Zambia

2020 VITAL STATISTICS REPORT

Republic of Zambia

2020 VITAL STATISTICS REPORT

Zambia Statistics Agency
Lusaka, Zambia

Ministry of Home Affairs
Lusaka, Zambia

February 2022

Bloomberg Philanthropies X DATA FOR HEALTH INITIATIVE

TABLE OF CONTENT

ACRONYMS AND ABBREVIATIONS

ASFR	Age-Specific Fertility Rate
ASMR	Age-Specific Mortality Rate
BID	Brought-in-Dead
BD4HI	Bloomberg Data for Health Initiative
CBR	Crude Birth Rate
CDC	Centre for Disease Control
CDR	Crude Death Rate
CoD	Cause of Death
CRS	Civil Registration System
CRVS	Civil Registration and Vital Statistics
DNRPC	Department of National Registration, Passport and Citizenship
ICD	International Classification of Diseases
IMR	Infant Mortality Rate
MCCD	Medical Certificate of Cause of Death
UNICEF	United Nations Children's Fund
U5MR	Under-Five Mortality Rate
VA	Verbal Autopsy
WHO	World Health Organization
ZamStats	Zambia Statistics Agency
ZDHS	Zambia Demographic Health Survey

PREFACE

The 2020 Vital Statistics Report is the fifth annual vital statistics report produced by the Zambia Statistics Agency (ZamStats). The report presents statistics on births and deaths in Zambia that were registered in 2020 as well as those that were certified in the same year. The statistics in this report were compiled from the civil registration data captured by the Department of National Registration Passport and Citizenship through the routine birth and death registration system.

The statistics presented in this report, even though affected by the low coverage and completeness rates, aim to assist in national planning and monitoring of development programmes and health interventions in the country.

Mulenga J.J. Musepa
Interim Statistician General
Zambia Statistics Agency

ACKNOWLEDGMENTS

The Department of National Registration, Passport and Citizenship under the Ministry of Home Affairs and Internal Security regards this Vital Statistics Report as a vehicle for having vital statistics of the country that can be used for National Planning and to track progress being made with improving the Civil Registration System especially since it is still in its infancy.

I would like to acknowledge the contribution of various line Ministries: the Ministry of Health and Ministry of Local Government for their contribution towards the registration of births and deaths in the Country. I would further like to thank the Zambia Statistics Agency who is mandated to produce Vital Statistics for taking the lead in the production of this Vital Statistics Report.

I further more wish to appreciate most sincerely the technical and financial support from UNICEF and Bloomberg Data for Health Initiative (BD4HI) towards the entire birth and death registration process and this undertaking which has brought out a clear picture in terms of birth and death registration coverage.

Lastly, I would like to recognize the tireless effort by the members of the CRVS technical working group for their work towards improving the CRVS system in Zambia and for their work towards the production of this Report.

Brenda K. Banda
Registrar General
Department of National Registration, Passport and Citizenship

DEFINITIONS

Age-specific fertility rate (AMFR): The annual number of births to women of a specified age or age group per 1,000 women in that age group.

Age-specific mortality rate (ASMR): A mortality rate limited to a particular age group. The numerator is the number of deaths in that age group; the denominator is the number of persons in that age group in the population.

Cause of death: "All those diseases, morbid conditions or injuries which either resulted in or contributed to death and the circumstances of the accident or violence which produced any such injuries.' Symptoms and modes of dying, such as heart failure or respiratory failure, are not considered to be causes of death for statistical purposes (see 'ill-defined cause of death').

Completeness of registration: The proportion of vital events that are registered. It is the number of registered vital events divided by an estimate of the 'actual' number of vital events that occurred in the same population during a specific period of time.

Crude birth rate (CBR): The number of live births relative to the size of that population during a given period, usually one year. It is expressed in numbers of births per 1,000 population per year.

Crude death rate (CDR): The number of deaths relative to the size of that population during a given period, usually one year. It is expressed in numbers of deaths per 1,000 population per year.

Death: The permanent disappearance of all evidence of life at any time after live birth has taken place (postnatal cessation of vital functions without capability of resuscitation).

Ill-defined cause of death: Any code that cannot or should not be used for the underlying cause of death (generally referring to 'R codes'). For instance, a 'mode of death' such as heart failure or kidney failure, symptoms such as backpain or depression, and risk factors such as high blood pressure are all uninformative codes for public health purposes.

Infant mortality rate (IMR): Probability (expressed as a rate per 1,000 live births) of a child born in a specific year or period dying before reaching the age of one, if subject to age-specific mortality rates of that period.

Live birth: The complete expulsion or extraction from the mother of a product of conception, irrespective of the duration of pregnancy, which, after such separation, breathes or shows any other evidence of life, such as beating of the heart, pulsation of the umbilical cord or definite movement of voluntary muscles, whether or not the umbilical cord has been cut or the placenta is attached; each product of such a birth is considered live born (all live-born infants should be registered and counted as such, irrespective of gestational age or whether alive or dead at the time of registration, and if they die at any time following birth, they should also be registered and counted as deaths).

Sex ratio: The number of male births for a specific area and during a specified period divided by the number of female births for the same area and period. The sex ratio is an important demographic indicator of the distribution of boys and girls at birth.

Total fertility rate (TFR): TThe sum of age-specific fertility rates for females aged between 15 and 49 years during a specified period, usually one year. It is an estimate of the average number of children a cohort of women would bear if they went through their child-bearing years experiencing the same age-specific fertility rates.

Under-five mortality rate (U5MR): The probability of a child born in a specific year or period dying before reaching the age of five, if subject to age-specific mortality rates of that period. The under-five mortality rate as defined here is strictly speaking not a rate (i.e. the number of deaths divided by the number of population at risk during a certain period of time) but a probability of death derived from a life table and expressed as rate per 1,000 live births.

Underlying cause of death: The cause of death to be used for primary statistical tabulation purposes has been designated as the underlying cause of death. The underlying cause of death is defined as '(a) the disease or injury which initiated the train of events leading directly to death, or (b) the circumstances of the accident or violence which produced the fatal injury'.

EXECUTIVE SUMMARY

The annual production and availability of vital statistics reports provides fundamental demographic and epidemiological measures that are needed in planning across multiple sectors and is a key step towards stimulating and guiding civil registration improvements. The "2020 Vital Statistics Report" provides vital statistics on births, death, and cause of death. The report uses 2020 registration and certification data of vital events from the Civil Registration System.

Fertility

Birth registration completeness was at 5 percent in 2020. The birth certification completeness has declined from 2.9 percent in 2016 to 0.6 percent in 2020. According to routine data from the civil registration system, the sex ratio was 102.

Summary Statistics on Certified Births by Year of Occurrence: Zambia 2016-2020					
Indicator	2016	2017	2018	2019	2020
Certified Births (number)	19,662	1,731	5,705	6,059	4,188
Certification Completeness (%)	2.9	0.3	0.8	0.9	0.6
Rural	1.1	0.1	0.2	0.2	0.2
Urban	5.8	0.5	1.7	1.8	1.1
Sex Ratio at Birth	101.9	101.3	106.8	101.5	102.3
Crude Birth Rate (per 1,000 population)	1.2	0.1	0.3	0.3	0.2

Mortality

In 2020 death registration completeness was at 18.0 percent. Death Certification completeness declined to 15 percent in 2020 from 20 percent in 2016.

Summary Statistics on Mortality by Year of Occurrence, Zambia 2016-2020					
Indicator	2016	2017	2018	2019	2020
Certified Deaths (number)	40,889	39,150	29,085	32,062	31,893
Males	23,680	16,610	16,756	18,187	18,480
Females	17,199	22,537	12,329	13,875	13,413
Certification Completeness (%)	20.0	19.0	14.0	15.2	15.0
Crude death rate (per 1,000 population)	2.6	1.7	2.4	1.8	1.8

The leading cause of death among males was HIV (8.9 percent) followed by Tuberculosis (3.9 percent). Cerebrovascular diseases was the third leading cause of death at 3.7 percent. Among females, the leading cause of death was HIV at 10.3 percent. The second leading cause of death were cerebrovascular diseases at 5.9 percent.

Leading Causes of Death Among Males and Females, Zambia 2020			
Males		Females	
1	Human Immunodeficiency Virus (HIV)	1	Human Immunodeficiency Virus (HIV)
2	Tuberculosis	2	Cerebrovascular diseases
3	Cerebrovascular diseases	3	Other disorders originating in the perinatal period.
4	Respiratory and cardiovascular disorders specific to the perinatal period	4	Malignant neoplasms of female genital organs
5	Other disorders originating in the perinatal period.	5	Respiratory and cardiovascular disorders specific to the perinatal period

Chapter 1: Introduction and methodology

1.1 Introduction
Zambia lacks comprehensive vital statistics data. Vital statistics data is available from the Civil Registration System (CRS), adhoc and routine household surveys, and population and housing censuses. However, data from the routine and administrative sources such as the CRVS has limitations due to incompleteness or under-coverage. The Department of National Registration, Passport and Citizenship (DNRPC) is mandated with the registration of all vital events in the country and is thus the custodian of the CRS. The production of Vital Statistics is however, the mandate of the Zambia Statistics Agency (ZamStats). Therefore, the production of this report was coordinated by ZamStats in collaboration with DNRPC, University of Zambia-Department of Population Studies (UNZA-DPS) and the Bloomberg Data for Health Initiative (BD4HI).

The need for a functional Civil Registration Vital Statistics (CRVS) system is inevitable for generating vital statistics required for measuring the performance towards achieving Sustainable Development Goals (SDGs) and aspirations in the eighth National Development Plan (8NDP) as well as successive development plans. Further, a functional CRVS system is key in generating vital statistics for health interventions, especially those related to reproductive, maternal, child and adolescent health.

Birth and death registration data are a source of fertility and mortality indicators, respectively. Indicators such as Crude Birth Rate (CBR), Total Fertility Rate (TFR), mean age at birth, nuptial births, Infant Mortality Rate (IMR), Under Five Mortality (U5MR) and Crude Death Rate (CDR) can be produced through vital statistics reports based on data generated through a functional CRVS system. Causes of death data can also be derived from the CRVS system, this data is key in monitoring progress made in reducing deaths attributable to various communicable diseases such as HIV and AIDS, Tuberculosis, Malaria, and Non-communicable diseases as well as externally attributable causes such as Road traffic accidents. Since CRVS data are in most cases compulsory and cover (under normal circumstances) the whole country or jurisdiction, they rarely suffer from errors which tag along traditional means of data collection such as surveys and censuses.

1.2 Source of data for the report
Data used to generate this report was captured administratively by the DNRPC while additional data required for computations was obtained from various sources such as surveys and censuses provided by ZamStats. Once cleaned and de-identified, the data from DNRPC was then transferred electronically to ZamStats for further processing and production of this vital statistics report.

1.3 Coverage of the report
Births and deaths reported herein are those that occurred in all the provinces of Zambia and were registered in 2020.

1.4 Data Analysis
The data was imported into the Statistical Package for Social Sciences Software (SPSS), STATA and Analysis of Causes of National Death for Action tool (ANACONDA) for editing, coding, tabulation and analyses. In the birth dataset, four variables were coded; sex, education level of mother, attendant at birth and region. The death dataset was coded for sex, age and cause of death.

1.5 Limitations of the Data

The data used in this report was not short of limitations. These mainly included incomplete registrations and missing values for variables such as age of deceased, mother's age, facility name, and place of death. A category, 'Not Stated' was introduced in each of these variables to cater for all the missing values. Incomplete registrations and records with missing information were completed by unit and/or item imputations and redistribution in some cases. There was also a substantial number of underlying causes of deaths that were not established. The records with insufficiently certified causes of death were combined under one category as "Ill-defined".

Chapter 2: Civil registration system of Zambia

Introduction

Civil registration is the continuous, permanent, compulsory, and universal recording of the occurrence and characteristics of vital events pertaining to the population in accordance with the legal requirements of a given country. A civil registration system is therefore, a source of legal documents that provide evidence used to protect human and civil rights.

In Zambia, management of the civil registration system is a function of the Department of National Registration, Passport and Citizenship under the Ministry of Home Affairs and Internal Security. Currently, the department conducts registration for Births, Deaths, Adoptions and Marriages. The civil registration system captures these vital events through an administrative system in line with the relevant pieces of legislation (see Section 2.2).

2.1 History

In the early 1900s registration of vital events was restricted to only the whites and those of Asian origin in accordance with the law under the colonial government. The law was segregative as it omitted registration of the native people. This continued even after independence in 1964 up until 1973 when the Birth and Death Registration Act CAP 51 of the laws of Zambia was enacted to correct the inequalities promoted by the previous law. This provided for registration of the indigenous children, through the registration of every birth and every death occurring within the boundaries of the country without distinction to origin or decent.

In 2013, there was recognition of the need to improve the CRVS system due to the fact that it was characterised by low birth and death registration coverage (11% and 5% respectively). Further, no cause of death information was being generated from civil registration while low demand for birth and death certificates was low. The link between civil registration and vital statistics was inactive.

In 2012, during the second conference for African Ministers responsible for Civil Registration, the importance of civil registration and vital statistics in advancing Africa's development agenda was recognized. Countries were advised to develop country owned national action plans to reform and improve civil registration among other initiatives. Against this background, Zambia conducted a CRVS assessment using the United Nations Economic Commission for Africa (UNECA) assessment tool in December 2013 and January 2014. The results from the comprehensive assessment fed into the finalization of the first National Strategic Action Plan for Reforming and Improving Civil Registration and Vital Statistics (NSAP – CRVS) 2015 – 2019. The implementation of the Plan yielded positive results with Zambia producing the first vital statistics report from civil registration data in 2016 and with subsequent reports are produced annually. The registration coverage has also improved for both birth and death over the years. According to the 2019 VSR, birth and death registration was about 20 percent.

Despite achieving the improvements stated above, the country's CRVS still has shortcomings that need to be addressed. After decentralizing the certification of births and deaths up to provincial level in 2018, there is still need to decentralize it further to the districts so that the service is taken closer to the public. Furthermore, there is need to sensitize the public more and attach incentives to registration of vital events in order to create demand.

2.2 Legal and administrative issues

The following are the pieces of legislation governing the management and registration of vital events in Zambia:

  i.   Birth and Death Registration Act Cap. 51;
  ii. Marriage Act Cap. 50;
  iii. Adoption Act Cap 54; and
  iv. Statutory instrument No. 44 of 2016.

The Department of National Registration, Passport and Citizenship in collaboration with other key stake holders in the civil registration system, conduct vital event registration in Zambia. The key stake holders include: the Ministry of Health through health facilities (issues birth records and medical certificates of cause of death which are vital documents in the birth and death registration process) the Ministry of Local Government and Rural Development through the local councils (solemnise and issue certificates of marriage); the Ministry of Community Development and Social Services through the department of social welfare facilitates the adoption process until adoption orders are granted by the courts of law.

2.3 Organisational structure, registration processes and information flows

The establishment of Registration centers as well as appointment of Registrars is done in accordance with the pieces of legislation governing civil registration.

The Birth and Death registration Act stipulates that birth and death notification and registration must take place in the district of occurrence. Therefore, once the notification of these vital events is done, the District Registrar validates and enters the notification details in the District Register. The notification forms are then sent to the provincial office for entry into the electronic civil register and thereby certified. Certificates are then sent to the respective districts for issuance to the applicants.

2.3.1 Registration Timelines

Birth and death registration Act Cap 51 of the laws of Zambia provides timelines within which a birth or death should be registered. Table 2.1 shows the timelines for birth and death registration as provided for in the Act.

Table 2..1: Birth and Death Registration Timelines			
No.	**Registration Timeliness**	**Birth**	**Death**
1	Current	≤1 Month	≤1 Month
2	Late	>1Month-12 Months	>1Month -3 Months
3	Delayed	>12 Months	>3 Months

2.3.2 Issuance of documentation

Birth and death certificates are issued by the DNRPC. These certificates are issued at the department's headquarters and at all ten provincial offices of the department. The birth and death certificates are issued after processes of notification and registration. The following are the steps for the issuance of certificates:

1. **Notification** is the first step in the registration process. It involves the completion of a notice of birth or death form by an applicant. Upon completion of the notification forms, the applicant is required to attach the prescribed documents which serve as proof of birth or death according to the provisions of the law. The notification form and all the attachments are then submitted to a district registration office.

2. **Registration** refers to the process where a birth or death that has occurred within a particular district is entered into that respective district's register in accordance with the law. Once the notification form is submitted, the district registrar checks the form and all the attachments for completeness and accuracy and enters the vital event in the district register and assigns a serial number.

3. **Certification** refers to the production of a birth or death certificate which is the final document issued in the process. Once a vital event is registered by a district registrar, it is entered in an electronic system and processed to produce a certificate which is issued to the applicant to serve as proof of birth or death registration.

2.3.3 Transfer of records

When a birth is registered in the district of occurrence, documents are physically sent to the respective provincial office for data entry and subsequent certification. However, death registration is centralized to the DNRPC headquarters as all death registration documents are manually forwarded to the DNRPC headquarters by the provincial offices for data entry and subsequent certification. All deaths registered in the country are coded at the National Morbidity and Mortality Coding Centre.

The DNRPC is currently working with the Ministry of Health to ensure health facility births are notified upon the issuance of a birth record. Similarly, the department is working with the local authorities to ensure deaths are notified upon issuance of a burial permit. This has been done to increase coverage of both birth and death registration as they are captured in real time.

2.4 Organization of vital statistics production and dissemination

Vital events' data is collected administratively by the DNRPC. The data is de-identified and processed by ZamStats and DNRPC for the production of vital statistics. These vital statistics are then disseminated by ZamStats.

2.5 Incentives and disincentives for registration

The registration office has identified and incorporated key institutions to create demand and scale up birth and death registration. These institutions include, among others, the Ministry of Education which require that a child obtains a birth certificate before enrolling to grade one. A birth certificate also serves as a requirement in the acquisition of national identity and travel documents. National Pensions Scheme Authority also demands for a death certificate when making financial claims for deceased persons. Additionally, the Higher Education Loans and Scholarships Board (HELSB), require a death certificate as proof of vulnerability before an education loan can be granted to orphaned loan applicants.

As a way of encouraging registration, the department commemorates the civil registration week every year and conducts public sensitisation on importance of vital event registration, It undertakes registration activities in public places such as shopping malls, government schools, and health facilities.

Despite the efforts made by the DNRPC to create demand for vital event registration, there are still challenges that slow down the registration process. These include the failure to decentralise certification up to district level and the delays in the transmission of forms and certificates.

Chapter 3: Data quality, timeliness of registration, and registration completeness

Information generated from the registration of vital events is critical in the production of usable vital statistics. Therefore, the importance attached to registration of vital events and the need for the country to achieve high level of completeness cannot be overemphasized. The quality of registration, in the quest to achieve usable and meaningful vital statistics for policy and planning purposes, is of prime importance. However, the coverage of vital events registered in Zambia remains very low.

According to routine data collected for the year 2020 from the Civil Registration System (CRS), birth registration completeness was at 5 percent, a significant reduction from that recorded in 2019 of 20.1 percent. Similarly, death registration completeness declined from 19.8 percent in 2019 to 18.0 percent in 2020. The low registration completeness in the year 2020 may be attributed to the effects of the COVID–19 pandemic experienced during the first half of the year which among others led to staff rotation and consequent reduced man hours. In addition, the mobile registration exercise for the issuance of National Registration Cards (NRCs) conducted in the third and fourth quarter of 2020 affected the normal operation of work in the respective registration centers.

3.1 Data Quality

Data on vital events registration is collected using a hard copy form called a "Notice" form. When the informant completes the notice form, the officer in-charge of collecting the application verifies the application for completeness and correctness. After the application has been validated by the officer, it is entered in the respective district register for official registration. The forms are then forwarded to the respective certification centers for processing of birth and death certificates. Once the notification forms reach the certification center, they are scrutinized for completeness by the front desk officers. All completed forms are sent for data entry, while the incomplete ones are queried and sent back to the respective districts.

The process of certification follows three (3) stages with independent staff at each stage to ensure good quality data. The first stage is data entry; here a data entry operator captures the details on the notification form into the electronic Civil Registration System (CRS). The second stage involves quality control; here an officer verifies whether what has been entered in the system corresponds with what is on the notification form. The quality control officer pays particular attention to the spellings, identity numbers and completeness of data. The third stage is printing; an officer at this stage once more, verifies the information on the form against the record in the electronic CRS paying particular attention to spellings. Once verified, the certificate is printed or else the record is sent back to stage 2 with reasons for rejection.

Important to note is that the system for certification has checks to help reduce data incompleteness in the system. However, these control functions in the system are not sufficient on some demographic variables.

During data analysis, missing values such as age of mother at time of the child's birth, marital status, place of death and age of decedent are identified. In order to fill the identified gaps, the original notification forms are retrieved. However, this cannot be done for all missing entries because the numbers are usually in thousands. Consequently, most of the missing entries are reported as "not stated".

3.2 Late and delayed registration

Table 3.1 presents information on the number of certified births by registration timeliness. Results show that only about 7 percent of certified births were registered within a month after birth. About 16 percent of the births were registered after 1 month but before 12 months, and 77 percent were registered after 12 months.

Table 3.1: Number of Certified Births by Registration Timeliness, Zambia 2020		
Registration Timeliness	**Number**	**Percent**
Current	3,333	7.3
Late	7,229	15.7
Delayed	35,424	77.0
Total	45,986	100.0

Table 3.2 shows information on the number of certified births by year of registration and year of birth. Most births were not registered within the stipulated time frame and/or within the year the birth occurred. For example, 21,708 certified births in 2020, only 4,188 births that occurred in 2020 were registered within the same year. Overall, most certified births fall under the "delayed" registration category.

Table 3.2: Numbers of Certified Births by Year of Registration and Year of Occurrence, Zambia 2010 - 2020												
	Birth Year											
Registration Year	**2010 and earlier**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**Total**
2010 and earlier	76	0	0	0	0	0	0	0	0	0	0	76
2011	5	5	0	0	0	0	0	0	0	0	0	10
2012	44	4	10	0	0	0	0	0	0	0	0	58
2013	14	2	3	7	0	0	0	0	0	0	0	26
2014	277	20	19	25	30	0	0	0	0	0	0	371
2015	84	8	8	7	6	27	0	0	0	0	0	140
2016	617	72	86	94	93	103	87	0	0	0	0	1,152
2017	1.256	135	177	130	153	159	190	199	0	0	0	2,399
2018	3.910	429	470	561	596	618	677	913	1171	0	0	9,345
2019	4,118	475	512	523	535	591	695	679	977	1,596	0	10,701
2020	7,299	692	737	782	804	949	991	1,033	1,350	2,883	4,188	21,708
Total	17,700	1,842	2,022	2,129	2,217	2,447	2,640	2,824	3,498	4,479	4,188	45,986

3.3 Completeness of registration

Completeness of registration aims at monitoring performance of the entire CRVS system in capturing all vital events and allows for adjustment where data is incomplete. It is defined as the proportion of actual vital events in a population that are registered, divided by the estimated number of vital events that occurred in a particular year. Birth registration completeness in this report was calculated as follows:

$$Completenss\ rate\ for\ births = \frac{Number\ of\ registered\ births\ within\ the\ year\ of\ occurence}{Estimated\ number\ of\ births\ within\ the\ year} \times 100$$

The 2020 estimated number of births were derived from the 2010 Census of Population and Housing, Population and Demographic Projections Report for Zambia.

The birth registration completeness by province is shown in Table 3.3. The results show that the national birth registration completeness was at 5 percent in 2020. At provincial level, Lusaka had the highest registration completeness at 7.9 percent while Northern and North Western provinces had the lowest at 1.7 percent each.

Table 3.3: Birth Registration Completeness by Province, Zambia 2020

Province	Estimated Annual Births	Number of Births Registered	Completeness (Percent)
Central	70,698	2,435	3.4
Copperbelt	97,146	7,432	7.6
Eastern	88,661	2,051	2.3
Luapula	56,146	3,293	5.9
Lusaka	126,997	10,062	7.9
Muchinga	49,673	1,028	2.1
North Western	39,384	2,726	6.9
Northern	66,211	1,150	1.7
Southern	85,696	5,490	6.4
Western	41,381	698	1.7
Zambia	721,993	36,365	5.0

Figure 3.1 shows the birth registration completeness by year of occurrence. There has been a gradual annual increase in the registration completeness from 14.7 percent in 2016 to 20.1 percent in 2019. However, there was a significant decrease in 2020.

Figure 3.1: Birth Registration completeness by year of occurrence, Zambia 2020
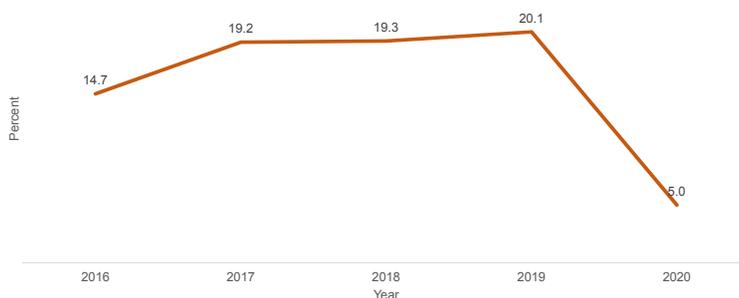
3.3.2 Death Registration Completeness

Death registration completeness was calculated by dividing the number of registered deaths in 2020 by the total number of estimated deaths, multiplied by 100.

$$Completenss\ rate\ for\ deaths = \frac{Number\ of\ registered\ deaths\ within\ the\ year\ of\ occurence}{Estimated\ number\ of\ deaths\ within\ the\ year} \times 100$$

Table 3.4 below shows the death registration completeness by province for 2020. The annual death registration completeness was 18.0 percent. At provincial level, Lusaka had the highest registration completeness at 52.3 percent. Northern, Western and Muchinga provinces had the lowest registration completeness at less than a percent each.

Table 3.4: Death Registration Completeness by Province, Zambia 2020

Province	Estimated Annual Deaths	Number of Deaths Registered	Completeness (Percent)
Central	20,231	3,616	17.9
Copperbelt	31,076	11,106	35.7
Eastern	29,088	1,429	4.9
Luapula	19,259	482	2.5
Lusaka	35,380	18,520	52.3
Muchinga	13,954	51	0.4
North Western	18,152	8	0.0
Northern	9,491	200	2.1
Southern	21,197	2,660	12.5
Western	14,536	99	0.7
Zambia	212,364	38171	18.0

Death registration completeness by year of occurrence is shown in figure 3.2. The trend shows that there was a reduction in the completeness of death registration from 20 percent in 2016 to 18 percent in 2020.

Figure 3.2 Death Registration Completeness by Year of Completeness

| 20.0 | 20.6 | 19.6 | 19.9 | 18.0 |
| 2016 | 2017 | 2018 | 2019 | 2020 |
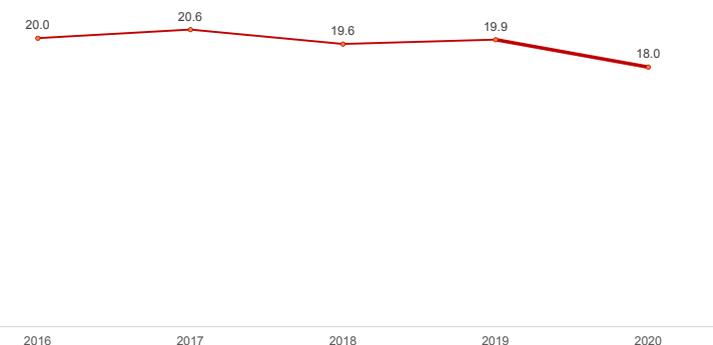
3.4.2 Redistribution of Missing values

The age distribution of the mother's age at birth was applied to the missing values to estimate how many of births with unknown age should go in each age group.

Table 3.6 shows the distribution of certified births by the mother's age. A total of 992 certified births did not have their mothers age stated. This meant that these needed to be redistributed among all the age groups.

Table 3.6: Distribution of certified births by mothers age group, Zambia 2020

| Mothers' age group | Unadjusted | | Adjusted |
	Births	Proportion (Percent)	Births
<15	2	0.1	3
15 - 19	51	1.6	67
20 - 24	441	13.8	578
25 - 29	1,157	36.2	1,516
30 - 34	913	28.6	1,196
35 - 39	494	15.5	647
40 - 44	125	3.9	164
45 - 49	13	0.4	17
50+	0	0.0	0
Not stated	992	0.0	0
Total	4,188	100.0	4,188

Chapter 4: Live Births

The right to be recognized as a person before the law is a top priority for countries globally as it ensures protection and forms a basis on which other rights are built. Registration of births is therefore a cardinal step in this process.

Chapter four presents certified births by place of occurrence, usual place of residence of mother, age of mother, marital status of mother, attendant at birth and place of delivery. Furthermore, this chapter presents the Crude Birth Rate and Age Specific Fertility Rate.

The previous vital statistics reports (2016-2019) presented information of certified births for each year regardless of the year in which the birth occurred. This report, however, shows information on certified live births for the year 2020 for births that occurred in 2020 only. Therefore, the indicators in this chapter should not be used for a trend analysis with indicators in previous reports.

Table 4.1 shows the summary statistics of certified births by year of occurrence for the period 2016 to 2020. The data shows that the number of certified births has been declining from 19,662 in 2016 to 4,188 in 2020. Similarly, certification completeness has declined from 2.9 percent in 2016 to 0.6 percent in 2020.

Table 4.1: Summary Statistics on Certified Births by Year of Occurrence, Zambia 2016-2020					
Indicator	2016	2017	2018	2019	2020
Certified Births (number)	19,662	1,731	5,705	6,059	4,188
Certification Completeness (Percent)	2.9	0.3	0.8	0.9	0.6
Rural	1.1	0.1	0.2	0.2	0.2
Urban	5.8	0.5	1.7	1.8	1.1
Sex Ratio at Birth	101.9	101.3	106.8	101.5	102.3
Crude Birth Rate (per 1,000 population)	1.2	0.1	0.3	0.3	0.2

4.1 Births by place of occurrence and place of usual residence of mother

Table 4.2 shows certified births by place of occurrence, usual place of residence of mother and sex ratio at birth. Almost all the births occurred at a health facility (99.3 percent). A similar pattern was observed in both urban and rural areas. There were 102 male births for every 100 female births.

Table 4.2: Live Births by Place of Occurrence and Region of Usual Residence of Mother, Zambia 2020							
	Place of Usual Residence of Mother				Total Number of Live Births		Sex Ratio at Birth
Place of Occurrence	Urban		Rural				
	Number	Percent	Number	Percent	Number	Percent	
Health facility	3,159	99.6	1000	98.3	4159	99.3	102
Home	12	0.4	17	1.7	29	0.7	81
Total	3,171	100	1017	100	4,188	100	102

Figure 4.1 shows certified live births by year of occurrence. Results show that there has been a decline in the number of live births that were certified over the years from 19,662 in 2016 to 4,188 in 2020.

Figure 4.1: Live Births by Year of Occurrence, Zambia 2016-2020
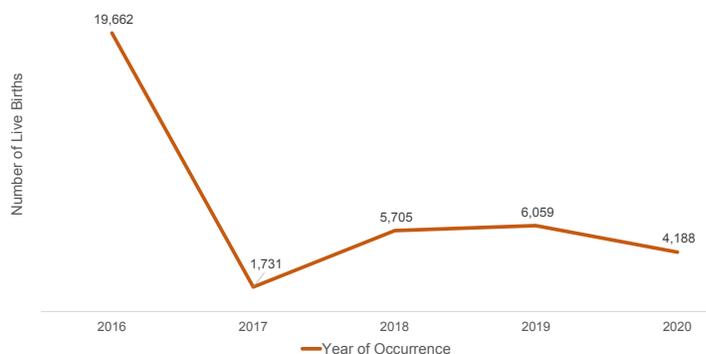
4.2 Births by age of mother

Figure 4.2 shows the distribution of certified births by five year age groups of the mother. The majority of the births occurred among mothers in the age groups 25-29 and 30-34.

Figure 4.2: Live births by age of mother, Zambia 2020
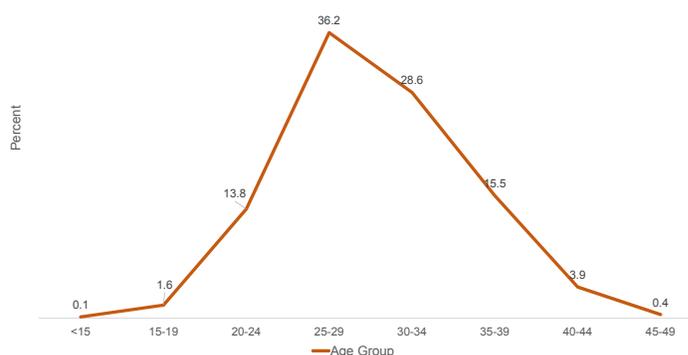
Table 4.3 shows certified births by age group and marital status of mother in urban and rural areas. Generally, within all the age groups, in both rural and urban, there were more children born to married women than to those not married. The highest number of births was among married women age 25-29 in both areas.

Table 4.3: Live Births by Age Group, Marital Status of Mother and Urban/Rural Residence, Zambia 2020				
Mothers' Age Group (years)	**Marital Status of Mother**			**Total Number of Live Births**
	Single	**Married**	**Not stated**	
URBAN				
<15	0	1	0	1
15–19	8	23	0	31
20–24	31	291	3	325
25–29	34	880	1	915
30–34	17	658	2	677
35–39	10	367	0	377
40–44	3	93	0	96
45+	1	8	0	9
Not stated	28	692	20	740
Total	132	3,013	26	3,171
RURAL				
<15	1	0	0	1
15–19	4	16	0	20
20–24	18	98	0	116
25–29	9	231	2	242
30–34	13	223	0	236
35–39	3	113	1	117
40–44	2	27	0	29
45+	0	4	0	4
Not stated	17	222	13	252
Total	122	934	16	1,017

2020 Vital Statistics Report

4.3 Births by Place of Occurrence and Type of Attendant at Birth

Table 4.5 shows that the total number of certified births by place of occurrence, attendant at birth and residence (rural/urban). The results show that almost all (99.8 percent) the births that occurred at a health facility were attended to by a qualified health personnel. A similar picture was observed for both rural and urban areas.

Place of occurrence and site of delivery	Qualified Health Personnel		Traditional Birth Attendants		Total number of live births	
	Number	Percent	Number	Percent	Number	Percent
All births						
Health Facility	4,150	99.8	9	0.2	4,159	100
Home	12	41.4	17	58.6	29	100
Total	4,162	99.4	26	0.6	4,188	100
Rural						
Health Facility	997	99.7	3	0.3	1,000	100
Home	6	35.3	11	64.7	17	100
Total	1,003	98.6	14	1.4	1,017	100
Urban						
Health Facility	3,153	99.8	6	0.2	3,159	100
Home	6	50.0	6	50.0	12	100
Total	3,159	99.6	12	0.4	3,171	100

Table 4.5: Live Births by Place of Occurrence and birth attendant, by Urban/Rural, Zambia 2020

4.4 Crude birth rate

Figure 4.3 shows the Crude Birth Rate (CBR) by year of occurrence from three different data sources. The CBR from the population projections in 2020 was 40.4 births per 1000 population while the CBR from CRVS was 0.2 births per 1000 population. The CBR from the CRVS is not a true reflection due to low coverage of birth registration which is at 5 percent.

Figure 4.3 Crude birth Rate by Year of Occurrence, Zambia 2016-2020
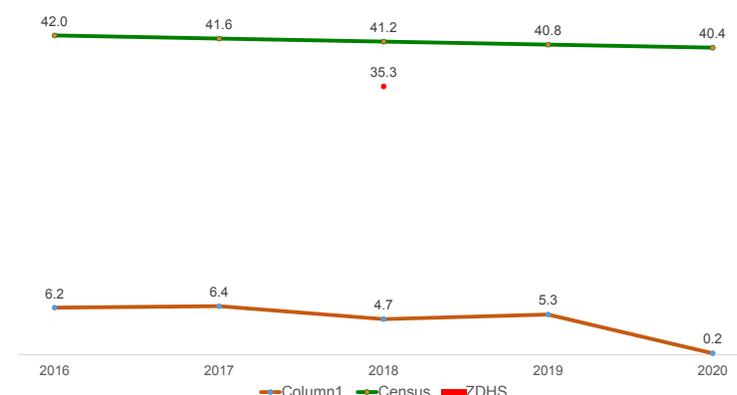
4.5 Age-specific fertility rates

Figure 4.4 shows the age specific fertility rates. The results show that the peak of child bearing was in the age groups 25-29 and 30-34 at 1.6 and 1.5 births, respectively.

Figure 4.4 shows the age specific fertility rates. The results show that the peak of child bearing was in the age groups 25-29 and 30-34 at 1.6 and 1.5 births, respectively.

Figure 4.4: Age-specific fertility rates (ASFRs), Zambia 2020

Chapter 5: Deaths

Death data is very important for monitoring health trends and is an important input into the health sector planning. The results presented in this chapter are based on the certified deaths captured in the civil registration system.

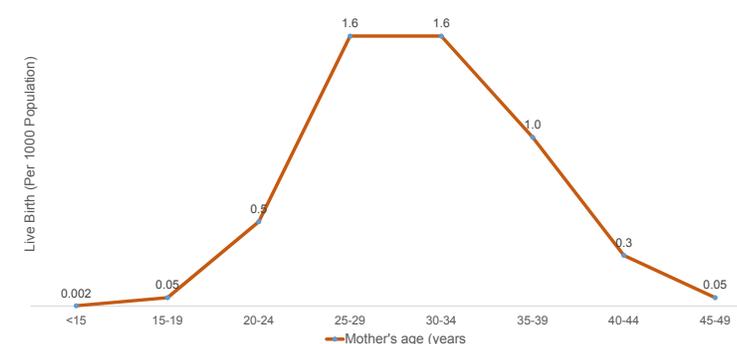Table 5.1 shows the total number of certified deaths by sex, certification completeness rates and the crude death rates for the period 2016 to 2020. The data shows that the number of certified deaths declined from 40,889 in 2016 to 31,893 in 2020 (Figure 5.1). The trend shows that certification completeness on deaths that occurred in the reference period was generally low, with the highest recorded in 2016 at 20 percent completeness. Certification completeness declined from 20 percent in 2016 to 15 percent in 2020.

Certified deaths among males have continued to be higher than certified deaths among females with the exception of 2017. In 2020, 18,480 of the certified deaths occurred among males compared to 13,413 among females.

Table 5.1: Summary Statistics on Mortality by Year of Occurrence, Zambia 2016-2020					
	Year				
Indicator	**2016**	**2017**	**2018**	**2019**	**2020**
Certified Deaths (number)	40,889	39,150	29,085	32,062	31,893
Males	23,680	16,610	16,756	18,187	18,480
Females	17,199	22,537	12,329	13,875	13,413
Certification Completeness (Percent)	20.0	19.0	14.0	15.2	15.0
Crude death rate (per 1,000 population)	2.6	1.7	2.4	1.8	1.8

Figure 5.1: Number of Certified Deaths by Year, Zambia 2020
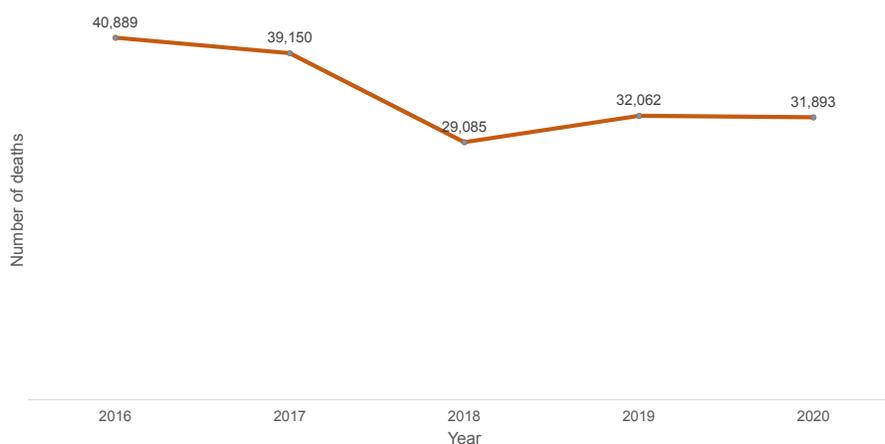
5.1 Deaths by Region, province, and sex of decedent

Table 5.2 shows certified deaths by rural/urban residence, province and sex of decedent. The number of deaths that were certified in 2020 was 31, 893 of which 13,413 were deaths that occurred among males and 18, 480 among females. More deaths were certified in urban areas (30, 593) compared to rural areas (1, 300). By province, Lusaka recorded the highest number of deaths that were certified (16, 901) followed by Copperbelt (10, 434) while Northern and North Western provinces recorded the least number of deaths that were certified at 8 each.

Table 5.2: Certified Deaths by Rural/Urban Residence, province and sex of decedent, Zambia 2020				
	Sex of Decedent			Registration Completeness (Percent)
Place of Occurrence	Male	Female	Total Number of Deaths	
All deaths	13,413	18,480	31,893	15
Urban	17,669	12,924	30,593	34.5
Rural	811	489	1,300	1
Central	1,208	1,654	2,862	14.2
Copperbelt	4,353	6,081	10,434	33.6
Eastern	17	34	51	0.2
Luapula	10	7	17	0.1
Lusaka	7,162	9,739	16,901	47.8
Muchinga	16	28	44	0.3
Northern	0	8	8	0
Northwestern	1	7	8	0.1
Southern	646	900	1546	7.3
Western	0	22	22	0.2

5.2 Deaths by place and site of occurrence

Certified deaths by the place and site of occurrence of the death are presented in figure 5.2. At national level, there were more deaths occurring at the health facility (65 percent) than at home (34 percent). By residence, urban areas had a similar pattern as the national level. However, in rural areas, there were more deaths that occurred at home than at the health facility (73% against 26%).

Figure 5.2: Deaths by place and site of occurrence, 2020
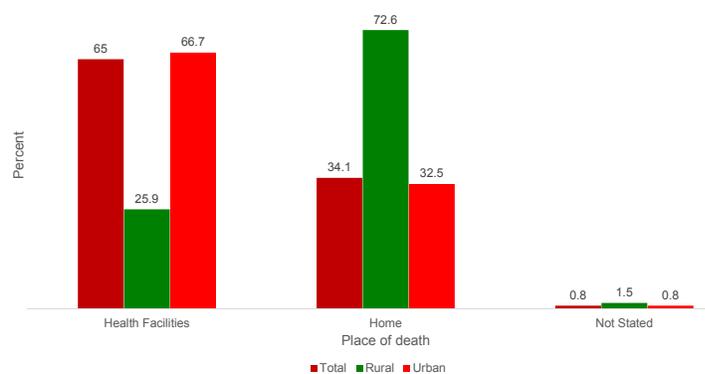
5.3 Crude death rate

Table 5.3 shows the Crude Death Rate (CDR) by place of usual residence of decedent from two data sources. The CDR from the population projections in 2020 was 11.9 deaths per 1,000 population while the CDR from CRVS was 1.8 deaths per 1,000 population. The CDR from the CRVS is not a true reflection due to the low coverage of death registration completeness which is at 18.0 percent.

Table 5.3: Crude Death Rate (CDR) by Place of Usual Residence of Decedent, Zambia 2020				
Place of Usual Residence of Decedent	**Total Number of Deaths**	**Total Population**	**Crude Death Rate (per 1,000 Population)**	
			CRVS	**Census**
All deaths	31,893	17,885,422	1.8	11.9
Urban	30,593	7,752,611	4.0	11.4
Rural	1,300	10,132,811	0.1	12.2
Central	2,862	1,734,601	1.7	11.7
Copperbelt	10,434	2,669,635	3.9	11.6
Eastern	51	2,065,590	0.0	14.1
Luapula	17	1,276,608	0.0	15.1
Lusaka	16,901	3,360,183	5.0	10.5
Muchinga	44	1,095,535	0.0	12.7
Northern	8	1,520,004	0.0	11.9
Northwestern	8	950,789	0.0	10.0
Southern	1,546	2,135,794	0.7	9.9
Western	22	1,076,683	0.0	13.5

5.4 Age-specific mortality rates

Figure 5.4 shows the age-specific mortality rates. The figure is the characteristic u-shape with high mortality at the oldest ages and the very young. Generally, deaths among males are higher than deaths among females for all the age groups.

Figure 5.4: Age-specific Mortality Rates by Sex, Zambia 2020
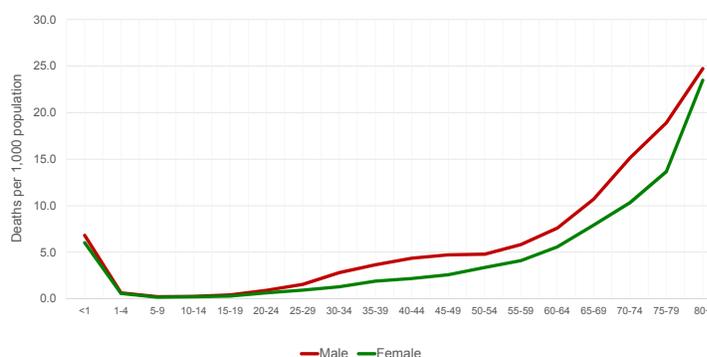
Chapter 6: Causes of Death

This chapter presents deaths by broad cause of death groups and leading Causes of Death (CoD) for 2020. The CoD data were classified using the 10th revision of the International Classification of Diseases (ICD-10) and focused on the underlying causes of death derived from the Medical Certificate of Cause of Death (MCCD).

6.1 Deaths by Broad Cause of Death Group

The nineteen ICD-10 chapters used in the reporting of information can further be condensed into three groups of causes of death as per the Global Burden of Disease cause list:

- Group I: Communicable diseases, Maternal and perinatal causes, and Nutritional conditions
- Group II: Non-communicable diseases; and
- Group III: External Causes of mortality.

Communicable diseases are diseases caused by pathogenic micro-organisms, such as bacteria, viruses, parasites, or fungi and can be spread, directly or indirectly, from one person to another (e.g., diarrhoea, tuberculosis and pneumonia). Non-communicable diseases are medical conditions or diseases that are non-infectious or non-transmissible among people (e.g., cancer, asthma, and heart diseases). External Causes of mortality are the non-natural causes of death (e.g., road traffic accidents, drowning, and poisoning).

Ill-defined codes are symptoms, signs and abnormal clinical findings which do not give sufficient information concerning the possible conditions that lead to the death.

Figure 6.1 shows deaths by broad disease groups. The leading cause of death were communicable diseases (group 1) at 36.6 percent followed by non-communicable diseases (group 2) at 31.4 percent. The ill-defined causes of death were at 27.8 percent.

Figure 6.1: Deaths by Broad Group, including Ill-defined Codes, Zambia 2020
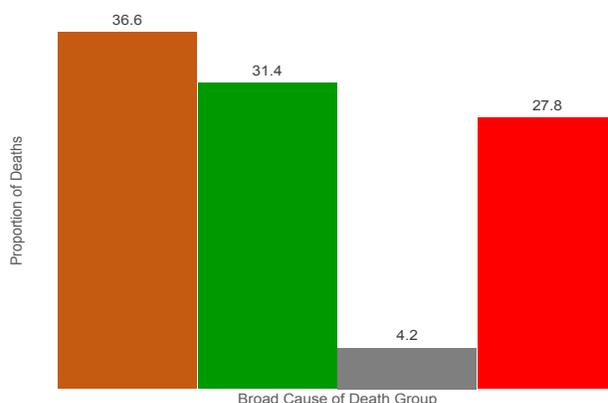
Figure 6.2 shows deaths by broad disease groups and age for males. Deaths due to communicable diseases (group 1) were highest for those less than 1 year and was lowest for those 85 years and older. Deaths due to non-communicable diseases (group 2) were highest for those age 45 years and older. The lowest cause of death for males was External Causes (group 3) across all age groups.

Figure 6.2: Deaths by broad disease group and age, males, Zambia 2020
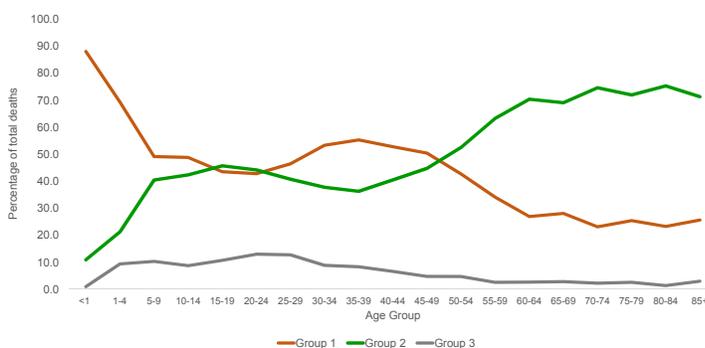
Figure 6.3 shows deaths by broad disease groups and age for females. Similar to the males, deaths due to communicable diseases (group 1) were highest for those less than 1 year and lowest for those 85 years and older. Deaths due to non-communicable diseases (group 2) were highest for those age 45 years and older. The lowest cause of death for females was External Causes (group 3) across all age groups

6.2 Leading causes of death

This subsection presents information on the leading underlying causes of death. The ten leading causes are identified through ranking by frequency.

Figure 6.3: Deaths by broad disease Group and Age, Females, Zambia 2020

Table 6.1 shows the top ten leading causes of death among males. The leading cause of death among males was HIV (8.9 percent) followed by Tuberculosis (3.9 percent). Cerebrovascular diseases was the third leading cause of death at 3.7 percent.

Table 6.1: Ten Leading Causes of Death, Males, Zambia 2020				
Rank	**ICD code**	**Diseases**	**Number of deaths**	**Proportion (Percent)**
1	(B20-B24)	Human Immunodeficiency Virus [HIV] disease	1,034	8.9
2	(A15-A19)	Tuberculosis	452	3.9
3	(I60-I69)	Cerebrovascular diseases	429	3.7
4	(P20-P29)	Respiratory and cardiovascular disorders specific to the perinatal period	403	3.5
5	(P90-P96)	Other disorders originating in the perinatal period.	394	3.4
6	(J09-J18)	Influenza and pneumonia	313	2.7
7	(A30-A49)	Other bacterial diseases	260	2.2
8	(P35-P39)	Infections specific to the perinatal period	253	2.2
9	(E10-E14)	Diabetes mellitus	237	2.0
10	(B50-B64)	Protozoal diseases	213	1.8
-		All other causes	4,307	37.2
-	R00-R99	Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified	3,296	28.4
-	-	Total	11,591	100

Table 6.2 shows the top ten leading causes of death among females in 2020. Similar to the males, the leading cause of death among females was HIV at 10.3 percent. The second leading cause of death were cerebrovascular diseases at 5.9 percent.

Table 6.2: Ten Leading Causes of Death among Females, Zambia 2020				
Rank	ICD code	Diseases	Number of deaths	Proportion (Percent)
1	(B20-B24)	Human Immunodeficiency Virus [HIV] disease	945	10.3
2	(I60-I69)	Cerebrovascular diseases	535	5.9
3	(P90-P96)	Other disorders originating in the perinatal period.	332	3.6
4	(C51-C58)	Malignant neoplasms of female genital organs	313	3.4
5	(P20-P29)	Respiratory and cardiovascular disorders specific to the perinatal period	292	3.2
6	(E10-E14)	Diabetes mellitus	267	2.9
7	(A15-A19)	Tuberculosis	237	2.6
8	(I30-I52)	Other forms of heart disease	232	2.5
9	(A30-A49)	Other bacterial diseases	231	2.5
10	(J09-J18)	Influenza and pneumonia	209	2.3
		All other causes	3254	35.6
-	R00-R99	Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified	2,305	25.2
-	-	Total	9,152	100

6.2.1 Infants and children (0-4 years)

Leading causes of death among infants and children are shown in Table 6.3. The leading cause of death among children age 0-4 years was 'Other disorders' originating in the perinatal period (14.7 percent) followed by Respiratory and cardiovascular disorders (14.2 percent). The third leading cause of death were infections specific to the perinatal period at 9.6 percent.

Table 6.3: Ten Leading Causes of Death, Infants, and Children (0-4 years, both sexes combined), Zambia 2020				
Rank	ICD code	Diseases	Number of deaths	Proportion (Percent)
1	(P90-P96)	Other disorders originating in the perinatal period	656	14.7
2	(P20-P29)	Respiratory and cardiovascular disorders specific to the perinatal period	632	14.2
3	(P35-P39)	Infections specific to the perinatal period	426	9.6
4	(E40-E46)	Malnutrition	224	5.0
5	(P05-P08)	Disorders related to length of gestation and fetal growth	116	2.6
6	(J09-J18)	Influenza and pneumonia	105	2.4
6	(A30-A49)	Other bacterial diseases	105	2.4
7	(P50-P61)	Haemorrhagic and haematological disorders of fetus and newborn	86	1.9
8	(X00-X09)	Exposure to smoke, fire and flames	82	1.8
9	(A00-A09)	Intestinal infectious diseases	62	1.4
10	(Q20-Q28)	Congenital malformations of the circulatory system.	60	1.4
-		All other causes	778	17.5
-	R00-R99	Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified	1,124	25.2
-	-	Total	4,456	100

6.2.2 Children (5-14 years old)

Table 6.4 shows leading causes of death among children age 5-14 years. The leading cause of death were 'Protozoal diseases' (7.9 percent) followed by 'HIV' (5.8 percent). Protozoal diseases are parasitic infections caused by organisms classified as protozoa such as malaria.

Rank	ICD code	Diseases	Number of deaths	Proportion (Percent)
1	(B50-B64)	Protozoal diseases	55	7.9
2	(B20-B24)	Human Immunodeficiency Virus [HIV] disease	40	5.8
3	(C81-96)	Malignant neoplasms, stated or presumed to be primary, of lymphoid, haematopoietic and related tissue	24	3.5
4	(G00-G09)	Inflammatory diseases of the central nervous system	22	3.2
5	(X00-X09)	Exposure to smoke, fire and flames	19	2.7
6	(D55-D59)	Haemolytic anaemias	18	2.6
6	(A30-A49)	Other bacterial diseases	18	2.6
7	(E40-E46)	Malnutrition	17	2.5
8	(D60-D64)	Aplastic and other anaemias	15	2.2
9	(V80-V89)	Other land transport accidents	14	2.0
10	(A15-A19)	Tuberculosis	12	1.7
-		All other causes	199	28.7
-	R00-R99	Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified	240	34.6
-	-	Total	693	100

Table 6.4: Ten Leading Causes of Death among Children (5-14 years), Zambia 2020

6.2.3 Adolescents and adults (15-69 years old)

The ten leading causes of death for male adolescents and adults age 15–69 years are shown in Table 6.5. HIV was the leading cause of death (13.5 percent) followed by Tuberculosis (5.5 percent).

Rank	ICD code	Diseases	Number of deaths	Proportion (Percent)
1	(B20-B24)	Human Immunodeficiency Virus [HIV] disease	948	13.5
2	(A15-A19)	Tuberculosis	385	5.5
3	(I60-I69)	Cerebrovascular diseases	269	3.8
4	(K70-K77)	Diseases of liver	191	2.7
5	(J09-J18)	Influenza and pneumonia	182	2.6
6	(E10-E14)	Diabetes mellitus	173	2.5
7	(C15-C26)	Malignant neoplasms of digestive organs	169	2.4
8	(X58-X59)	Accidental exposure to other and unspecified factors	149	2.1
9	(B50-B64)	Protozoal diseases	147	2.1
10	(N17-N19)	Renal failure	145	2.1
-		All other causes	2,215	31.5
-	R00-R99	Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified	2,050	29.2
-	-	Total	7,023	100

Table 6.5: Ten Leading Causes of Death among male Adolescents and Adults (15-69 years), Zambia 2020

Table 6.6 shows ten leading causes of death for female adolescents and adults age 15–69 years. The leading cause of death was HIV (16.7 percent) followed by cerebrovascular diseases (5.3 percent).

Rank	ICD code	Diseases	Number of deaths	Proportion (Percent)
Table 6.6: Ten Leading Causes of Death among Female Adolescents and Adults (15-69 years), Zambia 2020				
1	(B50-B64)	Human Immunodeficiency Virus [HIV] disease	867	16.7
2	(I60-I69)	Cerebrovascular diseases	276	5.3
3	(C51-C58)	Malignant neoplasms of female genital organs	269	5.2
4	(A15-A19)	Tuberculosis	203	3.9
5	(E10-E14)	Diabetes mellitus	188	3.6
6	(I30-I52)	Other forms of heart disease	136	2.6
7	(A30-A49)	Other bacterial diseases	118	2.3
8	(B50-B64)	Protozoal diseases	116	2.2
9	(C15-C26)	Malignant neoplasms of digestive organs	109	2.1
10	(K70-K77)	Diseases of liver	98	1.9
-		All other causes	1,568	30.3
-	R00-R99	Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified	1,232	23.8
-	-	Total	5,180	100

6.2.4 Older adults (70 years and older)

Table 6.7 shows the top ten leading causes of death among males age 70 years and older. 'Cerebrovascular diseases' was the leading cause of death (9.9 percent) followed by diseases of male genital organs (5.8 percent).

Rank	ICD code	Diseases	Number of deaths	Proportion (Percent)
Table 6.7: Ten Leading Causes of Death among Male Older Adults (70 years and older, males), Zambia 2020				
1	(I60-I69)	Cerebrovascular diseases	152	9.9
2	(N40-N51)	Diseases of male genital organs	89	5.8
3	(J09-J18)	Influenza and pneumonia	69	4.5
4	(E10-E14)	Diabetes mellitus	61	4.0
4	(I30-I52)	Other forms of heart disease	61	4.0
5	(I10-I15)	Hypertensive diseases	59	3.8
6	(A30-A49)	Other bacterial diseases	49	3.2
7	(N40-N51)	Diseases of male genital organs	46	3.0
7	(A15-A19)	Tuberculosis	46	3.0
8	(N17-N19)	Renal failure	32	2.1
9	(C15-C26)	Malignant neoplasms of digestive organs	30	2.0
10	(J40-J47)	Chronic lower respiratory diseases	19	1.2
-		All other causes	372	24.2
-	R00-R99		452	29.4
-	-	Total	1,537	100

Table 6.8 shows the top ten leading causes of death among females age 70 years and older. 'Cerebrovascular diseases' were the leading cause of death (17.3 percent), followed by hypertensive diseases (7.0 percent).

Rank	ICD code	Diseases	Number of deaths	Proportion (Percent)
1	(I60-I69)	Cerebrovascular diseases	248	17.3
2	(I10-I15)	Hypertensive diseases	100	7.0
3	(I30-I52)	Other forms of heart disease	86	6.0
4	(E10-E14)	Diabetes mellitus	68	4.8
5	(J09-J18)	Influenza and pneumonia	64	4.5
6	(A30-A49)	Other bacterial diseases	61	4.3
7	(C51-C58)	Malignant neoplasms of female genital organs	38	2.7
8	(C15-C26)	Malignant neoplasms of digestive organs.	37	2.6
9	(B50-B64)	Human Immunodeficiency Virus [HIV] disease	20	1.4
10	(N17-N19)	Renal failure	18	1.3
-		All other causes	289	20.2
-	R00-R99	Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified	402	28.1
-	-	Total	1,431	100

Table 6.8: Ten Leading Causes of Death among Female Older Adults (70 years), Zambia 2020

Chapter 7: Lusaka District Mortality and Cause of Death (Verbal Autopsy and MCCD)

Introduction

In vital statistics reports, cause of deaths data reported are mostly derived from medically certified deaths that usually occur in health facilities. However, if a large proportion of deaths occur outside the health facilities, as is the case in Zambia, they are missed out in the CoD data of the vital statistics report. Verbal Autopsy (VA) was introduced in Zambia to obtain cause of death information for deaths that occur outside health facilities, especially when Medical Certification of Cause of Death (MCCD) is unavailable or where resources and culture do not allow for actual autopsies to happen. VA is a structured interview conducted with the next of kin or a caregiver of the deceased about the signs, symptoms and circumstances leading to death. The questionnaire is structured for three age groups (under four weeks; 4 weeks-14 years, 15 years and older) including maternal and perinatal deaths and deaths due to injuries. Probable causes of death are subsequently derived by automated algorithms or physician analysis of VA interview results.

In Lusaka district, routine VA has been implemented for all non-facility deaths that are brought through to the hospital mortuaries as Brought-in-Dead (BID) since 2017. The cause of death information derived from the VA implementation can complement MCCD data to have a more complete mortality data of an area, which is vital for monitoring mortality patterns and public health interventions.

This chapter presents causes of death profile for Lusaka district using VA and MCCD obtained in the year 2020. It also includes the leading causes of deaths for both facility and non-facility deaths.

7.1 Death Registration System in Lusaka District

Lusaka district has a very high death registration coverage and completeness; All deaths (facility and non-facility) are expected to be captured by the Civil Registration System (CRS). Facility deaths are notified by the health facility workers, which require a MCCD form to be completed by the attending doctor and transmitted to Department of National Registration, Passport and Citizenship (DNRPC) for legal and statistical purposes. Non-facility deaths are captured as BID cases at hospital mortuaries where a death notification form is completed, and a VA interview is done. The information is then transmitted to DNRPC for legal and statistical purposes. In 2020, the total number of registered deaths for Lusaka district was 18,259. The death registration completeness rate was calculated using the following formula:

$$Completenss\ rate\ for\ deaths = \frac{Number\ of\ registered\ deaths\ within\ the\ year\ of\ occurence}{Estimated\ number\ of\ deaths\ within\ the\ year} \times 100$$

Based on this formula, the death registration completeness rate was 91.6 percent.

7.2 Basic Mortality Indicators (Rates)

The basic mortality indicators calculated for Lusaka District from the 2020 registered deaths include: CDR, Infant Mortality Rate (IMR), Under-Five Mortality Rate (U5MR) and Age-Specific Mortality Rate (ASMR). Weighting (using Inverse probability weighting) was applied to adjust for this degree of incompleteness (91.6 percent registration completeness) in the data.

A weight of 1.0504 was applied to the registered deaths.

i) Crude Death Rates (CDR)

The number of deaths in a given year divided by the mid-year population (per 1,000). It is given by the formula:

$$\frac{D}{P} x 1000$$

Where:

D (registered deaths) is 18,259 and Dw (weighted registered deaths) is 19,941; and
P (estimated mid-year population) is 2,731,696.
CDR= 7.3 deaths per 1000 population.

ii) Infant Mortality Rate (IMR)

The number of deaths of children younger than 1 year (12 months) per 1,000 live births in a given population. It is represented by the formula:

$$IMR = \frac{Number\ of\ deaths\ of\ infants\ under\ age\ 1\ in\ a\ given\ year}{Total\ live\ births\ in\ that\ year} x\ 1,000$$

Where the number of infant deaths was 2,148 (**weighted deaths = 2,256 weighted**) and the number of live births was 97,740
IMR = 23 deaths per 1000 live births

iii) Under 5 Mortality Rate (U5MR)

The number of children dying under the age of 5 per 1,000 live births in a given population.

$$U5MR = \frac{Number\ of\ deaths\ of\ children\ age\ 0 - 4\ in\ a\ given\ year}{Total\ live\ births\ in\ that\ year} x\ 1,000$$

Where the number of under 5 deaths was 2,892 (**weighted deaths=3,037**) and the number of live births was 97,740

U5MR = 31 deaths per 1000 live birth

iv) **Age-Specific Mortality Rate**

The number of deaths in the age group per 1000 population of the age group.

$$ASMR = \frac{Number\ of\ deaths\ of\ Age-group\ in\ a\ given\ year}{Total\ number\ of\ persons\ of\ Age-group\ in\ a\ given\ year} x\ 1{,}000$$

Figure 7.1 shows the ASMR for the registered deaths for Lusaka District in 2020. The figure is the characteristic u-shape with high mortality at the oldest ages and the very young. Generally, male deaths are higher than female deaths for all the age groups.

Figure 7.1: Age-Specific Mortality Rate by Sex, Lusaka District 2020
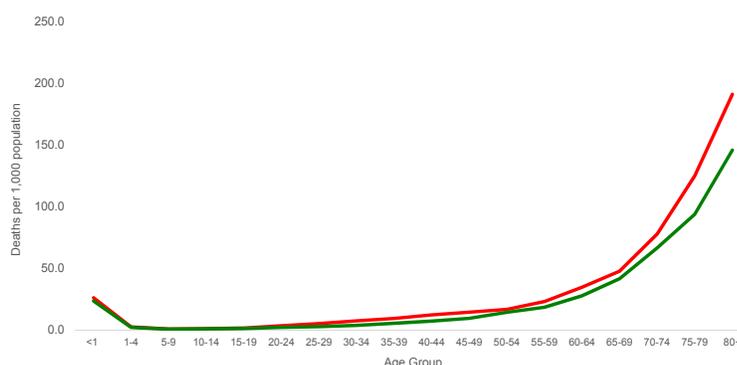
7.3 Cause of Death Data: VA and MCCD Deaths

Table 7.1 shows both facility (MCCD) and non-facility deaths (VA). A total of 6,169 VA interviews were conducted of which, 3,643 were male and 2,526 were female. In the same year (2020) 11,561 MCCDs were collected, of which 6,448 were male and 5,113 were female. The COD analyses for this report were based on both MCCD and VA data.

Table 7.1: Certified Deaths in Lusaka Districts in 2020 by Source of Cause of Deaths Information, 2020						
	Male	**Percent**	**Female**	**Percent**	**Total**	**Percent**
Facility deaths with MCCD	6,448	55.8	5,113	44.2	11,561	100
Non-facility deaths with VA	3,643	59.1	2,526	40.9	6,169	100
Total	10,091	-	7,639	-	17,730	-

7.3.1 Accuracy of the Death Data

Accuracy of the MCCD Data – ANACoD3 Evaluation

In examining the ANACoD3 tool output of the Lusaka district MCCD data, no invalid codes for underlying cause of death were found. Similarly, no implausible sex/cause and disease/age combinations, nor deaths due to unlikely   causes were found. This indicated that the data was of fairly good quality. The proportion of the ill-defined causes as underlying causes of deaths for both males and females was 34.2 percent.

Table 7.2 shows the distribution of the ill-defined causes. Most of the ill-defined causes were consisting of signs and symptoms (ICD-10: R00-R99) at 72.5 percent, followed by diseases of circulatory system at 9 percent and infectious parasitic diseases at 7.6 percent. While the overall proportion of ill-defined cause of 34.2 percent may be fairly high, it is expected for a country that is working on improving its quality of MCCD data through doctor MCCD training and improving its ICD-10 coding practices.

Table 7.2: Ill-defined causes for all MCCD deaths of Lusaka District , 2020				
All causes	Both sex	Male	Female	Percent of Ill-defined
Ill-defined causes by ICD-10 chapter:				
I. Infectious and parasitic diseases	300	172	128	7.6
II. Neoplasms	81	35	46	2.7
III. Diseases of blood	8	3	5	0.3
IV. Endocrine, nutritional, metabolic and immunity disorders	13	8	5	0.3
IX. Diseases of circulatory system	281	130	151	9.0
X. Diseases of respiratory system	14	7	7	0.4
XI. Diseases of digestive system	63	34	29	1.7
XIV. Diseases of genitourinary system	194	125	69	4.1
XVI Perinatal conditions	5	4	1	0.1
XVIII. Symptoms, signs and ill-defined conditions	2,929	1711	1,218	72.5
XX. External causes of morbidity and mortality	68	46	22	1.3
Total of ill-defined	3,956	2,275	1,681	100
Percent of All Ill-defined causes	34.2%	35.3%	32.8%	

Accuracy of the VA data

In examining the quality of the VA interviews, the average length of the VA interviews, using the WHO 2016 verbal autopsy questionnaire, was 45 minutes, which fell within the acceptable range. Variations based on the age and sex of the decedent and reported symptoms were observed. The mean period between the date of death and date of interview was one day; over 85 percent of all VAs were conducted on the same day of the death of the decedent. This is because in the routine VA implementation in Lusaka, the VA interviews were conducted the day when the deceased are brought to the mortuary, which is usually on the same day of their death.

In examining the VA outputs of the InterVA 5 data, the proportion of the undetermined causes was 5.5 percent, which suggests good quality data. Table 7.3 shows the distribution of the undetermined VAs by VA age-groups, where the majority (21.9 percent) of the undermined VAs were among the Neonatal group and the minority (3.3 percent) were among the adults.

Table 7.3: Percent of Undetermined causes for Neonatal, Child and Adult VA Deaths, Lusaka District 2020				
Causes from VA	Neonatal	Child	Adult	Total
All other causes	78.1	83.2	96.7	94.5
Undetermined	21.9	16.8	3.3	5.5
All causes	100.0	100.0	100.0	100.0

7.4.2 Leading Causes of Non-Facility Deaths using Verbal Autopsy

In this section, the leading causes of death by age and sex for the non-facility deaths from the VA data are presented.

Figure 7.2 shows the ten leading causes of non-facility deaths. The leading cause of death for all VA deaths (of all ages and both sexes) was 'HIV/AIDS related' at 12.9 percent followed by 'acute cardiac disease' at 9.6 percent. The third leading cause of death was 'Other and unspecified cardiac diseases' at 8.8 percent

Figures 7.3 shows the ten leading causes of death for females. The leading cause of death among females was 'HIV/AIDS related' at 15.1 percent deaths followed by 'other and unspecified cardiac disease' at 11.5 percent.

Figures 7.4 shows the ten leading causes of death for males. Similar to females, the leading cause of death was 'HIV/AIDS related' at 11.3 percent. The second leading cause of death was 'acute cardiac disease' at 10.7 percent.

Figure 7.2: Ten Leading causes of non-facility deaths (N=6,169), Lusaka District 2020

Cause	Percent
HIV/AIDS related death	12.9
Acute cardiac disease	9.6
Other and unspecified cardiac dis	8.8
Stroke	8.2
Acute resp infect incl pneumonia	5.8
Pulmonary tuberculosis	5.5
Diarrhoeal diseases	5.2
Digestive neoplasms	4.4
Epilepsy	3.5
Road traffic accident	3.3
Indeterminate	5.5
Other causes	27.4
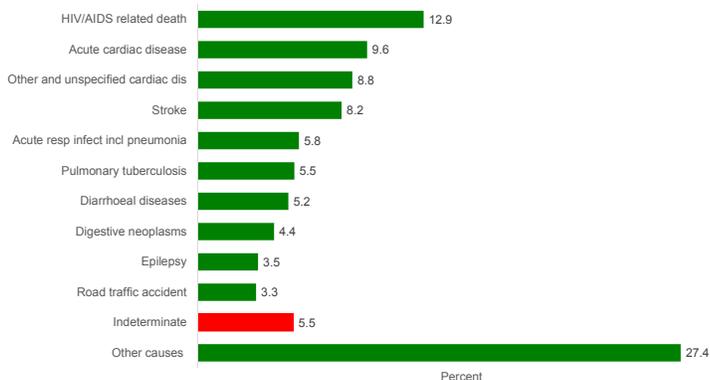
Figure 7.3: Ten Leading causes of non-facility deaths in Females (N= 2,526), Lusaka District 2020

Cause	Percent
HIV/AIDS related death	15.1
Other and unspecified cardiac disease	11.5
Stroke	11.2
Acute cardiac disease	8.1
Diarrhoeal diseases	5.9
Acute resp infect incl pneumonia	5.6
Diabetes mellitus	3.8
Digestive neoplasms	3.1
Epilepsy	3.1
Pulmonary tuberculosis	3.0
Indeterminate	4.7
All other causes	25.0
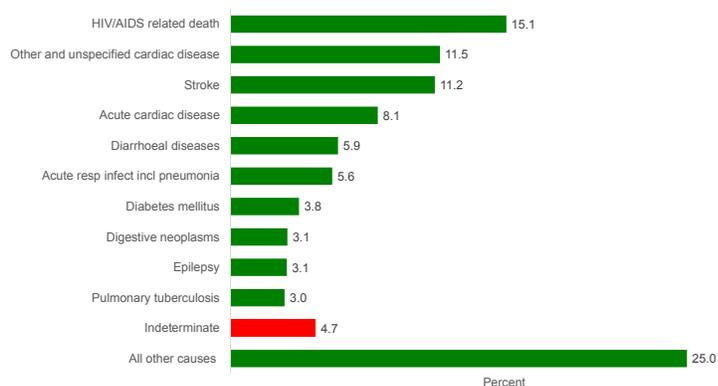
Figure 7.4: Ten Leading causes of non-facility deaths in Males (N= 3,643) , Lusaka District 2020
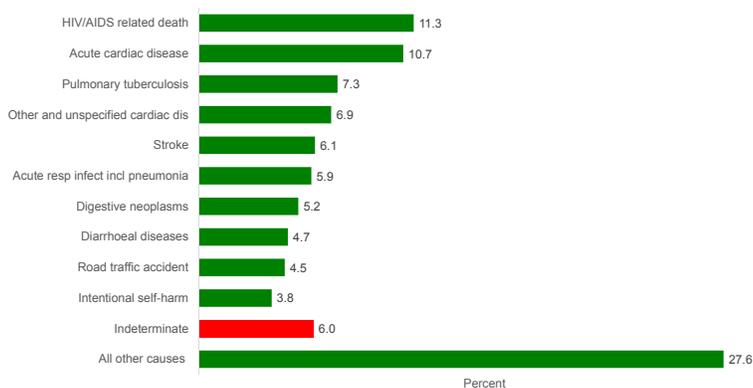
Cause	Percent
HIV/AIDS related death	11.3
Acute cardiac disease	10.7
Pulmonary tuberculosis	7.3
Other and unspecified cardiac dis	6.9
Stroke	6.1
Acute resp infect incl pneumonia	5.9
Digestive neoplasms	5.2
Diarrhoeal diseases	4.7
Road traffic accident	4.5
Intentional self-harm	3.8
Indeterminate	6.0
All other causes	27.6

Figure 7.1 shows the ASMR for the registered deaths for Lusaka District in 2020. The figure is the characteristic u-shape with high mortality at the oldest ages and the very young. Generally, male deaths are higher than female deaths for all the age groups.

Figure 7.5: Ten Leading causes of non-facility deaths in neonates (N=146), Lusaka District 2020
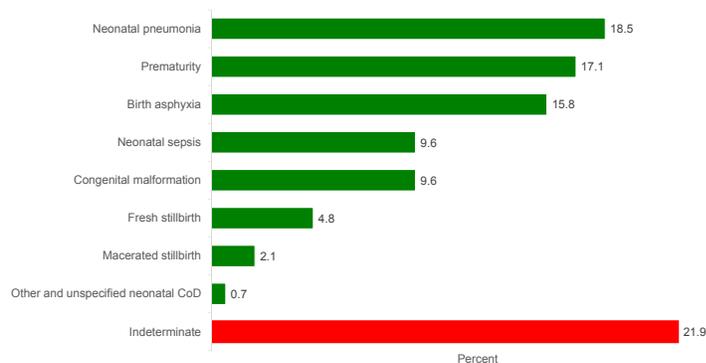
Figures 7.6 shows the ten leading causes of death in children (4 weeks to 14 years). Among the 794 children for which a VA was completed, diarrhoeal diseases was the leading cause, accounting for 24.1 percent of deaths followed by Other and unspecified infectious diseases accounting for 11.3 percent of deaths.

Figure 7.6: Ten Leading causes of non-facility deaths in children Age 4 Weeks to 14 years (N= 794), Lusaka District 2020

Figures 7.7 shows the ten leading causes of death in adults 15 years and older. Among the 5,229 adults for which a VA was completed, HIV/AIDS related diseases was the leading cause, accounting for 14.3 percent followed by Acute cardiac disease at 11.3 percent.

Figure 7.7: Ten Leading causes of non-facility deaths in adults 15 years and older (N=5,229), Lusaka District 2020

2020 Vital Statistics Report

7.4.3 Leading Causes of Deaths from Medical Certificate of Cause of Death

In this section, causes of death from health facilities (MCCD) occurring in Lusaka district for the year 2020 are discussed. Leading cause of facility deaths with the MCCD and by Sex and age are hereby outlined.

Figure 7.8 shows the ten leading causes of health facility deaths. HIV was the leading cause of death at 9.5 percent followed by Cerebrovascular diseases at 4.7 percent.
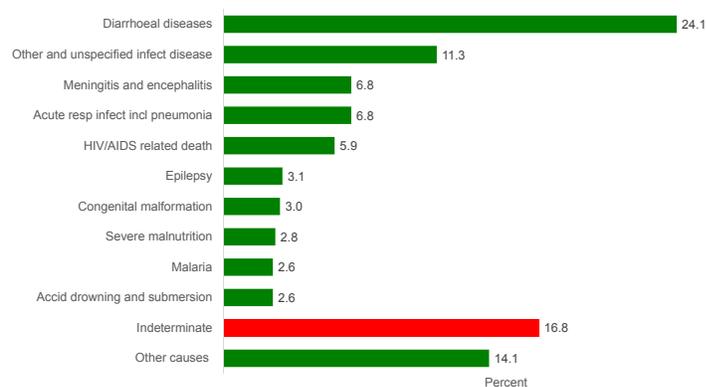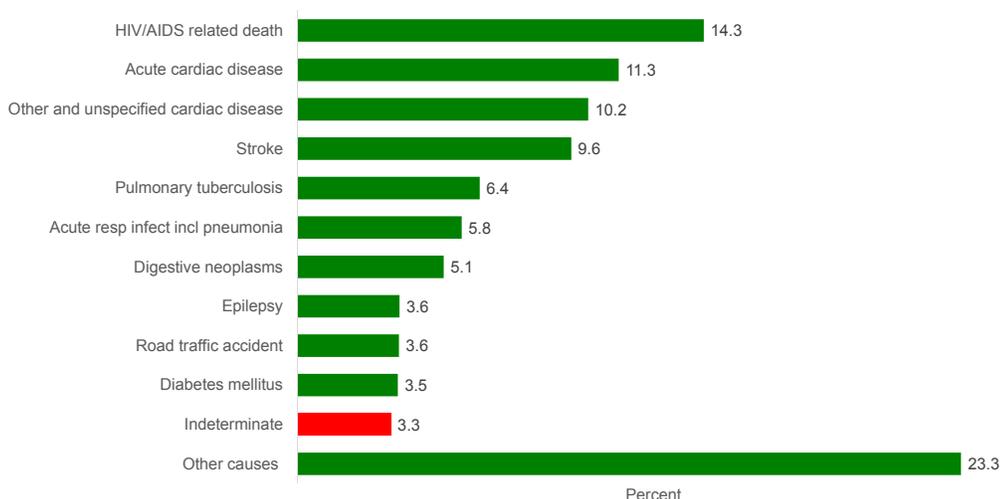
Figure 7.9 shows the ten leading causes of health facility deaths among males. HIV was the leading cause of death at 8.6 percent followed by Cerebrovascular diseases at 4.2 percent.

Figure 7.8: Ten Leading causes of facility deaths (N=11,561)

Cause	Percent
Human immunodeficiency virus [HIV] disease	9.5
Cerebrovascular diseases	4.7
Tuberculosis	3.5
Respiratory and cardiovascualar disorder	3.2
Other bacterial diseases	2.7
Influenza and pneumonia	2.7
Diabetes mellitus	2.6
Infections specific to the perinatal period	2.5
Other forms of heart disease	2.1
Malignant neoplasms of digestive orga..	2.1
Ill-defined and unknown causes of mortality	24.5
All other causes combined	39.9

Figure 7.9: Ten Leading causes of facility deaths in Males (N= 6,448)

Cause	Percent
Human immunodeficiency virus [HIV] disease	8.6
Cerebrovascular diseases	4.2
Tuberculosis	4.1
Respiratory and cardiovascualar disorder	3.3
Influenza and pneumonia	2.8
Other bacterial diseases	2.8
Infections specific to the perinatal period	2.4
Diabetes mellitus	2.4
Malignant neoplasms of digestive orga..	2.1
Renal failure	1.9
Ill-defined and unknown causes of mortality	25.8
All other causes combined	39.6

Figure 7.10 shows the top ten causes of health facility deaths among females. Similar to males, the leading cause of death among females was HIV was at 10.5 percent followed by Cerebrovascular diseases at 5.5 percent.

Figure 7.10: Ten Leading causes of facility deaths in Females (N= 5,113)

Cause	Percent
Human immunodeficiency virus [HIV] disease	10.5
Cerebrovascular diseases	5.5
Malignant neoplasms of female genital organs	4.3
Respiratory and cardiovascualar disorder	3.2
Diabetes mellitus	2.9
Tuberculosis	2.7
Other bacterial diseases	2.6
Infections specific to the perinatal period	2.5
Influenza and pneumonia	2.5
Hypertensive disease	2.5
Ill-defined and unknown causes of mortality	23.0
All other causes combined	37.9

Figure 7.11 shows the ten leading causes of death among infants. Of the 1,755 infant deaths reported, 18.6 percent were attributed to respiratory and cardiovascular disorders in perinatal, followed by infections specific to the perinatal period (15.3 percent). The third leading cause was other disorders in the perinatals at 9.0 percent.

Figure 7.11: Ten Leading causes of facility deaths for infants (N=1,755)

Cause	Percent
Respiratory and cardiovascualar	18.6
Infections in perinatals	15.3
Other disorders in the perinatals	9.0
Other bacterial diseases	3.5
Haemorrhagic and haematological disorders of fetus and newborn	3.2
Malnutrition	2.7
Congenital malformations of circulatory system	2.3
Influenza and pneumonia	2.3
Other congenital malformations of the digestive system	2.2
Disorders in length of gestation and fetal growth	2.1
Ill-defined and unknown causes of mortality	19.5
All other causes combined	19.2

Figure 7.12 shows the ten leading causes of death among children age 1 to 11 years. Among the 750 children for which an MCCD was completed, malnutrition was the leading cause at 14.5 percent followed by exposure to smoke, fire and flames at 5.6 percent. In the third place was HIV at 4.4 percent.

Figure 7.12: Ten Leading causes of facility deaths for children aged 1-11 years (N=750)

Cause	Percent
Malnutrition	14.5
Exposure to smoke, fire and flames	5.6
Human immunodeficiency virus [HIV] disease	4.4
Malignant neoplasms, stated or presumed to be primary, of lymphoid, haematopoietic and related tissue	3.1
Intestinal infectious diseases	2.9
Protozoal diseases	2.9
Other bacterial diseases	2.8
Inflammatory diseases of the central nervous system	2.5
Influenza and pneumonia	2.1
Aplastic and other anaemias	1.9
Ill-defined and unknown causes of mortality	30.7
All other causes combined	26.5

Figure 7.13 shows the ten leading causes of death among adults 12 years and older. Among the 8,825 adults for which an MCCD was completed, HIV was the leading cause at 11.6 percent followed by Cerebrovascular diseases at 6.1 percent.

Figure 7.13: Ten Leading causes of facility deaths among Adults 12 years and older (N= 8,825)
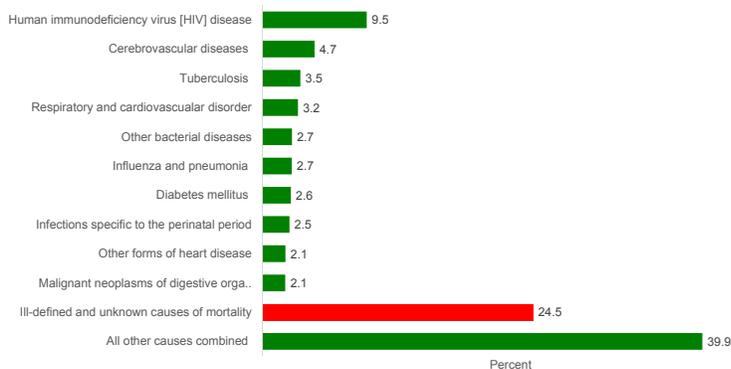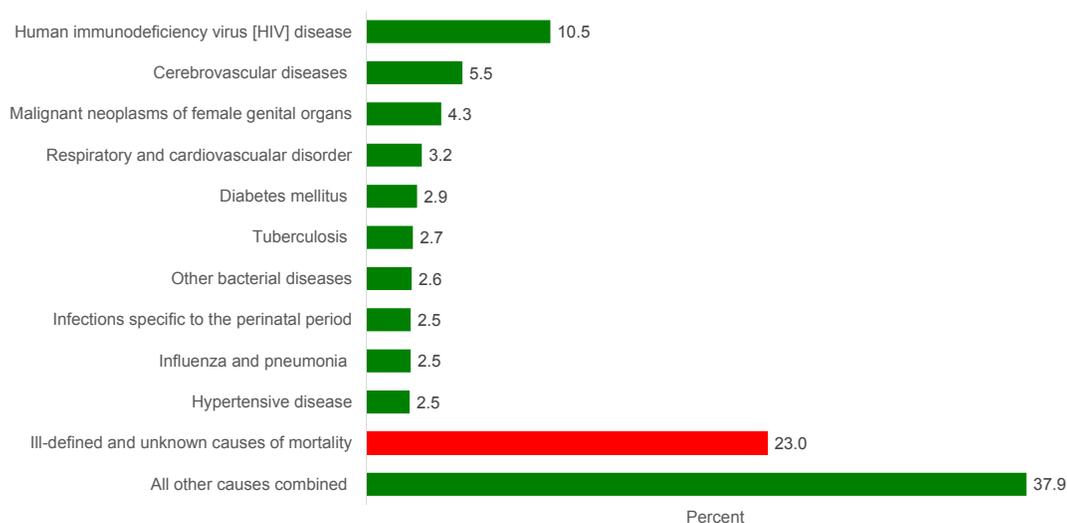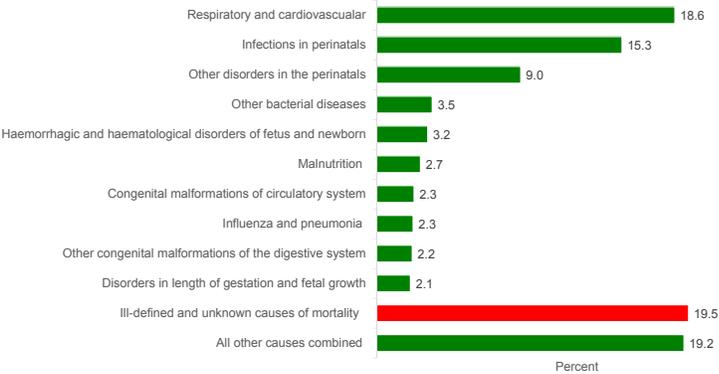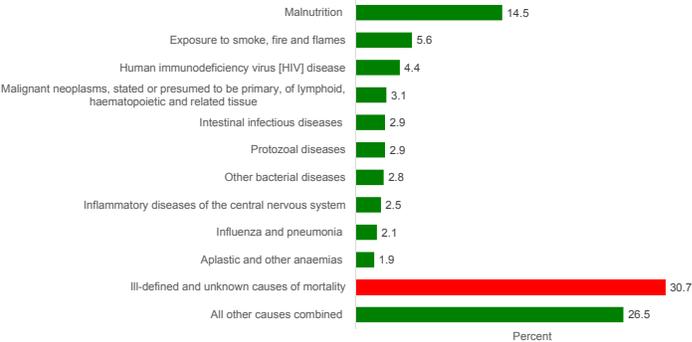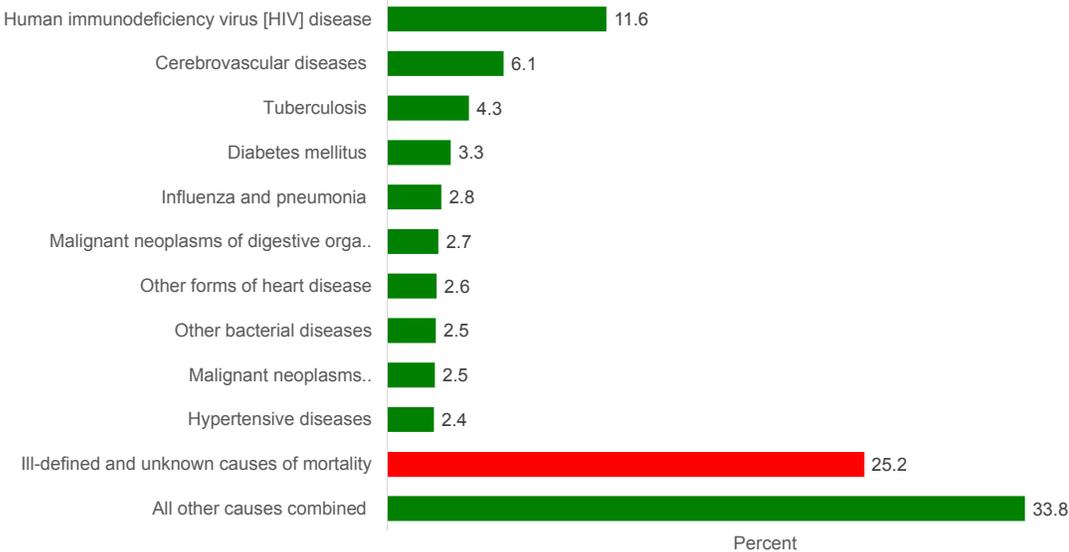
Cause	Percent
Human immunodeficiency virus [HIV] disease	11.6
Cerebrovascular diseases	6.1
Tuberculosis	4.3
Diabetes mellitus	3.3
Influenza and pneumonia	2.8
Malignant neoplasms of digestive orga..	2.7
Other forms of heart disease	2.6
Other bacterial diseases	2.5
Malignant neoplasms..	2.5
Hypertensive diseases	2.4
Ill-defined and unknown causes of mortality	25.2
All other causes combined	33.8

APPENDIX

Table 1: Distribution of the non-facility deaths according to Global Burden of Disease categories, by sex

Cause of Death	Sex		
	Female	**Male**	**Total**
	n(%)	**n(%)**	**n(%)**
All defined causes	**2,526 (100)**	**3,643 (100)**	**6,169 (100)**
Group I: Communicable, maternal, perinatal, and nutritional conditions			
Abortion-related death	32 (1.3)	0 (0.0)	32 (0.5)
Acute resp infect incl pneumonia	141 (5.6)	215 (5.9)	356 (5.8)
Anaemia of pregnancy	1 (0.0)	0 (0.0)	1 (0.0)
Birth asphyxia	13 (0.5)	10 (0.3)	23 (0.4)
Diarrhoeal diseases	149 (5.9)	170 (4.7)	319 (5.2)
Ectopic pregnancy	5 (0.2)	0 (0.0)	5 (0.1)
Fresh stillbirth	3 (0.1)	4 (0.1)	7 (0.1)
HIV/AIDS related death	382 (15.1)	411 (11.3)	793 (12.9)
Haemorrhagic fever (non-dengue)	2 (0.1)	4 (0.1)	6 (0.1)
Macerated stillbirth	3 (0.1)	0 (0.0)	3 (0.0)
Malaria	29 (1.1)	37 (1.0)	66 (1.1)
Meningitis and encephalitis	53 (2.1)	30 (0.8)	83 (1.3)
Neonatal pneumonia	14 (0.6)	13 (0.4)	27 (0.4)
Neonatal sepsis	8 (0.3)	6 (0.2)	14 (0.2)
Obstetric haemorrhage	15 (0.6)	0 (0.0)	15 (0.2)
Other and unspecified infectious disease	55 (2.2)	118 (3.2)	173 (2.8)
Other and unspecified maternal CoD	1 (0.0)	0 (0.0)	1 (0.0)
Other and unspecified neonatal CoD	1 (0.0)	0 (0.0)	1 (0.0)
Pertussis	1 (0.0)	2 (0.1)	3 (0.0)
Pregnancy-induced hypertension	12 (0.5)	0 (0.0)	12 (0.2)
Prematurity	12 (0.5)	13 (0.4)	25 (0.4)
Pulmonary tuberculosis	75 (3.0)	265 (7.3)	340 (5.5)
Severe malnutrition	18 (0.7)	19 (0.5)	37 (0.6)
Tetanus	0 (0.0)	2 (0.1)	2 (0.0)
Total	**1,025 (40.6)**	**1,319 (36.2)**	**2,344 (38.0)**

Cause of Death	Female n(%)	Male n(%)	Total n(%)
	Sex		
Group II: Non-communicable conditions			
Acute abdomen	12 (0.5)	25 (0.7)	37 (0.6)
Acute cardiac disease	204 (8.1)	391 (10.7)	595 (9.6)
Asthma	0 (0.0)	2 (0.1)	2 (0.0)
Breast neoplasms	5 (0.2)	0 (0.0)	5 (0.1)
Chronic obstructive pulmonary disease	1 (0.0)	1 (0.0)	2 (0.0)
Congenital malformation	17 (0.7)	21 (0.6)	38 (0.6)
Diabetes mellitus	95 (3.8)	93 (2.6)	188 (3.0)
Digestive neoplasms	79 (3.1)	190 (5.2)	269 (4.4)
Epilepsy	78 (3.1)	135 (3.7)	213 (3.5)
Indeterminate	118 (4.7)	219 (6.0)	337 (5.5)
Liver cirrhosis	28 (1.1)	41 (1.1)	69 (1.1)
Oral neoplasms	4 (0.2)	1 (0.0)	5 (0.1)
Other and unspecified cardiac disease	290 (11.5)	253 (6.9)	543 (8.8)
Other and unspecified neoplasms	24 (1.0)	39 (1.1)	63 (1.0)
Other and unspecified noncommunicable disease	5 (0.2)	13 (0.4)	18 (0.3)
Renal failure	19 (0.8)	23 (0.6)	42 (0.7)
Reproductive neoplasms MF	40 (1.6)	3 (0.1)	43 (0.7)
Respiratory neoplasms	12 (0.5)	43 (1.2)	55 (0.9)
Sepsis (non-obstetric)	19 (0.8)	28 (0.8)	47 (0.8)
Severe anaemia	2 (0.1)	3 (0.1)	5 (0.1)
Stroke	283 (11.2)	222 (6.1)	505 (8.2)
Total	**1,335 (52.9)**	**1,746 (47.9)**	**3,081 (49.9)**
Group III: Injuries			
Accidental drowning and submersion	10 (0.4)	30 (0.8)	40 (0.6)
Accidental exposure to smoke, fire and flames	3 (0.1)	12 (0.3)	15 (0.2)
Accidental fall	13 (0.5)	30 (0.8)	43 (0.7)
Accidental poisoning and exposure to noxious substance	6 (0.2)	15 (0.4)	21 (0.3)
Assault	37 (1.5)	133 (3.7)	170 (2.8)
Contact with venomous animals and plants	2 (0.1)	1 (0.0)	3 (0.0)
Exposure to force of nature	5 (0.2)	12 (0.3)	17 (0.3)
Intentional self-harm	33 (1.3)	139 (3.8)	172 (2.8)
Other and unspecified external cause of death	12 (0.5)	33 (0.9)	45 (0.7)
Other transport accident	3 (0.1)	9 (0.2)	12 (0.2)
Road traffic accident	42 (1.7)	164 (4.5)	206 (3.3)
Total	**166 (6.6)**	**578 (15.9)**	**744 (12.1)**