

MATERNAL HEALTH IN BOTSWANA

A Comprehensive Analysis Using
2022 Census And Other National Data Sources

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2022 CENSUS AND OTHER NATIONAL DATA SOURCES**

Preface

The 2022 Population and Housing Census (PHC) marked a transformative step in Botswana's statistical infrastructure, being the country's first fully digital census. This advancement has significantly improved data quality, operational efficiency, and the timeliness of dissemination, setting a new standard for large-scale data collection. The PHC offers a comprehensive dataset that captures critical demographic, social, and economic dimensions, and provides a robust foundation for empirical research, policy formulation, and monitoring of development frameworks including Vision 2036, the National Development Plans (NDPs), the Sustainable Development Goals (SDGs), and the African Union Agenda 2063.

This thematic report focuses on Youth and Maternal Health, a critical area of public health and development, and forms part of a strategic collaboration between Statistics Botswana and the Sexual and Reproductive Health Division (SRHD) of the Ministry of Health. The analysis was undertaken with technical and financial support from the United Nations Population Fund (UNFPA), under its broader initiative to enhance the availability, reliability, and utilization of maternal health data for programmatic and policy decisions.

The report integrates data from the 2022 PHC with other complementary sources, notably the Botswana AIDS Impact Survey V (BAIS V) and relevant administrative datasets. The analytical framework explores key maternal health indicators, including fertility trends, antenatal and postnatal care coverage, maternal mortality ratios, and contraceptive prevalence rates. The aim is to provide a data-driven assessment of maternal health outcomes and disparities, identify spatial and demographic patterns, and generate insights for targeted interventions.

We acknowledge the invaluable contributions of all technical experts, data analysts, and institutional stakeholders involved in the compilation, validation, and interpretation of the data. We particularly recognize the support of UNFPA, whose sustained partnership has been instrumental in ensuring methodological rigor and analytical depth throughout this process.

It is our expectation that this report will serve as a vital resource for researchers, public health professionals, and policy analysts seeking to engage with high-quality, disaggregated data on maternal health in Botswana. The findings presented here aim to support ongoing scholarly work, inform national health strategies, and contribute to a stronger evidence base for improving health outcomes among women and youth.



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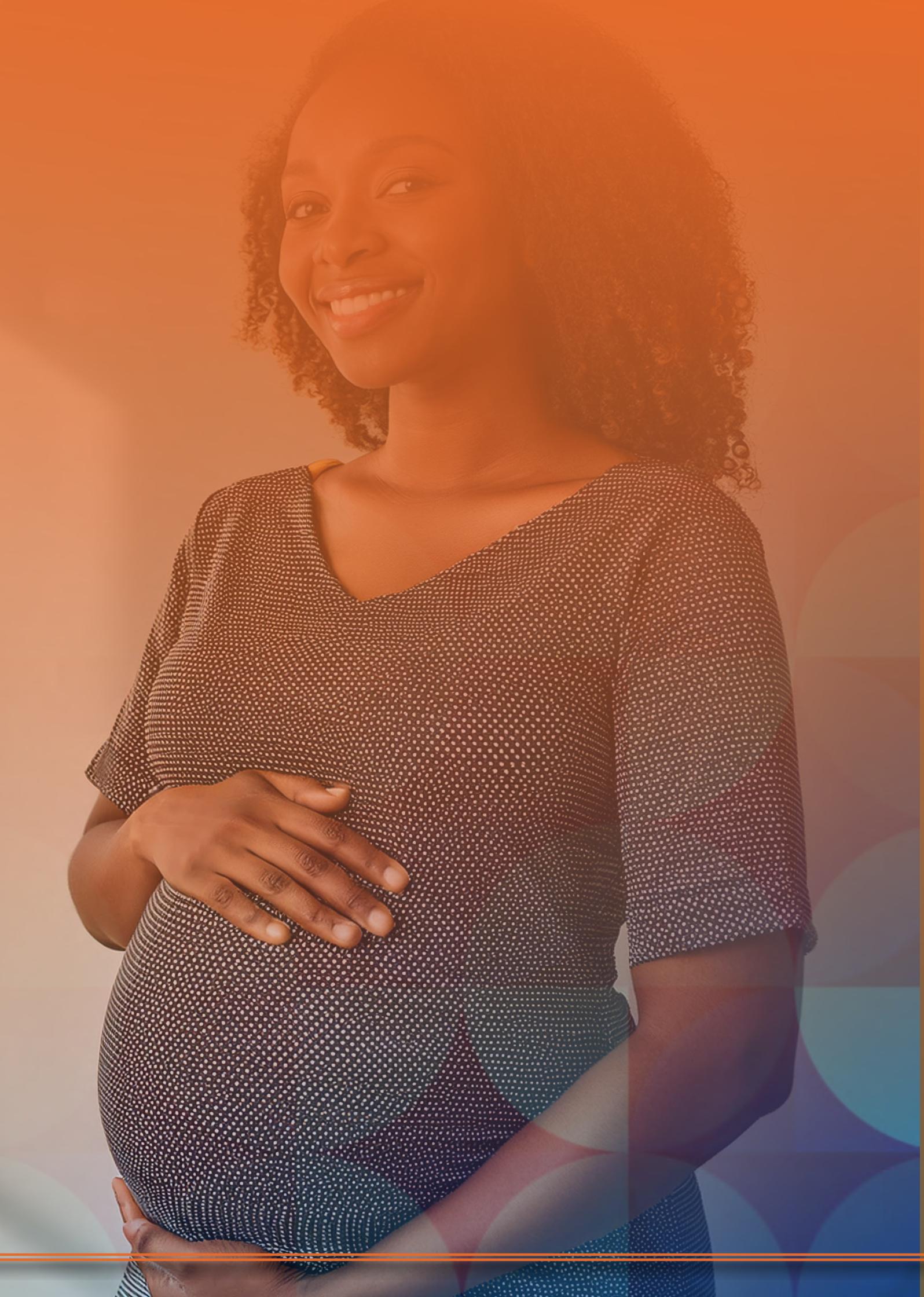


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Acronyms

AADPD	Addis Ababa Declaration on Population and Development
ANC	Antenatal Care
ASFR	Age-Specific Fertility Rate
BAIS	Botswana AIDS Impact Survey
BDHS	Botswana Demographic and Health Survey
BDS	Botswana Demographic Survey
BFHS	Botswana Family Health Survey
BBA	Born Before Arrival
BQA	Botswana Qualifications Authority
CPR	Contraceptive Prevalence Rate
CRVS	Civil Registration and Vital Statistics
DHMT	District Health Management Team
EmONC	Emergency Obstetric and Neonatal Care
HIV	Human Immunodeficiency Virus
ICD	International Classification of Diseases
ICPD	International Conference on Population and Development
MICS	Multiple Indicator Cluster Survey
MMR	Maternal Mortality Ratio
MMRate	Maternal Mortality Rate
MoH	Ministry of Health
NDP	National Development Plan
NGO	Non-Governmental Organisation
NHP	National Health Policy
PNC	Postnatal Care
PMDF	Proportion of Maternal Deaths among Deaths of Women of Reproductive Age
PHC	Population and Housing Census
RNPP	Revised National Population Policy
SBA	Skilled Birth Attendant
SDGs	Sustainable Development Goals
SRH	Sexual and Reproductive Health
SRHR	Sexual and Reproductive Health and Rights
SPSS	Statistical Package for the Social Sciences
Stats	Statistics
TFR	Total Fertility Rate
TNDP	Transitional National Development Plan
UN	United Nations
UNDESA	United Nations Department of Economic and Social Affairs
UNFPA	United Nations Population Fund
UNICEF	United Nations Children's Fund
WHO	World Health Organization
WG-SS	Washington Group Short Set on Functioning

Executive Summary

This report presents a comprehensive and multidimensional analysis of maternal health in Botswana, drawing on the 2022 Population and Housing Census (PHC), maternal mortality notifiable records from the Ministry of Health, Vital Statistics, and a range of national household surveys including the Botswana AIDS Impact Survey V (BAIS V). The report seeks to inform evidence-based planning and policy development by providing granular insights into maternal mortality trends, fertility patterns, service coverage, and socio-demographic determinants across districts, localities, and population subgroups.

Purpose and Significance

The overarching aim is to strengthen maternal health programming in Botswana by identifying disparities, tracking progress towards national and international goals, and proposing strategic interventions for reducing maternal deaths. This aligns with Botswana's commitments under the Sustainable Development Goals (SDGs), Vision 2036, the National Health Policy, the Revised National Population Policy (RNPP), and regional frameworks such as the Addis Ababa Declaration on Population and Development and the African Union Agenda 2063.

Key Findings

- **Maternal Mortality Ratio (MMR):** The national MMR for 2022, based on medically certified maternal deaths and vital statistics, was estimated at 163.7 per 100,000 live births. This represents a significant improvement from earlier years, though it remains above the SDG target of 70. The census-based MMR, before adjustment, stood at 424.3 per 100,000; after applying a correction factor (0.38), it aligned closely with the Ministry of Health estimate (161.2).
- **Geographic Disparities:** Maternal deaths remain concentrated in specific districts such as Ngamiland East, Kgalagadi South, and Kweneng East. Urban villages recorded the highest number of maternal deaths (73.5%), reflecting overburdened peri-urban health infrastructure. Rural areas face heightened risk due to long distances, inadequate referral systems, and limited emergency obstetric care.
- **Fertility Trends: Botswana's Total Fertility Rate (TFR)** has plateaued at 2.9 children per woman, after decades of decline. High fertility persists in rural and socioeconomically disadvantaged districts, such as Ngamiland West, Tutume, and Kweneng West. Conversely, cities like Gaborone and Francistown report TFRs below 2.0.
- **Contraceptive Prevalence Rate (CPR):** As of 2022, the national CPR (modern methods) stood at 63.4%, a considerable increase from 33.3% in 1996. However, the pace of progress has slowed, and gaps remain across age groups (particularly adolescents), employment status, and household wealth levels.
- **Antenatal Care (ANC) and Skilled Birth Attendance (SBA):** ANC coverage is nearly universal (99.1%), and 99.8% of all deliveries occur in health facilities attended by skilled personnel. Nonetheless, challenges persist in the quality and timeliness of care, as well as in the documentation of ANC visit frequency and SBA service content.
- **Postnatal Care (PNC):** No reliable or recent data exist on postnatal care utilisation in Botswana. National surveys (BAIS V, BDS 2017) lack PNC questions, and facility data are not publicly available. Given that 99.8% of births are facility-based, it is assumed that immediate postpartum checks are conducted. However, follow-up PNC coverage remains unmeasured.
- **Data Gaps and Systemic Challenges:** Maternal mortality data are currently recorded through non-coded systems, where critical variables—including facility name, gestational age, HIV status, and cause of death—are captured as unstructured text. Moreover,

demographic and socioeconomic variables (e.g., education, marital status, employment) are not routinely collected in facility-based records. This limits the ability to conduct root-cause analysis, monitor trends over time, or conduct policy-relevant stratifications.

Policy and Programme Implications

The findings reveal that while Botswana has achieved near-universal coverage for several key maternal health services, substantial equity gaps and systemic bottlenecks remain. These include regional disparities, lack of standardised data coding, poor integration between CRVS and maternal surveillance systems, and limited capacity to track social determinants.

Botswana's robust policy framework needs to be complemented by investments in interoperable digital health systems, decentralised emergency obstetric services, improved data structuring, and institutionalisation of maternal death audits.

Recommendations

- 1. Prioritise Data Coding and Digitalisation:** Develop a national codebook for vital events such as births and deaths and standardise the use of ICD-10 classifications. Transition data entry from Excel to statistical packages (e.g., SPSS) to improve accuracy, consistency, and analysis.
- 2. Strengthen Maternal Health Systems:** Expand referral capacity in underserved districts, ensure 24-hour emergency obstetric care in peri-urban and rural areas, and train frontline workers in maternal death audit procedures and postnatal follow-up.
- 3. Advance Socio-demographic Integration:** Modify obstetric reporting tools to include education, employment, marital status, and place of residence which are essential for identifying at-risk groups and targeting interventions effectively.
- 4. Enhance PNC Monitoring:** Incorporate postnatal care (PNC) questions into upcoming surveys and strengthen the Health Management Information System (HMIS) to capture PNC data disaggregated by age, district, and type of service.
- 5. Institutionalise Equity Monitoring:** Disaggregate maternal health indicators by disability status, economic status, and urban/rural locality in line with the “leave no one behind” principle of the SDGs.

1. INTRODUCTION

1.1. Purpose of the Report

This report provides an in-depth analysis of maternal health in Botswana, drawing on the 2022 Population and Housing Census (PHC), the Botswana Maternal Mortality Ratio Reports (2019–2022), and administrative data from the Ministry of Health. Its primary aim is to examine maternal mortality levels and patterns, identify geographic and socio-demographic disparities, and offer evidence-based recommendations to inform targeted interventions, policy formulation, and resource allocation.

Specifically, the report:

- Identifies the spatial and demographic distribution of maternal deaths.
- Assesses progress towards national and international maternal health goals.
- Highlights high-risk populations and underperforming health districts.
- Supports national planning and programming under Botswana's National Development Plan 11 (NDP11) and Vision 2036.

This comprehensive analysis is part of the ongoing collaborative work between Statistics Botswana and the Ministry of Health – Sexual and Reproductive Health Division (SRHD), with support from UNFPA, to enhance the availability, quality, and use of maternal mortality data for decision-making.

1.2. Context: Botswana's Commitment to Maternal Health, SRHR, and the SDGs

Botswana has consistently demonstrated a strong national, regional, and global commitment to advancing sexual and reproductive health and rights (SRHR) and reducing maternal mortality. Recognising that maternal health is not only a public health issue but also a matter of human rights, social equity, and sustainable development, the Government of Botswana has integrated maternal health into its overarching policy frameworks and international obligations.

A key milestone in Botswana's data-driven approach to maternal health was the successful conduct of the 2022 Population and Housing Census (PHC) by Statistics Botswana, in collaboration with national stakeholders and supported by UNFPA. This was the first fully digital census in the country's history and marked a significant step toward modernising demographic data collection. The 2022 PHC has produced reliable, comprehensive, and timely socio-demographic data, forming a robust foundation for thematic analysis and evidence-based policymaking.

As part of the post-enumeration phase, the Government prioritised thematic analyses in areas of national relevance, including maternal health. The United Nations Population Fund (UNFPA), as a lead partner in census-related initiatives, committed to supporting the thematic analysis of SRHR, focusing on maternal health due to its strategic significance to public health, gender equality, and socio-economic development. The study aims to identify key trends, geographic inequalities, and social determinants related to maternal mortality, fertility, family planning, and access to quality antenatal and delivery services.

The objective of this thematic analysis is to:

- Examine spatial and socio-demographic disparities in maternal mortality.
- Identify the social determinants influencing maternal health outcomes.
- Provide evidence to inform policy development, programmatic interventions, and resource allocation.

1.3. National Frameworks Supporting Maternal Health

This work contributes directly to Botswana's national efforts to uphold maternal health as a human right, and to meet its obligations under global and regional development frameworks. Botswana's commitment to maternal health is firmly embedded in its national development and policy frameworks:

1.3.1. Revised National Health Policy (2011):

This policy articulates Botswana's commitment to universal health coverage and equitable access to high-quality health services, including maternal and newborn care. It promotes:

- Expansion of antenatal, delivery, and postnatal services.
- Strengthening emergency obstetric and newborn care (EmONC).
- Reduction of regional and socio-economic disparities in health outcomes.
- Integration of maternal health into the primary healthcare system.

1.3.2. Revised National Population Policy (2010):

This policy recognises maternal health as a determinant of population dynamics and sustainable development. It prioritises:

- Reduction of maternal mortality through access to skilled care.
- Strengthening of family planning services.
- Addressing socio-economic factors affecting reproductive health.

1.3.3. Vision 2036:

Botswana's long-term development blueprint envisions a healthy and inclusive society.

Under Pillar 2: Human and Social Development, the Vision targets:

- A resilient healthcare system that reduces maternal mortality.
- Universal access to antenatal care, skilled birth attendance, and contraception.
- Gender equality and women's empowerment across all sectors.

1.3.4. National Development Plan 11 (2017–2023) and Second Transitional National Development Plan (TNDP 2):

These plans highlight maternal health as a strategic priority, focusing on:

- Strengthening maternal and child health services.
- Reducing regional disparities in SRHR outcomes.
- Investing in health system capacity and data-driven planning.

1.3.5. National Policy on Gender and Development (2015):

Promotes gender-sensitive health services and supports the empowerment of women through:

- Improved access to maternal health and family planning services.
- Prevention and response to gender-based violence (GBV).
- Socio-economic inclusion of women, including access to education and employment for young mothers.

1.3.6. Regional and Global Commitments

Regionally, Botswana is a signatory to:

- The Addis Ababa Declaration on Population and Development (AADPD), which calls for improved maternal and newborn care.

The AADPD provides a structured framework for integrating population, health, and development policies. It is built around four key pillars, each with corresponding commitments:

- **Dignity and Human Rights:** Ensuring access to reproductive health services for all, particularly vulnerable groups.
 - **Health and Well-being:** Reducing maternal and adolescent mortality and increasing contraceptive access.
 - **Place and Mobility:** Addressing youth migration and healthcare access.
 - **Governance and Accountability:** Strengthening data systems for SRHR monitoring.
- The African Union Agenda 2063, which promotes people-centred health systems, women's rights, and the reduction of maternal mortality.

The African Union Agenda 2063 emphasizes health and human capital development as key pillars for continental transformation. The analysis supports:

- **Aspiration 1:** A prosperous Africa based on inclusive growth and sustainable development, achieved through high-quality health services for women and youth.
 - **Aspiration 6:** An Africa where development is people-driven, ensuring that youth and maternal health services are accessible, equitable, and high-quality.
 - **AU Health Policy Framework:** Strengthening maternal health service delivery and promoting universal access to reproductive healthcare.
- 2030 Sustainable Development Agenda

Globally, Botswana has committed to the 2030 Sustainable Development Agenda. With respect to maternal health, the following targets are pursued:

- **SDG 3:** Ensure Healthy Lives and Promote Well-being for All at All Ages
Target 3.1: Reduce maternal mortality to less than 70 per 100,000 live births.
Target 3.7: Ensure universal access to sexual and reproductive health-care services, including family planning, education, and integration into national strategies.
- **SDG 5:** Achieve Gender Equality and Empower All Women and Girls
Target 5.6: Ensure universal access to reproductive rights and health services, including contraception and maternal care.
- **SDG 10:** Reduce Inequality Within and Among Countries
Target 10.2: Promote social, economic, and political inclusion, particularly for young women and marginalized groups.
- **SDG 17:** Strengthen the Means of Implementation and Revitalize Global Partnerships for Sustainable Development
Target 17.18: Enhance capacity-building for high-quality, timely, and reliable data collection to inform health policies.

These commitments are grounded in Botswana's constitutional guarantees of the right to life and health, affirming the Government's dedication to ensuring that no woman dies from preventable causes related to pregnancy and childbirth.

1.4. Strategic Significance of the Thematic Analysis

This report supports Botswana's policy and development goals by offering a detailed thematic analysis of maternal health using the 2022 PHC and complementary national data sources.

The insights derived will:

- Strengthen data-informed maternal health policies and programming.
- Identify priority districts and populations facing disproportionate risks.
- Support strategic investments in infrastructure, service delivery, and human resources.
- Contribute toward the realisation of national targets under Vision 2036, NDP 11, and global maternal health benchmarks.

1.5. Importance of Maternal Health

Maternal health remains a critical global public health priority and a cornerstone for achieving gender equality and sustainable development. Although substantial progress has been made over the past two decades, maternal mortality continues to be unacceptably high, particularly in low- and middle-income countries. Globally, it is estimated that about 800 women die every day from preventable causes related to pregnancy and childbirth, amounting to approximately 260,000 maternal deaths in 2023 alone (WHO, UNICEF, UNFPA, World Bank Group & UNDESA, 2024). Of these, 92% occurred in low- and lower-middle-income countries, highlighting persistent inequities in access to quality maternal healthcare.

Between 2000 and 2023, the global maternal mortality ratio (MMR) declined by about 40%, reflecting improved access to skilled birth attendants, antenatal care, and emergency obstetric services (UNFPA et al., 2024). However, the pace of progress has slowed in recent years, with some regions experiencing stagnation or even reversals. Nowhere is this more apparent than in Sub-Saharan Africa, which remains the region with the highest maternal mortality ratio in the world, accounting for approximately 70% of global maternal deaths in 2023. Many women in the region die due to complications such as haemorrhage, hypertension, sepsis, and obstructed labour, most of which are preventable with timely access to quality healthcare.

The persistently high maternal mortality rates in Sub-Saharan Africa, including Botswana, are shaped by a combination of factors, including inadequate health infrastructure, socio-economic inequalities, gender norms, and limited access to modern contraceptives. As Ngome and Odimegwu (2014) argue in their multilevel study on adolescent contraceptive use in Zimbabwe, social context, including community norms, education levels, and economic opportunities, plays a crucial role in shaping reproductive health outcomes and the use of modern family planning methods, which are essential for preventing unintended pregnancies and reducing maternal risk exposure. As such, addressing maternal mortality is not only a medical imperative but also a societal one, requiring a comprehensive and multi-sectoral response that considers the structural, behavioural, and contextual determinants of maternal health.

2. METHODOLOGY

2.1. A Review of the Data Sources for Maternal Health

2.1.1. Introduction

This subsection reviews key national data sources used to measure maternal health in Botswana. Each source is assessed based on its relevance for specific maternal health indicators, including:

- Maternal Mortality Ratio (MMR)
- Maternal Mortality Rate (MMRate)
- Proportion of Maternal Deaths Among Deaths of Women of Reproductive Age (PMDf)
- Lifetime Risk of Maternal Death
- Total Fertility Rate (TFR)
- Contraceptive Prevalence Rate (CPR)
- Antenatal Care (ANC) Coverage
- Skilled Birth Attendance (SBA)
- Postnatal Care (PNC) Coverage

Additionally, the review considers the advantages and disadvantages of each source, including challenges in the availability of socioeconomic variables essential for disaggregated analysis.

2.1.2. The 2022 Population and Housing Census (PHC)

The 2022 Population and Housing Census (PHC) is a nationally representative data source conducted by Statistics Botswana that provides comprehensive demographic, social, and economic data at individual and household levels. In the context of maternal health, the census offers valuable information for estimating several key indicators, including the Maternal Mortality Ratio (MMR), Proportion of Maternal Deaths Among Deaths of Women of Reproductive Age (PMDf), Lifetime Risk of Maternal Death, and Total Fertility Rate (TFR). Additionally, it allows for the analysis of household-level correlates of maternal deaths, such as age, marital status, education level, disability status, and urban-rural residence.

One of the primary strengths of the 2022 PHC lies in its comprehensive national coverage, which ensures inclusion of all population groups across Botswana, enabling disaggregation of maternal health indicators at district and sub-district levels. The inclusion of socioeconomic and demographic variables facilitates exploration of structural inequalities and identification of populations at higher risk of poor maternal outcomes.

However, there are notable limitations. Maternal deaths recorded in the census are based on household reporting rather than medical certification, raising concerns about misclassification or over-reporting. The census does not capture clinical details such as the timing (ante-partum, in-partum, or post-partum) or medical causes of maternal deaths, limiting its utility for detailed epidemiological assessment.

Furthermore, a key challenge is that the 2022 PHC does not collect data on clinical service indicators such as antenatal care (ANC) coverage, skilled birth attendance (SBA), or postnatal care (PNC). As a result, it cannot directly assess access to or utilisation of maternal health services. The absence of these clinical variables also constrains the ability to link reported maternal deaths to health system performance or quality of care.

Despite these limitations, the 2022 PHC remains a critical data source for broad-based maternal health surveillance and for understanding the sociodemographic distribution of maternal mortality across Botswana.

2.1.3. 2011 Population and Housing Census (PHC) & 2001 Population and Housing Census (PHC)

The 2011 and 2001 Population and Housing Censuses serve as important reference points for tracking long-term fertility trends and demographic transitions in Botswana. While neither census included questions directly related to maternal mortality, they remain valuable for estimating the Total Fertility Rate (TFR) and for analysing background sociodemographic patterns relevant to maternal health.

The 2011 Census provided updated estimates of TFR and offered a broad overview of population structure, household characteristics, and access to basic amenities. These variables are instrumental in historical comparisons of fertility behaviour, regional population growth, and socioeconomic correlates of reproductive health outcomes. Similarly, the 2001 Census serves as a baseline for examining long-term demographic changes and fertility decline across districts and subpopulations.

The key advantage of both censuses lies in their ability to support retrospective trend analysis of fertility indicators and provide population denominators needed for calculating maternal health-related ratios from other sources. They also help contextualise changes in household living conditions and socioeconomic status that may influence maternal health outcomes over time.

However, significant limitations constrain their utility in a maternal health-focused analysis. Notably, neither the 2011 nor the 2001 census included a maternal mortality module, meaning no data were collected on pregnancy-related deaths, causes of death, or access to maternal health services. As such, they cannot support direct estimation of maternal mortality indicators such as the Maternal Mortality Ratio (MMR), Proportion of Maternal Deaths Among Women of Reproductive Age (PMDF), or Lifetime Risk of Maternal Death.

Additionally, these datasets are outdated for current policy and programming needs. While they may reveal structural factors contributing to maternal health outcomes, their relevance is diminished by substantial changes in the health system, service coverage, and population dynamics over the past decade or more. Furthermore, the 2001 Census offers only limited detail on socioeconomic variables that are now central to disaggregated maternal health analysis, such as educational attainment, disability, and urban-rural disparities.

2.1.4. 2017 Botswana Demographic Survey (BDS)

The 2017 Botswana Demographic Survey (BDS), conducted by Statistics Botswana, stands as a nationally representative household survey that generates critical data for tracking population dynamics and key reproductive health indicators. With a specific focus on maternal health, the survey enables estimation of key indicators such as the Maternal Mortality Ratio (MMR), Maternal Mortality Rate (MMRate), Proportion of Maternal Deaths Among Deaths of Women of Reproductive Age (PMDF), Lifetime Risk of Maternal Death, Total Fertility Rate (TFR), and Contraceptive Prevalence Rate (CPR).

One of the strengths of the BDS 2017 is its inclusion of a maternal mortality module, which employs the indirect sisterhood method to estimate the level of maternal deaths among women aged 15–49. This is complemented by fertility histories and reproductive health data that allow estimation of the TFR and CPR. The survey also collects rich socioeconomic data, including education level, marital status, and employment, enabling disaggregation of maternal health indicators by background characteristics. These features make the BDS 2017 a valuable tool for national-level maternal health surveillance and policy development.

Despite these strengths, the BDS has several limitations. The use of the indirect sisterhood method means that maternal mortality estimates are derived from respondents' reports about the survival of their sisters. While useful in the absence of complete vital registration systems, this method is subject to recall bias, does not provide recent year-specific estimates, and cannot capture the

timing or medical cause of death. Moreover, the sample size of the BDS was not large enough to produce statistically robust maternal mortality estimates at the district or sub-district level, limiting its utility for localised planning.

A further challenge is that the 2017 BDS does not collect data on clinical service coverage indicators such as Antenatal Care (ANC), Skilled Birth Attendance (SBA), or Postnatal Care (PNC). As a result, it cannot be used to assess service uptake or quality of care, critical dimensions in understanding preventable maternal deaths. Additionally, the maternal deaths reported in the BDS are not medically certified, making it difficult to distinguish between direct and indirect obstetric causes or to validate findings with health system data.

In conclusion, the 2017 Botswana Demographic Survey provides a useful snapshot of fertility, family planning, and maternal mortality levels at the national level. However, its reliance on indirect methods, lack of service coverage data, and limited geographic granularity constrain its application for detailed maternal health policy and programme evaluation.

2.1.5. Multi-Topic Household Surveys (2019 To 2022)

The Multi-Topic Household Surveys (MTHS) conducted by Statistics Botswana between 2019 and 2022 are nationally representative instruments designed to monitor living conditions, household welfare, and labour market dynamics. While these surveys provide valuable socioeconomic data, they are not designed to collect information on core maternal health indicators.

The last round of MTHS that included detailed reproductive health data, including Total Fertility Rate (TFR) and Contraceptive Prevalence Rate (CPR), was the 2015/16 Botswana Multiple Indicator Survey (MIS), which forms part of the MTHS series. Since then, subsequent MTHS rounds have largely focused on labour and household economic issues, omitting maternal health-related modules. As a result, they no longer collect data on critical maternal health service utilisation indicators such as contraceptive use, skilled birth attendance (SBA), antenatal care (ANC) coverage, or postnatal care (PNC).

Although the current MTHS provides detailed individual and household-level data on education, employment, income, housing, and insurance coverage, which are essential for understanding the broader socioeconomic determinants of health, the absence of maternal health-specific data significantly limits their applicability for tracking maternal health outcomes.

Furthermore, the MTHS does not collect data on maternal deaths or related mortality indicators, which precludes the estimation of metrics such as the Maternal Mortality Ratio (MMR), Maternal Mortality Rate (MMRate), or the Proportion of Maternal Deaths Among Women of Reproductive Age (PMDF).

While the MTHS offers the advantage of geocoded and stratified data, facilitating equity-focused disaggregation by district, urban/rural setting, and other demographic factors, their limited scope in maternal health restricts their contribution to monitoring safe motherhood and reproductive health outcomes. Their utility in maternal health surveillance is currently confined to contextualising risk factors and providing socioeconomic background rather than directly informing health service coverage or mortality trends.

2.1.6. Botswana AIDS Impact Survey IV (2013) & V (2021)

The Botswana AIDS Impact Surveys (BAIS) IV and V, conducted in 2013 and 2021 respectively, are nationally representative surveys that focus primarily on monitoring the HIV/AIDS epidemic and its broader demographic and health implications. While these surveys are not specifically designed to measure maternal health outcomes, they offer relevant data for selected indicators such as the Contraceptive Prevalence Rate (CPR), Total Fertility Rate (TFR), and HIV-related maternal risk factors.

Both surveys collect detailed information on sexual and reproductive health (SRH), including knowledge and use of contraceptive methods, fertility preferences, and self-reported and biomarker-based HIV status. The data are disaggregated by age, sex, marital status, and educational attainment, allowing for nuanced analysis of sub-populations, including women of reproductive age. The HIV testing component enables assessment of HIV prevalence and risk factors among pregnant and postpartum women, which is essential for identifying indirect causes of maternal mortality related to HIV/AIDS.

The major strength of the BAIS lies in its ability to assess intersections between HIV and reproductive health, providing critical information for integrated maternal and HIV programming. For example, the data can be used to assess contraceptive uptake among HIV-positive women, evaluate HIV-related fertility trends, and explore the reproductive intentions of women living with HIV.

However, despite these advantages, the BAIS surveys do not include direct indicators of maternal mortality, such as the Maternal Mortality Ratio (MMR) or Proportion of Maternal Deaths Among Deaths of Women of Reproductive Age (PMDF). Additionally, they lack information on maternal healthcare service utilisation, including Antenatal Care (ANC), Skilled Birth Attendance (SBA), and Postnatal Care (PNC). As such, their application in assessing the performance of maternal health systems is limited.

A further challenge is that while the surveys provide critical insight into risk factors and population-level behaviours, they do not link health outcomes (e.g., maternal deaths or complications) to these behaviours. This limits their direct utility for evaluating maternal health outcomes or the effectiveness of interventions aimed at reducing maternal mortality.

In conclusion, the BAIS IV and V surveys are useful for analysing contraceptive use, fertility patterns, and HIV-related risks among reproductive-age women, but are not adequate for monitoring maternal mortality or evaluating the continuum of maternal health care. They should therefore be used in combination with other data sources to provide a more comprehensive picture of maternal health in Botswana.

2.1.7. Botswana Maternal Mortality Notifiable Records (2020 To 2023)

The Maternal Mortality Notifiable Records compiled by the Ministry of Health between 2020 and 2023 constitute Botswana's primary health facility-based data source for tracking maternal deaths. These records are instrumental in estimating key maternal health indicators such as the Maternal Mortality Ratio (MMR), Maternal Mortality Rate (MMRate), Proportion of Maternal Deaths Among Deaths of Women of Reproductive Age (PMDF), and Lifetime Risk of Maternal Death.

A major strength of this data source is its reliance on medically certified causes of death, which enhances data reliability and allows for the standardised classification of deaths into direct and indirect maternal causes using the ICD-10 framework. The records are linked to health facilities where the deaths occurred, allowing health system managers to monitor facility-based maternal outcomes and improve clinical responses to obstetric emergencies. This is essential for maternal death audits and quality-of-care assessments.

However, a significant limitation of the notifiable records is that they do not contain information on the usual place of residence of the deceased women. As such, the data reflect the location of death rather than the geographical origin of the patient. This poses a challenge because many women who die in tertiary or district hospitals were referred from lower-level health facilities in different localities or districts. In many cases, women are transferred from rural or underserved districts to better-equipped referral centres, particularly when complications arise during labour, delivery, or the postpartum period.

This referral-based reporting structure introduces a systemic geographic bias in the data. Districts that lack higher-level health facilities are under-represented in the maternal death statistics, while referral centres in urban or better-resourced districts may appear to have disproportionately high maternal deaths. Consequently, districts with lower socioeconomic status and weaker health

systems are less likely to be reflected in the maternal mortality counts, despite being the origin of a substantial number of fatal cases. This limits the use of the data for equitable sub-national analysis, health systems planning, and targeted interventions.

Another disadvantage is that the data do not include individual-level socioeconomic information, such as educational attainment, employment status, or living conditions. Nor are they linked to fertility histories, family planning use, or antenatal care attendance. As a result, they cannot provide insights into the social determinants of maternal mortality or the continuum of care preceding the death. Furthermore, maternal deaths occurring outside health facilities—such as at home or during transport—are typically not captured, potentially leading to undercounting in regions with limited facility access or weak reporting systems.

2.1.8. Vital Statistics Data (2019 To 2022)

Botswana's Vital Statistics system, derived from the Civil Registration and Vital Statistics (CRVS) framework, serves as a foundational data source for monitoring both fertility and mortality patterns. Covering the period from 2019 to 2022, this system provides comprehensive and increasingly accurate records on births and deaths, including both live births and stillbirths. In the context of maternal health, accurate enumeration of live births is essential for calculating the Maternal Mortality Ratio (MMR), a key indicator defined as the number of maternal deaths per 100,000 live births.

A key strength of the Vital Statistics system lies in its comprehensive registration of births, capturing essential details such as place of birth, maternal age, and birth outcomes (live birth or stillbirth). This makes it the most reliable source for the national count of live births, which is indispensable for determining the denominator in maternal mortality calculations. When paired with maternal death data from the Maternal Mortality Notifiable Records (2020–2023) compiled by the Ministry of Health, it supports the estimation of maternal mortality indicators with enhanced accuracy and consistency.

On the mortality side, the Vital Statistics system captures medically certified causes of death, along with a range of demographic and socioeconomic variables, including age, sex, education level, occupation, marital status, district and village of residence, and the location and type of facility where death occurred (e.g., home or health facility). This allows for meaningful socioeconomic and geographic profiling of mortality trends.

However, a major limitation of the Vital Statistics system in the context of maternal health is its inability to accurately classify deaths as maternal deaths. While the system records sex, age, and certified causes of death, it does not capture pregnancy status at the time of death, nor does it include information on the timing of death in relation to the end of pregnancy (e.g., antepartum, intrapartum, postpartum). Furthermore, ICD-10 maternal mortality codes (O00–O99) are not systematically applied. These omissions make it impossible to reliably determine whether a woman's death was related to or aggravated by pregnancy or its management, as defined by the WHO.

Consequently, although the Vital Statistics system provides valuable mortality data, it cannot independently support the estimation of maternal mortality indicators such as the MMR, Maternal Mortality Rate (MMRate), or Proportion of Maternal Deaths Among Deaths of Women of Reproductive Age (PMDf). These indicators can only be derived when Vital Statistics birth data (i.e., live births) is combined with maternal death data from the Ministry of Health's Notifiable Records, which contain medically certified and pregnancy-related cause-of-death information, including classification into direct and indirect causes of maternal death.

2.1.9. Other Reports Published by Statistics Botswana (Stas Briefs, Maternal Mortality Reports, etc.)

Statistics Botswana regularly publishes a range of analytical and summary reports, including Statistical Briefs (Stas Briefs), Annual Health Reports, and Key Indicators updates, which compile and present highlights of national demographic and health trends. These publications often draw upon a variety of primary data sources, including the Population and Housing Census,

Demographic Surveys, Vital Statistics, Multi-Topic Household Surveys, and sectoral administrative records. They are valuable for tracking aggregate trends in maternal health indicators such as the Maternal Mortality Ratio (MMR), Total Fertility Rate (TFR), Contraceptive Prevalence Rate (CPR), Antenatal Care (ANC) coverage, Skilled Birth Attendance (SBA), and Postnatal Care (PNC), particularly when sourced from health administrative systems.

One of the key strengths of these reports is their accessibility and timeliness. Designed with policymakers, programme managers, and stakeholders in mind, these publications are user-friendly, often accompanied by graphs, infographics, and plain-language summaries that facilitate quick interpretation of national-level indicators. They are particularly helpful in disseminating preliminary or updated findings while awaiting the release of more comprehensive datasets or survey reports.

Another advantage is that these reports may offer early insight into emerging maternal health issues, as they often highlight year-on-year changes in service coverage or health outcomes based on real-time administrative data. This makes them useful for tracking progress towards national and international targets, such as those outlined in the National Health Policy, Vision 2036, and the Sustainable Development Goals (SDGs).

However, these publications also present important limitations for rigorous maternal health analysis. Since they are secondary summaries, they do not include raw microdata, which precludes disaggregated analysis by socioeconomic or geographic subgroups. Users cannot assess maternal health disparities by variables such as age, education, income, disability status, or urban-rural location, limiting the ability to target interventions toward vulnerable populations.

Additionally, these reports do not support new or multivariate analysis, as the underlying datasets are not embedded within the publication and often require formal data requests or special access procedures. As such, while they are useful for high-level monitoring, they are inadequate for in-depth exploration of risk factors, causal pathways, or localised patterns of maternal health outcomes.

2.2. Key Indicators of Maternal Health Analysed

2.2.1. Measures of Maternal Mortality

This section presents the key measures of maternal mortality commonly used in demographic and public health analyses. These measures offer varying but complementary insights into the level and distribution of maternal mortality within a population.

The Maternal Mortality Ratio (MMR) captures the obstetric risk associated with pregnancy and childbirth, while the Maternal Mortality Rate (MMRate) reflects the risk in the general population of women of reproductive age. The Lifetime Risk of Maternal Death aggregates the cumulative probability of dying from maternal causes over the reproductive lifespan of a woman, thereby offering a long-term perspective on maternal risk. Additionally, the Proportion of Maternal Deaths among Female Deaths of Reproductive Age (PMDR) indicates the extent to which maternal causes contribute to overall mortality among women aged 15–49.

Collectively, these measures facilitate a nuanced understanding of maternal health outcomes, enabling policymakers and programme planners to design targeted interventions and evaluate progress in reducing maternal deaths over time.

a) Maternal Mortality Ratio (MMR)

The Maternal Mortality Ratio (MMR) is the standard and internationally accepted indicator used to measure maternal mortality. It represents the number of maternal deaths per 100,000 live births within a specified time period and reflects the risk of a woman dying as a result of pregnancy or childbirth once she has become pregnant. MMR is the primary indicator used in this report to assess maternal mortality in Botswana. It is also the global benchmark indicator adopted for monitoring maternal health under the Sustainable Development Goals (SDG 3.1) and by the World Health Organization (WHO).

- **Formula:**

- $MMR = (\text{Maternal deaths}/\text{Live births}) \times 100,000$

In this report, MMR estimates are derived using two complementary data sources:

- The 2022 Population and Housing Census (PHC), which provides household-reported maternal deaths and total live births across the country. This source enables a population-level estimation of maternal mortality and allows for detailed disaggregation by geographic area (district, health district, locality) and key demographic subgroups.
- The Ministry of Health (MoH) Maternal Mortality Notifiable Records, which capture medically certified maternal deaths reported through the health system, combined with live birth counts from Botswana's Vital Statistics system. This administrative data source benefits from standardised medical classification (including ICD coding) and is considered to offer a more accurate and clinically verified measure of maternal mortality at the national level.

While census-based estimates provide invaluable information for analysing sub-national disparities and exploring associations with social and economic variables, they are limited by the reliance on household-reported deaths, which may include overreporting or misclassification. In contrast, the MoH data, though more precise, may undercount deaths that occur outside the formal health system or among women who do not engage with medical services.

To ensure comparability and improve accuracy, this report applies an adjustment factor to the maternal mortality ratio (MMR) calculated from the 2022 PHC data. The factor is derived by comparing total maternal deaths reported in the census with verified maternal deaths recorded in the Ministry of Health's notifiable data. This adjustment accounts for the tendency of census data to include unverified deaths that may not meet the strict definition of maternal mortality, thereby aligning census-based MMR estimates with medically certified figures from administrative records. This approach allows the report to present census-based MMR estimates that are harmonised with national benchmarks while retaining the valuable disaggregation capacity of census data.

By integrating both data sources and applying this adjustment methodology, the report ensures that the MMR figures are both demographically rich (for identifying disparities and trends) and clinically robust (for national and international reporting purposes).

- **Formula:**

b) Maternal Mortality Rate (MMRate)

This measure of maternal mortality captures the risk of maternal death among the general population of women aged 15 to 49 years. It is the number of maternal deaths per 100,000 women of reproductive age (usually 15–49 years). The purpose of this measure is to reflect both fertility levels and the risk of maternal death. Useful for comparisons across populations with different fertility levels. This report only provides the indicator and does not go on to do trend analysis of this measure.

- **Formula:**

- $MMRate = (\text{Maternal deaths}/\text{Women aged 15–49}) \times 100,000$

c) Lifetime Risk of Maternal Death

This indicator measures the probability that a 15-year-old girl will eventually die from a maternal cause, assuming current levels of fertility and maternal mortality. The purpose is to capture the cumulative risk of maternal death over a woman's reproductive life. This report only provides the indicator and does not go on to do trend analysis of this measure.

- **Formula:**

- o **Lifetime risk=1-(1-MMR×TFR)³⁵ (where TFR = Total Fertility Rate)**

- d) **Proportion of Maternal Deaths Among Deaths of Women of Reproductive Age (PMDF)**

This indicator measures the percentage of all deaths among women aged 15–49 that are due to maternal causes. It indicates the burden of maternal deaths relative to other causes of death in women of reproductive age. This report only provides the indicator and does not go on to do trend analysis of this measure.

2.2.2. Other Measures of Maternal Health

- a) **Total Fertility Rate (TFR)**

This measure reflects the average number of children a woman is expected to have during her reproductive lifetime, assuming that current age-specific fertility rates remain constant. It is a widely used demographic indicator for assessing fertility levels in a population and informs reproductive health planning and policy formulation.

- **Formula:**

- o **TFR=Σ(ASFR×5)**

Where ASFR refers to the age-specific fertility rate for each 5-year age group between 15–49 years.

- b) **Contraceptive Prevalence Rate (CPR)**

This indicator measures the percentage of women of reproductive age (15–49 years) who are currently using, or whose partner is using, at least one method of modern contraception. CPR is essential for evaluating access to and use of family planning services, and it has direct implications for fertility reduction and maternal health outcomes.

- **Formula:**

- o **CPR = (Number of women aged 15 to 49 using modern contraception / Total number of women aged 15–49) ×100**

- c) **Antenatal Care (ANC) Coverage**

This indicator refers to the percentage of pregnant women who received at least four antenatal care visits during pregnancy, in accordance with WHO's former recommendation. ANC coverage is a key measure of access to preventive and early obstetric care and is crucial for identifying and managing complications during pregnancy.

- **Formula:**

- o **ANC Coverage = (Number of women with ≥ 4 ANC visits / Total number of pregnant women) ×100**

- d) **Skilled Birth Attendant (SBA)**

This indicator captures the proportion of births attended by skilled health personnel such as doctors, nurses, or midwives. It is used to assess access to quality intrapartum care, which significantly reduces maternal and neonatal mortality and morbidity.

- **Formula:**

- o **SBA = (Number of live births attended by skilled health personnel / Total number of live births) × 100**

e) **Postnatal Care (PNC) Coverage**

This measure indicates the percentage of women who received postnatal care from a skilled provider within 48 hours of delivery. It is a critical indicator for maternal health, as the immediate postnatal period is associated with a high risk of maternal and neonatal complications.

- **Formula:**

- o **PNC Coverage = (Number of women receiving PNC within 48 hours / Total number of women who gave birth) × 100**

Table 1 presents an overview of the key indicators, including their definitions, required variables, data sources, and levels of aggregation.

TABLE 1: Key Indicators with their definitions, list of variables required, data sources & aggregation

Key Indicator	List of Variables Required	Data Sources	Aggregation
<ul style="list-style-type: none"> • Maternal Mortality Ratio: Maternal deaths per 100,000 live births. 	<ul style="list-style-type: none"> • Number of Maternal Deaths • Number of Live Births during the same period 	<ul style="list-style-type: none"> • 2022 PHC • Maternal Mortality Data (MoH) • Vital Statistics 	<ul style="list-style-type: none"> • Age • district, • locality • urban/rural,
<ul style="list-style-type: none"> • Contraceptive Prevalence Rate (CPR): Percentage of Women Using Modern Contraceptives 	<ul style="list-style-type: none"> • Number of Women Using Modern Contraceptives among the 15 to 49 years • Number of Women aged 15 to 49 years 	<ul style="list-style-type: none"> • BIAS V (2021) • BAIS IV 2013 • 2017 BDS 	<ul style="list-style-type: none"> • Age • district, • locality • urban/rural, • education,
<ul style="list-style-type: none"> • Total Fertility rate (TFR) Average number of children a woman is expected to have during her lifetime. 	<ul style="list-style-type: none"> • Number of Live Births by 5 Year Age of Women • Number of Women by 5 Year Age of Women 	<ul style="list-style-type: none"> • 2011 PHC • 2017 BDS • 2022 PHC • Vital Statistics • BMTHS(s) 	<ul style="list-style-type: none"> • district, • locality • urban/rural, • education,
<ul style="list-style-type: none"> • Antenatal Care (ANC) coverage: Percentage of pregnant women receiving four or more antenatal visits. 	<ul style="list-style-type: none"> • Number of pregnant women receiving four or more antenatal visit • Number of pregnant women 	<ul style="list-style-type: none"> • BAIS V (2022) • 2017 BDS • BAIS IV (2013) 	<ul style="list-style-type: none"> • District, • Locality • Age group, • Marital Status • Level of Education • Household Wealth Quintile
<ul style="list-style-type: none"> • Skilled Birth Attendant (SBA): Proportion of births assisted by a skilled health professional. 	<ul style="list-style-type: none"> • Number of births assisted by a skilled health professional • Number of Births 	<ul style="list-style-type: none"> • BAIS V (2022) • 2017 BDS • BAIS IV (2013) 	<ul style="list-style-type: none"> • District, • Locality • Age group, • Marital Status • Level of Education • Household Wealth Quintile
<ul style="list-style-type: none"> • Post Natal Care Services (PNC) coverage: Percentage of women receiving postnatal care within 48 hours after delivery. 	<ul style="list-style-type: none"> • Number of Women receiving PNC care within 48 hours after delivery • Number of deliveries/births 	<ul style="list-style-type: none"> • None 	<ul style="list-style-type: none"> • District, • Locality • Age group, • Marital Status • Level of Education • Household Wealth Quintile

2.2.3. Explanatory Variables to Be Used for Disaggregation

This analysis adopts a disaggregated approach to identify demographic and socio-economic disparities in maternal health outcomes across Botswana. Disaggregation of maternal health indicators is essential for understanding inequities, targeting interventions, and informing inclusive policies. The following explanatory variables will be used, where applicable, to assess disparities in access, coverage, and outcomes:

- **Age of Women (15–49 years):** Age disaggregation will follow standard five-year age groups (e.g., 15–19, 20–24, ..., 45–49). This allows for the identification of age-related risks and patterns in maternal health service utilisation and outcomes. Adolescent pregnancies and advanced maternal age are of particular interest due to associated health risks.
- **District of Residence:** Geographic disaggregation by district will be conducted using 2022 Population and Housing Census codes. This enables the identification of spatial disparities in maternal health indicators and assists in locating underserved areas requiring targeted policy attention.
- **Health District:** Beyond administrative districts, the analysis will also be disaggregated by health district boundaries as defined by the Ministry of Health. This level of disaggregation is essential for evaluating maternal health service delivery and outcomes within the broader context of health system performance, resource allocation, and regional program implementation.
- **Urban/Rural Location:** Using census classifications, households and individuals will be categorised as urban or rural residents. This disaggregation is vital for understanding infrastructure-related and service delivery inequalities, with particular attention to rural under-service and accessibility challenges.
- **Education Level:** The highest level of education attained by women of reproductive age will be used to examine correlations between educational attainment and maternal health outcomes. Education is a key social determinant of health and affects knowledge, health-seeking behaviour, and service utilisation.
- **Economic Status:** Household economic status will be approximated using a wealth index derived from asset ownership and housing characteristics, following methods outlined in the 2011 and 2022 Census analytical frameworks. This will allow for equity analysis across wealth quintiles.
- **Sex of Household Head (where applicable):** In exploring household-level determinants, the sex of the household head will be examined in relation to maternal health outcomes, particularly for economic and decision-making implications.

This multi-dimensional disaggregation approach aligns with national and international commitments to leave no one behind, including the SDGs, the Revised National Health Policy, the National Commitment on Adolescent Well-being, and Vision 2036.

2.3. Statistical Analytical Approach

The statistical analysis for this report is designed to assess the levels, trends, and equity gaps in maternal health in Botswana using the 2022 Population and Housing Census and complementary national data sources. The approach combined both descriptive and inferential methods to explore variations in key indicators such as the Maternal Mortality Ratio (MMR), Total Fertility Rate (TFR), Contraceptive Prevalence Rate (CPR), Antenatal Care (ANC) coverage, Skilled Birth Attendance (SBA), and Postnatal Care (PNC).

2.3.1. Descriptive Analysis

Descriptive statistics formed the foundation of the analysis. Frequencies, proportions, and rates were computed for all maternal health indicators. The data were disaggregated by socio-demographic variables such as age, education level, district of residence, household wealth, and urban/rural locality.

The analysis also involved the generation of cross-tabulations to highlight disparities and identify sub-populations at higher risk. Categorical variables were analysed using percentages and frequency distributions. Visual aids such as bar charts and line graphs were employed to present temporal and spatial patterns.

2.3.2. Bivariate Analysis

Where applicable, bivariate analyses were conducted to assess statistical associations between maternal health outcomes and explanatory variables. This included the use of chi-square tests to determine whether differences across population subgroups were statistically significant. These analyses provided valuable insights into the correlates of service utilisation and maternal mortality patterns.

2.3.3. Limitations and the Decision Not to Apply Multivariate Analysis

Although multivariate analysis was originally considered as part of the methodology, it was not conducted in the final analysis due to practical limitations of the datasets. Specifically, the only maternal health outcomes in the data that lent themselves to multivariate analysis were ANC coverage and use of skilled birth attendants. However, the proportion of women who did not use these services was extremely small, leading to sparse outcome categories and unstable model estimates.

Attempting to apply logistic regression under such conditions would have resulted in wide standard errors and low statistical power, making the interpretation of results unreliable and of limited programmatic value. Given these constraints, it was methodologically sound to restrict the statistical analysis to descriptive and bivariate techniques.

Where possible, measures of association from bivariate analysis were reported to provide policy-relevant insights. The report acknowledges that future analyses could benefit from richer datasets or linkage with administrative records to enable more robust inferential modelling of maternal health determinants.

3. TRENDS AND PATTERNS IN MATERNAL HEALTH

3.1. Maternal Mortality Ratio

3.1.1. Introduction

The Maternal Mortality Ratio (MMR) is the most widely used indicator for monitoring maternal health outcomes. It measures the number of maternal deaths per 100,000 live births within a specified time period, typically a year. It reflects the risk of death once a woman becomes pregnant and is directly influenced by the quality, accessibility, and timeliness of maternal healthcare services. The formula for $MMR = (\text{Maternal deaths} / \text{Live births}) \times 100,000$.

3.1.2. MMR Using 2022 Population and Housing Census

The total number of reported maternal deaths among households during the 2022 PHC totalled 234 and the number of live births totalled 55,144.

- o **$MMRCENSUS = (234 / 55,144) \times 100,000 = 434.3$.**

This gives us 424.3 maternal deaths pre 100,000 live births. This indicator provides an estimate that can be utilized fully if other sources cannot provide a better estimate. While this estimate provides a useful national-level indicator, it should be interpreted with caution due to the nature of census-based data. Maternal deaths reported in the census are not medically certified, which increases the likelihood of misclassification, particularly the inclusion of non-maternal deaths of women of reproductive age.

Nevertheless, the census provides a valuable opportunity to analyse broad patterns and disparities in maternal mortality by district, socioeconomic status, and other demographic factors.

3.1.3. MMR Using the 2022 Ministry of Health Maternal Mortality Administrative Data and Vital Statistics

The Ministry of Health (MoH) maintains a notifiable system for tracking maternal deaths occurring in health facilities. These deaths are medically certified, reviewed, and classified using international standards, including the ICD-10 coding system. The number of maternal mortality cases provided by the Ministry of Health for the year 2022 totals 89. The number of live births during the 2022 as provided by the Vital Statistics records totals 54,372, making it the most reliable source for the MMR denominator.

- o **$MMRMOH = (89 / 54,372) \times 100,000 = 163.7$**

From the MMRMOH formula, this gives us an MMRMOH of 163.7 maternal deaths per 100,000 live births, a substantially lower and more accurate estimate compared to the census-derived figure. This estimate is considered the most robust and clinically reliable measure of maternal mortality in Botswana.

3.1.4. Rationale for Preferring Ministry of Health Data over Census Estimates in Measuring Maternal Mortality

The 2022 MMR estimate derived from the Ministry of Health's Maternal Mortality Notifiable Records provides a more accurate and clinically reliable picture of maternal mortality in Botswana than the estimate generated using census data. This measure benefits from the use of medically certified causes of death, standardised classification into direct and indirect maternal deaths, and near-universal coverage of health facility-based deliveries and deaths. Its precision is further enhanced when the number of maternal deaths captured by the Ministry of Health is combined with the accurate count of live births recorded in the Vital Statistics system, which serves as

the appropriate denominator for calculating the MMR. This integrated use of data ensures that the national MMR for 2022 is both methodologically robust and reflective of actual health system performance.

In contrast, while the Population and Housing Census can offer valuable demographic insights and help identify disparities in maternal mortality across different population subgroups, its reliance on household-reported deaths, which are not medically verified or classified using ICD standards, limits its suitability for generating precise national-level maternal mortality indicators. Therefore, for a more reliable and actionable estimate of maternal mortality in Botswana, the combination of MoH maternal death data and Vital Statistics birth data offers the most credible basis for calculating the MMR.

3.1.5. Adjusting Census-Based Maternal Mortality Estimates Using Benchmark Data

Given the discrepancy between the census-based and MoH-based MMR figures, it is useful to adjust the former using a correction factor derived from verified administrative data. This approach improves the accuracy of census-based estimates while preserving their utility for sub-national and demographic analyses.

The correction factor is calculated as:

- o **Correction Factor = (MOH Maternal Deaths/CENSUS Maternal Deaths) = 89/234 = 0.38**

Applying this to the census-derived MMR:

- o **Adjusted MMRCENSUS = 424.3 × 0.38=161.2**

This adjusted estimate closely aligns with the MoH-based MMR of 163.7, confirming the appropriateness of using administrative data as a benchmark to correct for overreporting. This proportional adjustment approach provides a pragmatic demographic method for aligning large-scale census estimates with more accurate administrative records, particularly in settings like Botswana where the Ministry of Health maintains a reliable notifiable system and Vital Statistics records accurate live births. It also reinforces the value of triangulating multiple data sources like the census, civil registration, and administrative records, to generate robust, policy-relevant maternal health indicators.

3.1.6. Trends In Maternal Mortality Ratio

The Maternal Mortality Ratio (MMR) is the most widely used and internationally comparable indicator of maternal health system performance. It measures the number of maternal deaths per 100,000 live births and reflects the effectiveness of healthcare systems in providing timely, quality, and accessible maternal care. Tracking MMR over time enables countries to evaluate their progress toward both national goals and international commitments, including Sustainable Development Goal (SDG) 3.1, which aims to reduce the global MMR to fewer than 70 per 100,000 live births by 2030. Over the past two decades, Botswana has made notable progress in reducing maternal mortality, although not yet at the pace required to achieve this global target.

In the early 2000s, maternal mortality was estimated at around 330 to 370 deaths per 100,000 live births, reflecting both limited access to emergency obstetric care and the peak of the HIV/AIDS epidemic's impact on women of reproductive age. By 2011, the MMR had declined to 188, partly due to increased institutional deliveries, improved access to antiretroviral therapy (ART), and expanded maternal health services.

The downward trend continued in subsequent years. The Botswana Demographic Survey (2017) estimated the MMR at 166, and Ministry of Health data placed the figure at 166.9 in 2020 and 185.5 in 2021. In 2022, the most reliable data source, Ministry of Health maternal death records linked with live births from the Vital Statistics system, estimated the MMR at 163.7 per 100,000 live births.

By comparison, the 2022 Population and Housing Census produced an MMR of 424.3, based on household-reported maternal deaths. However, this figure is considered an overestimate due to the lack of clinical verification. When adjusted using a correction factor derived from medically certified deaths, the adjusted census-based MMR falls to 161.2, which is closely aligned with the MoH estimate.

This trend demonstrates that Botswana is making steady and measurable improvements in maternal health outcomes. The alignment of the adjusted census-based figure with the clinical estimate provides further confidence in the reliability of recent maternal mortality data and confirms that national efforts, such as improved referral systems, better emergency obstetric care, and the integration of maternal health with HIV programmes—are yielding results. **Table 2** shows the Maternal deaths per 100,000 live births from 2001 to 2022 and with accompanying notes.

Table 2: Trends in MMR by year and data source.

Year	MMR (Per 100,000 Live Births)	Data Source	Notes
2001	330–370 (est.)	2001 Census and Health Reports	Pre-HIV-treatment era; elevated indirect maternal deaths
2011	188	MoH Administrative Data	Improved ART access; increased institutional deliveries
2017	166.0	Botswana Demographic Survey (BDS)	Derived from indirect methods
2020	166.9	MoH Notifiable Records & Vital Statistics	Facility-based, medically certified
2021	185.5	MoH Notifiable Records & Vital Statistics	
2022	163.7	MoH + Vital Statistics	Most reliable current estimate
2022	424.3 (unadjusted) 161.2 (adjusted)	2022 Population and Housing Census (PHC)	Household-reported; adjusted using MoH benchmark

3.1.7. District-level Disparities in Maternal Mortality

a) Maternal Mortality Ratio by National District Using 2022 PHC

A total of 234 maternal deaths were reported during the 2022 Population and Housing Census. **Table 3** and **Figure 1** show the percentage distribution of reported maternal deaths by districts during the 2022 PHC census. The analysis of **Table 3** and **Figure 1** reveal marked geographic disparities in the distribution of maternal deaths across Botswana's districts. These disparities likely reflect underlying inequities in the availability, accessibility, and quality of maternal healthcare services, as well as broader socio-demographic and infrastructural differences. This section presents a district-level analysis, focusing on areas with both the highest and lowest burdens of maternal deaths.

- **Districts with the Highest Share of Maternal Deaths**

The district with the highest share of reported maternal deaths in Botswana is Ngamiland East (22.2%). Ngamiland East recorded the highest proportion of maternal deaths in the country, with 52 out of 234 cases. This high burden may be attributable to geographic remoteness, limiting access to emergency obstetric care. High fertility rates or delays in care-seeking, and under-resourced health facilities and long referral pathways may be blamed for the high maternal deaths recorded within the districts.

The district with the second highest share of reported maternal deaths Kgalagadi South at 17.5%. The district reported 41 deaths, Kgalagadi South's high rate of maternal mortality is unexpected and may stem from dispersed rural settlements, which increase travel times to health facilities. It

may also stem from challenges linked to the “three delays” model: delay in deciding to seek care, delay in reaching care, and delay in receiving appropriate care.

Following after Kgalagadi South is Kweneng East with 15.8% of all maternal deaths reported. As one of the country’s most populous districts, Kweneng East’s 37 maternal deaths may reflect a high demand for services and overstretched health systems. It may also reflect urban-rural disparities in access to maternal healthcare within the district.

- **Districts with the Moderate Share of Maternal Deaths**

Districts that share a moderately high maternal mortality include Central Tutume (5.6%), Southern (4.7%), and Central Serowe-Palapye (4.7%) (See Table 3). These districts show moderately high maternal mortality, likely due to a combination of population size and fertility patterns, access limitations and sociocultural factors influencing maternal health behaviours.

Districts with a moderate share of maternal mortality, ranging between 3.4% and 1.3%, include: South-East (3.4%), Ngamiland West (3.0%), Central Mahalapye (2.6%), Central Boteti (2.6%), Kgalagadi North (2.6%), Francistown (2.1%), Central Bobonong (2.1%), Ghanzi (2.1%), Kgatleng (Wards) (1.7%), Barolong (1.7%), Lobatse (1.3%), and Kweneng West (1.3%).

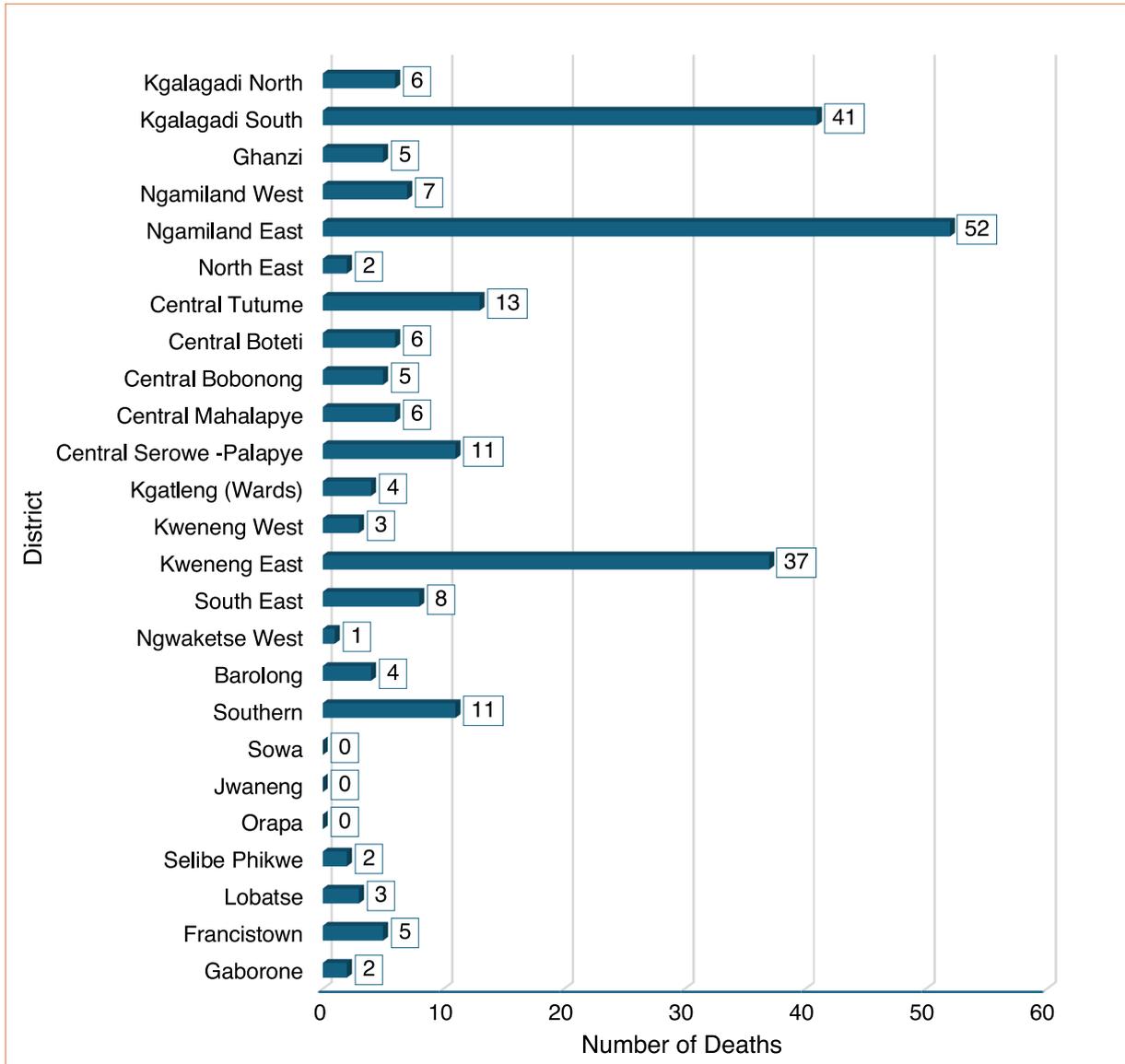
- **Districts with the Lowest Share of Maternal Deaths**

Districts with the lowest share of maternal deaths in Botswana include Ngwaketse West (0.4%), Selibe Phikwe (0.9%), Gaborone (0.9%), and North-East (0.9%) (See Table 3). Notably, the mining towns of Jwaneng, Orapa, and Sowa reported zero maternal deaths, reflecting either the impact of their small populations, restricted access to residence (as in the case of closed towns), or the presence of well-resourced health facilities catering to a limited population. Gaborone, the capital city, benefits from tertiary-level health facilities, well-staffed hospitals, and comprehensive emergency obstetric care, which likely contributes to its low maternal death share. Districts such as Selibe Phikwe and Ngwaketse West may report lower maternal deaths either due to smaller populations or effective local maternal care coverage.

Table 3: Percentage Distribution of Reported Maternal Deaths by District: 2022 PHC

District	Number Of Maternal Deaths	Percent
Gaborone	2.0	0.9
Francistown	5.0	2.1
Lobatse	3.0	1.3
Selibe Phikwe	2.0	0.9
Orapa	-	-
Jwaneng	-	-
Sowa	-	-
Southern	11.0	4.7
Barolong	4.0	1.7
Ngwaketse West	1.0	0.4
South East	8.0	3.4
Kweneng East	37.0	15.8
Kweneng West	3.0	1.3
Kgatleng (Wards)	4.0	1.7
Central Serowe -Palapye	11.0	4.7
Central Mahalapye	6.0	2.6
Central Bobonong	5.0	2.1
Central Boteti	6.0	2.6
Central Tutume	13.0	5.6
North East	2.0	0.9
Ngamiland East	52.0	22.2
Ngamiland West	7.0	3.0
Ghanzi	5.0	2.1
Kgalagadi South	41.0	17.5
Kgalagadi North	6.0	2.6
TOTAL	234.0	100.0

FIGURE 1: Number Of Reported Maternal Deaths By District: 2022 PHC

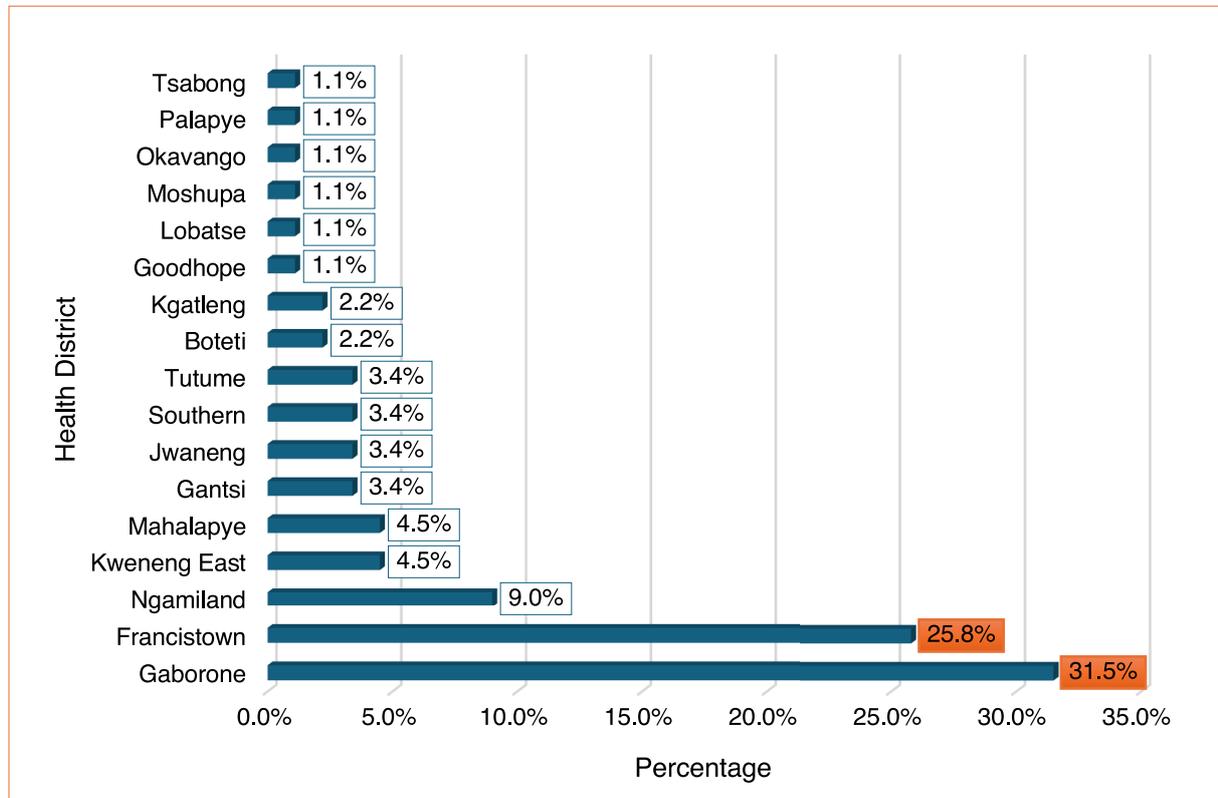


b) Maternal Mortality Ratio by Health District: MoH Notifiable Maternal Mortality Records

The data presented in this section are sourced from the Ministry of Health's Notifiable Maternal Mortality Records. The distribution of maternal deaths across Botswana's health districts in 2022 as presented in **Table 4** and **Figure 2** reveal notable geographic and facility-level disparities. A total of 89 maternal deaths were recorded nationally during the reporting period, with data disaggregated by district and type of health facility in which the deaths occurred (**see Table 4 and Figure 2**).

A significant concentration of maternal deaths occurred in the Gaborone and Francistown District Health Management Teams (DHMTs), which together accounted for 57.3% of all cases (**See Figure 2**). Gaborone recorded the highest share at 31.5%, followed by Francistown with 25.8%, highlighting the pressure on referral systems and tertiary facilities in the country's largest urban centres.

**FIGURE 2: Distribution of Maternal Deaths per Health District, 2022:
MoH Notifiable Maternal Mortality Records**



When examining the type of facility, nearly half (48.3%) of all maternal deaths occurred in referral hospitals (**See Table 4**), underscoring the role of these institutions in managing high-risk pregnancies and complications. District hospitals were the second most affected, accounting for 32.6% of deaths, followed by primary hospitals with 13.5%. Clinics, which typically manage fewer complex cases and serve as initial contact points in the health system, reported 5.6% of maternal deaths (**See Table 4**). This relatively low figure reflects both their limited capacity to manage obstetric emergencies and the efficiency of early referrals in most instances.

The observed geographic distribution of maternal deaths underscores the urgent need for a dual strategy: strengthening tertiary and referral systems in urban centres like Gaborone and Francistown to manage the high volume of complex cases, while simultaneously enhancing the capacity of district and sub-district health facilities to provide timely and high-quality maternal care. Districts such as Ngamiland, Mahalapye, and Kweneng East, which reported notable shares of deaths, require targeted interventions to improve emergency obstetric care, skilled birth attendance, and referral efficiency. For lower-burden districts where deaths still occur sporadically, continuous quality improvement initiatives, community awareness, and responsive maternal health surveillance are essential to prevent avoidable deaths and to close remaining equity gaps in maternal health outcomes across Botswana.

Table 4: Distribution of Maternal Deaths per Health District and Type of Facility, 2022: MoH Notifiable Maternal Mortality Records

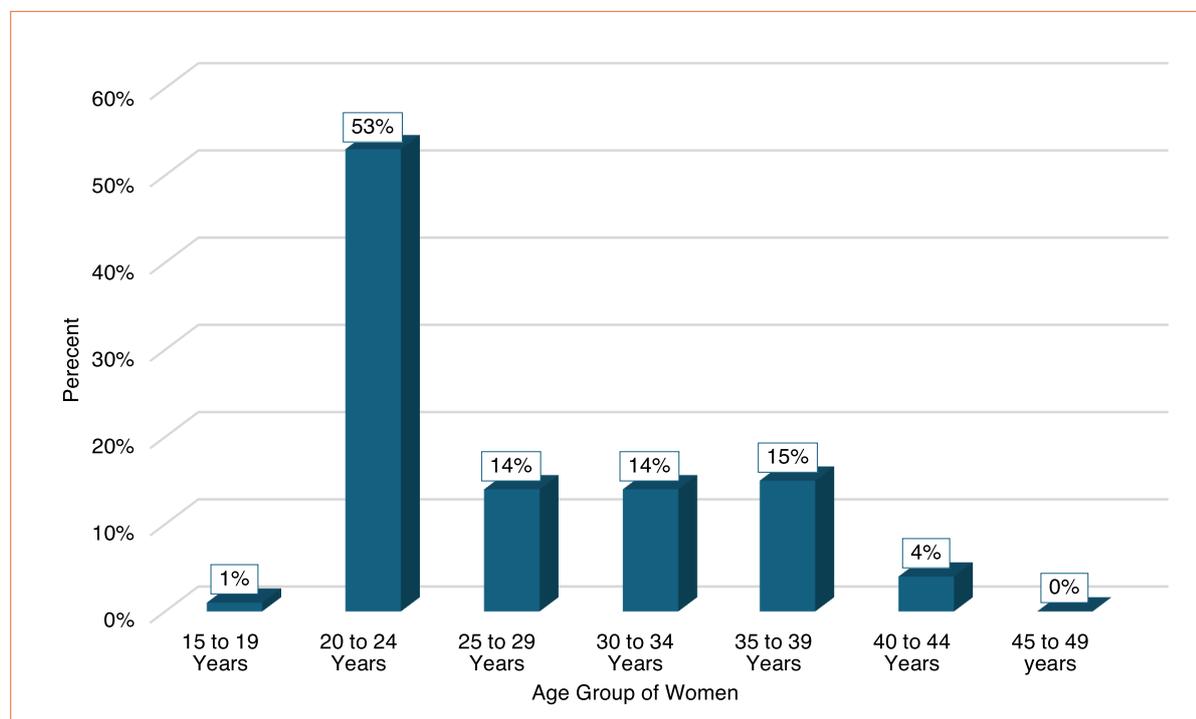
Health District	Clinics	District Hospital	Primary Hospital	Referral Hospital	Total Deaths	% of Total
Gaborone	3	5	-	20	28	31.5
Francistown	-	-	-	23	23	25.8
Ngamiland	-	8	-	-	8	9
Kweneng East	-	4	-	-	4	4.5
Mahalapye	-	3	1	-	4	4.5
Gantsi	1	-	2	-	3	3.4
Jwaneng	-	3	-	-	3	3.4
Southern	-	3	-	-	3	3.4
Tutume	-	-	3	-	3	3.4
Boteti	-	-	2	-	2	2.2
Kgatleng	-	2	-	-	2	2.2
Goodhope	-	-	1	-	1	1.1
Lobatse	-	1	-	-	1	1.1
Moshupa	1	-	-	-	1	1.1
Okavango	-	-	1	-	1	1.1
Palapye	-	-	1	-	1	1.1
Tsabong	-	-	1	-	1	1.1
Total	5	29	12	43	89	100
Percent	5.6	32.6	13.5	48.3	100	

Source: Statistics Botswana, Botswana Maternal Mortality Ratio 2022, 2024

3.1.8. Age Group Disparities in Maternal Mortality using 2022 PHC data.

Analysis of maternal deaths by age group from the 2022 Population and Housing Census reveals notable disparities in the distribution and risk of maternal mortality across different stages of a woman's reproductive life. As shown in **Figure 3**, young women aged 20–24 years accounted for the highest proportion of maternal deaths, representing 53.0% (124 out of 234 deaths) of all reported maternal deaths. This was followed by women aged 35–39 years, who accounted for 14.5% (34 deaths), and those aged 30–34 years and 25–29 years, each contributing 13.7% (32 deaths each). Adolescent girls aged 15–19 years accounted for only 1.3% (3 deaths) of reported maternal deaths. Women aged 40–44 years contributed a smaller share, at 3.8% (9 deaths), while no maternal deaths were reported among women aged 45–49 years, a reflection of both declining fertility rates and reduced pregnancy risk at older ages (**See Figure 3**).

FIGURE 3: Percentage Distribution of Reported Maternal Deaths by Age group of Women: 2022 PHC.



Further insights are revealed when examining maternal mortality ratios (MMRs) by age group, as presented in **Table 5**. The MMR among young women aged 20–24 years was notably high, at 1,063.3 deaths per 100,000 live births based on raw census data. Even after adjusting for potential overreporting using a national correction factor of 0.38, the adjusted MMR remained substantial at 404.0 deaths per 100,000 live births, more than twice the national adjusted MMR of 161.2. Adolescents aged 15–19 years had a lower MMR, adjusted to 33.0 per 100,000 live births, reflecting lower pregnancy rates but still underscoring vulnerability during adolescence. Maternal mortality ratios among women aged 25–34 years were markedly lower, with adjusted MMRs of 93.1 for those aged 25–29 years and 101.2 for those aged 30–34 years, indicating relatively safer childbearing ages. However, risk increased again among women aged 35–39 years, with an adjusted MMR of 137.5 deaths per 100,000 live births, highlighting heightened maternal risks associated with advanced age, including conditions such as pre-eclampsia and postpartum haemorrhage. Women aged 40–44 years recorded an adjusted MMR of 79.6 deaths per 100,000 live births, a lower risk partly explained by reduced fertility at older ages. Importantly, no maternal deaths were reported among women aged 45–49 years.

To ensure comparability and statistical stability across all age groups, a uniform adjustment was applied to the age-specific MMRs. This was necessary because of the small number of maternal deaths in some age categories, which would have rendered age-specific adjustment factors highly unstable. Consequently, the national adjustment factor, calculated as the ratio of administratively recorded maternal deaths (89 deaths) to census-reported deaths (234 deaths) resulting in a correction factor of 0.38, was consistently applied across all age groups. This approach balanced the need to correct for underreporting while preserving the relative differences in maternal mortality risk across age groups.

Overall, these findings underscore the urgent need to strengthen maternal health interventions, with particular focus on women aged 20–24 years—who face the highest risk of mortality during pregnancy and childbirth—as well as women of advanced maternal age. Preventive strategies, including quality antenatal care, skilled birth attendance, emergency obstetric services, and postpartum care, must prioritise these vulnerable age groups to accelerate progress toward reducing maternal mortality in Botswana

Table 5: Adjusted Maternal Mortality Ratio by Age Group of Women: 2022 PHC

Age Group	Number of Maternal Deaths Reported	Live Births	MMR	Adjusted MMR
15 to 19 Years	3	3,451	87	33
20 to 24 Years	124	11,662	1,063	404
25 to 29 Years	32	13,057	245	93.1
30 to 34 Years	32	12,016	266	101.2
35 to 39 Years	34	9,394	362	137.5
40 to 44 Years	9	4,295	210	79.6
45 to 49 years	-	1,234	-	-
Total	234	551,442	425	161.2

3.1.9. Age Group Disparities in Maternal Mortality Using the 2022 Ministry of Health Maternal Mortality Administrative Data and Vital Statistics.

An analysis of maternal mortality by age group using 2022 administrative records from the Ministry of Health and Vital Statistics reveals important differences in the risk of maternal death across different stages of a woman’s reproductive life. As shown in **Table 6**, maternal deaths were distributed across all reproductive ages but disproportionately affected older women.

Figure 4 shows that women aged 30–34 years accounted for the largest number of maternal deaths (24 deaths, or 27% of all recorded deaths), followed by women aged 35–39 years (19 deaths, 21%) and 25–29 years (18 deaths, 20%). Adolescent girls aged 15–19 years accounted for 6.7% of deaths (6 deaths), while women aged 20–24 years, traditionally considered the safest reproductive age group, accounted for 11% (10 deaths) (See Figure 4). Although fewer women aged 40–44 years and 45–49 years gave birth, the recorded maternal mortality ratios (MMRs) for these older age groups were markedly high at 403.5 and 395.3 deaths per 100,000 live births respectively (see **Table 7**), highlighting the heightened risks associated with late childbearing.

FIGURE 4: Number of Maternal Deaths by Age group of Women: Ministry of Health Maternal Mortality Administrative Data and Vital Statistics.

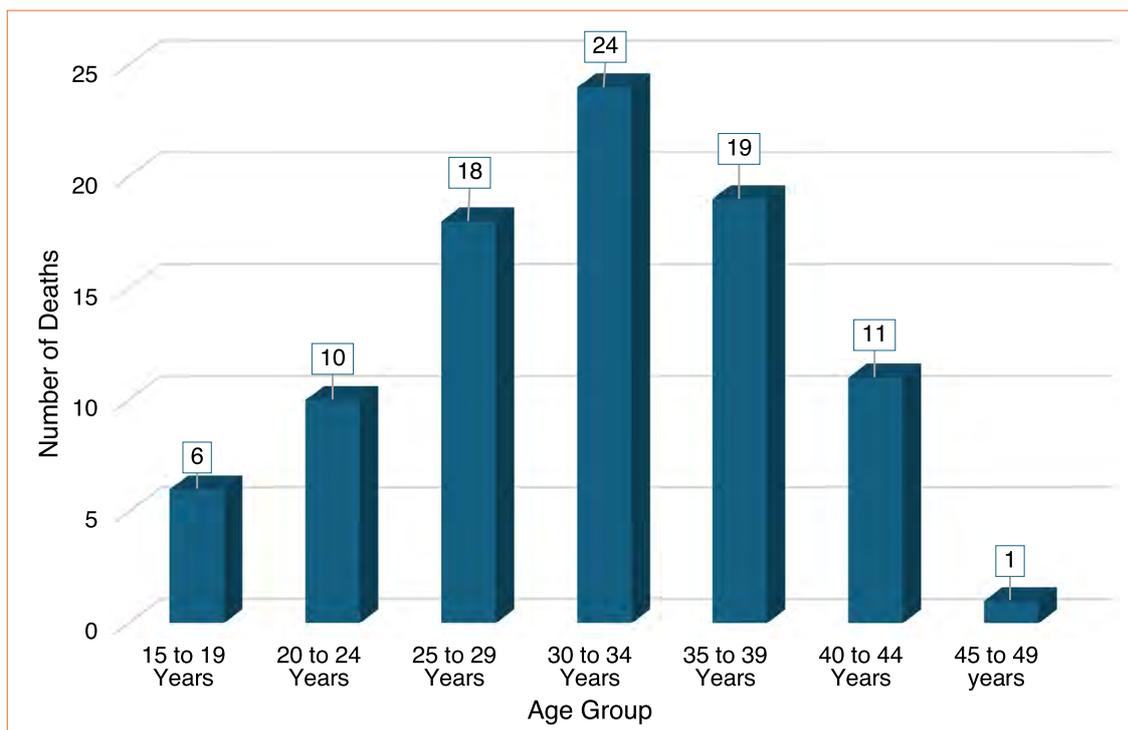


Table 6: Percentage Distribution of Recorded Maternal Deaths by Age group of Women: Ministry of Health Maternal Mortality Administrative Data and Vital Statistics.

Age Group	Number of Deaths Reported	Percent
15 to 19 Years	6	6.7
20 to 24 Years	10	11.2
25 to 29 Years	18	20.2
30 to 34 Years	24	27.0
35 to 39 Years	19	21.3
40 to 44 Years	11	12.4
45 to 49 years	1	1.1
Total	89	100.0

Unlike the pattern observed in census-reported data, the administrative data indicate that women in older age groups (especially 40–49 years) face significantly higher maternal mortality risks compared to younger women. For instance, although only 1 maternal death was recorded among women aged 45–49 years, the corresponding MMR was extremely high due to the small number of live births recorded in this age group (253 births). Similarly, for women aged 40–44 years, 11 deaths were recorded against 2,726 live births, yielding an MMR of 403.5 per 100,000 live births, the highest across all age groups.

Overall, the national MMR calculated from administrative data for 2022 was 163.7 maternal deaths per 100,000 live births, closely aligning with the adjusted MMR based on the 2022 census (161.2 per 100,000). The age-specific data from administrative records reinforces the need for heightened surveillance, tailored interventions, and targeted maternal health services for women of advanced reproductive age, particularly those aged 35 and above.

Preventive strategies should not only focus on expanding access to quality antenatal, intrapartum, and postpartum care across all age groups but should also specifically address the increased obstetric risks among older women, including pre-eclampsia, haemorrhage, and pre-existing non-communicable conditions that can complicate pregnancy outcomes.

Table 7: Maternal Mortality Ratio by Age Group of Women: Ministry of Health Maternal Mortality Administrative Data and Vital Statistics.

Age Group	Number of Maternal Deaths Recorded	Live Births Recorded	MMR
15 to 19 Years	6	5,967	100.6
20 to 24 Years	10	13,149	76.1
25 to 29 Years	18	13,160	136.8
30 to 34 Years	24	10,812	222.0
35 to 39 Years	19	7,829	242.7
40 to 44 Years	11	2,726	403.5
45 to 49 years	1	253	395.3
Total	89	54,372	163.7

3.1.10. Rural/Urban Disparities in Maternal Mortality

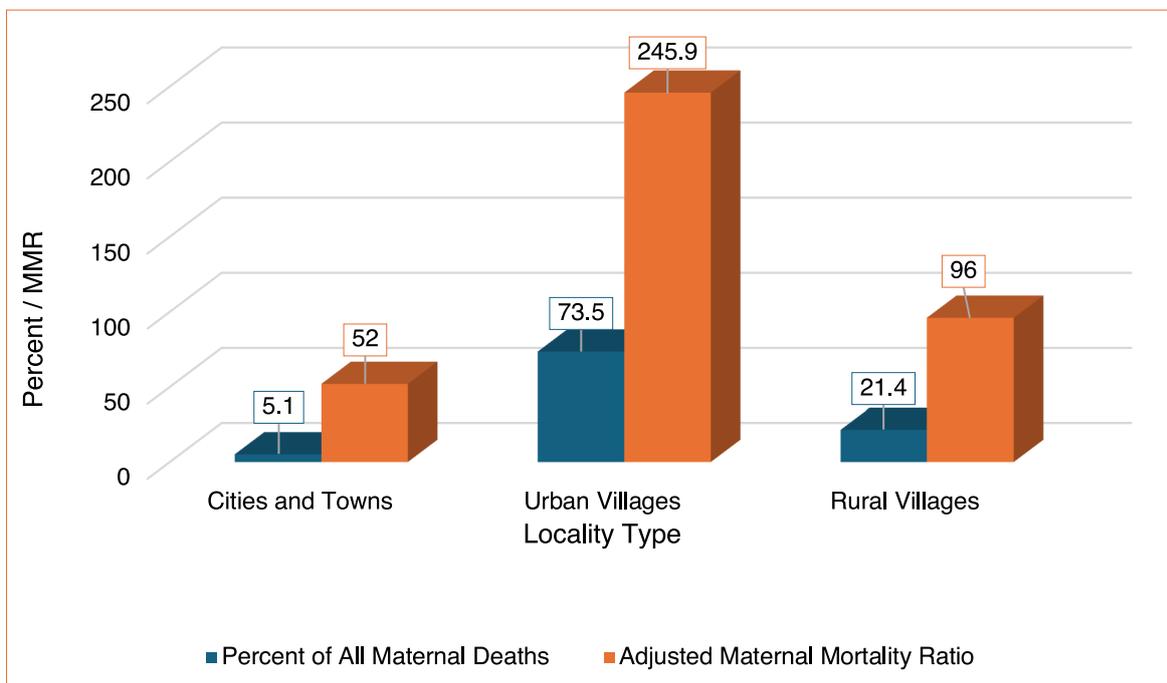
The recent data from the 2022 PHC reveal significant disparities in maternal deaths by locality, with the burden disproportionately affecting urban villages and rural communities.

Table 8 and **Figure 5** show that urban villages carry the heaviest burden of maternal mortality in Botswana, accounting for 73.5% of all reported deaths during the 2022 PHC. Despite their urban classification, these areas often lack essential health infrastructure such as fully equipped maternity theatres, adequately resourced clinics, and 24-hour emergency obstetric services. Delays in referrals are common, and the rapid population growth in centres like Mochudi, Molepolole, Kanye, Serowe, and Maun has outpaced the capacity of existing health systems, leading to service congestion and limited maternal care access.

Rural villages, while contributing 21.4% of maternal deaths, are likely to have a higher risk relative to population size. Their remoteness and limited infrastructure present serious barriers to maternal health. Challenges include widely dispersed settlements, long travel distances to health facilities, inadequate ambulance services, insufficient EmONC coverage, reliance on traditional birth practices, and persistent shortages of trained healthcare workers. These factors contribute to the well-documented “three delays” in seeking, reaching, and receiving care. Addressing maternal mortality in these settings calls for integrated, multisectoral efforts aimed at improving transport systems, community engagement, and equitable deployment of health personnel (See Table 8).

Cities and towns reported the lowest share of maternal deaths at 5.1%. Urban centres such as Gaborone, Francistown, and Lobatse benefit from proximity to major referral hospitals like Princess Marina and Nyangabgwe, access to skilled healthcare professionals, strong antenatal coverage, and functioning emergency obstetric services. Nonetheless, vulnerable populations, especially those in informal settlements, continue to face challenges such as overcrowded facilities, long waiting times, limited access for undocumented individuals, and language or cultural barriers that complicate their ability to access and navigate maternal health services (See Table 8).

FIGURE 5: Percentage Distribution of Reported Maternal Deaths and Maternal Mortality Ratio by Locality Type: 2022 PHC



The MMRate is particularly valuable in monitoring long-term trends in maternal health, as it reflects both the risk of maternal death and the fertility patterns within the population. When used in combination with the MMR and the Proportion of Maternal Deaths Among Deaths of Women of Reproductive Age (PMDF), it contributes to a comprehensive understanding of the magnitude and distribution of maternal mortality in the country.

Table 8: Reported Number of Maternal Deaths, Maternal Mortality Ratios and Adjusted Maternal Mortality Ratios by Locality Type: 2022 PHC

Locality	Number of Deaths Reported	MMR	Adjusted MMR
Cities and Towns	12	136.9	52
Urban Villages	172	647.2	245.9
Rural Villages	50	252.6	96
Total	234	424.4	161.2

In the Botswana context, the adjusted MMRate confirms that while maternal mortality remains a critical public health concern, its relative burden on the general female population of reproductive age is lower than census-reported figures initially suggest. This underlines the importance of triangulating data sources and applying appropriate adjustments to ensure accurate monitoring and decision-making.

3.2. Proportion of Maternal Deaths Among Deaths of Women of Reproductive Age (PMDF)

The Proportion of Maternal Deaths Among Deaths of Women of Reproductive Age (PMDF) measures the share of all deaths among women aged 15 to 49 that are attributable to maternal causes. This indicator helps to contextualise maternal mortality within overall female mortality and is particularly valuable in identifying the relative burden of maternal mortality during the reproductive lifespan.

The PMDF is calculated as follows:

- o **PMDF = (Maternal deaths/All deaths among women aged 15 to 49) × 100**

Based on data from the 2022 Population and Housing Census, a total of 2,413 deaths were reported among women aged 15 to 49 in the 12 months preceding the census, of which 234 were classified as maternal deaths. With a correction factor of 0.38, it yields a PMDF of:

- o **Adjusted PMDF₂₀₂₂ = ((234 × 0.38)/ 2,413) × 100 = 3.7%**

This means that approximately 3.7% of all deaths among women of reproductive age in Botswana in 2022 were attributable to maternal causes.

A high PMDF typically signals gaps in access to or quality of maternal health services, including antenatal, intrapartum, and postpartum care. While the adjusted PMDF is significantly lower than the unadjusted estimate of 9.7%, it still reflects a preventable burden of mortality among reproductive-age women. This reinforces the importance of continuous investment in emergency obstetric care, referral systems, and postnatal follow-up services.

In the Botswana context, this adjusted PMDF, anchored in verified clinical data—provides a more realistic picture of maternal mortality's share in overall female mortality. Further disaggregation by age, district, and cause of death is needed to identify specific areas of vulnerability and to strengthen targeted maternal health interventions at sub-national levels.

3.3. Lifetime Risk of Maternal Death

The Lifetime Risk of Maternal Death estimates the probability that a 15-year-old girl will eventually die from a maternal cause over her reproductive lifespan (typically defined as ages 15 to 49), assuming she is exposed to current levels of fertility and maternal mortality throughout that period. It is a cumulative measure that incorporates both the risk of maternal death per pregnancy (as reflected by the MMR) and the average number of pregnancies a woman would have (as reflected by the TFR).

The formula for estimating lifetime risk is:

o **Lifetime risk = $1 - (1 - \text{MMR} \times \text{TFR})^{35}$**

Where:

- MMR is the Maternal Mortality Ratio expressed as a proportion (e.g., 161.2 per 100,000 = 0.001612)
- TFR is the Total Fertility Rate (2.9)
- 35 approximates the average number of reproductive years between ages 15 and 49 Using the adjusted MMR of 161.2 and the TFR of 2.9 (Statistics Botswana, 2025), the lifetime risk is calculated as:

o **Lifetime risk = $1 - (1 - 0.001612 \times 2.9)^{35}$**
o **Lifetime risk $\approx 1 - (0.995325)^{35} \approx 1 - 0.848 \approx 0.152$**
o **Lifetime risk $\approx 15.2\%$**

This means that a girl aged 15 in Botswana in 2022 would face a 15.2% probability (or roughly 1 in 7 chance) of dying from a maternal cause during her reproductive years if current fertility and maternal mortality levels persist.

This adjusted estimate is substantially lower than what would be derived using unadjusted census-based MMR and is more aligned with verified clinical data. The lifetime risk remains a critical summary indicator of maternal health system effectiveness, as it reflects both access to and quality of maternal healthcare and the underlying fertility dynamics in the population.

3.4. Total Fertility Rate (TFR)

3.4.1. Introduction

The Total Fertility Rate (TFR) is a fundamental demographic indicator that measures the average number of children a woman is expected to have over her reproductive lifespan (ages 15–49), assuming she experiences the prevailing age-specific fertility rates throughout those years. It serves as both a summary measure of fertility and a key policy tool, offering insights into population dynamics, maternal health risks, and gender structures. TFR is particularly important for tracking fertility transitions, as higher fertility levels are closely associated with increased lifetime exposure to pregnancy-related health risks.

In the context of Botswana, the TFR plays a critical role in shaping population policy, reproductive health service planning, and education and health infrastructure development. It is also essential for monitoring progress toward national and international goals, including Vision 2036, the Revised National Population Policy, and the Sustainable Development Goals (SDGs)—notably Target 3.7, which promotes universal access to sexual and reproductive health services.

3.4.2. Age Specific Fertility Rates and TFR: 2022 PHC

Data from the 2022 Population and Housing Census (PHC) indicate a national TFR of 2.9 children per woman, which represents a modest increase from the 2.8 recorded in 2011. **Table 9** presents the Age-Specific Fertility Rates (ASFRs), showing the fertility pattern across seven reproductive age groups. Fertility peaks among women aged 25–29 and 30–34, consistent with the global shift toward childbearing at slightly older ages.

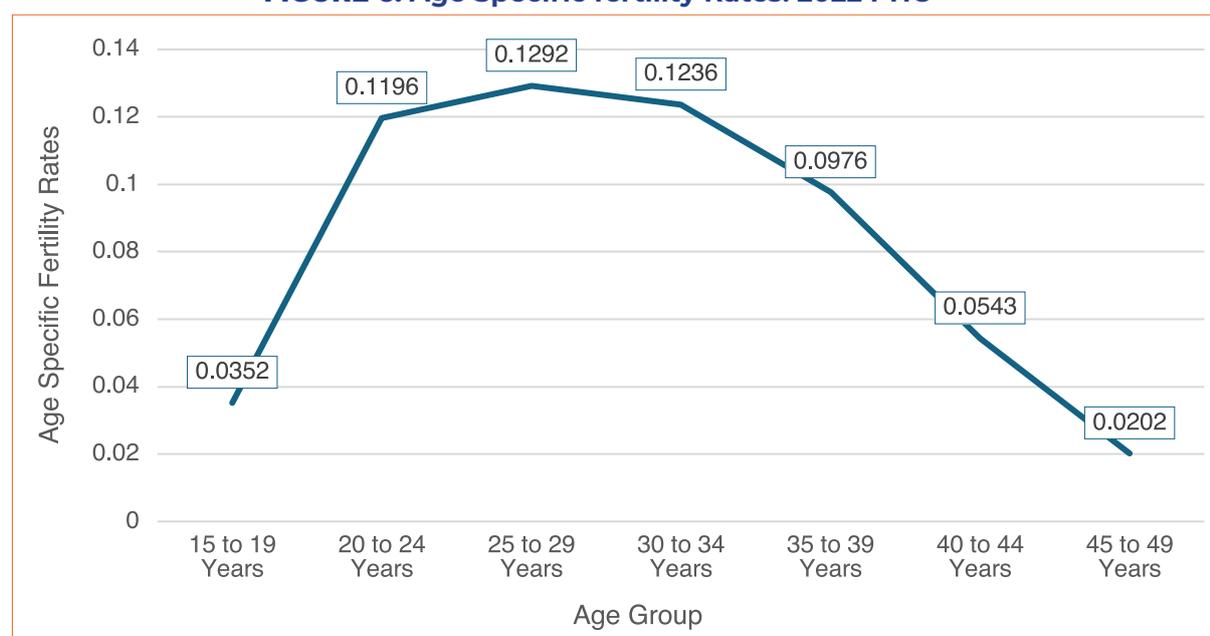
The adolescent fertility rate (15–19 years) remains low at 35.2 births per 1,000 women but remains a concern due to the health and social risks associated with early pregnancy. Fertility drops sharply after age 35, reflecting the natural decline in fecundity and possibly increased use of contraception

or sterilisation in later reproductive years. **Table 9** presents the 2022 ASFRs and the resulting TFR whereas **Figure 6** provides a visual summary of fertility across age groups, showing the classic bell-shaped curve typical of countries in mid-to-late fertility transition.

Table 9: Age Specific Fertility Rates: 2022 PHC

Age Group (Years)	ASFR (Births per 1,000 Women)
15–19	0.0352
20–24	0.1196
25–29	0.1292
30–34	0.1236
35–39	0.0976
40–44	0.0543
45–49	0.0202
Total Fertility Rate (TFR)	2.9 children per woman

FIGURE 6: Age Specific fertility Rates: 2022 PHC



3.4.3. Trends in Age Specific Fertility Rate and Total Fertility Rate from 1971 to 2022

Over the past five decades, Botswana has undergone a significant and sustained decline in fertility. As presented in **Table 10**, the Total Fertility Rate (TFR) dropped sharply from 6.5 children per woman in 1971 to 2.9 in 2022. This decline has been broad-based, with reductions observed across nearly all reproductive age groups, particularly among adolescents (15–19 years) and young women (20–24 years).

Several key drivers have contributed to this fertility transition:

- Widespread adoption of modern contraceptive methods, increasing birth spacing and reducing unintended pregnancies.
- Expansion of female education and growing participation of women in the labour force, both of which are associated with lower fertility preferences.
- Rising age at marriage and delayed childbearing, reflecting shifts in personal aspirations and economic considerations.

- Accelerated urbanisation and changing family norms, promoting smaller family ideals and improved access to reproductive health services.

The Age-Specific Fertility Rates (ASFRs) for 2022 show a continued flattening of the fertility curve, particularly in the younger age cohorts, confirming Botswana's progression into the later stages of the demographic transition. Fertility among women aged 15–24 has dropped substantially compared to earlier decades, while fertility rates for older women (35 years and above) have declined more moderately. This pattern reflects both delayed initiation of childbearing and a general compression of fertility into the mid-reproductive ages (25–34 years).

Figure 7 illustrates the decline in Age-Specific Fertility Rates (ASFRs) across all age groups from 1971 to 2022. For adolescents aged 15–19, the ASFR decreased from 95.5 births per 1,000 women in 1971 to 35.2 births per 1,000 in 2022. Among women aged 20–24, the rate declined from 277.8 to 119.4, and for the 25–29 age group, it dropped from 276.0 to 129.0. Even older age groups such as 35–39 saw a decline from 198.3 to 97.6, while women aged 40–44 experienced a reduction from 138.3 to 54.3 births per 1,000.

FIGURE 7: Trends in Age Specific Fertility Rates and TFR from 1971 to 2022

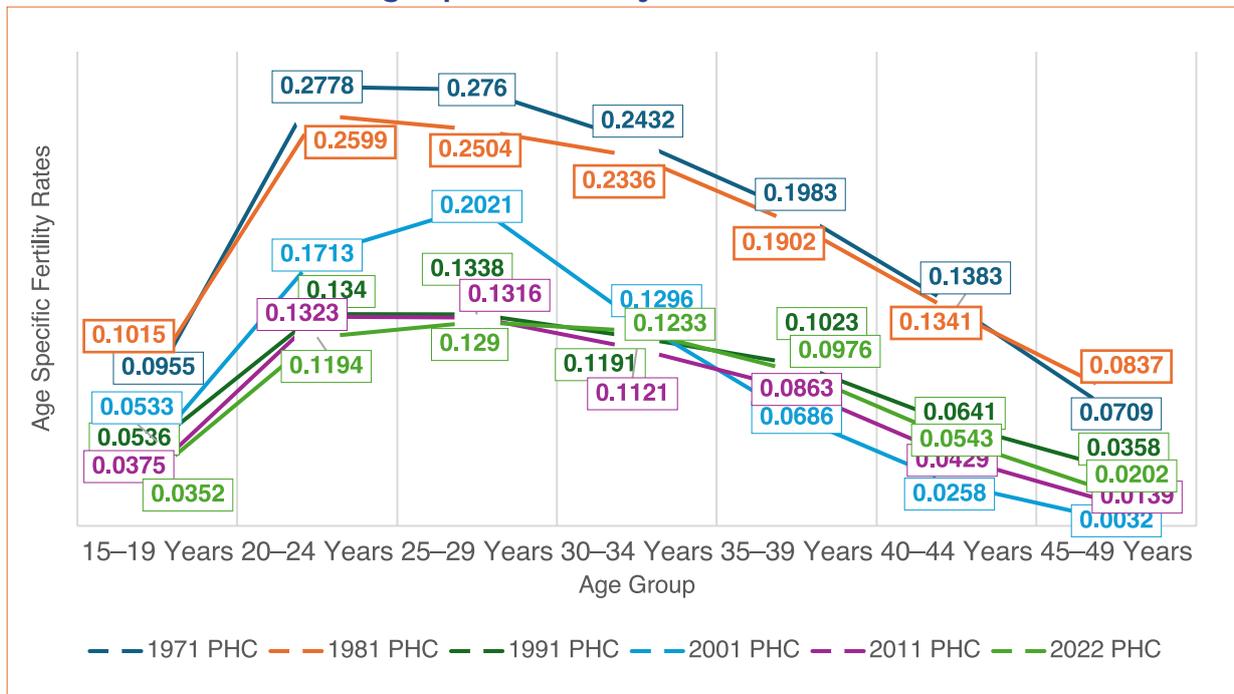
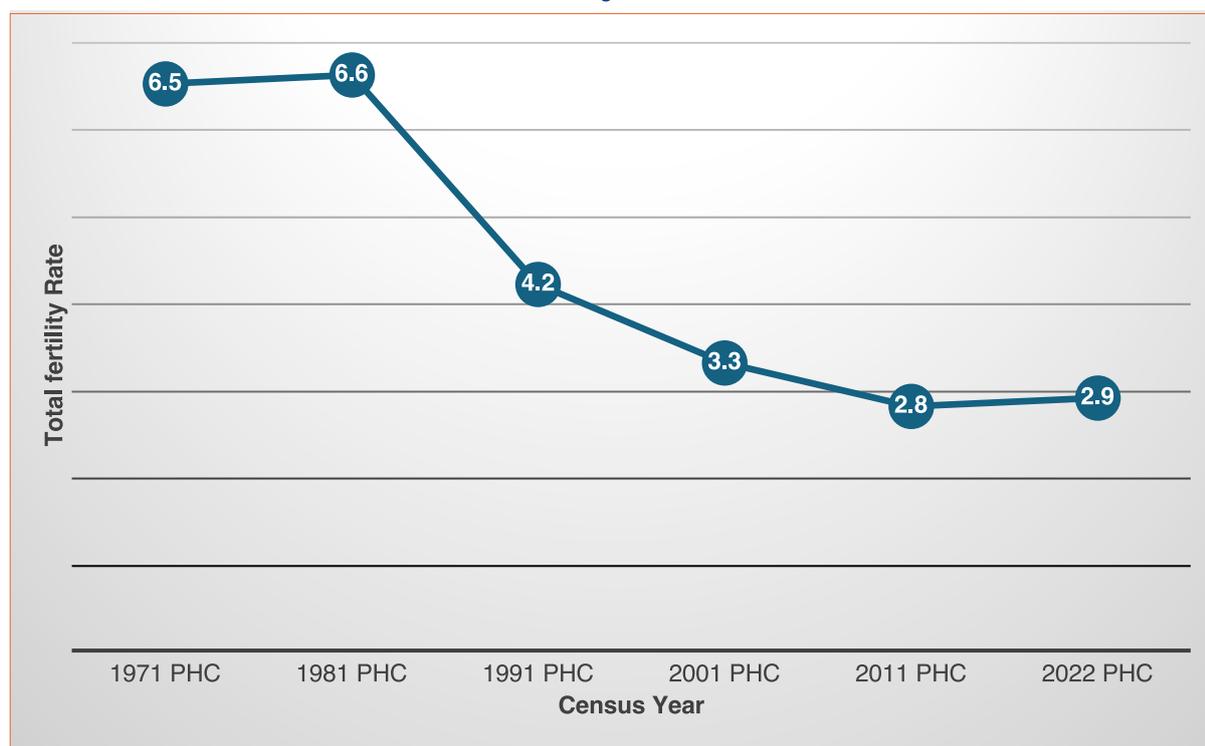


Figure 8 highlights the sustained downward trend in the national Total Fertility Rate (TFR) over the same period, which fell sharply from 6.5 children per woman in 1971 to 2.9 in 2022, reflecting Botswana's remarkable fertility transition over the past five decades

Table 10: Trends in Age Specific Fertility Rates and TFR from 1971 to 2022

Age Group	1971	1981	1991	2001	2011	2022
15–19	0.096	0.102	0.054	0.053	0.038	0.035
20–24	0.278	0.260	0.134	0.171	0.132	0.119
25–29	0.276	0.250	0.134	0.202	0.132	0.129
30–34	0.243	0.234	0.119	0.130	0.112	0.123
35–39	0.198	0.190	0.102	0.069	0.086	0.098
40–44	0.138	0.134	0.064	0.026	0.043	0.054
45–49	0.071	0.084	0.036	0.003	0.014	0.020
TFR	6.5	6.6	4.2	3.3	2.8	2.9

FIGURE 8: Trends in Total Fertility Rates: 1971 PHC to 2022 PHC.



3.4.4. Trends in Completed Family Size by Age of Women and TFR: 1981-2022

Completed fertility, measured by the mean number of children ever born (CEB) to women aged 45–49 years, is a cohort-based measure that complements the period-based TFR. It provides insights into the actual reproductive experience of women who have completed their childbearing years.

As shown in **Table 11** below, completed family size has dropped from 6.5 in 1981 to 2.9 in 2022, aligning almost exactly with the current TFR. This convergence signals that the fertility decline is not only a recent phenomenon but also reflects long-term reproductive behaviour shifts among successive cohorts of women.

This drop in completed fertility is consistent with widespread changes in:

- **Contraceptive access and use**
- **Fertility intentions**
- **Marriage and union formation patterns**

Table 11: Trends in Completed Family Size by Age of Women and Total Fertility Rate: 1981-2022

Census Year	Age Group							TFR
	15 to 19 Years	20 to 24 Years	25 to 29 Years	30 to 34 Years	35 to 39 Years	40 to 44 Years	45 to 49 Years	
1981	0.26	1.33	2.76	4.16	5.24	6.15	6.5	6.5
1991	1.12	1.12	2.27	3.49	4.6	5.56	6.1	4.2
2001	0.13	0.85	1.68	2.65	3.6	4.56	5.3	3.3
2011	0.1	0.73	1.44	2.12	2.75	3.38	4	2.8
2022	0.09	0.59	1.25	1.87	2.42	2.73	2.9	2.9

3.4.5. Age Specific Fertility Rates and TFR by Districts

Fertility rates vary significantly across Botswana's districts, reflecting spatial disparities in service access, socio-economic conditions, cultural norms, and education levels. **Table 12** and **Figure 9** presents ASFRs and TFR by district, revealing that:

Ngamiland West has the highest TFR at 4.5 children per woman, significantly above the national average. Other high-fertility districts include Barolong (3.9), Kweneng West (3.7), and Tutume (3.7) (See **Figure 9**).

In contrast, Sowa (1.4), Jwaneng (1.8), and Gaborone (1.8) report the lowest fertility rates, consistent with patterns observed in urban, highly educated, and economically developed populations (See **Figure 9**).

These variations underscore the importance of tailoring reproductive health interventions to local contexts, especially in high-fertility and underserved areas

Table 12: Age Specific Fertility Rates and Total Fertility Rate by Districts: 2022 PHC

District	15 to 19 Years	20 to 24 Years	25 to 29 Years	30 to 34 Years	35 to 39 Years	40 to 44 Years	45 to 49 Years	TFR
Gaborone	0.008	0.046	0.081	0.093	0.072	0.036	0.013	1.8
Francistown	0.024	0.094	0.103	0.104	0.074	0.039	0.009	2.2
Lobatse	0.02	0.099	0.115	0.114	0.093	0.038	0.017	2.5
Selibe Phikwe	0.012	0.108	0.102	0.101	0.07	0.04	0.022	2.3
Orapa	0.006	0.068	0.111	0.167	0.086	0.053	0.024	2.6
Jwaneng	0.009	0.059	0.097	0.097	0.059	0.029	0.019	1.8
Sowa	-	0.058	0.076	0.077	0.05	0.015	-	1.4
Southern	0.033	0.138	0.142	0.139	0.117	0.062	0.031	3.3
Barolong	0.058	0.192	0.163	0.163	0.133	0.052	0.018	3.9
Ngwaketse West	0.069	0.193	0.144	0.144	0.09	0.055	0.018	3.6
South East	0.017	0.071	0.095	0.097	0.088	0.047	0.023	2.2
Kweneng East	0.028	0.103	0.126	0.13	0.1	0.063	0.024	2.9
Kweneng West	0.072	0.193	0.166	0.122	0.124	0.054	0.018	3.7
Serowe-Palapye	0.037	0.146	0.136	0.136	0.096	0.06	0.015	3.1
Mahalapye	0.045	0.17	0.151	0.135	0.109	0.061	0.017	3.4
Bobonong	0.052	0.18	0.161	0.132	0.096	0.048	0.01	3.4
Boteti	0.06	0.181	0.146	0.132	0.101	0.06	0.036	3.6
Tutume	0.05	0.179	0.169	0.146	0.106	0.063	0.018	3.7
North East	0.035	0.15	0.162	0.129	0.089	0.05	0.013	3.1
Ngamiland East	0.046	0.148	0.14	0.124	0.115	0.071	0.02	3.3
Ngamiland West	0.067	0.202	0.194	0.173	0.145	0.088	0.031	4.5
Chobe	0.04	0.119	0.131	0.122	0.119	0.078	0.027	3.2
Delta	0.02	0.146	0.114	0.113	0.059	0.043	0.048	2.7
Ghanzi	0.057	0.129	0.137	0.108	0.1	0.054	0.048	3.2
Kgalagadi South	0.054	0.153	0.151	0.106	0.084	0.054	0.008	3.1
Kgalagadi North	0.049	0.123	0.123	0.136	0.09	0.032	0.007	2.8
Total	0.035	0.119	0.129	0.123	0.098	0.054	0.020	2.9

3.4.6. Age Specific Rates and TFR by Locality Type

Figure 10 shows that fertility in Botswana differs sharply by locality type. Women in rural areas have a TFR of 3.93, compared to 2.79 in urban villages and 1.76 in cities and towns. The rural fertility profile is consistently higher across all age groups (See Table 13 and Figure 11).

FIGURE 9: Total Fertility Rate by Districts: 2022 PHC

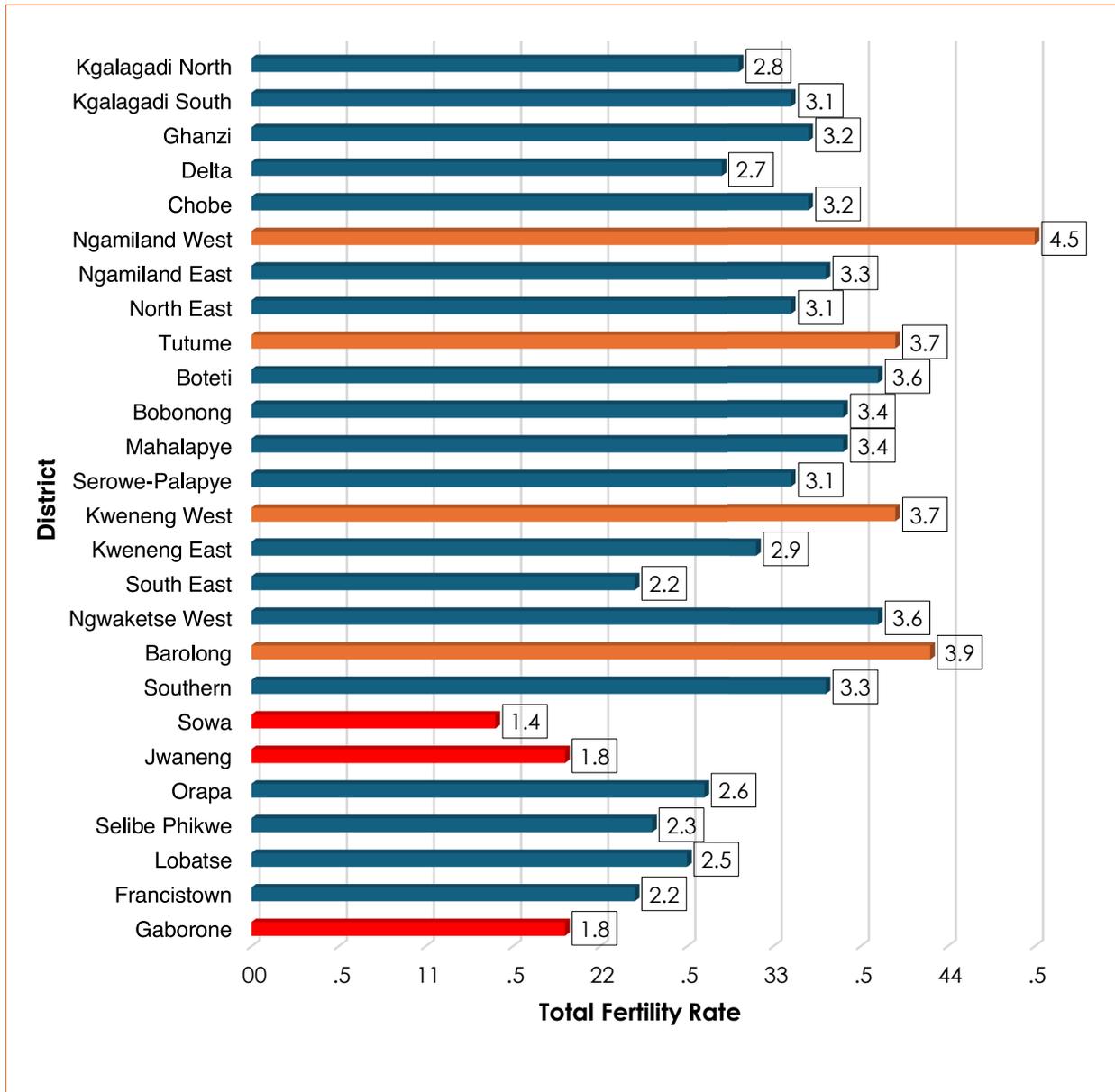


FIGURE 10: Total Fertility Rate by Locality Type versus National: 2022 PHC

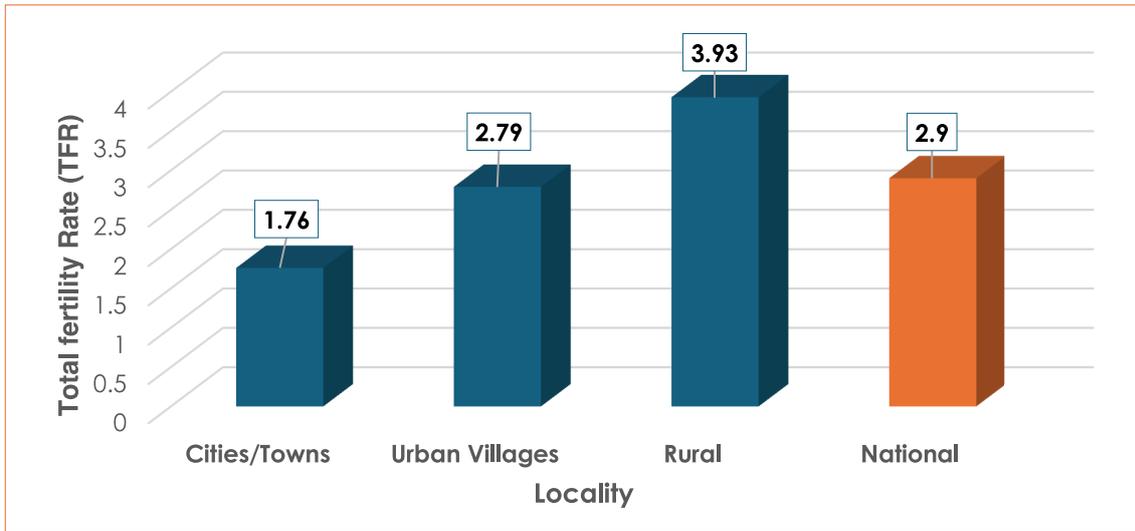


Figure 11 illustrates this contrast in fertility patterns, showing that rural women begin childbearing earlier and maintain higher fertility through their reproductive years.

These differences are likely driven by:

- Lower access to education and contraception in rural settings
- Earlier union formation
- Socio-cultural expectations around family size

Addressing these disparities is crucial for achieving reproductive equity and meeting universal access targets.

FIGURE 11: Age Specific Fertility Rates by Locality Type: 2022 PHC

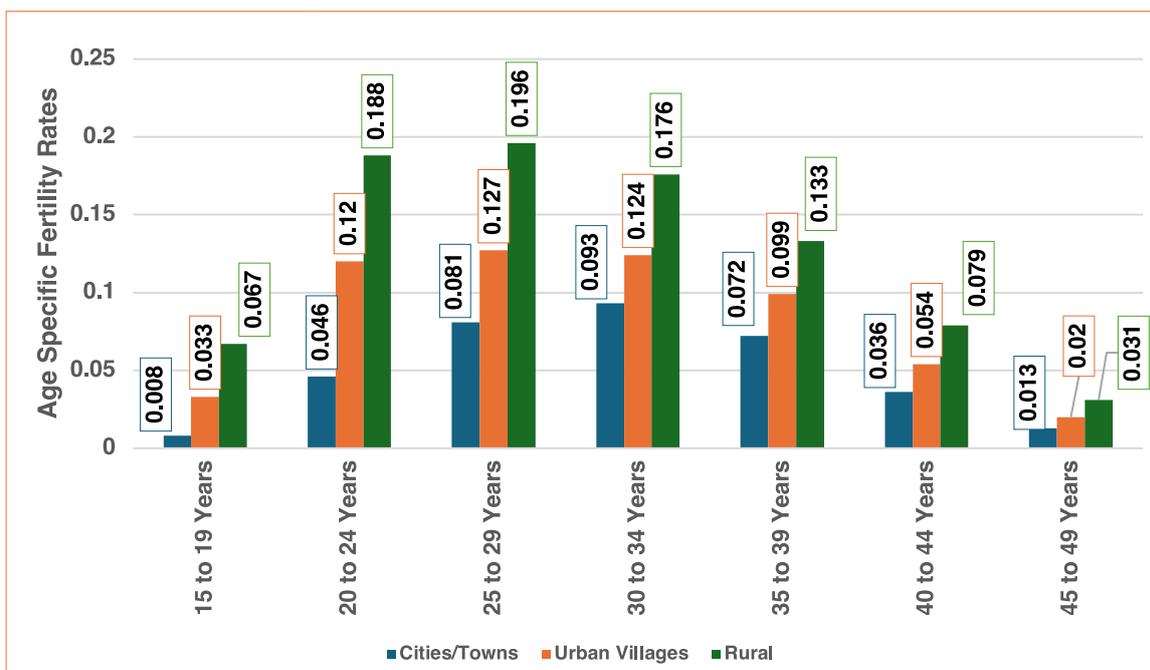


Table 13: Age Specific Fertility Rates by Locality Type: 2022 PHC

Age Group	Locality Type			Total
	Cities/Towns	Urban Villages	Rural	
15 to 19 Years	0.008	0.033	0.067	0.035
20 to 24 Years	0.046	0.12	0.188	0.120
25 to 29 Years	0.081	0.127	0.196	0.129
30 to 34 Years	0.093	0.124	0.176	0.124
35 to 39 Years	0.072	0.099	0.133	0.098
40 to 44 Years	0.036	0.054	0.079	0.054
45 to 49 Years	0.013	0.02	0.031	0.020
TFR	1.76	2.79	3.93	2.9

3.4.7. Socio-Demographic Differentials in TFR

Fertility in Botswana is strongly influenced by education level, marital status, and employment status, as illustrated in **Table 14** and **Figure 12**.

Education: TFR is highest among women with no formal education or only primary schooling (TFR = 4.28) and lowest among women with tertiary education (TFR = 2.16). This demonstrates the transformative effect of education on reproductive choices.

Marital Status: Fertility is highest among cohabiting (5.4) and ever-married women (5.13), and lowest among never-married women (2.73), highlighting the enduring influence of union status on fertility.

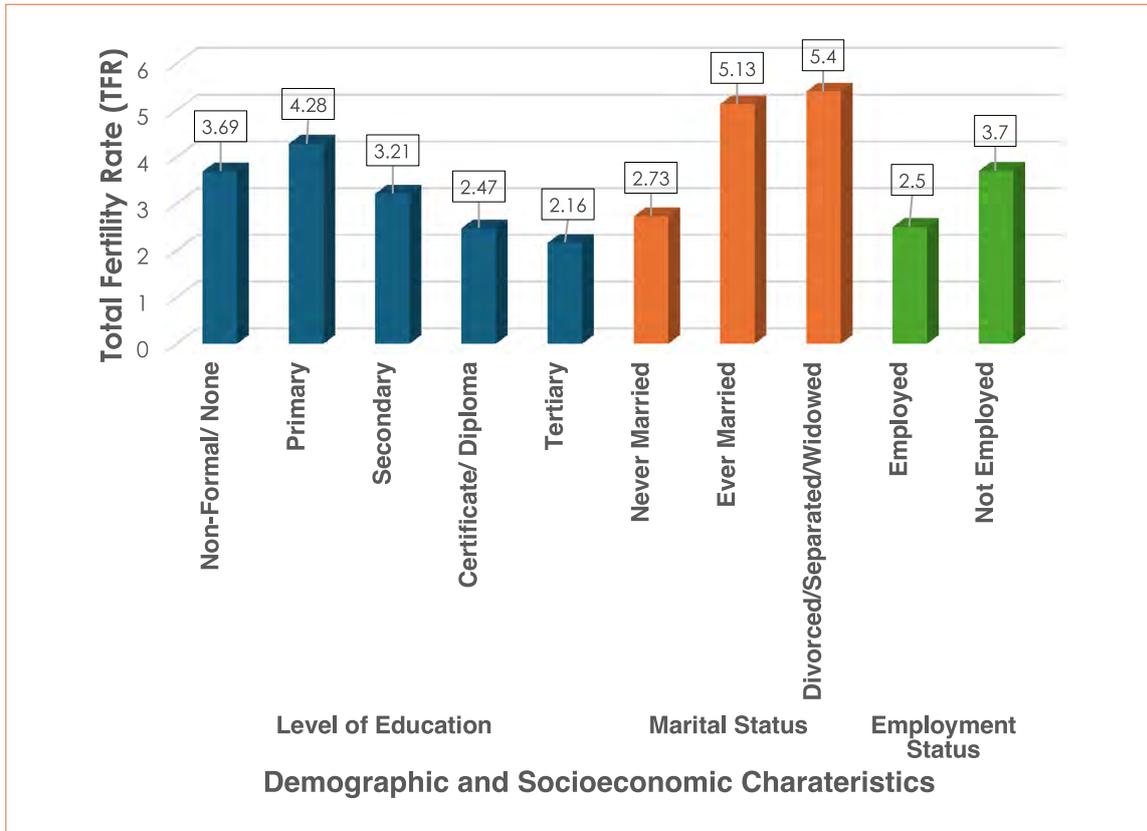
Employment: Women not in employment have a higher TFR (3.7) compared to their employed counterparts (2.5), suggesting that economic participation may delay or limit childbearing.

These patterns confirm global evidence that empowering women through education and economic participation contributes to lower and more voluntary fertility.

Table 14: Age Specific Fertility Rates and Total Fertility Rate by Socio-economic and Demographic Characteristics: 2022 PHC

Characteristics		15-19	20-24	25-29	30-34	35-39	40-44	45-49	TFR
Level of Education	Non-Formal/ None	0.079	0.149	0.112	0.188	0.111	0.079	0.02	3.69
	Primary	0.099	0.194	0.182	0.159	0.128	0.072	0.021	4.28
	Secondary	0.035	0.153	0.148	0.131	0.102	0.055	0.02	3.21
	Certificate/ Diploma	0.019	0.072	0.118	0.12	0.091	0.048	0.024	2.47
	Tertiary	0.006	0.044	0.098	0.125	0.094	0.05	0.016	2.16
Marital Status	Never Married	0.031	0.112	0.121	0.114	0.093	0.055	0.02	2.73
	Married/Cohabiting	0.225	0.237	0.214	0.169	0.108	0.051	0.021	5.13
	Divorced/ Separated/ Widowed	0.307	0.224	0.176	0.152	0.122	0.074	0.024	5.4
Employment Status	Employed	0.059	0.09	0.099	0.103	0.079	0.045	0.018	2.5
	Not Employed	0.036	0.141	0.168	0.159	0.131	0.072	0.025	3.7
Total		0.035	0.120	0.129	0.124	0.098	0.054	0.020	2.9

FIGURE 12: Total Fertility Rate by Socio-economic and Demographic Characteristics: 2022 PHC



3.5. Contraceptive Prevalence Rate (CPR) (15–49 Years)

3.5.1. Introduction

The Contraceptive Prevalence Rate (CPR) is a critical indicator of reproductive health that measures the proportion of women aged 15–49 years who are currently using any method of modern contraception. It reflects the level of access to family planning services, the ability of women and couples to control fertility, and the extent to which reproductive health needs are being met.

Access to contraception plays a key role in reducing unintended pregnancies, spacing births, preventing high-risk pregnancies, and ultimately reducing maternal mortality. The promotion and uptake of modern contraceptive methods is therefore central to achieving the objectives of Botswana's reproductive health policies and commitments under international frameworks such as the International Conference on Population and Development (ICPD) and Sustainable Development Goal (SDG) 3.7.

The 2010 Revised National Population Policy (RNPP) targeted an increase in contraceptive prevalence from 44% in 2010 to 80% by 2030. As of the latest estimates from the Botswana AIDS Impact Survey V (BAIS V, 2021), 63.4% of women aged 15–49 were using modern contraceptive methods, reflecting significant progress but also a notable gap to the national target.

As shown in **Table 15**, 36.6% of women reported not using any method of contraception, while 63.4% were active users of modern contraceptives. **Figure 13** further illustrates this distribution.

Table 15: Percentage Distribution of Women aged 15 to 49 years who uses Modern Contraception (BAIS V)

Whether Uses Modern Contraceptive	Frequency	Percent
Non-Contraceptive Users	3034	36.6
Contraceptive Users	5249	63.4
Total	8283	100

3.5.2. Trends in Contraceptive Prevalence Rate (CPR) (15–49 Years)

Over the past three decades, Botswana has experienced a steady and significant increase in contraceptive use, reflecting both individual behavioural change and successful national family planning policies. The Contraceptive Prevalence Rate (CPR) for modern methods among women aged 15–49 years has nearly doubled from 33.3% in 1996 to 63.4% in 2022 (see Table 16 and Figures 14). Figure 13 presents the current CPR distribution among women aged 15–49 years, based on the latest BAIS V results, indicating strong uptake across all reproductive age groups.

The growth in contraceptive use has been consistently documented through successive national surveys: CPR stood at 33.3% in 1996 (BFHS III), increased to 47.3% in 2007 (BAIS III), rose further to 53.1% in 2013 (BAIS IV), reached 54.8% in 2017 (BDS), and peaked at 63.4% in 2022 (BAIS V).

This sustained rise reflects multiple factors, including government investment in reproductive health services, public awareness campaigns, integration of family planning with HIV care, and broader improvements in women's education, employment, and autonomy. The upward trajectory in contraceptive use has contributed directly to Botswana's fertility decline and improved reproductive health outcomes. Figure 14 illustrates the long-term upward trend in CPR from 1996 to 2022.

Table 16 and Figure 14 provides a historical summary of CPR levels reported through major national surveys.

Figure 13: Chart Showing Percentage Distribution of Women aged 15 to 49 years who uses Modern Contraception (BAIS V)

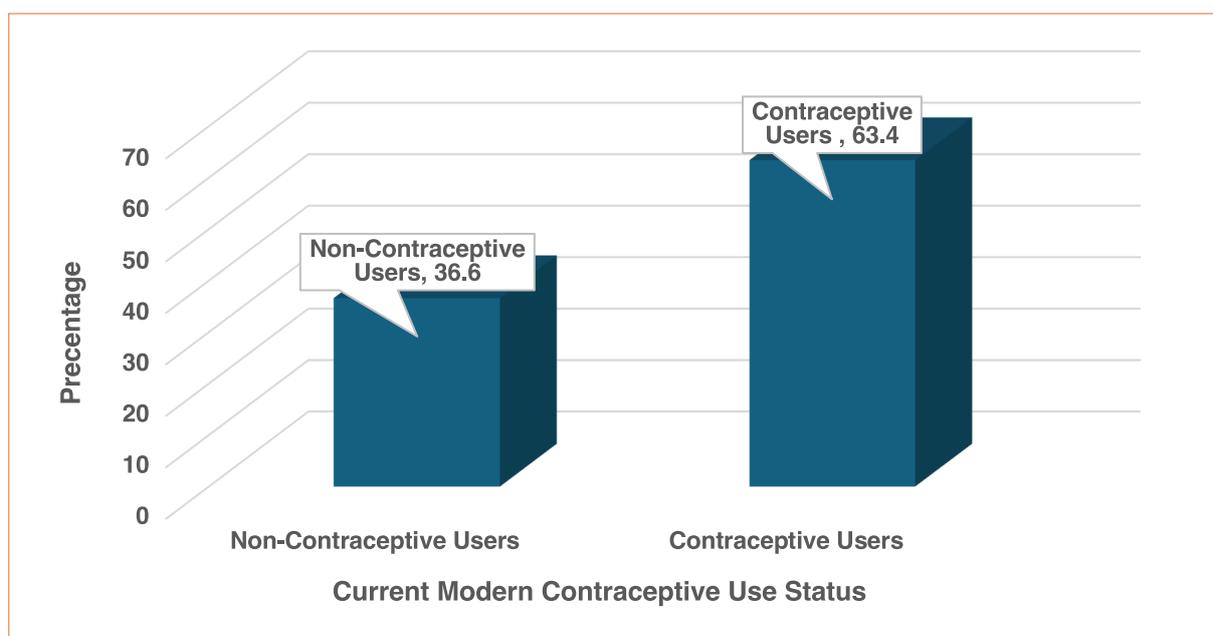


Table 16: Trends in Contraceptive Prevalence Rate (CPR) (15–49 Years) (BAIS V)

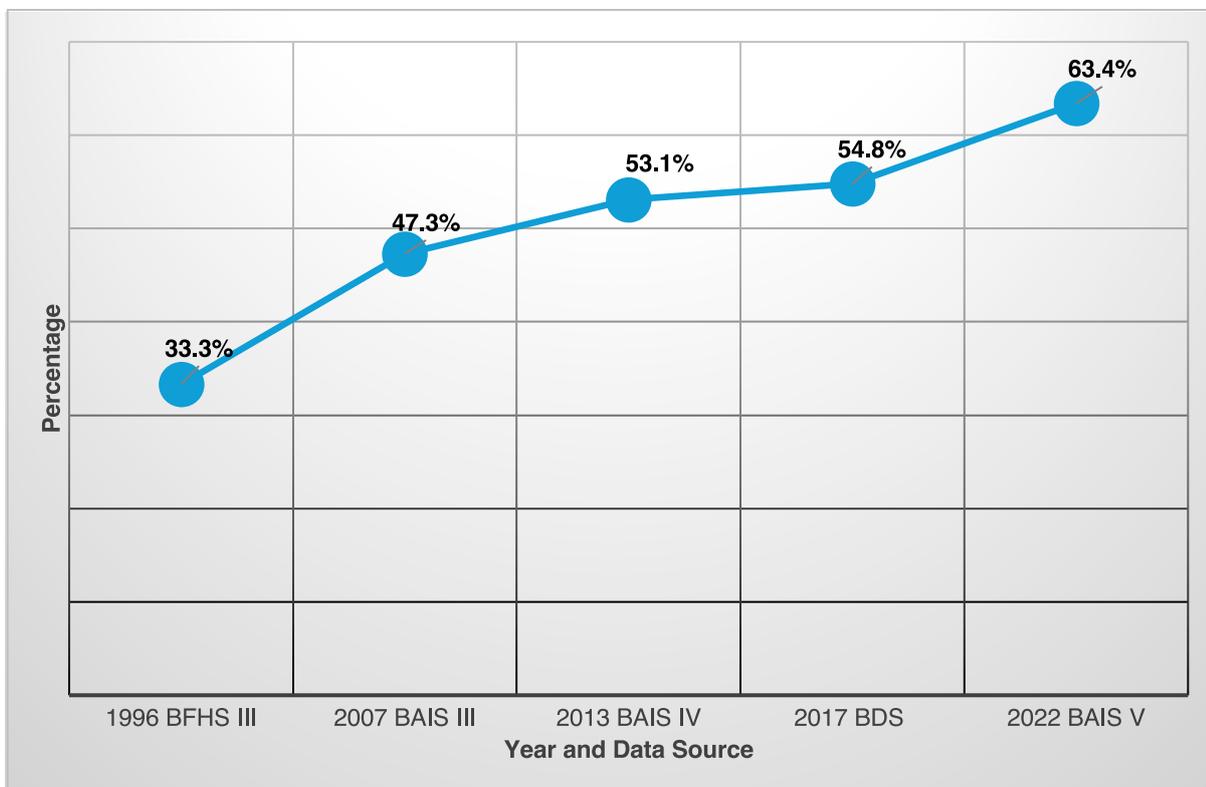
Year	Source	CPR (Modern Methods, Women 15–49)(Percent)
1996	Botswana Family Health Survey (BFHS III)	33.3
2007	Botswana AIDS Impact Survey III (BAIS III)	47.3
2013	Botswana AIDS Impact Survey IV (BAIS IV)	53.1
2017	Botswana Demographic Survey (BDS)	54.8
2022	Botswana AIDS Impact Survey V (BAIS V)	63.4

3.5.3. Contraceptive Prevalence Rate (CPR) (15–49 Years) by District (BAIS V)

There are marked geographic disparities in contraceptive use across Botswana's districts, as shown in **Table 17**. The highest Contraceptive Prevalence Rates (CPR) were recorded in Central Mahalapye (73.0%), followed by Ngamiland West (67.0%), Ngamiland East (66.2%), Orapa (66.9%), and Kgalagadi North (66.6%). These districts reflect strong uptake of modern contraception, likely due to a combination of accessible services, effective family planning outreach, and supportive community norms.

In contrast, the lowest CPRs were observed in Gaborone (56.7%), Kgatleng Wards (56.9%), Jwaneng (59.2%), Kweneng East (58.1%), and Kgalagadi South (58.4%). These lower rates may reflect challenges related to service accessibility, differences in education levels, cultural attitudes, or unmet need for family planning.

Figure 14: Trends in Contraceptive Prevalence Rate (CPR) (15–49 Years): 1996 to 2022: (BAIS V)



The differences in CPR across districts are statistically significant (Pearson Chi-Square $P = 0.011$), indicating that location remains a key determinant of contraceptive use. Addressing these district-level disparities is essential for promoting equitable access to reproductive health services and achieving national CPR targets.

Figure 15 visualises the CPR distribution by district, highlighting both high-performing and low-performing areas.

Figure 15: Contraceptive Prevalence Rate (CPR) (15–49 Years) by District (BAIS V)

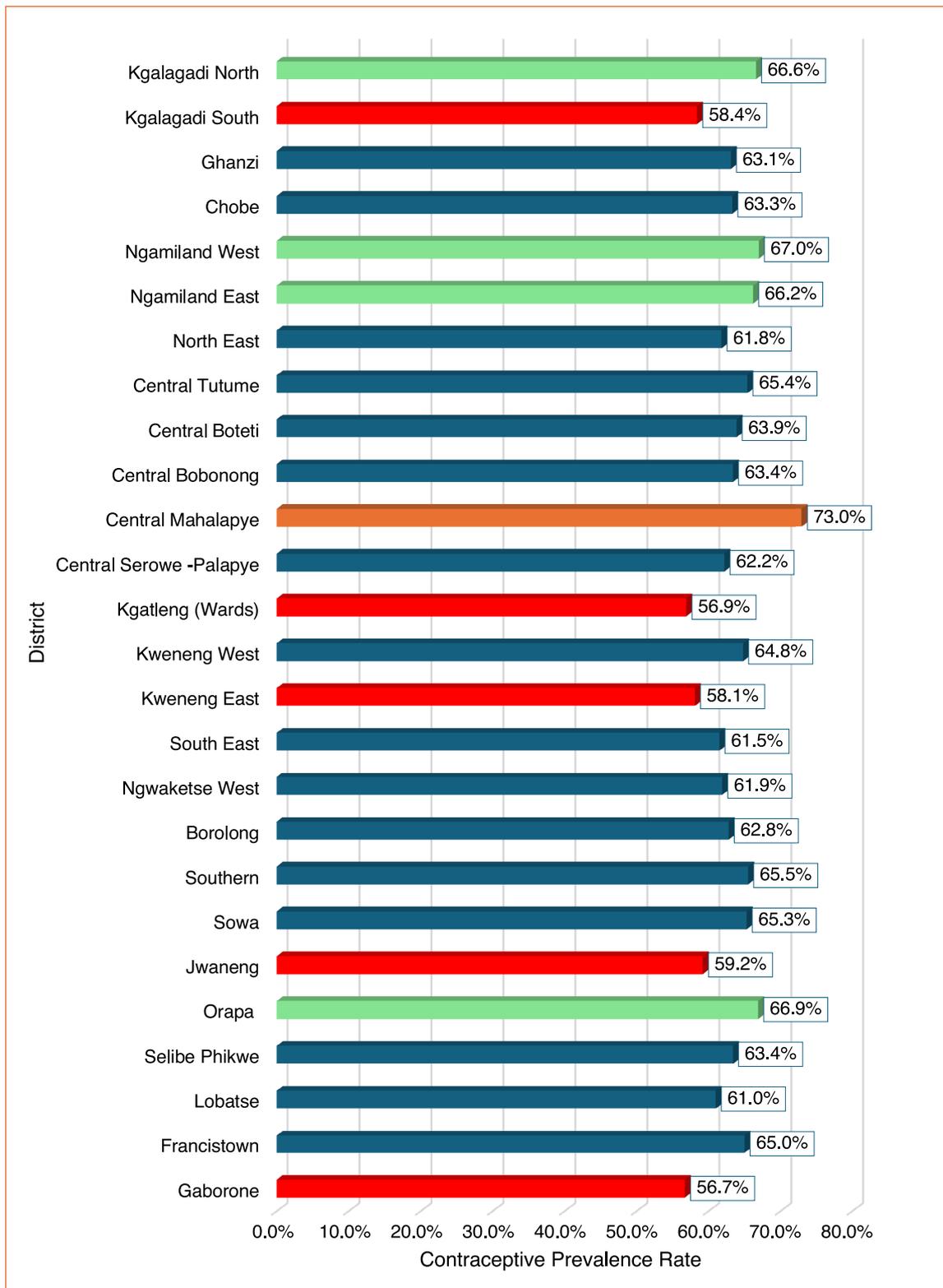


Table 17: Percentage Distribution of Contraceptive Prevalence Rate (CPR) and Non-Contraceptive Used (NCPR) (15–49 Years) and by District (BAIS V)

District	Non-Contraceptive Users (Percent)	Contraceptive Users(Percent)
Gaborone	43.3	56.7
Francistown	35	65
Lobatse	39	61
Selibe Phikwe	36.6	63.4
Orapa	33.1	66.9
Jwaneng	40.8	59.2
Sowa	34.7	65.3
Southern	34.5	65.5
Borolong	37.2	62.8
Ngwaketse West	38.1	61.9
South East	38.5	61.5
Kweneng East	41.9	58.1
Kweneng West	35.2	64.8
Kgatleng (Wards)	43.1	56.9
Central Serowe -Palapye	37.8	62.2
Central Mahalapye	27	73
Central Bobonong	36.6	63.4
Central Boteti	36.1	63.9
Central Tutume	34.6	65.4
North East	38.2	61.8
Ngamiland East	33.8	66.2
Ngamiland West	33	67
Chobe	36.7	63.3
Ghanzi	36.9	63.1
Kgalagadi South	41.6	58.4
Kgalagadi North	33.4	66.6
Total	36.6	63.4

Pearson Chi-Square P-Value = 0.011 (Statistically Significant)

3.5.4. Contraceptive Prevalence Rate (CPR) (15–49 Years) by Locality Type (BAIS V)

As shown in **Table 18**, contraceptive use also varies modestly by locality type. CPR is slightly higher in rural areas (64.0%) compared to urban areas (62.9%), although the difference is not statistically significant ($P = 0.326$). This finding contrasts with conventional expectations and may be attributed to the wide availability of male condoms, strong outreach services in rural clinics, and proactive community-based distribution. However, the marginal gap suggests that locality alone may not be the strongest predictor of contraceptive use, and that factors such as age, marital status, and education may be more influential.

Table 18: Contraceptive Prevalence Rate (CPR) (15–49 Years) by Locality Type (BAIS V)

District	Non-Contraceptive Users (Percent)	Contraceptive Users (Percent)
Urban	37.1	62.9
Rural	36	64
Total	36.6	63.4

3.5.5. Socio-economic Differentials in Contraceptive Prevalence Rate (CPR) (15–49 Years)

Socio-economic and demographic characteristics continue to influence contraceptive uptake in Botswana, as shown in **Table 19**.

- **Age:** CPR increases with age, peaking at 73.7% among women aged 35–39, and declining to 61.5% in the 45–49 age group. The lowest CPR is observed among adolescents aged 15–19 years (23.6%), highlighting the need for improved youth access and adolescent-friendly services (**See figure 16**).
- **Education:** CPR is relatively stable across education levels, ranging from 57.1% among women with no education to 64.6% among women with tertiary education. While the differences are not statistically significant ($P = 0.135$), they reflect a positive association between education and contraceptive uptake (**See Figure 16**).
- **Marital Status:** CPR is significantly higher among ever-married or cohabiting women (74.6%), compared to never-married women (58.0%) and those divorced, separated or widowed (60.4%) ($P < 0.001$). This suggests that women in unions are more likely to access or need contraception for spacing or limiting births (**See Figure 16**).
- **Employment:** Employment status is a strong predictor of contraceptive use. Employed women report a CPR of 70.8%, compared to 61.7% among the unemployed ($P < 0.001$), likely due to greater empowerment, mobility, and access to information and services (**See Figure 16**).
- **Household Wealth:** Interestingly, contraceptive use decreases with increasing household wealth, from 66.1% in the lowest quintile to 59.3% in the highest quintile ($P < 0.001$). This inverse relationship could reflect a shift in fertility intentions or service preferences among wealthier women, such as delayed childbearing or preference for non-public sector methods (**See figure 16**).

These findings highlight the importance of addressing social and structural inequalities to improve access and uptake of contraceptive services, especially among young people, the less educated, and unemployed women.

FIGURE 16: Contraceptive Prevalence Rate (CPR) (15–49 Years) by Selected Socioeconomic and Demographic Characteristics

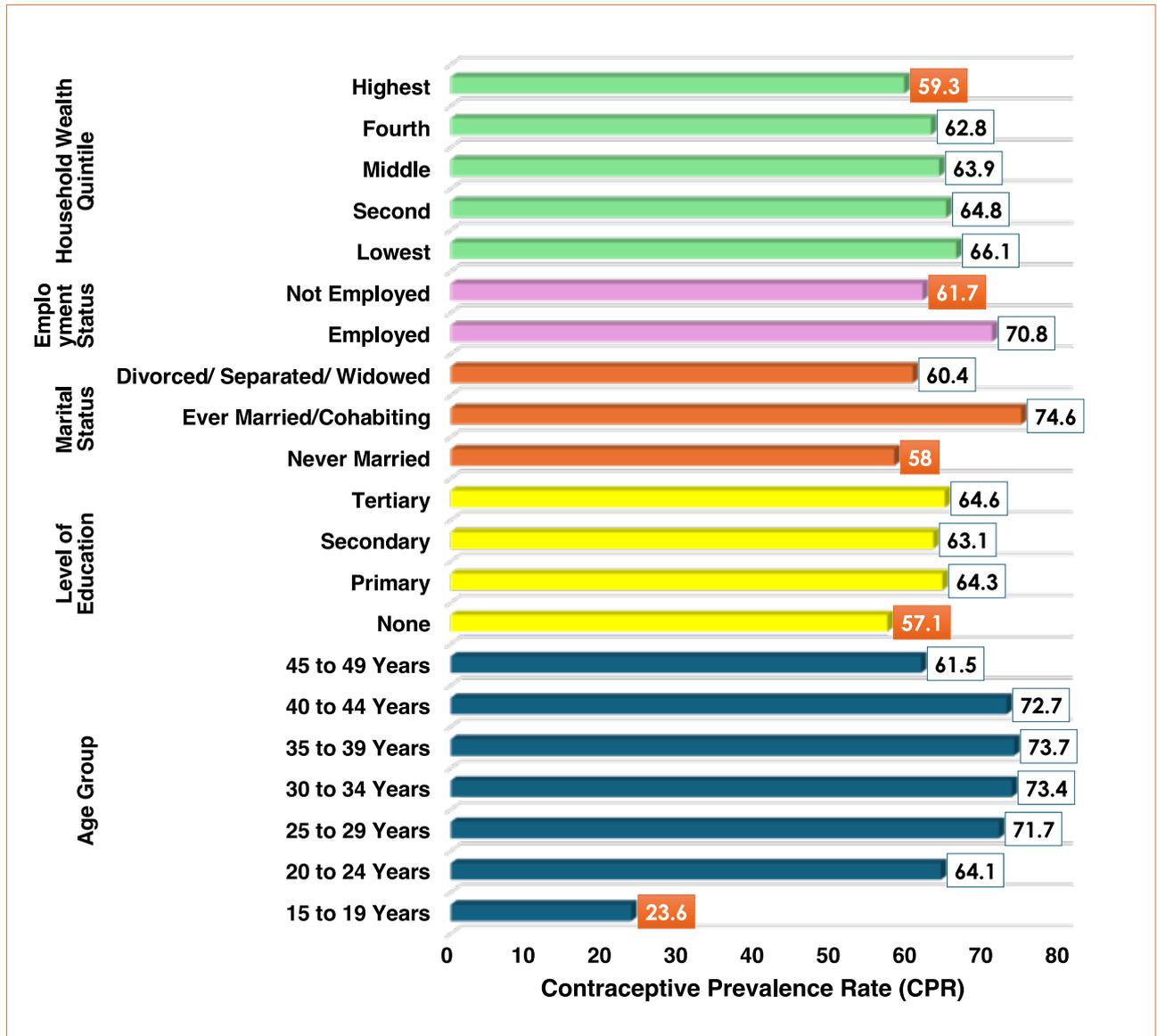


Table 19: Contraceptive Prevalence Rate (CPR) (15–49 Years) by Selected Socioeconomic and Demographic Characteristics

Characteristics		CPR	Pearsons Chi-Square P-Value
Age Group	15 to 19 Years	23.6	<0.001*
	20 to 24 Years	64.1	
	25 to 29 Years	71.7	
	30 to 34 Years	73.4	
	35 to 39 Years	73.7	
	40 to 44 Years	72.7	
	45 to 49 Years	61.5	
Level of Education	None	57.1	0.135
	Primary	64.3	
	Secondary	63.1	
	Tertiary	64.6	
Marital Status	Never Married	58	<0.001*
	Ever Married/Cohabiting	74.6	
	Divorced/ Separated/ Widowed	60.4	
Employment Status	Employed	70.8	<0.001*
	Not Employed	61.7	
Household Wealth Quintile	Lowest	66.1	<0.001*
	Second	64.8	
	Middle	63.9	
	Fourth	62.8	
	Highest	59.3	
Total		63.4	

* Statistically Significant

3.6. Antenatal Care (ANC) Coverage

3.6.1. Introduction

Antenatal care (ANC) remains a foundational component of maternal healthcare, allowing for early identification and management of pregnancy-related complications, provision of preventive care, and counselling on healthy behaviours and birth preparedness. High ANC coverage is widely associated with improved maternal and neonatal outcomes.

In the BAIS V (2021/22) survey, antenatal care (ANC) coverage was assessed by asking women whether they had visited a health facility for ANC during their most recent pregnancy that resulted in a live birth within the past three years. Among the 2,020 women who met this criterion, 99.1% reported attending at least one ANC visit, reflecting near-universal coverage

As presented in **Table 20**, only 19 women (0.9%) reported that they did not seek antenatal care during their last pregnancy. While this statistic highlights Botswana's strong health system outreach and service availability, it is important to note that BAIS V did not collect information on the number or timing of ANC visits, making it impossible to assess whether women received adequate or timely ANC, as recommended by WHO (i.e., four or more visits and first contact in the first trimester).

Table 20: Percentage Distribution by Whether a Health facility was Visited for Antenatal during the Last Pregnancy with Last Child

Whether	Frequency	Percent
Health Facility Not Visited for ANC	19	0.9
Health Facility Visited for ANC	2001	99.1
Total	2020	100.0

3.6.2. Trends in Antenatal Care (ANC) Coverage

Botswana has consistently demonstrated high levels of ANC coverage for decades. Data from successive surveys—particularly the Botswana Family Health Surveys (BFHS) and Botswana AIDS Impact Surveys (BAIS)—indicate a steady upward trend in the proportion of women receiving at least one ANC visit during pregnancy.

As shown in **Table 21**, ANC attendance increased from approximately 90% in the early 1980s to 94% by 1996, and further to 96.0% in BAIS IV (2013). The most recent estimate from BAIS V (2021/22) indicates a coverage rate of 99.1%, reflecting sustained progress towards universal maternal care access

These improvements can be attributed to:

- Expansion of public health infrastructure
- Decentralisation of maternal health services
- Community-based outreach efforts
- Strong policy commitment under the National Health Policy and Vision 2036

However, limitations in survey design have persisted, with most surveys—including BAIS V—reporting only on any ANC contact, without insight into visit adequacy, content, or quality.

Table 21: Trends in Antenatal Care (ANC) Coverage

Survey Year	Survey Name	ANC Attendance (% – At Least One Visit)
1984	Botswana Family Health Survey I (BFHS I)	~90%
1988	Botswana Family Health Survey II (BFHS II)	90%
1996	Botswana Family Health Survey III (BFHS III)	94%
2001	Botswana AIDS Impact Survey I (BAIS I)	Data not available
2004	Botswana AIDS Impact Survey II (BAIS II)	Data not available
2021/22	Botswana AIDS Impact Survey V (BAIS V)	99.10%

3.6.3. Antenatal Care (ANC) Coverage by District: 2021 BAIS V

Analysis of ANC coverage by district, as shown in **Table 22**, indicates consistently high rates across the country. In the majority of districts, 100% of women attended ANC, including Francistown, Selibe Phikwe, Orapa, Southern, Sowa, Central Mahalapye, Central Bobonong, Ngamiland East, Ngamiland West, Chobe, and Kgalagadi South.

The few districts reporting slightly lower ANC attendance include:

- Ghanzi (96.3%)
- Tutume (97.4%)
- Gaborone (97.8%)
- Kweneng West (97.8%)

Despite these minor variations, the differences are not statistically significant (Pearson Chi-Square $P = 0.561$), confirming a nationwide achievement in ANC access.

These findings highlight Botswana's success in delivering equitable maternal health services at sub-national levels, although continuous quality monitoring remains essential.

Table 22: Percentage Distribution by Whether a Health facility was Visited for Antennal during the Last Pregnancy with Last Child by District: 2021 BAIS V

District	Health Facility Not Visited for ANC (Percent)	Health Facility Visited for ANC (Percent)
Gaborone	97.8	2.2
Francistown	100.0	0.0
Lobatse	98.4	1.6
Selibe Phikwe	100.0	0.0
Orapa	100.0	0.0
Jwaneng	98.2	1.8
Sowa	100.0	0.0
Southern	100.0	0.0
Borolong	98.3	1.7
Ngwaketse West	98.6	1.4
South East	98.4	1.6
Kweneng East	98.6	1.4
Kweneng West	97.8	2.2
Kgatleng (Wards)	100.0	0.0
Central Serowe -Palapye	98.8	1.2
Central Mahalapye	100.0	0.0
Central Bobonong	100.0	0.0
Central Boteti	98.8	1.3
Central Tutume	97.4	2.6
North East	98.5	1.5
Ngamiland East	100.0	0.0
Ngamiland West	100.0	0.0
Chobe	100.0	0.0
Ghanzi	96.3	3.7
Kgalagadi South	100.0	0.0
Kgalagadi North	98.7	1.3
Total	99.1	0.9

NS: Statistically Significant with Persons Chi-Square P-Value = 0.561

3.6.4. Antenatal Care (ANC) Coverage by Locality Type: 2021 BAIS V

ANC coverage is similarly high across locality types. As shown in **Table 23**, coverage among urban residents stands at 99.3%, while rural residents report 99.1%. The difference between these groups is not statistically significant (Pearson Chi-Square $P = 0.319$), indicating equitable access to ANC services regardless of residence.

This suggests that maternal health services are effectively reaching women in both urban and rural settings—an important accomplishment in bridging health access gaps between geographically diverse communities.

Table 23: Antenatal Care (ANC) Coverage by Locality Type

District	Health Facility Not Visited for ANC (Percent)	Health Facility Visited for ANC (Percent)
Urban	99.3	0.7
Rural	99.1	0.9
Total	99.1	0.9

Statistically Significant with Persons Chi-Square P-Value = 0.319

3.6.5. Socio-economic Differentials in Antenatal Care (ANC) Coverage: 2021 BAIS V

Disaggregating ANC coverage by socio-economic characteristics reveals consistently high coverage across nearly all subgroups, with only minor differences observed.

- **Age:** Younger women aged 15–19 years had the lowest ANC attendance at 97.6%, while women aged 40–49 years reported 100% coverage. The variation by age group is not statistically significant ($P = 0.506$).
- **Education:** Women with no education had the lowest ANC coverage at 94.4%, while those with tertiary education achieved 99.8% coverage. This difference is statistically significant ($P = 0.002$), highlighting education as a key determinant of health-seeking behaviour.
- **Marital Status:** ANC coverage did not vary significantly by marital status, with coverage rates above 98.8% in all categories ($P = 0.969$).
- **Employment Status:** ANC coverage was slightly higher among employed women (99.4%) compared to those not employed (99.0%), though the difference is not statistically significant ($P = 0.813$).
- **Household Wealth Quintile:** Coverage ranged from 98.7% in the lowest quintile to 100% in the highest, but this trend is not statistically significant ($P = 0.369$), suggesting strong public sector access across wealth groups.

Table 24 summarises these socio-economic differentials. The only significant difference was by education level, reinforcing the need for continued investment in girl's education and health literacy to further improve maternal health service uptake.

Table 24: Antenatal Care (ANC) Coverage by Selected Socioeconomic and Demographic Characteristics: BAIS V 2021

Characteristics		ANC Coverage	Pearsons Chi-Square P-Value
Age Group	15 to 19 Years	97.6	P=0.506
	20 to 24 Years	99	
	25 to 29 Years	99.2	
	30 to 34 Years	98.6	
	35 to 39 Years	99.5	
	40 to 44 Years	100	
	45 to 49 Years	100	
Level of Education	None	94.4	P=0.002*
	Primary	98.6	
	Secondary	99	
	Tertiary	99.8	
Marital Status	Never Married	99.1	P=0.969
	Ever Married/Cohabiting	99.2	
	Divorced/ Separated/ Widowed	98.8	
Employment Status	Employed	99.4	P=0.813
	Not Employed	99	
Household Wealth Quintile	Lowest	98.7	P=0.369
	Second	98.9	
	Middle	98.9	
	Fourth	99.4	
	Highest	100	
Total			

* Statistically Significant

3.7. Skilled Birth Attendant (SBA)

3.7.1. Introduction

Skilled Birth Attendance (SBA) is a cornerstone indicator of maternal health, defined as delivery care provided by trained health personnel, such as registered midwives, nurses, or doctors, who are competent in the management of normal (uncomplicated) pregnancies, childbirth, and the immediate postnatal period. In the context of Botswana's healthcare system, institutional deliveries are considered skilled deliveries. This is based on the national assumption that all health facilities are manned by skilled personnel, particularly nursing midwives or trained registered nurses capable of providing delivery care or referring complications to higher-level facilities.

Hence, institutional births are a reliable proxy for SBA coverage, especially given the decentralised structure of Botswana's health system where even remote clinics are supported by professional health cadres or referral mechanisms.

3.7.2. Trends in Skilled Birth Attendant (SBA)

Botswana has sustained very high SBA coverage over the years. According to Statistics Botswana's Maternal Mortality Reports, institutional deliveries (i.e., births in hospitals and clinics (See Table 25) have consistently accounted for 99.8% of all births since at least 2017.

This high rate reflects:

- Widespread access to health facilities
- Trust in facility-based delivery services
- Strong health policy support and national emphasis on safe motherhood

Table 25: Trends in Skilled Birth Attendant (SBA), Institutional Births and Non-Institutional Births

Year	Sources	Total Live Births	Institutional Births	Non-Institutional Births	SBA Coverage (%)
2017	Vital Statistics	52,358	52,242	116	99.8
2017	2017 BDS	55368 est.	55,225 est.	143 est.	99.7
2018	Vital Statistics	53,115	52,999	116	99.8
2019	Vital Statistics	52,304	52,206	98	99.8
2020	Vital Statistics	58,244	58,146	98	99.8
2021	Vital Statistics	53,326	53,227	99	99.8
2022	Vital Statistics	50,704	50,605	99	99.8

Sources: Statistics Botswana MMR Reports (2019–2022)

3.7.3. Skilled Birth Attendant (SBA) by District: 2022 Vital Statistics

Although the overall national SBA coverage is high, slight variations exist across districts due to non-institutional births and “born-before-arrival” (BBA) cases. For instance, in 2022, districts like South East, Central Bobonong, and Greater Gaborone recorded slightly higher numbers of non-institutional deliveries, though these still represented a tiny proportion (<1%) of total births.

This underscores the importance of:

- Strengthening maternity outreach in urban fringes and remote areas
- Improving emergency transport systems to reduce BBA incidents

Table 26 supports the narrative that non-institutional births in Botswana are exceptionally low, with all districts maintaining institutional delivery coverage close to 100%. The highest number of non-institutional births was recorded in South East (18 births, 18.2%), followed by Central Bobonong and Gaborone, each with 10 births (10.1%). Many districts, including Orapa, Jwaneng, Sowa Town, Ngwaketse West, Kweneng West, Kgatleng, and both Kgalagadi districts, reported zero non-institutional deliveries, indicating effective access to skilled birth attendants nationwide.

3.7.4. Skilled Birth Attendant (SBA) by Locality Type: 2022 Vital Statistics

When disaggregated by locality type:

- Urban areas (cities/towns) consistently report SBA coverage close to 100%.
- Urban villages and rural areas also reflect high institutional delivery rates (>99%).

The Born Before Arrival (BBA) rates, though low, are slightly higher in rural and peri-urban areas, pointing to potential challenges in transport, timing of referral, and decision-making delays.

This affirms that geographic access remains a marginal yet significant factor, especially for rural residents who might experience long travel distances or lack timely emergency response.

3.7.5. Socio-economic Differentials in Skilled Birth Attendant (SBA)

Analysis of skilled birth attendance by key socio-economic characteristics reveals high overall coverage across all groups, with minimal but statistically significant variation by education level and marital status.

By Age Group, SBA coverage is nearly universal, with all age categories reporting above 99.7%. Notably, adolescents aged 10–14 and women aged 45 and above reported 100% SBA coverage. However, the observed differences across age groups are not statistically significant (X^2 , $p = 0.442$), indicating that age is not a major determinant of skilled attendance at delivery in Botswana.

**Table 26: Districts with Highest Non-Institutional Births in 2022:
2022 Vital Statistics**

District of Birth	Number of Non-Institutional Births	Percent (%) of Total Non-Institutional Births
Gaborone	10	10.1
Francistown	5	5.1
Lobatse	2	2.0
Selebi Phikwe	8	8.1
Orapa	0	0.0
Jwaneng	0	0.0
Sowa Town	0	0.0
Southern	3	3.0
Barolong	7	7.1
Ngwaketse West	0	0.0
South East	18	18.2
Kweneng East	8	8.1
Kweneng West	0	0.0
Kgatleng	0	0.0
Central Serowe/Palapye	6	6.1
Central Mahalapye	7	7.1
Central Bobonong	10	10.1
Central Boteti	1	1.0
Central Tutume	4	4.0
North East	1	1.0
Ngamiland East	5	5.1
Ngamiland West	1	1.0
Chobe	1	1.0
Ghanzi	2	2.0
Kgalagadi South	0	0.0
Kgalagadi North	0	0.0
Total	99	100.0

Source: Statistics Botswana, Botswana Maternal Mortality Ratio Report 2022

By Level of Education, although all categories show very high SBA coverage (>99.6%), a marginal decline is observed as education level increases—from 99.9% among those with no formal or only primary education, to 99.6% among women with tertiary education. The association between SBA coverage and education is statistically significant (χ^2 , $p < 0.001$), though the direction of the

relationship is not intuitive. This result may reflect residual reporting errors or differing rates of planned home births among more empowered, educated women—a hypothesis warranting further investigation.

By marital status, women who were divorced, separated, or widowed reported slightly lower skilled birth attendance (SBA) coverage (98.8%) compared to those never married (99.8%) and those ever married or cohabiting (99.7%). Although the difference is modest, it is statistically significant ($p = 0.013$), suggesting that women experiencing marital disruption may encounter additional barriers to accessing skilled delivery care, potentially linked to reduced social or financial support during pregnancy.

Overall, while disparities in SBA coverage by socio-economic group are minimal in absolute terms, the statistical significance of differences by education and marital status indicates the importance of targeted support to ensure equitable access. In particular, vulnerable groups such as formerly married women may require greater outreach and support to maintain universal SBA coverage.

3.8. Postnatal Care (PNC) Coverage

3.8.1. Introduction

Postnatal care (PNC) is a critical component of the maternal and newborn health continuum, covering the six weeks following childbirth—a period that poses heightened risks of complications for both the mother and the infant. Timely and comprehensive postnatal care helps prevent maternal and neonatal morbidity and mortality by addressing complications such as infections, haemorrhage, breastfeeding difficulties, and postpartum depression.

According to Botswana's Sexual and Reproductive Health Policy Guidelines and Service Standards, PNC is expected to include:

- Immediate post-delivery checks while the mother and baby are still at the health facility
- Domiciliary follow-up visits by community health workers
- A routine 6–8-week check-up for both mother and infant

The service package encompasses screening for complications, breastfeeding support, child immunisation, postnatal counselling, and family planning services. These standards aim to ensure continuity of care and early detection of health issues following childbirth. Policy Guidelines & Ser....

In Botswana, with over 99.8% of deliveries occurring in health facilities, it is assumed that all mothers and newborns receive at least one postnatal examination prior to discharge by a trained health professional. This assumption is supported by national protocols requiring such checks in all maternity units staffed by midwives or trained nurses. However, what remains unclear is whether mothers and newborns consistently receive the recommended follow-up care, particularly after discharge (**See table 27**).

Table 27: Percentage Distribution of Births by Skilled Birth Attendance: Vital Statistics 2022

Characteristics		Skilled Birth Attendance	Pearsons Chi-Square P-Value
Age Group	10 to 14 Years	100	P=0.442
	15 to 19 Years	99.9	
	20 to 24 Years	99.8	
	25 to 29 Years	99.7	
	30 to 34 Years	99.7	
	35 to 39 Years	99.7	
	40 to 44 Years	99.8	
	45 and Above	100	
Level of Education	None	99.9	P<0.001*
	Primary	99.9	
	Ever Married/Cohabiting	99.7	
	Divorced/ Separated/ Widowed	98.8	
Total		99.8	

* Statistically Significant

3.8.2. Data Availability on Postnatal Care in Botswana

Despite the national commitment to postnatal care, no recent national survey has captured postnatal care indicators. The BAIS V (2021/22) did not include questions on whether women or their newborns received any form of postnatal care following discharge. The survey focused instead on HIV testing and results among mothers and infants during the postnatal period but did not capture general PNC service utilisation.

- Botswana Demographic Survey (BDS 2017) and BAIS IV (2013): No postnatal care data collected.
- Vital Statistics and Census Reports: Do not include PNC indicators.
- BFHS III (1996): Remains the last national survey to report PNC coverage, but the data are now outdated.

Facility-based administrative data from the Ministry of Health (MoH) may provide insight into PNC attendance within 48 hours and at 6–8 weeks postpartum, but access to such data is currently limited and not publicly reported in sufficient detail.

3.8.3. Assumptions Based on Facility-Based Deliveries

In the absence of direct data, institutional delivery coverage is often used as a proxy for immediate postnatal care, based on clinical protocols followed at maternity facilities. These protocols ensure:

- Immediate examination of the mother and baby after delivery
- Monitoring for early complications before discharge
- Initial breastfeeding support and family planning counselling

Given the near-universal institutional delivery rate in Botswana, it is likely that most women receive some form of postnatal assessment before leaving the facility. However, this does not account for:

- Quality and depth of that care
- Follow-up home visits or outpatient reviews
- Postnatal care for newborns with complications or mothers who delivered outside facilities

3.8.4. The Need for Improved Data Collection and Monitoring

The lack of current, nationally representative data on postnatal care remains a critical gap in Botswana's maternal health monitoring framework. Without such data, it is difficult to:

- Track PNC coverage, especially beyond facility discharge
- Identify underserved populations (e.g., adolescents, rural women, informal sector mothers)
- Evaluate compliance with the SRH Policy Guidelines and Service Standards
- To address this, the following steps are recommended:
- Include PNC modules in upcoming surveys (e.g., DHS, BAIS VI, or a dedicated reproductive health survey)
- Expand HMIS reporting to capture both maternal and newborn PNC visits
- Strengthen community health systems to ensure follow-up care at home or health posts

4. Conclusions

The findings of this report provide a robust overview of maternal health in Botswana using triangulated data sources, notably the 2022 Population and Housing Census (PHC), Botswana Demographic Surveys (BDS), Vital Statistics, BAIS V, and Ministry of Health's Maternal Mortality Notifiable Records. These datasets enabled a nuanced understanding of maternal health outcomes and service uptake across different regions and population groups.

Botswana has made notable progress, reflected in near-universal antenatal care (ANC) coverage and consistently high levels of skilled birth attendance (SBA). The national Total Fertility Rate (TFR) has declined to 2.9, signaling an ongoing demographic transition and improved access to family planning services. Nonetheless, substantial district-level disparities persist, with regions such as Ngamiland East, Kgalagadi South, and Kweneng East recording disproportionately high maternal mortality ratios (MMRs) relative to the national average.

Challenges persist in the quality and consistency of maternal health data. For example, while vital event reporting has improved, large portions of maternal mortality data remain uncoded, limiting their utility for trend analysis and program targeting. Data entry practices using Microsoft Excel, particularly for variables like cause of death, referral facility, gestation at time of death, and HIV status; lead to inconsistencies and higher chances of human error due to reliance on string (text) entries.

Moreover, postnatal care (PNC) remains inadequately documented, and maternal deaths occurring outside health facilities are likely underreported. Socio-demographic data (e.g., education, employment, marital status, and place of residence) are not routinely collected within obstetric or maternal mortality records, hindering deeper analysis of structural determinants.

Therefore, while Botswana has achieved commendable improvements in several maternal health indicators, focused interventions are needed to address equity gaps, reinforce data systems, and advance the quality and completeness of maternal health services.

5. Policy and Programme Implications

5.1. Summary of Key Challenges

- **Regional Inequalities**

Maternal mortality remains disproportionately high in several districts, notably those with limited healthcare infrastructure, remote geographic access, or under-resourced facilities. These disparities point to longstanding systemic issues in the distribution of emergency obstetric care (EmOC), inconsistent availability of skilled birth attendants, and uneven responsiveness of local health systems. Such inequalities undermine national efforts to achieve equitable maternal health outcomes.

- **Poor Data Structuring and Entry Practices**

Critical variables in maternal death records, such as the name of the reporting facility, HIV status of the deceased, referral source, and gestational age at the time of death, are currently recorded as free-text fields rather than using predefined codes or dropdown lists. This increases the risk of typographical errors, inconsistent use of terms (e.g., different spellings or naming conventions for facilities), and duplication of entries. Such practices compromise data quality, consistency, and the efficiency of subsequent analysis.

- **Lack of Socioeconomic Variables in Facility Data**

Facility-based reporting tools for maternal mortality do not routinely include key sociodemographic indicators such as level of education, employment status, marital status, disability status or, in some cases, the usual place of residence. This omission hinders the identification of structural and social determinants that contribute to maternal mortality, such as poverty, lack of education, and gender-based vulnerability. Without such data, it is difficult to develop targeted interventions for at-risk groups.

- **Manual and Fragmented Data Systems**

The Ministry of Health continues to rely on Microsoft Excel spreadsheets to manage maternal mortality and other vital event data. This manual and decentralised approach lacks the standardisation, automation, and validation tools found in statistical software packages. It also limits interoperability with national health information platforms such as the District Health Information System (DHIS2), compromising real-time surveillance and the integration of maternal mortality data with broader health system analytics.

- **Uncoded Data**

Many records lack International Classification of Diseases (ICD-10) coding for the cause of death, referral diagnoses, and contributing factors. The absence of standardised coding undermines the comparability of data across facilities, districts, and time periods. It also limits the potential for root-cause analysis and for aligning Botswana's data systems with international norms for reporting maternal deaths and related conditions.

- **Postnatal Care Gaps**

Data on the postnatal period, a critical timeframe during which a significant proportion of maternal deaths occur, are either missing or inconsistently captured in routine reports. Many facilities do not document whether the deceased had received any postnatal care, nor do they record the timing and nature of complications in the days or weeks following delivery. This represents a blind spot in maternal mortality surveillance and programme design.

5.2. Alignment with Policy Frameworks and Gaps

Botswana's commitment to improving maternal health is reflected in its policy landscape, which includes:

- **National Frameworks:**

- **The Revised National Population Policy (2010):** Prioritises improved maternal and child health outcomes as part of the broader demographic and health agenda.
- **The National Health Policy (2011):** Promotes equitable access to quality health services, including reproductive, maternal, neonatal, child, and adolescent health.
- **Sexual and Reproductive Health (SRH) Policy Guidelines:** Provides guidance on comprehensive SRH services, including maternal health interventions.

- **Global and Regional Commitments:**

- **Sustainable Development Goals (SDG 3.1):** Calls for the reduction of the global maternal mortality ratio to less than 70 per 100,000 live births by 2030.
- **Africa Agenda 2063 and the Maputo Plan of Action:** Emphasise maternal health as a cornerstone of inclusive development and gender equality.
- **Vision 2036:** Articulates Botswana's aspirations for a healthy and prosperous society, highlighting maternal health as a key development pillar.

Despite this supportive policy environment, several operational and monitoring gaps persist:

- Inadequate Focus on Digitalisation and Coding
- Most data systems used for maternal health reporting remain manual and lack built-in mechanisms for automated coding, validation, or structured data capture. This limits the transition to evidence-based, data-driven policy formulation and hinders the adoption of international standards.
- Weak Integration with CRVS Systems
- Maternal death surveillance remains disconnected from the broader Civil Registration and Vital Statistics (CRVS) system. This fragmentation delays cross-verification of records and undermines the national ability to produce complete, reliable, and disaggregated maternal mortality statistics.
- Limited Mechanisms for Monitoring Social Determinants
- Routine health information systems do not systematically collect or analyse social and economic variables such as income, occupation, education, or access to transportation, factors which have a proven link to maternal health outcomes.
- Fragmented Data Flow Between Service Levels

Communication and data sharing between community-level service providers (e.g., clinics, mobile health teams) and centralised maternal death review committees remain weak. This fragmentation limits case tracking, delays alerts for policy response, and contributes to underreporting or misclassification of maternal deaths.

To address these challenges, Botswana must invest in modern, coded, and interoperable health information systems that not only track deaths but also identify risk factors and generate insights for timely intervention and accountability.

6. Recommendations

6.1. PRIORITY: Strengthen Maternal Health Data Systems

- **Develop a National Coding Manual/Codebook for Vital Events:**

- Establish a standardised codebook for maternal deaths, births, marriages, divorces, and internal migration to improve consistency and comparability across years and datasets.
- Ensure alignment with ICD-10 standards for causes of maternal death and related conditions.

- **Transition from Excel to Statistical Software:**

- Encourage the Ministry of Health to migrate from Excel-based data entry to software such as SPSS, Stata, or DHIS2, which support variable coding and reduce data entry errors.
- Equip data clerks and health officers with training in using these platforms, including code validation checks and automated analytics dashboards.

- **Ensure Coding of All Key Variables:**

- Introduce mandatory coding for:
 - Cause of death (ICD-10)
 - Direct or indirect cause
 - Gestational age at death
 - Facility name (using unique health facility codes)
 - Referral source
 - HIV status (coded as positive, negative, unknown)
- This will enhance longitudinal tracking, facilitate epidemiological studies, and improve resource allocation.

- **Link Socioeconomic Data to Maternal Health Records:**

- Collect additional demographic information, such as residence, education level, employment status, disability status and marital status, at the point of ANC or delivery care to enable multidimensional risk profiling.

- **Establish Maternal Health Dashboards:**

- Develop digital dashboards at district and national levels to visualise trends in maternal health outcomes, risk factors, and service uptake in real time.
- Enable automatic updates using Application Programming Interfaces (APIs) connected to hospital reporting systems or DHIS2.

6.2. Targeted Programmatic Interventions

- **Scale up adolescent and youth-friendly SRH services, with special emphasis on:**

- Access to contraception
- Prevention of early pregnancies
- Life-skills education in schools and communities

- **Focus on High-Risk and Underserved Districts:**
 - Tailor maternal health interventions for districts like Ngamiland East, Kweneng East, Kweneng West, Ngwaketse West, Gantsi, and Kgalagadi South, with mobile clinics, community midwifery (if possible), and strengthened referral chains.
- **Expand Emergency Obstetric and Newborn Care (EmONC) Capacity:**
 - Strengthen emergency obstetric care availability in high-burden districts by deploying trained personnel, ensuring blood supply, and maintaining ambulance services for timely referrals.

6.3. Systems-Level Health Improvements

- Introduce Incentives for Skilled Health Worker Retention in rural and hard-to-reach areas to reduce SBA disparities.
- Strengthen Postnatal Care Tracking and Service Delivery, ensuring timely follow-up for mothers and newborns through outreach and mobile health (mHealth) platforms.
- Institutionalise Maternal Death Surveillance and Response (MDSR) by linking facility, community, and civil registration data to ensure no maternal death goes uncounted or unanalysed.

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