

## **Estimating mortality and disease burden from death registration and causes of death data in Malawi**

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### **Background**

Malawi continues to rely on surveys, censuses, and facility-based Health Information System (HIS) to produce vital statistics for use and reporting at national and international level despite the presence of a functional Civil Registration and Vital Statistics (CRVS) system. CRVS systems have dual, integral purpose: first, civil registration upholds the rights of citizens by producing legal certificates to prove identity, legal status, and family relationships. Second, administrative data generated in an ongoing, systematic way from the established certificate system forms the basis of population based vital statistics. Accurate and timely data on births and deaths is needed for national planning to reduce the epidemiological burden, monitor and evaluate health interventions and assure appropriate resource allocation.

Universal and compulsory death registration with Medical Certification of Cause of Death (MCCoD) has been rolled out in health facilities in phases. By 2021, it had been introduced in 17 districts covering two-thirds of the country's population. There are now continuous facility death registration points in 410 health facilities and 28 district registration offices. Coding for causes of death is done at per International Classification of Diseases (ICD) 10<sup>th</sup> revision at a centralized coding unit within Kamuzu Central Hospital.

The system captures information on deaths in health facilities by completing a death report form (NR10). Section-1 of the death report collects information on bio-data of the deceased along with details of the parents required for the production of legal death certificates, whereas Section-2 is completed by the attending clinician and is used for determining the underlying

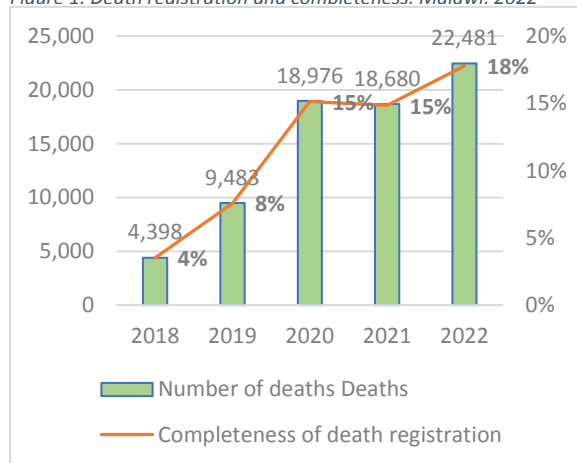
cause of death and for assignment of ICD-10 codes. We use death registration and medically-certified causes of death data from all the health facilities across the 17 districts to map Malawi’s disease burden.

## Methodology

Death registration data covering the period 2017 – 2022 were extracted from the civil registry at the National Registration Bureau (NRB). Microsoft Office Excel 2021, SPSS 25 and ANACOD 3 were used for data cleaning and analysis. The basic MCCoD data at 4-digit level was input to the ANACOD-3 software to generate ICD-10 3-character codes output. Due to a phased implementation of MCCoD in the districts, which essentially affects rates of coverage and completeness, the results need to be interpreted with caution. As such, of our conclusions may not be generalized to the general population because the death registration data representative.

## Findings:

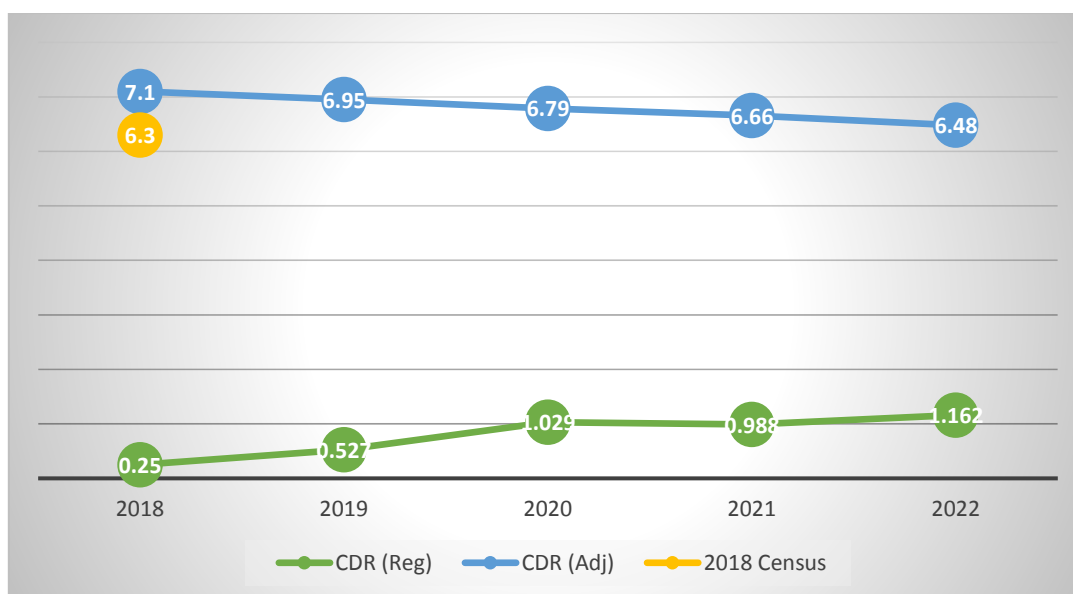
Figure 1: Death registration and completeness. Malawi. 2022



A total of 76,616 deaths were registered between 2017 and 2021 with an increasing trend over the years. Registered male deaths accounted for 64.9% and that of females was 35.1%. The annual number of deaths registered rose from 4,398 in 2018 to 22,481 in 2022. This translated in a rise in completeness of death registration from 4% in 2018 to 18% in 2022.

Death registration data estimates lower crude death rates (CDR) across all the years until adjusted for completeness. In 2018,  $CDR_{Reg}$  was 0.25 deaths per 1,000 population compared to 6.3 per 1,000 population as reported by NSO. The 2018 adjusted CDR for 7.1 depicting a relatively lower variation of 0.8 deaths per 1,000 population. Adjusted CDR shows a declining mortality pattern overtime, where as the  $CDR_{Reg}$  converges to the adjusted figures with improving completeness.

Figure 2: Crude Death Rate calculated from civil registration, with comparator data, 2018-2022



Child mortality indicators calculated from various indicators depict various patterns of mortality across different stages of early life. Neonatal Mortality rate from death registration data was the lowest in 2018 (0.8 deaths per 1000 live births) and highest in per 1000 live births 2022 (5.3 deaths per 1000 live births). Infant Mortality Rate was also lowest in 2018 (2.3 deaths) but highest in 2019 (11.4 deaths per 1000 live births). On the other hand, under-five mortality was the highest in 2020 at 20.5 deaths per 1000 live births.

Table 1: Number and rates of various child mortality indicators

Year Of Occurrence	Live Births	Neonatal mortality				Infant Mortality			1-4 Years	Under-5 mortality	
		0-6 days	7-27 days	Total	NMR	28-364 days	Total	IMR			
2017 and Below	-	14	3	17	-	13	30	-	54	84	
2018	138,884	59	50	109	0.8	207	316	2.3	234	550	4.0
2019	148,145	555	196	751	5.1	931	1682	11.4	1035	2717	18.
2020	225,806	694	259	953	4.2	1546	2499	11.1	2131	4630	20.5
2021	213,102	500	182	682	3.2	1046	1728	8.1	1623	3351	15.7
2022	205,069	870	216	1086	5.3	922	2008	9.8	1481	3489	17.0
Grand Total		2692	906	3598		4665	8263		6558	14821	

Findings for 2022 indicate that out of the 22,481 deaths registered in that year, 10,957 (48.7%) deaths had medical certification of cause of death with 4,736 and 6,211 being female and male deaths respectively. The ten leading causes of deaths that occurred in 2022 for all ages account

for 44 percent of all deaths with medical certification of cause of death. Malaria was the leading cause of death for all ages followed by Cerebrovascular Disease, HIV, diabetes mellitus, lower respiratory infections, prematurity and low birth weight, tuberculosis, endocrine disorders, birth asphyxia/trauma and diarrhoea diseases.

Table 2: Ranking of the top 10 leading causes of death, Malawi, 2022

Rank	ICD Code	Disease	Number of deaths	Proportion (%)
1	B50-B54, P37.3, P37.4	Malaria	914	9.0
2	I60-I69	Cerebrovascular Disease	637	6.2
3	B20-B24	HIV	600	5.9
4	E10-E14	Diabetes mellitus	451	4.4
5	J09-J22, P23, U04	Lower respiratory infections	423	4.1
6	P05, P07, P22, P27-P28	Prematurity and low birth weight	366	3.6
7	A15-A19, B90	Tuberculosis	328	3.2
8	D55-D64 (minus D64.9), D65-D89, E03-E07, E15-E34, E65-E88	Endocrine disorders	321	3.1
9	P03, P10-P15, P20-P21, P24-P26, P29	Birth asphyxia and birth trauma	251	2.5
10	A00, A01, A03, A04, A06-A09	Diarrhoea Diseases	216	2.1
	Total		<b>4,539</b>	<b>44.1</b>

## Conclusion

While completeness of death registration is on the rise the usability of the mortality and causes of deaths estimates may need to be interpreted with caution unless they have been statistically adjusted for completeness. The strongest advantage of civil registration data remains the availability of information at the granular level in closer intervals. This, however, poses a challenge with respect to triangulation and validation of the results, as comparator data sources are infrequently available.