

ETHIOPIAN DEMOGRAPHY AND HEALTH

CHAPTER 6

MORTALITY LEVELS AND TRENDS

Ethiopia's Quarter-Century Mortality Transition, 2000–2024/25

Aynalem Adugna, PhD

EthioDemographyAndHealth.org

Revised October 2026

APA 7TH EDITION | CITATION EXAMPLES

Reference-list entry

Adugna, A. (2026). Mortality levels and trends: Ethiopia's quarter-century mortality transition, 2000–2024/25 [Unpublished chapter manuscript].
EthioDemographyAndHealth.org.

Table of Contents

Acronyms and Abbreviations	4
6.1 Introduction.....	5
Methodological Preface	7
Two Directions of SNNPR Geographic Harmonization.....	8
PART I. Mortality Framework and Methods	9
6.2 Sources, Measurement, and Comparability	9
6.2.1 Data architecture	9
6.2.2 Time windows and geography	10
6.3 Mortality Indicators and Mathematical Formulas	10
6.3.1 Crude death rate (CDR)	10
6.3.2 Age-specific mortality rate (nM_x)	10
6.3.3 Age-interval probability of dying (nq_x)	11
6.3.4 Neonatal mortality probability (NMR)	11
6.3.5 Infant mortality probability ($1q_0$)	11
6.3.6 Under-five mortality probability ($5q_0$)	11
6.3.7 Conditional mortality from ages 1 to 5 ($4q_1$)	11
6.3.8 Post-neonatal probability (approximately)	11
6.3.9 Adult probability of dying from 15 to 60 ($45q_{15}$)	11
6.3.10 Pregnancy-related mortality ratio (PRMR).....	12
6.3.11 Maternal mortality ratio (MMR).....	12
6.3.12 Survivors in a life table (l_x)	12
6.3.13 Life expectancy at age x (e_x).....	12
6.3.14 Directly age-standardized mortality rate.....	12
6.3.15 Absolute mortality change	12
6.3.16 Relative mortality change	12
6.3.17 Regional gap relative to national	13
6.3.18 Absolute regional–national gap	13
6.3.19 Approximate confidence interval.....	13
6.4 National Mortality Levels and Trends	13
6.5 Regional Analytical Framework: National + 14 Regions	14
6.6 Data Quality, Limitations, and Validation.....	14
PART II. Regional Under-Five Mortality	14
6.7 Regional profiles and comparisons with the national series.....	15
6.7.1 Tigray	15
6.7.2 Afar	16
6.7.3 Amhara.....	16

6.7.4 Oromia	17
6.7.5 Somali	18
6.7.6 Benishangul-Gumuz	18
6.7.7 Central Ethiopia	19
6.7.8 Sidama.....	20
6.7.9 South Ethiopia.....	20
6.7.10 South West Ethiopia	21
6.7.11 Gambella	22
6.7.12 Harari	22
6.7.13 Addis Ababa.....	23
6.7.14 Dire Dawa	24
6.8 Cross-regional interpretation	24
6.9 Comparability, uncertainty, and validation	24
PART III. Pregnancy-Related and Adult Mortality.....	25
6.11 National pregnancy-related mortality: five-survey evidence	25
6.12 Timing and magnitude of historical change	26
6.13 Data quality, validation, and uncertainty	27
6.14 Adult mortality: what the evidence does and does not establish	27
6.15 Interpretation and public-health implications.....	27
PART IV. Integrated Mortality Synthesis.....	28
6.17 The geography of progress: convergence, persistence, and reversals	28
6.18 What the mortality data cannot establish about causes of death	29
6.19 Mortality shocks, survey timing, and interpretation.....	29
6.20 Data quality, triangulation, and limits of inference	30
6.21 Public-health implications and conclusion	30
Discussion	31
6.22 Interpretation of the quarter-century mortality transition.....	31
6.23 National improvement and the persistence of regional inequality	31
6.24 What the four successor regions reveal about geographic comparability	32
6.25 Interpreting the pregnancy-related mortality decline	32
6.26 The life-course interpretation and the limits of an epidemiological-transition claim	33
6.27 Mortality shocks, survey periods, and the danger of overinterpretation	33
6.28 Methodological strengths and limitations.....	34
6.29 Implications for public health and future measurement	34
6.30 Conclusion	35
References.....	35

Chapter 6 — Acronyms and Abbreviations

Acronym	Description
ANC	Antenatal Care
CI	Confidence Interval
CRVS	Civil Registration and Vital Statistics
DHS	Demographic and Health Survey
EDHS	Ethiopia Demographic and Health Survey
ICF	ICF, the organization implementing the DHS Program
IMR	Infant Mortality Rate
MMR	Maternal Mortality Ratio
NMR	Neonatal Mortality Rate
PNC	Postnatal Care
PRMR	Pregnancy-Related Mortality Ratio
SDG	Sustainable Development Goal
SE	Standard Error
SNNPR	Southern Nations, Nationalities, and Peoples' Region
U5MR	Under-Five Mortality Rate
UN DESA	United Nations Department of Economic and Social Affairs
UN IGME	United Nations Inter-agency Group for Child Mortality Estimation
UNFPA	United Nations Population Fund
UNICEF	United Nations Children's Fund
WHO	World Health Organization

Editorial notes

PRMR versus MMR. Pregnancy-related mortality includes deaths during pregnancy or within the specified postpartum period, irrespective of cause. Maternal mortality excludes accidental or incidental causes.

NMR, IMR, and U5MR. These measure mortality during the first 28 completed days, first year, and first five years of life, respectively, generally expressed per 1,000 live births.

SE versus CI. The standard error quantifies sampling uncertainty; a confidence interval provides an interval estimate. Neither establishes significance of a region–national difference without an appropriate variance calculation.

6.1 Introduction

Mortality is among the most consequential indicators of population health. Its level reflects the cumulative effects of disease exposure, nutrition, environmental conditions, health-system performance, and the distribution of social and economic resources. Yet mortality is not a single outcome. The death of a newborn, the death of a child before the fifth birthday, and a death occurring during pregnancy or shortly after its end arise within different risk sets and are measured with different sources. A comprehensive account of Ethiopia's mortality transition must therefore consider both the magnitude of change and the populations, places, and life stages in which it occurred (United Nations Inter-agency Group for Child Mortality Estimation [UN IGME], 2024; World Health Organization [WHO] et al., 2023).

Across the first quarter of the twenty-first century, Ethiopia experienced major improvements in child survival, alongside persistent geographic inequality and substantial challenges in reproductive and maternal health. The five-round Ethiopian Demographic and Health Survey (EDHS) evidence assembled for this chapter spans 2000, 2005, 2011, 2016, and 2024–25. In the certified, geographically harmonized historical under-five mortality panel used here, the reconstructed national rate decreased from 187.81 to 52.51 deaths per 1,000 live births. The independently reported national pregnancy-related mortality ratio decreased from 871 to 169 deaths per 100,000 live births. These figures are not interchangeable: they represent different mortality concepts, units, reference windows, and estimation procedures. Together, they establish the importance of examining multiple dimensions of survival rather than treating a single national indicator as a complete account of mortality change.

National progress can also conceal divergence in regional experience. A region with a high initial mortality rate may register a large absolute decline yet remain above the national benchmark; another may achieve a smaller absolute reduction but converge more rapidly toward the national level. Moreover, apparent changes between survey rounds need not be statistically distinguishable from sampling variability. This chapter therefore follows a consistent comparison strategy: each of Ethiopia's 14 current regions is examined individually against the national series over five EDHS rounds. The emphasis is on observed trajectories, regional–national gaps, and the distinction between absolute and relative change. Without the survey-design covariance required for formal tests, plotted regional–national differences are interpreted descriptively.

Geographic comparability requires particular attention because the former Southern Nations, Nationalities, and Peoples' Region (SNNPR) was subsequently reorganized into four successor regions: Central Ethiopia, Sidama, South Ethiopia, and South West Ethiopia. The wider research program developed two complementary approaches. One reconstitutes the former SNNPR geography from 2024–25 successor-region data to support comparison with historical SNNPR estimates. The other reconstructs historical observations for each of the four successor regions, allowing the current regional geography to be followed backward through earlier EDHS rounds. For the regional profiles in this chapter, the second approach underpins the certified 15-geography historical panel: the national benchmark plus 14 regions across five surveys, yielding 75 certified cells. Neither approach permits mortality rates to be added or averaged without regard to appropriate populations, exposures, and survey weights.

Pregnancy-related mortality warrants a separate analytical treatment. In the EDHS sibling-history framework, a pregnancy-related death is identified by its timing in relation to pregnancy, childbirth, or the postpartum period; it is not necessarily a death caused by pregnancy. This differs from the maternal-death definition used in cause-based maternal mortality measurement, which excludes accidental and incidental causes (WHO et al., 2023). Because such deaths are relatively rare in household surveys, national estimates and their uncertainty are more defensible here than a full set of regional pregnancy-related mortality ratios. Adult mortality, life expectancy, and cause-specific mortality remain conceptually important but cannot be numerically reconstructed from child-mortality and pregnancy-related mortality tables alone.

The empirical foundation of this chapter grew out of a broader twelve-chapter EDHS research effort conducted during summer 2026. That program emphasized replicating published survey benchmarks, harmonizing historical geography, examining indicator-specific denominators, and preserving an auditable distinction between observed estimates and derived interpretations. The accompanying Methodological Preface explains this research history and the two directions of SNNPR reconstruction in detail. For the present chapter, the historical regional childhood-mortality series and the national pregnancy-related mortality series are treated as distinct, traceable evidence streams. No simulated values or future mortality projections are included.

The chapter has four analytical components. Part I establishes definitions, data sources, mortality formulas, and comparability rules. Part II presents individual national-versus-region profiles of under-five mortality and examines the changing geography of child survival. Part III analyzes the national pregnancy-related mortality record and the limits of available adult-mortality evidence. Part IV synthesizes the historical findings, assesses inequality and uncertainty, and considers what can—and cannot—be inferred about Ethiopia’s broader epidemiological transition. The central question is not simply whether mortality declined, but how consistently survival improved across age, reproductive circumstance, and region—and where the evidence requires restraint.

Methodological Preface

The twelve-chapter EDHS research program and the certification of historical childhood-mortality estimates

A summer of linked demographic and public-health analyses

During the summer of 2026, a coordinated twelve-chapter research program examined approximately a quarter-century of change in Ethiopia using the 2000, 2005, 2011, 2016, and 2024–25 Ethiopia Demographic and Health Surveys (EDHS). The work brought together fertility, family planning, maternal health, child survival, nutrition, women’s agency, regional inequality, and related reproductive-health questions. Rather than treating each chapter as an isolated analysis, the program emphasized consistent survey definitions, reproducible computation, and cross-chapter checks. Chapter 6 draws particularly on the previously completed childhood-mortality analyses and, separately, the pregnancy-related mortality work.

From analytical output to a certified historical panel

The mortality tables and graphs used in Chapter 6 were not transcribed from the older, illustration-based manuscript. They came from a sequence of data processing, estimation, diagnostics, and validation. In the resulting historical panel, each observation identifies a geography, an EDHS round, and an under-five mortality estimate (deaths before the fifth birthday per 1,000 live births). The panel covers the national series and 14 current regional geographies for five survey rounds: 15 geographies $\times$ 5 rounds = 75 cells.

The workbook

PROSPECTS2030_02_CH01_U5MR_STAGE02_DIAGNOSTICS_BACKTEST_ELIGIBILITY_v1_0_1.xlsx documents this panel. Its Historical_Diagnostics worksheet displays the five estimates for each geography and a standard-error field for 2024–25. Its Input_Gates worksheet records that all 75 required historical cells are present and that the prescribed survey rounds and geography structure pass the recorded checks. “75/75 certified” therefore means that the historical input panel satisfied those specified completeness, identity, and consistency gates. It does not, by itself, mean that every estimate is free of survey error, that all regional changes are statistically significant, or that the historical geographic reconstructions require no methodological explanation.

Why the regional comparisons remain descriptive

A regional estimate and the national estimate are not independent: the region contributes to the national total. Consequently, the uncertainty of their difference depends not only on the separate standard errors but also on their covariance. The workbook provides a 2024–25 standard-error column, but not the full design-based covariance required for a formal region-versus-national difference test. Chapter 6 therefore reports observed differences in mortality levels and trajectories as descriptive contrasts, without labeling them statistically significant. Formal tests would require appropriate joint survey-design estimation, including the covariance.

The same caution applies to comparisons across rounds: estimates are drawn from different surveys and require harmonized definitions, exposure windows, and uncertainty assessment before inferential claims are made.

Two Directions of SNNPR Geographic Harmonization

Ethiopia’s regional reorganization created a central comparability problem. Earlier EDHS rounds reported the former Southern Nations, Nationalities and Peoples’ Region (SNNPR) as a unified geography, whereas the 2024–25 survey uses successor regions. The summer research addressed this mismatch in two complementary directions, each answering a different question.

Approach 1 | Recombine the 2024–25 successors into historical SNNPR

When the purpose is to compare the former SNNPR as a single geographic unit across survey rounds, the 2024–25 successor-region records are reassembled into a common historical SNNPR geography. For child mortality, this is not accomplished by adding or taking a simple average of published regional mortality rates. The proper procedure reconstructs the relevant underlying births, deaths, exposure periods, survey weights, and geographic membership, then re-estimates the combined rate using the same mortality method. This produces a historical-boundary comparison, subject to documented boundary and data-coverage decisions.

Approach 2 | Reconstruct the four successor regions in earlier EDHS rounds

When the purpose is to examine all 14 present-day regions individually, the analysis runs in the opposite direction. Earlier survey records originally grouped under SNNPR are reassigned, where supported by sufficiently detailed geographic identifiers and a documented boundary crosswalk, to Central Ethiopia, Sidama, South Ethiopia, and South West Ethiopia. The child-mortality estimator is then applied separately within each reconstructed successor geography for 2000, 2005, 2011, and 2016. The observed 2024–25 successor-region estimates complete the five-round series. The resulting lines are historical estimates for current geographic footprints—not administrative regions that existed in those forms in 2000.

Why the two approaches are not interchangeable

The first approach answers, “How did mortality change within the former SNNPR footprint?” The second answers, “How did mortality change within the footprints of today’s four successor regions?” They use different geographic denominators and support different comparisons. Neither can be obtained reliably by arithmetic manipulation of already published mortality rates alone. Both require transparent geographic allocation and re-estimation; where historical boundaries or cluster assignment are uncertain, that uncertainty must be acknowledged.

Implications for Chapter 6

Part II uses the second approach: national versus each of the 14 present-day regional geographies across the five observed EDHS rounds, ending in 2024–25. The first approach remains useful for comparisons with older publications organized around the former SNNPR. No projected values are used. The certified panel establishes the working historical series; the accompanying geographic

crosswalk and estimation records remain the appropriate evidence for auditing how individual successor-region observations were constructed.

PART I. 6.1 Introduction: Ethiopia’s Mortality Transition, 2000–2024/25

Mortality is both a demographic process and an indicator of social development. Its decline alters population survival, family experience, demand for services, and the age distribution of the population. Yet a national average can conceal pronounced geographic disparities, especially when neonatal survival improves at a different pace from survival after infancy.

This chapter examines the mortality transition across five Ethiopian Demographic and Health Survey (EDHS) rounds: 2000, 2005, 2011, 2016, and 2024–25. Child mortality is the empirical anchor because full birth histories permit the reconstruction of deaths and exposure over specified reference windows. Pregnancy-related mortality is considered through the distinct sibling-history measurement framework; its rarity and sampling uncertainty demand more conservative geographic inference.

The chapter is organized around two complementary questions: how did mortality change nationally, and how did each of the 14 contemporary regions change relative to the national experience? The latter question is not answered by a simple ranking: it requires examining each region’s starting point, endpoint, absolute and proportional decline, uncertainty, and changing distance from the national benchmark.

6.2 Sources, Measurement, and Comparability

6.2.1 Data architecture

EDHS full birth histories provide dates of birth, survival status, and age at death for children born to interviewed women. Mortality probabilities are estimated using period exposure and deaths assigned to age intervals and retrospective reference periods. Survey design features—sampling weights, clusters, and strata—must be respected when estimating uncertainty. Sibling histories, when available and comparably measured, supply the pregnancy-related mortality evidence; they do not constitute a civil-registration census of maternal deaths.

Evidence stream	Main use	Interpretive boundary
EDHS full birth histories	Neonatal, infant and under-five mortality; national and regional trends	Recall, omission, sampling error and retrospective windows
EDHS sibling histories	Pregnancy-related mortality among reproductive-age women	Rare deaths; reporting and selection limitations
CRVS / HMIS	Contextual triangulation and service-system evidence	Incomplete population coverage, especially outside facilities
UN IGME / WHO / UN WPP	Externally modeled benchmarks and wider demographic context	Models are not interchangeable with direct EDHS estimates
2030 exploratory projections	Conditional outlook for eligible regional series	Never represent as observed or guaranteed

6.2.2 Time windows and geography

The survey year is not the exact calendar year of all deaths contributing to a retrospective mortality estimate. The analytical tables must identify the retrospective window used for each indicator, and all compared survey rounds must use compatible estimators. Historic region labels must be mapped to the 14-region successor geography using documented, reproducible harmonization; uncertainty introduced by geographic reconstruction must not be hidden.

National results are retained as the reference line for every regional analysis. Each region is compared with the national series from the same survey and same mortality indicator. National estimates include the region itself, so these are descriptive benchmark contrasts rather than independent two-sample tests.

6.3 Mortality Indicators and Mathematical Formulas

The formulas below establish definitions and analytical conventions for the entire chapter. A mortality rate based on person-time and a probability of dying are related but are not interchangeable. Unless otherwise specified, child-mortality probabilities are reported per 1,000 live births and pregnancy-related mortality ratios per 100,000 live births.

6.3.1 Crude death rate (CDR)

$$\frac{D}{P} \times 1,000$$

Where: D = deaths occurring during the period; $\bar{P}$ = mid-period population (or corresponding person-years).

6.3.2 Age-specific mortality rate (nM_x)

$$\frac{D_{x,x+n}}{PY_{x,x+n}} \times 1,000$$

Where: $D_{x,x+n}$ = deaths at ages x to x+n; $PY_{x,x+n}$ = person-years exposed in that interval.

6.3.3 Age-interval probability of dying (nq_x)

$$\frac{n \times nM_x}{1 + (n - na_x) \times nM_x}$$

Where: n = interval width; na_x = average years lived within the interval by persons dying there; nM_x is expressed per person-year, not per 1,000.

6.3.4 Neonatal mortality probability (NMR)

$$\frac{\text{Deaths before 28 completed days}}{\text{Live births exposed to neonatal risk}} \times 1,000$$

Where: This is an intuitive risk expression; EDHS estimates use life-table exposure and survival methods rather than a simple unadjusted count ratio.

6.3.5 Infant mortality probability ($1q_0$)

$$\frac{l_0 - l_1}{l_0} \times 1,000$$

Where: l_0 = survivors at birth in a synthetic life-table cohort; l_1 = survivors to exact age 1.

6.3.6 Under-five mortality probability ($5q_0$)

$$\frac{l_0 - l_5}{l_0} \times 1,000$$

Where: l_5 = survivors to exact age 5; values are probabilities scaled per 1,000 live births.

6.3.7 Conditional mortality from ages 1 to 5 ($4q_1$)

$$\frac{5q_0 - 1q_0}{1 - 1q_0}$$

Where: The q terms in this identity are unscaled probabilities between 0 and 1. The simple difference $5q_0 - 1q_0$ is not the conditional probability $4q_1$.

6.3.8 Post-neonatal probability (approximately)

$$\frac{IMR - NMR}{1}$$

Where: When IMR and NMR share the same birth-cohort definition, their difference represents deaths after the neonatal period and before age 1 per 1,000 live births; it is not the conditional probability among neonatal survivors.

6.3.9 Adult probability of dying from 15 to 60 ($45q_{15}$)

$$\frac{l_{15} - l_{60}}{l_{15}}$$

Where: l_{15} and l_{60} are synthetic life-table survivors at exact ages 15 and 60; multiply by 1,000 when reporting per 1,000.

6.3.10 Pregnancy-related mortality ratio (PRMR)

$$\frac{\text{Pregnancy-related deaths}}{\text{Live births}} \times 100,000$$

Where: Pregnancy-related deaths occur during pregnancy, childbirth, or within the specified postpartum window regardless of cause; this is not equivalent to the cause-defined maternal mortality ratio (MMR).

6.3.11 Maternal mortality ratio (MMR)

$$\frac{\text{Maternal deaths}}{\text{Live births}} \times 100,000$$

Where: Maternal deaths exclude accidental or incidental causes and require cause-related classification. Do not substitute pregnancy-related deaths for maternal deaths.

6.3.12 Survivors in a life table (l_{x+n})

$$\frac{l_x \times (1 - nq_x)}{1}$$

Where: l_x = survivors at exact age x ; nq_x = conditional probability of dying before $x+n$.

6.3.13 Life expectancy at age x (e_x)

$$\frac{T_x}{l_x}$$

Where: T_x = total future person-years lived by the synthetic cohort above exact age x .

6.3.14 Directly age-standardized mortality rate

$$\frac{\sum_x w_x \times M_x}{\sum_x w_x}$$

Where: M_x = age-specific mortality rate; w_x = standard-population age weight; age bands and reference standard must be declared.

6.3.15 Absolute mortality change

$$\frac{M_{r,2} - M_{r,1}}{1}$$

Where: $M_{r,1}$ and $M_{r,2}$ are region r 's estimates at baseline and endpoint; a negative value represents a decline.

6.3.16 Relative mortality change

$$\frac{M_{r,2} - M_{r,1}}{M_{r,1}} \times 100$$

Where: The percentage is relative to the baseline; report alongside the absolute change in deaths per 1,000.

6.3.17 Regional gap relative to national

$$\frac{M_{r,t} - M^N_{,t}}{M^N_{,t}} \times 100$$

Where: $M_{r,t}$ = regional estimate; $M^N_{,t}$ = national estimate for the same indicator and survey; positive values mean higher regional mortality.

6.3.18 Absolute regional–national gap

$$\frac{M_{r,t} - M^N_{,t}}{1}$$

Where: Expressed in deaths per 1,000 live births for child mortality, not percentage points.

6.3.19 Approximate confidence interval

$$\frac{M - 1.96 \times SE(M)}{1} \text{ to } \hat{M} + 1.96 \times SE(\hat{M})$$

Where: $\hat{M}$ = estimated indicator; SE = survey-design standard error. For mortality probabilities, use the interval method certified by the estimation software; a normal approximation may be inappropriate near boundaries or with sparse events.

6.4 National Mortality Levels and Trends

The national section will report neonatal, infant, and under-five mortality in parallel for the five survey rounds, with the same retrospective-window definition used in the certified child-mortality analysis. Each table will distinguish observed estimates from any external modeled series. No placeholder rates from the 2025 manuscript are reproduced here.

Required national output	Unit	Certification/source requirement
Neonatal mortality (five surveys)	Deaths per 1,000 live births	Certified EDHS national table + uncertainty
Infant mortality (five surveys)	Deaths per 1,000 live births	Certified EDHS national table + uncertainty
Under-five mortality (five surveys)	Deaths per 1,000 live births	Certified EDHS national table + uncertainty
Neonatal share of under-five deaths	Percentage, explicitly defined	Derived from consistent components; distinguish risk ratio from death share
Change 2000–2024/25	Absolute and relative	Same indicator, comparable windows

Interpretation will emphasize three separate dimensions: the magnitude of improvement, the changing concentration of deaths early in life, and the remaining burden in 2024–25. A decline in under-five mortality does not by itself establish a similar decline in neonatal mortality, and a rising neonatal fraction can coexist with falling neonatal mortality.

6.5 Regional Analytical Framework: National + 14 Regions

Regional results will follow the sequence used in Chapter 4: a national benchmark, followed by individual region-by-region narratives. The five-panel supplied under-five mortality figure provides a presentation guide—not a substitute for the underlying certified estimates. The four historical

survey transitions and the 2024–25 endpoint will be discussed separately from conditional 2030 projections.

Regional aggregation and comparisons require a clear boundary crosswalk. The historical SNNPR geography must not be equated directly with its successor regions without a defensible reconstruction. Any apparent regional reversal during periods of conflict or displacement warrants explicit discussion of coverage, mortality shocks, and sampling uncertainty.

6.6 Data Quality, Limitations, and Validation

The primary quality gates are replication of official national estimates, coherent mortality ordering ($NMR \leq IMR \leq U5MR$), consistent retrospective windows, correct survey-design handling, documented geographic harmonization, and stable region labels. Regional estimates require inspection of numbers of clusters, births/person-time exposure, and neonatal or child deaths when recoverable. A visually smooth curve is not evidence of statistical reliability.

For pregnancy-related mortality, sibling-history death counts and confidence intervals must be reviewed before interpreting any trend. Because pregnancy-related deaths are uncommon in household surveys, regional disaggregation will not be treated as routine. Cause-defined maternal mortality must not be inferred from a pregnancy-related mortality ratio.

External series from UN IGME, WHO, or UN WPP may be used for triangulation, but their methods and estimation periods must be disclosed. Neither external model estimates nor 2030 scenarios should be spliced into an EDHS observational line without a clear visual and textual boundary.

Part I closure and evidence handoff

Part I fixes the chapter’s measurement rules. Part II will carry the certified national and 14-region child-mortality evidence into full region-by-region comparison. Part III will address pregnancy-related mortality and the limits of adult mortality measurement. Part IV will synthesize mortality inequalities, shocks, epidemiological transition, and policy implications. Numerical table cells not supported by accessible certified outputs remain intentionally unfilled.

PART II. Regional Under-Five Mortality: National Comparisons, EDHS 2000–2024/25

6.7 Regional profiles and comparisons with the national series

This section compares each of Ethiopia’s 14 current regions with the independently estimated national under-five mortality series across five EDHS rounds. All plotted values are historical observations from the certified 75-cell panel; no projected or simulated values are included. Rates

are deaths before age five per 1,000 live births. Each region is assessed using the same national benchmark, rather than a national rate calculated by averaging regional estimates.

Source:

PROSPECTS2030_02_CH01_U5MR_STAGE02_DIAGNOSTICS_BACKTEST_ELIGIBILITY_v1_0_1.xlsx, Historical_Diagnostics and Input_Gates worksheets. The Input_Gates sheet records 75/75 certified historical cells. The diagnostic workbook provides a 2024–25 SE column but does not contain the full design-based covariance needed to test differences between a region and the national estimate. Therefore, plotted gaps are descriptive and are not characterized as statistically significant.

6.7.1 Tigray

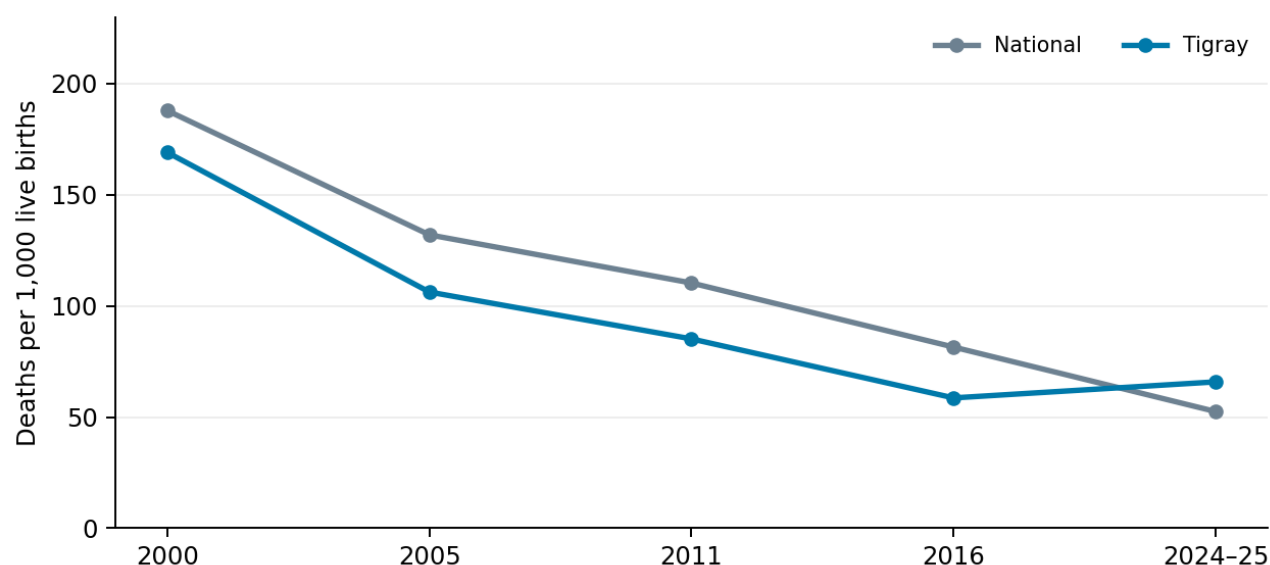


Figure 6.1. Tigray and national under-five mortality, five EDHS rounds, 2000–2024/25.

Tigray recorded 169.02 under-five deaths per 1,000 live births in 2000 and 65.84 in 2024–25, a change of -103.18 deaths (-61.0%). National mortality changed from 187.81 to 52.51 over the same period. The region was 18.79 deaths below the national rate in 2000 and 13.33 deaths above the national rate in 2024–25.

The largest observed interval change occurred in 2000–2005 (-62.78 deaths per 1,000). The region–national gap changed by +32.12 deaths per 1,000 between the endpoints. These are descriptive contrasts; uncertainty and covariance must be evaluated before drawing conclusions about statistical significance.

6.7.2 Afar

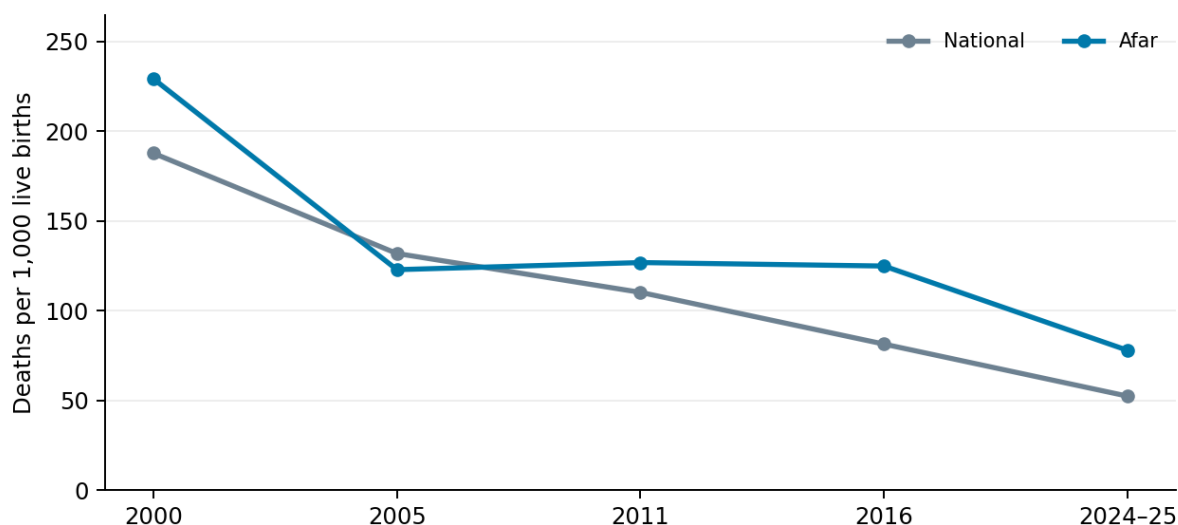


Figure 6.2. Afar and national under-five mortality, five EDHS rounds, 2000–2024/25.

Afar recorded 229.25 under-five deaths per 1,000 live births in 2000 and 78.04 in 2024–25, a change of -151.21 deaths (-66.0%). National mortality changed from 187.81 to 52.51 over the same period. The region was 41.44 deaths above the national rate in 2000 and 25.53 deaths above the national rate in 2024–25.

The largest observed interval change occurred in 2000–2005 (-106.30 deaths per 1,000). The region–national gap changed by -15.91 deaths per 1,000 between the endpoints. These are descriptive contrasts; uncertainty and covariance must be evaluated before drawing conclusions about statistical significance.

6.7.3 Amhara

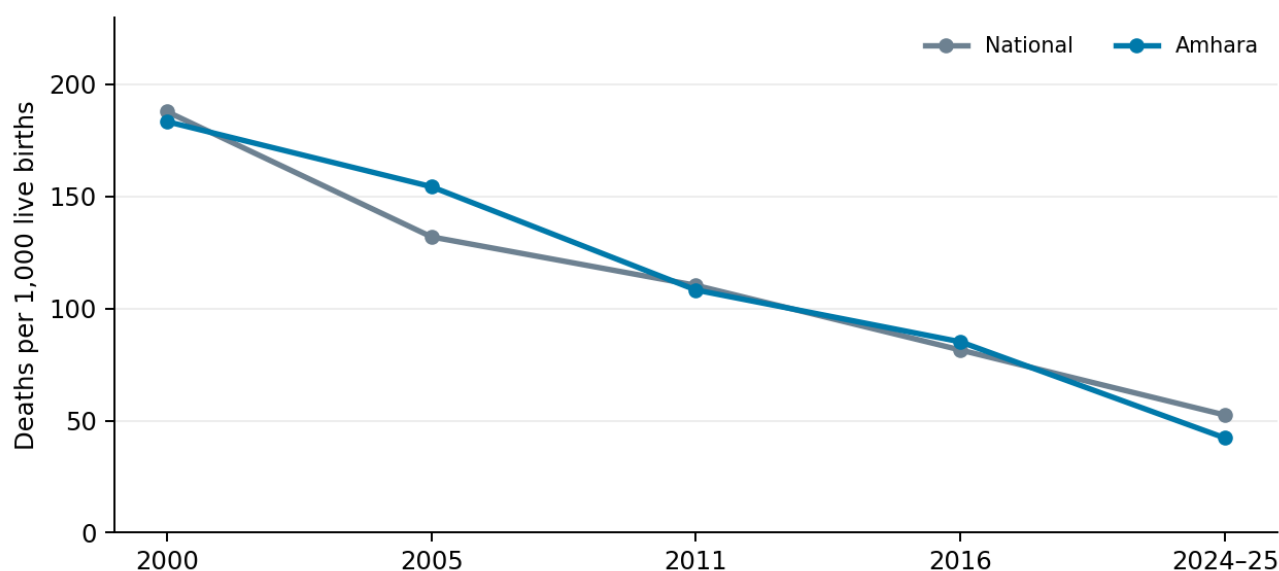


Figure 6.3. Amhara and national under-five mortality, five EDHS rounds, 2000–2024/25.

Amhara recorded 183.36 under-five deaths per 1,000 live births in 2000 and 42.27 in 2024–25, a change of -141.09 deaths (-76.9%). National mortality changed from 187.81 to 52.51 over the same period. The region was 4.45 deaths below the national rate in 2000 and 10.24 deaths below the national rate in 2024–25.

The largest observed interval change occurred in 2005–2011 (-46.08 deaths per 1,000). The region–national gap changed by -5.79 deaths per 1,000 between the endpoints. These are descriptive contrasts; uncertainty and covariance must be evaluated before drawing conclusions about statistical significance.

6.7.4 Oromia

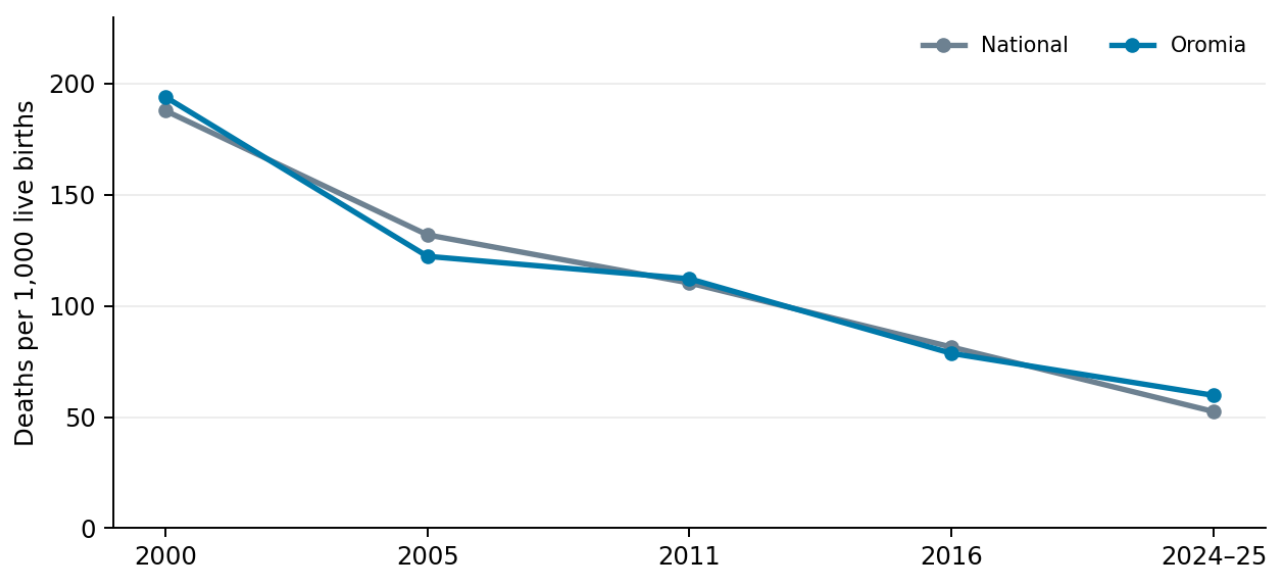


Figure 6.4. Oromia and national under-five mortality, five EDHS rounds, 2000–2024/25.

Oromia recorded 193.98 under-five deaths per 1,000 live births in 2000 and 59.78 in 2024–25, a change of -134.20 deaths (-69.2%). National mortality changed from 187.81 to 52.51 over the same period. The region was 6.17 deaths above the national rate in 2000 and 7.27 deaths above the national rate in 2024–25.

The largest observed interval change occurred in 2000–2005 (-71.67 deaths per 1,000). The region–national gap changed by +1.10 deaths per 1,000 between the endpoints. These are descriptive contrasts; uncertainty and covariance must be evaluated before drawing conclusions about statistical significance.

6.7.5 Somali

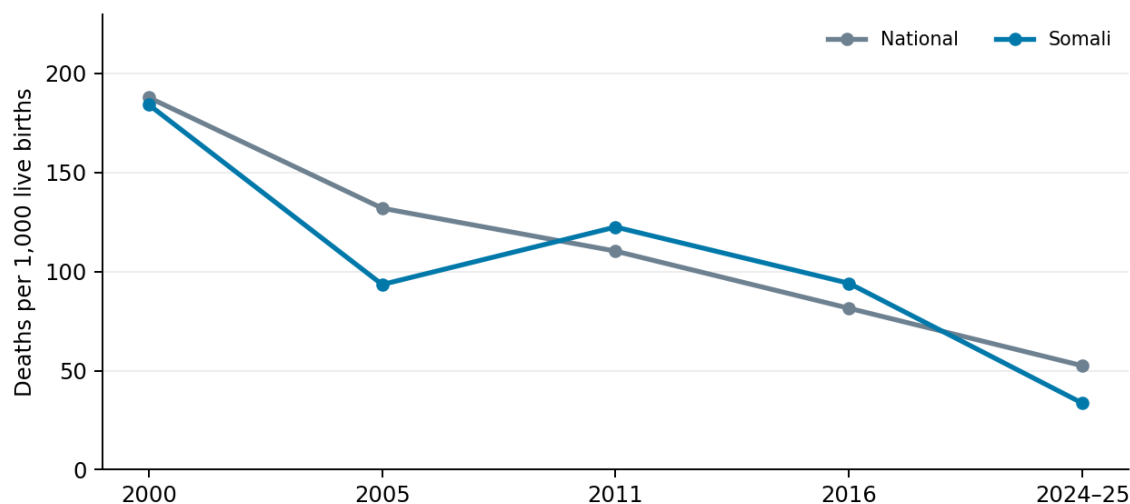


Figure 6.5. Somali and national under-five mortality, five EDHS rounds, 2000–2024/25.

Somali recorded 184.18 under-five deaths per 1,000 live births in 2000 and 33.63 in 2024–25, a change of -150.55 deaths (-81.7%). National mortality changed from 187.81 to 52.51 over the same period. The region was 3.63 deaths below the national rate in 2000 and 18.88 deaths below the national rate in 2024–25.

The largest observed interval change occurred in 2000–2005 (-90.72 deaths per 1,000). The region–national gap changed by -15.25 deaths per 1,000 between the endpoints. These are descriptive contrasts; uncertainty and covariance must be evaluated before drawing conclusions about statistical significance.

6.7.6 Benishangul-Gumuz

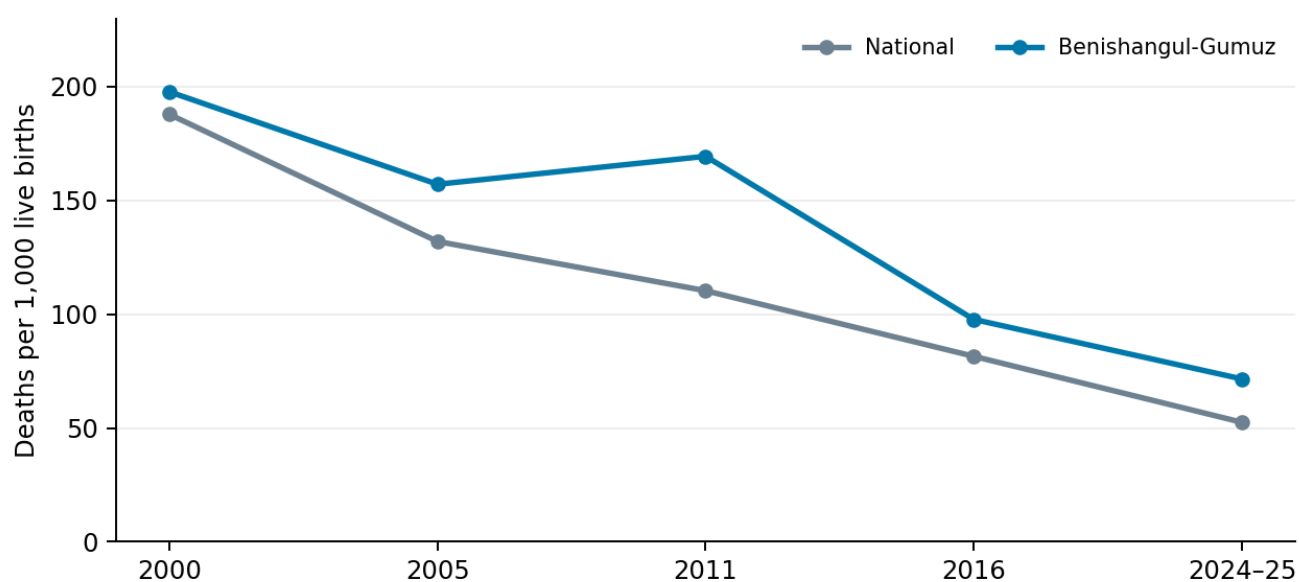


Figure 6.6. Benishangul-Gumuz and national under-five mortality, five EDHS rounds, 2000–2024/25.

Benishangul-Gumuz recorded 197.72 under-five deaths per 1,000 live births in 2000 and 71.55 in 2024–25, a change of -126.17 deaths (-63.8%). National mortality changed from 187.81 to 52.51 over the same period. The region was 9.91 deaths above the national rate in 2000 and 19.04 deaths above the national rate in 2024–25.

The largest observed interval change occurred in 2011–2016 (-71.64 deaths per 1,000). The region–national gap changed by +9.13 deaths per 1,000 between the endpoints. These are descriptive contrasts; uncertainty and covariance must be evaluated before drawing conclusions about statistical significance.

6.7.7 Central Ethiopia

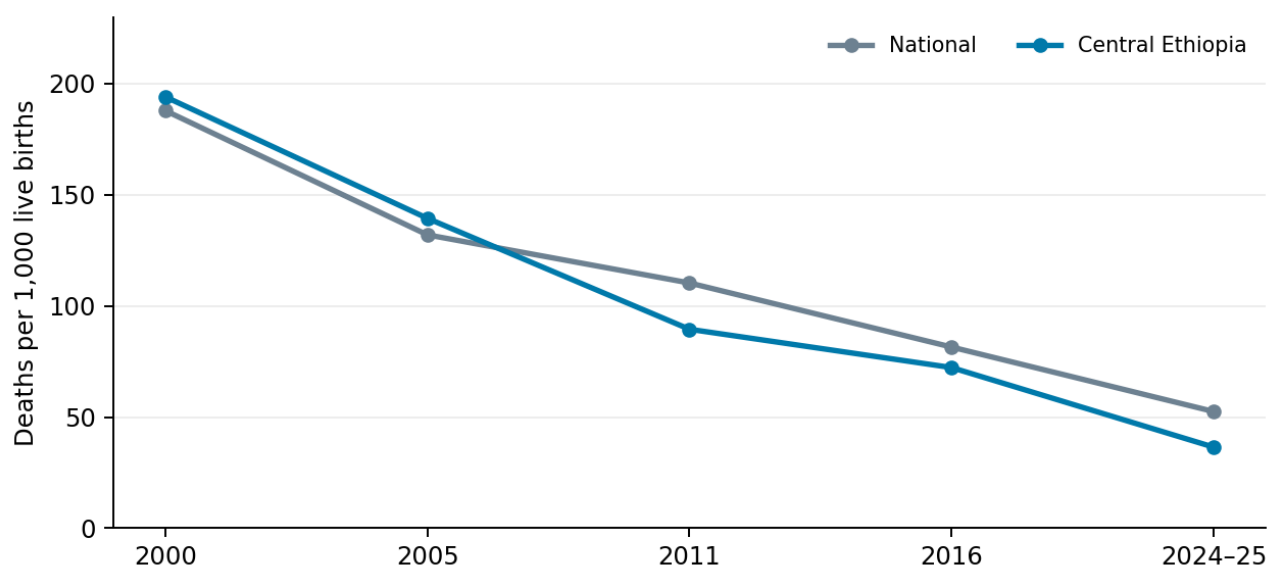


Figure 6.7. Central Ethiopia and national under-five mortality, five EDHS rounds, 2000–2024/25.

Central Ethiopia recorded 194.03 under-five deaths per 1,000 live births in 2000 and 36.50 in 2024–25, a change of -157.53 deaths (-81.2%). National mortality changed from 187.81 to 52.51 over the same period. The region was 6.22 deaths above the national rate in 2000 and 16.01 deaths below the national rate in 2024–25.

The largest observed interval change occurred in 2000–2005 (-54.64 deaths per 1,000). The region–national gap changed by -22.23 deaths per 1,000 between the endpoints. These are descriptive contrasts; uncertainty and covariance must be evaluated before drawing conclusions about statistical significance.

6.7.8 Sidama

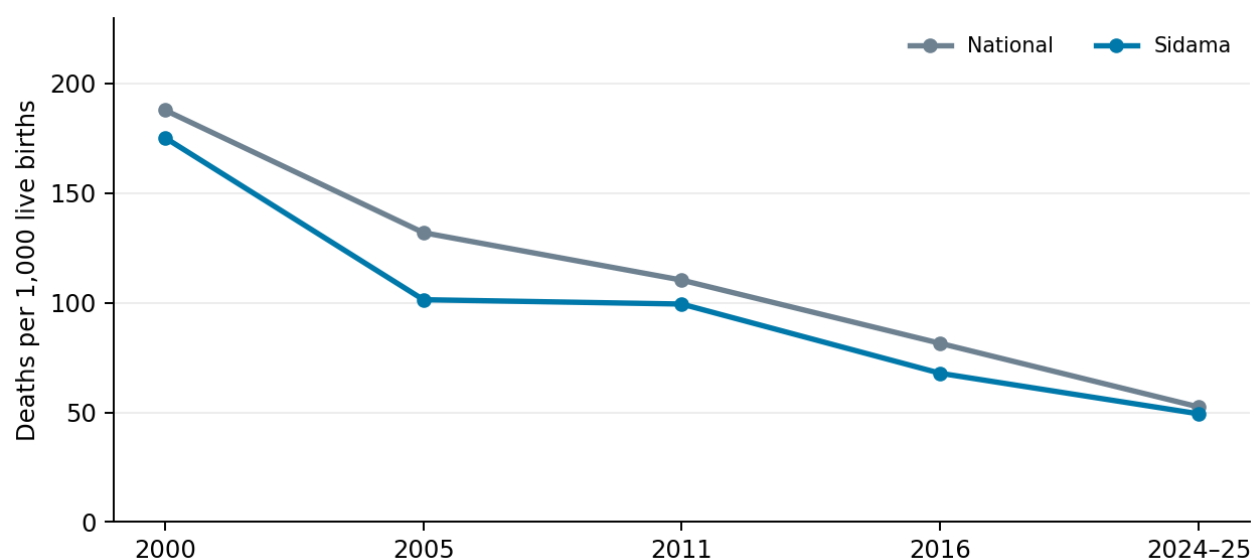


Figure 6.8. Sidama and national under-five mortality, five EDHS rounds, 2000–2024/25.

Sidama recorded 175.24 under-five deaths per 1,000 live births in 2000 and 49.37 in 2024–25, a change of -125.87 deaths (-71.8%). National mortality changed from 187.81 to 52.51 over the same period. The region was 12.57 deaths below the national rate in 2000 and 3.14 deaths below the national rate in 2024–25.

The largest observed interval change occurred in 2000–2005 (-73.85 deaths per 1,000). The region–national gap changed by +9.43 deaths per 1,000 between the endpoints. These are descriptive contrasts; uncertainty and covariance must be evaluated before drawing conclusions about statistical significance.

6.7.9 South Ethiopia

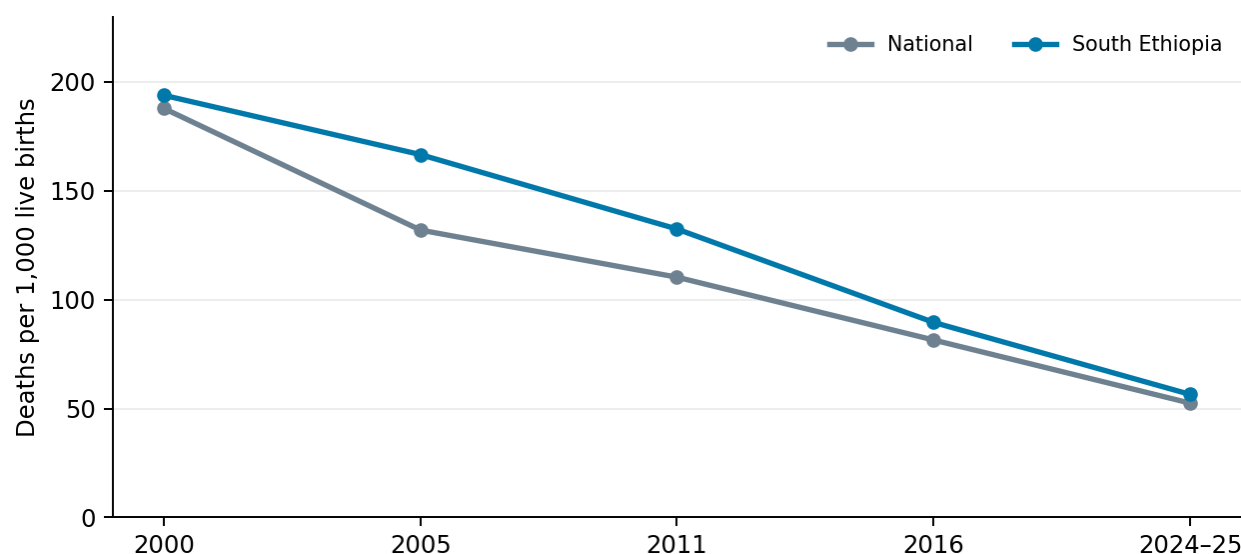
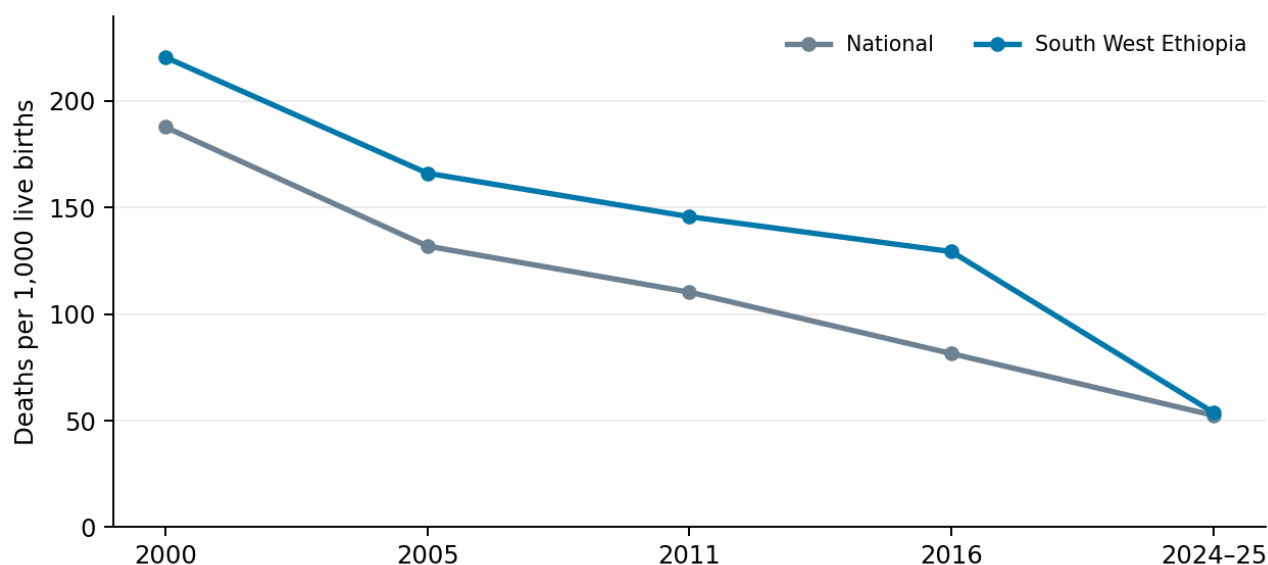


Figure 6.9. South Ethiopia and national under-five mortality, five EDHS rounds, 2000–2024/25.

South Ethiopia recorded 193.83 under-five deaths per 1,000 live births in 2000 and 56.51 in 2024–25, a change of -137.32 deaths (-70.8%). National mortality changed from 187.81 to 52.51 over the same period. The region was 6.02 deaths above the national rate in 2000 and 4.00 deaths above the national rate in 2024–25.

The largest observed interval change occurred in 2011–2016 (-42.84 deaths per 1,000). The region–national gap changed by -2.02 deaths per 1,000 between the endpoints. These are descriptive contrasts; uncertainty and covariance must be evaluated before drawing conclusions about statistical significance.

6.7.10 South West Ethiopia

**Figure 6.10. South West Ethiopia and national under-five mortality, five EDHS rounds, 2000–2024/25.**

South West Ethiopia recorded 220.58 under-five deaths per 1,000 live births in 2000 and 53.83 in 2024–25, a change of -166.75 deaths (-75.6%). National mortality changed from 187.81 to 52.51 over the same period. The region was 32.77 deaths above the national rate in 2000 and 1.32 deaths above the national rate in 2024–25.

The largest observed interval change occurred in 2016–2024–25 (-75.51 deaths per 1,000). The region–national gap changed by -31.45 deaths per 1,000 between the endpoints. These are descriptive contrasts; uncertainty and covariance must be evaluated before drawing conclusions about statistical significance.

6.7.11 Gambella

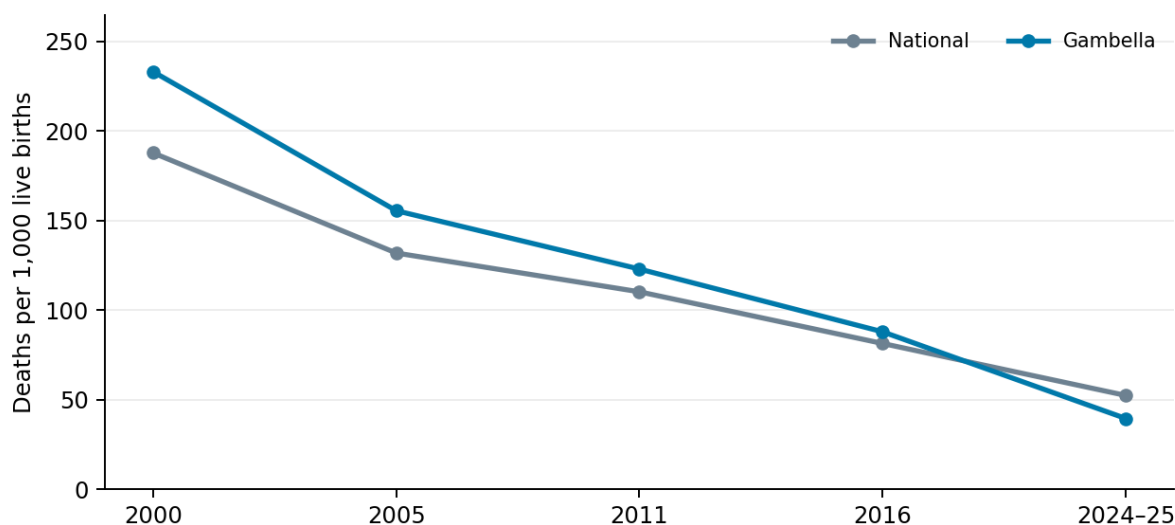


Figure 6.11. Gambella and national under-five mortality, five EDHS rounds, 2000–2024/25.

Gambella recorded 233.13 under-five deaths per 1,000 live births in 2000 and 39.66 in 2024–25, a change of -193.47 deaths (-83.0%). National mortality changed from 187.81 to 52.51 over the same period. The region was 45.32 deaths above the national rate in 2000 and 12.85 deaths below the national rate in 2024–25.

The largest observed interval change occurred in 2000–2005 (-77.56 deaths per 1,000). The region–national gap changed by -58.17 deaths per 1,000 between the endpoints. These are descriptive contrasts; uncertainty and covariance must be evaluated before drawing conclusions about statistical significance.

6.7.12 Harari

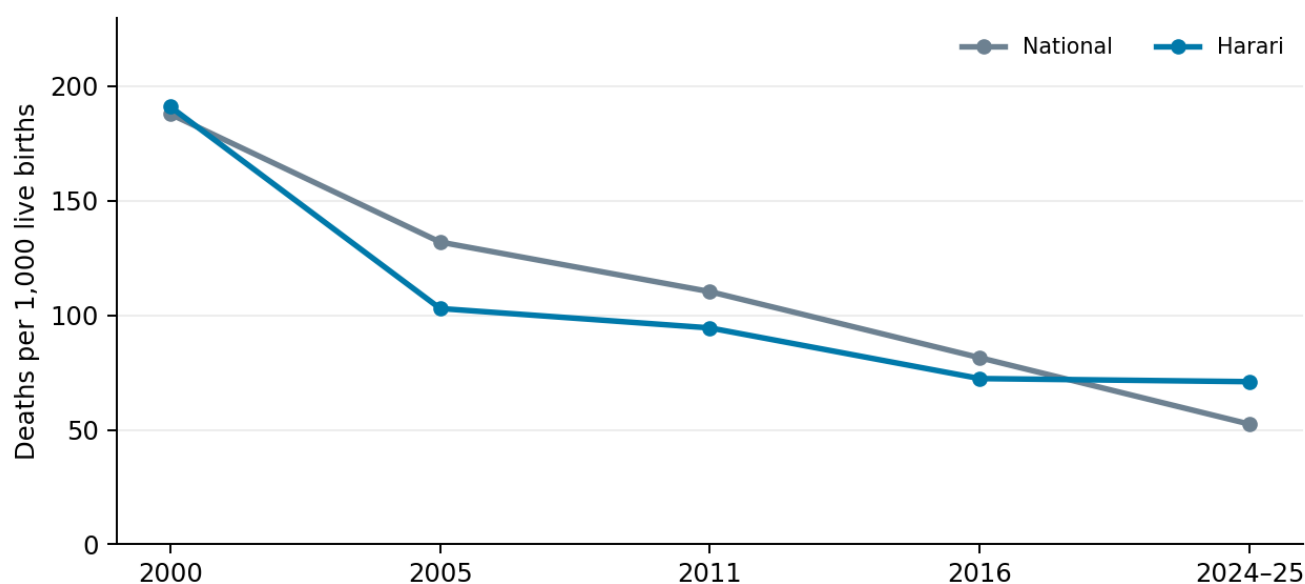


Figure 6.12. Harari and national under-five mortality, five EDHS rounds, 2000–2024/25.

Harari recorded 190.99 under-five deaths per 1,000 live births in 2000 and 71.03 in 2024–25, a change of -119.96 deaths (-62.8%). National mortality changed from 187.81 to 52.51 over the same period. The region was 3.18 deaths above the national rate in 2000 and 18.52 deaths above the national rate in 2024–25.

The largest observed interval change occurred in 2000–2005 (-88.03 deaths per 1,000). The region–national gap changed by +15.34 deaths per 1,000 between the endpoints. These are descriptive contrasts; uncertainty and covariance must be evaluated before drawing conclusions about statistical significance.

6.7.13 Addis Ababa

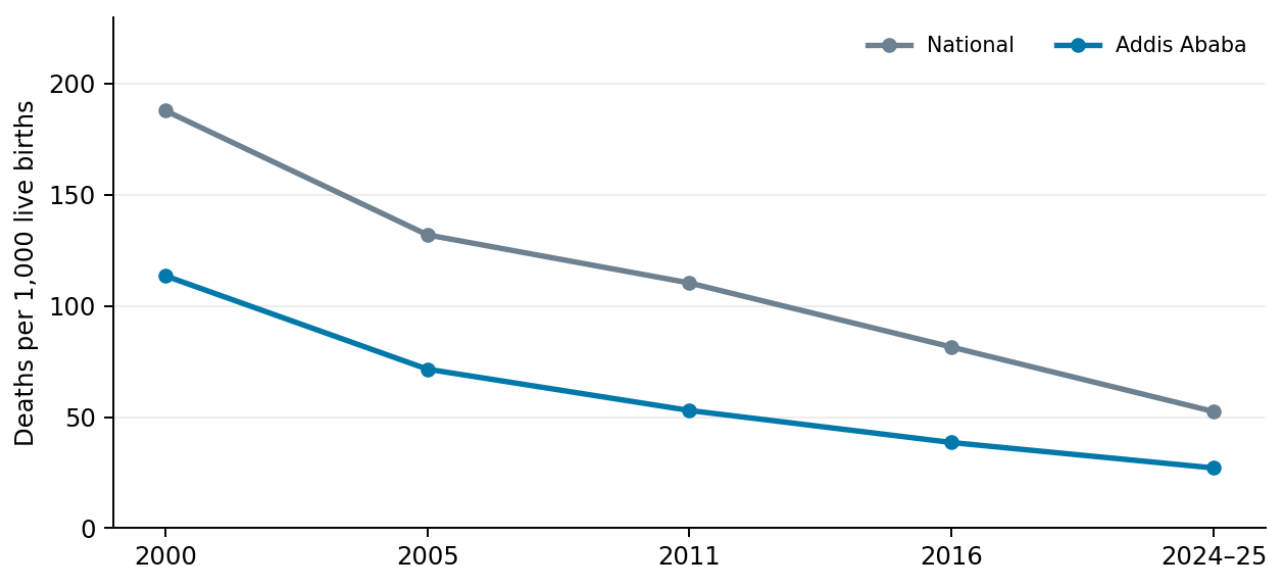


Figure 6.13. Addis Ababa and national under-five mortality, five EDHS rounds, 2000–2024/25.

Addis Ababa recorded 113.53 under-five deaths per 1,000 live births in 2000 and 27.13 in 2024–25, a change of -86.40 deaths (-76.1%). National mortality changed from 187.81 to 52.51 over the same period. The region was 74.28 deaths below the national rate in 2000 and 25.38 deaths below the national rate in 2024–25.

The largest observed interval change occurred in 2000–2005 (-41.99 deaths per 1,000). The region–national gap changed by +48.90 deaths per 1,000 between the endpoints. These are descriptive contrasts; uncertainty and covariance must be evaluated before drawing conclusions about statistical significance.

6.7.14 Dire Dawa

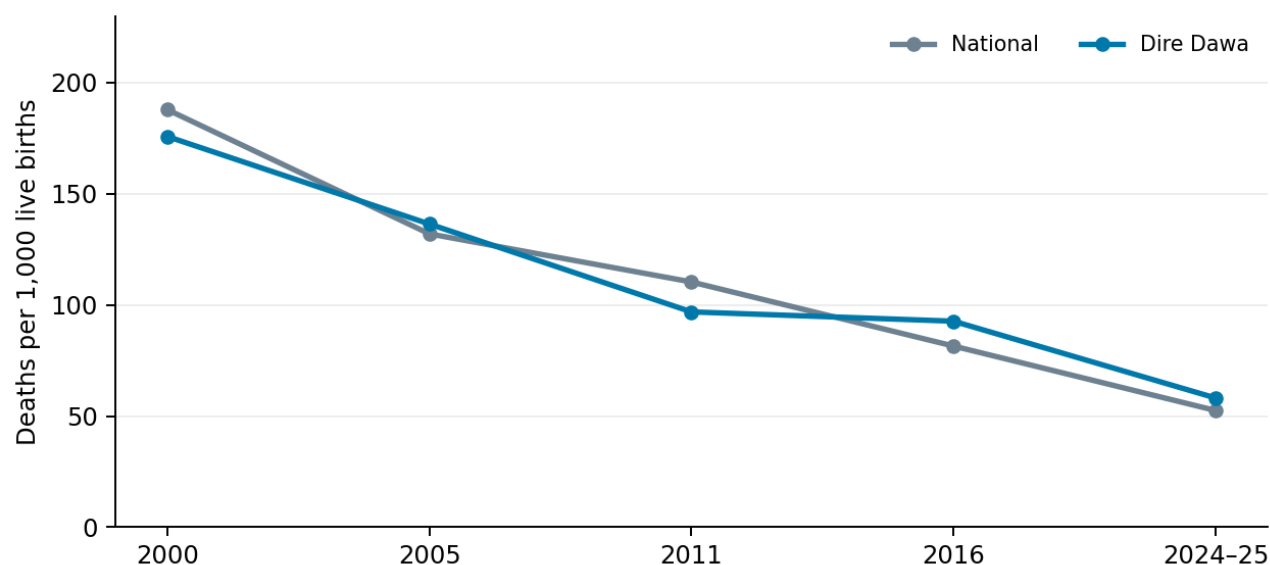


Figure 6.14. Dire Dawa and national under-five mortality, five EDHS rounds, 2000–2024/25.

Dire Dawa recorded 175.74 under-five deaths per 1,000 live births in 2000 and 58.14 in 2024–25, a change of -117.60 deaths (-66.9%). National mortality changed from 187.81 to 52.51 over the same period. The region was 12.07 deaths below the national rate in 2000 and 5.63 deaths above the national rate in 2024–25.

The largest observed interval change occurred in 2005–2011 (-39.52 deaths per 1,000). The region–national gap changed by +17.70 deaths per 1,000 between the endpoints. These are descriptive contrasts; uncertainty and covariance must be evaluated before drawing conclusions about statistical significance.

6.8 Cross-regional interpretation

The five-round national benchmark declined from 187.81 deaths per 1,000 live births in 2000 to 52.51 in 2024–25. The regional profiles demonstrate that progress was heterogeneous: initial levels, the pace of change, reversals between adjacent surveys, and the direction of the region–national gap vary across geographies. The successor regions are represented by their own certified historical trajectories rather than by isolated 2024–25 markers.

6.9 Comparability, uncertainty, and validation

All 15 geographies have five certified historical observations in the uploaded diagnostic workbook. These estimates are treated as the common analytical series. No 2030 projection, back-test forecast, or eligibility classification enters the charts or interpretation. For publication, the original estimation methodology, historical boundary harmonization, and full design-based standard errors and confidence intervals should be cross-referenced to the upstream Stage 1 certification record. In particular, standard errors alone do not establish significance of region–national gaps.

Data note. Figures use the Historical_Diagnostics worksheet (five observed survey points per geography); validation status uses Input_Gates. Values are rounded to two decimals in text and retained at workbook precision in plotting.

PART III. 6.10 Pregnancy-related mortality: definition and scope

Pregnancy-related mortality captures deaths of women aged 15–49 occurring during pregnancy, childbirth, or within two months after the end of pregnancy, irrespective of cause, as operationalized in the uploaded EDHS reconstruction. It is not synonymous with medically attributed maternal mortality: accidental and incidental deaths may be included. The pregnancy-related mortality ratio (PRMR) expresses these deaths per 100,000 live births. All five national estimates presented below derive from the uploaded

CH08_02_PRN_NATIONAL_QUARTER_CENTURY_TRENDS_v1_0.xlsx workbook.

The EDHS sibling-history reconstruction uses the seven years preceding each survey, excluding the interview month. Therefore, each survey point summarizes a retrospective period rather than a single calendar year. The five surveys should be read as successive period estimates, not annual vital-registration observations.

6.11 National pregnancy-related mortality: five-survey evidence

Table 6.11.1. National pregnancy-related mortality ratios, independent reconstruction, uncertainty, and observed events, EDHS 2000–2024/25.

EDHS	Official PRMR	Reconstructed PRMR	95% interval ¹	Observed PR deaths ²
2000	871	868.9	721.5–1,016.2	254
2005	673	672.5	547.6–797.4	165
2011	676	674.9	537.6–812.2	237
2016	412	411.8	277.6–546.0	131
2024–25	169	168.5	112.4–224.6	99

Note. PRMR is deaths per 100,000 live births. ¹Intervals accompany the independently reconstructed estimates and are reported as supplied in the workbook; the method notes describe 500 bootstrap replicate weights. ²Unweighted observed pregnancy-related sibling deaths are event counts, not denominators for the PRMR. Source:

CH08_02_PRN_NATIONAL_QUARTER_CENTURY_TRENDS_v1_0.xlsx, “Table 8.1 National Trend,” “Sibling Audit,” and “Method Notes.”

The official PRMR fell from 871 in 2000 to 169 in 2024–25, a reduction of 702 deaths per 100,000 live births, equivalent to 80.6% of the baseline level. The reconstructed ratios closely reproduce the

published figures: 868.9, 672.5, 674.9, 411.8, and 168.5. The workbook records every round as validated, with relative deviations from the official ratios below approximately 0.3%.

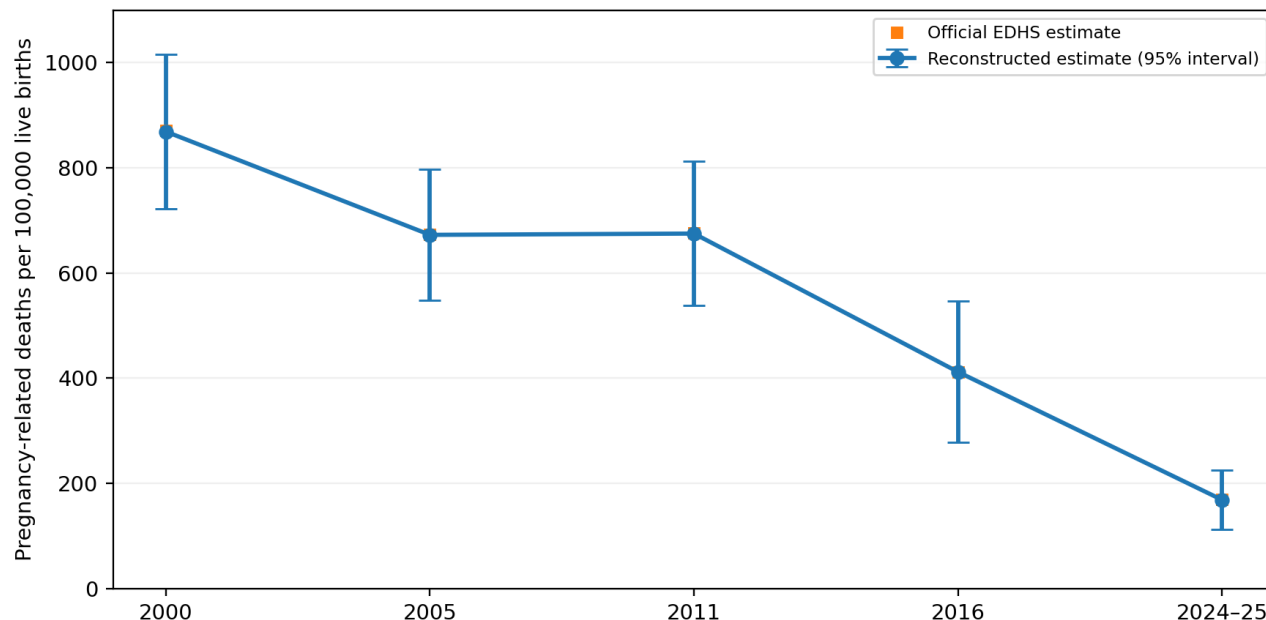


Figure 6.11.1. National pregnancy-related mortality ratio across five EDHS rounds, 2000–2024/25. Points show official survey estimates; the connected series and error bars show independently reconstructed estimates and their reported 95% uncertainty intervals. No projections are included.

6.12 Timing and magnitude of historical change

Table 6.12.1. Interval changes in the official national PRMR, EDHS 2000–2024/25.

Survey interval	Earlier	Later	Absolute change	Relative change
2000–2005	871	673	-198	-22.7%
2005–2011	673	676	+3	+0.4%
2011–2016	676	412	-264	-39.1%
2016–2024/25	412	169	-243	-59.0%

The largest absolute interval decline was between 2011 and 2016 (264 fewer deaths per 100,000 live births). The largest proportional interval decline was between 2016 and 2024–25 (59.0%). The 2005–2011 difference was only +3 deaths per 100,000 live births (+0.4%), a near-plateau at the level of point estimates. It should not be characterized as a statistically established increase: the uploaded workbook does not provide a formal covariance-aware test of differences between rounds.

6.13 Data quality, validation, and uncertainty

The sibling audit identifies 254, 165, 237, 131, and 99 observed pregnancy-related deaths in the five surveys, respectively. Unknown pregnancy status was recorded for 41 deaths in 2000, 11 in 2005, none in 2011, 29 in 2016, and none in 2024–25. The reconstruction deliberately did not proportionally allocate unknown-status deaths, because the upstream audit identified such allocation as a source of discrepancy. The reconstructed point estimates were compared with official national estimates and validated in all five rounds.

Although the trend is substantial, sibling histories remain vulnerable to recall, survival, reporting, and classification limitations. The intervals shown in Figure 6.11.1 reflect the supplied reconstruction; comparisons between separate survey rounds require attention to sampling design and the uncertainty of differences. Small observed event counts also make regional pregnancy-related mortality estimates unstable. Consequently, this part reports national PRMR only.

6.14 Adult mortality: what the evidence does and does not establish

The pregnancy-related mortality analysis provides evidence about deaths temporally associated with pregnancy among women of reproductive age. It does not, by itself, estimate all-cause adult mortality for women and men, adult probabilities of dying between exact ages, or national life expectancy. Those measures require separate, validated mortality exposures, age-specific deaths, or life-table inputs. No simulated adult mortality or life-expectancy numbers are carried into this manuscript.

The observed decline in PRMR should not be assumed to identify the contribution of any single intervention. Potential mechanisms include changing fertility exposure, antenatal and delivery care, postpartum services, emergency referral, and broader social change, but causal attribution requires distinct evidence.

6.15 Interpretation and public-health implications

The five-round evidence documents a pronounced long-run reduction in national pregnancy-related mortality, while the final estimate still represents preventable loss of life and the continuing need for reliable reproductive and emergency obstetric care. Priorities include timely recognition of complications, functioning referral and transport systems, respectful maternity services, postpartum follow-up, and high-quality mortality surveillance. Pregnancy-related and cause-specific maternal mortality should be monitored separately whenever the data permit.

The national-only analytical decision is substantive rather than merely presentational: it avoids portraying noisy regional rare-event estimates as precise differences. Future disaggregated analyses should proceed only with sufficient events, design-based uncertainty, and an explicit comparability audit.

PART IV. 6.16 Integrated synthesis: two dimensions of mortality transition

The quarter-century record documents substantial improvements in survival while revealing uneven progress across geography and across stages of life. In the certified historical regional under-five mortality panel, the national estimate fell from 187.81 deaths per 1,000 live births in 2000 to 52.51 in 2024–25: an absolute reduction of 135.30 and a relative reduction of 72.0%. These figures describe the common reconstructed historical series used in Part II; they should not be silently substituted for independently published official survey rates.

The national pregnancy-related mortality ratio (PRMR) in the survey-report series fell from 871 to 169 deaths per 100,000 live births between 2000 and 2024–25, a reduction of 702 (80.6%). The two indicators concern different populations, observation windows, ascertainment procedures, and denominators. Their parallel declines support an interpretation of broad survival improvement, not a claim that the same causal mechanisms or the same pace of progress applied to children and pregnant women.

Table 6.16.1. Two national mortality trajectories, 2000–2024/25

Indicator	2000	2024–25	Absolute change	Relative change
Under-five mortality (per 1,000 live births)	187.81	52.51	–135.30	–72.0%
Pregnancy-related mortality ratio (per 100,000 live births)	871	169	–702	–80.6%

Note. Under-five estimates derive from the certified 15-geography historical reconstruction used in Part II. PRMR values are official survey estimates reproduced in Part III. The two series should not be compared as if their units, event definitions, or reference periods were identical.

6.17 The geography of progress: convergence, persistence, and reversals

The region-by-region profiles in Part II provide a more informative description than a single national line. Every current region is plotted against the same independently calculated national series across five EDHS rounds. The plots permit comparison of starting levels, endpoint levels, absolute reductions, percentage reductions, and changes in the regional–national gap. They also reveal intervals in which a region’s observed mortality increased rather than declined.

A reduction in mortality does not necessarily imply convergence. A region may improve rapidly in percentage terms while remaining above the national benchmark, or achieve a large absolute reduction because its initial mortality was exceptionally high. Likewise, apparent crossings of

national and regional lines do not by themselves establish statistically significant differences. Regional estimates are correlated with the national estimate because the region contributes to the national survey; a valid inferential test requires the joint survey-design variance and covariance.

The four successor regions of the former Southern Nations, Nationalities, and Peoples' Region (SNNPR) are represented using certified historical reconstructions for all five survey rounds. This is distinct from the complementary exercise of reconstituting a single historical SNNPR from the four 2024–25 successor-region populations or microdata. Both directions of harmonization require appropriate denominators and weights; simple arithmetic averaging of mortality rates is not valid.

6.18 What the mortality data cannot establish about causes of death

Declining all-cause under-five mortality and pregnancy-related mortality cannot, by themselves, identify which diseases, injuries, or obstetric complications caused the observed changes. Full birth histories establish the timing of child deaths, not medically certified causes. Sibling-history pregnancy-related deaths are defined by temporal association with pregnancy and are not equivalent to deaths certified as caused or aggravated by pregnancy.

A substantive account of Ethiopia's epidemiological transition would require additional, independently documented sources: cause-of-death surveillance, civil registration and vital statistics, verbal autopsy, facility reporting, and appropriately identified modeled estimates. Such sources differ in coverage and estimation methods. Without a validated cause-specific series in the present analytical files, this chapter does not assign percentages of the mortality decline to infectious diseases, noncommunicable conditions, injuries, or specific obstetric causes.

Similarly, life expectancy and adult age-specific mortality cannot be inferred from the child-mortality and PRMR tables alone. The formulas presented in Part I are measurement tools, not substitutes for observed age-specific death rates or a defensible complete life table.

6.19 Mortality shocks, survey timing, and interpretation

A five-round survey series is not an annual mortality surveillance system. Each point reflects an estimation window, and comparisons across survey dates can conceal shorter-term shocks, displacement, interrupted services, epidemics, or recovery. The timing of reported deaths and births, survey fieldwork, recall periods, and geographic coverage must be considered before attributing a change to a particular event.

The regional profiles warrant particular care when a sharp interval change is observed. A large apparent increase or decrease can reflect genuine mortality change, sampling variability, shifting geographic composition, or measurement effects. The certified panel establishes that the included values passed the documented historical input gates; it does not, by itself, establish causal attribution or statistical significance of every interval contrast.

6.20 Data quality, triangulation, and limits of inference

Historical reconstruction and geographic comparability

The Part II diagnostic workbook records 75 of 75 certified historical cells: 15 geographies (national plus 14 current regions) across five EDHS rounds. Certification is a record of completeness and predefined consistency checks, not a guarantee that every estimated regional difference is precise or that all geographic assignments are beyond challenge. The regional histories should remain traceable to the underlying harmonization rules and survey microdata.

Uncertainty and dependence

A 2024–25 standard-error field is available in the historical diagnostic workbook, but the complete design-based covariance required for region–national difference testing is not. Accordingly, regional gaps in the figures are descriptive. For pregnancy-related mortality, observed death counts are limited and the estimates depend on sibling histories; confidence intervals and differences between successive surveys must be interpreted with particular restraint.

Distinct evidence streams

The under-five mortality reconstruction, published survey PRMR estimates, and independent PRMR reconstruction should retain separate provenance labels. Agreement between independently calculated and official figures strengthens confidence; disagreement calls for examination of denominators, reference periods, weights, and computation methods rather than automatic selection of whichever estimate appears preferable.

Evidence not included

No projected mortality estimates are presented. The chapter also excludes simulated adult mortality rates, unsupported life expectancy series, and unverified cause-of-death distributions. Where a numerical result is not certified, the appropriate response is to identify the evidence gap rather than fill it with an illustrative value.

6.21 Public-health implications and conclusion

The national declines establish the importance of sustained survival gains, but the regional patterns argue against a uniform response. Monitoring should retain neonatal, infant, and under-five mortality as distinct indicators; pair national progress with each region’s trajectory; and assess the reliability of observed changes before assigning priorities. Maternal and reproductive-health systems should monitor pregnancy-related mortality alongside the continuum of antenatal, delivery, emergency obstetric, and postnatal care, while recognizing that the PRMR does not measure cause-specific maternal deaths.

The next empirical priorities are transparent regional sample-size and death-event audits, design-based uncertainty for regional–national contrasts, careful comparison with independent mortality systems, and validated cause-specific and adult mortality evidence. These are extensions of the historical analysis, not grounds for importing forecasts into a chapter whose endpoint is 2024–25.

Ethiopia's mortality transition is therefore best understood as a major but geographically uneven improvement in survival. Its scientific significance lies not only in how far mortality fell, but also in identifying whose survival improved, where the gaps persisted, and which claims the available evidence can—and cannot—support.

Discussion

6.22 Interpretation of the quarter-century mortality transition

The central finding of this chapter is that Ethiopia experienced a substantial reduction in mortality over the first quarter of the twenty-first century, but the scale of national improvement was not replicated uniformly across the country. In the certified historical under-five mortality series, the national estimate declined from 187.81 deaths per 1,000 live births in 2000 to 52.51 in 2024–25, a 72.0% reduction. The national pregnancy-related mortality ratio (PRMR) declined from 871 to 169 deaths per 100,000 live births, an 80.6% reduction. These are two separate empirical achievements, not two measurements of the same process. Under-five mortality is derived from children's birth and survival histories, whereas the PRMR is based on sibling survival histories and deaths temporally associated with pregnancy (Croft et al., 2018; World Health Organization [WHO] et al., 2025).

The overall direction accords with the broader evidence of major improvements in child survival in sub-Saharan Africa and globally. The United Nations Inter-agency Group for Child Mortality Estimation (UN IGME, 2026) documents long-run declines alongside a recent slowing of progress and continued concentration of mortality in settings with limited access to effective care.

Nevertheless, the reconstructed EDHS series reported here should not be treated as numerically interchangeable with UN IGME model-based annual estimates or with other studies using different retrospective windows. A valid comparison must first align outcome definitions, calendar periods, geography, and estimation methods (Croft et al., 2018; UN IGME, 2026).

6.23 National improvement and the persistence of regional inequality

The regional results complicate any simple narrative of uniform convergence. By 2024–25, reconstructed under-five mortality ranged from 27.13 per 1,000 live births in Addis Ababa to 78.04 in Afar, nearly a threefold difference. Benishangul-Gumuz (71.55), Harari (71.03), and Tigray (65.84) also stood above the national level of 52.51, whereas Central Ethiopia (36.50), Gambella (39.66), and Amhara (42.27) stood below it. These comparisons identify descriptive differences in the certified historical panel; they do not establish the statistical significance of region–national contrasts.

Several trajectories merit distinct interpretations. Tigray's reconstructed rate fell from 169.02 in 2000 to 58.63 in 2016, then increased to 65.84 in 2024–25. Benishangul-Gumuz remained comparatively elevated at the endpoint despite a substantial long-run decline from 197.72 to 71.55. Afar began at 229.25 and ended at 78.04, showing both major improvement and a persistently high

endpoint. Conversely, Gambella fell from 233.13 to 39.66, among the largest absolute reductions in the panel. These patterns argue for examining initial conditions, final levels, and interval reversals together, rather than ranking regions on a single percentage-change statistic.

The finding of spatial heterogeneity is consistent in direction with earlier EDHS-based geospatial research. Atalell and Alene (2023) found substantial regional and local variation in under-five mortality in Ethiopia through 2019, with associations involving environmental and access-related factors. Their model-based estimates are not directly comparable with this chapter's certified reconstruction, but their work strengthens the rationale for spatially differentiated analysis rather than exclusive reliance on national means. Similarly, UN IGME (2026) emphasizes that location, household resources, and health-service access remain central dimensions of unequal child survival.

6.24 What the four successor regions reveal about geographic comparability

A particular contribution of the chapter is its use of a consistent 14-region geography across all five survey rounds, including historical reconstructions for Central Ethiopia, Sidama, South Ethiopia, and South West Ethiopia. Without such harmonization, a comparison of current regions against the former unified Southern Nations, Nationalities, and Peoples' Region would confuse administrative boundary change with mortality change. The method allows the chapter to ask how the populations corresponding to today's regions changed over time, rather than comparing unlike territorial units.

The reconstructed series also demonstrates that the four successor regions cannot be represented adequately by a single historical SNNPR average. Their 2000 values ranged from 175.24 in Sidama to 220.58 in South West Ethiopia; by 2024–25, they ranged from 36.50 in Central Ethiopia to 56.51 in South Ethiopia. These are different historical pathways within an area formerly summarized under one regional label. As explained in the Methodological Preface, reconstructing a unified SNNPR for historical comparison and reconstructing today's four successor regions backward in time answer different questions. Neither operation is justified by simply averaging published mortality ratios.

6.25 Interpreting the pregnancy-related mortality decline

The national PRMR trajectory—871, 673, 676, 412, and 169 per 100,000 live births across the five survey rounds—indicates pronounced long-run improvement. The near equality of the 2005 and 2011 estimates, however, should not be presented as evidence of either a meaningful reversal or a statistically established plateau without an explicit design-based comparison. Moreover, the underlying sibling-history death counts were 254, 165, 237, 131, and 99 across successive rounds. These observed event counts help explain why interval estimates and uncertainty deserve prominence even when the broad long-run decline is compelling (Croft et al., 2018).

The distinction between pregnancy-related and maternal mortality is essential. Pregnancy-related mortality includes deaths during pregnancy or the specified postpartum period irrespective of cause, whereas maternal mortality excludes accidental or incidental causes. The WHO-led

interagency maternal mortality series employs internationally harmonized definitions and modeling procedures; it cannot be directly substituted for this chapter's survey-based PRMR (WHO et al., 2025). Consequently, the latest PRMR of 169 must not be interpreted as a verified maternal mortality ratio or used without qualification to assess attainment of the Sustainable Development Goal maternal mortality target.

The parallel improvements in child and pregnancy-related survival are compatible with the potential contributions of expanded primary health care, immunization, improved nutrition, reproductive-health services, and obstetric care. But this chapter does not estimate the contribution of each intervention, nor does it establish causal effects from five observational survey rounds. International evidence supports the importance of quality maternal and newborn care, but causal attribution in Ethiopia would require linked service-delivery, exposure, and mortality analyses with explicit identification assumptions (UN IGME, 2026; WHO et al., 2025).

6.26 The life-course interpretation and the limits of an epidemiological-transition claim

Mortality change is best understood across the life course. Declines in under-five mortality indicate improvements in survival from birth through age four; declines in pregnancy-related mortality indicate changes in risk during women's reproductive years. Neither series, by itself, establishes a complete adult mortality transition, changes in life expectancy, or a shift in the distribution of causes of death. The full birth histories and sibling histories underlying DHS estimates were not designed to provide medically certified causes of death for all reported events (Croft et al., 2018).

An epidemiological-transition interpretation is therefore appropriate as a hypothesis to be examined with complementary evidence, not as a measured decomposition of the trends presented here. The contemporary UN IGME report provides internationally modeled cause-specific estimates and describes persistent infectious causes, neonatal conditions, and emerging relative importance of other causes as survival improves (UN IGME, 2026). Those findings supply context; they are not direct estimates of Ethiopia's cause-of-death composition in the certified chapter dataset. Cause-specific mortality analysis would require separate validation of verbal autopsy, civil registration, facility data, or appropriately documented modeled series.

6.27 Mortality shocks, survey periods, and the danger of overinterpretation

The observed increase in Tigray's reconstructed under-five mortality between 2016 and 2024–25 is epidemiologically important, particularly given the region's experience of conflict and health-system disruption. Yet the two survey values alone do not identify the magnitude attributable to conflict, the timing of excess deaths, or the counterfactual trajectory in the absence of disruption. A DHS mortality estimate aggregates events over a defined retrospective period; the survey label is not the date of every death contributing to the estimate (Croft et al., 2018). Interpretation requires scrutiny of fieldwork coverage, displacement, recall, sample composition, and contemporaneous independent evidence.

More generally, the five-round record is not an annual surveillance series. The temporal distance between observations and the possible overlap of retrospective windows mean that apparently abrupt changes should be described as differences between period estimates. International child-mortality monitoring likewise stresses data gaps and the need to distinguish direct survey observations from harmonized modeled time series (UN IGME, 2026).

6.28 Methodological strengths and limitations

Three features strengthen the present analysis. First, the historical child-mortality panel is complete for the national level and 14 present-day regions over five EDHS rounds, with 75 of 75 cells passing the recorded input-certification checks. Second, the analysis distinguishes absolute changes, relative changes, and regional–national gaps rather than collapsing them into a single rank. Third, the pregnancy-related mortality reconstruction closely reproduces official survey values, providing an important independent validation of the national series. These checks improve transparency and reproducibility, although certification of input cells is not equivalent to a formal audit of every source of survey error.

Important limitations remain. Region–national comparisons share observations and are therefore statistically dependent; the available historical diagnostic workbook does not contain the full design-based covariance required for significance testing. The pregnancy-related mortality analysis is constrained by relatively few observed events and by potential recall and reporting errors in sibling histories. Retrospective windows differ from single-year measures; geographic reassignment of historical records can introduce classification uncertainty; and mortality indicators alone cannot identify underlying causes or intervention effects. Finally, no certified adult mortality or cause-specific mortality series was available for inclusion, so such estimates were not manufactured or inferred from unrelated indicators (Croft et al., 2018; WHO et al., 2025).

6.29 Implications for public health and future measurement

The principal policy implication is that national gains and geographic equity must be monitored simultaneously. Regions with high current mortality require attention even if they achieved large historical percentage reductions, while regions with apparent reversals merit targeted verification and investigation. The next analytical step should be to estimate survey-design-consistent uncertainty for regional trends, report births, exposure and death-event counts alongside estimates, and examine regional–national contrasts using their covariance. A second priority is to triangulate mortality with independently validated service-coverage and health-system measures, including skilled birth attendance, emergency obstetric care, vaccination, nutrition, and timely referral. These are priorities for empirical investigation, not claims that any single service caused the observed declines.

Stronger routine civil registration, vital statistics, and cause-of-death ascertainment would also improve the capacity to detect shocks and explain changes between household surveys. WHO et al. (2025) highlight the importance of comparable maternal mortality measurement, while UN IGME (2026) underscores persistent child mortality data gaps. For Ethiopia, integrating these systems

with rigorously analyzed EDHS histories would move mortality monitoring from episodic description toward more timely and actionable population-health intelligence.

6.30 Conclusion

Over a quarter-century, Ethiopia achieved profound reductions in under-five and pregnancy-related mortality, yet the geography of survival remained unequal and some regional trajectories did not improve monotonically. The chapter's contribution lies in reconstructing comparable historical regional geographies, validating the national pregnancy-related mortality series, and distinguishing what the observed data demonstrate from what remains inferential. Sustained progress will require not only further reductions in national mortality, but also credible measurement of regional disparities, rapid detection of reversals, and evidence-based responses tailored to the populations and places still facing the greatest risks.

References

- Atalell, K. A., & Alene, K. A. (2023). Spatiotemporal distributions of under-five mortality in Ethiopia between 2000 and 2019. *PLOS Global Public Health*, 3(3), e0001504. <https://doi.org/10.1371/journal.pgph.0001504>
- Croft, T. N., Marshall, A. M. J., & Allen, C. K. (2018). Guide to DHS statistics: DHS-7. ICF. https://dhsprogram.com/pubs/pdf/DHSG1/Guide_to_DHS_Statistics_DHS-7.pdf
- Preston, S. H., Heuveline, P., & Guillot, M. (2001). *Demography: Measuring and modeling population processes*. Blackwell Publishers.
- United Nations Inter-agency Group for Child Mortality Estimation. (2024). Levels & trends in child mortality: Report 2024. United Nations Children's Fund. <https://childmortality.org/>
- United Nations Inter-agency Group for Child Mortality Estimation. (2026). Levels & trends in child mortality: Report 2025. United Nations Children's Fund. <https://data.unicef.org/resources/levels-and-trends-in-child-mortality-2025/>
- World Health Organization, United Nations Children's Fund, United Nations Population Fund, World Bank Group, & United Nations Department of Economic and Social Affairs, Population Division. (2023). Trends in maternal mortality 2000 to 2020: Estimates by WHO, UNICEF, UNFPA, World Bank Group and UNDESA/Population Division. World Health Organization. <https://www.who.int/publications/i/item/9789240068759>
- World Health Organization, United Nations Children's Fund, United Nations Population Fund, World Bank Group, & United Nations Department of Economic and Social Affairs, Population Division. (2025). Trends in maternal mortality 2000 to 2023: Estimates by WHO,

UNICEF, UNFPA, World Bank Group and UNDESA/Population Division. World Health Organization. <https://www.who.int/publications/i/item/9789240108462>