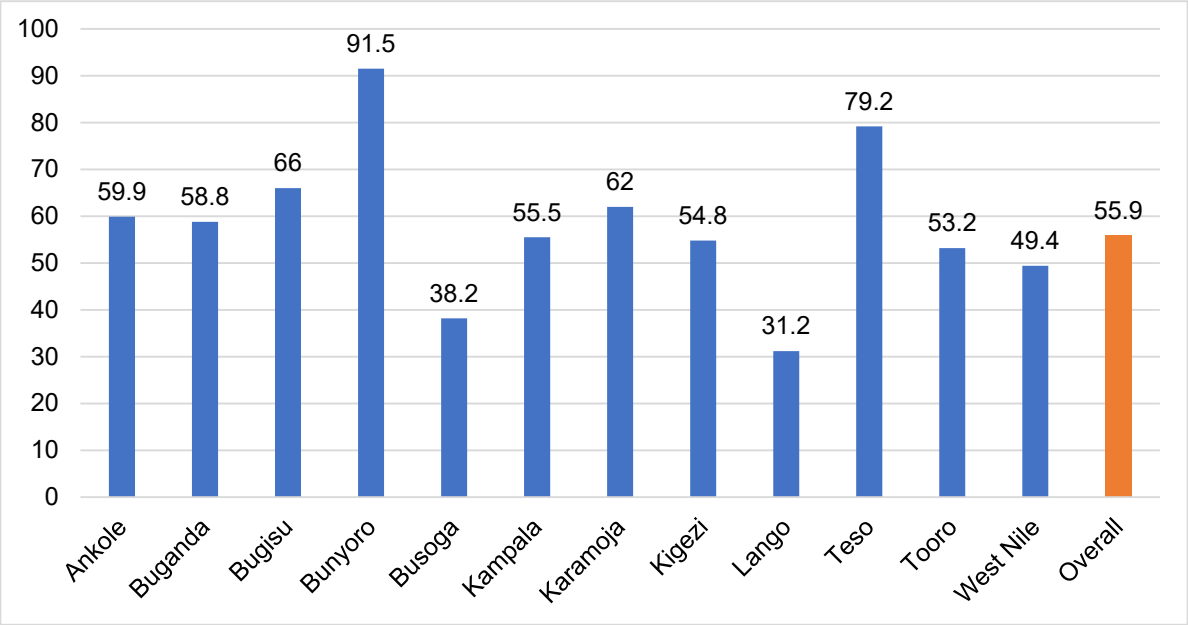
Table C 2: Antenatal components stratified by demographics

	Blood pressure checked	Urine sample taken	Received information about HIV	Received tetanus injection	Given iron and folic acid	Given fansidar	Given information to prepare for birth	Given information pregnancy danger signs	Given drugs for intestinal worms	Number of women with ANC for their most recent birth
Woman's age										
15-19	97.1	90.5	92.8	92.4	94.7	93.7	87.7	87.2	84.1	4,234
20-24	95.2	63.9	88.1	88.3	98.7	86.1	86.2	84.9	57.6	8,997
25-29	97.5	76.1	97	78	91	89	92.1	87.7	87.7	6,793
30-34	98.6	70.3	96.3	90.9	93.4	97.6	89.9	78.3	62	4,336
35-39	92.4	87.8	97.4	93.5	98.2	98.6	93.4	93.1	85.4	1,783
40-44	91.3	84.8	97.8	94.9	100	100	100	87	87.5	575
45-49	100	100	100	100	54.5	54.5	54.5	54.5	100	23
Woman's education level										
None	91.7	67.1	83.3	79.9	82.6	82.2	79	64.4	76.8	1,571
Primary	95.5	80.5	89.9	86.6	98.4	91.2	86	82.6	74.7	10,381
Secondary	97.5	69.6	96.3	87.5	93.4	90.7	93.9	92.4	69.3	12,257
Tertiary/University	97.3	76.2	98.7	93.1	99	97.4	87	77.2	78.6	2,533
Place of residence										
Urban	99.6	72.2	94.1	86.1	93.9	89.2	90.3	87.6	73.3	16,052
rural	91.5	77.5	92.1	89	97.3	93.8	87.8	82.3	71.8	10,690
Region										
Ankole	97.2	78.9	85.5	96.9	96.5	86.2	78.9	87.4	70.1	460
Bugisu	92.7	93.9	91.8	92.6	95.4	100	97.3	92.6	81.7	688
Bunyoro	95.2	95.2	100	96.3	100	100	100	92	100	931
Busoga	92.9	62.5	81.7	90.9	98.5	89.8	90.9	85.5	66.5	1,162
Greater Kampala Metropolitan	99.6	72.2	94	86.3	94.4	89.7	90.5	87.1	73.6	16,385
Karamoja	81.8	75.6	93.6	80.1	83	82.9	82.8	68.8	81.8	726
Kigezi	82.6	86	93.8	89.3	95.1	93.9	83.9	79	82.8	276
Lango/Acholi	87.7	69.3	86.5	65	97.5	90.4	91.9	83.6	57.9	1,450
South Buganda	92.1	78.7	98.2	93.7	97.3	97.3	76.1	73.1	49.8	2,269
Teso	96.8	94.4	95.8	100	95.8	100	100	100	90.8	587
Tooro	87.4	92.8	78.6	85.4	96.9	96.9	78.6	74.7	72.5	597
West Nile	93.8	60.9	97.8	96.1	98.3	85.7	89	88.6	85.5	1,210
Special area										
Kampala	100	70.8	93.9	85.4	93.9	88.7	90.1	87.3	72.1	14,912
Islands	95.1	86.7	95.1	95.1	100	100	95.1	85.6	88.6	1,472
Karamoja	81.8	75.6	93.6	80.1	83	82.9	82.8	68.8	81.8	726
Total	**96.4**	**74.3**	**93.3**	**87.2**	**95.2**	**91**	**89.3**	**85.5**	**72.7**	**26,742**

Optimal Antenatal Care Components composite indicator

A composite score/index for all components of ANC was calculated. The parameters included having blood pressure measures, urine tested, HIV tested, tetanus injection, folic acid, fancidar tablets and dewormers given. Overall, the results indicated relatively high coverage of mothers who received all ANC components, with an average of 55.9% across regions (figure C3). Regions like Bunyoro (91.5 %) and Teso (79.2%) reported higher coverage compared to the national average of 55.9%. Conversely, Lango/Acholi (31.2%) and Busoga (38.2%) exhibited relatively low coverage, suggesting potential gaps in ANC service delivery in this region.

Figure C 3: regional differences in proportion of mothers who received all the antenatal components



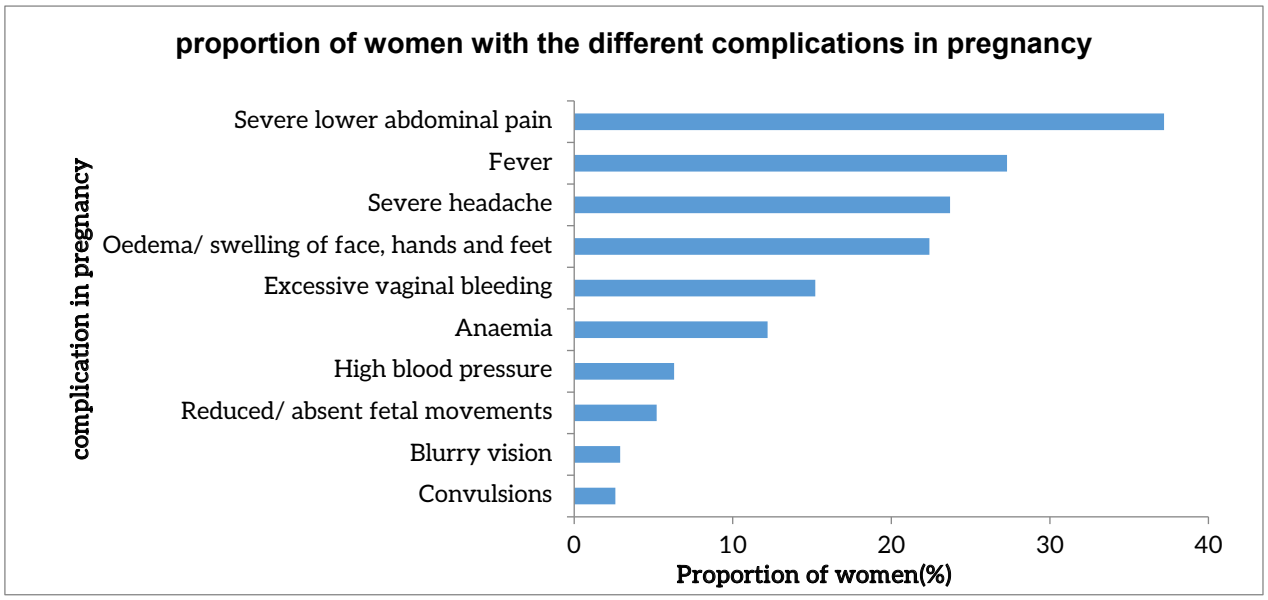
Equity analysis of mothers who received all ANC components

Deeper analysis revealed variations among age groups and education status of mothers who received all ANC components. About 78.1% of pregnant teenagers 15-19 years received all the ANC components compared to the other age groups (43.3% (20-24years), 56.8% (25-29 years) and 57.7% (30 + years). This shows that perhaps the teenagers are prioritized more when they reach health facilities for care. Mothers who had primary level education (61.7%) were seen to have received all ANC components compared to those with no education (58.8%), tertiary education (54.9%) and secondary education (50.8%).

Danger signs and complications during pregnancy

About three quarters (78.2%) of the mothers reported having experienced one or more danger signs during their pregnancy. The most commonly reported signs was severe lower abdominal pain (37.2%), followed by fever (27.3%), severe headache (23.7%) and swelling of the feet, hands and face (22.4%) as shown in figure C4. Most common complications reported were vaginal bleeding (15.2%) and anaemia (12.2%).

Figure C 4: Proportions of the different complications in pregnancy



Of the women who experienced dangers signs and complications during pregnancy, 81% sought care. Almost half (45.3%) sought care from health centres, 40.3% from hospital, 6.8% from nearby drug shops, 4.6% from Traditional Birth Attendants while 3% tried home remedies.

Birth preparedness

Birth preparedness is a strategy to promote the timely use of skilled maternal and neonatal care especially during delivery/childbirth. Birth preparedness is usually carried out by the pregnant mother and her spouse/family. The key elements in birth preparedness include identification of a facility where delivery will take place and a skilled attendant, arranging transportation, preparation of the items that will be used during delivery, preparation of the baby's clothes, identification of a companion/attendant during the labour process, etc

From the survey, almost all (90%) of the mothers made some form of preparations for birth. This was similar across all age groups with no urban-rural difference (Table C3). The only exception was in Karamoja region where only 35% of the women prepared for birth. This could be because of its nature as a nomadic community and high poverty levels. Special programmes should be designed and extensive sensitisation carried out to counteract this.

Table C 3: Proportion of women who prepared for birth stratified by demographics

	Proportions of components prepared for during birth preparedness											
	Made preparations for birth during last preg YES (%)	Financial	Transport	Food	Identification of birth attendant	Identification of health facility for delivery	Clean clothes	Kaveera to deliver on	Gloves	Cotton gauze	Mama kit	No (n)
	%	%	%	%	%	%	%	%	%	%	%	
Woman's age												
15-19	88.4	40.8	33.7	11.2	5.5	20.7	93.3	55.4	63.4	41.6	67.1	4,271
20-24	84.3	42.5	38.2	21.9	6.1	21.2	89.8	68.6	73.3	67.3	62.5	8,209
25-29	93.2	36.4	39.9	14.4	11.4	17.1	89.3	65.2	77	75.4	73.5	6,707
30-34	97.3	45	44.5	14.8	15.5	18.3	88.6	52.9	74.4	67.4	86.5	4,384
35-39	93.1	42.9	38.5	22.2	25.7	35.3	91.3	71.8	64.7	66.5	63.2	1,727
40-44	92.6	37.1	28	3.9	0	24.7	73.9	91	82.2	85.7	62.7	533
45-49	54.5	100	100	0	0	0	100	100	100	100	100	13
Woman's education level												
None	77.4	31.9	31.3	14	3.7	42.7	85	84.9	57	69.9	37.3	1,509
Primary	91.3	40.4	34.9	15.3	9.5	20.8	92.8	63.3	64.4	51.7	60.2	10,238
Secondary	88.8	43	42.5	15.8	9.3	16.6	88.5	61.9	76.6	72.7	81.2	11,573
Tertiary/ University	99.6	39.8	42.6	27.5	20.4	24.9	86.4	59.4	95.1	86.1	80.4	2,523
Place of residence												
Urban	89.6	34.2	36.6	13.8	10.5	17.7	90.6	64.5	80.6	75.5	79.1	15,988
Rural	90.6	52	42.4	21.3	9.5	25.3	88.6	62	59.3	49.3	55.9	9,856
Region												
Ankole	97.4	50.4	31	33.1	3.6	17.7	93.6	50.5	33	27.6	72.3	474
Bugisu	92.4	62.9	39.2	9.1	3.9	10.2	94.7	48.3	43.6	27.5	31.4	636
Bunyoro	100	59.6	33.4	17.6	12.2	44.6	100	87.8	67.1	48.1	37.9	931
Busoga	95.8	57.8	47.1	13.8	8.9	41.9	95.3	74.3	79.6	64.1	65.2	1,114
Greater Kampala Metropolitan	90.3	34.6	38	12.9	9.9	20.1	90.4	67.4	82.9	77.8	79.9	16,433
Karamoja	35	27.7	37.4	29.1	12.6	27.4	91.5	10.5	0	16.2	26.9	287
Kigezi	88.6	70.6	28.6	23.8	13.4	24.8	95.9	51.6	44.4	35.7	61.1	245
Lango/Acholi	100	35.6	33	23.4	8.5	8.5	91.3	51	34	32.5	73.5	1,450
South Buganda	90.7	51.4	31.4	27	3	8.3	84.9	50.1	61.8	53.4	65.3	2,057
Teso	95.9	83	50.9	42.3	31.8	51.6	71.8	48.4	64.4	54.1	49.5	587
Tooro	90	46.9	66.6	23.4	19.9	9	71.3	34.8	59.7	40.1	36.2	565
West Nile	88	47.2	54.7	20.6	17.5	18.1	86.3	70.2	52.6	40.1	25.8	1,064
Special area												
Kampala	90.3	31.8	36.1	12.4	9.5	16	91.1	65.7	82.4	77.4	81	15,033
Islands	90.6	64.3	58.5	18.8	13.8	65	82.9	86.2	88.2	82.3	68.3	1,400
Karamoja	35	27.7	37.4	29.1	12.6	27.4	91.5	10.5	0	16.2	26.9	287
Total	**90**	**41**	**38.8**	**16.6**	**10.1**	**20.6**	**89.8**	**63.6**	**72.4**	**65.5**	**70.2**	**25,844**

The most common components prepared for were preparation of clean clothes for the baby (89.8%), Gloves (72.4%) and Mama Kits (70.2%). Least preparations were made for identification of a birth attendant (10.1%), food preparations (16.6%) and identification of a health facility for delivery (20.6%).

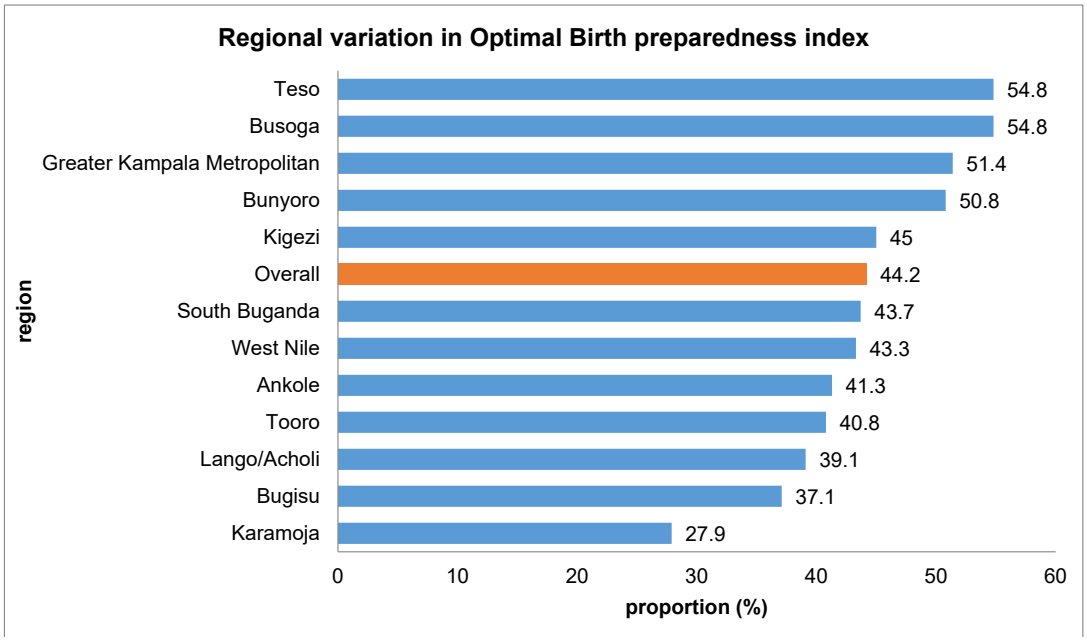
Optimal Birth preparedness index

The Optimal birth preparedness index was calculated as a composite indicator including 6 items which are financial preparation, transport, , identification of birth attendant, identification of health facility for delivery, clean clothes for baby, and mama kit

Results showed that birth preparedness is still suboptimal across the country. Overall, the optimal birth preparedness index was 44.2%. There were regional differences in preparation for birth with women in Teso (54.8%) and Busoga (54.8%) regions being better prepared while Karamoja (27.9%) and Bugisu regions (37.1%) were lagging behind (figure C5).

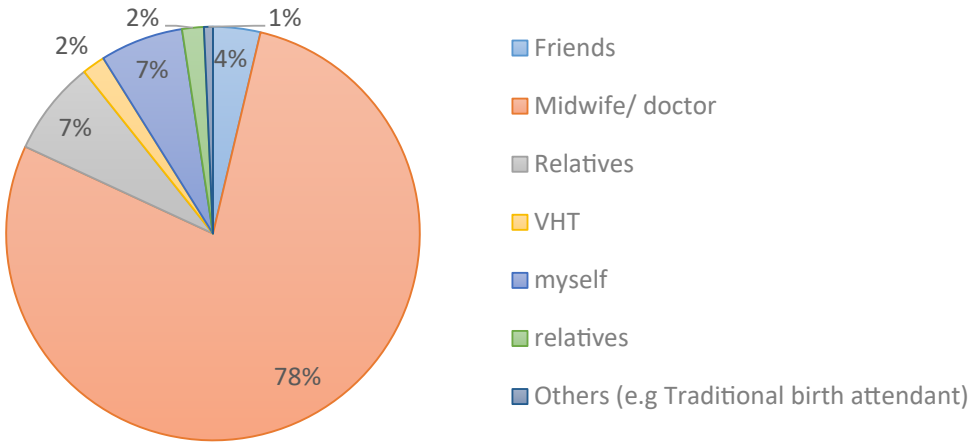
None of the regions had women who prepared all the items. On average, Bunyoro, Busoga, Greater Kampala Metropolitan, and Teso had women being prepared in at least half of the items (score is 50%+). The items that were often missing were identification of a birth attendant, identification of a facility to deliver from and transport.

Figure C 5: Regional variation in optimal birth preparedness index.



Overall, as seen in figure C6, three quarters of women who prepared for birth said they were taught by the health workers/midwives (78.2%). Other sources of information were relatives (9.1%), own knowledge (6.5%), friends (3.7%), VHT (1.8%) and others (0.7%). Notably only a small percentage acquired the knowledge on birth preparedness from VHTs and yet one of the roles of VHTs is to sensitize women on pregnancy, birth preparedness and childbirth. There is therefore need to strengthen the activities of the VHTs with this regard.

Figure C 6: Sources of information on birth preparedness



GAPS:

1) Even though 93.1% of women attended ANC at least once, only 3.6% of women managed to make the required 8 ANC visits as per the MoH guidelines. Attendance of ANC four or more visits was at 67% falling short of the MoH target of 80%. Also first trimester ANC initiation was at 32% failing to meet the target of 50%. There is need to sensitize mothers more on the importance of ANC and initiation of ANC in the first trimester of pregnancy. Through 1st trimester ANC, interventions can be optimized early enough and also ultrasound scanning for gestation dating can be accurately done. Achieving this can be through health sensitizations at the health facilities and through home visits by VHTs as well as other modalities such as media.
2) There is also need to prioritise the package given at the first ANC attendance to avoid missed opportunities. The package could include sensitization on birth preparedness and danger signs during pregnancy.
3) The contents of ANC (prophylactic drugs –dewormers, tetanus toxoid ; screening for diseases (urinalysis); and counseling on birth preparedness and danger signs) are not universally provided in all health facilities. There is need for health system strengthening to ensure that mothers receive all the required contents of antenatal care for a positive pregnancy experience.
4) Birth preparedness is still sub-optimal and more emphasis should be placed on this when mothers come to the facility for ANC.

Labour and Delivery

This section presents findings on recognition of labour, types of delivery and complications as well as access to delivery services.

Recognition of labour

It is important to recognize labour so as to seek care on time and avoid delays which could potentially lead to poor outcomes for both the mother and baby.

Overall, 79.2% of mothers interviewed were able to recognize that they were in labour when it started (table C4). The most easily recognized signs were abdominal contractions (73.3%), "breaking of the water" 38%; severe backache (33.2%) and presence of a blood-stained vaginal discharge (31.3%).

Most of the labour signs were fairly recognized by women aged 25 years and above (77.9%) as compared to teenagers 15-19 years (66.2%) (Table C4). The woman's education level or place of residence or region was not seen to play any role in determining whether a woman could recognize labour or not. However, about a third of women aged between 15-19 years (teenagers) were not able to recognize labour. This points to a gap that needs addressing. Pregnant teenagers need to be handled in a special way in preferable special teenage clinics/days and offered more sensitization on what to expect when one is pregnant and goes into labour.

Further analysis showed very subtle regional differences in recognition of labour with best recognition of symptoms in Teso (95.9%) and Bugisu (90.8%) while Karamoja (70.6%) and Kigezi (74.2%) had the least performance in recognition of labour (Table C4).

Qualitative findings showed that even though many mothers were able to recognise labour signs, these were ignored until they intensified and usually this was during the late hours in the night when money and reliable means of transport were not readily available. Hence most women only sought care when the labor signs intensified. These delays potentially result in negative outcomes of newborn deaths, stillbirths and asphyxiated babies.

> *"I first saw her and asked what was wrong? She told me that her water had broken, so I told her as your water has broken, it would be good for us to go to the hospital and she told me to first wait, and a day passed, I told her the second time and she still told me that we should wait, so I was patient, on the third day she said to me that " I will tell you when the time has come for you to take me to the hospital. So, when the time came, she told that now you can take me to the hospital. "(husband to woman with a preterm)*

Table C 4: Proportions of mothers who were able to recognize labour by particular signs

	Mothers who were able to recognize labour	Labor signs recognized					
	Yes (%)	Had abdominal contractions (%)	Had severe backache (%)	Had a blood stained vaginal dis-charge(%)	My water broke (%)	Other (%)	Number of women that recognized danger signs (%)
Total	**79.2**	**73.3**	**33.2**	**31.3**	**38**	**1.2**	**22,753**
Woman's age							
15-19	66.2	74.8	28	13	55.7	0.9	3,199
20-24	78.1	79.5	36.4	26	25.2	0.8	7,604
25-29	85.2	70.7	31.8	38.4	45.1	0.2	6,131
30-34	86.8	67.7	36.8	38.2	36.2	3.5	3,910
35-39	74.9	76.6	32.9	33.8	25.5	2.4	1,391
40-44	87.9	35.7	9.1	79.6	78.8	1.7	506
45-49	54.5	100	0	100	0	0	13
Woman's education level							
None	91	63.2	33.8	43.9	45.2	0	1,773
Primary	74.7	76	33.6	30.7	41.2	2.3	8,377
Secondary	80.8	72.9	29.4	25.5	37.4	0.6	10,532
Tertiary/University	81.8	73.5	50.3	53.1	21.4	1.2	2,071
Place of residence							
Urban	76.9	73.4	25.6	28.6	41.2	1.3	13,728
Rural	82.9	73.1	44.8	35.6	33.1	1.2	9,024
Region							
Ankole	84.5	76.5	26.4	25.8	28	3.5	412
Bugisu	90.8	93.3	33.4	29.3	39.1	1.1	625
Bunyoro	87.2	90.3	43.3	58.6	29.4	0	812
Busoga	82.1	56.9	45.1	29.4	31	4.3	954
Greater Kampala Metro-politan	77.6	72.8	28.9	27.9	37.8	0.8	14,122
Karamoja	70.6	83.9	55.9	34.5	31.1	0	578
Kigezi	74.2	66.3	11.4	40.8	39.5	12.3	205
Lango/Acholi	78.9	71.8	51.5	32.9	43.7	0	1,144
South Buganda	79.1	61.9	44.3	28.6	55.6	0	1,795
Teso	95.9	79.8	20.9	57.6	59	6.7	587
Tooro	84	77.4	18.2	52.1	3.4	1.7	527
West Nile	81.9	80.3	42.1	36.3	27.8	3.4	990
Special area							
Kampala	76.6	73.1	25.9	26.7	40.2	0.9	12,751
Islands	88.8	69.9	57.1	38.9	15.5	0	1,372
Karamoja	70.6	83.9	55.9	34.5	31.1	0	578
Total	**79.2**	**73.3**	**33.2**	**31.3**	**38**	**1.2**	**22,753**

Delivery and its complications

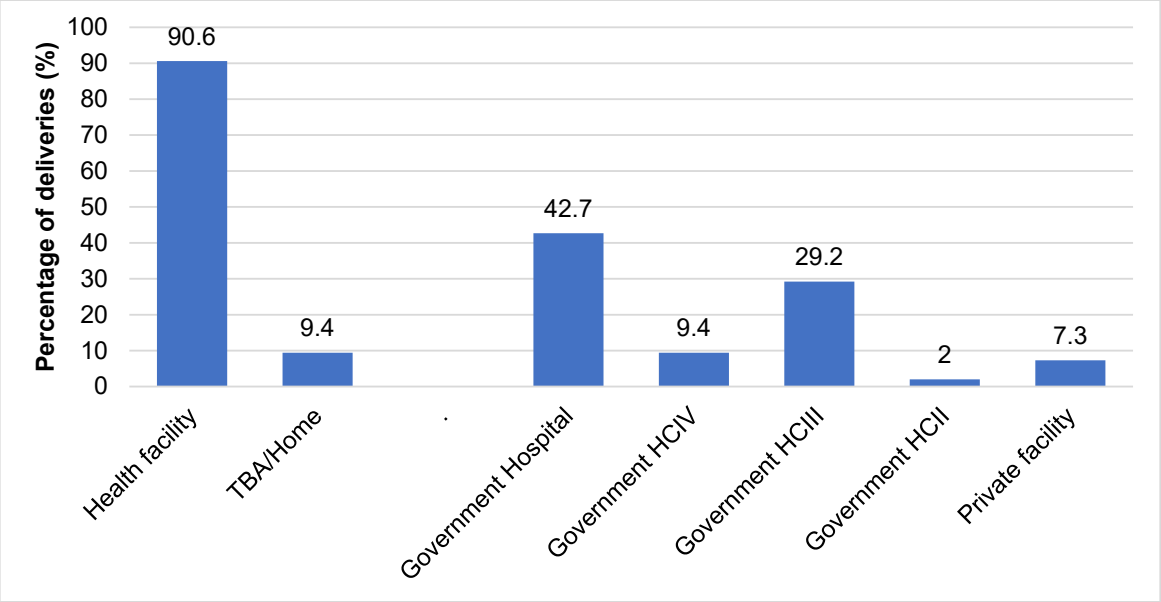
Place of delivery

From the survey, overall, almost all women (90.7%) delivered from health facilities. A total of 83.4% mothers delivered from government run facilities (40.7% in health centres and 42.7% in hospitals) while 7.3% delivered from private facilities (PNFPs and PFPs). Further stratification of health centre level deliveries showed that many deliveries occurred at HC III level (29.3%) compared to HC IV (9.4%) and only 2% at HC II level (figure C7). This result reflects that a number of women are by-passing HCIV level for deliveries probably because of sub-optimal services provided. It could also be due to deliberate referrals to the hospitals.

By passing of health facilities was also revealed in the qualitative findings as shown by the quote below:

> *"my husband always tells me to use higher level health facilities because when you go the clinics and things don't work out, they refer you to the hospital. So, it's good to start from the higher-level of care''. (mother of asphyxiated baby)*

Figure C 7: Graph showing place of delivery



Home deliveries were mainly seen among non-educated women, women 40 years and above; and living in rural areas. Regional variations in home deliveries showed the highest in Islands (32.8%), Lango/Acholi (20.3%), South Buganda (16.9%) and Bugisu (19.3%) regions compared to the national average of 9.3% (table C5.1).

Table C 5: Stratification of place of delivery by age, region, and education status

	Facility delivery			Home delivery	Total
	Government health center	Government hospital	Private facility	Other (home/ TBA	
	%	%	%	%	n
Total	**40.7**	**42.7**	**7.3**	**9.4**	
Age					
15-19	29.9	52.9	7.2	10.1	4,830
20-24	37.3	52.1	3.3	7.3	9,742
25-29	53.5	28.4	9.8	8.2	7,196
30-34	40.3	36	10.2	13.5	4,505
35-39	41.4	36.2	11.1	11.3	1,856
40-44	26.7	49.7	9.8	13.7	575
45-49	54.5	0	0	45.5	23
Total	**40.7**	**42.7**	**7.3**	**9.4**	**28,727**
Education status					
None	43.7	14.3	4.5	37.6	1,949
Primary	44.3	34.9	11	9.8	11,218
Secondary	40.7	51.5	1.6	6.1	13,027
Tertiary/University	21.7	53.4	22.2	2.8	2,533
Total	**40.7**	**42.7**	**7.3**	**9.4**	**28,727**
residence2					
Urban	30.3	58.7	6.4	4.7	17,847
rural	57.7	16.4	8.8	17.1	10,880
Total	**40.7**	**42.7**	**7.3**	**9.4**	**28,727**
Region					
Ankole	51.6	39.1	3.3	6	487
Bugisu	67.9	12.8	0	19.3	688
Bunyoro	84.1	0	0	15.9	931
Busoga	37.7	39.2	15.4	7.7	1,162
Greater Kampala Metropolitan	30.2	56.7	5.9	7.2	18,195
Karamoja	47.6	29.9	12.5	10	819
Kigezi	82.8	1.6	15.6	0	276
Lango/Acholi	79.7	0	0	20.3	1,450
South Buganda	37	26.2	19.9	16.9	2,269
Teso	72.9	7.1	15.9	4.1	612
Tooro	53.6	32	6.3	8	627
West Nile	70	10.2	7.5	12.3	1,210
Total	**40.7**	**42.7**	**7.3**	**9.4**	**28,727**
special_area					
Kampala	28.2	61.5	5.4	4.9	16,650
Islands	51.8	4.5	10.9	32.8	1,545
Karamoja	47.6	29.9	12.5	10	819

Type of delivery

Overall, the majority of the mothers delivered by vaginal delivery (86.4%) while 13.5% delivered by caesarian section. Caesarian sections were more in urban regions (15%) compared to rural areas (10.2%). The highest prevalence of caesarian sections was noted in South Buganda region (22.6%) followed by Tooro (16.7%) and Greater Kampala Metropolitan (15.1%). The least prevalence of caesarian sections was noted in Karamoja, Lango/Acholi, Bunyoro and Bugisu regions (table C5.2)

Table C 5. 1: Type of delivery stratified by residence and region

	Type of delivery			
	Ceasarean section	vaginal delivery	Total	n
	%	%	%	
residence				
Urban	15.5	84.6	100	17,847
rural	10.2	89.5	100	10,880
Region				
Ankole	8.9	88.4	100	487
Bugisu	5.3	92.4	100	688
Bunyoro	3.7	96.3	100	931
Busoga	11.3	88.7	100	1,162
Greater Kampala Metropolitan	15.1	84.9	100	18,195
Karamoja	4.3	95.7	100	819
Kigezi	8.9	91.1	100	276
Lango/Acholi	0	100	100	1,450
South Buganda	22.6	77.4	100	2,269
Teso	10.1	89.9	100	612
Tooro	16.7	81.3	100	627
West Nile	11.2	88.8	100	1,210
special_area				
Kampala	16.1	83.9	100	16,650
Islands	4.5	95.5	100	1,545
Karamoja	4.3	95.7	100	819
Total	**13.5**	**86.4**	**100**	**28,727**

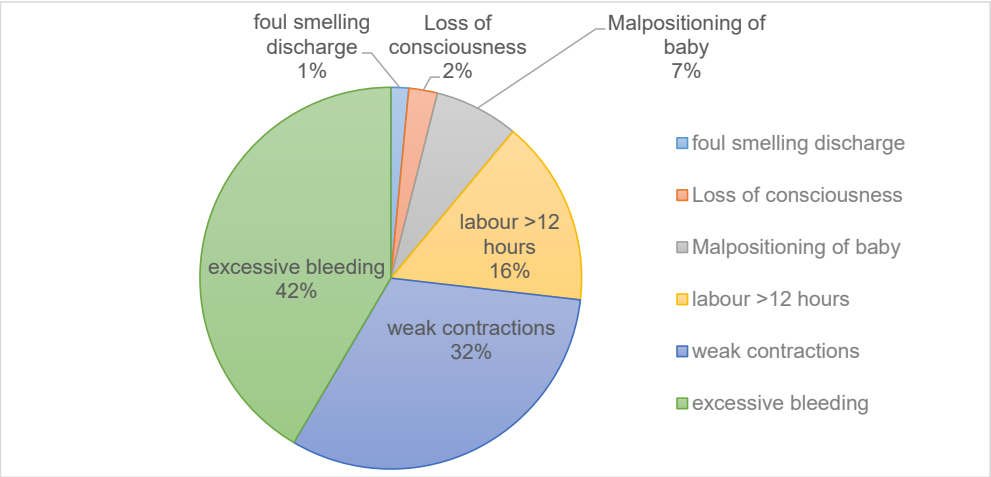
Complications during delivery

Of all the respondents, 11.1% mentioned that they had complications during delivery. Complications mentioned included excessive bleeding (27.4%), weak contractions (20.9%), prolonged labour of more than 12 hours (10.4%) and malpositioning of the baby (4.7%). Such findings underscore the importance of antenatal care attendance during pregnancy (figure C8).

Of those who reported complications, about one third (34.7%) of the complications were experienced by women in the age group 35-39 years while 10.9% were among teenagers 15-19 years of age. Among

women aged 35-39 years, the most common complication seen was excessive vaginal bleeding (19.3%) followed by malposition of the baby (7.1%); while among the teenagers, the most common complication was prolonged labour of more than 12 hours (33.5%) followed by excessive vaginal bleeding (11.1%). Overall, Kigezi region presented with women who had most complications (26.4%) while Karamoja region had the least (3%). There was no difference seen between rural and urban women.

Figure C 8: Distribution of complications during delivery

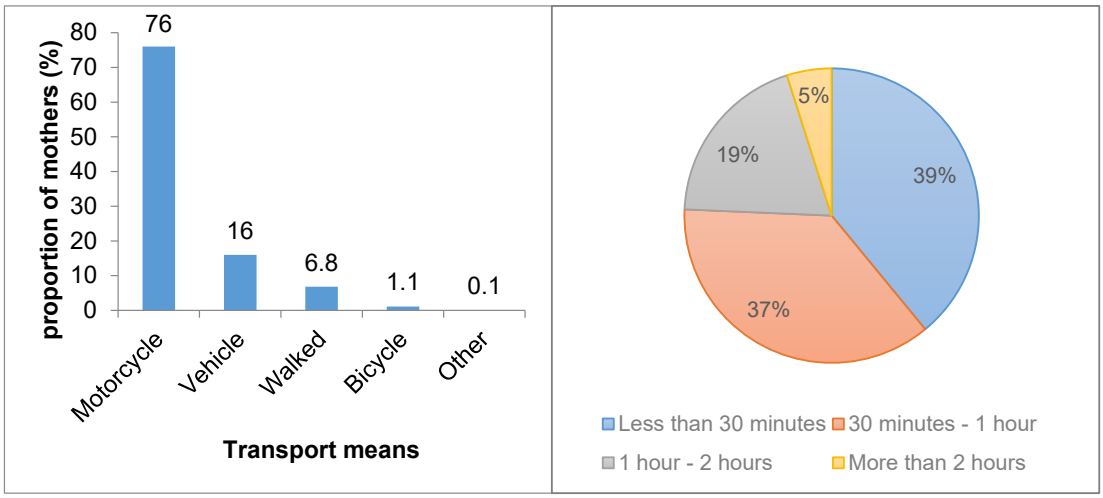


Access to care during labour

Access to delivery care is the act of receiving timely obstetric care which is important for reducing adverse maternal and neonatal outcomes. The dimensions of access include type of transport means, time taken to reach facility, time taken to receive care etc. Of the 90.7% mothers who delivered from a facility, the most commonly used means of transportation of a pregnant woman in labour to the health facility was by use of motorcycles (76%,) followed by motor vehicles (16%). A small number (6.8%) of mothers walked to the facility during labour (figure C9).

Notably for 39% of the mothers, it took less than 30 minutes to reach the health facility while 36.3% women took between 30 minutes and one hour. For 24.3% mothers, the distance to the facility took more than one hour to cover (figure C6).

Figure C 9: Showing transport means used (left) and time taken (right) to the health facility



The three delays during labour and delivery

Early care seeking and proper management of labor impacts positively on the pregnancy outcomes. From the qualitative interviews, although many of the respondents reported to have delivered from health facilities, there were reported delays in making decisions to go to a facility (delay 1), delays in reaching the facility (delay 2) and furthermore, delays in receiving care upon arrival at the health facility (delay 3).

The reasons given for these delays varied from respondent to respondent. Reasons given for delay 1 included husband not being home at the time of labour, labour starting late in the night while at home, lack of finances and failure to recognize initial labour signs. While for delay 2, the major reason given included long distance to the facility; no available means of transport at the time of labour; mother having other household chores to complete before going to the health facility; mother intentionally delaying so that she doesn't stay for long at the health facility as exemplified by the quote below,

> *"I noticed these symptoms(labour) at around 1:00 am and we decided to go to the hospital at around 9:00 am because we didn't have any means of transport to use that time since we don't have our personal motorcycle or car not even a bicycle."(mother of a sick newborn)*

> *Sometimes these mothers delay to go to the facilities because labour may start at night and there is no available means of transport. Also sometimes mothers intentionally delay at home so that the labour pains become stronger and this means that they produce immediately- that they don't stay for a long time in the health facility". (VHT, Busoga region)*

All the mothers who delivered from high volume facilities (regional and national referral hospitals) reported delays in receiving care and cited reasons such as inadequate staffing versus large number of women in labor, as well as few delivery beds. Most women who delivered from RRHs revealed that they waited for hours to be examined while others waited longer for beds to be vacated as explained by a mother in the quote below,

> *We arrived at the main hospital and met only one midwife present and yet there were many patients, about seven of them. She asked us why we left the HCIV yet it had everything to handle patients. We arrived at 9:00 am but it was approaching 01:30pm when the midwife called us to be seen. There were very many mothers that day and few nurses so we waited a very long time". (Mother of a preterm baby).*

GAP: All pregnant women should be able to identify the beginning of labour. However, 79.2% of pregnant women were able to identify that they were in labour through common signs like backache, severe abdominal pain, mucoid bloody vaginal discharge etc. All pregnant women should be sensitized on the importance of seeking care as soon as labour starts (avoiding delay 1 and 2).

About 33.8% of teen mothers were not able to recognize signs of labour. This points to an urgent need in offering specially tailored messages for teen mothers and more especially in teen specific clinics in which they are more comfortable than in the generalized ANC clinics. This is to avoid delays.

The overall prevalence of caesarian sections is within (13.5%) than the WHO recommended prevalence of 10-15%. Some regions like South Buganda have a very high prevalence of 22.6%. There is need to explore the reason for this.

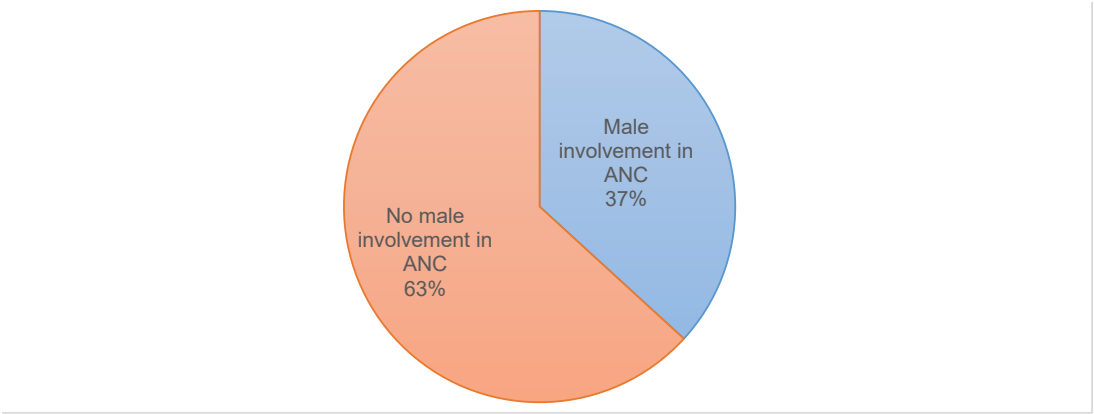
Qualitative findings show that women in labour especially in the rural areas usually delayed to make decisions to go the facility (delay 1) and delayed in reaching the facility (delay 2). Various reasons given for these delays included husband not present at home at that time, lack of transport means, long distance to the facility, labour started in late in the night, mother wanted to finish household chores before going to the facility, mothers don't want to stay in the health facilities for long etc. In addition, there were also delays in receiving care while at the facility (delay 3) mainly due to the inadequate number of staff, large number of patients etc. These delays may subsequently result in poor outcomes for the baby (e.g asphyxia, fresh stillbirth etc) and for the mother too.

Male involvement in antenatal care, labour/delivery and postnatal care

In Uganda, male involvement in maternal health still remains a big challenge despite the critical roles men play in decision making; providing financial, emotional and physical support. Traditionally, maternal, newborn and child health care is seen as a preserve for women. However, over time, there has been some improvement with regards to male involvement in maternal, newborn and child health care. Involvement in this survey referred to presence of men during ANC, labour/delivery and helping out mothers during the postpartum period

The community survey findings revealed that only about a third (36.8%) of pregnant women were accompanied by male partners for antenatal care (Figure C10). Of these, majority (64.3%) participated in 1-2 visits. Those who accompanied their spouses for 3-4 visits were 23.8% while only 11.9% managed to go for 5 or more visits.

Figure C 10: Involvement in antenatal care



Deeper analysis of male involvement revealed a rural urban disparity with more male support in the urban areas (68%) compared to rural regions (55.4%) (Table C6). More support was offered to women with no education (82.6%) compared to those with tertiary education (56.1%). There was also regional disparity of male involvement in antenatal care with greatest support in Ankole (80.7%), Bugisu (77.2%) and Greater Kampala Metropolitan (69.3%). The least male support during ANC was in Teso (26.2%) followed by Lango/Acholi/Acholi (37.8%) and South Buganda (40.8%).

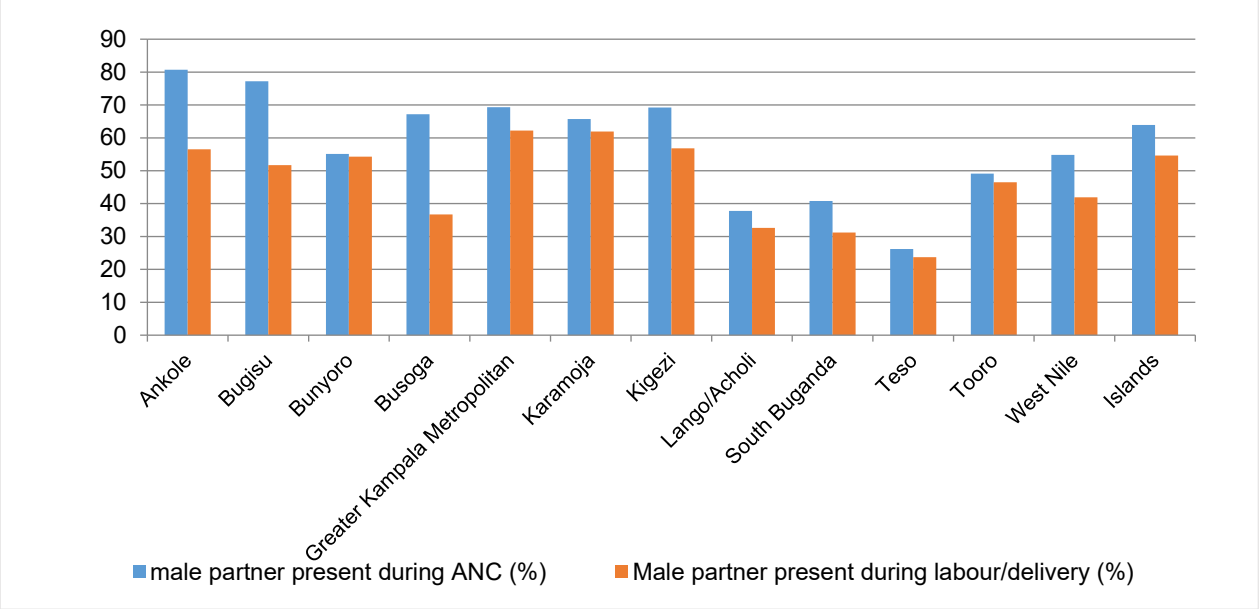
Table C 6 : Partner involvement in antenatal care

	Male partner (husband or partner) accompanied mother for antenatal care (ANC) during most recent pregnancy			Number of women
	No	Yes	Total	n
	%	%	%	
Woman's age				
15-19	67.4	32.6	100	4,830
20-24	61.6	38.4	100	9,742
25-29	61.9	38.1	100	7,196
30-34	58.6	41.4	100	4,505
35-39	72.3	27.7	100	1,856
40-44	79.4	20.6	100	575
45-49	100	0	100	23
Woman's education level				
None	82.6	17.4	100	1,949
Primary	58.1	41.9	100	11,218
Secondary	66.1	33.9	100	13,027
Tertiary/University	56.1	43.9	100	2,533
Place of residence				
Urban	68	32	100	17,847
rural	55.4	44.6	100	10,880
Region				
Ankole	80.7	19.3	100	487
Bugisu	77.2	22.8	100	688
Bunyoro	55.1	44.9	100	931
Busoga	67.2	32.8	100	1,162
Greater Kampala Metropolitan	69.3	30.7	100	18,195
Karamoja	65.7	34.3	100	819
Kigezi	69.2	30.8	100	276
Lango/Acholi	37.8	62.2	100	1,450
South Buganda	40.8	59.2	100	2,269
Teso	26.2	73.8	100	612
Tooro	49.1	50.9	100	627
West Nile	54.8	45.2	100	1,210
Special area				
Kampala	69.8	30.2	100	16,650
Islands	63.9	36.1	100	1,545
Karamoja	65.7	34.3	100	819
Total	63.2	36.8	100	28,727

Male/partner involvement in labour and delivery

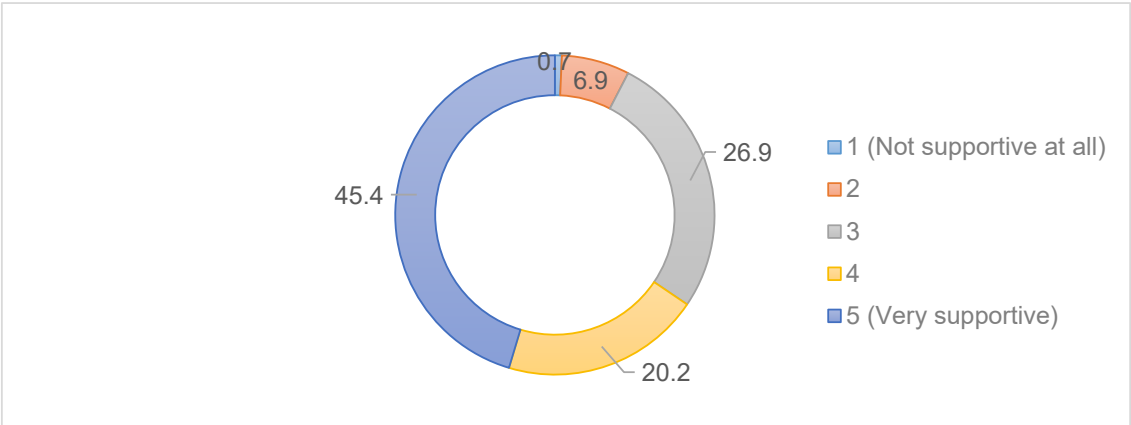
Survey findings show that close to half (45.5%) of the woman had their spouses present and involved during labour and delivery (figure C11). Most men were present in Greater Kampala Metropolitan (62.2%) followed by Karamoja (61.9%). Male involvement during labour and delivery was least seen in Teso (23.7%), South Buganda (31.2%) and Lango/Acholi (32.6%) regions.

Figure C 11: Male partner involvement during antenatal care and labour/delivery



Women were asked to rate how supportive their partners/spouses were on a scale of 1 to 5 with 5 being the most supportive. Nearly half (45.4%) of women rated their partners as most supportive while only 0.7% felt that their spouses/partners were not supportive at all (Figure C12).

Figure C 12: Rating of partner support during labour and delivery



The most common type of support offered at this time was financial. Other types of support reported were emotional (43.8%), Physical comfort measures e.g., massaging/rubbing her back, helping with breathing, walking around with woman during labour etc (32.7%) and advocating for the mother's needs with healthcare providers (24.6%).

Male involvement in postnatal period

During the postnatal/postpartum period, 6 in 10 men (61%) participated in caring for the newborn and the mother. The most common activities the males were involved in included helping with household chores (78.6%), carrying the baby (67.1%), buying and giving medicine (53.3%) and bathing the baby (29.8%).

GAP: Male involvement is still quite low. Only 36.8% males/partners were involved in antenatal care; 45.5% were involved during labour and delivery and 61% were involved during the postnatal period. Overall, there is need for more male/partner support during these critical stages of pregnancy, childbirth and post birth care

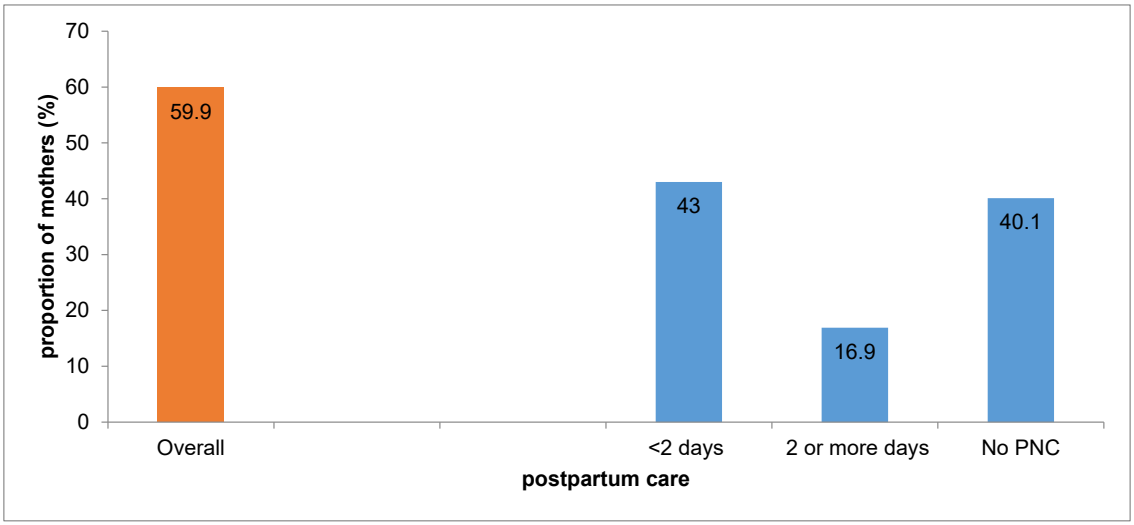
Postpartum/ postnatal care

This involves the practices that are carried out immediately a baby is born to six weeks after delivery. It includes checks on both the mother and the baby.

Postpartum care for the mother

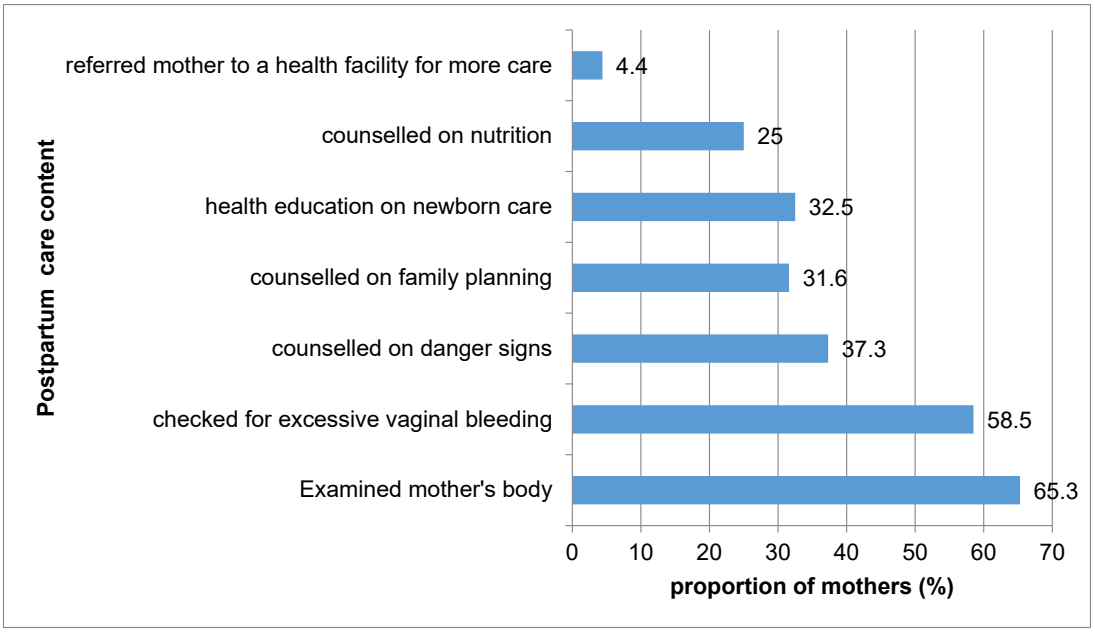
We assessed postpartum care by asking mothers if they had been checked by a health care worker after delivery. Survey findings showed that overall, slightly more than half (59.9%) of mothers who had delivered had their health checked by a health provider after delivery (figure C13). For less than half (43%) of the mothers, PNC was conducted in less than 2 days while for 16.9%, PNC assessment was within 2 or more days. Of the mothers who has PNC assessments, a little more than half (55.2%) had only one postnatal care check, one third (31.3%) were checked twice and 13.5% were checked on three or more times.

Figure C 13: Timing of Postpartum care assessments for the mother



The mothers mentioned that postpartum care was predominantly provided by the midwives (77.6%). In some cases, the checks provided by doctors (20.1%), VHTs (1.8%) and traditional birth attendants (0.4%). The most commonly received component of postpartum care was examining the mother's body (65.3%) and checking for excessive vaginal bleeding (58.5%) as shown in figure C14.

Figure C 14: Proportion of mothers who received different postpartum care contents



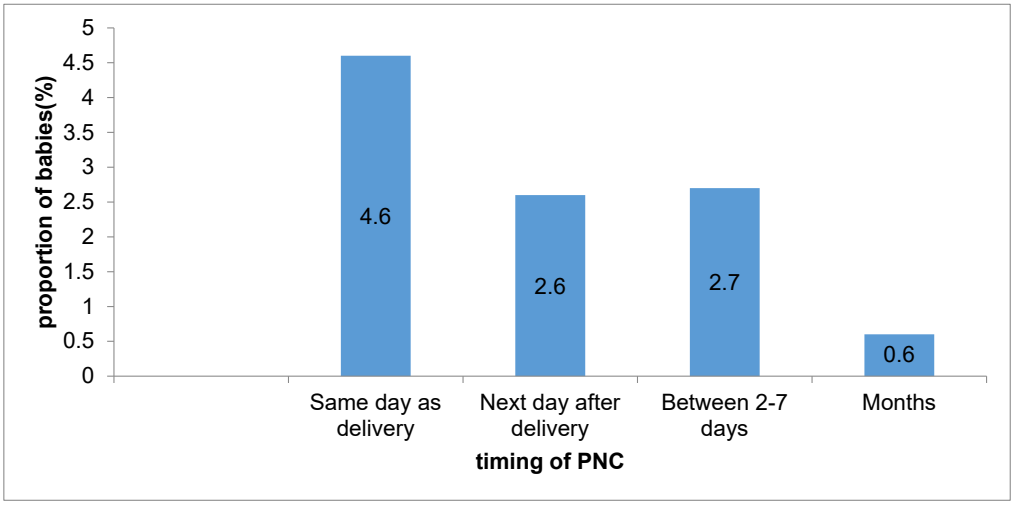
Essential newborn care

The post-natal period is the period following child birth and lasts from the time immediately after birth to six weeks after delivery. This is a very critical period for both the mother and baby as most maternal and newborn deaths occur during this time. It is therefore of utmost importance that both mother and baby are attended to by a skilled health attendant during this time. The essential newborn care practices during this period include resuscitation of babies who fail to cry at birth, initiation of breastfeeding within one hour after delivery, cord care, thermal care (warmth), maintaining hygiene, recognition of danger signs and appropriate management.

Overall PNC for babies

According to WHO and the Uganda MoH guidelines, postnatal care should be provided for every live birth in the first 24 hours after delivery. Every mother and baby should get a total of four postnatal care checks with 3 times being within the first week after delivery (Day 1, Day 3 and between Day 5-7 then after six weeks). Mothers were asked if their babies had been checked by a health care provider after delivery. From the survey findings, only one in ten (10.5%) of mothers mentioned that their babies were checked by a health worker in the postnatal period. Of those babies who received PNC, 43.6% had the first check on the same day of delivery (24.9% on the next day after delivery, 26.2% between 2 to 7 days after delivery and 5.4% at one month after delivery). Using the denominator of all babies born alive, 4.5% received PNC on the same day as delivery, 2.6% the next day after delivery, 2.7% received PNC between 2 to 5 days after delivery and 0.5% months after delivery (figure C15)

Figure C 15: Timing of postnatal care for baby



A little over a half of these mothers (54.8%) stated that the first PNC check for the baby was conducted by a nurse/midwife, 17.9% by a doctor, 17% by a traditional birth attendant and 8.7% by a VHT. Half of the mothers (55.5%) also mentioned that the first PNC check for the baby happened in a facility while for 29.4% it happened at their own homes; 3.1% in a dispensary and 12% at a TBAs home. Mothers mentioned that the commonest content of the PNC checks included general examination of the baby (73.1%), checking the cord (69%), weighing the baby (50.9%), observing for breast feeding (40.5%) and checking for danger signs (30.7%). Least commonly done activities were counseling for danger signs (18.6%) and referral for further care (2.2%).

Cord care

About two thirds (64.3%) of the mothers mentioned that at delivery, a new razor blade was used to cut the baby's cord. Other items used to cut the cord included scissors (16.9%) and any razor blade 4.6%). About 13.1% of the mothers did not know what was used.

From the survey, 51.8% of the mothers cleaned the baby's cord with boiled/ cooled water only while only 3.3% cleaned the cord with chlorhexidine. **The rest (44.9%) of the mothers reported to have applied other substances on the cord.** These substances included oil/ghee (4.7%), herbs (3%), ash (2.6%), spirit (0.1%) and animal dung (0.1%). Qualitatively, we found that different regions apply different substances to the cord (table C7).

Table C 7: Regional variation on use of additional substances on the baby's cord

Substance	Regions where it is predominantly used
Ash	Buganda, Ankole
Oil/Ghee	Karamoja, Kigezi, Lango/Acholi, Ankole
Animal dung	Karamoja
herbs	Kigezi, Buganda, Busoga
Spirit	Bugisu, Teso
powder	Busoga, Bugisu
Lizard droppings	Busoga, West Nile

> *In Kampala, mothers apply roasted banana ash because they believe it dries the cord so quickly. They also take out babies early in the morning and make them 'walk' through the morning dew with a belief that this practice makes baby's bones strong and learn to walk quickly (VHT, Kampala)*

From the case studies, there were some cultural practices surrounding cord care and management. Examples included seclusion of babies whose cords have not fallen off yet. In most of the regions, it was reported that a baby whose cord has not fallen off was kept indoors.

> *There is also misconception that when you give birth to a baby girl, she has to be kept in the house for four days without coming out and boys for three days, that is for preventing them from evil spirit attacks, yet in actual sense they do that to give time for the cord to fall first. (VHT, West Nile)*

> *Women who have just delivered are not allowed to take the baby out of the house for at least 7 days. (mother, Busoga region)*

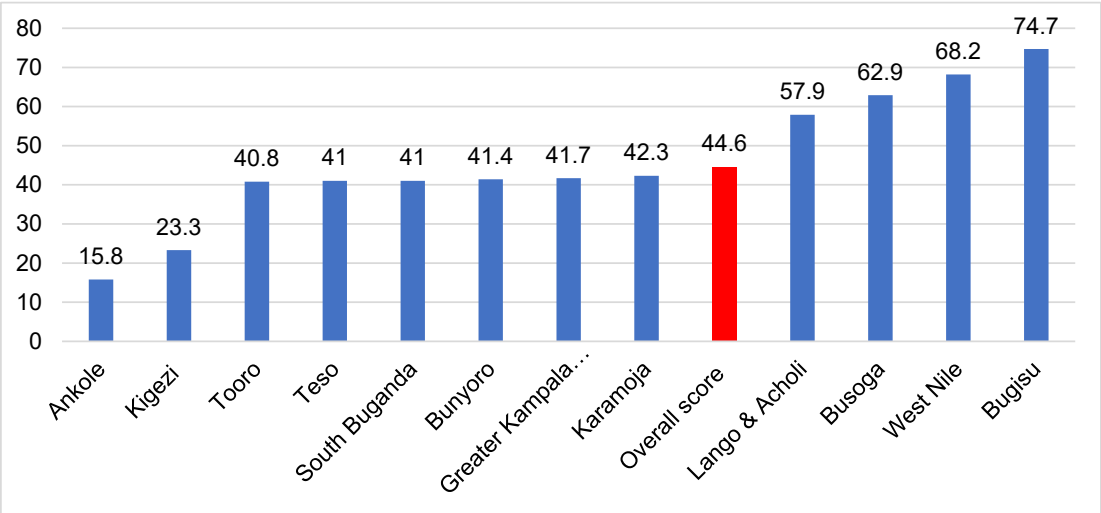
Other practices/beliefs included how a fallen cord should be treated and buried. For example in Bunyoro region, mothers reported that the cord that had fallen off was boiled and a little of this water given to the baby citing that it prevented newborn infections while in Busoga, the cord was kept in a secret place. Burial practices of the cord varied from region to region. It was reported that in West Nile, a fallen cord is buried in front of the house, while in some regions, it is buried under the kitchen verandah.

> *But what some of these mothers do are really very wicked, why do you put lizard droppings on a baby's cord? Others even bury the cords under the verandah of a house or at the entrance of a house. (VHT, West Nile)*

Optimal cord care

Good cord care as a composite indicator was defined as: type of instrument used to cut the cord (such as surgical blade or sterilized pair of scissors or a brand new razor blade,), type of material used to tie the cord (clean thread), and no medicinal substance (local or not local) put on the cord). From our survey, the overall good cord care practice was 44.6% with the best practices in Bugisu (74.7%), West Nile (68.2%) and Busoga (62.9%) (figure C16). Poor cord care practices were seen in Ankole (15.8%), Kigezi (23.3%), South Buganda (41%), Greater Kampala Metropolitan (41%) and Tooro (40.8%). The component in the good cord care index that requires most improvement is the practice of application of additional substances on the cord where 44.9% mothers reported that they apply some substances to the cord during the healing process.

Figure C 16: Regional variation in optimal cord care

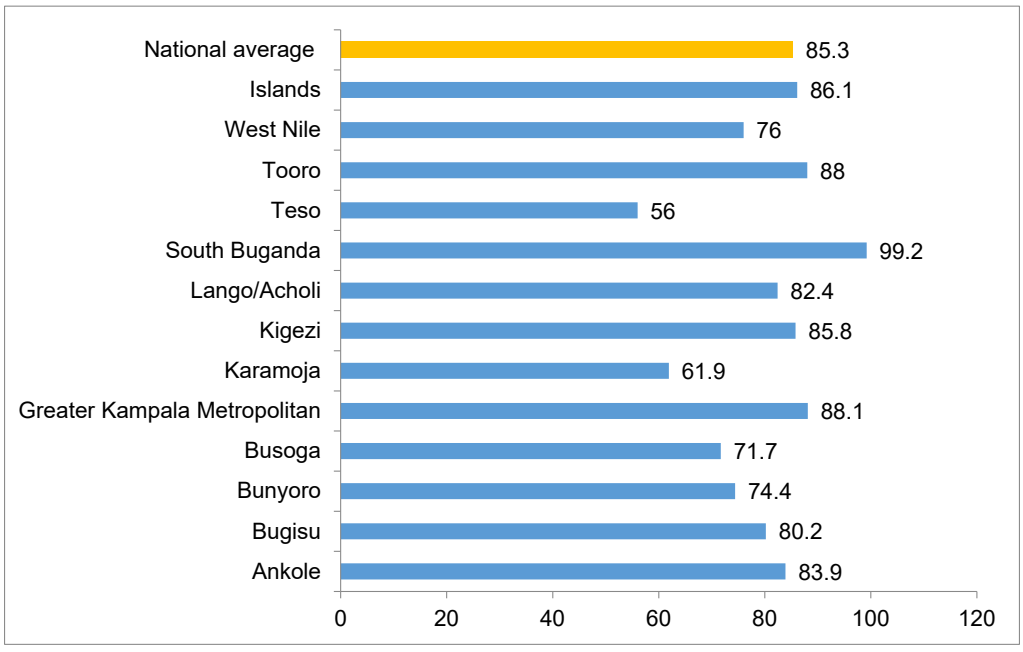


Thermal Care/Warmth

The practice of skin to skin after delivery was reported by 63.1% of the mothers while 82.1% mentioned that the baby was wiped dry and wrapped with a cloth before delivery of the placenta. These practices should be universal and therefore this points to a gap in quality of care in the immediate postpartum period. However, all mothers reported having dressed and covered their babies with warm cotton clothes.

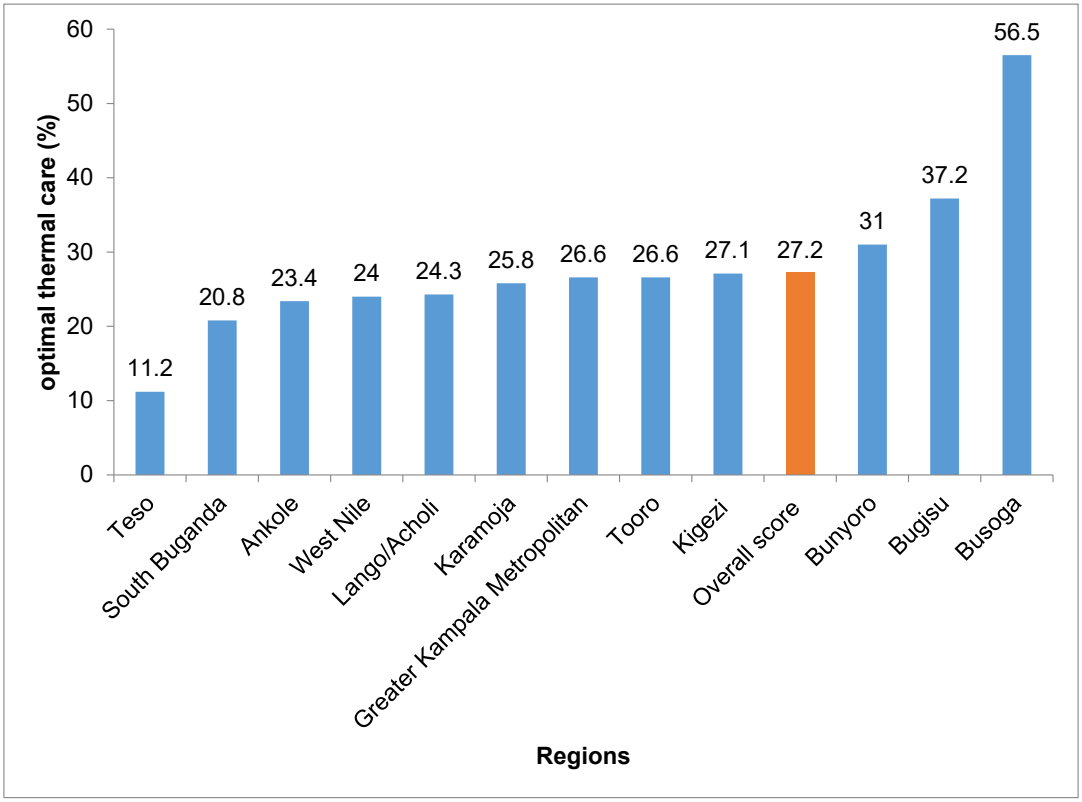
Almost all the mothers (94.3%) reported that they slept with their babies in the first week of life. Majority of the mothers (85.3%) reported that they delayed bathing by 24 hours/one day after delivery. There were no rural –urban differences in delayed bathing. However, Teso and Karamoja regions were seen to be lagging behind with regards to delayed bathing of babies as shown in figure 17 below.

Figure C 17: Differences in delayed bathing by region



Optimal thermal care as a composite indicator was defined as: newborn after birth was first dried, put skin-to-skin on mothers chest; wrapped in clean dry clothing and delayed bathing (after 24 h or more). The overall optimal thermal care reported in the survey was 27.2% (figure C 18). There was regional variation in optimal thermal care (figure C 18) with the best being Busoga (56.2%) while the worst performing regions were Teso (11.2%), South Buganda (20.8%)

Figure C 18: Regional variation in optimal thermal care



Initiation and Exclusive Breast feeding

Almost all mothers (99%) reported to have breast fed their babies within the first one month. This was universal with no differences across age, region or education status (table C8). Of those who breastfed their babies, 79.1% initiated breast feeding within the first hour after delivery. About 2 in 10 mothers (21%) expressed the first breast milk (colostrum) and threw it away instead of giving it to the baby. In-depth analysis showed that this practice was mainly seen in rural areas (23.7%) compared to urban areas (19.4%) and mostly in Karamoja (85.5%), Teso (48.8%) and South Buganda (30.2%) regions.

Findings also showed that 17 % of mothers reported to have given the baby additional (pre-lacteal) feeds other than breast milk in the first three days after delivery. These additional feeds included glucose water (62.8%), plain water (17.2%), infant formula (7.7%) and herbs (6.7%). The practice of giving pre-lacteal feeds to the baby was seen more in the rural areas (22.2%) compared to urban areas (13.9%) and mostly in South Buganda, Kigezi and Busoga regions.

Table C 8: Breast feeding practices

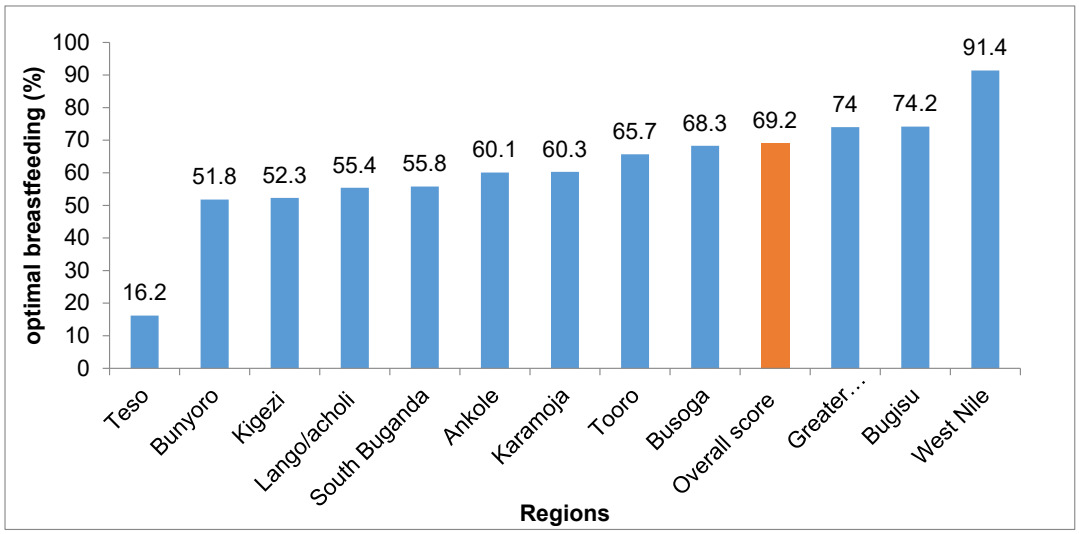
Did you ever breastfeed your baby?	Number of women (n)	Proportion (%)
Yes	28,294	98.7
How long after birth did you first put the baby to the breast?		
After one hour but during the first day	4,338	15.3
After the first day of life	1,581	5.6
In the first hour	22,375	79.1
Did you squeeze out and throw away the first milk from the breast?		
Yes	6,023	21
In the first three days after delivery, was the baby given anything else to drink other than breast milk?		
No	23,779	83
Yes	4,873	17
If yes, what was given?		
Glucose/ sugar water	3,060	62.8
Herbs	326	6.7
Infant formula	377	7.7
Plain water	839	17.2
Other (specify)	270	5.5
Total	4,873	100

From the case studies, it was revealed that there are some cultural practices surrounding initiation of breast feeding. **For example in Karamoja region, a drop of alcohol was placed in the baby's mouth before initiation of breast feeding.** This could potentially be harmful for the baby.

> *"Another bad practice is the first thing given to the baby after birth is local brew, it is given in small drops while calling the names until when the child swallows then the name has been accepted (VHT, Karamoja)*

Optimal breastfeeding practices as a composite score was defined as: initiation of breastfeeding within the first one hour after birth and not giving the baby any pre-lacteal feeds. The overall proportion of mothers reporting optimal breastfeeding practices was 69.2% (figure 19). There was regional variability in proportion of mothers reporting optimal breastfeeding practices with the best performing regions being West Nile (91.4%) and Bugisu (74.2%). The poorly performing regions include Teso (16.2%) and Bunyoro (51.8%).

Figure C 19: Regional variation in optimal breast feeding practices index



Optimal Newborn Care Practices (as a composite indicator)

Optimal newborn care practice was calculated as a composite indicator including Optimal cord care + optimal thermal care + optimal breast feeding practices (table C 9). Regional variation in newborn care practices was evident, with Bugisu leading at 20.4% and Kigezi lagging at 3% lagging in optimal newborn care practices (figure 20). The national average was 15.1%. Generally, the optimal newborn care index was poor across all regions.

Figure C 20: Regional differences in optimal newborn care practices

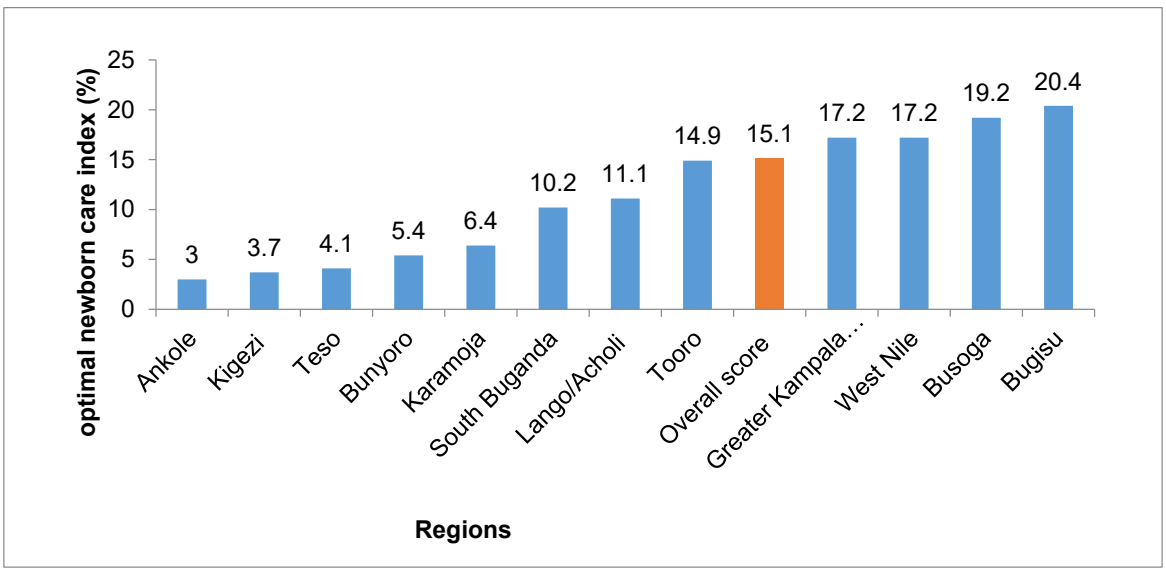


Table C 9 : Regional comparison of optimal cord care vs optimal breastfeeding vs optimal thermal care vs optimal essential newborn care practices

Region	Optimal cord care (%)	Optimal breastfeeding (%)	Optimal thermal care (%)	Optimal newborn care (%)
Ankole	15.8	60.1	23.4	3.0
Bugisu	74.7	74.2	37.2	20.4
Bunyoro	41.4	51.8	31.0	5.4
Busoga	62.9	68.3	56.5	19.2
Greater Kampala Metropolitan	41.7	74.0	26.6	17.2
Karamoja	42.3	60.3	25.8	6.4
Kigezi	23.3	52.3	27.1	3.7
Lango /Acholi	57.9	55.4	24.3	11.1
South Buganda	41.0	55.8	20.8	10.2
Teso	41.0	16.2	11.2	4.1
Tooro	40.8	65.7	26.6	14.9
West Nile	68.2	91.4	24.0	17.2
Overall/average score	**44.6**	**69.2**	**27.2**	**15.1**

Optimal breastfeeding: A woman did all these: breastfeeding initiation within the first 1 hour after delivery, and the baby given nothing else to drink other than breast milk within the first 3 days; Optimal cord care: All these were done-clean cutting instrument used to cut the umbilical cord, clean thread to tie the cord, and no substance applied to the cord; Optimal thermal care- All these were done; skin-to-skin at birth, dried the baby, wrapped baby, and delayed bath. Optimal newborn care: All the 9 components listed above done.

Comparison between composite indicators of optimal Maternal health utilization vs optimal newborn care practices

Optimal Maternal Health Care Utilization composite indicator

Optimal Maternal health Care utilization was measured by the percentage of women utilizing maternal health services (ANC4+ visits, received all components of ANC, delivered in a facility, and had postpartum care) (table C10). Overall, this indicator was suboptimal across all regions (figure C9b). Results showed variation across regions, with an average of 27.6%. Teso (49.5%) reported the highest optimal maternal health care utilization index rates. Conversely, Lango/Acholi (9.5%) and South Buganda (10.3%) reported the lowest rates.

Table C 10: Optimal Maternal health care utilization index by region

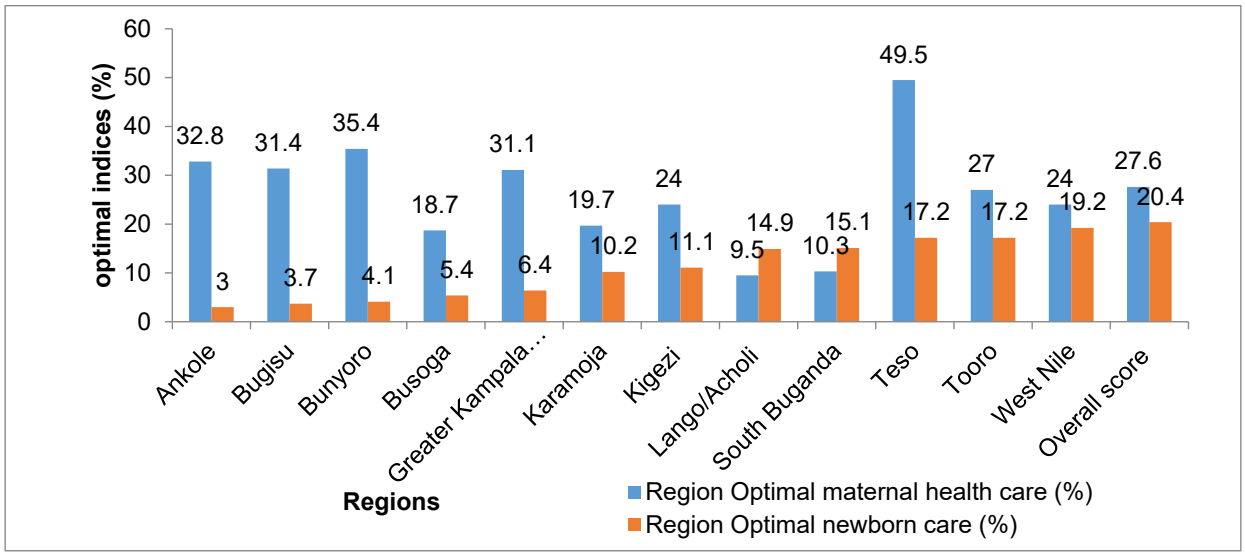
Region	ANC 4+ visits (%)	All components of ANC (%)	Institutional delivery (%)	Postpartum care (%)	Optimal maternal health care (%)
Ankole	79.0	59.9	94.0	63.2	32.8
Bugisu	79.2	66.0	80.7	52.9	31.4
Bunyoro	60.3	91.5	84.1	59.1	35.4
Busoga	67.3	38.2	92.3	60.1	18.7
Greater Kampala Metropolitan	59.6	57.7	92.8	62.5	31.1
Karamoja	74.7	62.0	90.0	44.5	19.7
Kigezi	76.5	54.8	100.0	67.4	24.0
Lango /Acholi	87.4	31.2	79.7	39.8	9.5
South Buganda	49.9	45.0	83.1	45.4	10.3
Teso	64.1	79.2	95.9	75.9	49.5
Tooro	66.1	53.2	92.0	66.1	27.0
West Nile	81.0	49.4	87.7	39.0	24.0
Overall score	**63.1**	**55.9**	**90.6**	**58.5**	**27.6**

Optimal maternal health care: A mother had all the following- At least 4 ANC visits, received all the components of ANC, delivered from a facility, and had Postpartum care.

Comparison between Optimal Maternal health utilization vs optimal newborn care practices

Across all regions, both optimal maternal health utilisation and optimal essential newborn care is still very low. However, maternal health care utilisation is better than essential newborn care (figure C 21)

Figure C 21: Comparison between optimal Optimal Maternal health utilization vs optimal newborn care practices



GAPS AND ACTION POINTS:

Postnatal and postpartum Care: Overall, PNC is still not well done. Therefore, there is need to strengthen both postpartum and postnatal care now that health facility delivery is over 90%. Care for mothers and babies should be approached as a dyad for better programming.

Breast Feeding: Although the overall rate of breast feeding was good at 98.7%, a smaller number of mothers 79.1% initiated breast feeding within an hour after delivery. About 2 in 10 mothers (21%) still expressed and poured away the colostrum while 17% gave additional feeds to the babies within the first 3 days after delivery. Overall optimal breast feeding practices was at 65.8%. There is therefore need to carry out continuous sensitization of mothers on breast feeding, importance of colostrum and dangers of additional feeds.

Cord Care: Optimal cord care practice was at 44.6% while only 3.3% used chlorhexidine to clean the cord stump. Almost half (44.9%) of mothers still add some substances to the cord including ash, ghee, animal dung, salt, spirit etc. There are also some harmful cultural cord practices that vary from region to region. There is urgent need to address these practices.

Thermal care: Although keeping the baby warm by dressing them in warm cotton clothes was universal, the practice of skin to skin immediately after birth was limited. The optimal thermal care practices was at 43.8% at national level. Therefore, health workers need to support mothers in practicing skin to skin, delayed bathing (after 24hours) and keeping their babies in warm cotton clothes.

Care for preterms and low birth weight babies

Preterm and low birth weight babies(<2500g) are vulnerable and need special care in terms of warmth, feeding, and follow up as compared to the normal weight babies. The prevalence of low birth weight babies was 10.2%.

Warmth/Thermal care

Mothers reported that the LBW and preterm babies were kept warm using 3 methods while at the health facility: Kangaroo Mother Care, use of incubators and wrapping the babies in warm clothes as seen in table C10. Study findings showed that about two thirds (65.6%) of the preterms/LBW babies were started on KMC immediately after while 13.3% were put in incubators, and about half (53%) of these babies were reportedly wrapped in warm clothes.

Home care practices for keeping babies warm included KMC; and wrapping baby in warm clothes and blankets, keeping the baby inside the house at all times, and closing all the doors and windows. Almost all (97%) of the participants reported following health workers' advice of delayed bathing of LBW babies , but rather wiping them clean with a cotton cloth and warm water as highlighted in the following quote.

> *"....., one I have to keep the door closed. Two, I have to wrap her properly with heavy clothes like blankets, another thing is that NO body else apart from me enters the room where the baby is to avoid infections..... I also only wipe my baby with a cotton cloth and warm water" (mother of a LBW baby)*

Further, results revealed that mothers practiced KMC with varying duration and number of times per day based on the condition of the baby and basing on the advice from the midwives. Mothers reported conducting KMC three times a day for lasting three hours, others reported two times for an hour while some only practiced it at night. The KMC practice was a sole responsibility of mother/woman who also had the burden of household chores and taking care of other children. As a result most of the mothers reduced on the KMC time and practiced it mostly in the night. However, all the mothers were in agreement that KMC improved the condition of their babies. They stopped practicing KMC completely upon the advice of health workers during follow up visits at the health facilities.

> *"The health worker told me to do KMC at home and I have been doing the KMC. I put one baby at time for two hours and do the same for the other baby but I used to do it a lot while in the health facility and it helped for my babies to grow, I have been doing KMC day and night here at home"(mother of preterm babies)*

> *"I was told to practice KMC for 2 hours three times in a day and by wrapping her in heavy cloths to keep her warm and keep the door closed most time".(mother of a LBW baby)*

Feeding of preterm babies

Feeding is an important aspect in care for babies. In as much as some LBW babies can breast feed immediately after birth, others have to be fed using a cup and spoon, or a feeding tube. Study findings showed that half of the LBW/preterm babies (50%) were able to breast feed/suckle immediately after birth while 31% were fed on expressed breast milk through a nasogastric feeding tube and 11% were fed on expressed breast milk using a cup and spoon. Notably about 8% were fed on glucose water immediately after birth.

Case studies showed that while at home, mothers reportedly fed their babies every two to three hours using a cup and spoon or a feeding tube, and for the few babies that could suckle, the feeding was on demand as mentioned in the quote below. Some mothers with insufficient breast milk were instructed to supplement with formula during the follow up visits by the health worker.

> *'while, at home we had to continue breastfeeding the baby every after three hours and top up expressed breast milk"(mother of a preterm baby)*

Infection prevention and control

Case study narratives revealed that mothers with preterms and LBW babies made an effort to prevent their babies from getting infections. Most of the mothers reported that they restricted people except immediate family from seeing the newborn baby until it reached about 2.5kg. The babies were confined in houses while the mothers were doing household chores. Mothers further revealed that they washed hands before holding their babies and maintained general cleanliness of the body and surroundings as a measure to further prevent infection to the newborn, a lesson they learnt from newborn care units where the babies had been admitted. In addition mothers also reported that they avoided cooking food inside their houses to prevent exposing newborns to smoke.

> *I was told not to let the baby get exposed to many people, even if someone came to see me that I shouldn't give the baby to them, and not to put a charcoal stove in a house where the baby is.''(Mother of a preterm baby)*

> *..Experience from health facility has taught me to observe cleanliness of my body and the environment before I touch the baby. Then about treatment, it is important to rush with the baby to hospital before the symptoms worsen to avoid inconveniences.'' (Mother of a LBW baby)*

> *....,'keeping the baby in the place that is not wet, washing his clothes and keeping him clean and ensuring the baby is warm, keep him in diapers and changing them when they get wet. When I am doing household activities, I keep the baby in my bed. My family members don't do a lot unless when the baby is crying while I am doing house chores ''(mother of a preterm baby)*

Discharge from health facility and follow up

Of the mothers who had LBW/preterm babies, 79.3% reported that they were counseled prior to discharge from the health facilities. These mothers were counseled on a variety of topics including feeding, warmth and infection prevention (88.5%); cord care (76.7%), maternal self-care and nutrition (68.6%), family planning (20%) and other topics (0.4%).

All mothers of LBW/preterm reported to have been given follow up dates on discharge. The first appointment given was two weeks after discharge. Three quarters (74.9%) mentioned that they took their babies back to the health facility for review on the given date. Those who did not go back for review gave the following reasons for not going back: Husband refused mother to take baby to the facility (50.8%); Forgot about the appointment (37.5%); No reason- just did not feel like taking the baby back to the facility (11.3%) and no money for transport (2.2%).

About a fifth (21%) of the mothers mentioned that they received home visits to check on the condition of the baby. Most of these home visits were conducted by a nurse/midwife (86.8%) and to a lesser extent by VHTs (7.3%) and doctors (5.9%). The content of the home visits included majorly assessment of the baby for growth and development (71.1%), provision of psychosocial support to the parents/family (19%), counseling on breast feeding keeping baby warm and infection prevention (9.9%).

Challenges of caring for preterm and low birth weight babies in the community

From the qualitative findings, all the mothers reported that care of preterms and low birth weight babies was very demanding; requiring the presence of the mother at all times thus affecting her involvement in income generating activities. It was further reported that mothers lived in constant fear, worrying about the survival of their babies especially due to their very small sizes as one mother mentioned:

> *...it was hard, you know something you have not been used to. Sometimes they over sleep and you feel like there is a problem. Some body parts are still growing, you're really scared if they are going to grow for example you look and the leg and the arm are still very small!.''(Mother of a preterm baby)*

> *“ It has not been good on my side because my business stopped, I am no longer working since I have to be with the baby all the time.’’(Mother of a preterm baby)*

GAP: Kangaroo Mother Care is very beneficial for the survival of small babies in our setting. However, there was inadequate KMC practice at home/community level. Few (only 20%) of babies were followed up by health workers in the community; there’s inadequate continuous skin to skin contact between caretaker and baby while at home; psychosocial challenges of mothers e.g emotional distress, overburdened with household chores, lack of support. Therefore, there is need for community sensitization on benefits of KMC and role of fathers in supporting or helping with KMC. Also strengthening of community follow up of baby while at home by health workers is critical. Mothers/families should be sensitized on the benefits of keeping review appointments for the baby’s overall monitoring of growth and development. Lastly a peer to peer support group for mothers would be beneficial.

Illness recognition and care seeking for sick newborns

Newborn illness symptoms

From the community survey, 33.9% of the mothers reported that their babies fell ill during the newborn period. The most common symptoms recognized and reported were Fever (45.5%), fast breathing (18.4%), Refusal to feed (14%), diarrhea (9.3%) and vomiting (8.8%). Other symptoms were skin pustules (3.1%), yellowing of the eyes/soles/palms (2%), convulsions (1.3%), lethargy (0.5%) and red discharging eyes (0.1%).

Recognition of newborn illness

All of the respondents mentioned that they were able to recognize that their newborn was sick if the baby developed a fever, refused to breastfeed, was not breathing normally, had convulsions, changed skin color to yellow, was excessively crying, was vomiting or had diarrhea.

> *“ It was one day in the morning when my baby could not breast feed, she was not crying but mere observation showed she was in deep pain. By the time the baby had started being cold , the health workers worked on the baby and said the blood was not flowing very well in the body and it had dirty things in the stomach , even the second baby had the same problem in the stomach but he did not become cold yet both of them were sick’’(mother of a sick newborn)*

> *“ Even when I checked on the temperature of the baby , it was very high , it had flu and even she was over crying, and even she was not happy compared to the previous days’’ (mother of a sick newborn)*

Perceived causes of newborn illness

The perceived causes of newborn illnesses ranged from medical to non- medical including spiritual / witchcraft, unknown causes and God’s will.

Care seeking

Care seeking varied depending on the perceived severity of the newborn illness. *In most cases, a home remedy such as herbs, tepid sponging or lukewarm baths were given first and if the baby did not improve, then they were taken to the nearest health facility for further treatment.*

Home based care

Quantitative results showed that 47.4% of the babies that fell ill were given home treatment first and then other care sought at facilities when the baby did not improve. The most common type of remedies used at home included giving western medicines like syrups that were already at home (56%), tepid sponging (7.1%), herbs (7%) and cold water baths (1.2%). Home remedies were more likely to be used in rural areas (51.1%) compared to urban areas (45%) as quoted by this mother from a rural district.

> *"She was given some local herbs at home by the grandmother and even in the hospital we did it."(mother of a sick baby)*

Further analysis revealed regional disparities with some regions showing higher use of home remedies. These included Islands (78.2%), Bunyoro (69.3%), Bugisu (57.1%), Busoga (55%), Teso (49.3%), Greater Kampala Metropolitan (48.4%), Karamoja (46.3%) and West Nile (46.1%).

The reasons given for use of home remedies varied including reasons such as it being a common practice, presence of some drugs at home, illness starting at night etc as shown in the table C 11 below.

Table C 11: Reasons given for use of home remedies

Reason for using home remedies	Proportion of women who gave this reason (%)
It is a common practice	26.4
Had medicines at home	11.6
Did not think illness was serious	10.5
Illness started at night	8.5
Had no money for drugs	7.6
Long distance to the health facility	6.9
Had no transport means	6.2
Herbal medicines were available	4.3
Knowledge on which medicines to use	2.5
Busy with work/harvesting	0.4

Health facility care

The parents/caretakers sought care from health facilities when the baby's condition worsened after giving initial care at home. From the survey, 65% mothers sought care for their babies outside home after trying home remedies (table C10). Of these, the first level of care seeking for the majority (43.7%) was from a health facility, 39.4% from a drug shop/nearby clinic and 12.3% from a hospital. This

shows that when babies are sick, most caretakers seek for care from places (some health centres, clinics/drug shops) without capacity to manage sick newborns.

Half (50%) of the respondents sought care outside home within a period of less than one day, 27.2% between 2 to 3 days and 22.8% four or more days after onset of illness (table C12).

Table C 12: Table showing when, where and after how long treatment was sought for sick newborns

Variable	No.	%
Did you seek care for the baby outside the home after?		
No	5,422	35
Yes	10,060	65
Total	15,482	100
Where outside the home did you seek care from the first time?		
Dispensary/Clinic	1,923	19.1
Drug Shop/ Pharmacy	2,042	20.3
Health center	4,401	43.7
Hospital	1,235	12.3
Other (specify)	387	3.8
Volunteer or a Traditional birth attendant	72	0.7
Do you have any medical record from when you went for health care outside the home the first time?		
No	6,611	65.7
Yes	3,449	34.3
After how many days did you seek care the first time outside home?		
0-1 day	5,032	50
2-3 days	2,738	27.2
4+ days	2,290	22.8
Where you sought care from, were any tests done on the baby?		
No	4,569	45.4
Yes	5,491	54.6
What tests were done?		
Took blood from the finger/ heel	4,998	91
Took some stool	263	4.8
Temperature measured	230	4.2
Were you informed of the test result for the baby?		
No	1,166	21.2
Yes	4,325	78.8
Was the baby given any drugs for the illness?		
No	1,079	10.7
Yes	8,981	89.3

Regional variation showed that more mothers in Ankole (74.3%), Greater Kampala Metropolitan (73.1%) and Busoga (72.4%) sought formal care for their sick newborns while in some regions like West Nile (34.1%), Bunyoro (45.9%) , Karamoja (47.3%), only few mothers sought formal care for their sick newborns.

A little more than half (54.6%) of respondents who mentioned that care for the babies was sought at a facility indicated that tests were done on the baby at the facility. The most mentioned test was taking blood from the finger /heel for analysis (91%). 78.8% of the respondents mentioned that they were given the test results while 89.3% mentioned that they were given drugs after the results. The most common drugs given were paracetamol, vitamin A and Gentamycin.

Decision makers

The decision to seek care was taken by immediate family especially the mother. Other decision makers included the father, mother-in-law and in some instances friends. It was reported that the decision on the where to seek care from was influenced by trust in level of facility, distance, whether care given at the facility was free of charge or not, economic condition of the family and place of delivery as one mother explained.

> *"'Kawempe was easy for me because it was near my home, even being that I had given birth from there, I thought it better that it would be the best place to treat my baby , I never wanted to change the hospital''(mother of a sick newborn)*

In urban areas with better health care infrastructure, there are hospitals equipped to handle sick newborns. These facilities are furnished with neonatal care units (NCUs) and skilled health care professionals. Some of the respondents revealed that the critically ill newborns were admitted in NCUs and placed on oxygen therapy and incubators. It was further revealed that these NCUs had well caring nurses on call 24 hours. However, one of the major challenges faced was inadequate staffing especially doctors, lack of essential medicines, oxygen, blood and standby generators which are critical in the care of the vulnerable newborns.

> *"what I saw in the NCU, the nurses were very good and they took very good care of my baby, they tried their very best. However, the problem that I found there was of the doctors, because in the NCU, according to the condition that the babies were in, they needed doctors every day, but sometimes we would spend a week without a doctor visiting the ward. But concerning the nurses, there wasn't a day my baby went without the treatment. For as long as you had bought the medication that had been written for you, they would come and administer it.'' (mother of a sick newborn)*

GAP: Care seeking for newborn illnesses is frequently delayed because home remedies are often prescribed as the first step of care. When this fails, care is sought from health facilities often with referrals from one facility to another (higher level) due to inadequate health worker skills in managing sick newborns at the lower level facilities. There is therefore need to skill health workers in managing small and sick newborns at all levels to prevent delays in care. There is also need to reinforce the referral system in Uganda.

Families in the community should be sensitized on the need for prompt care seeking for ill newborns as these rapidly deteriorate and may result in fatal outcomes. Also harmful cultural beliefs/practices should be addressed.

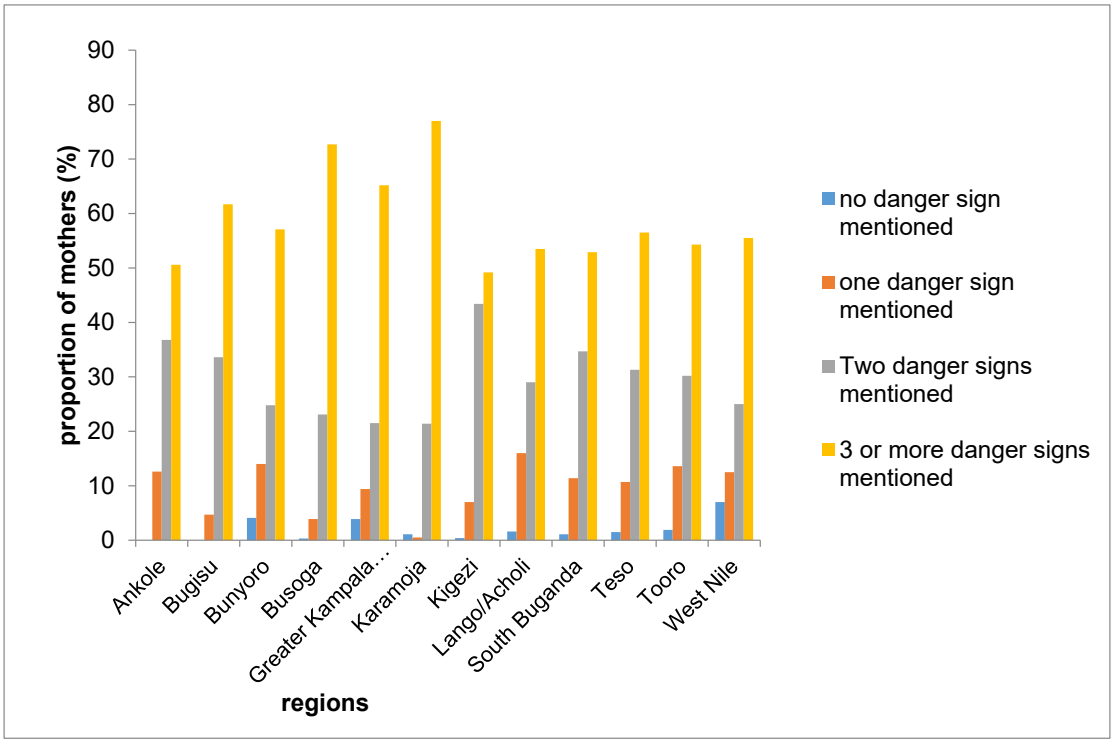
Maternal knowledge on essential newborn care and danger signs

Mothers in the community were asked about knowledge on danger signs and essential newborn care practices. Majority (81.1%) of mothers mentioned that breast feeding should be initiated within one hour of delivery; 66.2% correctly mentioned that a baby should be exclusively breastfed for 6 months while only 54.4% correctly stated that a newborn should be bathed one day or 24 hours after delivery.

Concerning postnatal care for mother and baby, 30.1% mothers mentioned that the first PNC check should be on the day of delivery. Others thought it should be carried out on the next day after deliver, after one week or even after one month. Less than a fifth (19.8%) of mothers were aware that a VHT should visit a newborn thrice in the first week after delivery. However, 93.5% of mothers felt that PNC was very beneficial for them and their babies.

About 6 out of 10 mothers (62.7%) were able to correctly state 3 or more newborn danger signs while 24.7% correctly mentioned 2 signs and 12.6% mentioned one or did not even mention any danger sign. A deeper delve into that data showed that 3 or more danger signs were mostly mentioned by teenage (15-19 years) mothers (70.3%) and mothers aged 45-49 years (77.5%). The regions that had highest proportion of mothers who knew 3 or more newborn danger signs included Islands (87.1%), Karamoja (77%), Busoga (72.7%), Greater Kampala Metropolitan (65.2%) and Bugisu (81.7%) as shown in figure C 22.

Figure C 22: Regional disparities in maternal knowledge of newborn danger signs



This shows that there is still need to reinforce sensitization of communities/mothers on the newborn danger signs. The most commonly mentioned signs included fever (78.7%), Baby less active than usual (62%), Difficulty in breathing (33.7%), Convulsions (28%), Failure to feed (24.2%), pus from the cord (11%), vomiting (10%), yellowing of eyes/palms (6.1%), redness of cord (5.9%),skin pustules (2.2%) and bleeding from the cord (1.3%).

GAP: There is still a knowledge gap in the community on essential newborn care practices especially time for bathing the newborn, breast feeding, cord care, newborn danger signs and postnatal care timing and duration. These can be addressed in through health care talks in the antenatal clinics and through sensitization of communities by the VHTS

Role of VHTs in newborn care

This section presents the findings from exploration of the capacity of community level health systems to deliver newborn care. This includes the roles played by the VHTs (conduct community sensitization, mobilization, continuity of care and referral of maternal and newborn emergencies), challenges they face, cultural practices concerning newborn care and suggested recommendations. We conducted 9 FGDs with VHTs in the regions of West Nile, Karamoja, Teso, Bunyoro, Busoga, Lango/Acholi, Kampala, Mukono and Kabarole.

Training on newborn care

Most of the VHTs across all the regions received an initial 5 day training provided exclusively by the Ministry of Health. This training focused on Integrated Community Case Management of Childhood illnesses (Malaria, Diarrhoea and Pneumonia) with a very small component on pregnancy and care for newborns. Additional trainings in some regions have been conducted by NGOs based on their scope of work and interest such as essential newborn care, family planning, etc. There is no designed training curriculum for newborn care for VHTs by the Ministry of Health The NGOs that have been involved in additional VHT trainings on newborn care include World Vision, TASO, KOFIH, Baylor, PICOT, CUAMM, Mercy Corps, IRC, Living Goods etc. These trainings vary in duration but are typically between 3-5 days. However, not all VHTs have received formal training on essential newborn care and newborn danger signs

> *"I was trained by Mercy Corps for three days and also another 3 days at Nadunget health centre. They trained us in care of the cord and how to know an infected cord, also knowing a sick baby. They also taught us how to follow up a woman from the time of delivery up to at least 7 days and monitor both the baby and the mother's health and if you see any danger sign, refer to the health centre. (VHT, Karamoja)*

Some of the VHTs who were not trained on essential newborn care and danger signs obtained the knowledge by virtue of being mothers and being taught during antenatal classes at the health facility. They then passed on this same exact message to other mothers in the community.

> *"some of us are mothers and when we go for antenatal and when you are giving birth, they tell us to do this and that and also the don'ts, so we learn from the virtues of being mothers and on top of that we are VHTs, so when you add what we learn from being mothers and what we practice at homes plus the added advantages of being VHTs, so when we put them together it means that we are trained. (VHT, West Nile)*

Newborn care services offered by VHTs

Universally, the VHTs were aware of their roles in the community pertaining to newborn care. These roles include sensitization of mothers on essential newborn care which includes warmth for the baby, exclusive breast feeding and cord care; identification danger signs in newborns and referral to the nearest facility for care; home visits for pregnant women and those in the post natal period, counseling on hygiene and health promotion in the home. The VHTs are also aware that they do not treat sick newborns but only refer to the nearest health facility for further care.

> *"The services we offer are, routine monitoring of pregnant woman, at the homes we make sure they have some things like nets and see if they are using properly. If there is anything I see during visits that is bad, we correct like hygiene, feeding like that. My supervisor is the health assistant, I write reports and submit to him and even the facility in charge. (VHT, Karamoja)*

> *"Immediately you hear that the newborn is discharged home, we go and check on her asking how the baby is. Every time we do follow-up of these babies, we check on their immunization card to see whether they have got their vaccines in the right time and also remaining them of their return dates. (VHT, Kabarole)*

> *"We sensitize the community about the dangers signs of newborn and encourage them to seek services once they notice those signs. We refer the babies to the health facility. (VHT, West Nile)*

> *"During pregnancy, I teach the pregnant woman on nutrition and hygiene. At birth, within the first week I follow up once and remind the mother on good newborn care practices like keeping the cord area clean and dry, proper breastfeeding. After six months, I encourage the mother to introduce the baby to mixed feeding. (VHT, Kampala)*

GAP: VHTs play a critical role in home based newborn care. However, not all of them have received formal training in newborn care. Most of these trainings in newborn health and care are offered by NGOs and tailored to suit the NGOs needs. Therefore the Uganda Ministry of Health needs to develop a harmonized training curriculum on newborn health for VHTs and further train them so they are adequately skilled to perform their duties.

Summary of community survey findings

Antenatal care: Even though 93.1% of women attended ANC at least once, 67.8% made 4+ visits while only 3.6% of women managed to make the required 8 ANC visits as per the current MoH and WHO guidelines on antenatal care. This is an improvement from the previous Situation analysis of newborn health in Uganda 2008 (SITAN 2008) which showed that 97% women attended ANC atleast once while only 47% managed to go four or more times (4+ visits). This improvement can be attributed to increased sensitization of mothers (through radios, outreaches, VHTS home visits) on the importance of antenatal care and also provision of mothers with maama kits when they attend antenatal. These maama kits contain items that are required at the time of delivery.

About one third (32%) of women attended ANC in the first trimester of pregnancy. This is also a improvement from the past but however does not meet the target of 50%. The MoH should leverage on this to optimize early antenatal care interventions as well as abdominal ultrasound scanning for accurate gestational dating. These are all well stipulated in the current national antenatal care guidelines. On the flip side, the contents of ANC (prophylactic drugs, screening for diseases, and counseling) were not universally provided in all health facilities and most especially urinalysis test and provision of dewormers as well as tetanus toxoid injections. There is need for health system strengthening to ensure that mothers receive all the required contents of antenatal care for a positive pregnancy experience.

Labour and delivery: All pregnant women should be able to identify the beginning of labour. However, from the community survey, 79.2% of pregnant women were able to identify that they were in labour through common signs like backache, severe abdominal pain, mucoid bloody vaginal discharge etc. Therefore, there is need for continuous sensitization of mothers on what to expect when labour begins and the need for early care seeking so as to avoid delays 1 and 2. Delays can be avoided with sufficient birth preparedness.

About 33.8% of teen mothers were not able to recognize signs of labour. This is quite a big percentage considering in Uganda, every 1 in 5 mothers is a teen mother. This points to an urgent need in offering specially tailored messages for teen mothers and more especially in teen specific clinics in which they are more comfortable than the generalized ANC clinics.

There are increasing trends of health facility delivery in the country. From this survey, it was found that 90.7% of women deliver in health facilities with 9.3% still delivering from home and mainly in the Islands (32.8%), Lango/Acholi (20.3%), South Buganda (16.9%) and Bugisu (19.3%). More sensitization on the importance of health facility delivery is required in these regions and if possible, incentivize health facility delivery for example by giving mothers transport vouchers, maama kits etc. Notably, the overall prevalence of caesarian sections is within the normal range (13.5%) than the recommended prevalence of 10-15% by the World Health Organisation. Some regions like South Buganda have a very high prevalence of 22.6%. Further exploration for this is warranted.

Qualitative findings showed that women in labour especially in the rural areas usually delayed to make decisions to go the facility (delay 1) and delayed to reach the facility (delay 2). Various reasons given for these delays included husband not present at home at the time labour begun, lack of transport means, long distance to the facility, labour started in late in the night, mother wanted to finish household chores before going to the facility, mothers don't want to stay in the health facilities for long etc. In addition, there were also delays in receiving care while at the facility (delay 3) mainly due to the inadequate number of staff, large number of patients etc. These delays may subsequently result in poor outcomes for the baby (e.g asphyxia, fresh stillbirth etc) and for the mother too. Therefore there is need to sensitize mothers on birth preparedness to avoid delays 1 and 2. Also health system strengthening is required to avert delay 3.

Postnatal care: The postnatal period which lasts from child birth to six weeks after delivery is a very critical period for both the mother and baby as most maternal and newborn deaths occur during this time. It is therefore of utmost importance that both mother and baby are attended to by a skilled health attendant during this time. Overall, postnatal care is not well done and there are no guidelines available. There is an urgent need to deliver postnatal care guidelines to match the increasing proportion of health facility deliveries in the country. In this current study, PNC for the mother was at 59.9% compared to 41% in the previous SITAN while PNC for the baby was at only 10.5%. One of the limitations could be that the mothers do not understand the question related to PNC. This is because ideally, every baby born in a health facility should be checked at birth and before discharge and this constitutes some of the components of PNC for the baby.

Essential newborn care practices: The essential newborn care practices of breast feeding, thermal care and cord care are fairly well done. Breast feeding is almost universal in all the regions however bad practices such as discarding the colostrum and giving pre-lacteal feeds should be addressed and more especially in Karamoja, South Buganda and Teso regions. Also despite improvements in cord care, there are still some harmful practices of putting substances such as ash, ghee, animal dung, salt, spirit on the cord hence the continuous need for sensitization. Education of mothers on use of chlorhexidine and its benefits versus delayed cord dropping off due to chlorhexidine is warranted as the benefits outweigh the risks. With regards to thermal care, mothers are aware of the need and importance of keeping their babies warm in cotton clothes and blankets. However, there is still limited practice of skin to skin in the first week of life. More emphasis should be placed on this as it not only keeps babies warn but also creates a bond between the mother and baby.

South Buganda, Islands and Greater Metropolitan Kampala seem to be the regions lagging behind in most of the indices such health facility delivery, postnatal care and essential newborn practices. Research for the reasons for this is warranted. But one of the possible reasons could be that historically, Buganda has had a high mortality rate due to absence of community interventions. Care for babies is mostly provided by the government and private sector as the region lacks of donors. There is high dependence on only government programmes and deeply rooted cultural practices surrounding care for babies. Most care from Buganda region is sought from the private sector which receives minimal governance and support supervision from Ministry of Health. Likewise, the same applies to islands. They are hard to reach, have few health facilities and lack donor programmes to boost health services.

Care for preterms and low birth weight babies: Kangaroo Mother Care is very beneficial for the survival of small babies in our setting. The gap in our setting is big (only 20%) community follow up of the these vulnerable babies by health workers; inadequate continuous skin to skin contact between caretaker and baby while at home; psychosocial challenges of mothers e.g emotional distress, overburdened with household chores, lack of support. Therefore, there is need for community sensitization on benefits of KMC and role of fathers in supporting or helping with KMC. Also strengthening of community follow up of baby while at home by health workers is critical. Mothers/families should be sensitized on the benefits of keeping review appointments for the baby's overall monitoring of growth and development. Lastly a peer to peer support group for mothers would be beneficial.

Illness recognition and care seeking: Care seeking for newborn illnesses is frequently delayed because home remedies are often prescribed as the first step of care. When this fails, care is sought from health facilities often with referrals from one facility to another (higher level) due to inadequate health worker skills in managing sick newborns at the lower level facilities. There is therefore need to skill health workers in managing small and sick newborns at all levels to prevent delays in care. There is also need to reinforce the referral system in Uganda. Families in the community should be sensitized on the need for prompt care seeking for ill newborns as these rapidly deteriorate and may result in fatal outcomes. Also harmful cultural beliefs/practices should be addressed.

Male/partner involvement in reproductive health: Despite improvement trends over the years, male involvement is still low. Only 36.8% males/partners were involved in antenatal care; 45.5% were involved in during labour and delivery and 61% were involved in postnatal care. Overall, there is need for more male/partner support during these critical stages of pregnancy, childbirth and post birth care

Role of VHTs in newborn care: VHTs play a critical role in home based newborn care. However, not all of them have received formal training in newborn care. Most of these trainings in newborn health and care are offered by NGOs and tailored to suit the NGOs needs. Therefore the Uganda Ministry of Health needs to develop a harmonized training curriculum on newborn health for VHTs and further train them so they are adequately skilled to perform their duties.

SPECIAL AREAS REPORT: COMMUNITIES PRACTICES IN SOUTH BUGANDA AND ON ISLANDS

Central Uganda, including but not limited to greater Kampala metropolitan region and south Buganda have had exponentially higher neonatal mortality rates over time.

Table 1 **Percentage of children who died before age 1 month by selected child and maternal background characteristics, UDHS 2001 to 2016**

	2016		2011		2006		2001	
Variable	p-value/ percentage	n	p-value/ percentage	n	p-value/ percentage	n	p-value/ percentage	n
Type of place of residence	**0.936**		**0.537**		**0.471**		**0.038**	
Urban	2.7	3,233	2.4	1,147	2.2	953	2.1	821
Rural	2.6	12,038	2.7	6,928	2.7	7,470	3.4	6,850
Region	**0.056**		**0.822**		**0.315**		**0.036**	
Central	3.2	4,106	2.9	2,129	2.8	1,942	3.0	2,173
Eastern	2.2	4,297	2.4	2,281	2.0	2,222	2.4	2,305
Northern	2.8	3,038	2.8	1,510	3.1	1,937	4.6	1,316
Western	2.3	3,829	2.6	2,155	2.7	2,323	3.7	1,878

Source: DHIS working papers, 2019

Furthermore, south Buganda has had one of the highest institutional maternal mortality rates in Uganda (109, 84, 122, 87 per 100,000 live births in 2019/20, 2020/21, 2021/22, and 2022/23 respectively), and among the top three regions with delay 3 (delay to provide appropriate care at health facility) as the leading cause of maternal mortality at 54.5%, with West Nile leading at 58.8%. It's worth noting that most of these deaths occur at higher levels of care, regional referral and large PNFP hospitals. Additionally, south Buganda is the only region off truck with regards to ANC 4+ coverage.

South Buganda

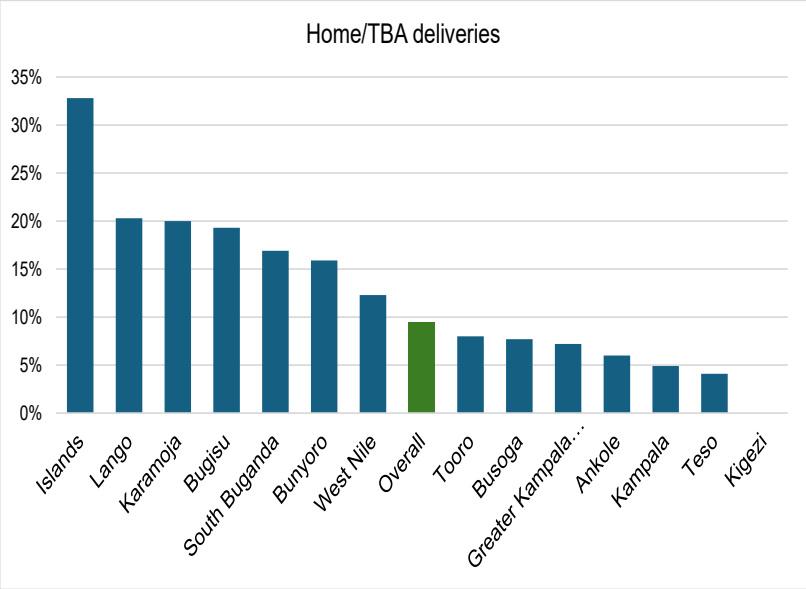
Antenatal Care

In this survey, all (100%) of mothers in South Buganda attended at least one or more antenatal care visits, exceeding the national coverage of 93.1%. With regards to ANC components, the region lags behind in all regions when it comes to Information about birth preparedness, danger signs in pregnancy and deworming services for pregnant mothers. Only 49.8% of mothers received deworming medicines in south Buganda compared to national coverage (Table A1).

Table A1: Antenatal Care Components Stratified By Regions

	Blood pressure checked	Urine sample taken	Received information about HIV	Received tetanus injection	Given iron and folic acid	Given fansidar	Given information to prepare for birth	Given information pregnancy danger signs	Given drugs for intestinal worms	Number of women with ANC for their most recent birth
Region										
Ankole	97.2	78.9	85.5	96.9	96.5	86.2	78.9	87.4	70.1	460
Bugisu	92.7	93.9	91.8	92.6	95.4	100	97.3	92.6	81.7	688
Bunyoro	95.2	95.2	100	96.3	100	100	100	92	100	931
Busoga	92.9	62.5	81.7	90.9	98.5	89.8	90.9	85.5	66.5	1,162
Greater Kampala Metropolitan	99.6	72.2	94	86.3	94.4	89.7	90.5	87.1	73.6	16,385
Karamoja	81.8	75.6	93.6	80.1	83	82.9	82.8	68.8	81.8	726
Kigezi	82.6	86	93.8	89.3	95.1	93.9	83.9	79	82.8	276
Lango	87.7	69.3	86.5	65	97.5	90.4	91.9	83.6	57.9	1,450
South Buganda	92.1	78.7	98.2	93.7	97.3	97.3	76.1	73.1	49.8	2,269
Teso	96.8	94.4	95.8	100	95.8	100	100	100	90.8	587
Tooro	87.4	92.8	78.6	85.4	96.9	96.9	78.6	74.7	72.5	597
West Nile	93.8	60.9	97.8	96.1	98.3	85.7	89	88.6	85.5	1,210
Special area										
Kampala	100	70.8	93.9	85.4	93.9	88.7	90.1	87.3	72.1	14,912
Islands	95.1	86.7	95.1	95.1	100	100	95.1	85.6	88.6	1,472
Karamoja	81.8	75.6	93.6	80.1	83	82.9	82.8	68.8	81.8	726
Total	96.4	74.3	93.3	87.2	95.2	91	89.3	85.5	72.7	26,742

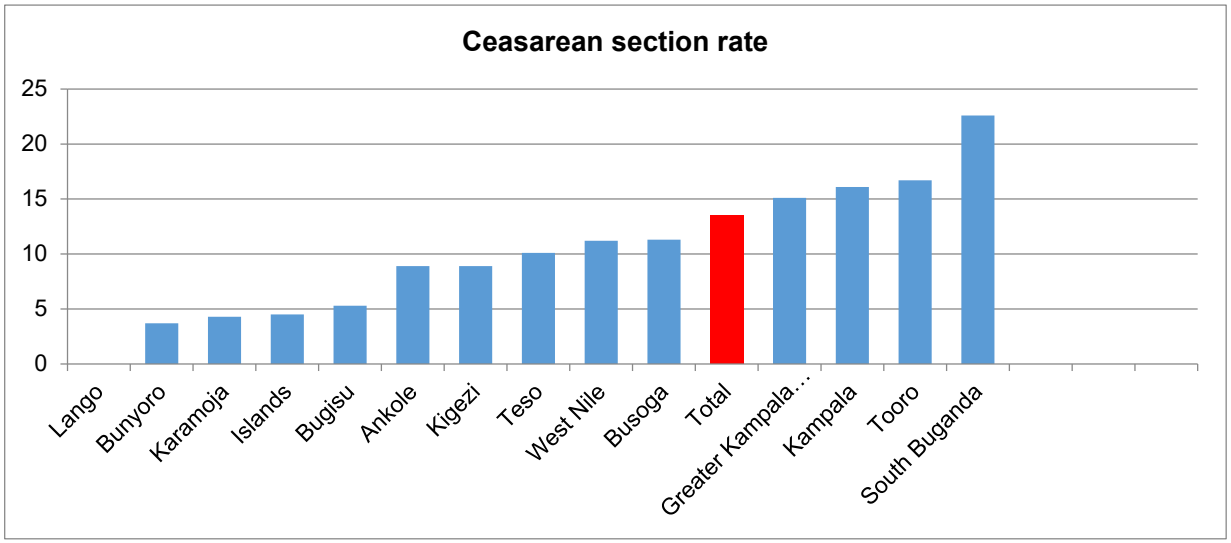
Place of delivery



Irrespective of a high antenatal care attendance in south Buganda, there is still high reliance and trust to deliver from TBA or home, ie 16.9% of mothers from this region delivered from TBAs and/ or home, way beyond the national average of 9.3%. This leaves the babies and mothers un-attended to by skilled birth personnel during the crucial postnatal period, with associated high risk morbidities like postpartum hemorrhage and birth asphyxia claiming lives of mothers and babies respectively delivered in these places (Graph A1)

Mode of delivery

Worth noting is that South Buganda emerged with the highest prevalence of caesarian section, (22.6%) compared the national prevalence of 13.5%. This is over and above the recommendable national caesarean section rate of 10-15%. This result is in line with our finding that women in rural areas delay to make decision to go to healthcare facilities following labour initiation, and also delay to reach health facilities. Other regions with un-acceptably high rates include Tooro (16.7%) and KMP (15.1%).



Cord care

South Buganda (65.1%) was among the top three regions with poor cord care practices, just third to Tooro region (70.9%) with poor cord care practices in the country. The region predominated in the use of herbs for cord care instead of chlorhexidine solution.

Thermo-care

Optimal thermal care, referred to in this survey as; timing of drying the baby after birth, put skin-to-skin on mothers chest; wrapping in clean dry clothing and delayed bathing (after 24 hours or more) was suboptimal in south Buganda at only 63.3%, second last to TESO (61.6%) among regions with poor thermal care practices, exposing babies to hypothermia and its associated complications.

Breastfeeding practices

While 79.1% of mothers in the country initiated breast feeding within the first hour after delivery, this was wasn't the case with south Buganda where 30.2% of the mothers expressed and threw away the first breast milk (colostrum), and it is of no surprise that the region topped those with mothers who gave babies other feeds other than breast milk in the first three days after delivery.

Newborn danger signs

South Buganda was among the top two regions with mothers who had no ability to recognize newborn danger signs, showing inadequate knowledge about newborn illnesses recognition in this region.

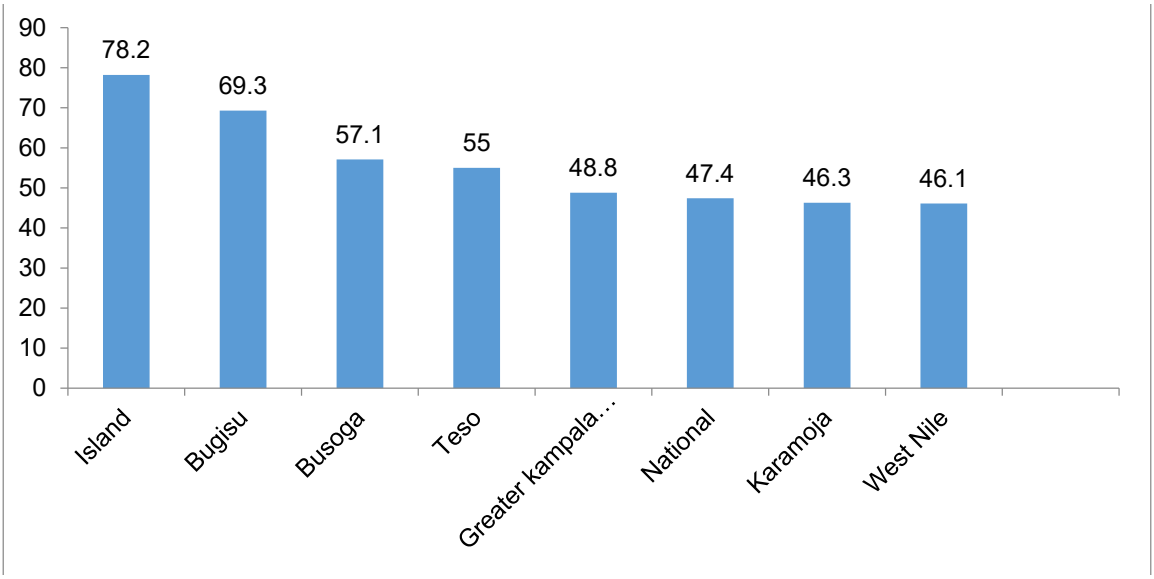
Islands

With regards to components of antenatal care; as compared to other regions, very few mothers at islands get a chance to receive information about danger signs during pregnancy and for this reason, the region lead in TBA and home deliveries in Uganda. Possible explanation for this high prevalence may be due to failure to appreciate how dangerous a pregnancy can turn, distance and un-reliable transport means to reach healthcare facilities.

Neonatal Illness recognition and Care seeking practices

In the survey, 47.4% of babies who fell ill in the newborn period received home remedies, and later sought medical care with worsening symptoms. Home remedies comprised greatly unknown herbal medicines, which were majorly the mainstay treatment at islands.

Top 7 regions using herbal medicines for newborn illnesses



Conclusion

South Buganda, Islands and Greater Kampala Metropolitan are the main regions lagging behind in most of the indices such health facility delivery, postnatal care and essential newborn practices. Further research is warranted to appreciate community and healthcare systems bottlenecks for this poor regional performance.

But one of the possible reasons could be that historically, Buganda has had a high mortality rate due to absence of community interventions, lack of implementing partners/donors and/or lack of continuity of services post implementation in these regions, dependence on only government programs and healthcare facilities with limited availability and readiness scores, and deeply rooted cultural practices surrounding care for babies . Most care from Buganda region is sought from substandard private sector which receives minimal governance and support supervision from Ministry of Health. Likewise, the same applies to islands, they are hard to reach, have few health facilities, less attractive to health workers, hard transportation services and lack donor programs to support healthcare services.

CHAPTER 05

HEALTH FACILITY READINESS AND QUALITY OF NEWBORN CARE

This section focuses on the critical aspect of health facility readiness to effectively provide newborn care in Uganda. Inpatient care of small and sick newborn babies requires timely and quality services which are influenced by the readiness of health facilities to respond to the care needs. The health facility readiness is defined as availability of a combination of appropriate infrastructure and amenities, trained/skilled health professionals, basic supplies and equipment, and laboratory tests, medicines and other commodities. Quality of care on the other hand refers to the performance and whether it meets the required standards.

Infrastructure for newborn care

The Ministry of Health and partners involved in newborn care have made some progress in establishing special newborn care units (SNCUs) and newborn intensive care units (NICUs) to provide specialized timely and appropriate care for small and sick newborns.

Readiness of infrastructure for newborn care

Results from the health facility readiness assessment showed that all (National Referral Hospitals) NRHs met the standards for level 3 NICU in terms of infrastructure to care for sick and small newborn babies. However, the Kawempe NRH NICU was found to be overcrowded to offer quality services.

On average, Kawempe NRH handles 21,000 births annually and on a monthly basis admits about 750 neonates in the NICU but had the same number of beds/cots (68) as Mulago specialized women and neonatal hospital which only delivers 624 mothers annually and admits about 150 newborn babies in the NICU on a monthly basis (Table 1)

In respect to Regional Referral Hospitals (RRHs), only 4 (25%), namely Arua, Entebbe, Gulu, and Masaka hospitals were found to be at level 2 NCUs in terms of readiness to care for small and sick newborn babies (Figure H1). A facility was considered to be at level 2 of care if it had a neonatal care unit with all equipment considered for level one, plus at least one functional i) CPAP, ii) phototherapy machine, iii) neonatal radiant warmer, and iv) neonatal patient monitor. On the other hand, only one (Ishaka Adventist hospital) out of the twelve district /general hospitals assessed (8.3%) was found to be at level 2 of care for sick and small newborn babies, far below the WHO recommended target of 80% (Figure H1). Most general hospitals (GH) lacked functional CPAP machines and patient monitors, while about a third had no phototherapy machines and radiant warmers. In addition, most level 2 care hospitals were crowded based on the number of newborn cots vs. admissions. For instance, Mbale RRH had an average of 330 monthly newborn admissions with 52 beds in a limited space, while Rakai GH with 40,273 annual average births, had 170 monthly admissions with only 6 beds.

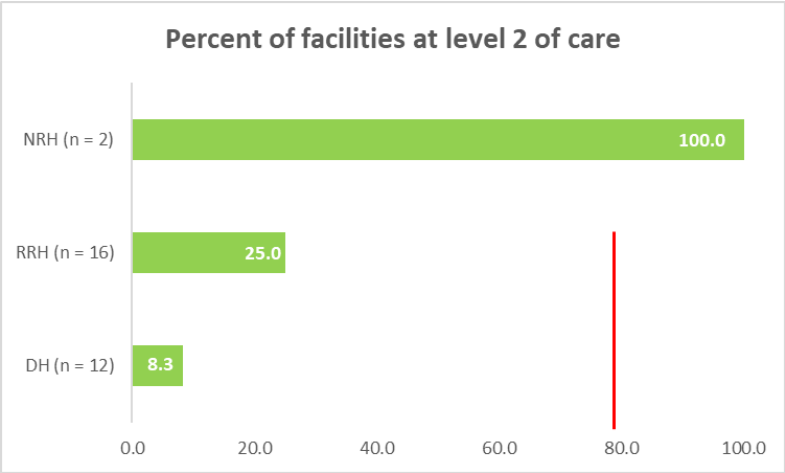
Out of the 13 HCIVs assessed, only 4 (31%) namely Amach, Kakuuto, Kumi and Bufumbo HCIVs had a KMC corner and were found to be at level 1 neonatal care. A facility was considered to be at level 1 of care if it had: i) KMC area, ii) at least 1 functional bag and mask (size 0) for preterm neonatal resuscitation, iii) at least 1 functional bag and mask (size 1) for neonatal resuscitation of term babies and iv) at least 1 functional pulse oximeter.

Table H 1: Infrastructure for newborn care

INDICATOR	NRH (2)	RRH (16)	GH (12)	HC IV (13)
Availability of a neonatal unit/ corner in the facility	2 (100.0)	16 (100.0)	12 (100.0)	4 (30.8)
Average number of births handled annually	10,812 (624 - 21,000)	4,651 (400 - 10,000)	6,666 (527 - 40, 273)	1,661 (180 - 8,904)
Average number of beds/ cots in the neonatal unit/corner	68 (68 - 68)	20 (8 - 52)	6 (2 - 10)	6 (2 - 13)
Average number of admissions in the neonatal unit per month	450 (150 - 750)	122 (55 - 330)	70 (13 - 200)	53 (3 - 200)
Average number of admissions for the specific conditions in the quarter prior to the survey				
Prematurity/LBW	522 (23 - 1,021)	108 (19 - 390)	67 (4 - 379)	27 (2 - 102)
Birth asphyxia	286 (90 - 481)	86 (18 - 480)	52 (4 - 251)	18 (2 - 75)
Sepsis	253 (90 - 415)	84 (4 - 312)	52 (5 - 129)	21 (2 - 126)
Jaundice	154 (98 - 210)	22 (6 - 59)	23 (1 - 168)	22 (2 - 53)
Congenital malformations	19 (15 - 23)	9 (2 - 21)	22 (1 - 84)	11 (2 - 24)
Other conditions	197 (197 - 197)	74 (7 - 237)	30 (4 - 106)	341 (341 - 341)
Level of care and services available in the neonatal unit				
KMC/Level 1		12(75.0)	11 (91.7)	4 (30.8)
Level 2		4 (25.0)	1 (8.3)	n. a
Level 3 (NICU)	2 (100)	n. a	n. a	n. a

n.a – not applicable

Figure H 1: Proportion of Health facilities at Level 2 Neonatal Care



Performance/quality of care

Overall, presence of critical infrastructure for newborn care was excellent at NRH, and quite adequate at RRH and GH level but very deficient at HC IV level. The NRH had 87.5% of the required infrastructure, the RRH had 73.6%, GHs had 70.8% while HCIVs has only 57.1% (table 2). However, critical to note was the complete absence of an isolation room for septic newborns and/or those born from outside the facility at all levels of care including NRHs, RRHs, GHs and HC IVs. The HCIVs scored poorly on presence of functional newborn infrastructure, critically missing resuscitation tables in labor suits and theater, non-availability of KMC rooms, beds and/or chairs; non-functional theatres in some cases. Only one facility had a KMC room/corner for newborn care (Table H10).

Table H 2: infrastructure for newborn care stratified by level of facility

Level/number of facilities	NRH(1)	RRH(9)	GH(6)	HCIV(7)
Presence of infrastructure for the care of small and sick newborn				
Space for Newborn Care Unit	1	8	6	5
Resuscitation corner/table	1	7	5	5
KMC room/corner	1	9	5	1
Isolation rooms	0	1	1	2
Labor suit	1	9	6	7
Labour suit has a resuscitation table	1	6	3	3
Theatre	1	6	3	4
Theatre has a resuscitation table	1	3	3	4
Average score	**87.5**	**73.6**	**70.8**	**57.1**

Critical Gap

- Most general hospitals (GH) lacked functional CPAP machines and patient monitors, while about a third had no phototherapy machines and radiant warmers.
- Almost all assessed healthcare facilities had no isolation rooms.
- Many theaters at regional referral (33%) and general hospitals (50%) did not have resuscitation tables or space

Human resource for newborn care

Health workforce

Availability of skilled healthcare workers at all times is pivotal in the provision of quality newborn care. Their proficiency in essential tasks such as diagnosis, monitoring vital signs, identifying danger signs, forecasting difficulty delivery outcomes, administering vital interventions, and addressing complications significantly reduces the risk of neonatal morbidity and mortality, and promotes overall health of the newborn.

Based on the health facility assessment, overall, no hospital was found to meet the staffing norms (MOH staffing guidelines) for newborn care (Table H3). At the national level, medical officers and neonatal care nurses (diploma trained) were inadequately staffed particularly at Kawempe NRH compromising the quality of care and neonatal outcomes at the highest level/Level 3 neonatal care unit. At the regional level, only pediatricians and medical records personnel were found to be at the required staffing levels. There was inadequate staffing for the rest of the cadres essential for provision of 24 hour neonatal care services. While at the district level, half of the general hospitals lacked pediatricians and had inadequate medical officers and midwives despite the high volumes of births and admissions in the neonatal care units. The staffing levels were worse at lower levels with only 3(23%) of HCIVs found to meet the recommended number of staff required per cadre (minimum of 3 medical officers, 6 general nurses/ midwives, 3 support staff, and 1 medical records personnel). Overall, none of the facilities had degree trained neonatal nurses while only a 3 neonatologists were present at the National referral hospitals (Kawempe and Mulago Specialized Women and neonatal hospital) and Mbale Regional Referral hospital.

Table H 3: Staffing at various levels of newborn care in Uganda

Cadre	NRH N=2		RRH N=16		DH N=12		HCIV N=13	
	Available	Average	Available	Average	Available	Average	Available	Average
Neonatologists	2	1	2	1	NA	NA	NA	NA
Pediatricians	10	5	22	2	7	0.6	NA	NA
Medical officers	5	3	9	0.5	17	1.4	15	1.15
Neonatal nurses (BSc Neonatology)	0	0	0	0	0	0	NA	NA
Neonatal/ Pediatric nurses (Diploma)	0	0	2	1	3	0.25	NA	NA
Clinical officers	-	-	NA	NA	NA	NA	12	1
Nurses/ Midwives	64	32	101	7	80	6.7	85	6.5
Nutritionist	0	0	1	0.06	4	0.3	N/A	NA
Physiotherapist	1	1	0	0	2	0.17	N/A	NA
Support staff e.g cleaners	7	4	13	1	12	1.0	20	6.7
Medical records personnel	1	1	4	0.25	4	0.3	8	0.6

GAPS

- All healthcare facilities were staffed below recommended norms.
- None of the health care facilities had neonatal specialized nurses (Neonatal nurses (BSc Neonatology), compromising delivery of quality neonatal services at higher levels of care.
- Medical officers were below the staffing norms at all levels, while midwives were inadequate at both NRHs and GHs.
- Lack of neonatologists countrywide and insufficient numbers of paediatricians especially in general hospitals.

On job Training to offer newborn care

On-job training is important in information retention and competency building since it can be tailored to meet the training needs of health providers. The MoH and Partners continuously conduct on-job training of staff to build capacity for newborn care in the country. Health workers were asked if they had ever received certain specific refresher trainings pertaining to newborn care. Our readiness facility assessment revealed gaps in refresher courses at various levels with HCIVs noted to have the least refresher trainings conducted especially in IMCI, care for the small and sick newborns, and KMC. Overall, most health workers reported being trained in Essential Newborn care and Helping Babies Breathe while the least refresher trainings were reported in integrated childhood illness management as seen in table H4 below. On the other hand, only 11/16(68.8%) RRHs and 7/12 (87.5%) GHs reported having had support supervision in the previous quarter prior to the assessment.

Facilities were also asked if they received any support supervision in the quarter prior to the assessment. Both the NRHs and HCIVs were offered support supervision while only 68.8% of RRHs had support supervision conducted. Notably, almost all facilities had quality improvement teams in place as shown in the table below.

Table H 4: On job training and support supervision in newborn care

Type of training	NRH (2)	RRH (16)	GH (12)	HCIV (13)
Essential Newborn Care (ENC)	2 (100.0)	13 (81.3)	12 (100.0)	8 (61.5)
Kangaroo Mother Care (KMC)	2 (100.0)	13 (81.3)	11 (91.7)	7 (53.9)
Neonatal resuscitation- Helping Babies Breath (HBB)	2 (100.0)	14 (87.5)	11 (91.7)	8 (61.5)
Breastfeeding support/lactation	2 (100.0)	13 (81.3)	11 (91.7)	7 (53.9)
Care for small and sick newborns	2 (100.0)	14 (87.5)	11 (91.7)	6 (46.2)
Infection prevention and control	2 (100.0)	15 (93.8)	11 (91.7)	7 (53.9)
Integrated management of childhood illnesses	2 (100.0)	9 (56.3)	8 (66.7)	4 (30.8)
Support supervision and QI teams				
Facility received support supervision in the last quarter	2 (100)	11 (68.8)	7 (87.5)	13 (100)
Availability of quality improvement teams in the facility	2 (100)	15 (93.8)	8 (100)	13 (100)

Utilization of health services critically depends on the number, quality and type of health workers at the service delivery points and the services provided. Uganda has not yet adapted the 2020 World Health Organization framework and human resource strategies (29) to improve newborn care in health facilities and ensure that they survive and thrive as guided for low- and middle-income countries. However, Uganda has made some gains in health workforce improvement in the past fifteen years between 2005 and 2020 to support newborn care services. There has been an overall increase in health workforce numbers from about 45,000 in 2008 to about 118,236 in 2020 (30). Nonetheless, there are several challenges in the workforce that would affect newborn care service delivery and its quality including:

- The health workforce coverage remains inequitable and insufficient for achieving universal health coverage and health goals in the country.
- The health workforce density of 1.6 per 1,000 falls far short of the 4.45 per 1,000 populations WHO threshold for progress towards Universal Health Coverage (UHC).
- The distribution of the health workforce and skills mix is not optimal, characterized by inequitable distribution of health workforce with low staffing levels in rural areas and lower-level health facilities compared to urban areas and higher-level health facilities. This poses suboptimal accessibility of health workforce.
- The national staffing level is 74% with associated high vacancy level of 26% (HRH Staff Audit 2020)
- Professional Councils registers reveal that only 67,047 (57%) of the 118,236 health workers have active practicing licenses and are legally employable.
- Unauthorized public sector absenteeism rate is 11% and authorized absenteeism is 38% leading to an average only about 46% of the health workers in employment present at the health facility at any one time (Ministry of Health, 2020). Overall, the availability of the health workforce is low to support quality newborn care services.
- There is very limited health workforce specialized in newborn care including neonatologists, and neonatal nurses. The only available ones are mainly found in Kampala and in the few neonatal Centres of Excellence at Nsambya, Kiwoko, and Mbale regional referral hospitals

Uganda needs to contextualize the WHO framework and human resource intervention newborn care workforce strategies to improve maternal, neonatal and child health services. Specifically, to:

- Improve and standardize the content, curricula and development of competence in pre-service programs for health workers in neonatal care
- Build the capacity of existing newborn care providers through orientation programs, continuing education, skills training, quality improvement initiatives and support to maintain or increase competence
- Upgrade existing cadres with additional specialized training in neonatal care, with additional qualification or certification at undergraduate level
- Establish strategies for health worker recruitment, well-being, motivation and retention
- Ensure effective staffing, staff ratios and skill mixes in local neonatal units
- Create and train a new cadre of specialized neonatal nurses
- Strengthen national human resources planning, policy and regulations for development and management of neonatal services at all levels

Availability of commodities

Essential newborn care commodities

The immediate newborn care after birth/Essential newborn care is important for the survival of all newborn babies. This includes the immediate cord care, early initiation of breast feeding, skin to skin contact to prevent hypothermia, and administration of Vitamin D and tetracycline eye ointment (TEO). Tetracycline eye ointment and vitamin K were present at almost all levels of care during the facility assessment. Chlorhexidine was available at NRHs and only present in about half of the remaining facilities per level with least availability in RRHs (43.8%) as seen in Table H5. Some facilities reported Chlorhexidine being out of stock while others reported that they have never received chlorhexidine.

Facilities where chlorhexidine gel was reported not available/out of stock included – Arua RRH, Entebbe, RRH, Lira RRH, Mbarara RRH, Bududa DH, Kambuga DH, Kumi hospital Ongino, Amach HC IV, Awachi HC IV, Nagongera HC IV, Oli HC IV

Facilities where chlorhexidine gel was reported to never have been available – Hoima RRH, Jinja RRH, Masaka RRH, Naguru RRH, Soroti RRH, Iganga GH, Koboko hospital

More than half of HC IV facilities lacked digital weighing scales and wall clocks. Overall, the readiness for essential newborn care was excellent at NRHs and good at RRHs, GHs and HC IVs.

Table H 5: Availability of commodities for Essential newborn care, resuscitation and respiratory support services at different levels of care.

Item/ requirement per newborn care service	NRH (n=2)	RRH (n=16)	GH (n=12)	HC IV (n=13)
Essential Newborn Care				
Tetracycline eye ointment	2 (100.0)	14 (93.3)	13 (100.0)	13 (100.0)
Vitamin K	2 (100.0)	15 (100.0)	12 (92.3)	12 (92.3)
Digital infant weighing scale	2 (100.0)	13 (86.7)	10 (76.9)	8 (61.5)
Wall clock with second hand	2 (100.0)	11 (73.3)	5 (38.5)	5 (38.5)
Surgical blade size 22	2 (100.0)	13 (86.7)	10 (76.9	10 (76.9)
Chlorhexidine	2 (100.0)	7 (43.8)	7 (58.3)	8 (61.5)
Average score	**100**	**82.5**	**83.3**	**73.8**
Resuscitation/ Respiratory support				
Bag and mask (size 1)	2 (100.0)	13 (81.3)	7 (58.3)	9 (69.2)
Bag and mask (size 0)	2 (100.0)	14 (87.5)	10 (83.3)	9 (69.2)
Resuscitation area	2 (100.0)	14 (87.5)	11 (91.7)	8 (61.5)
Penguine sucker	2 (100.0)	14 (87.5)	10 (83.3)	10 (76.9)
Stethoscope	2 (100.0)	10 (62.5)	8 (66.7)	5 (38.5)
Oxygen concentrators	1 (50.0)	16 (100.0)	9 (75.0)	10 (76.9)
Oxygen cylinders	2 (100.0)	12 (75.0)	10 (83.3)	8 (61.5)
Oxygen blenders	1 (50.0)	3 (18.8)	0 (0.0)	3 (23.1)
Oxygen nasal cannulas (Neo)	2 (100.0)	14 (87.5)	11 (91.7)	9 (69.2)
Neonatal patient monitor	2 (100.0)	9 (56.3)	4 (33.3)	n.a
Suction device	2 (100.0)	5 (31.3)	5 (41.7)	n.a
Pulse oximeter	2 (100.0)	13 (81.3)	9 (75.0)	10 (76.9)
Furosemide IV	2 (100.0)	13 (81.3)	12 (100.0)	n.a
Adrenaline	2 (100.0)	14 (87.5)	11 (91.7)	n.a
Dopamine	2 (100.0)	n.a	n.a	n.a
CPAP machine	2 (100.0)	10 (62.5)	2 (16.7)	n.a
Mechanical ventilators	2 (100.0)	n.a	n.a	n.a
Safe oxygen use protocol	2 (100.0)	11 (68.8)	7 (58.3)	7 (53.9)
Neonatal resuscitation protocol	2 (100.0)	14 (87.5)	11 (91.7)	11 (84.6)
Average score	**92.5**	**73.1**	**68.5**	**57.7**
Additional respiratory support for preterm babies				
Pulmonary surfactant	2 (100.0)	n.a	n.a	n.a
Caffeine citrate	2 (100.0)	6 (37.5)	2 (16.7)	n.a
Aminophyline	2 (100.0)	16 (100.0)	10 (83.3)	12 (92.3)
Maternal corticosteroids	2 (100.0)	16 (100.0)	12 (100.0)	n.a
CPAP machine	2 (100.0)	10 (62.5)	2 (16.7)	n.a
Management of respiratory distress protocol	2 (100.0)	13 (81.3)	7 (58.3)	7 (53.9)
Average score	**100.0**	**76.3**	**55.0**	**73.1**

Management of selected neonatal conditions

Newborn resuscitation/respiratory support

Readiness to provide newborn resuscitation/respiratory support

More than half of the neonatal deaths in Uganda are due to birth asphyxia (MPDSR Report FY 2022/23). Thus, health facility readiness in resuscitation at all levels of newborn care is very critical to ensure quality service provision/effective neonatal resuscitation and reduce neonatal mortality due to birth asphyxia.

Although, the two hospitals at the highest level of newborn care (Kawempe NRH and Mulago women and neonatal specialized hospital) had almost all the equipment, medicines and supplies needed for neonatal resuscitation, Kawempe NRH lacked oxygen blenders to deliver safe oxygen and effectively manage respiratory distress (Table H4). On the other hand, more than half of the assessed RRHS and GHs lacked critical equipment including patient monitors, suction devices, and oxygen blenders critical for newborn resuscitation (Table H5). Only 1/12 (8.3%) district/general hospital had the necessary equipment, supplies and commodities to offer level 2 neonatal care (Figure 1), compared to the WHO recommendation of 80% for a country to significantly reduce neonatal mortality and achieve the SDG target(31). Although all the 16 RRHs had at least one phototherapy machine, and 15/16 (94%) hospitals had radiant warmers, the assessment revealed non availability of functional CPAPs and patient monitors in 7 (44%) and 6 (38%) of the RRHs respectively. It is worth mentioning that all RRHs and GHs had the recommended level 2 neonatal care equipment, however most of these equipment were non-functional and required repairing.

Oxygen

The facility assessment revealed that oxygen was always present/constant at NRH (100%), RRH (68.8%), GHs (83.3%) and HCIVs (76.9%), as seen in table H6. On the day of assessment, 100% of the NRH and RRH, 91.7% GH and 92.3% HCIVs had oxygen. Only two facilities namely Apac hospital and Kumi HCIV lacked oxygen on the day of assessment.

Table H 6: Availability of oxygen in facilities

Item	NRH (n=2)	RRH (n=16)	GH (n=12)	HC IV (n=13)
Constant availability of oxygen at a facility	2 (100.0)	11 (68.8)	10 (83.3)	10 (76.9)
Facilities with oxygen supply on the day of assessment	2 (100.0)	16 (100.0)	11 (91.7)	12 (92.3)
Facilities without oxygen on the day of assessment	0	0	1 (8.3)	1 (7.7)

Respiratory support for preterm babies

Caffeine citrate which is the preferred and recommended medicine for management of apnea of prematurity (AOP) in preterm babies was only found at all NRHs, 6/16 (37.5%) RRHs and 2/12 (16.7%) GHs as shown in Table H4. Notably, a significant number of HCIVs which were assessed lacked resuscitation areas, stethoscopes, oxygen blenders, and safe oxygen use protocols which are vital for quality resuscitation. Despite inadequate neonatal respiratory support medicines and equipment, only 8/13 (62.5%) HCIVs had referral guidelines.

Quality of care for resuscitation

In some facilities, there were no complicated deliveries during the observation study period and thus practices and processes regarding to birth asphyxia and resuscitation were not observed. For those healthcare facilities where neonatal resuscitation was conducted, the following were noted:

Overall, quality of newborn resuscitation was poorest at HCIVs (11.1%) followed by GH at 16.7%. This was not so different at regional referral hospitals at only 43.1% and yet lower level facilities refer complicated babies to RRHs for advanced neonatal resuscitation. At NRH, resuscitation quality was slightly above average at 67.5%. Notably, across all levels of care, there was poor communication by healthcare workers to mothers and their attendants. This included failure by healthcare workers to effectively communicate to mothers and their care takers what was going on, listening to them and providing physical and emotional support during the resuscitation process. Also performing repeat assessments on the neonate before continuing ventilation is an area where performance was poor (Table H7).

Table H 7: Newborn resuscitation processes/practices stratified by level of care

	NRH (1)	RRH (9)	GH(6)	HCIV (2)	Total score
Records time resuscitation started	1	5	2	1	9
Clears the airway by suctioning the mouth first and then the nose	1	6	4	1	12
Stimulates baby with back rubbing	1	6	2	0	9
Does newborn starts to breathe or cry spontaneously?	0	0	3	1	4
Calls for help	0	5	1	0	6
Ties or clamps cord immediately	1	6	1	1	9
Cuts cord with sterile blade or sterile scissors	1	7	2	2	12
Places the newborn on his/her back on a clean, warm surface or towel	1	7	2	2	12
Tells the woman (and her support person) what is going to be done	0	3	1	1	5
Places the head in a slightly extended position to open the airway	1	8	2	2	13
Listens to the woman and provides support and reassurance	0	4	1	1	6
Checks mouth, back of throat and nose for secretions, and clears if necessary	1	8	2	0	11
Places the correct-sized mask on the newborn's face so that it covers the chin, mouth and nose (but not eyes)	0	8	2	1	11
Checks the seal by ventilating two times and observing the rise of the chest	1	7	1	1	10
is newborn's chest rising in response to ventilation?	1	7	1	1	10
Checks the position of the newborn's head to make sure that the neck is in a slightly extended position (not blocking the airway)	1	2	1	1	5
Checks mouth, back of throat and nose for secretions, and clears if necessary	0	2	1	1	4
Checks the seal by ventilating two times and observing the rise of the chest	0	2	1	1	4
is newborn's chest rising in response to ventilation?	1	2	1	1	5
Checks the position of the newborn's head again to make sure that the neck is in slightly extended position	0	1	0	1	2
Repeats suction of mouth and nose to clear secretions, if necessary	0	0	0	1	1
Checks the seal by ventilating two times and observing the rise of the chest	0	1	0	1	2
is newborn's chest rising in response to ventilation?	1	3	0	1	5
Ventilates at a rate of 30 to 50 breaths/minute	1	4	0	0	5
Conducts assessment of newborn breathing after 1 minute of ventilation	1	4	0	0	5
Respiration rate <30 breaths/minute with severe in drawing	0	3	0	0	3
Respiration rate 30-50 breaths/minute and no chest in drawing	0	3	0	0	3
No spontaneous breathing	1	3	0	0	4
Continues Ventilation	1	2	0	0	3
Conducts assessment of newborn breathing after prolonged ventilation (10 minutes)	1	2	0	0	3
Respiration rate 30-50 breaths/minute and no chest in drawing	1	3	0	0	4
Respiration rate <30 breaths/minute with severe in drawing	1	2	0	0	3
No spontaneous breathing	1	2	0	0	3
Continues Ventilation	1	2	0	0	3
Record time that resuscitation actions ended (or time of death if baby died)	1	3	1	1	6
Was the resuscitation successful?	1	7	2	2	12
Arranges transfer to special care either in facility or to outside facility	1	4	2	1	8
Explains to the mother (and her support person if available) what happened	1	4	1	1	7
Listens to mother and responds attentively to her questions and concerns	0	4	2	1	7
Observer: Did you call for help or intervene during the resuscitation to save the life of newborn?	1	3	1	2	7
Total score	27	155	40	31	253
Average score (%)	**67.5**	**43.1**	**16.7**	**11.1**	**27.5**

GAPS: There is sub optimal readiness among a significant proportion at Regional Referral Hospitals (43.1%) and general hospitals (16.7%), for resuscitation and respiratory support for newborn babies with asphyxia.

More than half of the assessed RRHS and general hospitals lacked functional equipment including CPAP, patient monitors, suction devices, and oxygen blenders critical for newborn resuscitation.

Most HCIVs had no newborn resuscitation tables/areas, and safe oxygen use protocols despite inadequate presence of skilled human resource for newborn care

Overall, the performance /quality of care in resuscitation is poor at all levels of care.

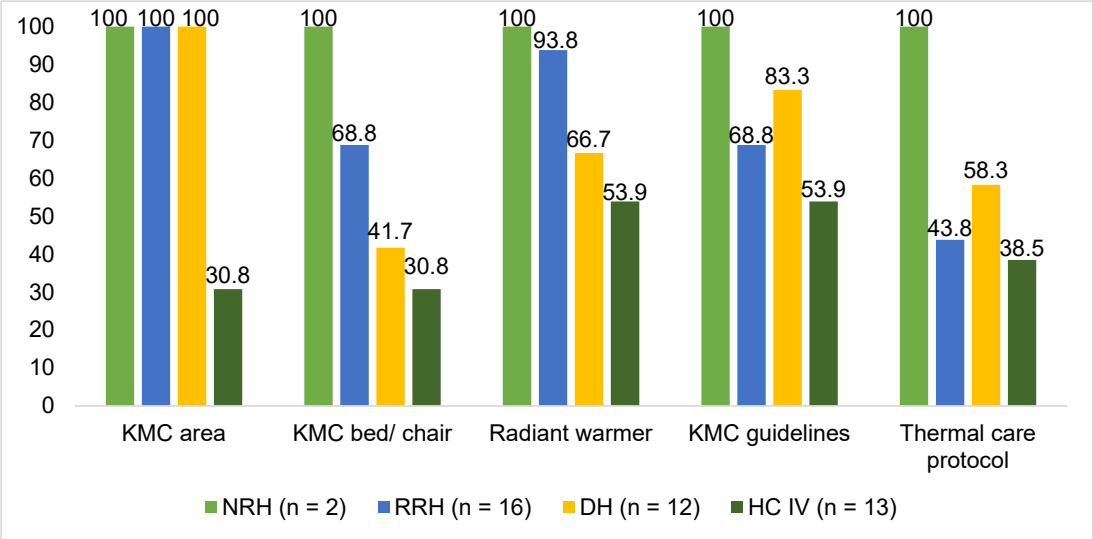
Warmth/thermal care

Readiness to provide thermal care

Thermal care for all newborn babies is essential for prevention of hypothermia. Preterm and low birth weight babies are especially more at risk of morbidity and mortality due to hypothermia and require extra thermal care.

Readiness for thermal care was found to be optimal at national referral hospitals (Figure H2). However, readiness scores for thermal care reduced with reduction in levels of facilities. Less than half of all HCIV facilities assessed met the neonatal thermal care required standards. Only 4/13 (30.8%) HCIVs had KMC space and KMC chairs/beds, the basic infrastructure for thermal care for preterm and LBW babies.

Figure H 2: Proportion of health facilities with thermal care requirements



Quality of care for warmth/thermal care

Overall, **the quality of thermal care** provided was poorest at HCIVs (28.3%) and average at NRH (50%) compared to the rest of the healthcare levels. General hospitals scored highest in thermal care, with an overall average score of 74.4% (Table H8). Notably at the NRHs and HCIVs, vital signs charts were not available or used, health workers did not record the temperatures of babies regularly and glucose levels for hypothermic babies was not measured regularly. In addition, skin to skin care and nesting of small babies was not conducted at NRHs.

Table H 8: Adherence to Warmth and thermal care practices stratified by level of facility

	NRH	RRH	GH	HCIV
Number of facilities	1	9	6	7
Indicator				
Health worker measures and records temperature of baby	0	8	5	0
1. Vital signs monitoring tool/chart available	0	7	5	0
2. Vital signs monitoring tool/chart used	0	3	2	0
Temperature is assessed at least 4hourly	0	3	3	0
Health worker does the following for babies with temperature below 36.50 (hypothermic babies)				
a. Closes windows and doors of unit	1	9	6	1
b. Removes wet linen and replace with dry ones	1	8	4	2
c. Prolongs or initiates skin to skin care	0	6	4	2
d. Uses alternative warming methods in moderate to severe hypothermia if available e.g. (incubators, infant warmers, electric warming methods.)	1	9	6	2
e. Nests babies if small babies	0	2	NA	NA
f. Covers in plastic paper if ELBWT or VLBWT	0	1	NA	NA
g. Checks glucose levels at least once a day if no concern or more frequent if otherwise,	0	5	3	0
h. If glucose less than2.6mmol/dL corrects hypoglycemia.	1	6	3	0
i. Feeds as per the indications and gives fluid as indicated on the chart.	1	9	6	1
j. Gives antibiotics accordingly e.g. (danger signs, presumed sepsis, raised CPR, concerns on CBC, or as guided by results of culture and sensitivity)	1	9	6	5
Health Worker does the following for a baby with hyperthermia				
a. Exposes the baby	1	9	6	6
b. Assesses for dehydration	1	8	3	3
c. Uses antipyretics and tepid sponging	0	3	0	3
d. Provides antibiotics as per indications.	1	8	5	5
Overall average score (%)	**50**	**69.8**	**74.4**	**28.3**

Kangaroo mother care

The findings showed that NRHs were excellently equipped to provide thermal care while GHs were above average and HC IVs were poorly equipped (table H9).

Table H 9: Availability of commodities for thermal care

Service	Item/ requirement	NRH (n=2)	RRH (n=16)	GH (n=12)	HC IV (n=13)
Thermal care	KMC Beds/chairs	2 (100.0)	11 (68.8)	5 (41.7)	4 (30.8)
	KMC area	2 (100.0)	16 (100.0)	12 (100.0)	4 (30.8)
	Radiant warmers	2 (100.0)	15 (93.8)	8 (66.7)	n.a
	Thermal care protocol	2 (100.0)	7 (43.8)	7 (58.3)	5 (38.5)
	KMC guidelines	2 (100.0)	11 (68.8)	10 (83.3)	7 (53.9)
	Care for small and sick newborns protocol	2 (100.0)	14 (87.5)	8 (66.7)	7 (53.9)
	Average score	**100.0**	**77.1**	**69.4**	**41.5**

Quality of KMC care

The adherence to quality KMC practices was inadequate at all levels. The best performance was seen at RRHs (61.1%) while the worst performance was at HC IV level (12.5%). NRHs and GHs almost had similar performance at 50% and 56.3% respectively.

KMC practice was poor at HCIVs (12.5%), with none of the mothers observed performing intermittent KMC greater or equal to 8hours or continuous KMC for more than 22 hours a day. This was further evidenced by poor adherence to KMC guidelines and critical absence of separate KMC room/ward, chairs/beds and KMC wraps at this care level. The absence of KMC wraps was also seen at National referral hospitals (Table H10).

Table H 10: Adherence to Kangaroo Mother Care practices at different levels of care

	NRH	RRH	GH	HCIV
Number of facilities	1	9	6	7
Indicator				
Observe the types of KMC being practiced in the unit(please tick)				
1. Intermittent ≥ 8hours a day	0	2	2	0
2. Continuous ≥ 22 hours a day	1	4	1	0
3. Intermittent <8hrs	0	7	5	3
Observe for KMC guidelines /protocols in the unit	1	6	4	2
Observe whether mothers stay with their babies 24Hrs within the neonatal unit	1	6	4	0
Observe whether mothers have separate ward/space for staying while doing in the facility	1	8	4	1
Observe for availability of KMC chairs/beds	1	8	4	1
Observe for whether mothers doing KMC have KMC wraps provided	0	3	3	0
Average score	**62.5**	**61.1**	**56.3**	**12.5**

Critical gaps

- Vital sign monitoring tools and vital sign monitoring including temperature was completely absent at both NRH and HCIVs.
- Use of antipyretics to treat neonatal hyperthermia was noted at 3/9 RRH and 3/7 HCIVs, showing a critical knowledge gap in neonatal thermo-care provision.
- KMC beds/chairs and wraps absent at NRH

Feeding/ Nutrition/ Fluids

Readiness to provide feeding/ nutrition/ fluids

One of the major challenges preterm and sick newborn babies face is hypoglycemia due to inadequate feeding, and therefore benefit from feeding support. However, from this survey, generally, the facility readiness on feeding and fluids management was above average for almost all health facilities. Although the national level hospitals/Level 3 care facilities had the essential items and guidelines for feeding and giving fluids, they lacked neonatolytes and parenteral nutrition critical for intensive care for the most at risk newborns. Many general hospitals lacked glucometers to assess glucose levels with only 7 (58.3%) hospitals found to have at least one glucometer on the ward during the assessment (Table H9a). None of the RRHs and GHs had infusion pumps to control fluid administration. Other equipment found lacking were the feeding cups, weighing scales and wall clocks to support the quantity and frequency of feeding and fluids. Most facilities especially HCIVs also lacked breast feeding protocols, and feeding guidelines for the preterm and sick newborns as shown in table H11.

Table H 11: Availability of commodities for feeding and fluid management

Service	Item/ requirement	NRH (n=2)	RRH (n=16)	GH (n=12)	HC IV (n=13)
Feeding/ nutrition/ fluids	**Normal saline**	2 (100.0)	14 (87.5)	12 (100.0)	11 (84.6)
	Dextrose 10%	2 (100.0)	11 (68.8)	5 (41.7)	5 (38.5)
	Dextrose 50%	2 (100.0)	15 (93.8)	9 (75.0)	12 (92.3)
	Micro infusion pumps	1 (50.0)	n.a	n.a	n.a
	Glucometer	2 (100.0)	15 (93.8)	7 (58.3)	8 (61.5)
	Syringes (5mls)	2 (100.0)	16 (100.0)	12 (100.0)	11 (84.6)
	Syringes(10mls, 20 mls)	2 (100.0)	15 (93.8)	12 (100.0)	11 (84.6)
	Syringes(50mls, 60 mls)	2 (100.0)	6 (37.5)	6 (50.0)	n.a
	Disposable caps	1 (50.0)	11 (68.8)	8 (66.7)	3 (23.1)
	Nasal gastric tubes(size4, 5, 6)	2 (100.0)	n.a	n.a	n.a
	Breastfeeding protocol	2 (100.0)	12 (75.0)	10 (83.3)	10 (76.9)
	Feeding for preterm and sick newborns guidelines	2 (100.0)	13 (81.3)	11 (91.7)	7 (53.9)
	Digital infant weighing scale	2 (100.0)	14 (87.5)	9 (75.0)	8 (61.5)
	Wall clock with second hand	2 (100.0)	12 (75.0)	4 (33.3)	5 (38.5)
	Amino acids	2 (100.0)	n.a	n.a	n.a
	Neonatolyte	0 (0.0)	n.a	n.a	n.a
	Total parenteral nutrition (IV)	0 (0.0)	n.a	n.a	n.a
	Average score	**82.4**	**80.2**	**72.9**	**63.6**

Quality of care in feeding and fluid management

Overall, the quality of care adherence scores for fluid management and breast feeding was best at RRHs with a score of 78.7% followed by general hospitals with a score of 74.6%. National RH scored 68.2% while HC IV level scored only 12.5% (table H12). This means that fluid management and breast-feeding practices were better performed in RRHs and general hospitals compared to national referral hospitals.

Only 1 in 6 of the general hospitals had both infusion pumps and syringe drives essential for neonatal fluid management. At national level, the only observed facility staff knew only 60% of the proper indications for cup and spoon for neonatal feeding. Only 2/7 observed HCIVs staff had some knowledge about the indications of cup and spoon feeding. In a nutshell, use of cup and spoon was poor at both National referral hospitals and health center IVs compared to regional referral hospitals.

None of the 7 observed HCIVs had burets for fluid management for neonatal patients, and only 4 had nurses who could give bolus infusion correctly. Only 3/7 observed HCIVs had their healthcare workers help mothers initiate breastfeeding within 1 hour after birth, and only 2 of these facilities had healthcare workers who could help mothers properly position babies for effective breastfeeding. Only 4 of the 6 observed general hospitals helped mothers initiate breastfeeding within the first one hour after birth and helped them position babies for proper and effective breastfeeding.

Table H 12: Adherence to fluid management and breast feeding practices stratified by level of facility

Facility level	NRH	RRH	GH	HCIV
Number of facilities	1	9	6	7
Indicator				
Health worker helps mother initiate breast feeding within 1hr after birth	1	8	4	3
Health worker helps a mother position baby to start breast feeding	1	8	4	2
Health worker provides adequate feeds as per the feeding guidelines for babies who are not breast feeding	0	9	6	2
Health worker uses cup and spoon to feed a baby when;				
a. When the baby is ≥ 1.5 kgs	0	6	4	1
b. Tolerating the calculated amount without chocking, vomiting or getting cyanotic or tiring before finishing the required amount	0	6	4	1
c. Gaining weight as outlined	0	4	3	0
d. Not losing more than 10% of birth weight in the first week of life	0	3	3	0
Health worker uses Nasal/ Oral Gastric Tube in feeding a sick new born for the following conditions.				
a. If ≤1.5 kgs birth weight	1	9	5	0
b. When cannot tolerate the calculated amount by cup and spoon before tiring, vomits, gets cyanotic	1	9	6	0
c. Not gaining adequately	1	9	5	0
d. Losing more than 10% of the birth weight in the first week of life	1	8	5	0
e. Any sick neonate who cannot swallow effectively	1	9	6	0
f. When cannot tolerate the calculated amount by cup and spoon before tiring, vomits, gets cyanotic	1	9	5	0
Heath worker uses NG-tube for the following?				
a. All very sick babies to decompress the stomach and ease breathing	1	8	4	0
b. Babies on C-PAP	1	7	4	0
c. Babies with defects on the upper roof mouth	1	7	3	0
d. Babies with intestinal obstruction, NEC, etc.	1	7	4	0
Health worker tests placement of the NG tube in the stomach before feeding	0	8	5	0
Health worker uses the following methods of fluid administration (please tick)				
a. Infusion pumps	1	4	1	0
b. Syringe drives	1	3	1	1
c. Burettes	1	8	6	0
d. Boluses	0	7	6	4
New overall average scores (%)	68.2	78.8	74.6	12.5

Sepsis/Jaundice/Seizures and Encephalitis

Readiness to manage sepsis/ jaundice/seizures and encephalitis

Neonatal sepsis is one of the leading causes of neonatal mortality in Uganda. Health facility readiness to manage cases of neonatal sepsis is therefore critical to saving newborn lives. Although most facilities had the necessary antibiotics to manage neonatal sepsis, the assessment revealed lack of infusion pumps and sepsis management protocols especially at GHs and HCIVs (Table H13). Lumber puncture needles/kits used in diagnosis of neonatal meningitis were found in less than a quarter of RRHs and GHs. Additionally, there was suboptimal readiness to manage seizures and pathological jaundice. For instance three Level 2 hospitals lacked phenobarbitone, while phototherapy machines were only found in only 7/12 (58%) GHs and 3/13 (23%) HCIVs. Furthermore, only about half of the RRHs and GHs had protocols for neurological assessment making it difficult for early identification and management of neurological complications.

Table H 13: Availability of commodities for managing neonatal illness

Service	Item/ requirement	NRH (n=2)	RRH (n=16)	GH (n=12)	HC IV (n=13)
Sepsis/Jaundice/ Seizures and Encephalitis management	Ampicillin (IV)	2 (100.0)	16 (100.0)	11 (91.7)	11 (84.6)
	Gentamicin	2 (100.0)	16 (100.0)	12 (100.0)	13 (100.0)
	Cefotaxime	2 (100.0)	13 (81.3)	6 (50.0)	n.a
	Ceftriaxone	2 (100.0)	15 (93.8)	12 (100.0)	n.a
	Amikacin (IV)	2 (100.0)	6 (37.5)	3 (25.0)	n.a
	Vancomycin	2 (100.0)	n.a	n.a	n.a
	Phenytoin	2 (100.0)	n.a	n.a	n.a
	Phenobarbitone	2 (100.0)	14 (87.5)	11 (91.7)	n.a
	Masks for covering eyes	1 (50.0)	2 (12.5)	2 (16.7)	n.a
	Dextrose (50%)	2 (100.0)	15 (93.8)	9 (75.0)	n.a
	Dextrose (10%)	2 (100.0)	11 (68.8)	5 (41.7)	n.a
	Normal saline	2 (100.0)	14 (87.5)	12 (100.0)	11 (84.6)
	Neonatolytes	2 (100.0)	n.a	n.a	n.a
	Half strength darrows	1 (50.0)	11 (68.8)	11 (91.7)	5 (38.5)
	Diazepam (IV) for tetanus	2 (100.0)	12 (75.0)	9 (75.0)	0 (0.0)
	Diazepam (PO) for tetanus	2 (100.0)	11 (68.8)	8 (66.7)	0 (0.0)
	Tetanus Immunoglobulin (IgG)	0 (0.0)	7 (43.8)	5 (41.7)	n.a
	Drug Formulary (calculating and mixing medication) protocol	2 (100.0)	15 (93.8)	9 (75.0)	9 (69.2)
	Syringes (1ml, 2 mls)	2 (100.0)	16 (100.0)	12 (100.0)	11 (84.6)
	Syringes (5mls)	2 (100.0)	16 (100.0)	12 (100.0)	11 (84.6)
	Syringes (10mls, 20 mls)	2 (100.0)	15 (93.8)	12 (100.0)	11 (84.6)
	Syringes (50mls, 60 mls)	2 (100.0)	6 (37.5)	6 (50.0)	n.a
	Neonatal Lumbar puncture needles	1 (50.0)	4 (25.0)	2 (16.7)	n.a
	Cannulas (26GA 0.6X19mm) purple (BD Neoflon)	2 (100.0)	3 (18.8)	2 (16.7)	6 (46.2)
	Cannulas (26) yellow	2 (100.0)	11 (68.8)	7 (58.3)	11 (84.6)
	Cannulas (24)	2 (100.0)	12 (75.0)	9 (75.0)	11 (84.6)
	Cannulas (22)	2 (100.0)	12 (75.0)	8 (66.7)	9 (69.2)
	Use micro drip infusion set or micro-pump for intravenous infusion protocol	2 (100.0)	3 (18.8)	4 (33.3)	n.a
	Phototherapy machine	2 (100.0)	16 (100.0)	7 (58.3)	3 (23.1)
	Management of jaundice protocol	2 (100.0)	13 (81.3)	9 (75.0)	6 (46.2)
	Neurological assessment protocol	2 (100.0)	8 (50.0)	5 (41.7)	n.a
	Follow up care protocol	2 (100.0)	13 (81.3)	5 (41.7)	3 (23.1)
	Thermometer	2 (100.0)	14 (87.5)	10 (83.3)	10 (76.9)
	Management of sepsis protocol	2 (100.0)	14 (87.5)	9 (75.0)	9 (69.2)
	Average score	90.0	71.4	65.6	60.7

Infection prevention and control

Readiness for infection prevention and control (IPC)

Infection prevention and control (IPC) measures aim to prevent the patient and health care provider from harm through prevention and control of transmission of microorganisms from one patient to another or from the health worker to the patient. Meeting the minimum IPC requirements is vital in ensuring safety of patients and all people working in health facility environment. Seven domains of IPC were assessed including Personal Protective Equipment (PPE), facility hygiene, hand hygiene, running water, waste management, equipment processing /disinfection /sterilization and IEC materials.

Overall, the IPC readiness was excellent at National Referral Hospitals (95.2%) and good at the other levels; RRH (88.3%), GH (80.8%), HCIV (77.4%) as shown in Table H14. The poorest performance for readiness was in the domain of equipment processing/disinfection/sterilization with NRH (80%) and HCIVs (79.5%) scoring well while RRH (50%) and GH (45%) scored poorly. Many facilities lacked cidex while 3/9 of the GHs lacked a functional autoclave.

Although PPE including masks, surgical and examination gloves were available in almost all facilities assessed, 2/16 (13%) of RRHs did not have masks. Similarly, access to running water (piped, bucket with a tap, or pour pitcher) was not available in 1 RRH (Naguru hospital), 2 GHs (Kayunga and Amudat hospitals), and 3 HCIVs (Kanungu, Nagongera, and Kataraha) thereby limiting hand hygiene which is the most important measure of infection prevention. Supplies like absorbent gauze, iodine swabs and alcohol swabs were not available in most of the facilities

Table H 14: Availability of commodities for IPC

Infection prevention and control		NRH(n=2)	RRH(n=16)	GH (n=12)	HCIV (n=13)
PPE	Gloves (disposables)	2 (100.0)	14 (87.5)	11 (91.7)	12 (92.3)
	Surgical Gloves	2 (100.0)	15 (93.8)	12 (100.0)	11 (84.6)
	Masks	2 (100.0)	13 (81.3)	12 (100.0)	11 (84.6)
	Score PPE (%)	**100**	**87.5**	**97.2**	**87.2**
Facility hygiene	Liquid soap (Specifications)	2 (100.0)	15 (93.8)	12 (100.0)	12 (92.3)
	Bar soap	2 (100.0)	6 (37.5)	8 (66.7)	6 (46.2)
	Alcohol 70% (jerrycans)	2 (100.0)	10 (62.5)	7 (58.3)	7 (53.9)
	Povidone Iodine (0.5l)	1 (50.0)	13 (81.3)	9 (75.0)	10 (76.9)
	Clinical examination rolls	2 (100.0)	2 (12.5)	4 (33.3)	n.a
	Cotton	2 (100.0)	16 (100.0)	12 (100.0)	10 (76.9)
	Gauze	2 (100.0)	15 (93.8)	12 (100.0)	10 (76.9)
	Absorbent gauze	2 (100.0)	13 (81.3)	7 (58.3)	5 (38.5)
	Bandages	2 (100.0)	13 (81.3)	7 (58.3)	7 (53.9)
	Alcohol swabs	0 (0.0)	8 (50.0)	8 (66.7)	11 (84.6)
	Iodine swabs	0 (0.0)	5 (31.3)	3 (25.0)	n.a
	Score Facility Hygiene(%)	**86.4**	**73.9**	**76.3**	**76.4**
Hand Hygiene	Alcohol hand rub	2 (100.0)	14 (87.5)	10 (83.3)	9 (69.2)
	Hand washing area	2 (100.0)	15 (93.8)	12 (100.0)	8 (61.5)
	Score Hand hygiene (%)	**100**	**90.7**	**91.7**	**65.4**
Running water	Running water from an improved water source (piped, bucket with tap or pour pitcher)	2 (100.0)	15 (93.8)	10 (83.3)	10 (76.9)
	Score running water (%)	**100**	**93.8**	**83.3**	**76.9**
Waste management	Bin liners black	2 (100.0)	16 (100.0)	11 (91.7)	10 (76.9)
	Bin liners yellow	2 (100.0)	16 (100.0)	10 (83.3)	9 (69.2)
	Bin liners red	2 (100.0)	16 (100.0)	11 (91.7)	9 (69.2)
	Score Waste management (%)	**100**	**100**	**88.9**	**71.8**
Equipment processing, Disinfection and Sterilization	Milton tabs/solution	1 (50.0)	1 (6.3)	0 (0.0)	n.a
	Jik	2 (100.0)	14 (87.5)	12 (100.0)	10 (76.9)
	Cidex (glutaraldehyde)	1 (50.0)	7 (43.8)	3 (25.0)	n.a
	Sterilizer	2 (100.0)	2 (12.5)	3 (25.0)	10 (76.9)
	Autoclave	2 (100.0)	16 (100)	9 (75.0)	n.a
	Score Equipment processing (%)	**80**	**50**	**45**	**79.5**
IEC Materials	IPC guidelines	2 (100.0)	14 (87.5)	10 (83.3)	11 (84.6)
	Score IEC (%)	**100**	**87.5**	**83.3**	**84.6**
	Total Average Score	**95.2**	**83.3**	**80.8**	**77.4**

More than 85% of possible points: A – recommended practices are followed consistently and thoroughly. 70 – 85% of possible points: B – recommended practices usually followed. Less than 70% of possible points: C – training and follow-up needed on recommended practice

Quality of IPC processes

In as much as readiness for IPC was found to be good at all levels of care, the quality of the IPC processes conducted was found to be optimal at RRH (75.2%) and GH (77.2%) level but very poor at NRH (47.5%) and HCIV level (53.9%).

At NRH level, proper waste disposal recommendations including waste segregation was not observed. This was further evidenced by absence of coded waste bin liners. There was also poor processing and sterilization/autoclaving of equipment at NRH level. Regional Referral hospitals and General hospitals had the best IPC average scores. It was noted that all (100%) of the observed facilities at these levels had their units scrubbed with water and a disinfectant at least once a day and all had coded waste bins with appropriate liners.

Hand hygiene was sub-optimal across all levels with the challenging areas being observing the five moments of hand hygiene as well as the five steps of hand washing.

Overall, in almost all neonatal units at HCIVs, there was poor behavior including entering the neonatal care unit with street shoes and clothes, non-restriction of visitors in the unit, no regulation on noise in the units etc as seen in table H15.

Table H 15: Adherence to Infection prevention and control measures in neonatal care units stratified by level of facility

		National Referral Hospital	Regional Referral Hospital	General Hospital	Health Centre IV
	Number of facilities	**1**	**9**	**6**	**7**
	Indicator				
Facility hygiene	Presence of right behavior in the neonatal unit for infection control: (Shoes out, specific attire, restriction of guests, no noise etc.)	1	8	5	2
	Unit scrubbed with water, jik, soap at least once a day.	1	9	6	3
	Dump dusting done every morning or whenever necessary	1	9	6	3
	Average Score (%)	**100**	**92.3**	**94.4**	**38.1**
Equipment processing and sterilization	Provision for equipment processing the four-bucket system.	1	8	4	2
	Cleans equipment like incubators, warmers etc before and after use	1	8	6	3
	Are different types of equipment being processed as out lined below?				
	Resuscitation equipment.	0	6	4	5
	Decontaminates metallic equipment	0	7	5	6
	Autoclaves//sterilises equipment including resuscitation equipment	0	1	4	5
	Average score (%)	**40**	**66.7**	**76.7**	**60**
Waste management	Presence of coded waste bins with liners	0	9	6	6
	Follows waste disposal recommended guidelines e.g waste segregation	0	4	4	4
	Average score (%)	**0**	**72.2**	**83.3**	**71.4**
Hand hygiene	Presence of hand washing basin with running water/ tap or improvised tap within easy reach	1	9	6	5
	Presence of hand washing basin at entrance of the Newborn Care Unit	1	7	4	5
	Observes the five moments of hand hygiene	0	4	2	1
	Health workers observes the steps/points of handwashing	0	5	1	2
	Average score	**50**	**69.4**	**54.2**	**46.4**
Overall average score (%)		**47.5**	**75.2**	**77.2**	**53.9**

Clean-up after birth

The quality of practices regarding clean up after birth for infection prevention and control was inadequate across the board. However, best adherence to the quality practices was seen at NRHs (64.3%) followed by RRHs (62.7%), General hospitals (61.9%). The poorest adherence/performance was at HC IV level (5.1%).

Hand hygiene was poor at regional and general hospitals and worse at health center fours, only 2 of the 7 observed hospitals had their healthcare workers wash their hands or use alcohol hand rub after performing a delivery (table H16).

Table H 16: Adherence to Infection prevention and control practices after birth stratified by level of facility

CLEAN-UP AFTER BIRTH				
	NRH(n=1)	RRH(n=9)	GH(n=6)	HCIV(n=7)
Disposes of all sharps in a puncture-proof container immediately after use	1	9	6	7
Decontaminates all reusable instruments in 0.5% chlorine solution	1	7	6	6
Sterilizes or uses high-level disinfection for all reusable instruments	1	8	5	5
Disposes of all contaminated waste in leak-proof containers	1	7	5	6
Removes apron and wipe with chlorine solution.	0	3	2	4
Washes his/her hands with soap and water or uses alcohol hand rub	1	7	5	6
Was there a newborn resuscitation?	1	8	4	2
Disposes off disposable suction catheters and mucus extractors in a leak-proof container or plastic bag	0	2	1	0
Takes the bag and mask apart and inspects for cracks and tears	0	3	2	1
Decontaminates the bag and mask in 0.5% chlorine solution	1	6	4	1
Sterilizes or uses high-level disinfection for bag, valve and mask	0	3	2	1
Decontaminates reusable suction devices in 0.5% chlorine solution	1	7	4	1
Sterilizes or uses high-level disinfection for reusable suction devices	0	4	3	1
Washes his/her hands with soap and water or uses alcohol hand rub	1	5	3	2
Average score (%)	**64.3**	**62.7**	**61.9**	**5.1**

Referral

A coordinated referral system across the health system is very key in ensuring that all small and sick newborns have access to the appropriate level of care. Survey findings showed that ambulances were generally available at hospital level. However, only 53.9% of HCIVs had functional ambulances (table H17). A key challenge noted in the referral system was provision of fuel for the ambulance. Patients provided the required fuel in 37.5% RRHs, 50% GHs and 46.2% HCIVs. It was also noted that skin to skin was the most common method of maintaining thermal care for neonates during transportation at referral (100% at NRHs, 81.3% RRHs, 91.7% GHs and 69.2% HCIVs. Transportation incubators were generally unavailable across the board. Even though referral guidelines stipulate that a health worker must accompany a patient during referral, this was not always the case. Referred patients were always

accompanied by a nurse or doctor in only 50% NRHs, 81.3% RRHs, 58.3% GHs and 30.8% HCIVs. Feedback on referral was sub-optimal.

Table H 17: Referral practices within the facilities

	Facility level			
REFERRALS	**NRH (2)**	**RRH (16)**	**DH (12)**	**HC IV (13)**
Facility refers sick newborns out to other facilities	1 (50.0)	14 (87.5)	12 (100.0)	13 (100.0)
Availability of a register where out referrals are recorded	1 (50.0)	12 (75.0)	11 (91.7)	12 (92.3)
Facility receives feedback on out referrals made				
Always	1 (50.0)	4 (25.0)	5 (41.7)	4 (30.8)
Sometimes	1 (50.0)	6 (37.5)	4 (33.3)	6 (46.2)
Availability of a functional ambulance or other vehicle for transportation stationed at the facility	2 (100.0)	16 (100.0)	11 (91.7)	7 (53.9)
Provider of fuel for the ambulance to take a patient				
Government (MoH, KCCA)	0 (0.0)	1 (6.3)	0 (0.0)	1 (7.7)
Health facility	2 (100.0)	12 (75.0)	7 (58.3)	4 (30.8)
Patients	0 (0.0)	6 (37.5)	6 (50.0)	6 (46.2)
Implementing partners	0 (0.0)	1 (6.3)	1 (8.3)	1 (7.7)
Availability of fuel for the ambulance on the day of the survey	2 (100.0)	8 (50.0)	6 (50.0)	5 (38.5)
Facility has access to an ambulance or other vehicle for emergency transport stationed at another facility	2 (100.0)	12 (75.0)	10 (83.3)	10 (76.9)
Ways thermal care is maintained for neonates during transportation at referral				
Skin to skin	2 (100.0)	13 (81.3)	11 (91.7)	9 (69.2)
Transportation incubator	0 (0.0)	0 (0.0)	0 (0.0)	1 (7.7)
Warm blanket only	0 (0.0)	2 (12.5)	1 (8.3)	3 (23.1)
Other (Thermo pouch with CPAP, swaddling, transport with warmth source, any cloth with the mother)	1 (50.0)	1 (6.3)	2 (16.7)	1 (7.7)
Nurse or doctor routinely accompanies the referred infant during transportation				
Always	1 (50.0)	13 (81.3)	7 (58.3)	4 (30.8)
Sometimes	1 (50.0)	3 (18.8)	5 (41.7)	6 (46.2)

Data and its use

Neonatal registers were found to be available in all NRHs, RRHs, GHs and 76.3% HCIVs. The most common method of collecting patient information was by use of an admission file. A computer data base was present at the two NRHs, a few RRHs (31.3%), GHs (41.7%) and HCIVs (15.4%) as shown in the table below H18. The users of data were majorly the health facility staff and government; and to a lesser extent implementing partners and researchers. At hospital level, there was optimal use of data mainly used for performance monitoring, reporting, quality improvement and planning. Data was used sub-optimally at HCIV level with the main use being for performance monitoring.

Table H 18: data collection methods, data use and users

DATA AND ITS USE	NRH (2)	RRH (16)	DH (12)	HC IV (13)
Availability of a register for the neonatal unit	2 (100.0)	16 (100.0)	12 (100.0)	10 (76.9)
Method used to collect patients' records/ data				
Computer database	2 (100.0)	5 (31.3)	5 (41.7)	2 (15.4)
Logbook	1 (50.0)	5 (31.3)	2 (16.7)	4 (30.8)
Admission form, treatment form (file)	2 (100.0)	14 (87.5)	10 (83.3)	11 (84.6)
Patient exercise book	0 (0.0)	5 (31.3)	5 (41.7)	8 (61.5)
Other	1 (50.0)	0 (0.0)	0 (0.0)	1 (7.7)
Users of facility data				
Government (MoH, District, KCCA)	1 (50.0)	9 (56.3)	5 (41.7)	9 (69.2)
Health facility (staff and administration)	2 (100.0)	16 (100.0)	10 (83.3)	13 (100.0)
Implementing partners	0 (0.0)	3 (18.8)	4 (33.3)	1 (7.7)
Researchers	0 (0.0)	3 (18.8)	0 (0.0)	0 (0.0)
Ways data collected is used in the hospital or region				
Reporting	2 (100.0)	15 (93.8)	12 (100.0)	5 (38.5)
Performance monitoring	2 (100.0)	16 (100.0)	11 (91.7)	9 (69.2)
Quality improvement	2 (100.0)	16 (100.0)	12 (100.0)	4 (30.8)
Planning	2 (100.0)	16 (100.0)	10 (83.3)	6 (46.2)
Research	0 (0.0)	9 (56.3)	4 (33.3)	0 (0.0)

Discharge and follow up

Planning discharge is a very important aspect in care. Ideally, all health facilities should have guidelines for planning discharge and follow up of patients. A system or guidelines for planning discharge was only available in 50% NRHs, 75% RRHs, 75% GHs and 69.2% HCIVs. However, strict adherence to these guidelines was sub-optimal with best adherence in 56.3% RRHs (table H19). At all NRHs and RRHs, caretakers of babies were counseled before discharge while this also happened in 92.3% GHs and 69.2% HCIVs.

Table H 19: Availability and adherence to discharge guidelines.

DISCHARGE AND FOLLOW UP	NRH (2)	RRH (16)	DH (12)	HC IV (13)
Availability of a system or guidelines for planning discharge of the newborn/ young infant receiving inpatient care	1 (50.0)	12 (75.0)	9 (75.0)	9 (69.2)
Strict adherence to the guidelines for planning discharge of the newborn/ young infant receiving inpatient care				
Always	1 (50.0)	9 (56.3)	5 (41.7)	5 (38.5)
Sometimes	0 (0.0)	3 (18.8)	3 (25.0)	4 (30.8)
Never	1 (50.0)	0 (0.0)	4 (33.3)	3 (23.1)
Availability of linkages with community based health workers who support home or clinic-based follow up of newborn/ young infants post discharge	0 (0.0)	3 (18.8)	7 (58.3)	7 (53.9)
Usage of other methods to promote adherence for treatment and follow up of newborns/ young infants after discharge	1 (50.0)	8 (50.0)	8 (66.7)	8 (61.5)
Methods used to promote adherence for treatment and follow up of newborns/ young infants after discharge				
Trace through phone calls/text message	1 (50.0)	4 (25.0)	4 (33.3)	5 (38.5)
Trace through community volunteers or facility outreach	0 (0.0)	4 (25.0)	4 (33.3)	4 (30.8)
Appointed focal point at the facility to manage community follow-up for discharged infants	1 (50.0)	4 (25.0)	3 (25.0)	3 (23.1)
Identify a community support person for parent	0 (0.0)	2 (12.5)	5 (41.7)	4 (30.8)
Use appointment systems	1 (50.0)	11 (68.8)	6 (50.0)	7 (53.9)
Use appointment reminder systems	0 (0.0)	1 (6.3)	4 (33.3)	2 (15.4)
Identify missed appointments for clinical follow-up and ensure follow-up	0 (0.0)	2 (12.5)	6 (50.0)	5 (38.5)
Counseling of parents prior to discharge of the baby	2 (100.0)	16 (100.0)	11 (91.7)	9 (69.2)

Parent/caregiver feedback and support

Close involvement of the parent especially the mother or any caregiver in decisions about care of the newborn while in a facility is very important. This involvement in care is also expected to improve the ability of the caregivers to provide care for the baby upon discharge. Involvement with the infant care, however, requires a person to remain at the facility. Therefore availability of spaces for the caretaker to sleep and prepare their meals is important. From this assessment, sleeping spaces for caretakers were available in all the NRHs, 37.5% RRHs, 75% GHs and 38.5% HCIVs (table H20).

Almost all the facilities had systems in place for client opinion. The most commonly used systems to receive client feedback were though directly talking to a health worker and use of suggestion boxes.

Generally, caretakers were not charged for admission of babies in the neonatal care units with the exception of one national referral hospital and in three general hospitals.

Table H 20: Systems for client feedback and support

PARENT/ CAREGIVER FEEDBACK AND SUPPORT	NRH (2)	RRH (16)	DH (12)	HCIV (13)
Availability of a system for determining clients' opinions or receiving feedback about the health facility or its services	2 (100)	14 (87.5)	12 (100)	12 (92.3)
Systems used to receive client feedback				
Suggestion box	1 (50.0)	8 (50.0)	11 (91.7)	8 (61.5)
Patient exit interviews	1 (50.0)	2 (12.5)	3 (25.0)	4 (30.8)
Directly to health worker	1 (50.0)	11 (68.8)	11 (91.7)	11 (84.6)
Other	1 (50.0)	0 (0.0)	2 (16.7)	6 (46.2)
Availability of space for parents and caregivers to sleep on facility grounds	2 (100)	6 (37.5)	9 (75.0)	5 (38.5)
Availability of a place on facility grounds where parents/ caregivers can cook	0 (0.0)	12 (75.0)	10 (83.3)	6 (46.2)
Facility charges for care of babies in the neonatal unit	1 (50.0)	0 (0.0)	3 (25.0)	0 (0.0)
Amount charged for care of babies in the neonatal unit (Ushs)				
180,000	0 (0.0)	0 (0.0)	1 (8.3)	0 (0.0)
250,000	1 (50.0)	0 (0.0)	0 (0.0)	0 (0.0)
1,500,000	0 (0.0)	0 (0.0)	1 (8.3)	0 (0.0)

Neonatal care unit environment

The complexity of newborn care, including assessment, treatment, and other procedures, requires an environment with adequate lighting, continuous power supply, running water, and sanitary facilities. The unit should be well-illuminated with sufficient daylight to facilitate physical examination and clinical procedures, e.g. cannulation, blood draws, etc. Operating newborn care equipment requires an uninterrupted power supply, and noise-generating activities and gadgets (such as telephone sounds, staff areas, and equipment) should be acoustically isolated.

We assessed health facilities for appropriateness of their environment to provide newborn care. The areas evaluated include power supply and backup, water and sanitation, lighting, noise levels and water sources and findings are shown in table H21.

a. Water and sanitation facilities (including pit latrines and toilets): The most commonly used source of water at the health facilities was piped water (86% of the facilities) followed by borehole water (7%) and rain water (4.6%). The use of piped water was 50%, 100%, 83% and 69.2% for NRH's, RRH, GH and HCIV respectively (table H16). 8.3%of GHs and 7.7% HCIVs used harvested rain water while 15.4% of HCIVs relied on borehole water. A functional toilet or pit latrine for parents and visitors to the neonatal units was seen in 62% of the health facilities. This included 100% of NRH, 62.5% of RRHs, 66.7% of GHs and 69.2% of HCIVs.
b. Lighting: Maintaining appropriate lighting levels in neonatal units is crucial for improving new-born survival. Low lighting reduces levels of cortisol, extends sleep duration, stimulates the release of growth hormones and encourages the early development of a circadian rhythm. From the assessment, only 32.6% of the facilities maintained low lighting in the neonatal unit which included 50% of the NRH's, 31.3% of RRHs, 58.3% of GHs and 7.7% of HCIVs.
c. Electricity: In the study, 86% of facilities said they always have electricity, 9.3% (4) said they have it sometimes while 2% (1) said they did not have. The facilities that always have electricity included 100% of NRH, 88% of RRHs, 75% of GHs and 85% of HCIVs. Only one facility said they did not have electricity (Amach HCIV). Furthermore, 86% of the facilities said they

had a back-up source of electricity installed for critical equipment in the neonatal unit and 14% did not.

d. Noise control: Low sound levels are required in neonatal care units. We did not measure the sound levels in decibels but asked about the maintenance of quietness or low sound levels in the NCU. Finding showed sound maintenance/regulation in all NRHs, 37.5% RRHs, 75% GHs and 7.7% HCIVs. Additionally, a posted sign about maintaining a quiet environment in the unit was only seen in 23.3% of the facilities. These included 100% NRHs, 18.8% RRHs, 16.7% GHs and 23.1% HCIVs.
e. Temperature: Control of the NCU room temperature is very important. Generally, wall thermometers or thermostats for taking temperature were lacking in most facilities and only available in 50% NRHs, 18.8% RRHs, 41.7% GHs and 15.4% HCIVs.

Table H 21: Neonatal Care unit environment

ENVIRONMENT	NRH (2)	RRH (16)	GH (12)	HC IV (13)
Availability of electricity				
Always	2 (100.0)	16 (100.0)	9 (75.0)	10 (76.9)
Sometimes	0 (0.0)	0 (0.0)	2 (16.7)	2 (15.4)
Availability of a back-up source of electricity for critical equipment in this unit	2 (100.0)	14 (87.5)	11 (91.7)	10 (76.9)
Availability of a thermometer or thermostat that shows the NICU room temperature	1 (50.0)	3 (18.8)	5 (41.7)	2 (15.4)
Facility maintains low lighting in the neonatal unit	1 (50.0)	5 (31.3)	7 (58.3)	1 (7.7)
Neonatal unit is always quiet/ with low sound levels	2 (100.0)	6 (37.5)	9 (75.0)	1 (7.7)
Availability of a posted sign about maintaining a quiet environment in the unit	2 (100.0)	3 (18.8)	2 (16.7)	3 (23.1)
Availability of chairs where the mother can sit comfortably for skin-to-skin/ KMC and/ or for feeding the baby	2 (100.0)	12 (75.0)	10 (83.3)	4 (30.8)
Availability of a functional toilet/ pit latrine that parents and visitors to the neonatal unit can use	2 (100.0)	10 (62.5)	8 (66.7)	9 (69.2)
Most commonly used source of water for this unit				
Borehole water	0 (0.0)	0 (0.0)	1 (8.3)	2 (15.4)
Piped water	2 (100.0)	16 (100.0)	10 (83.3)	9 (69.2)
Rain water	0 (0.0)	0 (0.0)	1 (8.3)	1 (7.7)

Maternal and perinatal death and surveillance reviews (MPDSR) and death notification

MPDSR committees were almost universal across all facilities as was conduction of routine maternal and newborn death reviews. However in 8.3% GH and 2.1% HCIVs, death reviews were not routinely conducted. In some facilities 43.8% RRHs, 25% GH and 38.5% HCIVs, maternal death reviews were done immediately after death while in most of the facilities, these reviews were conducted on a weekly basis (Table H22). On the other hand, perinatal death reviews were conducted on a weekly basis in most facilities (50% NRHs, 62.5% RRHs, 66.7%GHs and 30.8%HCIVs). Notably, HCIVs were performing very poorly in conducting maternal and perinatal death reviews and notification while NRHs and RRHs performed well.

Table H 22: MPDSR and death notification by level of facility

MPDSR AND DEATH NOTIFICATION	NRH(2)	RRH (16)	GH (12)	HC IV (13)
Availability of an MPDSR committee at the facility	1 (50.0)	14 (87.5)	12 (100)	12 (92.3)
Facility routinely conducts death reviews for maternal and newborns	2 (100)	16 (100)	11 (91.7)	10 (76.9)
Number of times facility conducts maternal death reviews				
Immediately after death	0 (0.0)	7 (43.8)	3 (25.0)	5 (38.5)
Daily	1 (50.0)	0 (0.0)	0 (0.0)	0 (0.0)
1-4 days after a death	0 (0.0)	0 (0.0)	2 (16.7)	0 (0.0)
Weekly	1 (50.0)	9 (56.3)	4 (33.3)	2 (15.4)
Monthly	0 (0.0)	0 (0.0)	2 (16.7)	2 (15.4)
Rarely	0 (0.0)	0 (0.0)	0 (0.0)	1 (7.7)
Never	0 (0.0)	0 (0.0)	1 (8.3)	2 (15.4)
Number of times facility conducts perinatal death reviews				
Immediately after death	0 (0.0)	6 (37.5)	1 (8.3)	4 (30.8)
Daily	1 (50.0)	0 (0.0)	0 (0.0)	0 (0.0)
1-3 days after a death	0 (0.0)	0 (0.0)	1 (8.3)	0 (0.0)
Weekly	1 (50.0)	10 (62.5)	8 (66.7)	4 (30.8)
Monthly	0 (0.0)	0 (0.0)	2 (16.7)	3 (23.1)
Twice a month	0 (0.0)	0 (0.0)	0 (0.0)	1 (7.7)
Facilities that notified all maternal deaths in the previous quarter	2 (100)	13 (81.3)	8 (66.7)	2 (15.4)
Facilities that audited all maternal deaths in the previous quarter	2 (100)	13 (81.3)	8 (66.7)	2 (15.4)
Facilities that notified all perinatal deaths in the previous quarter	2 (100)	12 (75.0)	11 (91.7)	5 (38.5)
Facilities that audited all perinatal deaths in the previous quarter	2 (100)	8 (50.0)	10 (83.3)	6 (46.2)
Inclusion of still births in perinatal death reviews/ audits				
Yes, all	2 (100)	12 (75.0)	10 (83.3)	9 (69.2)
Yes,some	0 (0.0)	3 (18.8)	1 (8.3)	1 (7.7)

Summary

Generally the quality of care provided across the board is average. Better quality of care overall seems to be provided at regional referral hospitals and general/district hospitals compared to the national referral hospitals and health centre IVs. The infrastructure for newborn care is adequate at NRHs while it is average but could be boosted at many RRHs and GHs. Infrastructure at HC IV level is very deficient and there is a need to revamp/reconstruct neonatal care units at this level. Key areas for improvement across all levels are in neonatal resuscitation; infection prevention and control especially at NRH and HCIV levels; and thermal care especially at NRH and HCIV level. A probable reason for reduced quality at NRH level is the huge number of patients versus insufficient human resource.

CHAPTER 06

SPECIAL STUDIES OF NEWBORN COMPLICATIONS IN UGANDA

Congenital anomalies in Uganda: Introduction

According to the World Health Organisation (WHO), Congenital Anomalies (CA) also known as birth defects are defined as structural or functional abnormalities that occur during intrauterine life and can be identified prenatally, at birth or sometimes may only be detected later in infancy. Annually, over 8 million children (6%) of the total births worldwide are born with serious birth defects and an estimated 295,000 newborns die due to congenital abnormalities (1). In 2019, 30% of congenital anomalies occurred in Sub-Saharan Africa (SSA) and as advances are made against other causes of infant and child mortality, the proportion of under-5 mortality due to congenital anomalies is expected to continue to increase (2). The high rates of congenital anomalies can be ascribed to the high rates of both young and older mothers, consanguinity in some regions and the survival advantage of certain haemoglobinopathies coupled with high fertility and numerous high-risk environmental exposures (nutritional, infectious, medicine, pollution, climate) (1,3).

The Epidemiological Transition in Sub-Saharan Africa is not typical and the burden of infectious disease remains as the incidence of non-communicable diseases increases. The region has been hardest hit by HIV/AIDS which, with TB and malaria, remain important public health issues. Health services in many countries remain under-resourced with poor antenatal and perinatal care, fragmented infrastructure and a lack of universal health care (4).This context has resulted in a data deficit: the true scale of congenital anomaly-related health issues remains unknown (5,6). The WHO March of Dimes Global Report on Birth Defects 2006 provides estimates for baseline national affected births

in 193 countries at a no-care baseline (7). The Modell Global Database estimates the prevalence and outcomes (pregnancy loss, death, disability) of selected endogenous conditions (either present at birth or with early onset) based on actual resources and then modelled in optimal scenarios. The Modell Global Database is currently being updated.

Congenital abnormalities and prevalence in Uganda

The burden of congenital anomalies is not well known in Uganda. There is no national registry of birth defects, however efforts to establish the burden of congenital anomalies are being led by Makerere University – Johns Hopkins Research Collaboration (MU-JHU). MU-JHU has over the past 9 years conducted a hospital-based birth defects surveillance at four urban hospitals (5). The prevalence of congenital abnormalities in Uganda is reported to be 6.6% and they contribute to 8% deaths among neonates (8). The overall prevalence for the major external birth defects per 10, 000 births is 66.2. The most prevalent defects in Uganda per 10,000 births are hypospadias, 23.4, clubfoot 14.0, neural tube defects10.3 and cleft lip and palates 7.6 (5).

There is so much focus on reduction of infections, increasing survival among neonates and mothers, and improving maternal and child health but congenital abnormalities are less prioritised, yet they are a burden in Uganda and the sub-Saharan region in general slowing down the progress in achieving Sustainable Development Goals (SGDs) by 2030 (9).

Challenges in data collection and reporting congenital abnormalities

There is limited epidemiological data and research on birth defects registries which makes it challenging to plan and allocate resources effectively. Underreporting is a very common problem in Uganda and some types of CAs are not included in reports written (5,6).

Diagnosis and screening of congenital abnormalities in Uganda

Challenges in diagnosis: Diagnosing congenital abnormalities in Uganda is challenged by several factors, including affordability, accessibility to advanced diagnostic technologies, insufficient funds in healthcare, limited healthcare capability and structure and a shortage or non-existence of trained healthcare professionals (5,12).

Gaps in congenital abnormalities diagnostic and management services in Uganda

- Prenatal screening for birth defects is mainly done by ultrasonography, but not all have access to ultrasonography. Even where it is done, few reports include birth defects (5,6,12).
- At birth, although newborn examination is performed, the reports either vaguely indicate the type of birth defects identified or none (6). The current HMIS 103 does not provide for documenting the type of birth defect but rather just provides for noting whether there is a birth defect or not (21).
- Internal birth defects are usually diagnosed later in life, due to poor health seeking behaviour plus lack of access to facilities and services, few may be diagnosed/ documented (5,6,12).
- There is limited data on the availability of premarital counselling and testing services in Uganda, yet it plays a critical role in prevention of congenital abnormalities (22).

Role of prenatal and postnatal screening

Prenatal and postnatal screening and diagnostic tests play a crucial role in detecting congenital abnormalities. These tests are vital for identifying potential health issues in infants and unborn fetuses

which opens windows for early intervention, treatment, and better management of these conditions (12,23,24).

Treatment and management in Uganda

Resource constraints in Uganda

The population, health systems, resources, and policy constraints affect the delivery of effective treatment and care services in Uganda (25). Patients in northern Uganda experience delayed diagnosis and treatment because there is only one facility (26). Just like most sub-Saharan counties, there is shortage of surgical services and infrastructure in Uganda due to lack of specialists, and trained health care practitioners which hinders treatment, management and care given to individuals with CAs as well as high costs attached (5,13,15,27,28).

Legal considerations for pregnancy termination

When an anomaly is diagnosed, treatment is limited to pregnancy termination. However, in Uganda elective termination of pregnancies is not legal except when it preserves maternal life and requires consent by two registered physicians (5,12).

Importance of surgeries, medications, and therapies

Specialised medical care and treatment plans are often needed for individuals with CAs. Many CAs require surgical correction to restore normal function or appearance, correct skeletal deformities and alleviate pressure or repair neural defects. Medications may be prescribed to control symptoms, manage pain, treat associated medical issues and prevent infections before surgical procedures. Therapies help to improve mobility, strength, overall function, and skills development (11). The surgical need for congenital heart disease in Uganda is 14% but only half of this has received treatment (12–14).

Support and care

The economic burden on families and healthcare systems is substantial, and the emotional toll is equally significant. The long-term outcomes for affected individuals may include developmental delays, disabilities, and compromised quality of life (15,16)and within countries, the poor have less access to health services. This article documents disparities in access to health services in low- and middle-income countries (LMICs. The poor data recording on congenital malformations makes it difficult to ascertain the burden in order to formulate policies in many African settings (17).

Increased emotional and psychological challenges for families struggling to cope with the morbidities associated with their child's malformation, followed by poor transport systems from remote areas, and high cost of follow-up consultations in the background of poverty, results in the high rate of default from follow-up in most African countries (18).

Discrimination based on disability is outlawed in Uganda but there are still many cases of prejudice, stigma and misunderstanding within families and communities. This impacts the vulnerability of adults and children with congenital abnormalities throughout in their life (12,17,19,20,29–33)"

Most extended families and communities abhor individuals with CAs which increases psychological distress and grief among parents and families. This leads to child deaths, exploitation, abuse and neglect in Uganda. Not only children but mothers to the children face the same issue (17,19,20,34).

Disabled children require extra attention and this requires more resources that may not be available in countries with limited resources, like Uganda (33,35).

Recommendations

1-Collaboration between government, international organizations and NGOs: There is already collaboration between the Government of Uganda, international organisations and NGOs on maternal and child health, this could be an opportunity to address CAs and include them in the health sector strategic and development plan (3). The guidelines and policies for prevention and treatment of other infections and diseases in maternal and newborn health are already in place. Therefore, it is essential to align birth defects alongside these policies and guidelines for health promotion and secure the future of Uganda (36).

2. Integration of CAs in healthcare planning and budgeting: The burden of CAs is not well known in Uganda due to various factors mentioned above which calls for action today for inclusion of CAs in the planning and budgeting in the health care sector. This will increase opportunities for funding of healthcare and research on CAs, improve and strengthen healthcare infrastructure, access to healthcare and helps in inclusion of the affected individuals and families.

3. Training midwives for congenital anomaly recognition: Most midwives in Uganda detect and report the birth defects that are only visible at birth while other defects like heart defects are detected by other physicians later in infancy (6). There is need for training of midwives on routine examination of the newborn for CAs and inclusion of this in their routine duties is likely to be feasible and could particularly improve the recognition and management of anomalies in Uganda. This can be done through training midwives on surveillance and prenatal screening of CAs, providing appropriate advice to mothers and emphasising on and including newborn screening for birth defects in the postnatal care package (4,17).

4. Identification of risk factors and preventive measures: In order to address gaps in knowledge, we need to improve our understanding of the epidemiology of CAs and develop better tools for diagnosis, management, and prevention of congenital abnormalities (37). Identifying, providing information on the causes and risk factors for CAs as well as providing premarital genetic counselling including the preventable causes such as alcohol consumption, smoking during pregnancy and folic acid deficiency may help in reducing the incident of CAs in the future (38).

5.Public awareness campaigns and education: Support from advocacy organizations and groups often plays a crucial role in raising awareness on CAs through advocating for the rights of affected individuals, providing resources and support to families. Campaigns and programs should be sponsored to educate people on the causes and risk factors for congenital malformations (37). This will in turn give the opportunity to include congenital abnormalities in curriculum in schools to increase public awareness and launching public awareness programmes in the communities as well as advocating for supportive education and devices to children with birth defects (33).

6.Need for continued birth surveillance and research: Nationwide research is essential for better understanding of CAs, treatments improvement and development of new interventions. Investment in medical research can lead to advancements in care and support (38).

Conclusion

Therefore, there is a need for efforts to address CAs in Uganda through multisectoral and multidisciplinary approaches, healthcare development, awareness campaigns, prenatal and perinatal care programs, and capacity-building initiatives. The continued surveillance of birth outcomes among women is essential as well as a need for development of medications friendly to pregnant women and those that do not influence the birth outcomes. Additionally, research and funding are required to develop effective evidence-based interventions for neonatal survival and to reduce the burden of CAs, thereby enhancing the quality of life for pregnant mothers, affected neonates, infants and children and families in Uganda.

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CHAPTER

07

MATERNAL AND NEWBORN HEALTH POLICIES, STRATEGIES AND PROGRAMMES; FINANCING

Uganda government through Ministry of Health partnering with United Nations agencies, international and local organizations have made efforts in the last decade to contextualize global policies and programs into national essential maternal and newborn clinical care guidelines and standards of care to address the constraints of newborn health. Efforts have been made to align or revise national policy guidelines to World Health organization (WHO) recommendations.

Key Policies/guidelines/strategies for newborn care

These current key guidelines guiding newborn care in Uganda include:

- Reproductive, Maternal, Newborn, Child, Adolescent And Healthy Aging. Sharpened Plan II 2020/21-2025/26.
- Clinical Protocols for Managing Small and Sick Newborns 2023.
- Uganda MOH Essential Maternal and Newborn Clinical Care (EMNC) Guidelines 2022.

- National Standards for Improving the Quality of Maternal and New Born Care 2018
- MOH Integrated Management of Pregnancy and Childbirth Pregnancy, Childbirth, Postpartum
- Newborn Care: A guide for essential practice 2016.
- National Integrated Early Childhood Development Policy (2016)

a) Reproductive, Maternal, Newborn, Child, Adolescent And Healthy Aging. Sharpened Plan II 2020/21-2025/26

Uganda has made significant progress towards the reduction of neonatal mortality rate decreasing from 27 to 22 deaths per 1,000 live births (UDHS 2022), close to the FY2022/23 NDP III target of 21 deaths per 1,000 live births. For the next five-year period from 2021/2-2025/6, the National RMNCAH Strategy (Sharpened Plan II) contributes towards the human capital development sub goal of increasing productivity of the population for better quality of life for all and pursues two broad objectives

(i) Ending preventable maternal, newborn, child and adolescent deaths

(ii) Promoting the health and development of all children, adolescents and, women.

To achieve this target in newborn health, the country has adopted five strategic shifts as stipulated in the national reproductive maternal newborn child adolescent and health aging (RMNCAH) sharpened plan II 2022/2023-2027/28. These include:

i. Focusing on districts with the highest maternal and child mortality;
ii. Increasing access for high burden population in each district with a focus on addressing specific needs and service barriers especially for the most vulnerable and marginalized sub populations;
iii. Scaling up delivery of evidence-based high-impact intervention packages;
iv. Addressing the broader multisectoral context;
v. Strengthening mutual accountability for RMNCAH outcomes by all stakeholders.

The RMNCAH sharpened plan is aligned to global plans and strategies such as the ENAP; EPMM; SDGs; the Global Strategy for Women's, Children's, and Adolescents' Health (2016–2030); the Decade of Healthy Ageing (2020-2030) etc

In response to the high perinatal deaths rates and using the RMNCAH sharpened plan five strategic shifts, Uganda Government through the Ministry of Health and her partners is implementing interventions to address preventable perinatal deaths. Review of the national Sharpened Plan II, revealed a total of 62 key intervention activities inclusive of health system inputs and the five strategic shifts.

b) Essential Maternal and Newborn Clinical Care (EMNC) Guidelines for Uganda 2022.

These guidelines are structured along the continuum of care from pregnancy through the perinatal period to the postnatal period for mothers and newborns. They are evidence based clinical guidelines and protocols on the management of the most common obstetric/neonatal conditions that contribute to maternal and neonatal mortality. In these guidelines, emphasis is placed on a refocused quality antenatal care; birth and emergency preparedness; identification, prevention and management of life threatening complications of pregnancy and childbirth; as well as the management of the normal and sick new-born.

Although the MOH has well developed and current 2022 national essential maternal and newborn care guidelines aligned to the 2022 WHO recommendations on maternal and newborn care for a positive postnatal experience, certain multiple attributes may need to be updated. Further, training manu-

als, pocket handbooks, job aids and strategic action plan are lacking to operationalize implementation of clinical protocols for management of newborns.

c) Clinical guidelines for managing small and sick newborns 2023

This document is aligned to the the 2020 WHO standards for improving quality of care for small and sick newborns in health facilities and the WHO new recommendations for the care of preterms or LBWs. It contains additional special care and neonatal intensive care interventions for small and sick newborns; advice on prevention and management of important neonatal problems, including congenital abnormalities and retinopathy of prematurity, and on general and neurodevelopmental follow-up and screening.

d) National Standards for Improving the Quality of Maternal and New Born Care 2018

The MOH 2018 standards for improving quality of maternal and newborn care (32) were adapted based on the 2016 WHO standards for improving quality of maternal and newborn care in health facilities care. However, in 2020 WHO published standard alone standards for improving quality of care for small and sick newborns in health facilities

e) Guidelines on Maternal, Infant, Young Child and Adolescent Nutrition(33)

These guidelines provide the framework for the standardization and improvement of the quality and coverage of nutrition interventions targeting mothers, infants, young children, and adolescents across delivery platforms in the country. It provides the necessary guidance for the health sector with the support of the development partners, to deliver high quality nutrition interventions to the prioritized vulnerable target groups. The first 1,000 days (the period between conception to 24 months of age), is the golden window of opportunity, to ensure that children receive optimal nutrition, proper health care and nutritional care and support, to ensure a long-lasting impact on their lives and wellbeing. The overall aim is to contribute towards the commitments and targets stipulated under the Sustainable Development Goals (SDGs).

f) Maternal and Perinatal Death Surveillance and Response Guidelines (34):

These guidelines focus on improving the overall maternal and perinatal health, including newborn health. They provide recommendations on antenatal care, skilled birth attendance, emergency obstetric care, and postnatal care, which include essential newborn care and early initiation of breastfeeding.

h)_Early Childhood Development:

The WHO Integrated Early Childhood Development (IECD) Policy includes a variety of strategies and services to provide basic health care, adequate nutrition, nurturing and stimulation within a caring, safe and clean environment for children and their families (35). The IECD hence calls for multi-sectoral collaboration and participation to fulfill needs of the children. Enabling young children to achieve their full developmental potential is a human right and an essential requisite for sustainable development. Given the critical importance of enabling children to make the best start in life, the health sector, among other sectors, has an important role and responsibility to support nurturing care for early childhood development (ECD). Uganda has the National Integrated Early Childhood Development (NIECD) Policy (2016) which envisages integrating nutrition and health in Early Childhood Development (36). However, the Ministry of Health is lagging behind the Ministry of Education and Sports and the Ministry of Gender Labor and Social Development to have policy strategic guidelines on how to mainstream ECD across the levels and layers of the health care system and how coordination, planning, implementation, supervision and mentorship can be institutionalized (36-38). The

WHO recommendations relate to i) providing responsive care and activities for early learning during the first 3 years of life; ii) including responsive care and early learning as part of interventions for optimal nutrition of infants and young children; and iii) integrating psychosocial interventions to support maternal mental health into early childhood health and development services (35). Most parents and other caregivers need support to put the nurturing care that children need to develop in the earliest years into practice. The Ministry of Health systems and the associated private sector, offers a vast opportunity and the first point of contact to reach most parents and other caregivers of 0 to 3-year-olds for ECD integration.

Supporting policies/strategies for newborn care

There are also supporting strategies/guidelines /policies pertaining to newborn care in Uganda. These include documents such as:

i) The National Development Plan III: Uganda Vision 2040 guides the country's development paths and strategies towards a society transformed from a peasant one to a modern and prosperous country within 30 years (39). The Vision is operationalized through a series of five-year National Development Plans (NDPs), which are aligned to international and regional frameworks, conventions and treaties (40). To date, two NDPs have been implemented and since 2015, Uganda is among the UN Member States that adopted the 2030 Agenda for Sustainable Development with a pledge to 'leave no one behind.' Uganda is now implementing its third NDP (NDP III), which runs from FY2020/2021 to FY2024/2025 with the 17 Sustainable Development Goals (SDGs) and their targets fully integrated (41). The Uganda NDP III underpinned by SDG has related multi-sectoral targets of reducing child mortality by half and maternal mortality by one third

ii) Ministry of Health Strategic Plan 2020/21-2024/25 The Uganda government National Health Policy (NHP) (42)is implemented through Health Strategic Plans **(HSP) and development of the plans is informed by the NDPs and** a number of regional and international instruments, conventions protocols and agreements. **The HSP II and the current HSP specifies newborn health and survival targets in a continuum of care. The current HSP 2020/21 – 2024/25 expanded to emphasize maternal perinatal mortality reviews (Table P1) (43).**

Table P 1: Ministry of Health Maternal Newborn Health Strategic Plan Targets 2020/21 – 2024/2025

Indicators	Base 2017/18	2020/21	2024/25
IPT3 or more doses coverage for pregnant women, %	30	49	90
Anaemia screening at first prenatal visit, %	49	50	65
ANC 4 coverage, %	42	46	56
Annual Health Facility deliveries	62	65	74
HC IVs providing CeMNOC, %	48 (87/186)	56	75
Facility based fresh still births (per 1,000 deliveries)	9	8	4
Maternal deaths reviewed, %	72	76	95
Neonatal deaths reviewed, %	9.7	14	58

iii) An Investment Case for Integrated Community Case Management of Childhood illnesses 2021-2026
Both the Integrated Management of Neonatal and Childhood Illnesses (IMNCI) and the integrated Community Case Management (iCCM) guidelines (44-46) provide a foundation in support of care for vulnerable babies. The guidelines cater mainly for management of the sick newborn at the first level of care closest to the newborn's home and community. However, the implementation coverage is limited, fragmented and donor dependent.

iv) Health Sector Development Plan (HSDP)

v) Uganda National Expanded Programme on Immunisation Multi-year Plan 2012-2016: Uganda has a well-developed and mature Expanded Program on Immunization (EPI) with standardized protocols (47). The traditional postnatal check starts at six weeks, too late to provide routine newborn care and identify and save those who are vulnerable. Moreover, the primary focus of this initial postnatal check is immunization. The EPI program prioritizes tuberculosis and polio vaccines just after birth. The strength of the EPI program coupled with high uptake and demand for immunization services provides a platform to integrate other health interventions for both the mother and the baby. The integration; however, is commonly affected by staffing levels and the capacity of staff to offer the integrated services.

GAP: Needed Policy Guidelines

1. Small and nutritionally at-risk infants U6M and their mothers have received little attention in public health programs, and current –predominantly hospital-based-care which reaches few of those who need it. A novel Care Pathway for improved management of small and nutritionally at-risk infants U6M and their mothers (MAMI) has been developed to bridge this gap globally (48). MAMI is multi-sectoral approach focusing on outpatient care to screen at community and primary care level, referral for complications and focused support including weight monitoring, breastfeeding counselling and maternal mental health support; however, its operationalization in Uganda health and nutrition care systems is scanty and policy guidelines are lacking. The Ministry of Health and partners will therefore need to develop policy guidelines, accompanying training and operational plans and dissemination for integration of MAMI care pathway into the health systems and its uptake into local guidelines.

2. Studies have shown that home-based newborn care interventions can prevent 30–60% of newborn deaths in high mortality settings under controlled conditions. Therefore, WHO and UNICEF now recommend home visits in the baby's first week of life to improve newborn survival by a skilled attendant during and immediately after birth irrespective of where the birth takes place (49). Women who give birth in a health facility and their newborns should be assessed for problems and given a specific date to return for further postnatal care, even if everything is going well, and advised to return immediately if they notice any danger signs. The recommendation for women who give birth at home without skilled care, and where continuous professional care cannot be assured, is that they should seek postnatal care as soon as possible after birth. Many mothers cannot comply with the above recommendations because of financial, social or other barriers. The coverage of postnatal care within 24 hours of birth among all women giving birth at home is only 13%. The recommendation for home visitations after birth as a strategy to deliver effective elements of care to newborns and increase newborn survival must be strengthened.

3. Routine application of topical emollients in term, healthy newborns for the prevention of skin conditions is not recommended as per the WHO recommendations on maternal and newborn care for a positive postnatal experience 2022 (50). None of the Uganda contextualized guidelines speaks to this.

4. Uganda Ministry of Health and partners have made progress in development of policies aligned to the Ending Preventable Maternal Mortality (EPMM) and Every Newborn Action Plan (ENAP) except for stillbirth registration (51). However, the country is yet to attain the acceptable WHO targets for stillbirth and neonatal mortality and is yet to develop the following ENAP and EPMM targets which include:

    - National strategy/implementation plan for scale-up
    - Specific budget line in the national plans (and where relevant subnational plans)
    - Standard designs and floor plans to deliver level 2 package of services
    - Defined human Resources staffing norms for level 2 newborn care
    - Specific budget line in the national plans (and where relevant subnational plans)

Programs/interventions to reduce neonatal mortality in Uganda

The programs that have been implemented include the following (table P2):

Table P 2: Programs/interventions to reduce neonatal mortality

S/N	Strategy	Important Components
1	Helping babies breathe (HBB)	Focused on reducing birth asphyxia related mortality and FSB rates. Actions: Interventions in Golden Minute, clean working resuscitator
2	Helping babies survive (HBS)	Focused on all major causes of newborn death including BA, infections, and complications related to preterm/low-birth weight infants.
3	Empower the Midwife	Providing tools to manage mothers during labor (MOYO) and newborns at birth (resuscitator).
4	Maternal Antibiotics for Unexplained prematurity and PPROM	Action: treat Gram-positive and negative organisms.
5	Avoiding Moderate Hypothermia	28% dose increase dependent in neonatal mortality for every 1°C below 36.5°C.
6	Antenatal Steroids	Enhance lung function, decrease Intraventricular haemorrhage, enhances temperature maintenance
7	Early Postnatal Antibiotics	Prevent and/or treat Gram-positive and negative organisms.
8	Kangaroo Mother Care	Maintain temperature homeostasis, decrease Infections
9	Care Bundle	Incorporated antenatal steroids, maternal and neonatal antibiotics and avoiding moderate hypothermia.
10	Continuous positive airway pressure	Establish functional residual capacity, facilitates gas exchange.

Helping Babies Breathe

Helping Babies Breathe® (HBB) is an evidence-based educational program which teaches the simple steps that effectively resuscitate most infants not breathing at birth to address one of the most important causes of neonatal death – birth asphyxia, one of the intrapartum-related events (52). Beyond skill acquisition, HBB has been associated with a significant reduction in early neonatal mortality within 24 hours and fresh stillbirth rates (53). Helping Babies Breathe was designed to coordinate with other interventions in a package selected to improve neonatal and maternal health. HBB can be used as the resuscitation component in courses teaching Essential Newborn Care (WHO) and courses in midwifery skills, and can be used at all levels in the health system.

HBB extends resuscitation training to first-level health facilities and health workers in resource-limited settings, where these skills are most lacking. It also can be used in higher-level health facilities, including regional and national tertiary facilities, where it complements, but does not replace, comprehensive resuscitation programs such as the Neonatal Resuscitation Program (NRP). Both HBB and NRP teach the same first steps in resuscitation, but NRP also includes the use of supplemental oxygen, chest compressions, intubation, and medications. HBB uses a learner-cantered educational methodology with emphasis on mastery of key skills. Pictorial, color-coded print materials and a low-cost, high-fidelity neonatal simulator engages learners and empower them to continue learning in the workplace. HBB encourages frequent practice, using job aids, simulators, and mannequins available in the workplace to maintain skills (52). As an integral element of maternal and neonatal care, HBB acts as a catalyst for broader improvements in these services, particularly at HC II to general district hospitals in the health system.

HBB has been transformed into a set of program interventions termed Helping Babies Survive (HBS) that includes Essential Care for Every Baby (ECEB) and Essential Care for Small Babies (ECSB) to address the additional top causes of neonatal mortality (infection and prematurity) (53, 54). The ECEB and ECSB require more comprehensive education, including content on thermal and nutritional support, breastfeeding, and alternative feeding strategies, as well as recognition and treatment of infection. The two program interventions complement the content provided with HBB, by further integrating counselling of families to advance the agenda of providing quality care to all infants at birth. New generation of newborn educational program interventions have incorporated bedside teaching and clinical exposure, multimedia platforms for demonstrating clinical content, and added efforts toward quality improvement; providing a critical framework to both educate and advocate for optimal care of every newborn (54, 55). A novel live newborn resuscitation trainer as well as a novel app (HBB Prompt) have been developed, increasing knowledge and skills while providing simulation-based repeated practice (53).

Achieving widespread dissemination of HBB is complex and influenced by many factors. Several key processes essential to facilitating sustained and widespread rollout of HBB and HBS to improving neonatal survival have been proposed (Table P3) (53, 56, 57). Among the critical ones include:

- Empowering the midwife, the primary provider at most facility deliveries,
- Low-dose high-frequency training in person or using a technical feedback mechanism is essential for maintaining skills, and
- The commitment of the Ministry of Health to improving the health of newborns (53, 56, 57).

Table P 3: Proposed Processes for the National and Sustained Rollout of HBB and HBS

S/N	Processes
1	Ministry of Health must make newborn care including that of premature infants a national health care priority
2	A commitment to train all birth attendants in the current health workforce in HBB, HBS, and integration of HBB and HBS with other relevant programs
3	Empower midwives as primary providers at deliveries
4	Identify and support local leaders and champions of high-quality delivery room care
5	Establish a system for training of providers (cascade, Low-dose High-frequency practice tailored to needs and self-reflective)
6	Provide appropriately adapted learning materials, equipment, and supplies simultaneously with training
7	Strengthen policies and regulations, supporting high quality care (training, commodities, facilities, and personnel)
8	Build a reliable supply chain, procurement, maintenance, and reprocessing system to provide health care providers at all levels with required resuscitation equipment (resuscitator, suction, etc)
9	Accountability to collect and report defined core data on an ongoing basis to and from all levels of the health system
10	Use data to guide improvement and budgeting at a national and local level
11	Commitment to sustainability
12	Encourage community participation and mobilization (awareness and advocacy and training of families in basic care)
13	Work with stakeholders who are ready for implementation (national and facility level).

The second critical issue in widespread dissemination of HBB is reducing overall neonatal mortality through 28 days. This may be accomplished by a series of interventions outlined in HBS while focusing on the premature infant. The HBS interventions include:

- Avoiding moderate hypothermia,
- Assuring early KMC is initiated in the delivery room using a premature care bundle (antenatal steroids,
- Targeted use of maternal and neonatal antibiotics) and
- The targeted use of bubble continuous positive airway pressure (53).

In addition, use of birth weight is suggested to be more reliable as opposed to gestational age which is highly variable as predictor of neonatal mortality.

Although the Ministry of Health and partners in Uganda have made newborn care including that of premature infants a national health care priority with incorporation in strategic RMNCAH policy and development of clinical newborn care protocols embedding ECEB and ECSB program interventions (58-60), strategic national roadmap to roll-out and sustain HBB and HBS processes to implement proven program interventions at different health system levels to avert neonatal mortality is minimally evident. Similarly, country-wide training needs assessment, monitoring and evaluation of country trainings in HBB and HBS have hardly been done. Context local studies have been conducted and demonstrated that peer learning and mentorship; HBB Prompt, a mobile app created by user-centered design improved skills retention (61, 62). However, effort to adapt such evidence into HBB and HBS national training protocol are lacking.

Kangaroo Mother Care Intervention in Uganda

Kangaroo mother care (KMC) is a high-impact intervention that has been prioritized in Uganda policies (63) (60, 64-66). KMC is a low-tech and cost-effective total health-care intervention in which mothers serve as human "incubators" for their newborns within a supportive environment where a mother of the low birthweight or premature infant is supported by health care workers in the health care facility and by members of the family and in the community at home (67). KMC comprises a set of care practices for low birth weight newborns – including continuous skin-to-skin contact, establishing breastfeeding, and close follow up after discharge from a health facility (68).

Conceptualization of Kangaroo Mother Care (Bergh, 2002)

KMC has been shown to reduce neonatal mortality by over 50% amongst babies weighing less than 2000g at birth (69). It has also been found to be highly effective in reducing severe morbidity, particularly from infection (70). Other effects when compared with incubator care include the reduction of hypothermia, severe illness, lower respiratory tract disease, and length of hospital stay. Babies cared for with KMC show improved weight gain, length, and head circumference, breastfeeding, and mother-infant bonding (70, 71).

Health system financing for newborn health

Uganda health system is financed by public (government allocations), private (household out of pocket spending), development partner support, and voluntary health insurance (private firms) (72). The health financing for PHC level health services are conditional grants to decentralized local governments for wages, facility operating costs, and infrastructure development to support the provision of services by providers that deliver maternal, newborn and child health services (MNCH) (73). Regional and national referral hospitals in addition, are funded by the central government as budget entities that receive global budgets. The financing of health services by government is guided by the UNMHCP and the Uganda clinical care guidelines; a package that includes key MNCH services such as antenatal care, deliveries (including C-Sections), and postnatal care.

In the public sector, purchasing of health services relies on the government's quarterly release of funds to public and PNFP health facilities, district local governments and central-level institutions to support delivery of services. Government pays for health services through direct provision of resources for health workers' salaries, pharmaceuticals and operations (72). A resource allocation formula based on standard unit of output expected to be delivered by the health facility or institution is used to apportion funds to non-wage recurrent, wages and development expenditures. Meanwhile in the private sector, purchasing of services is mainly on a fee-for-service or out-of-pocket payments by individuals or households (74). However, government also purchases health services from PNFP health facilities through provision of grants and secondment of staff based on agreed undertakings.

According to the latest Uganda's National Health Accounts (NHA) of FY 2020/21, the Total Health Expenditure (THE) was UGX 8,708 billion and the sources of this financing include: Government at 25.6%, private sector (mainly household out of-pocket (OOP) expenditure at 29% and development partners at 45.4% (74). The current health expenditure has gently been decreasing since 2014 and not matching with the population increase and, thus likely impact on health and well-being of the popu-

lation. Although government funding has increased in absolute terms, the share of the health sector as percent of total government expenditures on health are below commitments to the Abuja targets of 15% and below the health sector development plan target of 9.8%, ranging from 6 to 8% and leading to gaps in service delivery, quality of care and strengthening of systems (Table F1) (73-75). There is high reliance on donor support for healthcare including newborn health components of the RMNCAH as 45.4% of the THE is from development partners, limiting the capacity of the health sector to decisively lead and coordinate the implementation of activities in the sector.

Table F 1: Budget Allocations to the Health Sector Over the Last 10 Years

Year	Health Budget (Billions)	Total National Budget	Health budget allocation as % of total National budget	Annual growth rate Health Budget	Government Health spending as % Gross Domestic Product	Population	Per Capital Health Budget
2016/17	1,827	20,431	8.9%	44%	0.8%	36,605,900	49,910
2017/18	1,950	29,000	6.7%	6.7%	0.8%	37,741,300	51,668
2018/19	2,373	32,700	7.2%	18%	0.7%	39,059,000	60,754
2019/20	2,589	36,113	7.2%	9%	1.65%	41,583,600	62,260
2020/21	2,788	45,494	6.1%	8%	1.43%	43,066,701	64,737
2021/22	3,331	44,779	7.4%	19%	n/a	43,700,000	76,224
2022/23	3,685	48,130	7.6%	10%	n/a	45,562,000	80,879

Source: MoFPED MTEF &UBOS

Donor funds from development partner assistance has helped fill critical gaps in health financing in marginalized areas such as family planning, adolescent health, community-based health, and support for indigenous communities (73). Through a combination of partners including multilateral development banks; bilateral partners; global organizations such as Gavi, the Vaccine Alliance, the GFF, the Global Fund, and UN agencies, the Ministry of Health has piloted various tools and filled service delivery gaps. The design, piloting, and scale up of performance-based financing (PBF) have demonstrated both the vital need for increased financing at the frontlines (health facilities) and the potential role for enhancing the quality of health care delivery through incentives that reward strong performance. PBF models have complemented primary health care grants and have been widely used on the supply side to support the procurement of medicine and supplies, train health care workers, and procure equipment. On the demand side, PBF models have helped secure vouchers for patients, incentivize VHTs, and support community dialogue activities (73, 76).

CHAPTER 08

STAKEHOLDER MAPPING FOR NEWBORN CARE IN UGANDA

Stakeholders involved in newborn care can be found at different levels (National, regional, district and community) with varying roles (table S1):

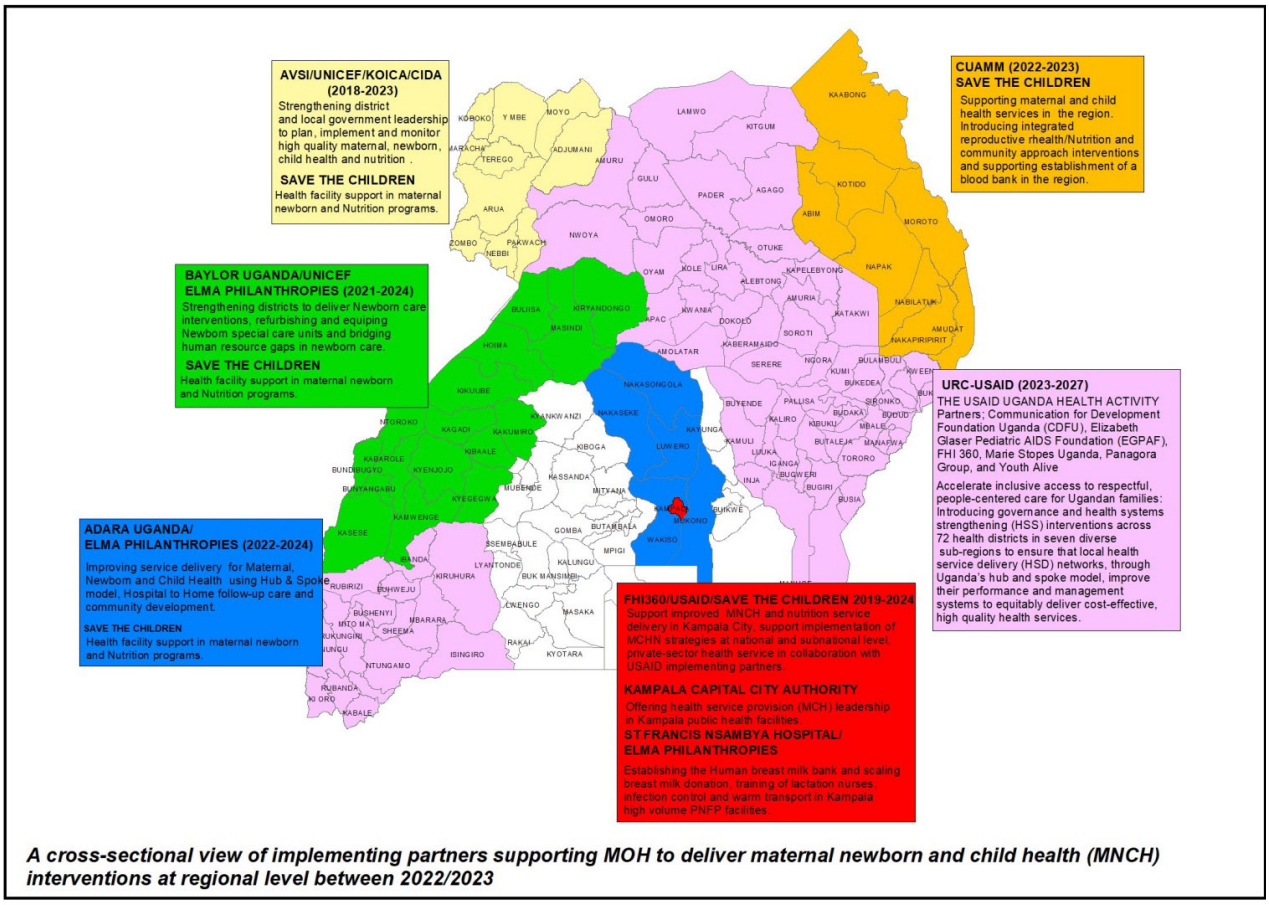
Table S 1: Stakeholders and their roles in newborn health and care

Stakeholder level	Name of stakeholder	Roles
Overall	Ministry of Health	• Overall oversight, governance and coordination of all stakeholders involved in newborn health care • Development of newborn health care guidelines, strategies, plans and policies • Dissemination of guidelines, strategies', plans and policies • Convene stakeholders • Mobilization of resources
National level	UNICEF, USAID, UNFPA, World bank, WHO, KOICA, ELMA Philanthropies, Professional associations e.g Paediatric Association, Association of Obstetrics and Gynaecology	• Support MoH to develop guidelines, strategies, policies, and plans • Support MOH in dissemination of guidelines, policies, plans and strategies • Support districts to integrate the RMNCAH sharpened plan into district health plans • Establish simulation skills training and learning hubs for catchment area-based mentorship on MNCH (for both clinical and non-clinical management skills) • Targeted investments and interventions to the highest burden of maternal and perinatal mortality • Make recommendations for sufficient allocation of funding for MNCH in the national budget • Advocate for better equitable services • Conduct and fund implementation and evaluation research in MNCH

Stakeholder level	Name of stakeholder	Roles
Regional level	AVSI, KOICA, CUAMM, URC, Save the Children, KCCA, Baylor, Adara, Makerere University School of Public Health, Mbarara University of Science and Technology, Jhpiego, Marie Stopes, Aga Khan University	• Support implementation of evidence based interventions • Generate evidence for learning • Build skills capacity of health workers through trainings and mentorships • Support Implementation of Maternal Perinatal Death Surveillance and Response (MPDSR) • Develop Knowledge translation products • Conduct research • Strengthen the HMIS system and data utilisation • Cascade learning
District level	Health workers, NGOs, community based organisations,	• Implement evidence based interventions • Generate data for use at local and national levels • Provide services to the community • Engage in advocacy for better newborn care
Community level (users of services)	Population	• create demand for newborn health services

Further mapping stakeholders involved in regional newborn care activities is shown in figure S1.

Figure S 1: Map of Uganda showing regional stakeholders driving newborn care in Uganda



A cross-sectional view of implementing partners supporting MOH to deliver maternal newborn and child health (MNCH) interventions at regional level between 2022/2023

Leadership/governance and strides made for newborn health

Leadership and governance for newborn health

Uganda government has in place adequate national-level policy strategies, frameworks and roadmap to enable different aspects of newborn health. The RMNCAH Sharpened Plan II provides a harmonizing framework prioritizing critical interventions across the RMNCAH continuum of care (60). National development efforts including Vision 2040, NDP III, and sectoral strategies such as the National Health Policy and MOH Strategic Plans, all prioritize RMNCAH and an enabling policy environment for reforms (40, 75, 77). Under the district local governments, there is existence of district councils and district health teams that together form organizational structures of leadership to motivate managers to effectively carry-out their duties. Hospital boards and Health Unit Management Committees (HUMCs) exist to positively influence relationships and performance of members in these governance and management structures. Strengthening collaborations between HUMCs and VHTs contributes to enhanced community-level engagement.

Although the government has well developed and mature governance and leadership structures and guiding policies, there are limited trainings and sensitization plans on the roles, responsibilities and accountability of governance and management structures, leaving governance committees and structures with limited efficacy to provide effective or adequate oversight (76). The heads of health facilities and leaders of facility departments have minimal training in leadership and face considerable resource constraints, inhibiting their ability to oversee the delivery of services at health facilities and to hold their staff accountable for results. The HUMC meetings are not always attended because of a variety of issues such as inadequate facilitation and lack of access to transportation, and meetings are also not regularly convened because of financial constraints in organizing and facilitating participants (76). This has resulted into having governance and management structures which are not always functional or consistently impactful.

Government and partner interventions to improve newborn health

In the recent years, government through the Ministry of Health and partners have made some strides in improving newborn health in Uganda. These include:

I. Drive to establish neonatal care units countrywide in all hospitals and some health centre IVs to provide specialised care for the small and sick newborns. These units have been equipped with essential equipment and supplies, such as incubators, phototherapy units, and CPAP devices.

II. The Ministry of Health in Uganda has prioritized the training of health workers in newborn care. This includes training in essential newborn care, neonatal resuscitation, management of small and sick newborns and the use of specialized equipment and supplies. Other high level trainings include:

    a) The Neonatal Fellowship supported by UNICEF and World bank (first intake had 5 paediatricians and 5 nurses)
    b) A month long neonatal training for nurses followed by mentorship under the URMCHIP programme (81 nurses have been trained so far from six sites including Kawempe NRH, Specialised Mulago Neonatal and Women's Hospital, St Francis hospital Nsambya, Kiwoko hospital , Mbale RRH and Mbarara RRH).

III. Reinforcing of Kangaroo mother care (KMC): KMC is a low-cost, high-impact intervention that has been shown to improve the survival and health of small and sick newborns(78). Uganda has been a leader in promoting KMC, and has integrated it into its national newborn care

guidelines. KMC involves continuous skin-to-skin contact between the mother and newborn, along with exclusive breastfeeding and close monitoring of the newborn's health.

IV. Training and Mentorship programmes for health workers in neonatal care. These are managed by the national newborn steering committee and partners with an aim to impart and sustain skills in newborn care for already available health workers in service.
V. Streamlining provision of drugs and supplies for facilities through the National Medical stores
VI. Reinforcing maternal and perinatal death surveillance reviews in all health facilities.
VII. Building partnerships and collaborations to improve newborn care: The government of Uganda has established partnerships with international organizations and non-governmental organizations to support the care of small and sick newborns.
VIII. Deliberate efforts to introduce ultrasound scanning machines in all hospitals and health centre IVs with an aim of early detection of pregnancy complications so as to influence proper management.

Ministry of Health's New infrastructural plans/priorities for newborn care

In collaboration with partners, the Ministry of Health has articulated deliberate interventions under the MoH Strategic Plan 2020 – 2025(79). Under the plan, the MoH intends to functionalize neonatal intensive care units in regional and general hospitals and special care units in high volume Health Centre IVs to increase survival rate for newborns at health facilities by 50%.

Tenacious efforts to increase equitable access to quality health services that could provide capacity to deliver care for small and sick newborns at all levels have been made as follows:

- There has been improved accessibility by the population to health facilities at over 91% within 5km of reach from 83% in 2014.
- A number of health infrastructure development activities which can be optimized for newborn care have been undertaken at national and local government levels as follows:
    - Completed construction or rehabilitation of 11 national and regional referral hospitals
    - Rehabilitation of over 40 general district hospitals and health center IVs (HC IVs)
    - Upgrading of over 7 HC IVs to hospitals
    - Upgrading of over 10 HC IIIs to IVs and 223 HC IIs to HC IIIs.
- Development of clear referral pathways from lower-level health facilities to neonatal care units as well as the development of guidelines and protocols for the management of small and sick newborns.
- Proposal to functionalize neonatal care units in regional and general hospitals by:
    - Construction of Neonatal Care Units (NCU)
    - Procurement and installation of NCU equipment
    - Project supervision, monitoring and evaluation.

CHAPTER 09

ROUTINE NEWBORN DATA AVAILABILITY, QUALITY AND UTILISATION

Data quality

The availability of accurate and reliable health data is crucial for informed decision-making, policy formulation, and the effective delivery of healthcare services. Over the past few years, there has been an increasing emphasis on strengthening health information systems to ensure the timely collection, analysis, and dissemination of data. In this context, we provide a comprehensive overview of the progress in data quality and reporting within the health sector(DHIS 2) spanning from 2018 to 2022. Focusing on key aspects such as completeness of monthly facility reporting, assessment of extreme outliers, and the consistency of annual reports, alongside an in-depth analysis of maternal and perinatal mortality data quality metrics, we explore and analyze the trends and advancements in health data management throughout this period.

Table D1 shows the progress in data quality and reporting in the health sector for the period 2018-2022. Overall, the data quality score has demonstrated consistent improvement, ranging between 81% in 2018 and 89 % in 2022.

Table D 1: Summary of the health facility data quality assessment for 2018-2022

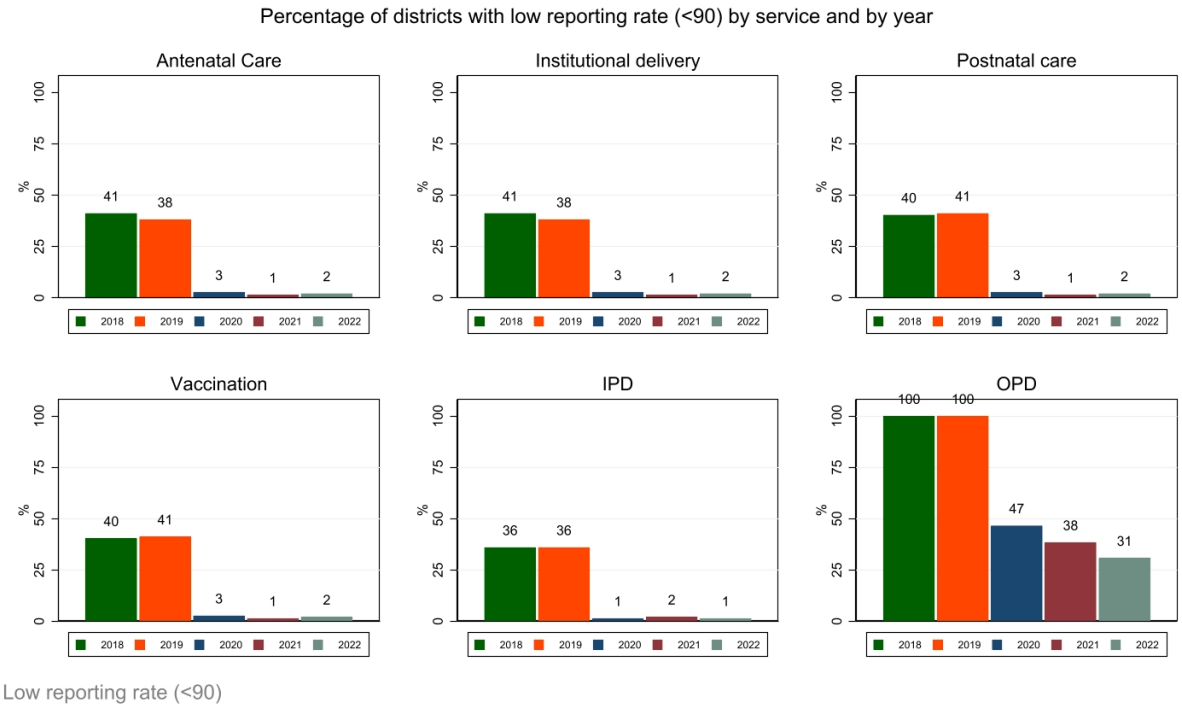
		2018	2019	2020	2021	2022
1	**Completeness of monthly facility reporting, for ANC, deliveries, immunization and OPD**					
1a	% of expected monthly facility reports (mean for ANC, deliveries, immunization and OPD reports, national)	80.0	79.0	96.0	97.0	98.0
1b	% of districts with completeness of facility reporting (mean for the 4 reports) >= 90%	50.0	51.0	90.0	92.0	93.0
1c	% of districts with no missing monthly values in the year for any of the 4 reports	91.9	92.0	91.8	92.1	93.0
2	**Extreme outliers for ANC, deliveries, immunization and OPD**					
2a	% of monthly values that are not extreme outliers (mean for ANC, deliveries, immunization, OPD reports, national)	98.8	98.8	99.0	98.7	97.8
2b	% of districts with no monthly extreme outliers in any of the 4 reports in the year	93.4	93.0	93.9	92.8	89.2
3	**Consistency of annual reports of ANC1 and penta1, and of penta1 and penta3**					
3a	% of districts with ANC1-penta1 ratio between 1.0 and 1.5	67.6	59.6	78.8	70.5	68.5
3b	% of districts with penta1-penta3 ratio between 1.0 and 1.5	88.2	91.2	85.6	87.7	85.6
4	**Annual data quality score (mean of the indicators 1a to 3b)**	81.0	80.0	90.0	90.0	89.0

Completeness of monthly facility reporting

Between 2020 and 2022, there was a consistent improvement in data reporting across districts in the health sector. A majority (above 90%) of districts consistently had complete monthly data for all four reports during this period. Additionally, the percentage of expected monthly reports from health facilities compared to the total number of reports expected has significantly increased from 80% in 2018 to 98% in 2022. Furthermore, the proportion of districts where the completeness of facility reporting for the four reports was 90% or higher has also increased over time.

Moreover, there has been a notable improvement in the reporting of key health indicators such as Antenatal Care (ANC), institutional delivery, postnatal care, vaccination, and Inpatient Department (IPD) data from 2018 to 2022. As of 2022, all districts achieved a reporting rate of 90% and above (out of the 146 districts) for these indicators. Initially districts were not reporting in 208 and 2019. However in 2022, reporting had improved with 69% of the districts reporting (Figure D1). This improvement highlights the concerted efforts made to enhance data reporting in the health sector over the years.

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



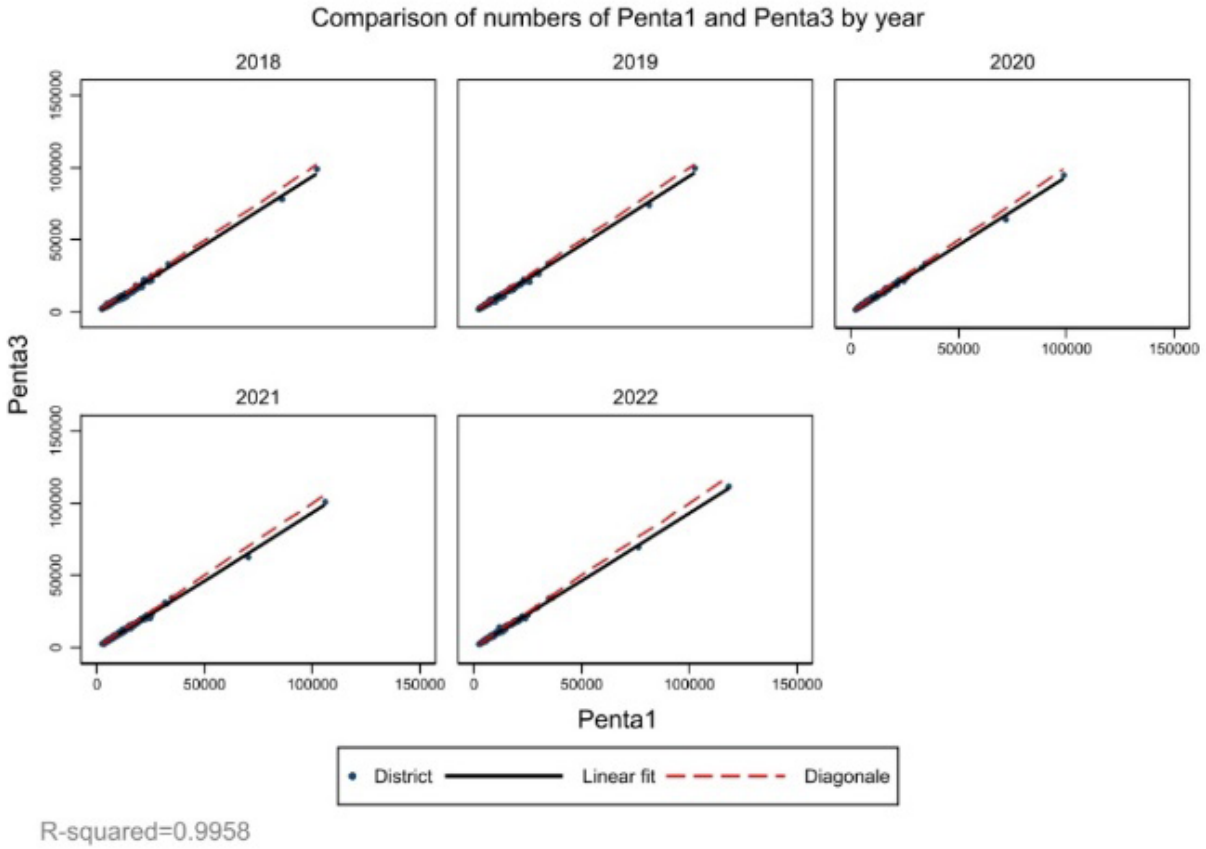
Extreme Outlier assessment

The percentage of monthly values that are not considered extreme outliers in the data for ANC, deliveries, immunization, and OPD reports at the national level has generally remained high, though (above 90%). Conversely, the proportion of districts without extreme outliers in any of the four reports throughout the year has progressively declined over time, with 89.2% of districts meeting this criterion in 2022.

Consistency of annual reports

The percentage of districts maintaining a penta1-penta3 ratio between 1.0 and 1.5 has shown relative stability over time. Although minor inconsistencies were observed in a few districts (Figure D2), a strong correlation emerged between ANC1-penta1 and penta1-penta3 data. Notably, a perfect match between Penta 1 and Penta 3 vaccinations was also identified. This robust correlation underscores the reliability and accuracy of the data, signifying a high level of consistency in reporting and vaccination practices.

Figure D 2: Comparison of adjusted number of (a) penta1-penta3; (b) ANC1-penta1 by year, Uganda



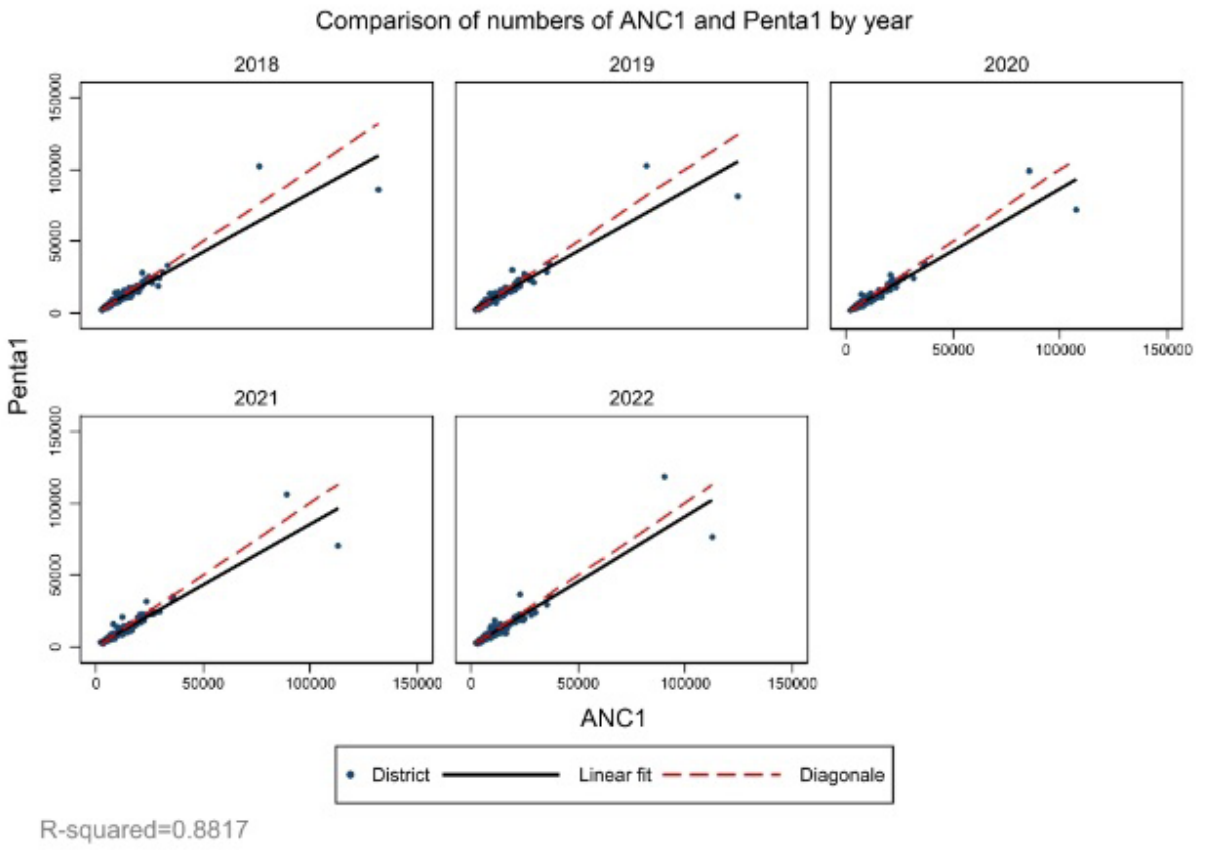


Table D 2: Systematic assessment of health facility data quality for maternal mortality and stillbirth rates

Input Data	2018	2019	2020	2021	2022
Livebirths (N)	4,162,836	4,253,676	4,622,796	4,670,784	4,742,508
Stillbirths (N)	20,775	21,000	20,169	20,275	18,816
Stillbirths, fresh (N)	10,384	10,272	10,261	10,088	9,366
Stillbirths, macerated (N)	10,393	10,643	10,068	10,260	9,485
Maternal deaths (N)	1,217	1,217	1,380	1,452	1,352
Other inputs					
Population stillbirth rate, UN estimate (per 1000 births)	18.0	17.5	16.3	15.1	
Population MMR estimate, UN (per 100,000 live births)	283.3	291.6	284.1		
Institutional live birth coverage (%), from survey or DHIS2	62.0	64.4	64.7	72.5	74.6
Institutional mortality					
Stillbirths per 1,000 births (institutional)	17.9	17.3	16.3	14.3	
Maternal mortality per 100,000 live births (MMR) (institutional)	106.8	101.9	113.5	104.2	
Data quality metric					
1. Completeness reporting delivery forms	80.0	79.0	96	97	98
2. Consistency annual numbers					
2a: Livebirths	9.9	8.0	0.0	1.0	2.6
2b: Stillbirths	2.5	3.6	0.5	0.0	7.2
2c: Maternal deaths	1.2	0.1	0.0	1.7	8.7
3. Ratio stillbirths to maternal deaths	17.1	17.3	14.6	14.0	13.9
4a. Ratio computed community to institutional stillbirth rate	1.0	1.0	1.0	1.1	
4b. Ratio compute community to observed institutional MMR	2.7	2.9	2.5	0.0	
5. % of stillbirths that are fresh/ intrapartum	50.0	48.9	50.9	49.8	49.8
Note the colours		Acceptable		Questionable	

The completeness of institutional delivery reports has steadily improved over the years, reaching a notable coverage of 98% in 2022 (Table D2). Analysis of annual numerical counts and medians over a five-year period, including live births, stillbirths, and maternal mortality rates, consistently showed variations below the acceptable threshold of 25%. This consistency indicates accurate reporting of deliveries, maternal mortalities, and stillbirths within health facilities.

Additionally, the ratio of stillbirths to maternal deaths saw a slight reduction from 17 in 2018 to 14 in 2022, and this remains above the acceptable threshold.

The relationship between computed community stillbirth rates and observed institutional stillbirth rates remained consistently close to 1.0 over the years. Similarly, the ratio comparing community maternal mortality rates to observed institutional rates stayed within an acceptable range.

The proportion of fresh or intrapartum stillbirths remained relatively stable within an acceptable margin. In addition, there has been a consistent reduction in institutional stillbirths per 1,000 births and institutional maternal mortality rates per 100,000 live births over the observed timeframe, aligning with United Nations projections. This consistent trend highlights the reliability of routine health information in monitoring institutional maternal mortality and stillbirths.

CHAPTER

10

SUMMARY OF KEY FINDINGS COMPARED WITH DIFFERENT DATA SOURCES/SETS

In the recent past 3 years, in addition to this SITAN, a number of health surveys have been conducted in Uganda. These include 1) The Uganda Demographic Health Survey of 2022 (ii) Harmonized Health Facility Assessment (HHFA) in Uganda 2023(80) (iii) The 2023 Ugandan Emergency Obstetric and Newborn Care (EmONC) Needs Assessment.(81)

In this section, we synthesize and draw a comparison on selected indicators from the current Situation Newborn Analysis and the previous newborn situation analysis of newborn health in Uganda 2008 as well as the recent surveys listed above where applicable. Overall, there is significant improvement on all the indicators over the years from 2008 to 2023. Results from the current situation analysis are comparable to those in the UDHS 2022.

Table K 1: Comparison of community findings using different data sets

Indicators	Previous SITAN (2008)	Current SITAN 2023/2024	UDHS 2022
Antenatal Care (ANC)			
ANC at least once during pregnancy (%)	97	93.1	99
ANC 4+ visits (%)	47	67.8	68
ANC 8 or more visits (%)	-	3.6	
Started ANC in first trimester (%)	17%	32%	37
Delivery			
Health Facility delivery (%)	41	90.3	86
Home delivery (%)	59	9.1	13
Postpartum care (PNC)			
Postpartum care for mother within 2 days (%)	38	43	66
Postpartum care for mother at 2 or more days (%)	3	16.9	4
No Postpartum care for mother (%)	59	40.1	29
Babies who received PNC (%)		10.5	
Thermal care			
Baby placed on mother's abdomen after delivery (%)		68.4	86
Delayed bathing by 24 hours (%)	Baby bathed soon after birth	85.3	
Baby held skin to skin in first week of life (%)	Skin to skin seldom done	66	86
Cord care			
Cord cleaned with chlorhexidine gel (%)	-	3.3	
Cord cleaned with only boiled cooled water (%)	-	51.8	
Other substances applied to the cord (%)	Mentioned but not quantified	44.9	
Breast feeding			
Mothers who breastfed their babies (%)	98	98.7	96
Breastfeeding initiated within one hour after delivery (%)	51	79.1	82
Mother expressed and threw away colostrum (%)	Mentioned but not quantified	21	-
Pre-lacteal feeds given in first 3 days after birth (%)	Mentioned but not quantified	17	54
Illness recognition and care seeking			
Illness recognition	Common danger signs recognised are fever, poor suckling/feeding, difficulty in breathing, vomiting.	Common danger signs recognised are fever, poor suckling/feeding, difficulty in breathing, vomiting	-
Care seeking	Home remedies tried first for about half of the babies. Care seeking affected by perceived severity and cause of illness	Home remedies tried first for about half of the babies Care seeking affected by perceived severity and cause of illness	

Health Facility findings were also compared across data sets. Here we compare readiness data from the most current data sets as seen below:

Table K 2: Comparison of Health facility readiness using recent different data sets

Indicator	Previous SITAN 2008	[2]Current SITAN 2023/2024	[3]EmONC assessment 2023 (values for hospitals and HCIVs only)	HHFA assessment
Infrastructure for newborn health	Gross lack of newborn care units in most hospitals and all HCIVs. Only Mulago had a newborn care unit	• 2 level 3 NICU at the NRHs • 25% RRHs at level 2 NCU • 8.3%GHs at level 2 • 31% HCIVs at level 1 • absence of isolation rooms at all levels • theatres in 33% RRHs and 50% GHs with no resuscitation tables/space	• 33% hospitals with neonatal care units and 17% HCIVs with special care units • Theatres in all NRHs and RRHs, 97%GHs and 97% HC IVs with resuscitation tables/space	
Human resource for newborn health	Specific staff for neonatal care such as neonatologists and neonatal nurses were not in the staffing norms at that time. Shortage of midwives and medical officers at all levels	• all facilities do not meet required staffing norms • only 3 neonatologists available nationally • no specialised neonatal nurses • 50% GHs lack paediatricians • medical officers and midwives insufficient at all levels	• no specialised neonatal nurses • paediatricians in only 19% of hospitals	
Resuscitation bag and mask	Bag and mask available in 90% hospitals and 80% HCIVs Readiness: 60% hospitals and 50% HCIVs	• Bag and mask present at all NRH, RRH and 83.3% GHs and in 69% HCIVs • Readiness at 92.5% (NRH), 73.1% (RRHs), 68.5% (GHs) and 57.7% (HCIV)	37% of the facilities had no ambu bag (neonatal size (two national, 12% regional, 18% district, 27% HC IVs,) Face mask size zero and one were not available in 52% and 47% of the facilities • Readiness 69%	
Corticosteroids	No information	Maternal corticosteroids available in all facilities	• Available in 96% hospitals and HCIVs • Readiness 95%	
Antibiotics for PROM	Many facilities lacked antibiotics	Most facilities have antibiotics Readiness scores: 90% NRHs, 71.4% RRHs, 65.6% GHs and 60.7% HCIVs	• availability of antibiotics for management of PROM at 92% • Readiness 65%	
IV Antibiotics for sepsis	Many facilities lacked antibiotics	Most facilities have antibiotics Readiness scores: 90% NRHs, 71.4% RRHs, 65.6% GHs and 60.7% HCIVs	Available in 80% hospitals and HCIVs • Readiness 80%	94% facilities have IV antibiotics for sepsis
KMC	KMC was not provided in any of the facilities assessed	KMC spaces available in all NRHs, RRHs and GHs and 30.8% HCIVs KMC chairs/beds present in all NRHs, 68.8% RRHs, 41.2% GHs and 30.8% HCIVs Readiness scores: 100% (NRHs), 77.1% (RRHs), 69.4% (GHs), 41.5% (HCIVs)	KMC equipment and supplies in 34% hospitals and HCIVs • Readiness 33%	National KMC availability is 57% KMC services provided in 50%NRHs, 100%RRHs, 83%GHs and 75% HCIVs

2 *There are 2 components to being "ready" to provide a signal function: the availability of a minimum package of drugs, equipment, and supplies, and the availability of at least one cadre who provides the signal function.*

3 *There are 2 components to being "ready" to provide a signal function: the availability of a minimum package of drugs, equipment, and supplies, and the availability of at least one cadre who provides the signal function.*

Oxygen	No information	Oxygen present in almost all facilities (all NRH and RRH, 91.7% GHs and 92.3% HCIVs • Lack of oxygen blenders in most of the hospitals including Kawempe.	availability safe oxygen at 82% Readiness 80%	National oxygen availability is at 25%. Oxygen available in 50% NRHs, 100% RRHs, 90% GHs and 69% HCIVs
IV Fluids	General lack of fluids in most facilities	IV fluids (N/S, 5% Dextrose) available in all facilities. However Dextrose 10% and neonataloytes lacking • Readiness scores 82.4% (NRHs), 80.2% (RRHs), 72.9% (GHs) and 63.6% (HCIVs)	availability of IV fluids at 78% Readiness 77%	National IV fluid availability is 51% (100% NRHs, RRHs, 90% GHs, 69% HCIVs)
Other commodities	No information	• TEO and Vitamin K present at all levels • Digital infant weighing scale available in almost all facilities • Chlorhexidine gel was available atall NRHs, in 43.8% RRHs, 58.3% GHs and 61.5% HCIVs • Patient monitors in all NRHs, only 56% RRHs, 33.3% GHs • functional CPAP machines in all NRHs, 62.5% RRHs, 16.7% GHs • Gross lack of suction devices at RRHS and GHs • Pulmonary surfactant available in only all NRHs • Caffeine citrate present at NRH, 37.5%RRHs, 16.7%GHs	• TEO present in all NRHs, 69% RRHs, 90%GHs,82%HCIV • Vitamin K available in 50% NRHs, 81% RRHs, 92% GHs and 84% HCIVs • Chlorhexidine gel was available at all NRHs, in 44% RRHs, 55% GHs and 49% HCIVs • functional CPAP machines in 50% NRHs, 38% RRHs, 39% GHs • Suction apparatus was not available in 88% of the facilities (50% national, 69% RRHs, 63% GHs, 77% HC IVs)	
Infection prevention and control	No Information	• IPC readiness was excellent at National Referral Hospitals (95.2%) and good at the other levels; RRH (88.3%), GH (80.8%), HCIV (77.4%) • Poorest performance was in the domain of equipment processing/disinfection/ sterilization: NRH (80%) and HCIVs (79.5%) scoring well while RRH (50%) and GH (45%) scored poorly. • PPE and examination gloves available in most facilities • Lack of running water in Naguru RRH, 16.7% GHs and 23.1% HCIVs • No gowns for mothers/ caretakers in NCUs in almost all facilities	More than 87% of the facilities had disposable latex examination gloves • IPC equipment and supplies were available in more than 84% of the facilities • chlorhexidine 7% gel, ethanol scrub, and hibitane solution was available in 23% • 49% of the facilities.	

CHAPTER

11

BENCHMARKING / POSITIONING UGANDA IN THE INTEGRATED MORTALITY TRANSITION FRAMEWORK

Overview of the Integrated Mortality Transition Framework

Context

Exemplars in Global Health (EGH) is a program that aims to learn from contexts where exemplary success has been achieved in improving health outcomes globally. Through a partnership between EGH and Countdown to 2030, a study was conducted on countries that rapidly reduced neonatal and maternal mortality beyond what would be expected from economic improvements alone between 2000 and 2020.[4] Seven Exemplar countries (*Bangladesh, Ethiopia, India, Morocco, Niger, Nepal, and Senegal*) were identified and studied to identify successful strategies, programs, and initiatives that contributed to rapid mortality reduction. An output of this research is the Integrated Mortality Transition Framework (IMTF), which can help the Government of Uganda prioritize activities to accelerate reductions in maternal and neonatal mortality. This chapter describes the IMTF and maps Uganda's progress along key health indicators to provide a global comparison to the SITAN.

4 *Campbell OMR, Amouzou A, Blumenberg C. The Countdown to 2030 Exemplars Collaboration, et al. Learning from success: the main drivers of the maternal and newborn health transition in seven positive-outlier countries and implications for future policies and programmes. BMJ Global Health 2024;9:e012126. https://gh.bmj.com/content/9/Suppl_2*

Introduction to the Integrated Mortality Transition Framework

The integrated maternal, neonatal, and stillbirth mortality transition framework is based on comparable data from 151 countries spanning two decades. It categorizes countries into "phases" based on mortality levels and contextualizes each country's progress to facilitate forward-looking priority setting. Building on the Obstetric Transition Model, the Integrated Mortality Transition Framework (IMTF) provides an opportunity to assess a country's overall performance based on their maternal mortality, neonatal mortality, and stillbirth rates, alongside various key MNH metrics.[56]

The IMTF categorizes countries into five phases by mortality levels, with phase 1 representing the highest mortality levels and phase 5 representing the lowest. As countries progress through the framework from higher to lower mortality, phase-specific characteristics linked to mortality decline are highlighted. These include fertility decline in phases 1 and 2, increased healthcare access in phases 2 and 3, shifting causes of death from phases 2 to 4, improved care quality in phases 3 and 4, and reduced inequities in phases 4 and 5. Additional context for typical country progress can be seen in Figures B 1 and B 2. Although each phase has specific characteristics important for progress within that phase, these characteristics serve to highlight areas to prioritize in order for a country to progress to the next phase of lower mortality.

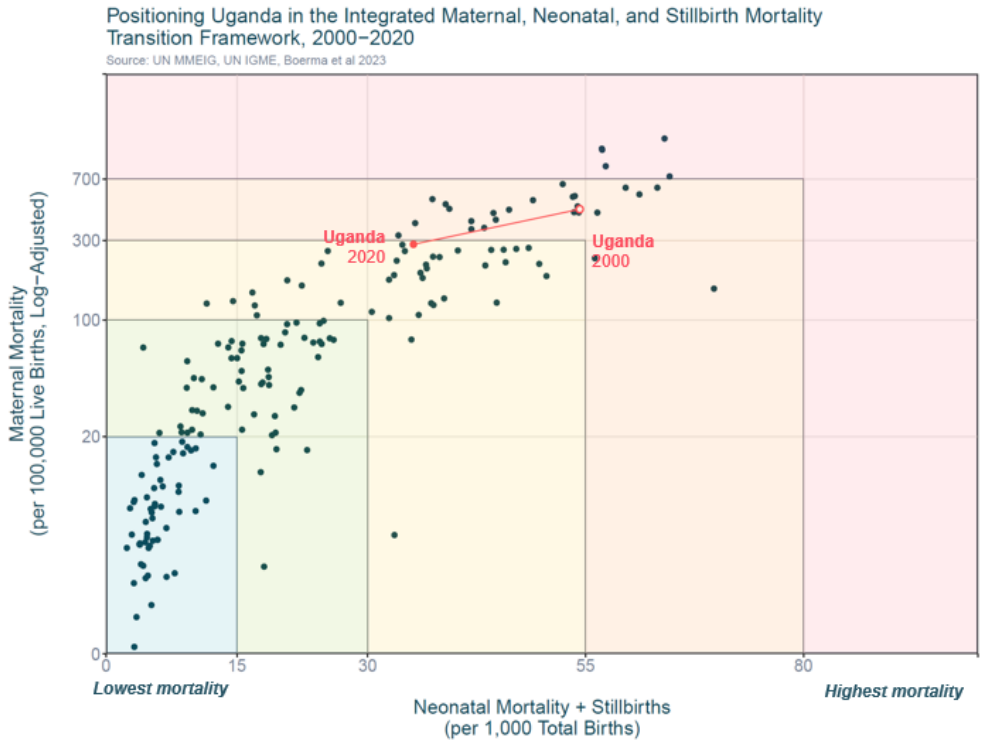
To enable country-specific contextualization and an assessment of drivers of performance by phase, key MNH indicators can also be benchmarked to assess progress relative to peers. Data sources include World Health Organization (WHO) on health workforce and health financing databases, 300 DHS/MICS surveys, and estimates from the United Nations (UN) and World Bank. This approach provides context for a country's progress and current performance, serving as a means to identify areas for prioritization based on a country's current phase relative to other countries in similar and future phases. Policymakers and decision-makers can use the tool to assess country performance, mortality levels, and key MNH indicators to identify areas for prioritizing funding and interventions. Lessons from the Exemplar countries can provide additional operational context for progressing from higher to lower mortality levels.

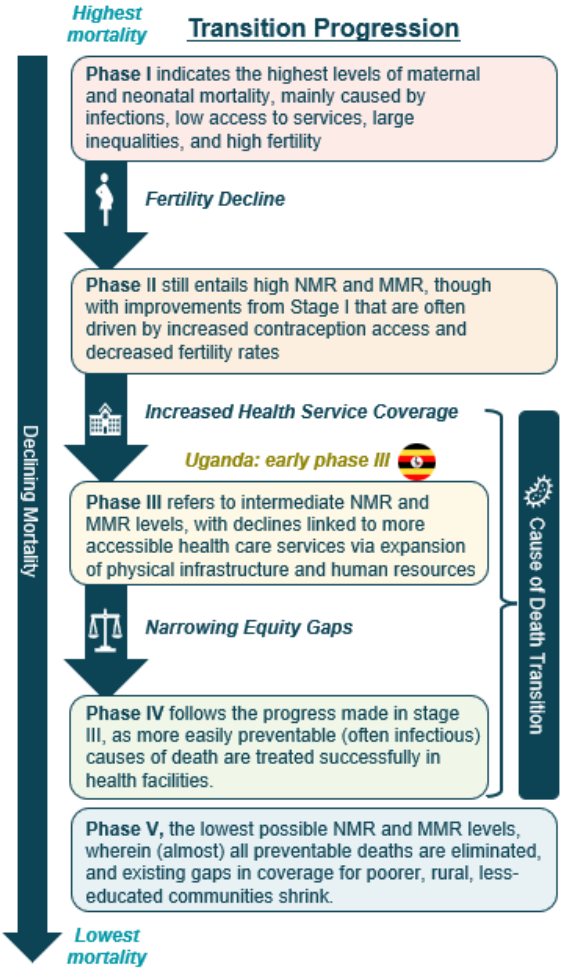
5 *Souza JP, Tunçalp Ö, Vogel JP, Bohren M, Widmer M, Oladapo OT, Say L, Gülmezoglu AM, Temmerman M. Obstetric transition: the pathway towards ending preventable maternal deaths. Obstetrics and Gynaecology 2014;121:(supp.1):1-4.*

6 *Boerma T, Campbell OMR, Amouzou A, Blumenberg C, Blencowe H, Moran A, Lawn JE, Ikilezi G. Maternal mortality, stillbirths, and neonatal mortality: a transition model based on analyses of 151 countries. Lancet Global Health 2023;11:e1024-31. https://www.thelancet.com/pdfs/journals/langlo/PIIS2214-109X(23)00195-X.pdf*

Positioning Uganda along the IMTF

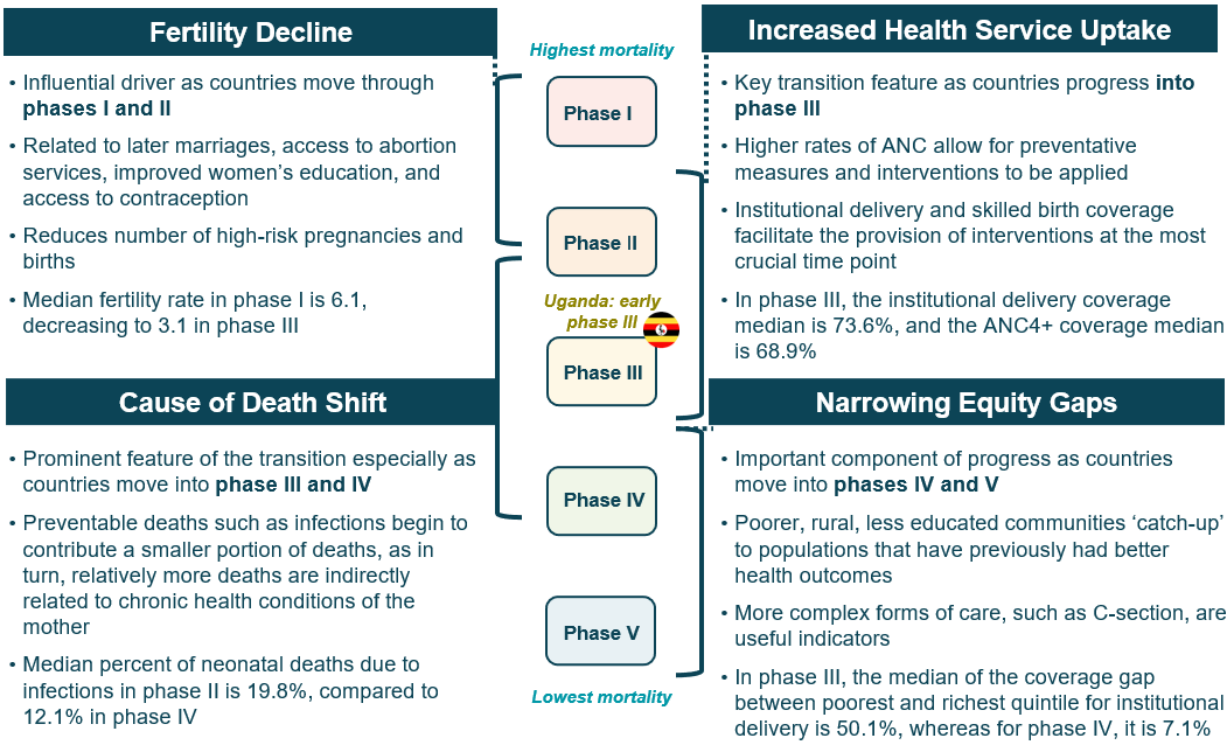
Figure B 1: Positioning Uganda in the Integrated Mortality Transition Framework





Between 2000 and 2020, Uganda reduced both neonatal mortality and stillbirths, as well as maternal mortality, progressing from mid-phase two to early phase three along the IMTF (see Figure B 1). This advancement reflects the fact that during the past two decades, Uganda experienced declines in fertility and increased health service coverage. As Uganda seeks to further reduce mortality levels and transition to later stages, global trends suggest that the country should continue expanding health service coverage and further reduce fertility rates, prioritize efforts to narrow equity gaps, and improve service quality. The following sections describe drivers of reduced mortality for Uganda during the study period.

Figure B 2: Key components of progress along the Integrated Mortality Transition Framework



Benchmarking Uganda in the IMTF

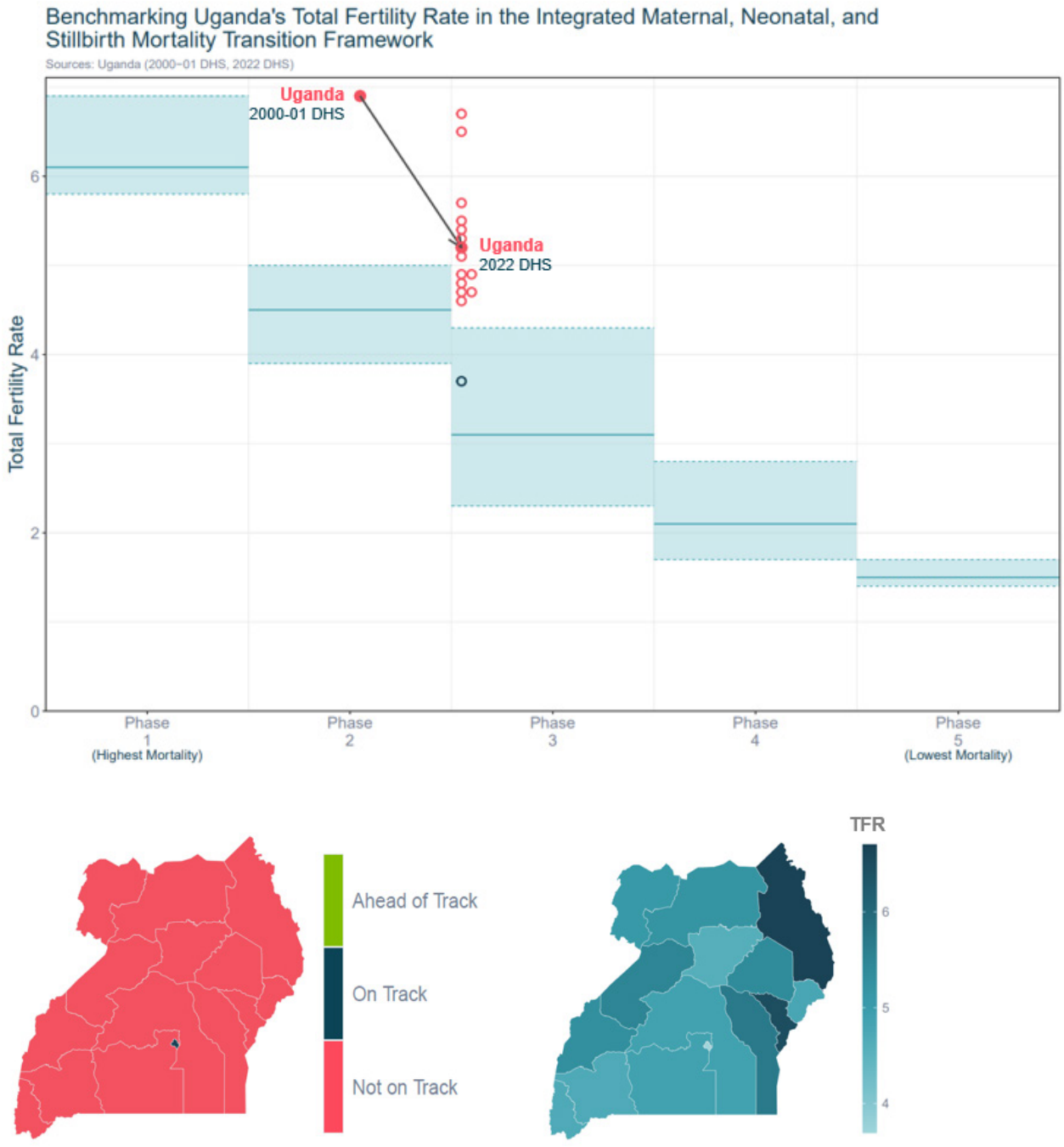
Using results from the Uganda 2022 DHS survey, four indicators (total fertility rate, antenatal care coverage, institutional delivery rate, and c-section rate) were benchmarked nationally and subnationally compared to ranges typically seen in countries with similar mortality rates. "Off track" indicates below expected levels typical for a Phase 3 country, "on track" indicates the indicator is within the typical coverage levels, and "ahead of track" indicates above expected levels. The following section covers Uganda's historical trajectory for these four indicators and identifies potential areas for further focus.

Total Fertility Rate

From 2000 to 2022, Uganda moved from mid-Phase 2 with a Total Fertility Rate (TFR) of 6.9 births per woman to early Phase 3 with a TFR of 5.2 births per woman. Although improvements have occurred in reducing total fertility since 2000, Uganda is currently not on track for this indicator nationally, with rates generally higher than typically seen for a country with mortality levels in Phase 3 (see Figure B 3 below). Most regions in Uganda are also not on track, with relatively high total fertility rates. Kampala is the only exception, with the lowest TFR in the country of 3.7. Successful strategies applied in Kampala may be relevant to other regions, particularly for Karamoja and Bukedi where TFR rates are currently above 6. For urban areas, fertility rates overall were 4.3 in 2022 and are on

track with values typical of Phase 3. Conversely, in rural areas, TFR rates declined from 7.4 in 2000 to 5.6 in 2022 but are still not on track for Phase 3. This suggests a continued need for targeted interventions to support further reductions.

Figure B 3: Benchmarking TFR in Uganda along the Integrated Mortality Transition Framework

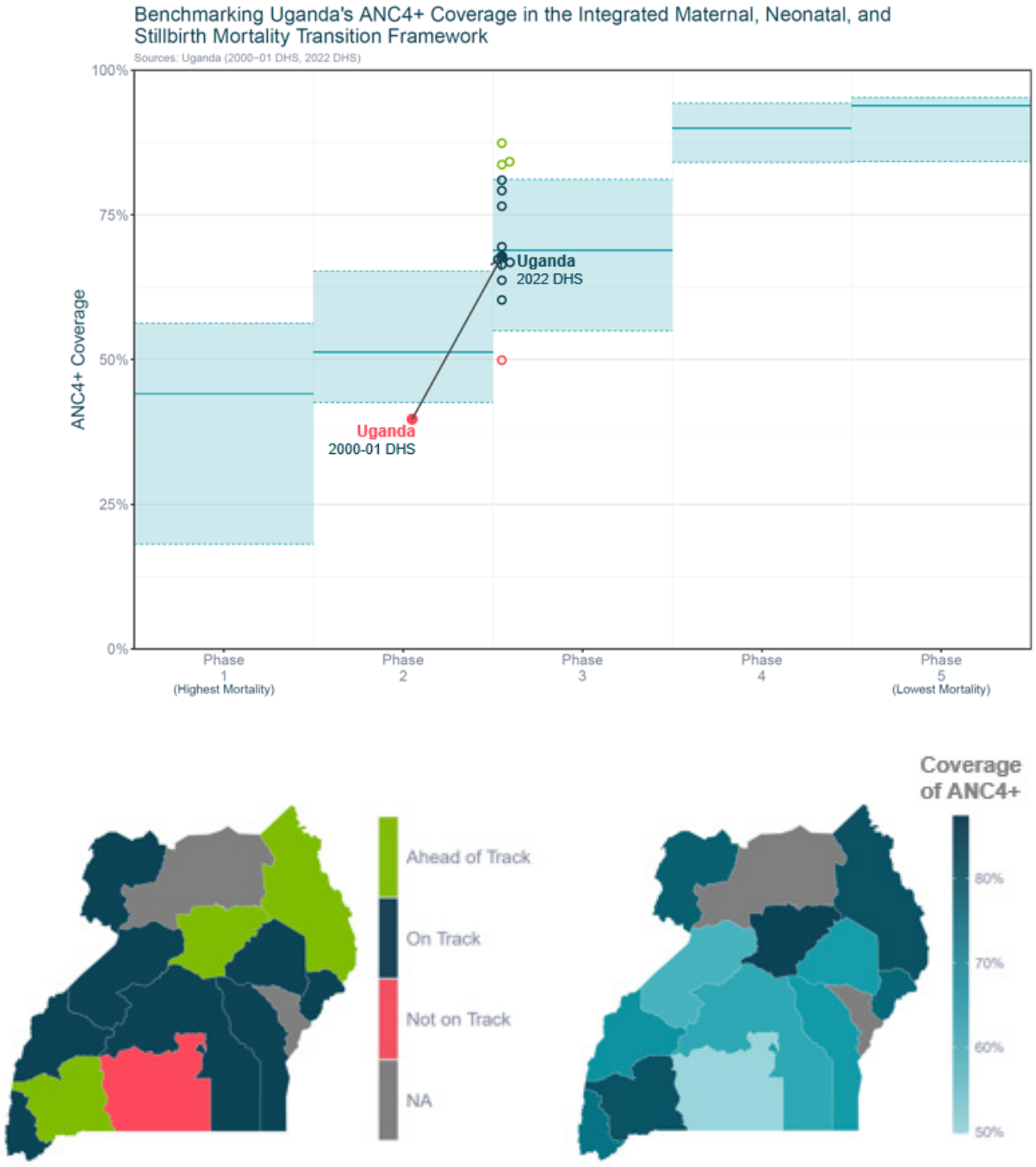


Antenatal Care 4+ Coverage

Antenatal care (ANC) 4+ coverage is currently on track for Phase 3 nationally, rising from 39.7% in 2000 to 67.8% in 2022, reflecting significant improvements over the time span. Although the coverage of 4+ ANC visits has increased over the years, wide subnational variations exist. Three regions are ahead of track, one region is currently not on track, and most regions are on track (see Figure B 4 below). The three regions ahead of track—Lango, Karamoja, and Ankole—are above the expected ANC4+ coverage levels typically seen for regions in Phase 3. In contrast, South Buganda is the only

region not on track for Phase 3, with an ANC4+ coverage of 49.9% in 2023 according to the 2023 SITAN. Despite the large regional variation, urban/rural gaps are narrowing, indicating improvements in equitable access to care.

Figure B 4: Benchmarking ANC4+ in Uganda along the Integrated Mortality Transition Framework



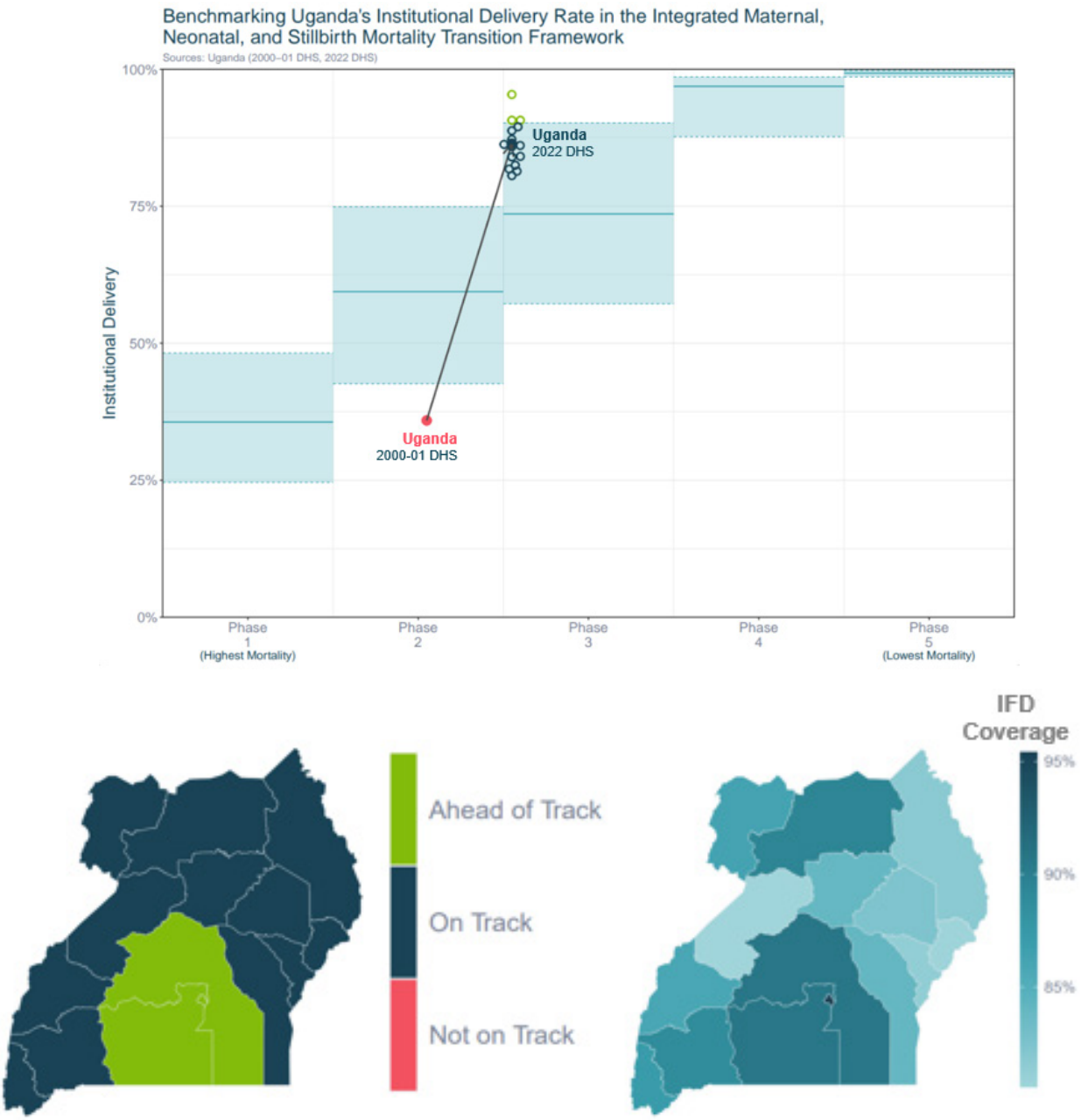
Institutional Delivery Rate

From 2000 to 2022, Uganda's institutional delivery rate more than doubled, increasing from 35.9% to 86.4%. All regions in Uganda were found to be either on track or ahead of track, with high coverage of institutional delivery across all regions. Twelve regions in Uganda are on track for institutional delivery rates and are above the median rate typically expected for regions in Phase 3. Notably, Kampala and Buganda are ahead of track for Phase 3, with exceptionally high coverage levels of 95.4% and

90.7%, respectively, as of 2022. Uganda has also made progress in narrowing the regional equity gap for this indicator, with the gap decreasing from 38.1% in 2016 to 14.8% according to the 2022 DHS.

Uganda's 2023 Emergency Obstetric and Newborn Care (EmONC) Needs Assessment found that an estimated 64% of expected births occurred in health facilities, but that only 9% of these births occurred in an EmONC facility. This was highest in Acholi at 24%, but lowest in Elgon at 1%. The availability of EmONC facilities varies substantially by region, though no region has as many EmONC facilities as is recommended. Acholi – the region with the highest rate of delivery at EmONC facilities – has 5 EmONC facilities compared to the 20 that would be needed to meet the WHO, UNFPA, and UNICEF recommendation of one EmONC facility per 500,000 in the population. This survey also found that 68% of facilities lack a newborn corner, special newborn care unit, or newborn intensive care unit – indicating that care for small or sick newborns after institutional delivery may currently be a gap in Uganda.

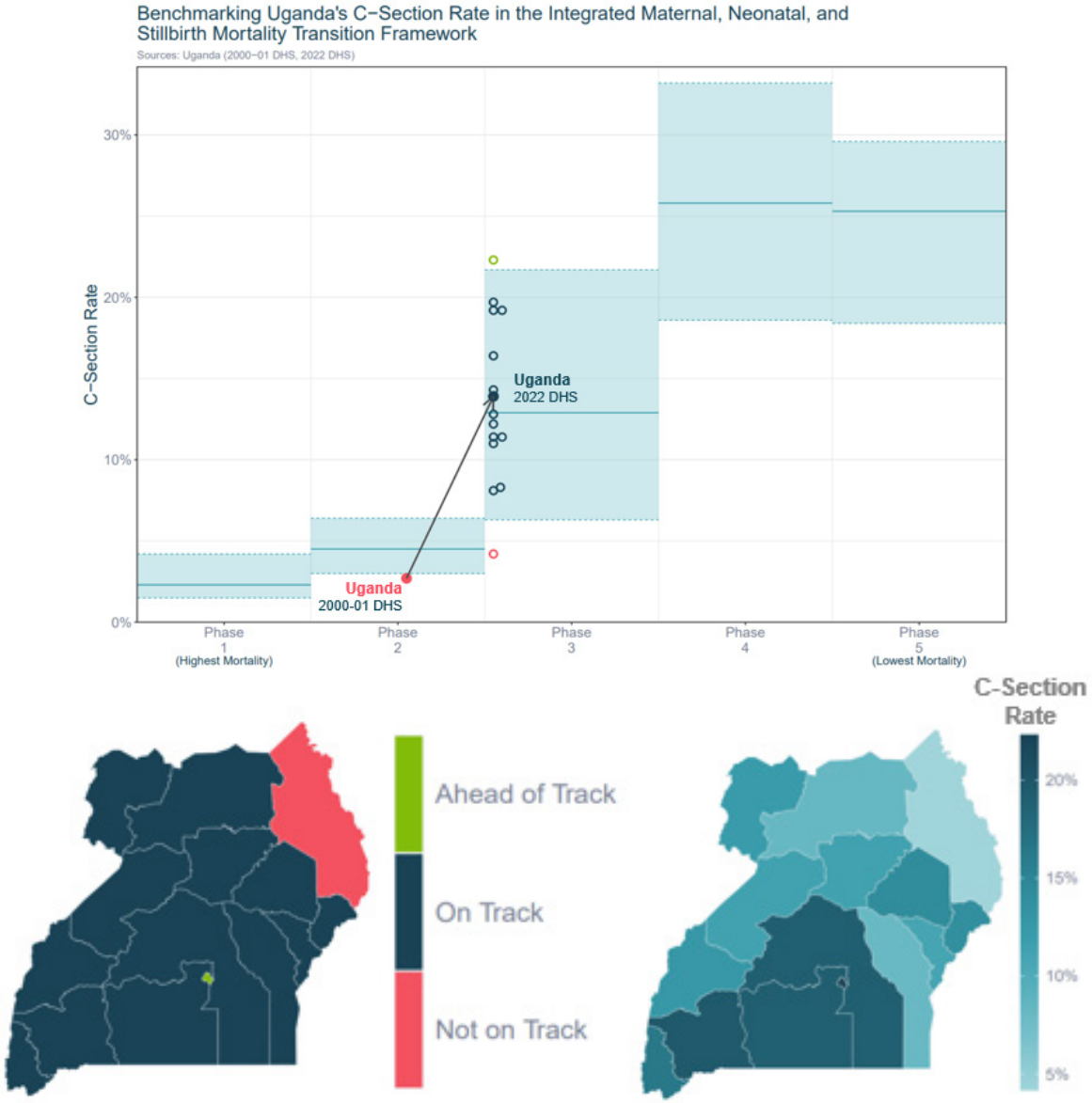
Figure B 5: Benchmarking Institutional Delivery Rates in Uganda along the Integrated Mortality Transition Framework



C-Section Rate

Since 2000, C-section rates in Uganda have risen, increasing from 2.6% to 13.9% in 2022, placing Uganda nationally on track for Phase 3. However, significant subnational variation remains. Most regions in Uganda have C-section rates above those typically seen in Phase 3 countries, with one region surpassing these levels. To note, according to the World Health Organization, C-section rates that exceed 10% are not associated with additional benefits to reducing MMR, indicating that the C-section rates in these localities may be excessive.[7] Three regions have relatively low coverage: Acholi and Busoga have coverage levels around 8%, and Karamoja has the lowest coverage at 4.2%, making it the only region currently off track.

Figure B 6: Benchmarking C-Section Rates in Uganda along the Integrated Mortality Transition Framework



7 *Betrán AP, Torloni MR, Zhang JJ, Gülmezoglu AM; WHO Working Group on Caesarean Section. WHO statement on caesarean section rates. BJOG. 2016;123(5):667-670. https://doi.org/10.1111/1471-0528.13526*

Subnational Assessment Across Benchmarked Regions

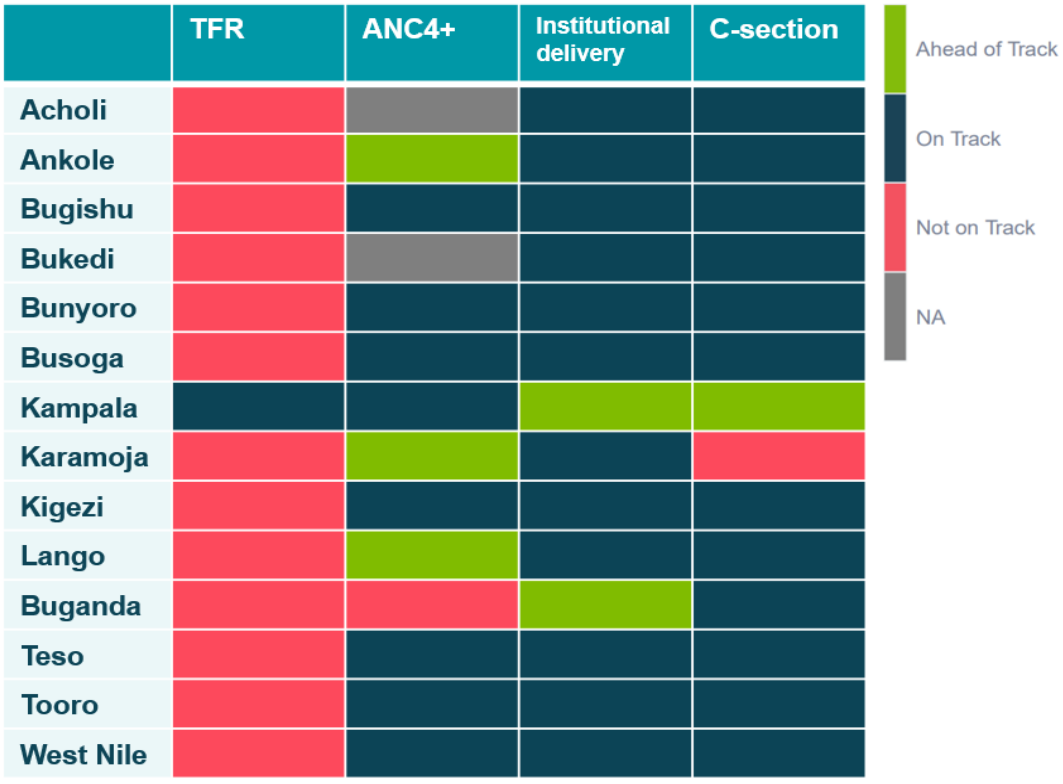
Uganda is broadly on track for Phase 3 for key MNH indicators. However, as Uganda seeks to transition to later stages and into Phase IV, targeted efforts to increase the quality of services and close equity gaps may need to be prioritized to facilitate further mortality reduction. At the same time, efforts for other indicators, such as fertility declines and increased health service coverage, will need to be sustained and maintained to enable continued mortality reductions.

At the subnational level, although most regions are generally on track across the four benchmarked indicators, Karamoja, Acholi, Busoga, and Buganda are regions that are mostly on track but at risk of becoming off track.

Total Fertility Rate (TFR) is mostly not on track for Phase 3 in all regions of Uganda, with the exception of Kampala, indicating future efforts may be required to prioritize women's empowerment initiatives that emphasize the importance of female education and increase access to and demand for family planning methods.

Although health services uptake has increased and most regions in Uganda are on track for Phase 3, additional efforts may be warranted for sustained improvement. Targeted efforts to mitigate financial and logistical barriers subnationally can improve coverage in specific regions (e.g., Karamoja for C-sections and Buganda for ANC 4+ coverage).

Figure B 7: Summary of key benchmarked indicators in Uganda



Recommendations from NMR/MMR Exemplars

The IMTF can be used to assess a country's performance and set forward-looking priorities. Additionally, it serves as an opportunity for valuable lesson-sharing as countries in earlier stages of the transition seek to further reduce mortality and learn successful strategies undertaken in countries currently in later stages of the transition. Lessons from the NMR/MMR Exemplars study provide insights into effective strategies that have successfully driven down mortality rates for key MNH indicators.[1] As Uganda seeks to further reduce neonatal and maternal mortality, this section includes recommendations and relevant lessons from NMR/MMR Exemplars, offering strategies that have proven successful in other contexts. More information and lessons from the NMR/MMR Exemplar countries can be referenced here: https://www.exemplars.health/topics/neonatal-and-maternal-mortality

Fertility Decline

In Uganda, TFR is broadly not on track for most regions with rates typically higher than what would be expected for a country in Phase 3.

Recommendation: Especially among younger women, prioritize women's empowerment initiatives that emphasize the importance of female education and generate demand for (while increasing access to) family planning methods

Relevant Lessons from NMR/MMR Exemplars:

- **Strengthen supply chains** to increase the availability of contraceptive methods and establish monitoring systems to reduce stockouts, improving access to and availability of family planning methods.
- **Increase female education rates** through the development of incentives or campaigns.
- **Improve awareness and uptake of family planning methods** by leveraging the community health workforce to aid in demand generation.
- **Prioritize efforts to increase the legal age of first marriage** and decrease adolescent/teen fertility rates.

Increased Health Service Uptake

In Uganda, although health services uptake and coverage of key MNH services (e.g. institutional delivery, hospital delivery, antenatal care coverage, and c-sections) has increased, and most regions in Uganda are on track for Phase 3, additional efforts may be warranted for sustained improvement.

Recommendation: Subnationally ensure targeted efforts to mitigate financial and logistical barriers to improve coverage in specific regions (e.g. Karamoja and Buganda). At national level, prioritize quality of care for key MNCH services now that coverage levels have improved

Relevant Lessons from NMR/MMR Exemplars on ANC4+ Coverage:

- **Improve ANC coverage** by leveraging CHWs and community-based strategies to aid in demand generation through targeted awareness campaigns at the community level.
- **Mitigate financial barriers to ANC services** through the introduction of social assistance mechanisms.
- **Strengthen HRH capacity** to increase the number and skill level of providers, especially in rural areas, to increase capacity for ANC.

Relevant Lessons from NMR/MMR Exemplars on C-Section Rate:

- **Increase the number of CEmONC facilities and upgrade lower-level facilities** to perform C-sections and other emergency procedures.
- **Strengthen HRH capacity and the skills of existing health professionals**, especially in rural areas, for specialized obstetric skills.
- **Strengthen emergency transport and referral networks** between various levels of facilities, especially for high-risk pregnancies and those delivering in lower-level facilities.
- **Strengthen maternal and neonatal death audits** to improve service quality.

Conclusion

As Uganda seeks to further reduce neonatal and maternal mortality levels, the IMTF can serve as a valuable tool to support priority setting and help decision-makers identify critical areas that may need to be addressed for continued progress towards SDG targets by 2030. While significant improvements have been made since the last Uganda DHS in 2016, with most indicators showing widespread increases in coverage levels, subnational variation remains wide in most cases. Uganda's transition to lower levels of mortality will require intensified efforts to reduce equity gaps and improve the quality of key MNH services.

Of the four benchmarked indicators—TFR, institutional delivery, C-section rate, and ANC 4+ coverage— concerted efforts to address TFR will be crucial for future mortality reduction. This can be achieved by prioritizing and improving women's empowerment measures, increasing female education, increasing access to family planning methods nationally by strengthening supply chains, reducing stockouts, and leveraging the community health workforce to generate awareness and demand (SITAN Recommendation 1). Efforts should also focus on decreasing the adolescent fertility rate and delaying the age of first marriage (SITAN Recommendation 1). Additionally, subnational targeting for regions with high TFRs, such as Karamoja and Bukedi, which had the highest TFR rates at 6.7 and 6.5 respectively according to the 2022 DHS, may also be warranted.

Although the other three benchmarked indicators are broadly on track in most subnational regions, regional prioritization may be needed for specific indicators. For instance, the C-section rate in Karamoja is not on track relative to other contexts with similar mortality rates or WHO guidelines with a rate of 4.2%. Acholi and Busoga are currently on track but may be at risk of lagging behind based on the 2022 DHS. In terms of ANC 4+ coverage, Buganda is not on track for Phase 3 with coverage at 49.9%, and Bunyoro is on track but at risk of lagging with 60.3% coverage, based on the SITAN data. For both indicators, this may speak to a need to continue efforts to increase health service uptake and utilization and ensure access to higher level facilities (SITAN Recommendation 2).

Additionally, there may be opportunities to improve health service quality for key MNH indicators nationally, given that coverage levels have risen over the years (SITAN Recommendation 2). Increased efforts to standardize protocols to enhance and ensure quality while strengthening referral processes, especially for high-risk cases to higher-level facilities, will be essential to further reduce mortality in Uganda and particularly important as causes of death shift to less preventable causes and more complex cases (SITAN Recommendations 3-4). Increasing the number and quality of higher-level facilities, upgrading lower-level facilities to perform complex procedures such as C-sections, and increasing the capacity and skill of the HRH workforce to handle increasingly complex cases will also be crucial as Uganda continues to progress along the transition (SITAN Recommendations 1-4).

Lessons from NMR/MMR Exemplars can serve as examples of successful strategies used in other countries to reduce mortality and improve key MNH indicators. By addressing the identified areas highlighted by the IMTF, Uganda can make substantial progress in reducing neonatal and maternal mortality, enhance its progression to later stages along the IMTF, and accelerate progress towards achieving SDG targets by 2030.

CHAPTER

12

RECOMMENDATIONS

The text box below summarizes the key findings from this survey.

Summary of overall findings of the survey

Community newborn care and primary health care system

Uganda has made advances in newborn care practices and care seeking. However, we find that major gaps still exist with overall optimal newborn care practices index being only 15.1%. In addition, care seeking is delayed for sick newborns and many babies are born at primary health care facilities (40.7% are below a hospital level) and most babies are cared for from clinics and PHC health facilities. However, we found very limited capacity for care at this level. In addition, the country has no clear system for proper newborn referral or follow up of sick newborns discharged from clinics and hospitals. There are also regions that are lagging behind in terms of newborn care, especially Central Buganda, Karamoja, islands, and surprisingly, urban settings.

Hospital care and capacity at different levels

In as much as the 2 national Referral Hospitals provide level 3 (NICU) care, many hospitals (RRHs and GHs) do not meet the requirements for level 2 care because of lack of specific equipment such

as functional CPAPs, patient monitors and phototherapy machines. Capacity for care for newborns is generally lacking at Health Centre IV level. Although, readiness to provide newborn care is above average at hospital level, the quality of care is still sub-optimal especially in resuscitation and infection prevention and control. Some key commodities such as caffeine citrate and chlorhexidine are generally not available in many of the facilities. In addition, human resources for newborn care is generally dire, with a lot of care being done through task shifting to nurses and midwives that have been trained through in-service courses. Over 50% general hospitals lack a paeditrician, and rotation of nurses working in NICUs and maternity units is a very unregulated norm. The country lacks specialised neonatal nurses and neonatologists, which is a challenge given the high burden of neonatal morbidity and mortality. A summary take home message for facility care is a general limited attention to quality standards, their measurement and implementation, yet this is the cradle of clinical health care delivery.

Partners and their co-ordination

Current implementers of newborn care in Uganda are a mix of government, the private sector, and NGOs. There are many partners in the newborn space but their coordination needs to be improved with a focus of having a scale up plan of a defined national package of services, equitably. .However, their activities are fragmented and not well coordinated. The Ministry of Health needs to effectively coordinate all these partners with one shared vision so that there is consolidation of efforts toward one goal: impactful, equitable scale-up.

Policies and guidelines

To address the high MNCH mortality and morbidity burden, Uganda has not only entrenched international commitments and policies in its national policy framework but has also emphasized measurement and accountability. The country is signatory to global commitments such as The Global Strategy for Women, Newborns Children and Adolescents; the Every Newborn Action Plan, The Standards for improving quality of maternal and newborn care in health facilities to mention but a few. These global strategies have been embedded and translated into national policies like the Reproductive Maternal Newborn Child and Adolescent Investment Case for Uganda, The Health Sector Quality Improvement Framework and the Strategic plan, the Uganda adolescent health Policy and the Health Sector development plan. The policy frameworks generally emphasize implementation of evidence-based interventions along the continuum of care at scale and at the highest level of quality of care in an equitable manner. However, even with the implementation of evidence-based interventions such as Kangaroo Mother Care, Voucher systems, women's peer groups, Adolescent youth friendly services, etc. to address the high burden of maternal, newborn, child mortality and adolescent morbidity, implementation remains sub-optimal. Although most policies and guidelines have been updated, many are still in draft form, and the extent to which they have been disseminated remains unknown. The MoH needs to be very intentional in completing and disseminating these guidelines to the frontline health workers.

Recommendations

There is urgent need faster systems change. This requires leadership, investment and innovation at all levels of governance.

Uganda has made some modest progress in improving newborn health after almost two decades of stagnation. Despite this, Uganda is not on track to achieve the set national and SDG targets for newborn health. In order for Uganda to achieve targets, it needs to do much more, to move twice as

fast. To do so, Uganda will need focused leadership, investment, and innovation in implementation to achieve high coverage equitably. It will require packages of interventions, more than one system change, more than one level of care, and change beyond the ward into communities. The country should adopt a national plan and the MoH should ensure that all partners adhere to it. Based on the findings of the SITAN, here below are the major recommendations. Their implementation should be linked to the RMNCAH Sharpened Plan while also ensuring the mother-baby dyad.

1. Urgently address the high fertility rate, including efforts to reduce rates of teenage pregnancy

- Improve awareness and uptake of family planning methods, by leveraging the community health workforce and available social media platforms, to aid in demand generation. (Action: DHMT, Health facility in-charges)
  Strategies:
  - VHTs to carry out community sensitization on FP (Action: DHMT, IPs)
  - VHTs to provide some of the FP types to the community (Action: DHOs, IPs)
  - MoH to develop and provide IEC materials on FP and dangers of teenage pregnancy. (Action: MoH, IPs)
- Ensure sufficient and equitable access to quality contraceptive commodities by strengthening supply chain, HRH capacity, and monitoring systems to reduce stock outs. (Action: MoH, DHOs)
  Strategies:
  - Train health workers on proper projection and requisition of supplies for FP (Action: DHOs, IPs)
  - MoH to liaise with National Medical Stores to ensure that contraceptive commodities are always available and get to the health facilities on time. (Action: MoH)
- Increase female education rates through the development of incentives or campaigns (Action: MoH, MoES, IPs)
  Strategies:
  - Bursaries for the girl child
  - Provide free sanitary towels so that the girl child stays in school. This is one of the main reasons for drop out especially in the rural setting
  - Encourage and integrate girls that have had babies back into school
- prioritize women's empowerment initiatives that emphasize the importance of female education

2. Improve health service delivery, uptake and quality that links the mother and the baby

- Antenatal care: Sub-nationally ensure targeted efforts to mitigate financial and logistical barriers to improve coverage in specific regions (e.g. Karamoja and Buganda). At the national level, prioritize quality of care for key MNCH services now that coverage levels have improved
  Strategies:
  - Leveraging VHTs to aid in demand generation through targeted awareness campaigns at the community level (Action: DHMT, IPs)
  - Mitigate financial barriers to ANC services through the introduction of social assistance mechanisms such as cash incentives, voucher schemes. (Action: MoH, DHOs, IPs)

  - Enhance strategies of public-private partnerships in increasing coverage and access of ANC to underserved populations. (Action: MoH)
  - Enhance and sustain integrated service delivery to maximize on resources for eMTCT and malaria programs in goal-oriented ANC. (Action: MoH, DHOs, IPs)
  - Continued advocacy with government and donor partners on importance and prioritizing supplies and logistics for ANC. (Action: MoH, IPs)

- Increase number of CEmONC facilities and upgrading of lower-level facilities to perform C-sections and other emergency procedures, especially bridging coverage gaps in regions such as Karamoja, Acholi and Busoga that are lagging behind. Nationally, there is urgent need to improve the quality of C/S and other CEmONC services.
  Strategies:

  - Upgrading of lower-level facilities to perform c-sections and other emergency procedures. (Action: MoH)
  - Strengthen HRH capacity and skill of existing skilled health professionals, especially in rural areas, for specialized obstetric skills through training and mentorships (Action: MoH, DHOs, IPs)
  - Strengthen emergency transport and referral networks between various levels of facilities, especially for high-risk pregnancies and those delivering in lower-level facilities through use of vouchers, providing ambulances with fuel, providing necessary means of communication between facilities at the point of referral etc (Action: MoH, DHOs, IPs)

- Strengthen referral systems from lower-level to higher-level facilities including developing innovative referral systems for sick and vulnerable newborn babies. **Strategies:**

  - This can be through provision of ambulances with fuel for referral, provision of transportation incubators for sick newborns at the time of referral, strengthening skill of existing health workers through mentorship and coaching, provision of communication means between facilities at the time of referral, use of vouchers (Action: MoH, DHOs, IPS)

- Improve the quality of intrapartum care including resuscitation of newborns. (Action: DHOs, facility in-charges, IPs)
  Strategies:

  - Continuous mentorship in intrapartum care to improve the health worker skill and thus quality of services provided
  - Provide appropriately adapted learning materials, equipment, and supplies simultaneously with training.
  - Mentorship on use of CPAP and safe oxygen administration

- Promote uptake of skilled childbirth in areas where home deliveries still occur. (Action: DHMT, IPs)
  Strategies:

  - Empower VHTs and TBAs to promote skilled care and refer mothers and newborns to health facilities.
  - Engage PNFP and PFP health facilities under the public-private partnership strategies in provision of underserved populations

- Strengthen postpartum care for both mother and baby. The PNC service package is not well understood by the mothers/caregivers or service providers at facility and community levels. The focus is mainly on immunization (Action: MoH, DHMT, Facility in-charges, IPs)
  Strategies:

- Review postnatal care package to prioritize delivery strategy and service package for first week of life plus community communication strategy
- Develop postnatal care service training package as part of the integrated newborn care training manual, implementation plan and training cascade system to providers at facility and community levels.
- Develop postnatal care service package communication strategy and implementation framework to reach mothers/caregivers to cause demand for services.
- Engage strategies for public-private partnership to offer increased opportunity for postnatal care
- Empower VHTs and TBAs in evaluation of newborns to increase access to care at community level.

- Scale up special services for the care of preterm and LBW babiesas well as the quality of KMC provided. (Action: MoH, DHMT, IPs)
  Strategies:

  - Develop training manual, desk aides, pocket handbook and implementation plan for the current newborn clinical protocols and essential maternal and newborn care guidelines with integrated components of HBB, HBS and KMC for distribution to front line health workers
  - Establish and cascade a Low-dose High-frequency practice system for training of providers (all birth attendants, nurses and clinicians) in pre- and in-service tailored to needs and self-reflective at each level.
  - Provide appropriately adapted learning materials, equipment, and supplies simultaneously with training.
  - Provide continuous support supervision and mentorship to health workers until skills are sustained
  - Improve follow up mechanisms for vulnerable babies within the community (Hospital to Home care)

- Optimize adolescent and youth friendly services. (Action: MoH, IPs, DHMT)
  Strategies:

  - Prioritize provision of Adolescent Friendly Health Services (AFHS) as per health sector strategic plan and RMNCAH Sharpened Plan while addressing constraints contributing to frequent stock-outs of contraceptives.
  - Establish multi-sectoral mechanisms to coordinate planning, financing, implementing, and scaling up of AFHS at the national and decentralized levels.
  - Raise awareness among adolescents at service delivery points, including health facilities, schools, and communities, by putting up sign posts and conducting outreach to the communities where they live.

- Strengthen Maternal and Perinatal Death Surveillance Reviews countrywide (Action: MoH, IPs, DHMT, Facility in-charges)
  Strategies:

  - institute and facilitate feedback processes for both capacity building and quality improvement to link referral facilities to lower-level facilities in MPDSR;
  - mobilize resources to increase budgets for MPDSR implementation at health facility and district levels, particularly perinatal death reviews;
  - strengthen organizational and operational capacity of facility-level MPDSR committees;
  - ensure MPDSR committee at general hospital and HC IV levels strengthens community linkages; and link MPDSR reviews with performance-based financing schemes.

- institute a capacity-building strategy for MPDSR to ensure all members of MPDSR committee are trained and to ensure continuous health worker skills building through training, mentorship and support supervision;
- establish and promote region-level communities of practice for MPDSR champions at health facility and district levels;
- DHMTs support facilities to establish formal and systematic procedures to follow-up on recommendations and coordinating responses, evaluating and reflecting on changes resulting from MPDSR reviews.

3. Operationalize quality maternal and newborn care in hospitals:

- Scale up small and sick newborn care at national and regional referral hospitals and at least 80% of general hospitals as recommended by WHO/UNICEF. (Action: MoH)
- Ensure implementation of quality standards for newborn care, including resuscitation and infection prevention and control.(Action: MoH, DHOs, Health facility in-charges, IPs)
- Adopt new neonatal intensive care unit (NICU) designs that meet updated standards and support kangaroo mother care (KMC) practices. (Action: MoH, IPs)
- Ensure quality of care, particularly key for CPAP, + safe oxygen use. (Action: MoH, DHOs, Health facility in-charges, IPs)
  Strategies:

  - This can be achieved through support supervision, mentorship of health workers to enhance skills, provision of the necessary commodities, supplies and equipment.

- Ensure sufficient items are in place (people, products and data collection tools) to aid in data monitoring and metric tracking for quality of care monitoring (Action: MoH)
- Ensure the regular availability of basic supplies and equipment to support skilled newborn care in health facilities. (Action: MoH, IPs)
  Strategies:

  - MoH together with partners should build a reliable supply chain, procurement, maintenance, and reprocessing system to provide health care facilities at all levels with required newborn care supplies, equipment and logistics.
  - Regular review of the essential supplies list for inclusion of newborn items and regular stock taking reviews to ensure availability at all health facility levels.
  - MoH to establish and integrate a management information system dashboard to aid regular review and stock taking.
  - MoH and DHOs to work together to ensure that the equipment bought are regularly serviced and maintained. This can be through recruitment of biomedical engineers at regional level.

4. The findings show that most births and most of the care for small and sick newborns occur in communities or in the PHC setting. Therefore, Uganda should develop and implement a package of care for newborns within the primary healthcare context:

- Develop guidelines for newborn care at community level and within primary healthcare facilities. (Action: MoH, IPs)
- Define standards for newborn care at primary healthcare facilities, including referral and follow-up protocols. (Action: MoH)
- Create demand for MNH services. ((Action: MoH, DHMT, IPs)

Strategies:

- Implement an aggressive engagement and education strategy for community members on maternal and newborn care with a special focus on Karamoja, Buganda, and islands and other hard to reach populations.
- Mitigate financial barriers to services through the introduction of social assistance mechanisms such as vouchers, cash incentives
- leveraging VHTs to aid in demand generation through targeted awareness campaigns at the community level
- Strengthen community Integrated Management of Childhood Illness (IMCI) to reinforce recognition of danger signs and timely care seeking; to actively promote healthy behavior within the community
- Engage communities in birth preparedness, including planning to give birth at a health facility and emergency transport

5. Review human resources for newborn care:

- Adopt or develop human resource norms for newborn care at different levels of the healthcare system. (Action: MoH)
- Consider introducing specialized cadres for newborn care, such as neonatologists and neonatal nurses, to improve skills mix. (Action: MoH)
- Standardize pre-service training in newborn care and enhance ongoing professional development opportunities. (Action: MoH)
- MoH should prioritize recruitment and sustained training of all personnel who are essential for providing CEmONC and other RMNCAH services. Continuous review and filling of all vacant midwifery posts at HC III and above by responsible offices.
- District Health Offices (DHOs) should reinforce good client-centered clinical practices through training, mentorship, and support supervision of health workers.
- Impart Inadequate skills/or training in immediate and emergency care for newborn and delivery of neonatology services for existing health workers.
  Strategies:

  - Continuous support and strengthening in integration of newborn care into pre-service training for midwives and other general nurses
  - provision of in-service training and mentorship for health workers on essential and emergency newborn care.
  - Consider introducing specialized cadres for newborn care, such as neonatologists and neonatal nurses, to improve skills mix.
  - Standardize pre-service training in newborn care and enhance ongoing professional development opportunities.
  - Mentorship of health workers should be linked to Quality Improvement (QI) systems and data use
  - Foster local innovation capacity for delivery of quality services

- Stop the practice of rotation of nurses in NCU. Trained and skilled staffs in newborn care are often transferred to other units and may be replaced by unskilled or untrained staff – "because it is part of nursing policy and practice". The MoH needs to address the wide spread practice of rotation of nurses and midwifes in health facilities and hospitals as it affects patient care. Future health systems should promote specialization for some areas of health care such as newborn care.

6. Develop evidence-based policies and programs to address postnatal care and emerging areas of newborn health such as congenital abnormalities:

- The Ministry of Health should collaborate with stakeholders to develop evidence-based policies and programs to address emerging areas of newborn health such as congenital abnormalities, integration with HIV/AIDS and sickle cell disease prevention, post-NICU discharge follow-up, and management of neurological complications. These initiatives must prioritize prevention, early detection, and equitable access to high-quality care for all newborns in Uganda. (Action: MoH, IPs)
- Ensure countrywide dissemination of guidelines and strategies developed. (Action: MoH, IPs)
  Strategies:
  - MoH should develop comprehensive dissemination plans for guidelines/strategies developed
  - Follow up should be done to ensure that these guidelines are being adhered to.
- Develop comprehensive guidelines/policy on postnatal care. (Action: MoH, IPs)

7. Foster Data-Informed Decision-Making:

- Improve the quality of data collected. (Action: MoH, DHMT, facility in-charges, IPs)
  Strategies:
  - Provide facilities with data collection tools- registers for vulnerable newborns
  - Mentorship of health workers in collection of quality data
  - Include more newborn indicators in routine data collected through DHIS 2
- Strengthen data utilization mechanisms to enhance the use of routine data for maternal and newborn health.
  Strategies:
  - Need clear country indicators against which change will be measured
  - Provide training and capacity-building initiatives for healthcare providers and decision-makers on data analysis and interpretation and use.
  - Pay attention to subnational inequalities
  - Develop user-friendly dashboards, reports, and policy briefs to present key findings in a clear and accessible manner.
- Use data to develop a scale up package for newborn care
  Strategies:
  - Utilize the findings from the analysis to inform the urgent development of an evidence-based, feasible national community-facility linked package for newborn care.
  - Ensure the package addresses regional variations and urban-rural complexities, and integrates maternal care.
  - Promote adherence to the package among all partners involved in newborn care

8. Enhance mechanisms for partner coordination, management, and accountability (Action: MoH, IPs)

- Strengthen national and subnational reproductive, maternal, newborn, child, and adolescent health and nutrition (RMNCAH/N) networks.

- Establish transparent frameworks for partner coordination, participation, contribution, and accountability.
- Foster organizational commitments to shared network goals and accelerate capacity for strong, equity-based RMNCAH/N programming.

9. Advocate for more a bigger resource envelop specifically for newborn health (Action: MoH, IPs)

Strategies:

- MoH must advocate for more finances from government for RMNCAH
- MoH to promote dialogue and action between academic, policy, and budgetary realms to capitalize on Uganda's existing expertise and address healthcare transitions effectively.

10. Future research: (Action: MoH, IPs)

a. Prioritize implementation research (IR) in routine programming:

- Embed implementation research into all routine programming to facilitate the scale-up of effective and scalable programs.
- Ensure that program implementation is informed by evidence, including IR, to develop successful models for wider scale-up.

b. Review curriculum content, knowledge, and skills of the training institution.

- Whereas these institutions produce the country's workforce, they have not been a target for capacity building as most initiatives focus on in-service training.

c. Conduct research on maternal and newborn care in the private sector as they provide most of the care in urban settings.
d. Promote dialogue and action between academic, policy, and budgetary realms to capitalize on Uganda's existing expertise and address healthcare transitions effectively.

These recommendations aim to address the identified gaps and challenges in newborn care in Uganda and provide a roadmap for improving implementation and outcomes at various levels of the healthcare system. By prioritizing these recommendations, stakeholders can work together towards achieving the Sustainable Development Goal targets and ensuring equitable access to quality maternal and newborn healthcare services across the country.

CHAPTER 13

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ANNEXES

ANNEX 1: IMPLICATIONS AND OPPORTUNITIES FOR ACTION

Implications

Uganda has adequate policy environment and well-developed governance structures under the decentralized system to support newborn health. Following the adoption and revisions of the RMNCAH Sharpened Plan over the last decade, there has been rapid changes within the health sector frameworks with addition of specific newborn health policies and guidelines. Concerted efforts and coordination advocating for maternal and newborn health within the Ministry of Health and among partners led to upgrading of lower health centers to HC IIIs/IVs; renovations and re-equipping of HC IVs and higher-level referral hospitals; establishment of newborn intensive care units in some hospitals and institutionalization of national maternal and perinatal deaths surveillance review and response. To this effect, there has been noticeable reduction in maternal and neonatal mortality rates based on findings from the recent 2022 UDHS (82). However, the change and pace is very slow to attain the desired SDG target of at least as low as 12 per 1,000 livebirths by 2030 (41, 83, 84).

The national-level policies and strategies for newborn survival appear to be beginning to have an effect given the current reductions in maternal and newborn mortality in the country. However, gaps are also apparent in coverage and quality of care given the lower indicators among rural and underserved regions, the uneducated and poor segments of the population. This can further be explained by the complex policy environment dependent on donors and with competing agenda affecting universal distribution of resources. The health care financing is largely from donors and out-of-pocket.

The general fertility and adolescent pregnancy rate remains very high, reflecting existing barriers to family planning. Therefore, understanding and addressing barriers to family planning is critical to reducing maternal, newborn and child deaths. The steady increase in facility birth levels as reflected by this SITAN and the previous UDHS (41, 85) is an opportunity if quality of care is improved, but also poses increased workload to the already existing limited workforce, supplies and logistics in health facilities with resultant low quality of care.

The rapid development of multiple national policies and strategies for newborn survival needs to be accompaniment with budget itemized strategic plans for dissemination, trainings, mentorship and support supervision to the last mile. Further, new strategies needed integrated training and implementation packages targeting both pre- and in-services.

Challenges and Opportunities for Action

Key issues to be addressed for improved newborn health in Uganda (Table R1).

Table R 1: Newborn Health Challenges and Opportunities for Action

Challenge/gap	Opportunities for Action/Call to Action
Leadership and Governance	
Inadequate partner coordination and management and accountability; Fragmentation of work by the different partners	• Strengthen national and subnational reproductive, maternal, newborn, child, and adolescent health and nutrition (RMNCAH/N) networks. • Establish transparent frameworks for partner coordination, participation, contribution, and accountability. • Foster organizational commitments to shared network goals and accelerate capacity for strong, equity-based RMNCAH/N programming.
Health workforce	
Inadequate staffing particularly for newborn care at lower health facilities.	• Adopt or develop human resource norms for newborn care at different levels of the healthcare system. MOH should coordinate with Ministry of Public Service to review staffing structure for HC IVs and lower facilities • MoH should prioritize recruitment and sustained training of all personnel who are essential for providing CEmONC and other RMNCAH services. Continuous review and filling of all vacant midwifery posts at HC III and above by responsible offices. • District Health Offices (DHOs) should reinforce good client-centered clinical practices through training, mentorship, and support supervision of health workers.
Inadequate skills/or training in immediate and emergency care for newborn and delivery of neonatology services.	• Continuous support and strengthening in integration of newborn care into pre-service training for midwives and other general nurses • provision of in-service training and mentorship for health workers on essential and emergency newborn care. • Consider introducing specialized cadres for newborn care, such as neonatologists and neonatal nurses, to improve skills mix. • Standardize pre-service training in newborn care and enhance ongoing professional development opportunities. • Mentorship of health workers should be linked to Quality Improvement (QI) systems and data use • Foster local innovation capacity for delivery of quality services
Rotation of nurses in NCU. Trained and skilled staff in newborn care are often transferred to other units and may be replaced by unskilled or untrained staff – "because it is part of nursing policy and practice".	• MoH needs to address the wide spread practice of rotation of nurses and midwifes in health facilities and hospitals as it affects patient care. Future health systems should promote specialisation for some areas of health care such as newborn care.
Commodities and Equipment	
Limited supply of basic supplies and equipment to support skilled newborn care in health facilities.	• MOH together with partners should build a reliable supply chain, procurement, maintenance, and reprocessing system to provide health care facilities at all levels with required newborn care supplies, equipment and logistics. • Regular review of the essential supplies list for inclusion of newborn items and regular stock taking reviews to ensure availability at all health facility levels. • MOH to establish and integrate a management information system dashboard to aid regular review and stock taking.

Inadequate maintenance of equipment for newborn care	• Biomedical engineers should be recruited at all RRHs to provide support in maintenance of equipment within the region
Infrastructure	
Limited infrastructure for newborn care across the country	• Scale up small and sick newborn care at national and regional referral hospitals and at least 80% of general hospitals. • Adopt new neonatal intensive care unit (NICU) designs/floor plans that meet updated standards and support kangaroo mother care (KMC) practices.
Information Systems: Data Quality and Use	
Low quality of newborn data collected;	• Provide facilities with data collection tools- registers for vulnerable newborns • Mentorship of health workers in collection of quality data • Include more newborn indicators in routine data collected through DHIS 2
Insufficient use of data for decision making	• Need clear country indicators against which change will be measured • Strengthen data utilization mechanisms to enhance the use of routine data for maternal and newborn health both locally and nationally. • Provide training and capacity-building initiatives for healthcare providers and decision-makers on data analysis and interpretation. • Pay attention to subnational inequalities • Develop user-friendly dashboards, reports, and policy briefs to present key findings in a clear and accessible manner.
Use data to develop a scale up package	• Utilize the findings from the analysis to inform the urgent development of an evidence-based, feasible national community-facility linked package for newborn care. • Ensure the package addresses regional variations and urban-rural complexities, and integrates maternal care. • Promote adherence to the package among all partners involved in newborn care.
Financing	
Inadequate financing for newborn care	• Advocate for more finances for RMNCAH • Promote dialogue and action between academic, policy, and budgetary realms to capitalize on Uganda's existing expertise and address healthcare transitions effectively.
Service Availability and Delivery	
Pre-pregnancy care: Adolescent and youth friendly service delivery is suboptimal	• Prioritize provision of Adolescent Friendly Health Services (AFHS) as per health sector strategic plan and RMNCAH Sharpened Plan while addressing constraints contributing to frequent stock-outs of contraceptives. • Establish multisectoral mechanisms to coordinate planning, financing, implementing, and scaling up of AFHS at the national and decentralized levels. • Raise awareness among adolescents at service delivery points, including health facilities, schools, and communities, by putting up sign posts and conducting outreach to the communities where they live.
Antenatal Care: Quality of pregnancy care is very low as few women receive all essential components of ANC.	• Enhance and sustain integrated service delivery to maximize on resources for eMTCT and malaria programs in goal-oriented ANC. • Continued advocacy with government and donor partners on importance and prioritizing supplies and logistics for ANC.

Antenatal Care: Coverage of ANC 4+ visits is still low	• Leveraging VHTs to aid in demand generation through targeted awareness campaigns at the community level • Mitigate financial barriers to ANC services through the introduction of social assistance mechanisms such as cash incentives, voucher schemes • Enhance strategies of public-private partnerships in increasing coverage and access of ANC to underserved populations.
Childbirth: Skilled childbirth care is low in some areas such as islands	• Empower VHTs and TBAs to promote skilled care and refer mothers and newborns to health facilities. • Engage PNFP and PFP health facilities under the public-private partnership strategies in provision of underserved populations.
Childbirth: Suboptimal quality of intrapartum care; Poor quality of resuscitation of babies	• Continuous mentorship in intrapartum care to improve the health worker skill and thus quality of services provided • Provide appropriately adapted learning materials, equipment, and supplies simultaneously with training. • Mentorship on use of CPAP and safe oxygen administration

Limited availability of special services for the care of preterm and LBW; inadequate performance of KMC	• MOH with partners at national and subnational levels should
	  • Develop training manual, desk aides, pocket handbook and implementation plan for the current newborn clinical protocols and essential maternal and newborn care guidelines with integrated components of HBB, HBS and KMC;
	  • Establish and cascade a Low-dose High-frequency practice system for training of providers (all birth attendants, nurses and clinicians) in pre- and in-service tailored to needs and self-reflective at each level;
	  • Provide appropriately adapted learning materials, equipment, and supplies simultaneously with training.
	  • Provide continuous support supervision and mentorship to health workers until skills are sustained
	  • Improve follow up mechanisms for vulnerable babies within the community

Very Low C/S rates in some regions	• Increase amount of CEmONC facilities and upgrading of lower-level facilities to perform c-sections and other emergency procedures • Strengthen HRH capacity and skill of existing skilled health professionals, especially in rural areas, for specialized obstetric skills • Strengthen emergency transport and referral networks between various levels of facilities, especially for high-risk pregnancies and those delivering in lower-level facilities

Maternal and Perinatal Death Surveillance Reviews: Limited implementation of MPDSR in health facilities especially GHs and HCIVs. Compliance with national guidelines and the quality of the review process are weak.	• MOH and partners and in collaboration with District Health Management Teams (DHMTs)should strengthen maternal and neonatal death audits to improve service quality by:
	  • institute and facilitate feedback processes for both capacity building and quality improvement to link referral facilities to lower-level facilities in MPDSR;
	  • mobilize resources to increase budgets for MPDSR implementation at health facility and district levels, particularly perinatal death reviews;
	  • strengthen organizational and operational capacity of facility-level MPDSR committees;
	  • ensure MPDSR committee at general hospital and HC IV levels strengthens community linkages; and link MPDSR reviews with performance-based financing schemes. .

	• Regional referral hospitals (RRHs), DHMTs and health partners should
	  • institute a capacity-building strategy for MPDSR to ensure all members of MPDSR committee are trained and to ensure continuous health worker skills building through training, mentorship and support supervision;
	  • institute a technical capacity-building structure of health workers at lower level facilities
	  • establish and promote region-level communities of practice for MPDSR champions at health facility and district levels;
	  • DHMTs support facilities to establish formal and systematic procedures to follow-up on recommendations and coordinating responses, evaluating and reflecting on changes resulting from MPDSR reviews.

Postnatal care services: The PNC service package is not well understood by the mothers/caregivers or service providers at facility and community levels and the focus in one immunization.	• Develop postnatal care service training package as part of the integrated newborn care training manual, implementation plan and training cascade system to providers at facility and community levels. • Develop postnatal care service package communication strategy and implementation framework to reach mothers/caregivers to cause demand for services. • Engage strategies for public-private partnership to offer increased opportunity for postnatal care • Empower VHTs and TBAs in evaluation of newborns to increase access to care at community level.
Policies and Programs	
Lack of guidelines/policy on postnatal care	• Review postnatal care package to prioritize delivery strategy and service package for first week of life plus community communication strategy. • Expedite the roll-out of the VHT strategy to cover all villages in the country for improved universal access to newborn care at household and community levels using the current iCCM package stipulating VHT roles in newborn care with accompanying training manuals, job aides and service kits.
Poor dissemination of guidelines and strategies developed	• MoH should develop comprehensive dissemination plans for guidelines/ strategies developed • Follow up should be done to ensure that these guidelines are being adhered to.
Lack of policies on emerging areas	• MoH should collaborate with stakeholders to develop evidence-based policies and programs to address emerging areas of newborn health such as congenital abnormalities, integration with HIV/AIDS and sickle cell disease prevention, post-NICU discharge follow-up, and management of neurological complications. These initiatives must prioritize prevention, early detection, and equitable access to high-quality care for all newborns in Uganda.
Community level/primary Health Care context	
Lack of newborn care guidelines at community level	• Develop guidelines for newborn care at community level and within primary healthcare facilities. • Define standards for newborn care at primary healthcare facilities, including referral and follow-up protocols.

Creation of more demand for health services	• Implement an aggressive engagement and education strategy for community members on maternal and newborn care to create awareness of key newborn health packages, such as routine postnatal care, KMC and IMCI; debunk myths and tackle harmful practices • Mitigate financial barriers to services through the introduction of social assistance mechanisms such as vouchers, cash incentives • leveraging VHTs to aid in demand generation through targeted awareness campaigns at the community level • Strengthen community Integrated Management of Childhood Illness (IMCI) to reinforce recognition of danger signs and timely care seeking; to actively promote healthy behavior within the community • Engage communities in birth preparedness, including planning to give birth at a health facility and emergency transport
Fertility: there is need to address the High Total Fertility Rates in Uganda	• Strengthen supply chains to increase availability of contraceptive methods and instill monitoring systems to reduce stock outs • Increase female education rates through the development of incentives or campaigns • prioritize women's empowerment initiatives that emphasize the importance of female education • Improve awareness and uptake of family planning methods, by leveraging the community health workforce, to aid in demand generation

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