GENDER INEQUALITIES IN BHUTAN USING CIVIL REGISTRATION AND VITAL STATISTICS

FINAL REPORT


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National Statistics Bureau

Vital Strategies

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DATA FOR HEALTH INITIATIVE

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EXECUTIVE SUMMARY

This report provides a comprehensive gender inequality assessment of Bhutan's Civil Registration and Vital Statistics (CRVS) system, commissioned by the National Statistics Bureau (NSB) in collaboration with ESCAP. The study analyzes administrative CRVS microdata to examine gender and socioeconomic disparities in the timeliness of registration of births and deaths.

Bhutan has made remarkable progress in expanding coverage and timeliness of birth and death registration. The completeness of birth registration reached 73.9% in 2023, while death registration stood at 69.2%. Gender parity is strong overall—there is no significant difference between male and female births in either registration or timeliness. However, disparities persist across other dimensions, particularly maternal age, education, and geographic location. Children born to younger or less educated mothers, or in remote Dzongkhags, are less likely to have timely registration.

Survey-based data from MICS 2010 reported near-universal birth registration (over 99%), but this contradicts administrative estimates. The NHS 2023, meanwhile, did not collect data on birth registration at all—an omission that prevents the estimation of socioeconomic determinants and triangulation between administrative and survey data. The report recommends reinstating standardized questions on registration status, and timing of registration in future national surveys.

Regarding death registration, Bhutan has achieved major gains in timeliness: the share of delayed registrations fell from over 15% in 2016 to just 1.3% in 2023. Yet, delays remain concentrated among infant and under-five deaths, especially for females, whose deaths are more likely to be registered late. Geographic disparities also persist, with higher delays in remote Dzongkhags such as Gasa, Dagana, and Haa.

Overall, Bhutan's CRVS system demonstrates strong progress toward universal, gender-inclusive registration. Nonetheless, specific vulnerabilities remain—particularly for young mothers, geographically isolated households, and female child deaths. Strengthening the integration of CRVS with health systems, improving data collection, and enhancing community outreach are key to achieving complete and equitable registration.

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INTRODUCTION

Civil Registration and Vital Statistics (CRVS) systems lie at the heart of modern governance and inclusive development. They provide individuals with legal identity, safeguard fundamental rights, and generate continuous, complete, and reliable data on key life events, including births, deaths, marriages, and divorces. As emphasized by the United Nations, CRVS is the most reliable and sustainable source of population and vital statistics, and is central to the realization of the 2030 Agenda for Sustainable Development. In particular, Sustainable Development Goal (SDG) 16.9 calls for the provision of legal identity for all, including birth registration, by 2030. Moreover, the comprehensiveness of CRVS data underpins the monitoring of a wide range of other SDGs, from reducing child mortality (SDG 3.2) and eliminating harmful practices such as child marriage (SDG 5.3), to strengthening national statistical systems and governance (SDG 17.19).

The importance of CRVS systems extends beyond their statistical value. Registration of vital events provides individuals with proof of identity, citizenship, and family relations, thereby enabling access to essential services such as healthcare, education, social protection, and inheritance rights. Birth certificates, for instance, are often required for school enrolment, health services, and social transfers, while death certificates are critical for inheritance, pension claims, and accurate cause-of-death reporting. In their absence, individuals—particularly those from marginalized and vulnerable groups—remain invisible to the state and are more likely to experience exclusion, discrimination, and rights violations. Incomplete registration of deaths, for example, undermines the production of reliable mortality statistics, hampers evidence-based health planning, and conceals gendered vulnerabilities such as maternal mortality or deaths related to gender-based violence.

Across the world, however, CRVS systems face persistent challenges of coverage, completeness, and equity. Despite global progress in recent decades, UNICEF (2019) estimates that around one in four children under five remain unregistered, with wide disparities by income, geography, ethnicity, and maternal education. Studies also reveal systematic gender dimensions. Although sex differences in birth registration coverage have become small in recent years, inequalities appear when disaggregated by mother's age, marital status, and social group. Female-headed households and unmarried mothers frequently face barriers of stigma, administrative restrictions, or discriminatory legal provisions that prevent them from independently registering children. At the same time, female deaths are less likely to be registered than male deaths in many countries, and deaths of children under five—especially girls—are particularly under-recorded. These inequities compromise both the inclusiveness of CRVS systems and the gender-responsiveness of policies derived from them.

The Asia-Pacific region, under the leadership of the United Nations Economic and Social Commission for Asia and the Pacific (ESCAP), has made significant strides under the 'CRVS Decade 2015–2024.' The Regional Action Framework set ambitious goals of achieving universal registration of births and deaths, ensuring legal documentation for all, and producing complete and timely vital statistics. Within this framework, countries have been encouraged to undertake inequality assessments to identify 'who is left out' of CRVS systems and to ensure that registration is truly universal. Such assessments highlight how overlapping vulnerabilities—gender, income, geography, ethnicity, disability, or migratory status—compound exclusion and undermine the equity of CRVS systems.

Bhutan has made notable progress in strengthening its CRVS system through comprehensive institutional reforms and policy initiatives. The country's CRVS governance operates through a coordinated framework involving the National Statistics Bureau (NSB) as the central statistical authority established in 2003 and designated under an Executive Order in 2006 as the central authority for the collection, compilation and release of official data, the Department of Civil Registration and Census (DCRC) under the Ministry of Home Affairs responsible for birth and death registration operations alongside citizenship card issuance and census functions, and the Ministry of Health (MoH) which plays a crucial role in facility-based birth and death reporting through its network of health facilities. Since the launch of the Bhutan Civil Registration System (BCRS) in 2012, the country has expanded coverage and timeliness of registration. Aligned with the 13th Five Year Plan's emphasis on strengthened data ecosystems and digital transformation, Bhutan has undertaken systematic CRVS strengthening efforts. The plan specifically prioritizes operationalizing a Civil Registration and Vital Statistics (CRVS) system that meets international standards by 2025, alongside establishing a fully equipped and resourced statistical structure by 2028 to support evidence-based decision-making across all sectors.

The Vital Statistics Report (2023) indicates that 83.2 percent of births occurred in 2022 were registered, a substantial improvement compared to earlier decades. Completeness of death registration was estimated at around 70 percent, with particularly low coverage among children under eight years of age. Encouragingly, the data show no aggregate gender gap in birth registration, yet disaggregated analyses point to disparities associated with mother's age, socio-economic status, and geographic location. Moreover, female death registration lags in some categories,such as under 5 mortality, reflecting broader challenges documented across the region. These patterns underscore the need for a more systematic understanding of gendered and intersectional inequalities in CRVS coverage in Bhutan.

It is against this backdrop that the present assignment has been commissioned. The National Statistics Bureau (NSB), in collaboration with ESCAP, is undertaking an inequality assessment of CRVS in Bhutan with a specific focus on gender. This study seeks to provide a comprehensive diagnostic of disparities in birth and death registration, examining how factors such as sex, age, maternal characteristics, location, and socio-economic background affect completeness. In doing so, it will generate evidence to inform policy reforms, strengthen inclusiveness, and support Bhutan's commitment to universal CRVS coverage.

The assignment is timely and relevant for several reasons. First, it contributes directly to Bhutan's national priorities of improving statistical systems and ensuring equitable access to services. Second, it supports global and regional commitments under the SDGs and the Asia-Pacific CRVS Decade, particularly in the lead-up to 2030. Third, it brings a gender lens to CRVS analysis, aligning with broader national and international efforts to promote gender equality and women's empowerment. Finally, it responds to the growing recognition that universal CRVS systems are not only a technical and administrative goal, but also a matter of social justice, equity, and human rights.

2

LITERATURE REVIEW

Civil Registration and Vital Statistics (CRVS) systems are universally recognized as the foundation of legal identity and inclusive governance. The United Nations defines civil registration as the continuous, permanent, compulsory and universal recording of vital events such as births and deaths, in accordance with national laws (UN, 2014). CRVS data constitute the most reliable source of population and health statistics, forming the backbone of planning, service delivery, and accountability.

CRVS is directly linked to the Sustainable Development Goals (SDGs). SDG 16.9 calls for 'legal identity for all, including birth registration' by 2030, while SDG 17.19 requires countries to strengthen statistical capacity, including through vital statistics. At the same time, CRVS contributes indirectly to other SDGs: ensuring universal health coverage and reducing child and maternal mortality (SDG 3), eliminating harmful practices such as child marriage (SDG 5), and reducing inequalities (SDG 10). ESCAP's Asia-Pacific CRVS Decade 2015–2024 further articulated regional ambitions through its Regional Action Framework, setting three goals: (i) universal registration of vital events, (ii) provision of legal documentation, and (iii) production of complete and timely vital statistics.

Despite these commitments, progress remains uneven. Globally, UNICEF (2019) estimated that 166 million children under five—one in four—remain unregistered, with persistent disparities across and within countries.

2.1 Socioeconomic and geographic inequalities in CRVS

Evidence consistently shows that children born into poor households, rural areas, and to less educated mothers are less likely to be registered. A cross-country analysis of 67 low- and middle-income countries (LMICs) (Bhatia et al., 2019) found that while birth registration improved globally between 1999 and 2016, inequities persisted, with the wealthiest quintiles and urban households benefiting disproportionately.

Country-specific studies confirm these patterns. For example, in Nigeria, Adi and al (2015) showed that birth registration was significantly associated with place of delivery, maternal antenatal care attendance and household wealth. Similarly, Amo-Adjei and Annim (2015) found that in Ghana, children of mothers with higher education and those born in health facilities were more likely to be registered.

Latin American evidence also points to socio-economic gradients. Brito and al (2013) highlighted that children from the poorest quintiles in the region were much less likely to be registered, with lower educational attainment and reduced immunization coverage among unregistered children.

Geographic location plays a critical role. Singh et al. (2025) documented spatial disparities in death registration across 707 districts in India, identifying clusters of low coverage in Uttar Pradesh, Bihar, Jharkhand, and the northeast. These gaps were strongly correlated with poverty, rurality, and the proportion of marginalized households (Scheduled Tribes, Muslims, and those with uneducated members).

Disadvantaged groups—including ethnic minorities, migrants, refugees, persons with disabilities, and residents of remote areas—face compounded exclusion. ESCAP's review of inequality assessments[1] in Asia-Pacific highlighted how intersecting vulnerabilities intensify barriers to CRVS access, particularly for women and girls in marginalized communities. Refugees and displaced populations often lack documentation to prove parentage or fear engaging with authorities, further inhibiting registration (Bell, 2020; UNICEF and UNHCR, 2021).

Disparities are often rooted in structural and legal barriers that disproportionately affect women. One of the most significant gendered barriers identified in the literature concerns paternal identity. In several countries, including Bhutan and Nepal, a child cannot be legally registered if the father is unknown or unacknowledged (UNICEF and UNHCR, 2021). This barrier is a direct consequence of the CRVS system's legal basis in the Citizenship Act of 1977, rather than a standalone civil registration law. By intertwining legal identity with paternal lineage for citizenship purposes, the framework inadvertently penalizes both mother and child, creating a critical gendered gap in registration.

Significant gaps are also evident in Bhutan's death registration system. The subgroups most likely to be missing from the official records are infants and children under the age of 8. This under-registration is directly linked to a structural incentive: the rural life insurance scheme can only be claimed for deaths of individuals aged 8 years and older (WHO, 2021). This creates a powerful disincentive for families to register the deaths of younger children, rendering early-life mortality statistically invisible. The systemic invisibility of early childhood deaths not only highlights gaps in registration but also points to a more profound issue: the system's current inability to convert registration data into the vital statistics needed to address such public health crises.

These patterns demonstrate that CRVS inequalities follow predictable socioeconomic and geographic lines, highlighting the need for country-specific analysis to understand how these dynamics manifest in Bhutan's particular context.

2.2 Gender inequalities in CRVS

Multi-country analyses and regional reviews generally find small or no average differences by the child's sex in birth registration. Bhatia et al. (2019) show that the male–female gap is typically near zero, while large inequalities persist by residence and wealth; the authors caution, however, that national means can conceal subgroup disparities. However, a focus on these aggregates can obscure deeper, intersectional inequalities. This study posits that gender-based disparities in CRVS are not uniform but emerge at the intersection of gender with other characteristics like a mother's age, education, marital status, disability, and geographic location (urban/rural, district). In the Asia–Pacific, ESCAP's synthesis of recent inequality assessments similarly reports no strong evidence suggesting differentials in birth registration by sex, even as it documents pronounced gaps among children of teenage and older mothers, the poorest quintiles, and some ethnic groups.

That said, gender inequality can surface in the timeliness of registration even where overall sex gaps are small. A national-scale analysis of ~80 million administrative records in Mexico (1985–2014) shows systematically longer delays for girls than for boys (Harbers, 2020). The study argues that gendered 'trigger events' (e.g., school or work requirements more salient for boys) and norm-driven prioritization

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[1] Available at: https://unstats.un.org/unsd/demographic-social/genderstat-forum-9/presentations/Session%207.3%20ESCAP%20-%20Sharita%20Serrao.pdf

when resources are scarce can shift families toward earlier registration of sons. Importantly, positive incentives—notably the Progresa conditional cash transfer—were associated with shorter lags and improved registration among girls, indicating that benefit-linked registration can attenuate gendered timing disparities.

The Bhutan evidence is consistent with the global picture of near parity by sex at the aggregate level. In 2022, the birth registration completeness rate stood at 83.2%, with only marginal differences between males (82.7%) and females (83.8%); the sex ratio at birth (SRB) was 103, within the biological range expected in settings without strong son preference (NSB, 2023). In 2023, completeness declined to 73.9%, though the SRB remained broadly within the expected natural range at 106 (NSB, 2024). These findings indicate no systematic bias by child sex. Nevertheless, there are marked differentials by maternal characteristics—particularly mother's age and education—as well as by geographic and socio-economic factors, reinforcing the need to interrogate indirect, gendered pathways to exclusion (NSB, 2023; NSB, 2024).

Although aggregate sex differences in birth registration are often small, inequities emerge when considering gender norms, maternal characteristics, and family structures. Evidence from Fiji's inequality assessment (ESCAP, 2023) shows that children of teenage and unmarried mothers face significantly lower registration rates, often due to stigma and administrative barriers. Bhutan's own inequality assessment (ESCAP & NSB, 2025) found lower birth registration completeness among younger mothers, echoing these patterns. These findings suggest that a crucial gender dimension is often not the sex of the child, but the socio-economic position of the mother. For example, a young, uneducated mother in a remote district may face compounded barriers that are missed when only looking at gender or geography in isolation. Wendt et al. (2022) analyzed 93 LMICs and found mixed associations between the sex of the household head and registration. In some countries, children in female-headed households had equal or higher likelihood of being registered, possibly due to women's stronger control over household resources.

Regarding death registrations, comparative studies provide evidence that female deaths are, on average, registered slightly less completely than male deaths, and that the quality of cause-of-death (CoD) coding is marginally poorer for females (Adair et al, 2021). Mechanisms underpinning these sex differentials operate through legal, institutional, and social channels. Incentives to register a death often stem from administrative needs—property transfer, pensions, and insurance claims—which can be more salient for men where asset ownership is gender-skewed, tilting registration efforts toward male deaths. These system features intersect with gender norms that constrain women's mobility and decision-making and designate men as the family members who handle official documentation, all of which can delay or deter the registration of female deaths. The inclusion of disability data in Bhutan's 2023 National Health Survey, which measures impairments in vision, hearing, and mobility, provides a critical opportunity to explore this intersection. An intersectional lens is therefore crucial to understand if these gendered norms around death registration are amplified for women with disabilities, particularly those in remote geographic locations who may face compounded barriers to being counted.

Unlike the global context, where men's deaths are often more completely registered than women's, Bhutan's recent evidence illustrates a somewhat different pattern. In 2022, the Vital Statistics Report estimated overall death registration completeness at 70.1%, with males at 68.2% and females at 72.5%—indicating that female completeness exceeded male completeness at the national level (NSB, 2023). In 2023, completeness fell slightly to 69.2%, but the female advantage persisted, with death registration remaining more comprehensive among women than men (NSB, 2024). Age-disaggregated analyses across both reports reveal shifting gaps: in early childhood (<1–9 years), female completeness is slightly higher; during adolescence and early adulthood (10–29 years), male completeness is greater; and from age 40+, female completeness again exceeds male completeness, with the widest disparities emerging at ages 80+. These findings underscore that sex differences in death registration are not uniform but shaped by age, care-seeking behavior, site of death, administrative incentives, and family decision-making across the life course (NSB, 2023; NSB, 2024). Therefore, while Bhutan's aggregate data appears to show gender parity or even a female advantage, the existing literature compels a more granular, intersectional analysis. The critical gap, which this study aims to fill, is to systematically investigate how gender combines with age, maternal characteristics, disability, and geography to shape CRVS outcomes in Bhutan. This approach will move beyond simple male/female comparisons to uncover the nuanced pathways of exclusion that may otherwise remain invisible.

2.3 CRVS and implications for women empowerment

Civil Registration and Vital Statistics (CRVS) systems play a foundational role in advancing women's empowerment by establishing legal identity, enabling access to rights and services, and generating the data required to design gender-responsive policies. While CRVS is often framed as a technical administrative function, the literature increasingly emphasizes that it is deeply intertwined with gender equality outcomes. The ability—or inability—of women and girls to be fully counted by the state has far-reaching implications for their social, economic, and political empowerment.

Globally, birth registration is recognized as a critical enabler of girls' rights across the life course. Legal proof of age and identity is central to protecting girls from child marriage, child labor, and trafficking, and to ensuring access to education, health care, and social protection. For adult women, civil registration of vital events—particularly marriage, divorce, and death—underpins inheritance rights, access to pensions and survivor benefits, land and property claims, and participation in civic life. In contexts where women lack documentation, they are more likely to be excluded from formal institutions, financial systems, and legal remedies, reinforcing cycles of dependency and marginalization.

The literature also highlights the role of CRVS data itself as an empowerment tool. Sex-disaggregated and age-disaggregated vital statistics are essential for identifying gender gaps in health outcomes, such as maternal mortality, adolescent fertility, and gender-based violence-related deaths. Without complete and timely registration, these outcomes remain statistically invisible, weakening accountability and limiting governments' ability to design effective, targeted interventions.

In Bhutan, the relationship between CRVS and women's empowerment must be understood within a context of strong policy commitments to gender equality alongside persistent structural barriers faced by women. National strategies—including the 13th Five-Year Plan and the Reproductive, Maternal, Newborn, Child and Adolescent plus Ageing (RMNCAH+A) Strategy—explicitly prioritize improvements in maternal health, adolescent well-being, and gender equality. Achieving these goals, however, depends on the availability of reliable CRVS data and on women's equitable access to registration systems.

Birth registration is particularly salient for girls' empowerment in Bhutan. While aggregate indicators show no evidence of systematic sex discrimination in birth registration, disaggregated evidence reveals that children born to adolescent mothers are far less likely to be registered. This has direct implications for girls' empowerment because adolescent motherhood is closely linked to early marriage, school dropout, and economic dependency. When children of young mothers are not registered, both mother and child remain administratively invisible, limiting access to social services and reinforcing intergenerational disadvantage. In this sense, gaps in birth registration function as both a symptom and a driver of gender inequality.

Legal and institutional arrangements further shape these dynamics. Bhutan's CRVS framework, which is rooted in the Citizenship Act rather than a standalone civil registration law, ties registration closely to citizenship and paternal lineage. The literature notes that requirements related to paternal identification can create barriers for unmarried or unsupported mothers, placing the administrative burden disproportionately on women. These constraints undermine women's autonomy in securing legal identity for their children and weaken the empowering potential of CRVS for female-headed or vulnerable households.

Death registration and the production of mortality statistics are equally critical for women's empowerment, albeit through less visible pathways. Reliable death registration enables the measurement of maternal mortality, gender differences in life expectancy, and age-specific female mortality patterns. In Bhutan, however, under-registration of infant and child deaths—particularly those occurring outside health facilities—limits the ability to fully capture gendered vulnerabilities in early-life mortality. Institutional disincentives, such as the structure of the rural life insurance scheme, further reduce incentives to register deaths of young children, contributing to the invisibility of early childhood mortality in official statistics.

This invisibility has direct implications for women. When deaths of infants and young children are under-registered, the emotional, health, and economic burdens borne by mothers remain uncounted and unaddressed in policy design. Moreover, weak death registration systems constrain Bhutan's ability to monitor maternal mortality and other gender-sensitive health indicators, undermining accountability for commitments to women's health and well-being.

The Bhutanese literature underscores that the empowering potential of CRVS is mediated by broader structural gender inequalities. Women's lower labor force participation, concentration in unpaid care work, and limited representation in decision-making roles restrict their ability to navigate administrative systems and advocate for their rights. These constraints help explain why socioeconomic and geographic disadvantages translate into CRVS gaps that disproportionately affect women and girls. In this context, CRVS does not merely reflect existing inequalities; it can also reproduce them by systematically excluding those least able to overcome administrative barriers.

At the same time, strengthening CRVS offers a powerful opportunity to advance women's empowerment in Bhutan. A more inclusive and gender-responsive CRVS system—one that ensures timely registration of all births and deaths and produces high-quality sex-disaggregated statistics—can support enforcement of laws against child marriage, improve targeting of social protection programs, and enhance monitoring of gender and health outcomes. The literature therefore positions CRVS not only as a technical system, but as a critical institutional lever for advancing gender equality and women's empowerment in Bhutan.

2.4 Lessons from comparative experiences

Comparative experiences provide relevant lessons for Bhutan's ongoing reforms. Incentives work but may be temporary – as seen in Fiji, where financial incentives improved registration rates but effects waned after removal. Legal reforms are critical – removing discriminatory laws that prevent mothers from registering children independently is essential to closing gender gaps (UNICEF & UNHCR, 2021). Digital innovation helps – OHCHR (2025) noted that digital registration platforms reduce physical barriers but require careful attention to certification gaps. Intersectionality matters – ESCAP and country studies emphasize that focusing solely on overall completeness masks deep inequalities across subgroups.

The reviewed literature demonstrates that CRVS systems are deeply embedded in questions of equity, gender, and rights. While progress has been made globally and in Bhutan, significant inequalities persist in both birth and death registration, often disadvantaging women, children of young or unmarried mothers, rural and poor households, and marginalized groups.

Addressing these disparities requires combining robust quantitative methods to assess completeness, with policy reforms that confront gender norms, reduce administrative and financial barriers, and strengthen coordination between CRVS and health systems. For Bhutan, this study's focus on inequality assessment is both timely and essential for ensuring that the country meets its SDG commitments and secures universal, gender-inclusive CRVS coverage.

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3

RESEARCH QUESTIONS AND METHODOLOGY

This study combines recent household surveys with administrative CRVS microdata to study (i) levels and timeliness of births and deaths registration, (ii) determinants of registration and late registration, and (iii) the contribution of child's gender to observed gaps using decomposition methods. Data access was formally granted by the relevant national authorities, including the National Statistics Bureau and the Ministry of Health. In line with Bhutan's National Data Governance Framework (NDGF) 2025, this access involved formalized data sharing arrangements under its pillars for classification, secure exchange, privacy, and ethics, with all personally identifiable information (PII) anonymized prior to linkage and analysis. All datasets were fully anonymized and de-identified by these agencies prior to their use in this research, ensuring the confidentiality of all individuals and households in line with national data protection protocols.

RQ1. Are there gender differences in birth registration/timeliness of registration?

We analyse gender differences in births registrations using the 2010 Multiple Indicator Cluster Survey (MICS). This nationally representative household survey provides detailed data on children under five. The survey design allows robust disaggregation by Dzongkhags, mother's age (e.g., <20, 20-34, 35+), socio-economic status (wealth quintiles), and urban/rural residence, enabling detailed subgroup analysis for birth registration.

Next, we examine the gender differences in the timeliness of birth registrations using CRVS data. We define the dependent variables as follows:

- Delayed registration: registration completed more than 1 year after the event date (births)
- Number of days between birth and registration

Delayed registration is a dummy variable and the model estimated is a logit model similar to Equation (1) below.

$$Pr(Delayed\_Reg\_i = 1 \mid X\_i) = f\ (\alpha + \beta \cdot Female\_i + X\_i'\beta + \varepsilon\_i\ ) \qquad (1)$$

In the previous regression model, the dependent variable equals 1 if the child's birth has been registered less than a year after the birth and 0 otherwise. Explanatory variables include the child's sex, the child's birth order, the mother's age at birth, the mother's education level, the site of delivery, location and year variables.

The number of days between birth and registration is continuous and will be estimated using OLS as described in Equation (2) The same set of explanatory variables is used as with the previous logit model.

$$Num\_days\_i = \alpha + \beta \cdot Female\_i + X\_i'\beta + \varepsilon\_i\ (2)$$

For all outcomes of interest, after the logit is estimated, we will apply the Oaxaca–Blinder method to decompose the male–female gap in means and report the contribution of the child's sex to differences in births registration.

RQ2. Are there gender differences in death registration timelines?

To study timeliness of death registration, we use CRVS microdata on registered deaths. We define (i) a binary indicator of late registration if the death was registered more than one year after the date of occurrence (0 otherwise), and (ii) the number of days between death and registration. Covariates comprise the decedent's sex, the site of death and age. The late-registration model is logistic, and the timing model is OLS.

BOX 1

OAXACA-BLINDER DECOMPOSITION

The classic Oaxaca-Blinder decomposition is a widely used method in labor economics to analyze differences in outcomes (such as wages) between two groups (for example, men and women or different racial groups). It decomposes the outcome differential into parts: one attributable to differences in characteristics (or endowments) and another to differences in coefficients (or the returns to those characteristics), which can be interpreted as a measure of discrimination or unexplained gap. The method can also be used for other types of outcomes.

The classic Oaxaca-Blinder decomposition for a linear model can be represented as follows:

$$\Delta y = \bar{x}_1 - \bar{x}_0 * \beta_1 + \bar{x}_1 * (\hat{\beta}_1 - \hat{\beta}_0) \qquad (1)$$

Where $\Delta y = y_1 - y_0$ is the variation of the outcome y (for instance birth registrations between females $f=1$ and males $f=0$. x_1 is the mean of the explanatory variables for the 1st group ($f=1$) and x_0 is the mean of the explanatory variables for the 2nd group $f=0$. β_1 and β_0 are the coefficients estimated respectively for $f=1$ and $f=0$ for the linear regression model: $Y = X\beta + \varepsilon$

The first term on the right side of equation (1) represents the endowments effect (due to differences in characteristics), and the second term represents the coefficients effect (due to differences in the returns to those characteristics). The sum of the 2 terms represents the total variation.

4

BIRTH REGISTRATION AND TIMELINESS OF REGISTRATION

4.1 Birth registration

Bhutan has made substantial progress toward improving birth registration through the continuous strengthening of the Civil Registration and Vital Statistics (CRVS) system and its integration with health facilities. According to administrative data, the birth registration completeness rate was 73.9% in 2023, reflecting continued improvement in recent years and nearing universal coverage, with minimal gender disparities.

However, the analysis on the determinants of birth registration using household survey data was not possible due to a major data limitation in the National Health Survey (NHS 2023). The NHS questionnaires do not include a question on whether a birth has been registered. Consequently, it was not possible to estimate the determinants of birth registration (such as parental education, place of delivery, or household wealth) using nationally representative survey data.

The last available household-based measure comes from the Multiple Indicator Cluster Survey (MICS) 2010, which reported that over 99% of children under five had their birth registered. While this figure suggests near-universal registration, it likely overstates actual completeness relative to administrative data, which indicated that registration coverage was around 73.9% in 2023. The discrepancy may arise from differences in question phrasing, respondent recall bias, or misinterpretation of registration. This underscores the need for harmonized indicators and clearer survey questions.

To enable a more comprehensive understanding of inclusiveness in Bhutan's CRVS system, future rounds of the National Health Survey and other population-based data collections should include specific questions on:

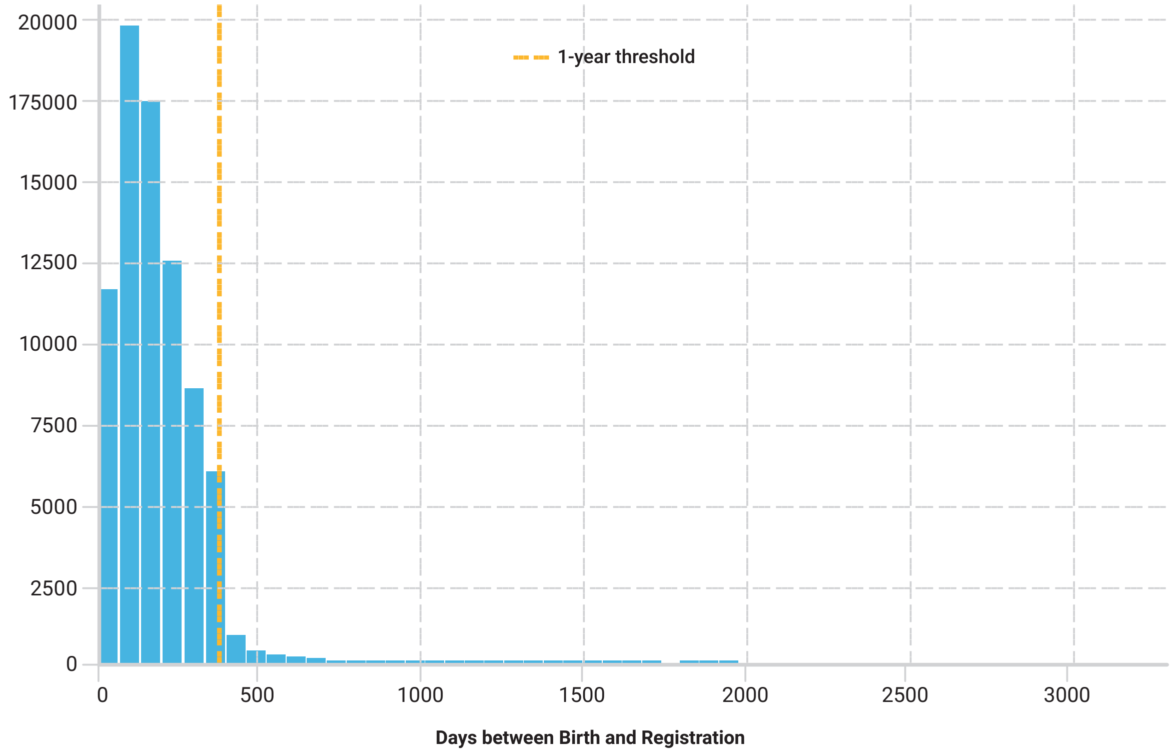
- Whether each live birth has been officially registered with the civil authority;
- Whether the household holds a birth certificate for the child; and
- The timing and location of registration.

Incorporating these questions would make it possible to analyze the socioeconomic and demographic determinants of birth registration, monitor timeliness and equity of coverage, and strengthen evidence-based policy planning. Collecting this information at the household level would also allow the National Statistics Bureau (NSB) and the Department of Civil Registration and Census (DCRC) to cross-validate survey and administrative data, ensuring that Bhutan's progress toward universal and timely birth registration is accurately captured and sustained.

4.2 Timeliness of birth registration

In Bhutan, the legal threshold for timely registration is one year. Most births are registered well before this cut-off, reflecting the generally strong performance of Bhutan's CRVS system in ensuring early registration. The majority of registrations occur within a few months of birth, as shown by the sharp concentration of observations toward the left of the distribution. Yet, a long but thin right-hand tail shows that a small minority of births are registered after one year, often referred to as delayed registrations. These outliers, while few, can be critical for policy attention because they often correspond to births in remote Dzongkhags or among households with limited access to registration centres. Their presence suggests that geographic and socioeconomic barriers still hinder full compliance with the legal timeframe in certain areas.

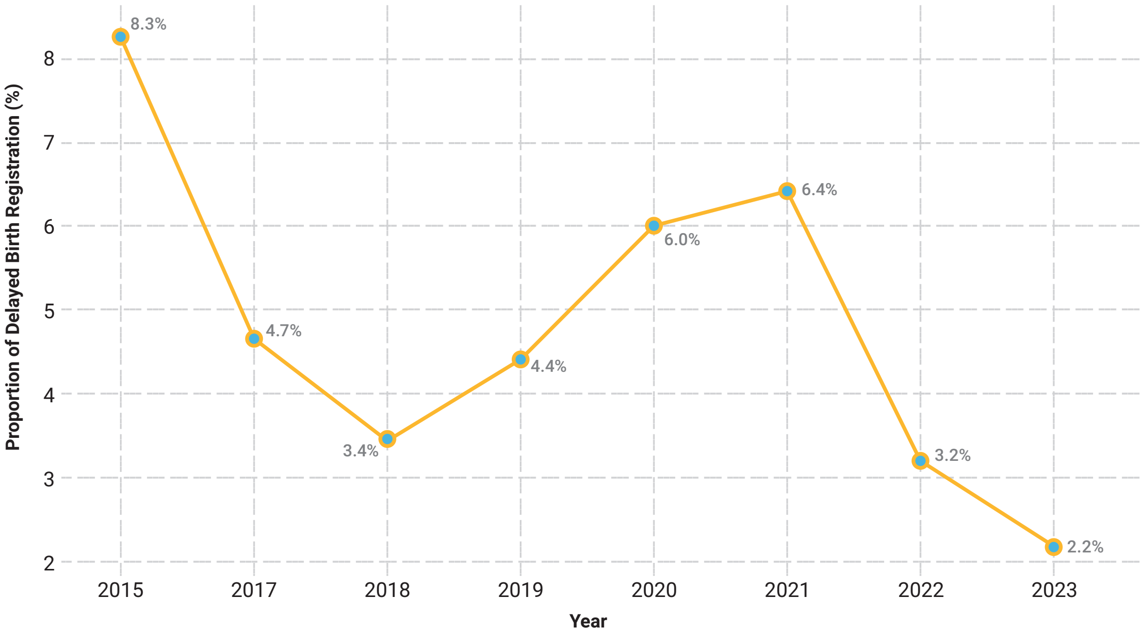
Figure 1: **Distribution of birth registration delays**



Source: CRVS Data, 2016-2023

The share of delayed birth registrations—defined as those completed more than one year after birth—has shown a remarkable decline over time, highlighting Bhutan's continued progress in improving the timeliness of birth registration. In 2016, about 8.3% of births were registered beyond the legal one-year period. By 2023, this figure had dropped to just 2.2%, marking a reduction of nearly three-quarters over seven years. The decline was particularly steep between 2016 and 2018, when the share of delayed registrations fell from 8.3% to 3.4%, suggesting significant early improvements in CRVS coverage and administrative efficiency. However, there was a temporary rise between 2020 and 2021 (peaking at 6.4%), likely reflecting the disruptive effects of the COVID-19 pandemic on service delivery and mobility restrictions. After 2021, the system recovered quickly, and delays fell again sharply to 3.2% in 2022 and 2.2% in 2023, reaching their lowest levels in the time series.

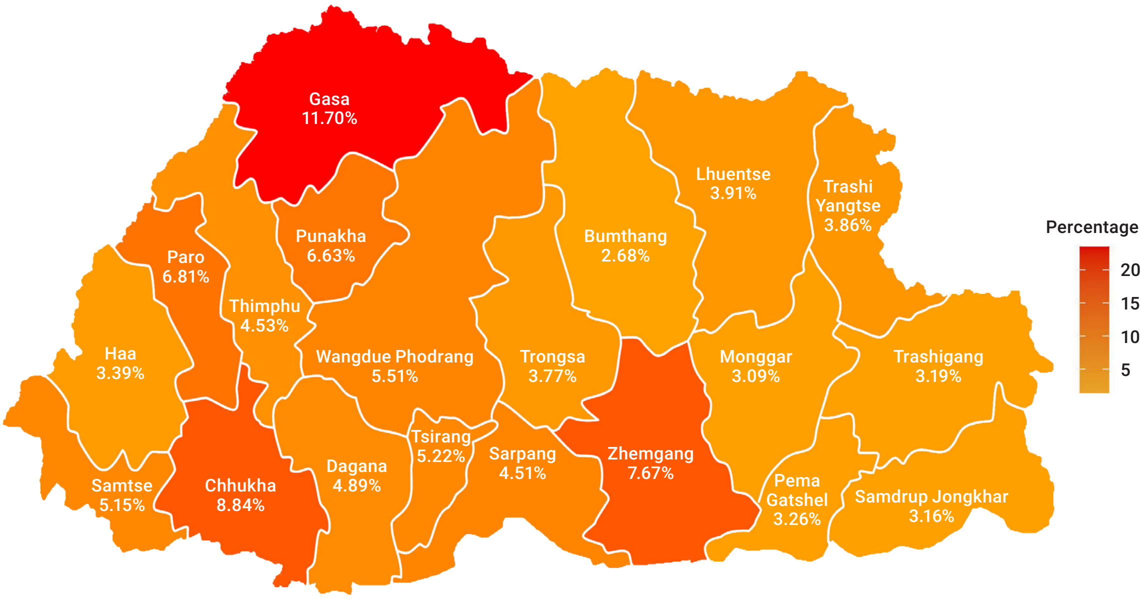
Figure 2: Delayed birth registration rates by year



Source: CRVS Data, 2016-2023

There are geographic disparities in the share of births registered after the legal one-year period across Bhutan's 20 Dzongkhags. Nationally, delayed registration averages around 4–5%, but subnational variation is substantial—from as low as 2.7% in Bumthang to over 11% in Gasa. These differences reveal how geography, access to services, and administrative efficiency jointly shape the timeliness of registration. The western and southern regions—notably Gasa (11.7%), Chhukha (8.8%), and Zhemgang (7.7%)—stand out for higher shares of delayed registrations. These three Dzongkhags combines geographic isolation with limited connectivity, contributing to weaker registration. These Dzongkhags likely require targeted outreach and digital solutions, such as mobile registration services or integration with health post reporting systems. At the other end of the spectrum, Bumthang (2.7%), Monggar (3.1%), and Samdrup Jongkhar (3.2%) record the lowest shares of delayed registrations, indicating more effective coordination between health facilities and civil registration units. Thimphu maintains a moderate rate at 4.5%.

Figure 3: **Delayed birth registration by Dzongkhag**



Source: CRVS Data, 2016-2023

CRVS data show very small and statistically insignificant differences in the share of delayed birth registrations between male and female children in Bhutan. On average, 4.9% of male births and 4.7% of female births are registered more than one year after birth—a gap of just 0.2 percentage points. This minimal difference indicates that the timeliness of birth registration is largely gender-neutral in Bhutan. Both male and female births are recorded within similar timeframes. These results suggest that the administrative, geographic, or socioeconomic barriers affecting registration delays operate similarly across genders, with no evidence of systematic gender bias in how families or local registration offices handle birth reporting.

The regression analysis identifies the main factors associated with delays in birth registration, measured both as a binary indicator of registration beyond one year and as the number of days between birth and registration. The results from the logistic regression model for the binary outcome are presented as Odds Ratios (OR), where a value greater than 1 indicates an increased risk of delay, and a value less than 1 indicates that the covariate decreases the risk of delay registration. The model includes fixed effects for both Year and Dzongkhag to control for temporal shocks that could have affected the whole country—such as digital reforms or the COVID-19 pandemic—and time-invariant district characteristics, such as remoteness or local customs. By holding these geographic and temporal factors constant, the model ensures that the relationships described below reflect true socioeconomic disparities rather than location-specific infrastructure gaps. Overall, the findings confirm that gender has no significant effect on registration delays — boys and girls are registered with similar timeliness, consistent with earlier descriptive evidence.

Maternal education emerges as one of the strongest determinants of timeliness. Children born to more educated mothers are significantly less likely to experience late registration. Maternal education exhibits a monotonic gradient: compared to mothers with no education, those with primary education have significantly lower odds of delaying registration (OR 0.835), and this advantage strengthens for mothers with secondary (OR 0.823) and university education (OR 0.602). Notably, even mothers with Non-Formal Education (NFE) show significantly better outcomes (OR 0.635) than uneducated mothers, Birth order has a nonlinear association: higher-order births, particularly fifth or later, are more prone to delayed registration. This likely reflects time and resource constraints among larger families, as well as possible lower perceived urgency for documentation relative to firstborns.

Mother's age shows a statistically significant non-linear association with delayed birth registration. At younger ages, each additional year of age reduces the odds of delaying registration (OR = 0.83), but the positive age-squared term (OR = 1.003) indicates that this effect weakens and eventually reverses at older ages, resulting in a U-shaped pattern.

Finally, births occurring outside health facilities are substantially more likely to be registered late and to have longer delays. This confirms that facility-based deliveries facilitate immediate notification and registration, while home deliveries increase the likelihood of administrative lag.

To test whether gender bias might exist within specific vulnerable subgroups, the analysis is extended to include interaction terms between the child's sex and key risk factors: birth order, place of delivery, and maternal age. These tests yielded no statistically significant results. For instance, the interaction between the child's sex and birth order was insignificant, indicating that even in large families where resources are stretched, there is no "daughter penalty." Similarly, the interaction with maternal age confirmed that while younger mothers face challenges, they do not discriminate by gender; the positive effect of having an older mother applies equally to boys and girls.

Even when the sex of the child itself is not a determining factor, it remains essential to apply a gender lens. All of the key influences identified—maternal education, place of delivery, and family size—are deeply shaped by gender norms and roles. This means that delayed birth registration in Bhutan is driven less by the child's sex and more by gendered socioeconomic and institutional factors. Strengthening community-level awareness and ensuring birth notification from all delivery sites, including home births, would further reduce registration delays.

Given that the gender gap in delayed birth registration is both very small (0.2 percentage points) and statistically insignificant, an Oaxaca–Blinder decomposition was not conducted. This parity indicates that Bhutan's CRVS system records births of boys and girls with equal timeliness, and that observed delays are driven primarily by socioeconomic and geographic factors rather than by sex.

Table 1: **Determinants of delayed birth registration**

VARIABLES	Delayed Reg (>1year) Odds Ratios	Number of days (OLS)
Female	0.983	0.019
	(0.072)	(1.176)
Birth order: 2nd (ref: 1st)	1.048	4.004***
	(0.085)	(1.301)
Birth order: 3rd (ref: 1st)	0.909	3.647**
	(0.100)	(1.640)
Birth order: 4th (ref: 1st)	1.189	12.101***
	(0.171)	(2.394)
Birth order: 5+ (ref: 1st)	1.295	18.268***
	(0.227)	(3.275)
Female × Birth order: 2nd	1.001	-1.465
	(0.110)	(1.750)
Female × Birth order: 3rd	1.069	2.181
	(0.145)	(2.078)
Female × Birth order: 4th	0.756	-0.808
	(0.141)	(3.049)
Female × Birth order: 5th	0.889	1.181
	(0.192)	(4.285)
Mother's age	0.830***	-7.096***
	(0.024)	(0.623)
Mother's age × Mother's age	1.003***	0.111***
	(0.000)	(0.010)

VARIABLES	Delayed Reg (>1year) Odds Ratios	Number of days (OLS)
Mother’s edu: Primary (Ref: None)	0.835^{**}	6.273^{***}
	(0.071)	(1.447)
Mother’s edu: Secondary (Ref: None)	0.823^{***}	9.376^{***}
	(0.051)	(1.029)
Mother’s edu: University (Ref: None)	0.602^{***}	9.698^{***}
	(0.063)	(1.423)
Mother’s edu: NFE (Ref: None)	0.635^{***}	-9.93^{6***}
	(0.103)	(2.260)
Site of delivery: Non health facilities	1.570^{***}	14.079^{***}
	(0.189)	(3.189)
Year Fixed Effects	Yes	Yes
Dzongkhag Fixed Effects	Yes	Yes
Observations	75,309	75,309
R-squared		0.042

Robust Standard errors in parentheses
*** $p<0.01$, ** $p<0.05$, * $p<0.1$

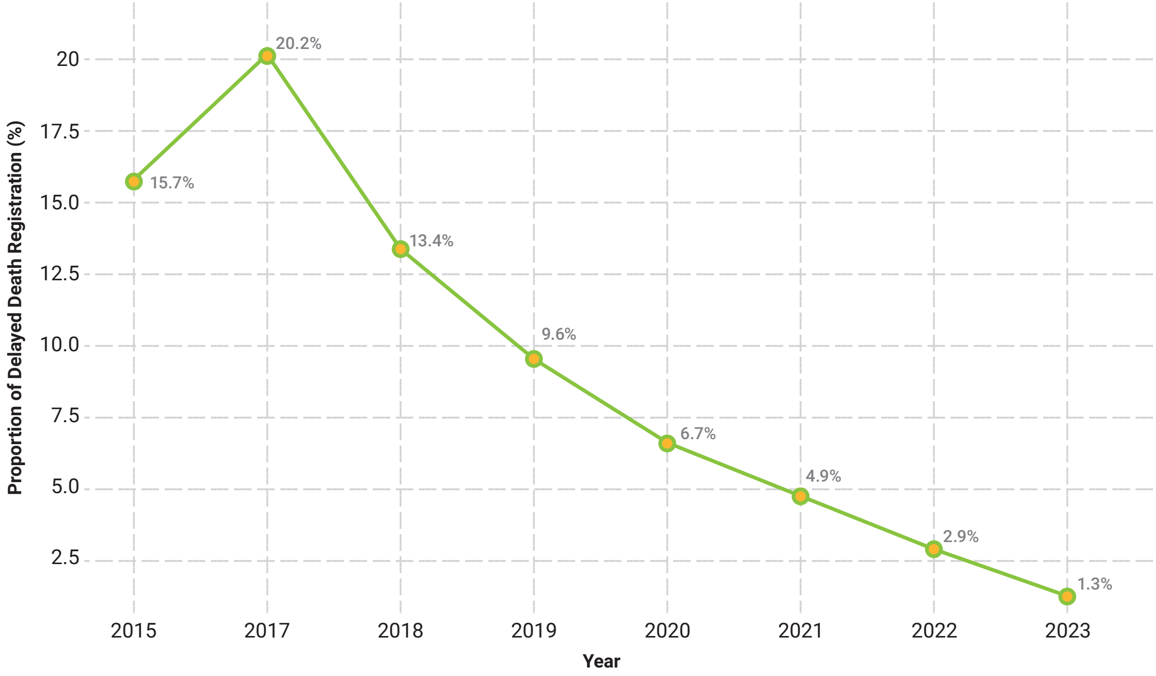
5

DEATH REGISTRATION AND TIMELINESS

This section examines the timeliness, and equity of death registration in Bhutan, drawing on administrative data from the Civil Registration and Vital Statistics (CRVS) system. Death registration plays a vital role in generating accurate mortality statistics, informing health planning, and ensuring that families can access legal and social benefits linked to vital events. Over the past decade, Bhutan has made steady progress in expanding coverage and improving the timeliness of death registration through closer integration between the health and civil registration sectors. The analysis below explores trends over time, differences across Dzongkhags, age groups, and gender and the remaining challenges to achieving universal and timely registration of all deaths.

The share of delayed death registrations — defined as deaths registered more than one year after occurrence — has declined dramatically over the past seven years, underscoring major improvements in the timeliness and efficiency of Bhutan's death registration system. In 2016, about 15.7% of deaths were registered beyond the legal timeframe, rising temporarily to a peak of 20.2% in 2017. Thereafter, delays consistently fell, reaching 1.3% by 2023 — a reduction of more than 90% since 2017. The sharp decline after 2018 likely reflects the progressive integration between health facilities and the Civil Registration and Vital Statistics (CRVS) system, as well as growing awareness among families about the importance of timely death reporting. The COVID-19 period (2020–2021) did not appear to reverse this progress; on the contrary, delayed registration continued to decrease even during the pandemic. The overall trend indicates that Bhutan's CRVS system has become significantly more responsive, with most deaths now registered within the legal one-year window.

Figure 4: Delayed death registration rate by year



Source: CRVS Data, 2016-2023

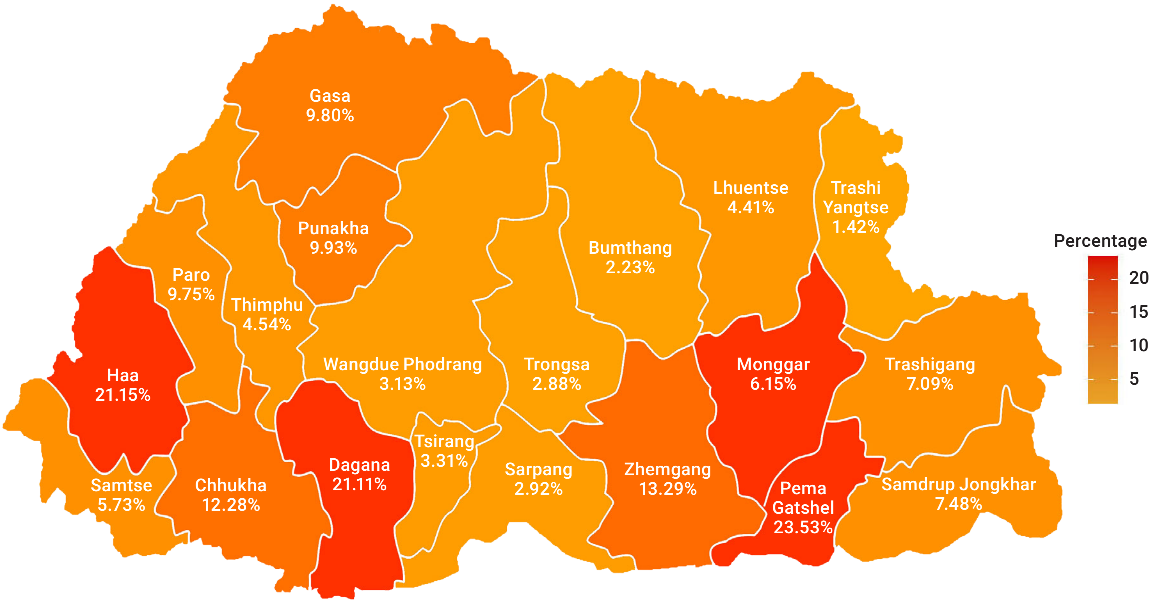
Subnational variations reveal significant disparities in the timeliness of death registration across Bhutan. While the national average delay rate is relatively low, several regions exhibit much higher shares of deaths registered beyond the legal one-year period. The contrast between the best- and worst-performing Dzongkhags exceeds 20 percentage points, highlighting persistent geographic inequalities in CRVS performance.

The southern and western districts—notably Pema Gatshel (23.5%), Dagana (21.1%), and Haa (21.1%)—record the highest shares of delayed death registration. In these areas, delays are likely linked to limited access to registration offices, mountainous terrain, and lower institutional presence of civil registration units. Chhukha (12.3%) and Zhemgang (13.3%) also show elevated rates, potentially reflecting population mobility, cross-border dynamics, or administrative backlogs.

In contrast, Trashi Yangtse (1.4%), Trongsa (2.9%), and Sarpang (2.9%) exhibit the lowest levels of delayed registration, demonstrating efficient coordination between health facilities, local authorities, and civil registration offices. Thimphu (4.5%), despite recording the largest number of deaths, maintains a relatively low delay rate, indicating that urban areas benefit from stronger institutional capacity and immediate access to registration services.

The observed disparities underscore the geographic dimension of CRVS performance in Bhutan. High-delay Dzongkhags tend to be more remote or less connected, suggesting that distance to registration centres remains a key barrier. In contrast, urban and better-served districts show strong compliance with the one-year legal timeframe.

Figure 5: **Delayed death registration rate by Dzongkhag**



Source: CRVS Data, 2016-2023

The data reveal a strong age gradient in the timeliness of death registration. Delays are highest among infant and child deaths, and decrease sharply as age increases. At age 0 (infants), more than 54% of deaths are registered after the one-year legal threshold. High delays also persist through early childhood, with over 40% delayed among deaths aged 1–4 years. These figures suggest that infant and child deaths are less likely to be reported immediately. Delays drop markedly after age 10 and remain relatively low throughout adulthood, generally ranging between 6–10%. This improvement likely reflects the fact that adult deaths are more often institutionally recorded (e.g., through hospitals or formal death notifications) and are administratively required for inheritance, pension, or other legal purposes.

The CRVS system performs relatively well for adult and elderly deaths but faces continued challenges in capturing early-age deaths, especially neonatal and infant mortality. Strengthening the link between health facilities and civil registration offices, ensuring immediate notification of infant deaths, and raising community awareness about the legal importance of registering all deaths, including of young children, would further enhance the completeness and timeliness of the system.

Figure 6: Delayed death registration rates by age groups

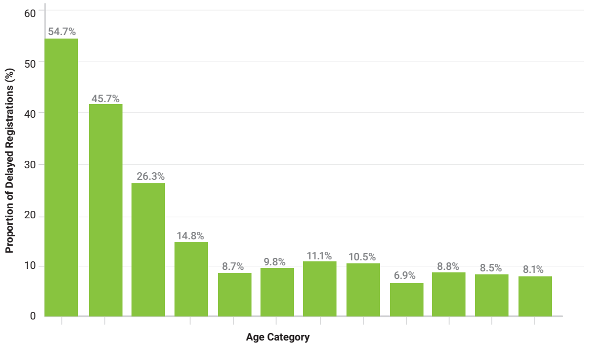
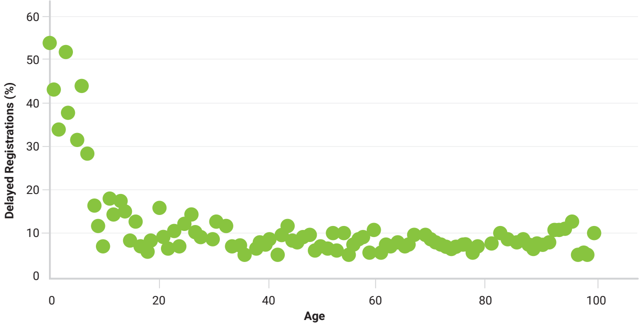
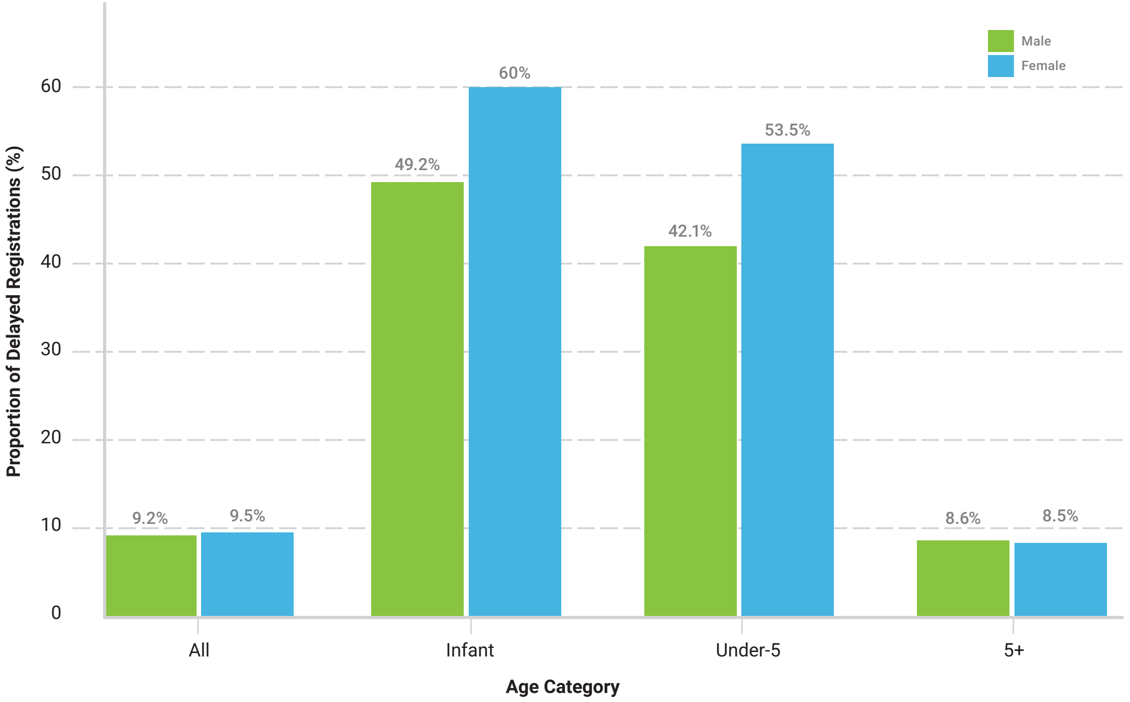


Figure 7: Correlation between delayed death registration and age



Delayed death registration is strongly associated with gender, and the effect is much more pronounced among infant and under five mortality. Among infants, about 49% of male deaths and 60% of female deaths are registered after the one-year legal threshold. This pattern persists, though slightly narrowed, among under-five deaths, where 53.5% of female and 42.1% of male deaths experience delayed registration. These large gaps suggest that female child deaths are less promptly registered. In contrast, for individuals aged five years and above, delays are minimal and virtually identical for both sexes (8.6% for males and 8.5% for females). This confirms that gender disparities in timeliness are specific to early-age deaths rather than systemic across the population.

Figure 8: Delayed death registration by age groups and gender



Female under-five deaths are significantly more likely to be registered late than male deaths according to the regression results. The preferred model includes year and Dzongkhag fixed effects to account for temporal shocks and geographic heterogeneity. The analysis of under-5 mortality reveals a concerning pattern of gendered exclusion that was not present in birth registration. In the main model, female child deaths are associated with 59% higher odds of delayed registration compared to male child deaths (OR 1.59). Deaths occuring outside health facilities are also strongly associated with delayed registration underscoring that institutional deaths are more promptly recorded due to the automatic notification process that links hospitals with civil registration offices.

Gender differences largely disappear when all age groups are considered, as the female coefficient becomes small and statistically insignificant in the model without interactions. However, the model with an interaction between sex and age reveals that this average masks important heterogeneity: female deaths are more likely to face delayed registration at younger ages, but this gender gap narrows with age and approaches zero in adulthood. In all models, deaths outside health facilities are consistently much more prone to delayed registration. Deaths occurring outside health facilities are more likely to be delayed, even after accounting for time and Dzongkhag effects. Additionally, age is negatively correlated with delay, meaning that deaths at older ages are registered more promptly, possibly because adult deaths more often involve administrative or legal follow-ups (inheritance, pensions, etc.) that require timely certification.

Table 2: Determinants of delayed death registration

VARIABLES	Delayed reg < 5 Mortality Odds Ratios	Delayed reg all ages Mortality Odds Ratios	Delayed reg all ages Mortality Odds Ratios
Female	1.587*	1.046	1.391**
	(0.396)	(0.053)	(0.199)
Age	–	0.990***	0.992***
	–	(0.001)	(0.002)
Interaction: Female × Age	–	–	0.995**
	–	–	(0.002)
Site of death: Non-health facilities	1.866*	2.111***	2.115***
	(0.676)	(0.153)	(0.153)
Year Fixed Effects	Yes	Yes	Yes
Dzongkhag Fixed Effects	Yes	Yes	Yes
Observations	384	26,314	26,314

Robust Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

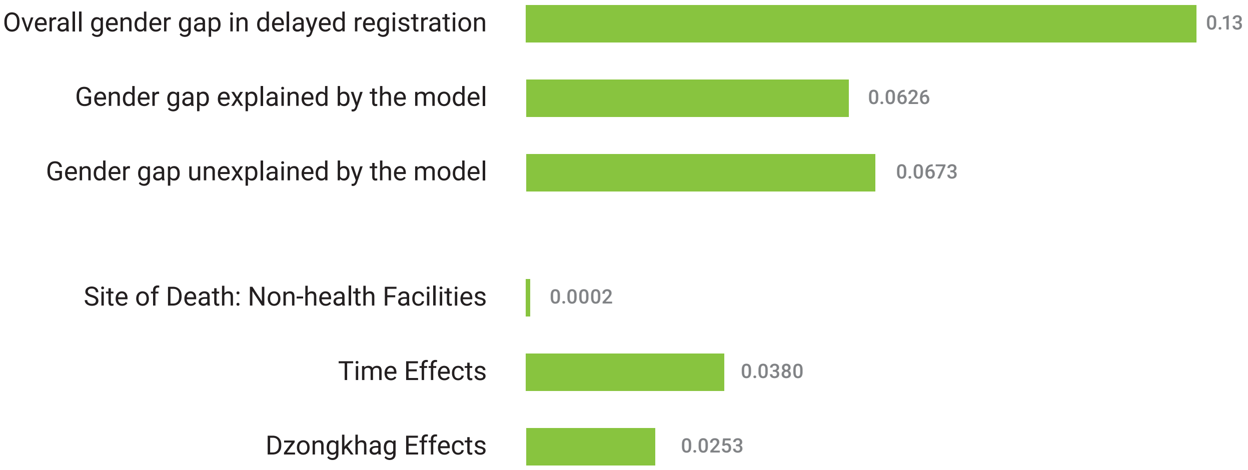
The Oaxaca–Blinder decomposition was conducted to identify the factors driving gender differences in delayed death registration among children under five years of age. Of the total gender gap, around half (0.063, or 48%) is explained by observable characteristics, while the remaining 0.067 (52%) remains unexplained by the model. This balance suggests that both structural and behavioral factors contribute meaningfully to the gender disparity in the timeliness of under-five death registration.

Among the explanatory components, temporal (year) effects account for the largest share (0.038), implying that improvements in registration timeliness over time have not benefited boys and girls equally—possibly due to differential patterns in health-facility deaths or reporting awareness across years. Dzongkhag-specific effects (0.025) also explain a notable portion of the gap, pointing to geographic variation in CRVS performance where certain districts show higher delays for female deaths. The contribution of site of death is small (0.0002) but directionally consistent.

The unexplained component (0.067) captures differences not accounted for by the included variables—potentially reflecting social norms, administrative practices, or unobserved household factors that affect the timeliness of death reporting for girls. This structural component suggests that even after controlling for location and health-system access, female deaths remain less promptly registered, indicating that the gap is not purely compositional.

In summary, while part of the gender disparity in delayed registration among under-five deaths arises from differences in time and location, nearly half of it remains structural and unexplained, pointing to the need for continued efforts to ensure gender-equitable death reporting and notification within Bhutan's CRVS system. Targeted awareness campaigns, community-based death notifications, and consistent follow-up of non-facility deaths could help close this remaining gap.

Figure 9: Oaxaca-Blinder decomposition of gender differences in delayed under 5 death registration

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6

LIMITATIONS

This study is subject to several potential limitations that warrant consideration when interpreting the findings.

- Under-registration and Selection Bias in Administrative Data: The analysis of official CRVS microdata is inherently limited to events that were successfully registered. This can create a selection bias if certain types of events are systematically less likely to be recorded. For instance, mirroring challenges seen in other contexts, if neonatal deaths that occur at home in remote rural areas are less frequently registered than deaths in urban health facilities, then an analysis based only on registered deaths would underestimate the true infant mortality rate and could mask gender disparities if female infant deaths at home are disproportionately unrecorded.
- Data Quality and Incompleteness: The administrative CRVS data may have quality issues. There may be a risk of misclassification; the Fiji study noted the potential for stillbirths to be incorrectly registered as live births and then infant deaths, artificially inflating infant death registration rates. A similar systemic issue in Bhutan could affect the accuracy of child mortality estimates.
- Omitted Variable Bias: When analyzing Civil Registration and Vital Statistics (CRVS) data, there is a potential risk of omitted variable bias—that is, bias in estimated relationships due to the absence of important explanatory variables that influence both the outcome and the included predictors. For instance, administrative CRVS records often lack detailed socioeconomic information such as household income, parental occupation, or distance to registration centres. If these unobserved factors are correlated with registration outcomes (e.g., timeliness or completeness), regression estimates may misattribute their effects to observed variables like education or place of delivery. This limitation should be recognized when interpreting results from CRVS-based analyses, and future data integration efforts—linking CRVS with health and household survey data—are recommended to reduce such bias and improve causal inference.

7

CONCLUSION AND POLICY RECOMMENDATIONS

Bhutan's CRVS system has evolved into one of the most robust in the region, achieving high levels of completeness and timeliness while maintaining gender parity in birth and death registration. However, persistent disparities across maternal, geographic, and socioeconomic lines highlight the need to move beyond aggregate measures and adopt an intersectional approach to inclusiveness. The study reveals that structural inequalities shape differential outcomes across subgroups. Data limitations, particularly the omission of CRVS variables in major surveys, constrain deeper analysis of these dynamics and impede evidence-based policymaking.

The report makes the following recommendations:

1. Restore Household-Based Measurement of CRVS to Address Evidence Gaps

Finding:
The absence of birth and death registration questions in the National Health Survey (NHS 2023) prevents analysis of socioeconomic and gender-related determinants and creates inconsistencies between survey-based and administrative estimates. The last household evidence (MICS 2010) substantially overstates registration completeness relative to CRVS administrative data.

Recommendation:

- Reintroduce standardized CRVS questions in future rounds of the NHS and other national surveys, including:
  - Whether births and deaths were registered
  - Possession of birth and death certificates
  - Timing and place of registration
- Develop protocols to routinely link CRVS administrative data with health surveys and facility records to enable triangulation and disaggregated equity analysis.

Rationale:

Restoring household-based measurement is essential to identify populations that remain underserved by CRVS and to validate administrative completeness estimates.

2. Target High-Delay Dzongkhags with Tailored Registration Solutions

Finding:
Despite national improvements, delayed birth and death registrations remain highly concentrated in specific Dzongkhags—particularly Gasa, Dagana, and Haa—indicating persistent geographic barriers related to remoteness and access.

Recommendation:

- Prioritize high-delay Dzongkhags for:
  - Mobile and outreach-based registration services
  - Periodic registration drives coordinated with local administrative and health activities
- Strengthen the role of local health posts as notification points for both births and deaths, especially in remote areas.

Rationale:

Geographic disparities reflect structural access constraints rather than lack of awareness alone; targeted service delivery is therefore required to close remaining gaps.

3. Address Maternal and Household Factors Driving Delayed Birth Registration

Finding:

Delayed birth registration is strongly associated with younger maternal age, lower maternal education, higher birth order, and non-facility deliveries. Although no direct gender bias by child sex is observed, these determinants reflect gendered socioeconomic vulnerabilities.

Recommendation:

- Integrate birth registration support into antenatal, postnatal, and child immunization services, with special attention to:
  - Young and less educated mothers
- Strengthen notification and follow-up mechanisms for home births through community health workers and local registrars.

Rationale:

Embedding registration within maternal and child health services directly addresses the pathways through which maternal disadvantage translates into delayed registration.

4. Close the Gender Gap in Under-Five Death Registration

Finding:

Female under-five deaths are significantly more likely to be registered late than male deaths, even after controlling for geography and place of death. Nearly half of this gender gap remains unexplained, suggesting structural or normative barriers.

Recommendation:

- Strengthen mandatory notification of all infant and child deaths, including those occurring outside health facilities, through:
  - Community-based death notification systems
  - Active follow-up by registrars and health workers
- Implement targeted awareness campaigns emphasizing the importance of registering all child deaths, explicitly addressing gender bias.
- Introduce routine gender-disaggregated monitoring of under-five death registration timeliness.

Rationale:

This is the most pronounced gender inequality identified in the study and requires focused interventions to ensure equal visibility of female child mortality.

5. Leverage Digital CRVS Systems While Preventing New Exclusion Risks

Finding:

Digital integration has contributed to improvements in timeliness, but geographic and social disparities persist, particularly in areas with limited connectivity and among populations with lower digital literacy.

Recommendation:

- Expand digital and mobile CRVS solutions to remote areas, ensuring:
  - Offline functionality where connectivity is limited
  - Assisted registration through trained frontline workers
- Provide targeted support to ensure women and marginalized households can effectively use digital registration tools.

Rationale:

Digitalization should function as an equalizer rather than introducing new barriers for already vulnerable groups.

6. Institutionalize Gender-Responsive and Intersectional CRVS Governance

Finding:

Aggregate gender parity in registration masks significant inequalities at the intersection of gender, age, geography, and maternal characteristics. Without systematic monitoring, these disparities risk remaining invisible.

Recommendation:

- Embed routine gender and inequality analysis into CRVS reporting by the NSB.
- Establish regular reviews aligned with SDG 16.9 that track registration completeness and timeliness across key vulnerability dimensions.
- Use these analyses to inform adaptive policy responses and resource allocation.

Rationale:

Institutionalizing an intersectional approach ensures that CRVS strengthening efforts remain inclusive and responsive as the system continues to evolve.

8
APPENDIX

Appendix 1: Delayed Birth registration

VARIABLES	Delayed Reg (>1year) Odds Ratios	Delayed Reg (>1year) Odds Ratios	Number of days
Female	0.966	0.972	-0.225
	(0.044)	(0.071)	(0.751)
Birth order: 2nd (ref: 1st)	0.973	0.973	1.147
	(0.059)	(0.078)	(0.963)
Birth order: 3rd (ref: 1st)	0.872	0.83^{1*}	3.340***
	(0.073)	(0.090)	(1.293)
Birth order: 4th (ref: 1st)	1.019	1.132	11.577***
	(0.116)	(0.158)	(1.857)
Birth order: 5+ (ref: 1st)	1.460***	1.536**	24.036***
	(0.200)	(0.260)	(2.539)
Female × Birth order: 2nd		0.999	
		(0.109)	
Female × Birth order: 3rd		1.102	
		(0.148)	
Female × Birth order: 4th		0.796	
		(0.148)	

VARIABLES	Delayed Reg (>1year) Odds Ratios	Delayed Reg (>1year) Odds Ratios	Number of days
Female × Birth order: 5th		0.897	
		(0.192)	
Mother's age	0.971***	0.971***	-0.685***
	(0.006)	(0.006)	(0.090)
Mother's edu: Primary (Ref: None)	0.761***	0.762***	6.749***
	(0.064)	(0.064)	(1.459)
Mother's edu: Secondary (Ref: None)	0.691***	0.692***	9.437***
	(0.041)	(0.041)	(1.015)
Mother's edu: University (Ref: None)	0.480***	0.480***	6.982***
	(0.048)	(0.048)	(1.376)
Mother's edu: NFE (Ref: None)	0.588***	0.589***	-13.348***
	(0.094)	(0.095)	(2.290)
Site of delivery: Non health facilities	1.892***	1.898***	16.96^{3***}
	(0.220)	(0.221)	(3.239)
Year Fixed Effects	No	No	No
Dzongkhag Fixed Effects	No	No	No
Observations	75,359	75,359	75,359
R-squared			0.004

Robust Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Appendix 2: Delayed Death registration

VARIABLES	**Delayed reg < 5 Mortality Odds Ratios**	**Delayed reg Mortality Odds Ratios**	**Delayed reg Mortality Odds Ratios**
Female	1.591***	1.088**	1.419***
	(0.270)	(0.046)	(0.157)
Age	–	0.984***	0.986***
	–	(0.001)	(0.001)
Interaction: Female × Age	–	–	0.995**
	–	–	(0.002)
Site of death: Non health facilities	1.623**	2.50^{5***}	2.514***
	(0.307)	(0.125)	(0.126)
Year Fixed Effects	No	No	No
Dzongkhag Fixed Effects	No	No	No
Observations	572	27,759	26,314

Robust Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

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