Facility Death Analysis Report of Bangladesh

5-year analysis 2019-2023

— Dhaka, Bangladesh, 2024

Table of Contents

Acronyms

Acronym	Full Form
ANACOD	Analyzing Causes of Death
BBS	Bangladesh Bureau of Statistics
CDR	Crude Death Rate
COPD	Chronic Obstructive Pulmonary Disease
COVID-19	Coronavirus Disease 2019
CRVS	Civil Registration and Vital Statistics
DGHS	Directorate General of Health Services
DHIS2	District Health Information System 2
GBD	Global Burden of Disease
ICD-10	International Classification of Diseases, 10th Revision
ICD-11	International Classification of Diseases, 11th Revision
MCCD	Medical Certificate of Cause of Death
MOHFW	Ministry of Health and Family Welfare
NCD	Non-Communicable Disease
NGO	Non-Governmental Organization
NMTWG	National Mortality Technical Working Group
SDG	Sustainable Development Goal
SMoL-ICD-10	StartMortality List - International Classification of Diseases, 10th Revision
SVRS	Sample Vital Registration System
VA	Verbal Autopsy
WHO	World Health Organization

Glossary

Term	Definition
Advanced Age	Population aged 75 years and above, representing the oldest demographic group in mortality analysis.
Birth Asphyxia	A medical condition resulting from deprivation of oxygen to a newborn infant that lasts long enough during the birth process to cause physical harm.
Cardiovascular Diseases	A class of diseases that involve the heart or blood vessels, including ischemic heart disease, cerebrovascular disease, and hypertensive heart disease.
Cause of Death	The disease, injury, or abnormality that initiated the sequence of events leading directly to death, as determined through medical certification.
Cerebrovascular Disease	A group of conditions affecting blood flow and blood vessels in the brain, commonly known as stroke.
Crude Death Rate	The number of deaths per 1,000 individuals in a population during a specified time period, usually one year.

Data Quality	The degree to which mortality data meets requirements for accuracy, completeness, consistency, and reliability for health planning purposes.
Epidemiological Transition	The shift in disease patterns from predominantly infectious diseases to non-communicable diseases as the primary causes of mortality in a population.
Facility-based Deaths	Deaths that occur within formal healthcare facilities such as hospitals, clinics, or health centers with medical attendance.
Global Burden of Disease (GBD) Classification	An international framework that categorizes diseases into three groups: Group 1 (communicable, maternal, perinatal, and nutritional conditions), Group 2 (non-communicable diseases), and Group 3 (injuries).
Group 1 Conditions	Communicable diseases, maternal conditions, perinatal conditions, and nutritional deficiencies that primarily affect populations in early stages of epidemiological transition.
Group 2 Conditions	Non-communicable diseases including cardiovascular diseases, cancers, diabetes, and chronic respiratory diseases.
Group 3 Conditions	Injuries from external causes including accidents, violence, and self-harm.
Hypertensive Disorders of Pregnancy	A group of conditions characterized by high blood pressure during pregnancy, including preeclampsia and eclampsia, representing a leading cause of maternal mortality.
ICD Mortality Coding	The systematic process of assigning standardized codes from the International Classification of Diseases to causes of death for statistical and comparative purposes.
Ill-defined Causes	Deaths for which the underlying cause cannot be determined with sufficient specificity, often indicating limitations in diagnostic capabilities or certification practices.
Invalid ICD Codes	Codes that do not conform to proper ICD classification standards or are inappropriately used for underlying cause of death reporting.
Ischemic Heart Disease	A condition characterized by reduced blood supply to the heart muscle due to coronary artery disease, representing the leading cause of death globally.
Maternal Death	The death of a woman while pregnant or within 42 days of termination of pregnancy from any cause related to or aggravated by pregnancy or its management.

Medical Certificate of Cause of Death (MCCD)	A standardized document completed by qualified medical practitioners to record the cause of death according to international guidelines for vital statistics.
Neonatal Period	The first 28 days of life, representing a critical period with specific mortality risks related to birth complications and congenital conditions.
Non-communicable Diseases (NCDs)	Chronic diseases that are not transmissible between individuals, including cardiovascular diseases, cancers, diabetes, and chronic respiratory diseases.
Perinatal Conditions	Medical conditions occurring during the period from 22 weeks of gestation through the first seven days after birth.
Prematurity	Birth before 37 weeks of gestation, associated with increased risk of neonatal mortality and long-term health complications.
Proportional Mortality	The percentage of total deaths attributable to specific causes within a population during a defined time period.
Under-5 Mortality	Deaths occurring in children under five years of age, serving as a key indicator of population health and healthcare system effectiveness.
Underlying Cause of Death	The disease or injury that initiated the train of morbid events leading directly to death, as distinct from immediate or contributing causes.

Foreword

The Medical Certificate of Cause of Death (MCCD) system has transformed Bangladesh's capacity to understand mortality patterns within health facilities. Since its pilot implementation in January 2017 with four hospitals, the system has expanded to 532 government hospitals and 62 private hospitals by March 2023, representing a significant advancement in health information infrastructure.

This analysis of facility-based mortality data from 2019-2023 reveals Bangladesh in epidemiological transition. Non-communicable diseases, particularly cardiovascular conditions, now dominate facility deaths while maternal and child health challenges persist. This dual burden requires balanced health system responses addressing both traditional and emerging health priorities.

The data demonstrate substantial progress in mortality surveillance while highlighting areas for improvement. Gender disparities in facility death reporting and data quality challenges underscore the need for continued system strengthening and expanded access to healthcare services.

These findings will inform evidence-based health policy development, resource allocation decisions, and progress toward national health goals and Sustainable Development Goal commitments. The foundation established positions Bangladesh to address its evolving health challenges through improved data collection and targeted interventions.

Acknowledgement

The Management Information System (MIS) of the Directorate General of Health Services (DGHS) extends its sincere appreciation to all stakeholders who contributed to the successful implementation and expansion of the MCC) system in Bangladesh and the preparation of this comprehensive mortality analysis.

We acknowledge the dedicated efforts of healthcare professionals across all hospitals who have embraced the MCCD system and consistently provided quality mortality data. Their commitment to accurate cause-of-death certification has been fundamental to the success of this initiative.

The MIS-DGHS acknowledges the valuable technical and analytical support provided by our development partners, including Bloomberg Philanthropies Data for Health (D4H) Initiative, Vital Strategies, UNICEF, and WHO. Their contributions have strengthened our capacity for data analysis and quality assurance.

This analysis represents a collective achievement in strengthening Bangladesh's health information systems and will serve as a foundation for evidence-based health policy development and improved health outcomes for our population.

Executive Summary

This report presents a comprehensive analysis of facility-based cause-of-death data in Bangladesh from 2019-2023, providing critical insights for health policy and planning. The data, collected through the Medical Certificate of Cause of Death (MCCD) system, shows significant progress in recording death at health facilities and capturing cause of death data, increasing from 8.12% in 2019 to 16.21% of all expected deaths in 2023, while highlighting several important mortality patterns:

- **Rising Data Coverage**: MCCD reporting has increased by 159% over five years, though gender disparities persist with consistently lower reporting for females.
- **Noncommunicable Disease Burden**: NCDs account for over 55% of reported deaths and exceed 60% in non-COVID years, indicating Bangladesh's late epidemiological transition.
- **Cardiovascular Diseases**: Ischemic heart disease and cerebrovascular disease consistently rank among the top causes of death, particularly affecting adults over 40 years.
- **Childhood Mortality**: 18% of all reported deaths occur in children under five, with perinatal conditions being the primary cause, indicating the need for targeted maternal and child health interventions.
- **Maternal Health**: While the proportion of maternal deaths has declined slightly, hypertensive disorders and hemorrhage remain significant challenges, alongside data quality issues.
- **Data Quality Concerns**: The high proportion of deaths classified under "other" categories and "ill-defined causes" highlights the need for improved cause of death certification and coding.

These findings underscore the importance of a dual approach to health planning: strengthening efforts to address the growing NCD burden while maintaining focus on maternal and child health priorities. Improving data quality is essential for effective health policy development and resource allocation.

Chapter 1: Introduction

Accurate and up-to-date mortality statistics are essential for informed health policy, effective resource allocation, and monitoring progress toward national and global health goals. The Medical Certificate of Cause of Death (MCCD) system in Bangladesh represents a significant advancement in health data collection, providing standardized reporting aligned with international norms.

Periodic analysis of mortality data serves multiple critical purposes:

- Informing evidence-based health and social policy development
- Monitoring progress toward Sustainable Development Goals (SDGs)
- Tracking disease and injury trends over time
- Evaluating the effectiveness of health interventions and policies

The optimal source of cause of death data is a functioning civil registration and vital statistics (CRVS) system that registers all deaths and assigns medically certified underlying causes of death. In Bangladesh, MCCD documents deaths occurring in health facilities, while verbal autopsy (VA) methodology is used for community deaths. This report focuses exclusively on facility-based mortality documented through the MCCD system.

MCCD in Bangladesh was introduced through a pilot program in January 2017, under the supervision of the National Mortality Technical Working Group (NMTWG) and the Civil Registration and Vital Statistics (CRVS) Secretariat at the Cabinet Division. The program has expanded from an initial four hospitals to currently (March 2023) include 532 government hospitals and 62 private hospitals nationwide.

The system employs a local adaptation of the WHO-recommended international MCCD form (see Annex 1) and the SMoL-ICD-10 coding standard with data collection in DHIS2. The use of these standards enhances data accuracy and enables meaningful comparison with international mortality statistics. Based on these advances, Bangladesh has started to report cause of death data to WHO.

To ensure sustainable application of the standards, teaching of MCCD practices has been integrated into the medical school curricula issued by the Bangladesh Medical and Dental Council to ensure sustainability and quality.

Chapter 2: Objectives and Methods

Objectives

This analysis aims to understand the pattern of hospital deaths in Bangladesh that have an MCCD based on:

1. Age group distribution
2. Gender differences
3. Under-5 mortality
4. Maternal death patterns
5. Causes of death based on ICD-10 classification
6. Noncommunicable disease burden

Methods

The analysis utilizes data from the MCCD system implemented across Bangladesh's health facilities. Data were extracted for the period of 2019-2023 and analyzed using the WHO Analyzing Causes of Death (ANACoD3) methodology, which follows the International Classification of Diseases, 10th Revision (ICD-10).

Data processing included:

- Classification of causes according to the WHO Global Burden of Disease (GBD) list
- Redistribution of deaths with unknown or ill-defined causes through ANACOD 3
- Age-sex standardization though ANACOD 3
- Calculation of proportional mortality ratios

This methodology allows for standardized analysis and interpretation, facilitating comparison with international patterns and trends.

Data Completeness and Representativeness

The steady rise in MCCD coverage from 8.12% in 2019 to 16.21% of all expected deaths in 2023 highlights significant progress, nearly doubling in just four years and demonstrating growing adoption and awareness of medical certification of cause of death practices in Bangladesh (see Table 1).

Table 2.1: Total population and deaths as per the SVRS, 2023 report

Year	CDR	Population	Expected deaths	Deaths with MCCD	MCCD Completeness
2019	4.9	165,880,000	812,812	66,025	8.12%
2020	5.1	168,080,000	857,208	82,866	9.67%
2021	5.7	170,070,000	969,399	115,164	11.88%
2022	5.8	171,740,000	996,092	141,870	14.24%
2023	6.1	172,920,000	1,054,812	171,010	16.21%

Bangladesh Bureau of Statistics, DHIS2

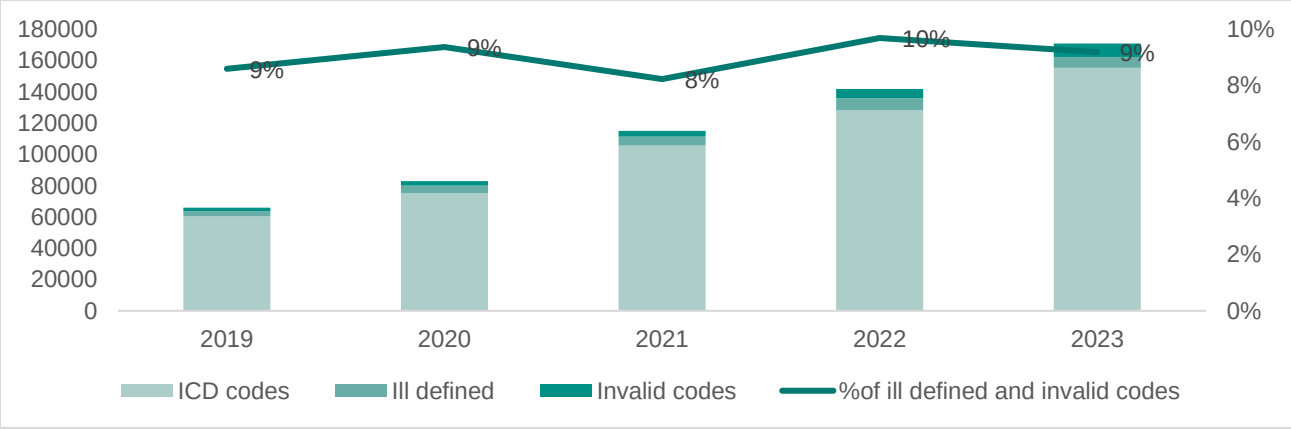
The data quality analysis reveals important insights into the robustness of mortality data collection in Bangladesh and highlights several critical areas for improvement. Data was cleaned and errors revised whenever possible.

1. **Data cleaning impact**: The data cleaning process resulted in significant improvements, reducing the overall percentage of errors from 13% in the raw data to 10% in the cleaned dataset. This demonstrates the value of systematic quality control procedures in managing mortality data. Though the data cleaning of all columns with age was revised and merged to complete as many records as possible, where sex was missing but had a cause of death related to a specific sex, sex was assigned; there were records that had a specific case of death but weren't coded, and an ICD code was assigned. Finally, the deaths of women of reproductive age with neonatal causes of death were recoded, as well as neonatal deaths with an obstetric cause of death.
2. **Persistent coding challenges**: Despite data cleaning efforts, approximately 9% of all reported deaths remained classified with either ill-defined causes or invalid ICD codes throughout the five-year period. This consistent proportion suggests that while the MCCD system has expanded its coverage, fundamental challenges in

accurate medical certification of cause-of-death by physicians and ICD mortality coding by the DHIS2 data entry staff persist.

3. **Sex and age coding improvements**: The data cleaning process was particularly effective in addressing sex-specific invalid codes, reducing these from 2,563 cases to just 14 cases across the five-year period. Similarly, age-specific invalid codes decreased from 8,583 to 1,474 cases. This demonstrates that demographic information can be validated and corrected with relatively high success rates.
4. **Trend in error rates**: Before cleaning, there was a concerning upward trend in error percentages from 11% in 2019 to 15% in 2023, suggesting deteriorating data quality as the system expanded. However, after cleaning, this trend was mitigated, maintaining a more stable 9-11% error rate. This indicates that routine and potentially even automated, quality assurance processes are essential as the system scales up.
5. **Inappropriate coding practices**: "Codes not to be used for underlying cause of death" showed minimal improvement after cleaning (32,469 to 33,121 cases), representing a persistent challenge. This suggests that ICD coders are not applying the mortality codes correctly when recording the underlying cause of death.
6. **Invalid vs. Ill-defined causes**: After cleaning, deaths with invalid codes were reduced more substantially (from 29,309 to 23,538) than ill-defined causes (from 28,581 to 28,844). This suggests that technical coding errors are more amenable to correction than the fundamental issue of non-specific cause-of-death determination by clinicians.

Fig, 2.1 Distribution of Ill-defined causes of death



Chapter 3: Key Findings

3.1 Overall Mortality Trends

Between 2019 and 2023, Bangladesh captured 576,935 medically certified deaths in health facilities, with reporting steadily increasing by 159% over these five years. This increase mainly reflects improved reporting systems, with more hospitals and facilities reporting MCCD (Annex 2)

Fig. 3.1.1 Number of deaths by sex 2019-2023 ANACOD 3

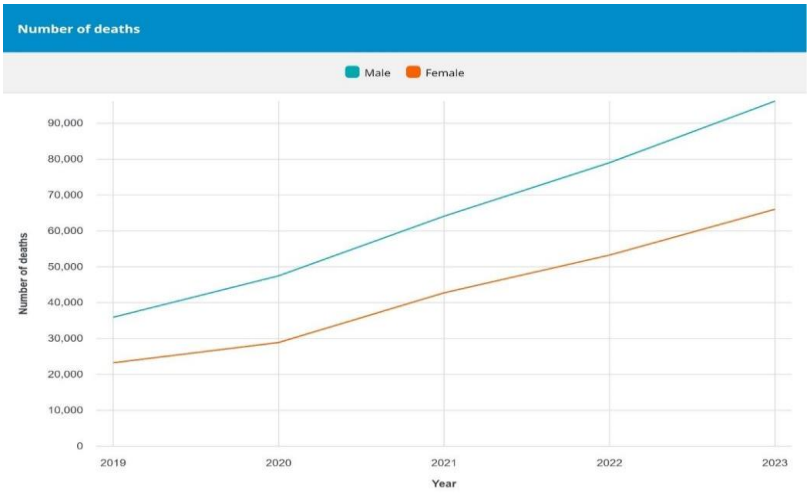


Fig 3.1.2 Number of deaths per GBD group 2019-2023

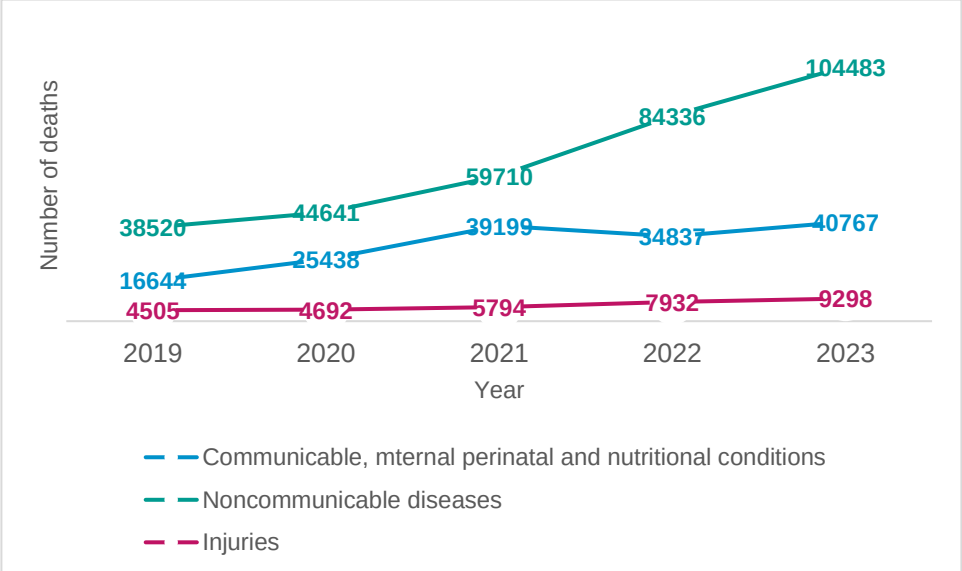
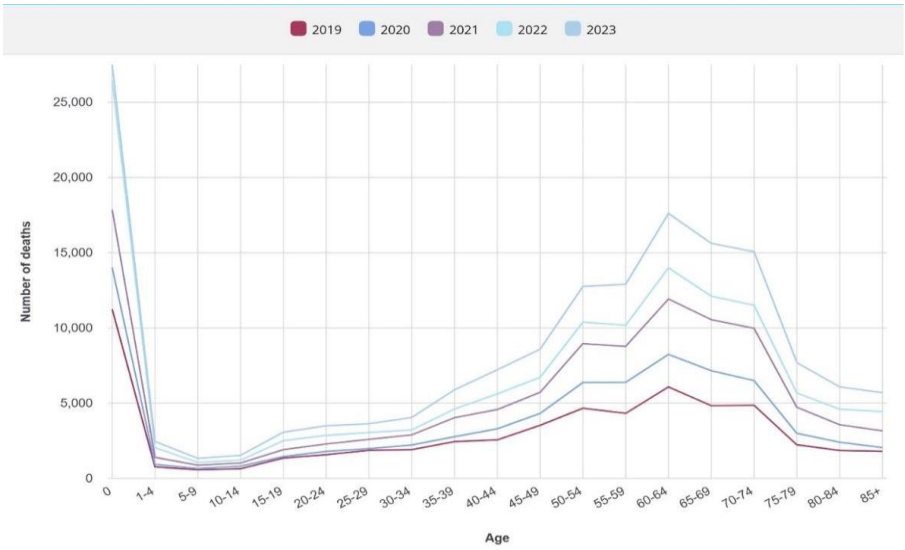


Fig 2.1.3 Number of deaths per 5-year age groups 2019-2023



3.2 Age and Sex Distribution

The age distribution of deaths in health facilities across Bangladesh has maintained a consistent pattern from 2019 to 2023, reflecting a mix of trends typical of lower- and lower-middle-income countries:

- **Early Childhood**: Child mortality is notably high, with the largest proportion of deaths occurring in the 0-4 age group, aligning with patterns shown in ANACOD3 for lower-middle-income countries where infant deaths typically constitute 10-20% of total mortality.
- **Middle Age**: A steady increase in mortality is observed from age 40 onward, with significant burdens in the 50-74 age range.
- **Advanced Age**: The sharp decline in deaths among those over 75 is more characteristic of lower-income countries, contrasting with the steadier patterns in middle-income countries where a greater proportion of the population reaches advanced age.

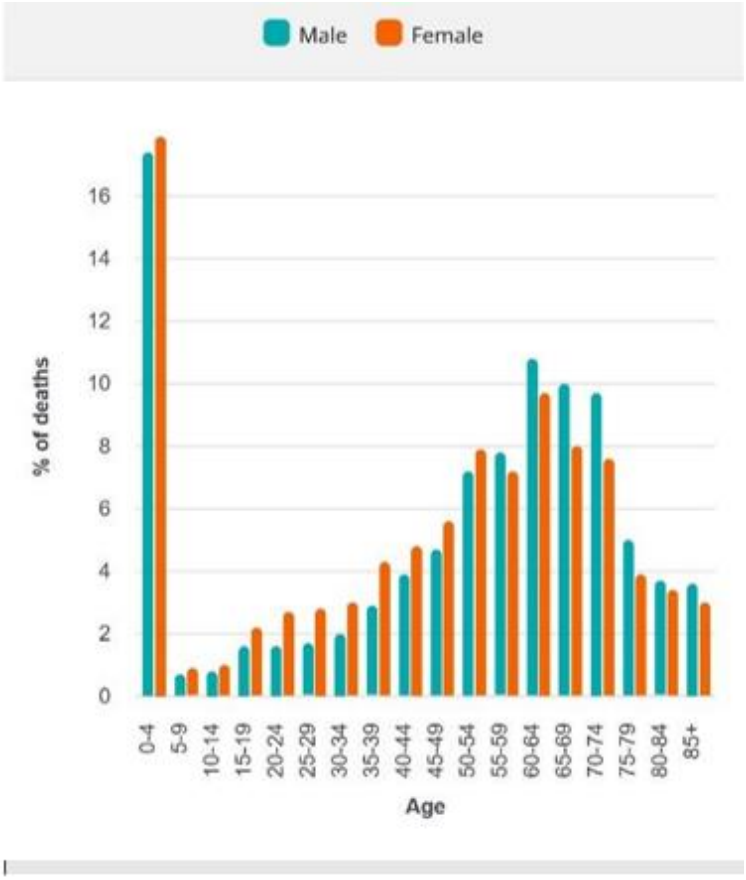
Gender patterns reveal important differences from global norms:

In most countries, male and female mortality rates are similar in childhood, with male deaths exceeding female deaths in adulthood until very advanced ages. In Bangladesh, however:

- More female deaths are reported in childhood and early adulthood
- Male deaths only exceed female deaths after age 65

This reversed pattern raises important questions about female health and access to healthcare and the likely preventable causes of the higher female mortality in the lower ages needs further investigation (e.g., looking at issues of maternal mortality). This data also suggests that there are potential barriers that result in older-age women dying outside healthcare facilities or without proper medical certification of cause of death.

Fig. 3.2.1 Percentage of deaths by age group 2019-2023 ANACOD 3



*Deaths of unknown age redistributed by ANACOD 3

Gender disparities remain pronounced in death registration:

- Males account for 60% of reported deaths (345,621 cases)
- Females represent 39% of reported deaths (227,490 cases)
- Unknown sex cases comprise 1% (3,824 cases)

This gender imbalance has remained relatively stable throughout the analysis period, suggesting potential differences in healthcare access, utilization patterns, or reporting practices that warrant further investigation.

The age distribution shows significant burdens at both ends of the life spectrum:

- 17% of deaths occur in infants under 1 year (97,383 cases)
- 1% in children aged 1-4 years (7,636 cases)
- 10% in adults aged 60-64 years (57,968 cases)
- 9% in adults aged 65-69 years (50,409 cases)

The data indicate a pattern transitional between lower and middle-income countries, with substantial early-life mortality alongside a growing burden of deaths in older age groups.

3.3 Causes of Death (WHO-GBD Classification)

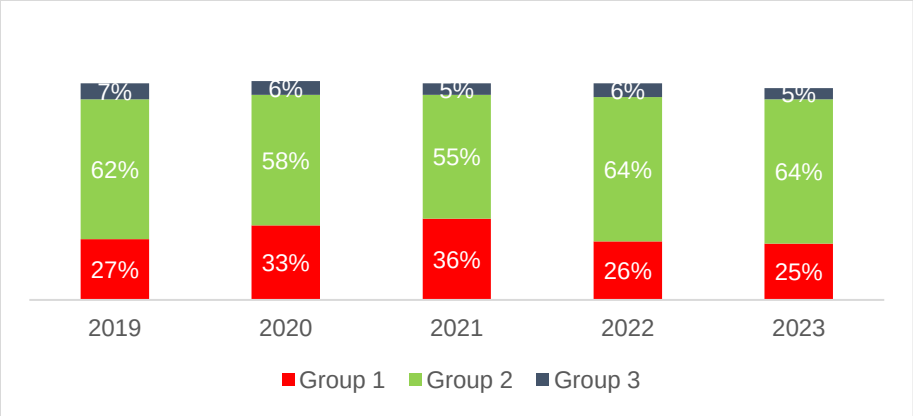
All causes of death recorded with an ICD-10 code are categorized according to the WHO Global Burden of Disease (GBD) list into three main groups:

1. **Group 1**: Communicable, maternal, perinatal, and nutritional conditions (27% of deaths)
2. **Group 2**: Noncommunicable diseases (57% of deaths)
3. **Group 3**: Injuries (6% of deaths)

The remaining 9% of deaths fall under ill-defined causes (5%) or invalid ICD codes (4%).

The major burden in Bangladesh over the five-year period is from noncommunicable diseases, which account for more than 55% of deaths each year and exceed 60% in non-COVID years (2019, 2022, 2023). The ratio of Group 2 to Group 1 deaths has increased from 2.3 in 2019 to 2.6 in 2023, indicating a strengthening epidemiological transition.

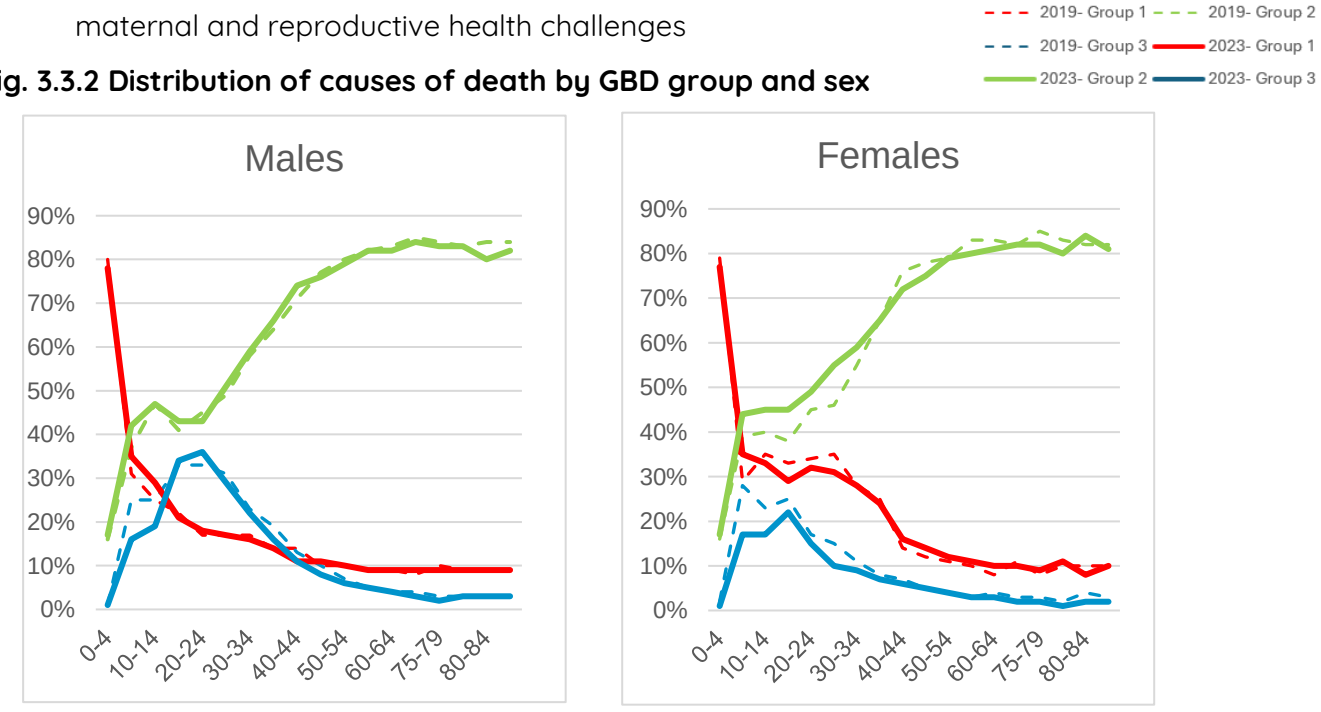
Fig 3.3.1 Distribution of major causes of death in health facilities, Bangladesh, 2019-2023



Age-specific patterns show distinctive distributions:

- **Early Childhood**: Group 1 conditions dominate mortality under age 5
- **Young Adults**: Group 3 (injuries) peaks between ages 5-25, reaching 40% in males and 20% in females
- **Adults 25+**: Group 2 accounts for over 50% of deaths, steadily increasing to more than 80% in advanced age
- **Reproductive Age Women (15-49 years)**: Group 1 still represents over 30% of deaths compared to less than 20% in males of the same age, highlighting persistent maternal and reproductive health challenges

Fig. 3.3.2 Distribution of causes of death by GBD group and sex

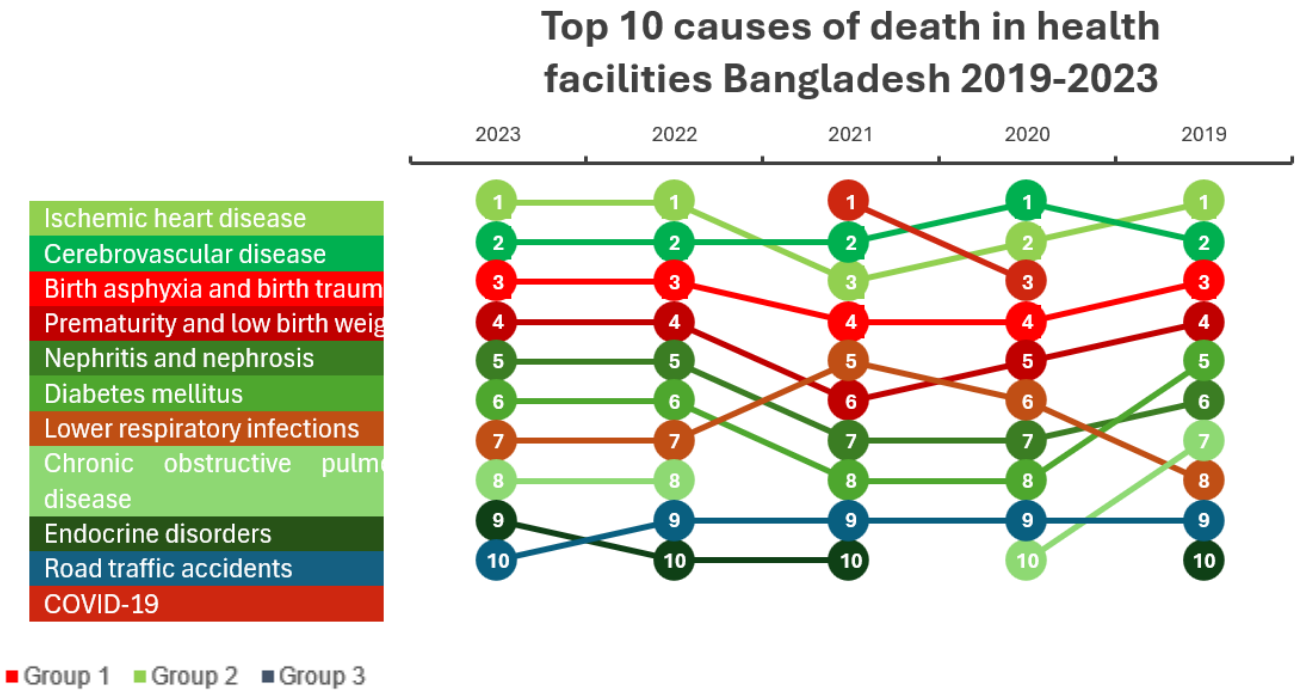


These patterns broadly resemble those of upper-middle-income countries, where noncommunicable diseases and injuries account for a higher mortality burden, though Bangladesh maintains a higher proportion of communicable disease deaths characteristic of its transitional status.

Top Ten Causes of Death

The top ten causes of death reported in Bangladesh health facilities have remained relatively stable over the five-year period, accounting for more than 45% of total deaths each year. These leading causes reflect the country's dual burden of disease.

Fig. 3.3.3 Top ten causes of death 2029-2023



Of these ten leading causes, five are from Group 2 (noncommunicable diseases), underscoring their significant burden. Among Group 3 causes, road traffic accidents constitute the primary burden from injuries.

The pattern reflects a mix of trends seen in both lower-middle- and upper-middle-income countries:

- Similar to lower-middle-income countries, ischemic heart disease and stroke are the primary causes of death, followed by neonatal conditions
- Like upper-middle-income countries, diseases such as diabetes mellitus and chronic obstructive pulmonary disease are also prominent, gradually surpassing infectious diseases in their impact

COVID-19 emerged as a leading cause of death in 2020 and 2021, accompanied by an increase in deaths due to lower respiratory infections. This illustrates the impact of the pandemic on mortality patterns. Having COVID-19 as a cause of death during the pandemic years reflects the effort made to diagnose, capture, and correctly code these deaths.

3.4 Cause of death by age and sex

The distribution of specific causes of death across different age groups and by sex provides critical insights into Bangladesh's evolving health challenges and helps identify targeted intervention opportunities. Analysis of the 2019-2023 facility-based mortality data reveals distinct patterns across demographic segments.

A notable observation across all age groups and sexes is the high proportion of deaths classified under various "other" categories. This raises significant data quality concerns, as these non-specific classifications limit the precision of health planning. Similarly, ill-defined diseases consistently rank among the top ten causes of death across demographic groups, highlighting the urgent need for improved medical certification of cause-of-death and coding practices. (Annex 3)

Early Childhood (Under 5 Years): In this vulnerable age group, perinatal conditions remain the predominant causes of mortality for both sexes:

- Birth asphyxia and birth trauma, along with prematurity and low birth weight, consistently rank as the leading causes, collectively accounting for over 40% of deaths in this age group
- Other conditions arising during the perinatal period contribute an additional 15% of deaths
- Infectious diseases, particularly respiratory infections, remain significant contributors to mortality

- The pattern shows remarkable consistency between males and females, with only minor differences in specific rankings

School-Age Children (5-14 Years): This age group displays a different pattern with greater diversity in causes of death:

- Infectious diseases emerge as the leading cause for both sexes, accounting for 13-16% of deaths
- Injury-related deaths, particularly from road traffic accidents, become prominent, especially among males (8.5% vs. 5.1% in females)
- Ill-defined injuries/accidents rank disproportionately high in this age group, suggesting challenges in determining specific causes for traumatic deaths
- Notable sex differences include a higher proportion of cerebrovascular disease in females and road traffic accidents in males

Young and Middle Adults (15-49 Years): This economically productive age group shows a clear shift toward noncommunicable diseases:

- Cardiovascular diseases have moved into top-ranking positions, with "other cardiovascular diseases" emerging as the leading cause for both sexes in 2023
- Ischemic heart disease and cerebrovascular disease appear in the top five causes, highlighting the increasing NCD burden
- Significant gender differences emerge in this age group:
    - Males show higher mortality from road traffic accidents and ill-defined injuries
    - Females have a higher proportion of deaths attributed to cerebrovascular disease and nephritis
    - Maternal conditions feature prominently among females, with "other maternal conditions" and hypertensive disorders of pregnancy in the top ten causes
- The category of "other cardiovascular diseases" may potentially mask some maternal deaths, warranting further investigation

Older Adults (50-74 Years): Noncommunicable diseases clearly dominate in this age group:

- Ischemic heart disease ranks first for males (17.2%) while remaining third for females (16.0%)
- "Other cardiovascular diseases" and cerebrovascular disease rank among the top three causes for both sexes
- Chronic obstructive pulmonary disease (COPD) ranks higher among males (5.8%) than females (not in top 10)
- Diabetes mellitus shows a higher relative ranking in females (4th at 5.5%) than males (5th at 4.9%)
- Nephritis and nephrosis feature prominently in both sexes, reflecting the burden of renal disease

Advanced Age (75+ Years): In this oldest age group, the NCD dominance continues with some distinctive features:

- Cerebrovascular disease ranks first for both males (18.8%) and females (20.1%)
- Ischemic heart disease and other cardiovascular diseases complete the top three causes for both sexes
- COPD remains a significant cause of death in males (7.3%) but does not feature in the female top ten
- Despite the NCD predominance, infectious diseases remain notable causes of death, suggesting ongoing vulnerability to infections in advanced age
- Nephritis and diabetes maintain significant rankings, reflecting the accumulated burden of chronic conditions

3.5 Childhood Mortality

Childhood mortality represents a critical public health concern in Bangladesh, with medically certified reports from health facilities indicating that 18% of all reported deaths over the past five years occurred among children under five years of age. The vast majority of these (17% of total deaths) were among infants less than one year old.

Among infants under one year, neonatal (first 28 days of life) deaths represent the largest burden, with birth asphyxia, birth trauma, prematurity, and low birth weight consistently

ranking as the top causes of death. This pattern likely reflects higher reporting when deaths occur in hospitals, especially in neonatal care settings.

The leading causes of death among children under five show slight variations by sex but maintain consistent patterns:

Under 5 years (Male):

1. Birth asphyxia and birth trauma (23.6%)
2. Prematurity and low birth weight (19.0%)
3. Other conditions arising during the perinatal period (15.8%)
4. Other infectious diseases (8.7%)
5. Lower respiratory infections (8.4%)

Under 5 years (Female):

1. Birth asphyxia and birth trauma (23.1%)
2. Prematurity and low birth weight (17.9%)
3. Other conditions arising during the perinatal period (16.1%)
4. Lower respiratory infections (9.0%)
5. Other infectious diseases (9.0%)

For children aged 1-5 years, injuries emerge as a more significant cause of death, particularly among males.

These findings highlight the need for targeted interventions in maternal and child health, with particular emphasis on:

- Quality antenatal and perinatal care
- Neonatal resuscitation and emergency care
- Prevention and management of prematurity
- Infection prevention and control
- Injury prevention for older children

Fig 3.5.1 Distribution of deaths in children below 5 years

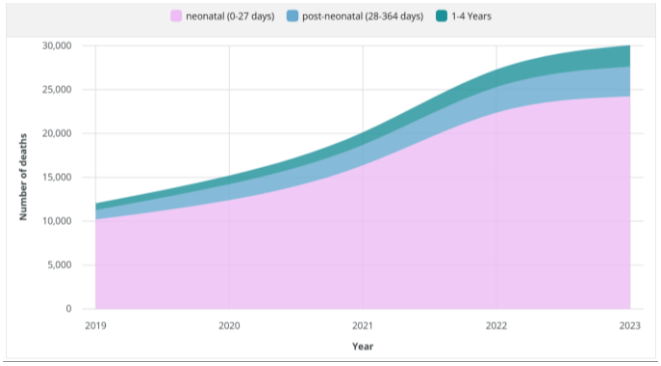


Fig 3.5.2 Distribution of infant deaths (below 1 year of age)

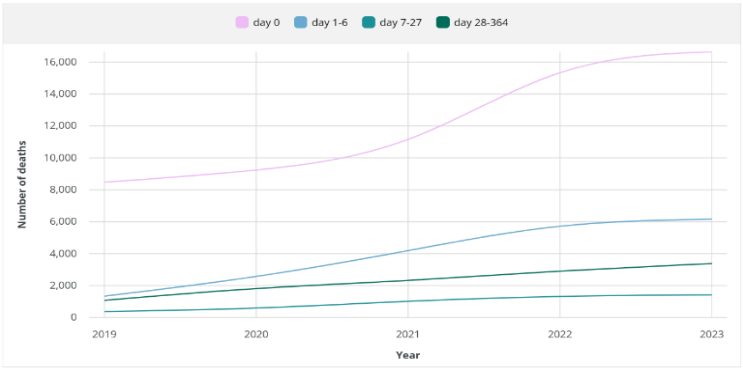


Fig 3.5.3 Neonatal (0-27 days)

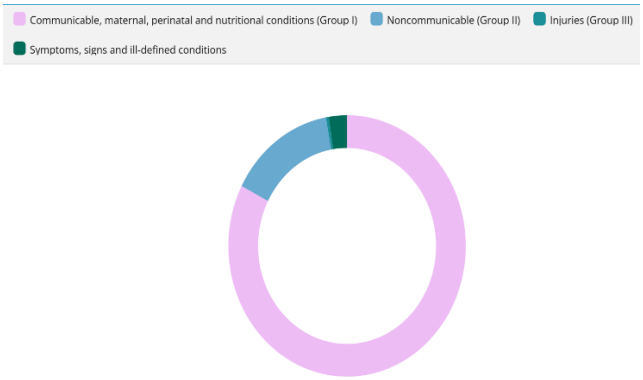


Fig 3.5.4 Post neonatal (28-365 days)

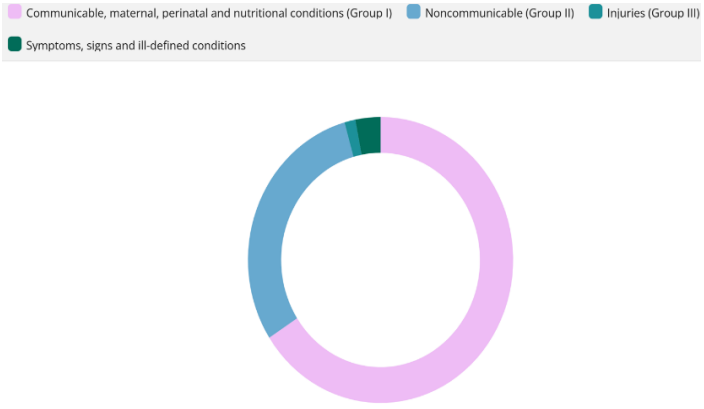
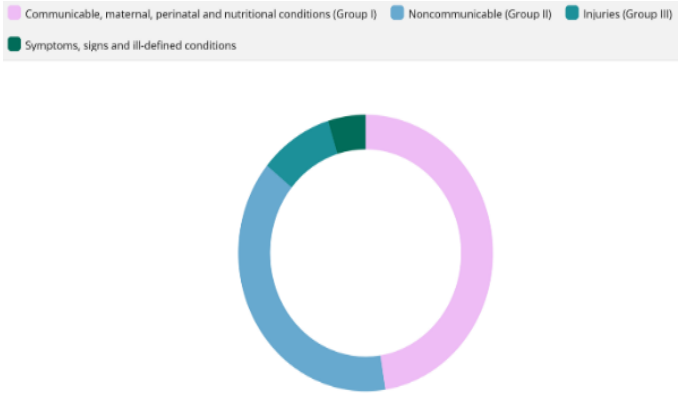


Fig 3.5.5 Children 1-4



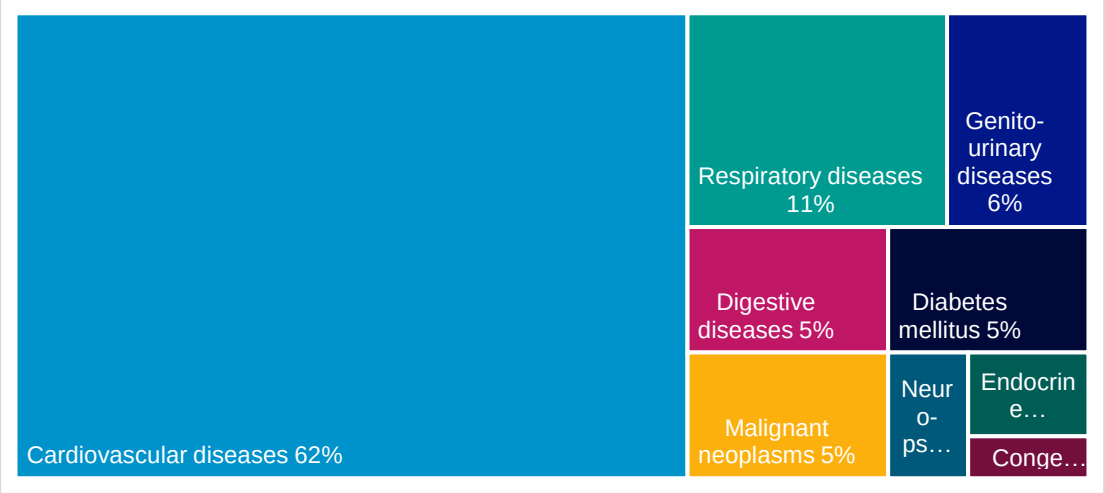
3.6 Noncommunicable Diseases

Noncommunicable diseases (NCDs) constitute a substantial and growing burden in Bangladesh, accounting for over 55% of all medically certified deaths. The distribution of NCD mortality has remained relatively consistent since 2019, with cardiovascular diseases dominating the landscape:

- **Cardiovascular diseases**: 62% of all NCD deaths (205,403 cases)
- **Respiratory diseases**: 11% of NCD deaths (36,730 cases)
- **Genito-urinary diseases**: 6% of NCD deaths (19,812 cases)
- **Digestive diseases**: 5% of NCD deaths (18,057 cases)
- **Diabetes mellitus**: 5% of NCD deaths (17,052 cases)
- **Malignant neoplasms**: 5% of NCD deaths (15,965 cases)

The data reveal concerning trends regarding premature mortality, with NCDs now causing significant deaths in the economically active population. By 2023, NCDs accounted for over 40% of deaths in individuals aged 15-40, exceeding the typical 30-40% range observed in comparable countries.

Fig 3.6.1Distribution of Non-communicable causes of death 2019 to 2023



Several important observations emerge:

- **Diabetes mellitus** ranks sixth overall as a single cause but likely contributes to deaths recorded under cardiovascular diseases, suggesting an even larger impact

- **Cancer reporting** shows data quality issues, with the "other" category ranking first in cancer-related deaths, obscuring specific cancer types
- **Neuropsychiatric conditions** are emerging as more frequent causes of death, indicating a growing burden that requires attention

These patterns underscore the urgent need for comprehensive NCD prevention and management strategies, alongside efforts to improve the granularity and quality of cause-of-death data for more targeted interventions.

3.7 Maternal Health

Maternal health remains a priority concern in Bangladesh. Analysis of medically certified maternal deaths reveals both progress and persistent challenges:

The proportion of maternal deaths relative to all reported deaths in health facilities decreased by 16% (from 0.043 to 0.036 between 2019 and 2023. However, this proportion has remained relatively stable since 2020, with a slight increase from 2022 to 2023.

The distribution of causes of maternal death shows consistent patterns over the five-year period:

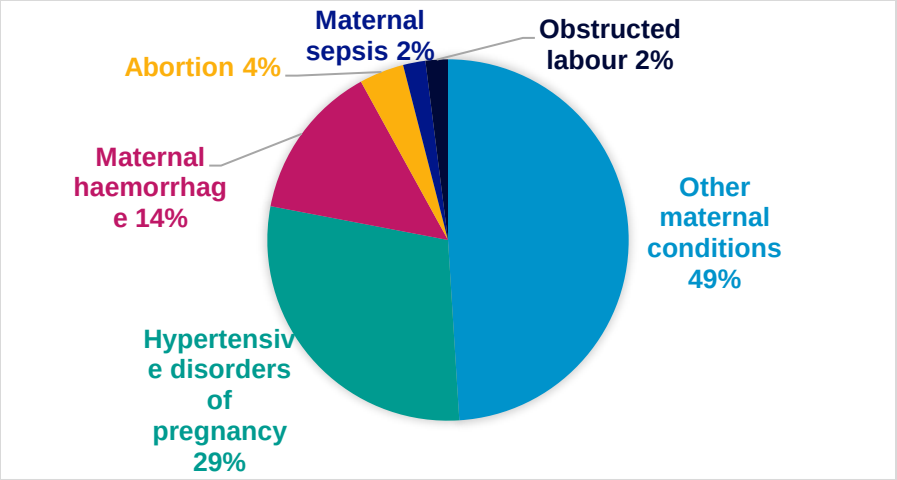
- **Other maternal conditions**: 49% (2,103 cases)
- **Hypertensive disorders of pregnancy**: 29% (1,229 cases)
- **Maternal hemorrhage**: 14% (579 cases)
- **Abortion**: 4% (182 cases)
- **Maternal sepsis**: 2% (93 cases)
- **Obstructed labor**: 2% (80 cases)

Significant data quality issues persist, particularly with the "other maternal conditions" category, which accounts for more than half of maternal deaths and masks specific underlying causes. This limits the ability to develop targeted interventions.

Beyond this categorization issue, hypertension in pregnancy and maternal hemorrhage remain the leading specified causes, highlighting the need for improved antenatal care, emergency obstetric services, and blood banking facilities.

Improving the specificity of maternal death classification is essential for developing effective interventions to further reduce maternal mortality in line with global commitments.

3.7.1 Distribution of all maternal causes of death 2019-2023



4. Recommendations

Based on the comprehensive analysis of facility death data in Bangladesh from 2019-2023, the following recommendations are proposed to strengthen health systems, improve data quality, and address key mortality challenges, acknowledging that decision-makers and clinical experts should be included for further policy analysis:

Addressing the NCD Burden

1. **Develop targeted NCD prevention strategies**: Create population-wide and high-risk approaches to address major risk factors for cardiovascular disease, diabetes, and respiratory conditions.
2. **Strengthen primary healthcare capacity**: Enhance screening, diagnosis, and management of NCDs at primary care level to reduce complications and mortality.
3. **Improve emergency response**: Strengthen emergency medical services and acute care facilities for cardiovascular emergencies to reduce case fatality rates.
4. **Implement multi-sectoral NCD policies**: Engage sectors beyond health (agriculture, education, urban planning) in comprehensive NCD prevention approaches.

Maternal and Child Health

1. **Enhance perinatal care**: Strengthen quality of care during labor, delivery, and immediate postpartum period to address birth asphyxia and birth trauma.

2. **Improve neonatal intensive care**: Expand access to quality neonatal intensive care services to address complications of prematurity.
3. **Strengthen antenatal screening**: Enhance detection and management of hypertensive disorders of pregnancy and other high-risk conditions.
4. **Address maternal hemorrhage**: Improve blood banking services and emergency obstetric care protocols in district and sub-district hospitals.

Health System Strengthening

1. **Address gender disparities**: Investigate and address barriers to female healthcare access to reduce potential underreporting of female deaths.
2. **Expand MCCD coverage**: Continue expanding the MCCD system to additional healthcare facilities to improve representativeness.
3. **Develop integrated surveillance**: Establish an integrated disease surveillance system that connects mortality data with morbidity information for improved planning.
4. **Strengthen capacity for data analysis**: Build analytical capacity at district and national levels for regular interpretation and use of mortality data in decision-making.

Data Quality Improvement

1. **Supervision and training for medical certification of cause of death should be improved**: Establish a system for institutionalized, centralized, routine and continuous quality monitoring of MCCD with timely response and communication of any error patterns. Also, expand training programs for healthcare providers on proper completion of MCCDs, with special emphasis on accurate cause-of-death reporting to reduce "ill-defined" and "other" categories.
2. **A Centralized ICD mortality coding system should be established and should incorporate the transition to ICD-11**: Develop and implement centralized and automated ICD mortality coding (transition away from SMoL-ICD-10) and conduct the necessary capacity building of ICD mortality coders to improve consistency and reduce invalid ICD codes. Continue the transition to ICD-11 for ICD mortality coding.

3. **The coverage of private hospitals reporting of MCCD should be increased:** To understand the total burden of hospital deaths it is very important to include MCCD data from all private hospitals, clinics and NGO. Currently there are around 8,000 private health institutions and approximately 60 report MCCD.
4. **MCCD data should be compared to community death patterns**: Develop mechanisms to compare verbal autopsy data with facility-based MCCD data for a more comprehensive mortality picture and understand gaps.
5. **Strengthen the link between Health and Civil Registration to improve death registration:** This will allow to have better understanding of heath facility deaths as well as community deaths.

5. Conclusion

This analysis of facility-based mortality data from 2019-2023 provides valuable insights into Bangladesh's health challenges and priorities. The findings reveal a country in epidemiological transition, facing the dual burden of noncommunicable diseases and persistent maternal and child health concerns.

The increasing coverage of the MCCD system represents significant progress in health information systems, though further improvements in data quality and representativeness are needed. The gender disparities in reported deaths highlight potential inequities in healthcare access that warrant further investigation.

The dominance of cardiovascular diseases, alongside continued challenges in neonatal health, underscores the need for a balanced approach to health system strengthening—one that addresses the growing NCD burden while maintaining focus on maternal and child health priorities.

By implementing the recommended strategies for data quality improvement, NCD management, maternal and child health interventions, and overall health system strengthening, Bangladesh can make significant strides toward improved health outcomes and reduced mortality across all population groups.

Continuous monitoring of these mortality patterns, coupled with responsive policy adjustments, will be essential for progress toward national health goals and international commitments, including the Sustainable Development Goals.

ANNEXES

Annex. 1. WHO-recommended international MCCD form

Medical Certificate of Cause of Death

Hospital Name | Hospital Code No. | Admission Reg. No. | Ward No.

Patient Name

Father's/Mother's Name

Address: House/Road (Name/No.) | Village/Area/Town | Union/Ward | Post Office | Post Code | Upazila/Thana | District

Sex: Female | Male | Third gender — **Religion:** Islam | Hindu | Buddha | Christian | Other

Occupation: Service | Business | Govt. Service | Student | Housewife | Retired | Other

Date of Birth of Deceased (d d m m Y Y Y Y) — Age if DoB is not available (Y Y Y m m) — Date of admission (d d m m Y Y Y Y)

Time of Admission (h h m m) — Date of Death (d d m m Y Y Y Y) — Time of Death (h h m m)

NID of Deceased

Birth Reg. No. of Deceased

Family Cell Phone number (If available)

Frame A: Medical data: Part 1 and 2

		Cause of death	Time interval from onset to death
1 Report disease or condition directly leading to death on line a	a		
Report chain of events in due to order (if applicable)	b	Due to:	
State the underlying cause on the lowest used line	c	Due to:	
	d	Due to:	

2 Other significant conditions contributing to death (time intervals can be included in brackets after the condition)

Frame B: Other medical data

Was surgery performed within the last 4 weeks? Yes | No | Unknown. — **If yes please specify date of surgery** (d d m m Y Y Y Y)

If yes please specify reason for surgery (disease or condition)

Was an autopsy requested? Yes | No | Unknown. — **If yes were the findings used in the certification?** Yes | No | Unknown.

Manner of death

Disease | Assault | Could not be determined | Accident | Legal intervention | Pending investigation | Intentional self harm

War | Unknown. | **If external cause or poisoning:** | **Date of injury** (d d m m Y Y Y Y)

Please describe how external cause occurred (If poisoning please specify poisoning agent)

Place of Occurrence of the external cause

At home | Residential | School, other institution, public administrative area | Sports and athletics area | Street and highway | Trade and service area

Industrial and construction area | Farm | Other place (please specify): | Unknown

Fetal or infant Death

Multiple pregnancy: Yes | No | Unknown; **Stillborn?** Yes | No | Unknown

If death within 24h specify number of hours survived (h h) — Birth weight (in grams) (g g g g)

Number of completed weeks of pregnancy (d d) — Age of mother (years) (Y Y)

If death was perinatal, please state conditions of mother that affected the fetus and newborn

For women of reproductive age

Was the deceased pregnant within past year? Yes | No | Unknown.

If yes, was she pregnant When she died | Within the 42 days preceding her death | Within 43 days up to 1 year preceding her death | Exact pregnancy timing unknown

Did the pregnancy contribute to the death? Yes | No | Unknown.

Name | Position | BMDC Reg. No.

Bangladesh Form No: | Signature with Date | Seal

Annex2. All facility deaths distribution	Total		2019		2020		2021		2022		2023	
	N	%	N	%	N	%	N	%	N	%	N	%
Total number of deaths	576935	100%	66025	100%	82866	100%	115164	100%	141870	100%	171010	100%
Sex												
Male	345621	60%	39929	60%	51474	62%	68698	60%	84313	59%	101207	59%
Female	227490	39%	25407	38%	31052	37%	45470	39%	56522	40%	69039	40%
Unknown	3824	1%	689	1%	340	0%	996	1%	1035	1%	764	0%
Age group												
0	97383	17%	11281	17%	14032	17%	17905	16%	26551	19%	27614	16%
1-4	7636	1%	775	1%	940	1%	1412	1%	2053	1%	2456	1%
5-9	4524	1%	577	1%	657	1%	879	1%	1070	1%	1341	1%
10-14	5234	1%	645	1%	810	1%	1027	1%	1213	1%	1539	1%
15-19	10329	2%	1358	2%	1460	2%	1919	2%	2515	2%	3077	2%
20-24	12040	2%	1581	2%	1798	2%	2292	2%	2864	2%	3505	2%
25-29	13151	2%	1873	3%	1980	2%	2597	2%	3058	2%	3643	2%
30-34	14321	2%	1917	3%	2226	3%	2897	3%	3228	2%	4053	2%
35-39	19808	3%	2455	4%	2777	3%	4043	4%	4628	3%	5905	3%
40-44	23325	4%	2570	4%	3307	4%	4583	4%	5624	4%	7241	4%
45-49	28949	5%	3534	5%	4328	5%	5733	5%	6747	5%	8607	5%
50-54	43227	7%	4670	7%	6390	8%	8969	8%	10412	7%	12786	7%
55-59	42671	7%	4339	7%	6394	8%	8795	8%	10196	7%	12947	8%
60-64	57968	10%	6089	9%	8255	10%	11939	10%	14027	10%	17658	10%
65-69	50409	9%	4854	7%	7175	9%	10568	9%	12142	9%	15670	9%
70-74	48050	8%	4883	7%	6517	8%	9997	9%	11542	8%	15111	9%
75-79	23400	4%	2243	3%	3002	4%	4744	4%	5697	4%	7714	5%
80-84	18564	3%	1862	3%	2409	3%	3574	3%	4615	3%	6104	4%
85+	17217	3%	1811	3%	2056	2%	3172	3%	4456	3%	5722	3%
Unknown	38738	7%	6717	10%	6353	8%	8119	7%	9232	7%	8317	5%
Cause of death*												

Group 1: Communicable, maternal, perinatal and nutritional conditions	156885	27%	16644	25%	25438	31%	39199	34%	34837	25%	40767	24%
Group 2: Noncommunicable diseases	331690	57%	38520	58%	44641	54%	59710	52%	84336	59%	104483	61%
Group 3: Injuries	32221	6%	4505	7%	4692	6%	5794	5%	7932	6%	9298	5%
Ill-defined diseases	28844	5%	3277	5%	5048	6%	5637	5%	7785	5%	7097	4%
Invalid ICD codes	23471	4%	2390	4%	2707	3%	3828	3%	5945	4%	8601	5%
Ratio of group 2 to group 1	2.1		2.3		1.8		1.5		2.4		2.6	

*Excludes analysis of unknown sex

Annex 3. Top ten causes of death by age group 2023 v. 2019

		2023 Male (%)	2019 Male (%)		2023 Female (%)	2019 Female (%)
<5 years	1	Birth asphyxia and birth trauma (23.6)	Birth asphyxia and birth trauma (24.9)	1	Birth asphyxia and birth trauma (23.1)	Prematurity and low birth weight (24.2)
	2	Prematurity and low birth weight (19)	Prematurity and low birth weight (22.8)	2	Prematurity and low birth weight (17.9)	Birth asphyxia and birth trauma (22.5)
	3	Other conditions arising during the perinatal period (15.8)	Other conditions arising during the perinatal period (14.9)	3	Other conditions arising during the perinatal period (16.1)	Other conditions arising during the perinatal period (14)
	4	Other infectious diseases (8.7)	Other infectious diseases (8.6)	4	Lower respiratory infections (9)	Other infectious diseases (8.7)
	5	Lower respiratory infections (8.4)	Lower respiratory infections (4.9)	5	Other infectious diseases (9)	Lower respiratory infections (5.3)
	6	Other cardiovascular diseases (5.2)	Other cardiovascular diseases (4.2)	6	Other cardiovascular diseases (5.7)	Other cardiovascular diseases (3.9)
	7	Other digestive diseases (2.5)	Other respiratory diseases (3)	7	Other respiratory diseases (2.7)	Other respiratory diseases (2.5)
	8	Other respiratory diseases (2.4)	Other digestive diseases (2.2)	8	Other digestive diseases (2.5)	Other digestive diseases (2.4)
	9	Other neuropsychiatric disorders (1.5)	Other congenital anomalies (1.3)	9	Other neuropsychiatric disorders (1.3)	Congenital heart anomalies (1.5)
	10	Endocrine disorders (1.3)	Other neuropsychiatric disorders (1.2)	10	Congenital heart anomalies (1.2)	Ill-defined injuries/accidents (1.3)
		Ill-defined diseases (2.8)	Ill-defined diseases (4.1)		Ill-defined diseases (2.7)	Ill-defined diseases (4.4)
5–14 years	1	Other infectious diseases (15.2)	Other infectious diseases (16.4)	1	Other infectious diseases (13.8)	Ill-defined injuries/accidents (16)
	2	Other cardiovascular diseases (11.3)	Ill-defined injuries/accidents (10.5)	2	Ill-defined injuries/accidents (11.5)	Other infectious diseases (13.3)
	3	Ill -defined injuries/accidents (7.4)	Road traffic accidents (8.5)	3	Other cardiovascular diseases (10.3)	Road traffic accidents (5.1)
	4	Road traffic accidents (6.8)	Other cardiovascular diseases (6.8)	4	Lower respiratory infections (5.3)	Other cardiovascular diseases (4.9)
	5	Lower respiratory infections (5.8)	Other digestive diseases (4.9)	5	Other digestive diseases (4.9)	Other digestive diseases (4)
	6	Other digestive diseases (4.5)	Other respiratory diseases (4.5)	6	Road traffic accidents (3.7)	Lower respiratory infections (3.6)

	7	Leukaemia (4.1)	Leukaemia (4.2)		7	Cerebrovascular disease (3.4)	Nephritis and nephrosis (3.2)
	8	Cerebrovascular disease (4)	Falls (4.2)		8	Leukaemia (3.2)	Leukaemia (3.2)
	9	Other respiratory diseases (4)	Other neuropsychiatric disorders (3.4)		9	Dengue (3.2)	Other respiratory diseases (3)
	10	Nephritis and nephrosis (2.8)	Lower respiratory infections (3.1)		10	Other neuropsychiatric disorders (3)	Other neuropsychiatric disorders (2.7)
		Ill-defined diseases (5.1)	Ill-defined diseases (5.7)			Ill-defined diseases (5.9)	Ill-defined diseases (6.3)
15–49 years	1	Other cardiovascular diseases (14.1)	Other cardiovascular diseases (11)		1	Other cardiovascular diseases (16.3)	Other cardiovascular diseases (12.4)
	2	Ischaemic heart disease (11.2)	Ill-defined injuries/accidents (9.3)		2	Cerebrovascular disease (9.4)	Ill-defined injuries/accidents (8.2)
	3	Cerebrovascular disease (9.4)	Ischaemic heart disease (9)		3	Other infectious diseases (7.3)	Cerebrovascular disease (7.2)
	4	Ill-defined injuries/accidents (9.2)	Cerebrovascular disease (7.3)		4	Ischaemic heart disease (6.8)	Other infectious diseases (7)
	5	Road traffic accidents (6.2)	Other digestive diseases (6.8)		5	Ill-defined injuries/accidents (6.7)	Ischaemic heart disease (6.2)
	6	Other infectious diseases (5.8)	Road traffic accidents (6.7)		6	Nephritis and nephrosis (5.3)	Nephritis and nephrosis (5.3)
	7	Nephritis and nephrosis (4.9)	Other infectious diseases (6)		7	Diabetes Mellitus (4.8)	Other digestive diseases (5.3)
	8	Other digestive diseases (4.8)	Nephritis and nephrosis (4.8)		8	Other digestive diseases (4.1)	Diabetes Mellitus (5.2)
	9	Other respiratory diseases (3.7)	Other respiratory diseases (3.5)		9	Other respiratory diseases (3.6)	Other maternal conditions (4)
	10	Diabetes mellitus (2.6)	Diabetes Mellitus (2.9)		10	Other maternal conditions (3.3)	Hypertensive disorders of pregnancy (2.9)
		Ill-defined diseases (5.3)	Ill-defined diseases (5.9)			Ill-defined diseases (5)	Ill-defined diseases (5)
50-74 years	1	Ischaemic heart disease (19.4)	Ischaemic heart disease (17.2)		1	Other cardiovascular diseases (19.6)	Other cardiovascular diseases (16.7)
	2	Other cardiovascular diseases (18.1)	Other cardiovascular diseases (15.6)		2	Cerebrovascular disease (16.9)	Cerebrovascular disease (16.2)
	3	Cerebrovascular disease (14.7)	Cerebrovascular disease (13.5)		3	Ischaemic heart disease (16.5)	Ischaemic heart disease (16.0)

		4	Other respiratory diseases (5)	Chronic obstructive pulmonary disease (5.8)		4	Diabetes Mellitus (6.1)	Diabetes Mellitus (5.5)
		5	Chronic obstructive pulmonary disease (5)	Diabetes Mellitus (4.9)		5	Other infectious diseases (5.1)	Nephritis and nephrosis (5.3)
		6	Nephritis and nephrosis (4.4)	Other digestive diseases (4.7)		6	Nephritis and nephrosis (5)	Other digestive diseases (4.1)
		7	Other infectious diseases (4.1)	Other respiratory diseases (4.5)		7	Other respiratory diseases (4.1)	Other infectious diseases (3.7)
		8	Diabetes Mellitus (3.9)	Nephritis and nephrosis (4.3)		8	Other digestive diseases (2.9)	Other respiratory diseases (3.2)
		9	Other digestive diseases (3.3)	Other infectious diseases (3.8)		9	Endocrine disorders (2.3)	Ill-defined injuries/accidents (1.9)
		10	Road traffic accidents (1.8)	Road traffic accidents (2.1)		10	Lower respiratory infections (2)	Lower respiratory infections (1.9)
			Ill-defined diseases (4.9)	Ill-defined diseases (5.9)			Ill-defined diseases (4.4)	Ill-defined diseases (45.5)
75+ years		1	Other cardiovascular diseases (20)	Cerebrovascular disease (18.8)		1	Other cardiovascular diseases (21.8)	Cerebrovascular disease (20.1)
		2	Ischaemic heart disease (17.3)	Ischaemic heart disease (16.5)		2	Cerebrovascular disease (18.6)	Other cardiovascular diseases (18.6)
		3	Cerebrovascular disease (16.8)	Other cardiovascular diseases (15.1)		3	Ischaemic heart disease (18.6)	Ischaemic heart disease (18.1)
		4	Chronic obstructive pulmonary disease (6.7)	Chronic obstructive pulmonary disease (7.3)		4	Other respiratory diseases (14.9)	Other respiratory diseases (4.7)
		5	Other respiratory diseases (6.6)	Other respiratory diseases (5.5)		5	Other infectious diseases (4.8)	Diabetes Mellitus (4.6)
		6	Other infectious diseases (4.3)	Diabetes Mellitus (4.5)		6	Nephritis and nephrosis (4.2)	Other infectious diseases (4.3)
		7	Nephritis and nephrosis (4.3)	Nephritis and nephrosis (4.2)		7	Diabetes Mellitus (3.7)	Nephritis and nephrosis (3.5)
		8	Diabetes Mellitus (3.2)	Other infectious diseases (3.8)		8	Lower respiratory infections (2.8)	Other digestive diseases (2.9)
		9	Other digestive diseases (2.4)	Other digestive diseases (3)		9	Other digestive diseases (2.3)	Lower respiratory infections (2.6)
		10	Lower respiratory infections (2.3)	Lower respiratory infections (2.3)		10	Endocrine disorders (2.3)	Chronic obstructive pulmonary disease (2.2)
			Ill-defined diseases (4.2)	Ill-defined diseases (4.5)			Ill-defined diseases (4.2)	Ill-defined diseases (3.7)

Annx4. Non Communicable Diseases

	2019		2020		2021		2022		2023		Grand Total	
	N	%	N	%	N	%	N	%	N	%	N	%
Cardiovascular diseases	21560	56%	27397	61%	38620	65%	54081	64%	63745	61%	205403	62%
Respiratory diseases	4486	12%	5073	11%	6468	11%	8936	11%	11767	11%	36730	11%
Digestive diseases	2769	7%	2602	6%	2776	5%	4226	5%	5684	5%	18057	5%
Malignant neoplasms	2461	6%	2225	5%	2496	4%	3660	4%	5123	5%	15965	5%
Genito-urinary diseases	2453	6%	2584	6%	3288	6%	5042	6%	6445	6%	19812	6%
Diabetes mellitus	2281	6%	2317	5%	2926	5%	4155	5%	5373	5%	17052	5%
Neuro-psychiatric conditions	836	2%	730	2%	845	1%	1171	1%	1709	2%	5291	2%
Endocrine disorders	822	2%	928	2%	1268	2%	1961	2%	2863	3%	7842	2%
Congenital anomalies	437	1%	366	1%	514	1%	542	1%	926	1%	2785	1%
Other neoplasms	166	0%	187	0%	205	0%	171	0%	351	0%	1080	0%
Skin diseases	120	0%	86	0%	92	0%	145	0%	250	0%	693	0%
Musculo-skeletal diseases	108	0%	104	0%	156	0%	194	0%	212	0%	774	0%
Oral conditions	17	0%	17	0%	21	0%	35	0%	19	0%	109	0%
Sense organ diseases	2	0%	10	0%	14	0%	8	0%	13	0%	47	0%
Sudden infant death syndrome	2	0%	15	0%	21	0%	9	0%	3	0%	50	0%
	38520		**44641**		**59710**		**84336**		**104483**		**331690**	

Annex 5. Maternal deaths

	2019		2020		2021		2022		2023		Grand Total	
	N	%	N	%	N	%	N	%	N	%	N	%
Other maternal conditions	287	43%	326	42%	393	50%	478	53%	619	54%	2103	49%
Hypertensive disorders of pregnancy	211	32%	276	36%	224	28%	223	25%	295	26%	1229	29%
Maternal haemorrhage	109	16%	101	13%	113	14%	113	13%	143	13%	579	14%
Abortion	33	5%	32	4%	29	4%	39	4%	49	4%	182	4%
Maternal sepsis	14	2%	14	2%	17	2%	22	2%	26	2%	93	2%
Obstructed labour	10	2%	21	3%	16	2%	22	2%	11	1%	80	2%
TOTAL	**664**		**770**		**792**		**897**		**1143**		**4266**	