

Figure 15: Rates of death & disability for select conditions in Cameroon compared to HICs (GBD 2019)

The years of life lost (YLL) due to NCD is higher in Cameroon compared to HIC for several conditions. This is worse for key pediatric NCDs like sickle cell and asthma with YLL of 308 & 172 in Cameroon versus 4 & 33 respectively in HIC. A similar trend is observed with adult conditions like diabetes, hemorrhagic stroke, burns and congenital anomalies as illustrated in Figure 16.

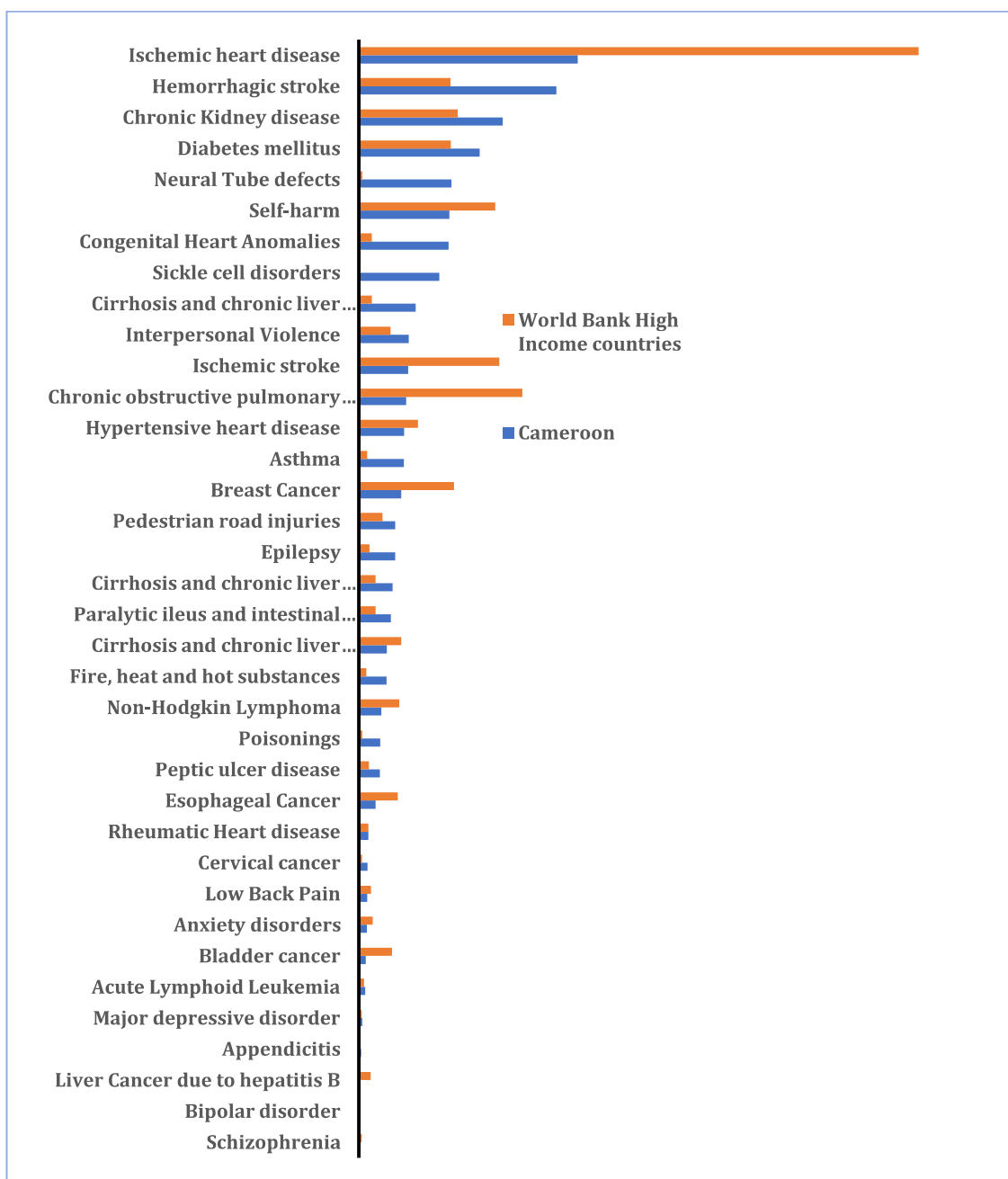


Figure 16: Comparison of Years of Life Lost/Deaths in Cameroon Versus High Income Countries by disease categories (GBD 2019)

As represented on Figure 17, NCDs generally account for greater number of years of healthy living lost in Cameroon compared to HICs. There is higher risk of dying from conditions like hemorrhagic stroke, chronic kidney disease, cirrhosis, diabetes mellitus, sickle cell disorders and pedestrian road injuries in Cameroon than in HICs.

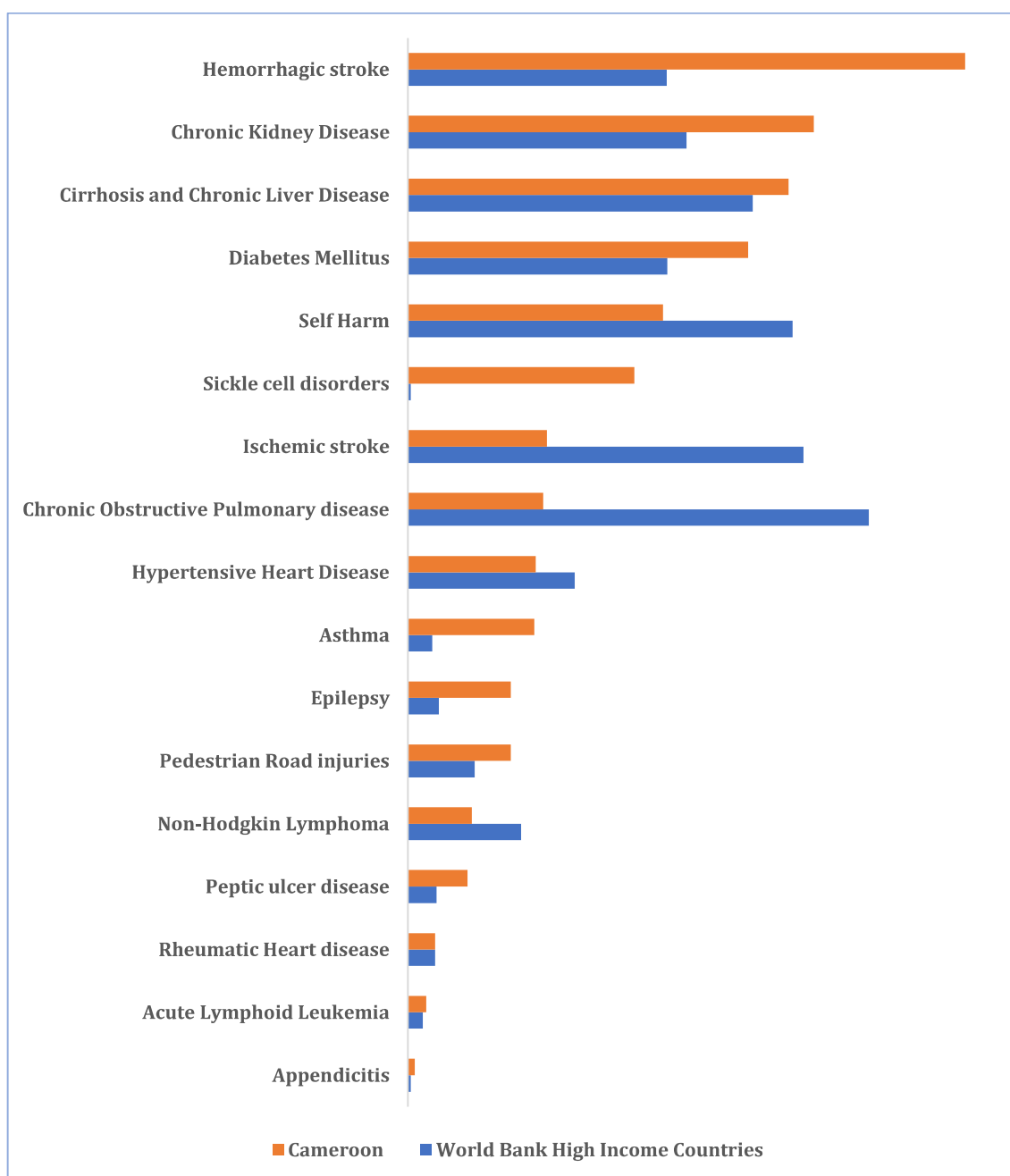


Figure 17: Comparison of the Years of Healthy living lost between Cameroon and HIC by disease conditions (GBD 2019)

Figure 18 displays the years lived with disabilities (YLD) for people with specific health disorders. In Cameroon, key conditions with high YLD include low back pain, mental disorders like major depressive disorders and neurological disorders like epilepsy and tension-type headaches.

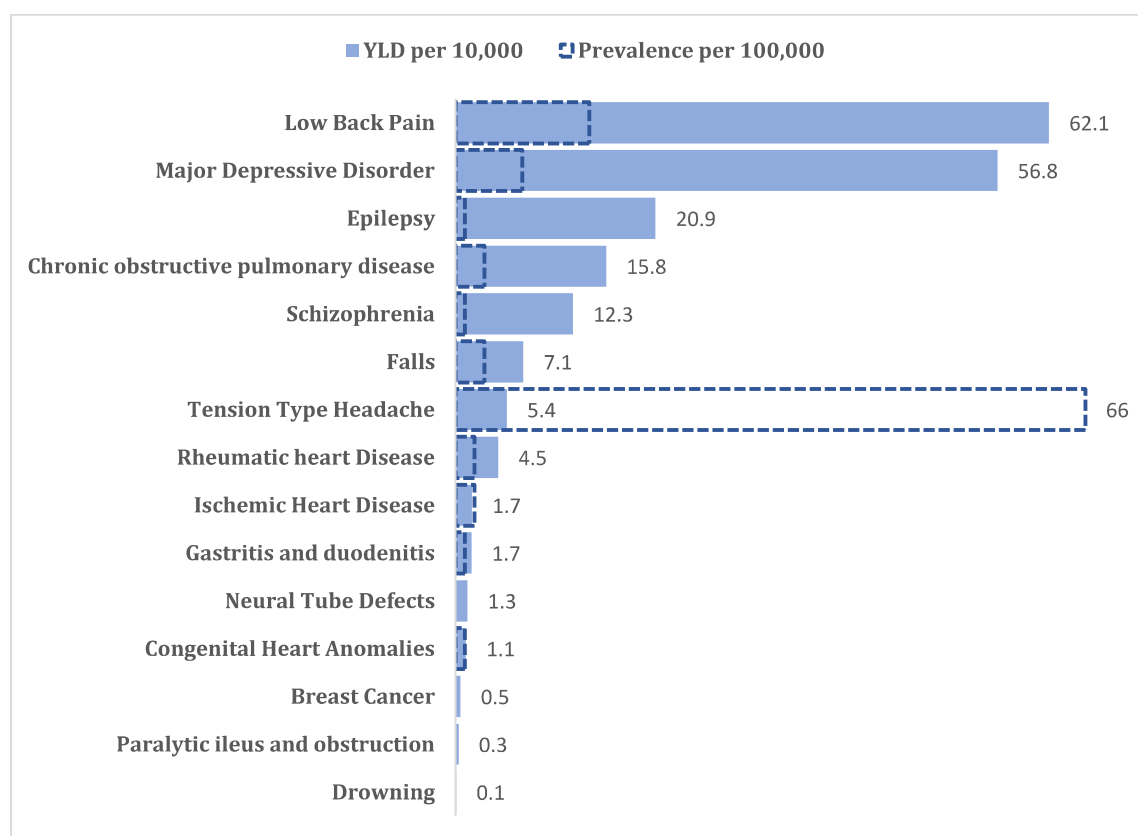


Figure 18: Years Lived with Disability (YLD) & Prevalence of NCDs in Cameroon in 2019 (GBD 2019)

2.4. KEY NCDIS IN CAMEROON

2.4.1. CARDIOVASCULAR DISEASES (CVD)

CVDs are responsible for the highest NCD burden in Cameroon. They account for an overall DALY burden of 5.51% with a prevalence of 3.48%. This translates into over 745,000 total DALYS lost at an estimated rate of over 2,500 per 100,000 inhabitants¹². Amongst the different etiologies, ischemic heart diseases (IHD) are the most common conditions, contributing to about a third (33%) of the total CVD burden with 40% mortality. Figures 19 & 20 compares the common CVD etiologies for Cameroon and HICs.

¹² Institute for Health Metrics and Evaluation (IHME). 2019. GBD Results Tool. [ONLINE] Available at: <http://ghdx.healthdata.org/gbd-results-tool>. [Accessed 4 September 2022].

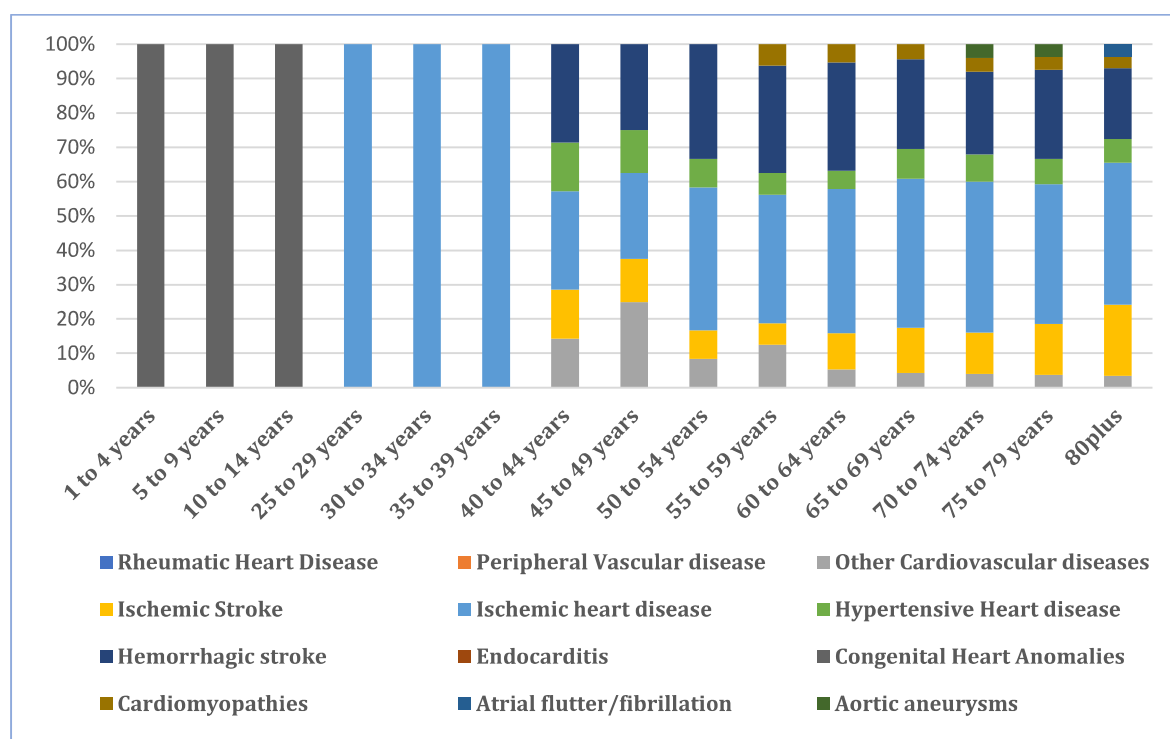


Figure 19: Etiology of cardiovascular diseases in Cameroon (GBD 2019)

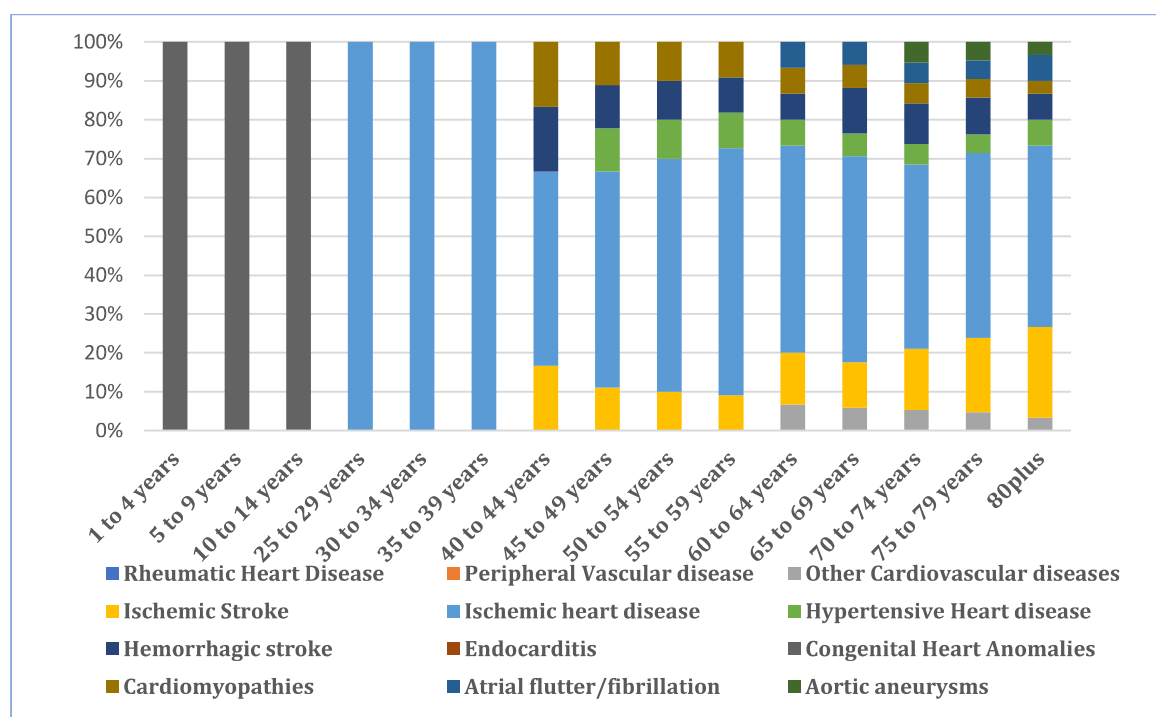


Figure 20: Etiology of Cardiovascular diseases in World Bank High Income Countries (GBD 2019)

In 2019, a survey conducted in a semi-urban setting revealed that hypertensive heart disease (47.7%), followed by cor pulmonale (11.6%), dilated cardiomyopathy (9.3%), ischemic heart disease (9.3%), and rheumatic heart disease (5.8%)¹³ were the common causes of heart failure in Cameroon as illustrated in Figure 21.

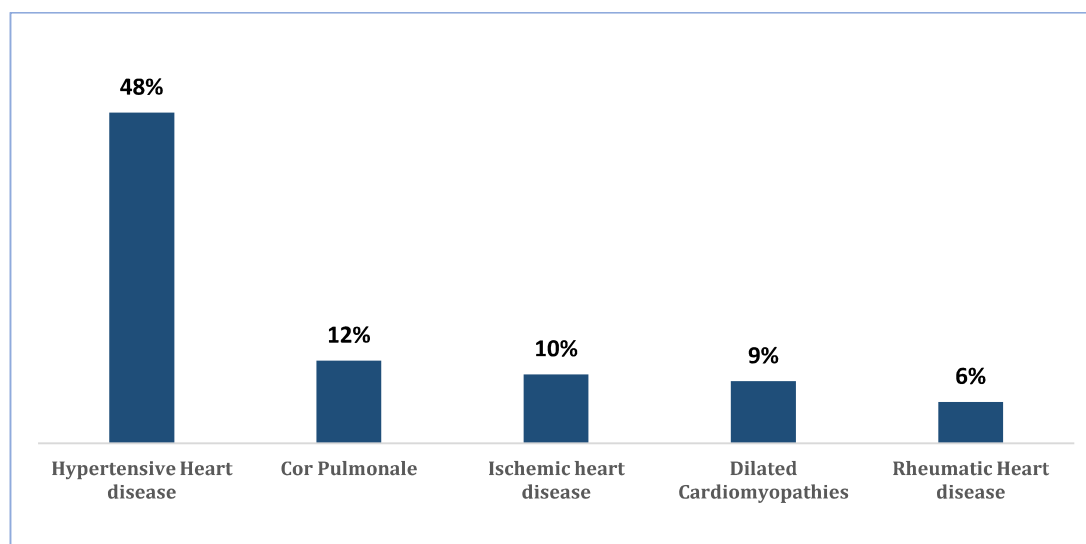


Figure 21: Causes of heart failure in a semi-urban setting in Cameroon (Nkoke et al, 2019)

Contrary to the believe that CVD burden is attributable to lifestyle factors, GBD estimates reveal that in Cameroon, for CVDs, the DALY attributable to tobacco and dietary risk is 9.6% and 25.2% respectively, as opposed to 19.9% (2-fold increase) and 34.7% (1,5-fold increase) in high-income countries.

2.4.2. NEOPLASMS (CANCERS)

In Cameroon, neoplasms are the second highest causes of NCD burden. They account for an overall DALY burden of 3.34% and 6.87% mortality. Certain cancers have higher incidence and mortality than others. This is especially true for respiratory system cancers (trachea, bronchial and lung), gynecological cancers (cervical and breast), pediatric cancers (leukemia, lymphoma and nephroblastoma) and colorectal cancers amongst others. According to the national cancer strategy, over 15,700 new cancer cases are diagnosed annually in Cameroon, with an annual mortality of 10,533 deaths. Women are most affected by cancers with 9,335 new cases annually representing a standardized risk of 116.9 cases per 100,000 women compared to 100.5 per 100,000 men (with 6,434 new cases per year)¹⁴. Figure 21 illustrates the number of suspected cases of key common adult cancers in Cameroon. Case detection rates vary by region but are significantly higher in the north-west region compared to the nine other regions as illustrated in Figure 23.

¹³ Nkoke C, Jingi AM, Aminde LN, Teuwafu D, Nkouonlack C, Noubiap JJ, et al. Heart failure in a semi-urban setting in Cameroon: clinical characteristics, etiologies, treatment, and outcome. *J Xiangya Med* [Internet]. 5 mars 2019 [cité 4 oct 2022];4(0). Disponible sur : <https://jxym.amegroups.com/article/view/5054>

¹⁴ MINSANTE. National Strategic Plan for Prevention and Cancer Control. 2020-2024;

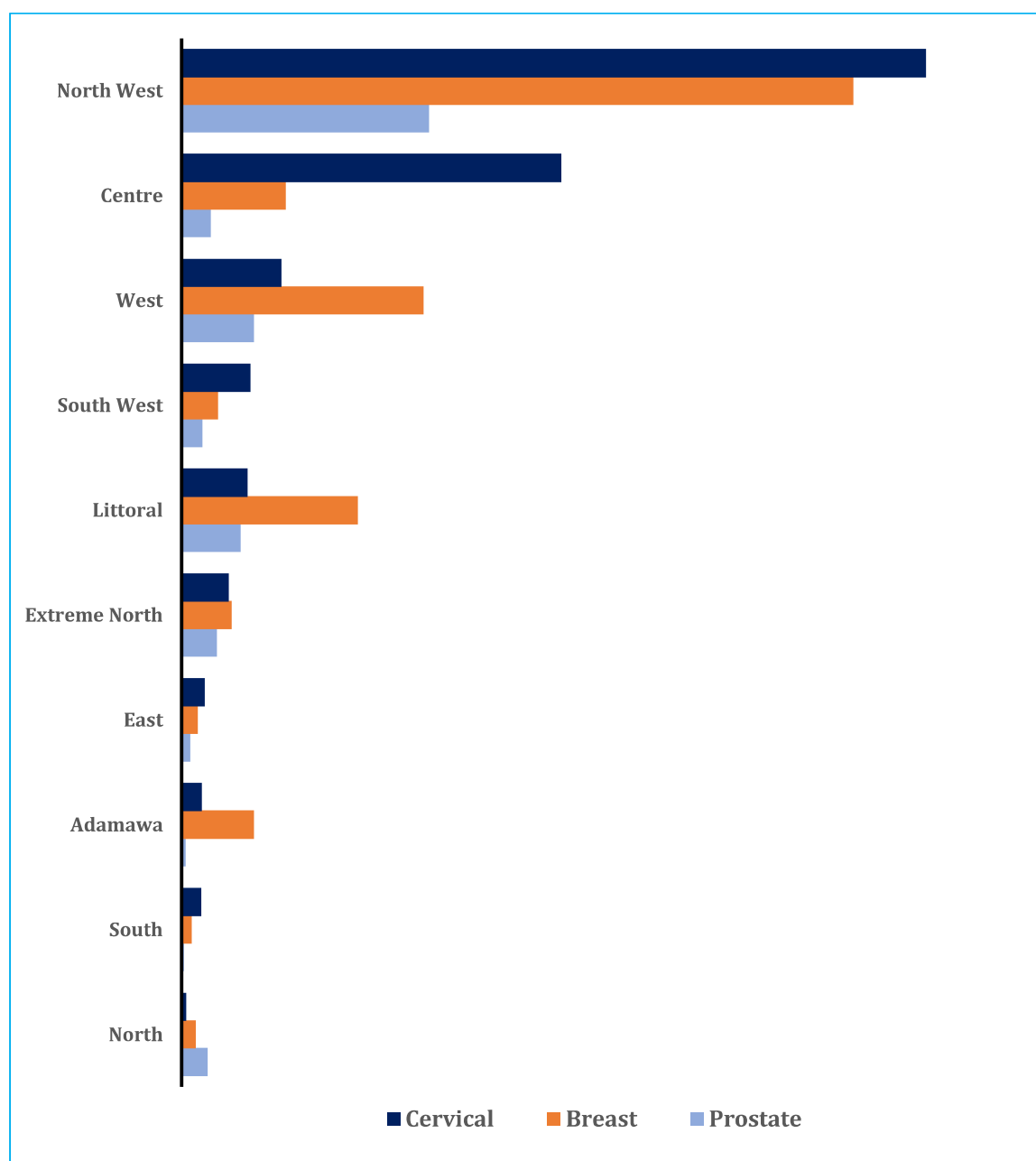


Figure 22: Number of suspect cases key adult cancers per region in Cameroon 2018 (DHIS)

The pediatric population (less than 15 years) in Cameroon makes up nearly half (43%) of the population and according to the national cancer strategy, pediatric cancers account for ~2% of all cancers. In one study¹⁵, the frequently diagnosed pediatric cancer cases were lymphoma, leukemia and nephroblastoma as illustrated in Figure 23.

¹⁵ A H, Pondy-Ongotsoyi, Ma C, Tiogouo NE D, Sadeu G W, L MB, Ndi KC, et al. Route of Children with Cancer to the Hematology-Oncology Unit of the mother and Child Center of the Chantal Biya Foundation. South Asian Res J Appl Med Sci. 2019 Sep 30;01(02):32-40.

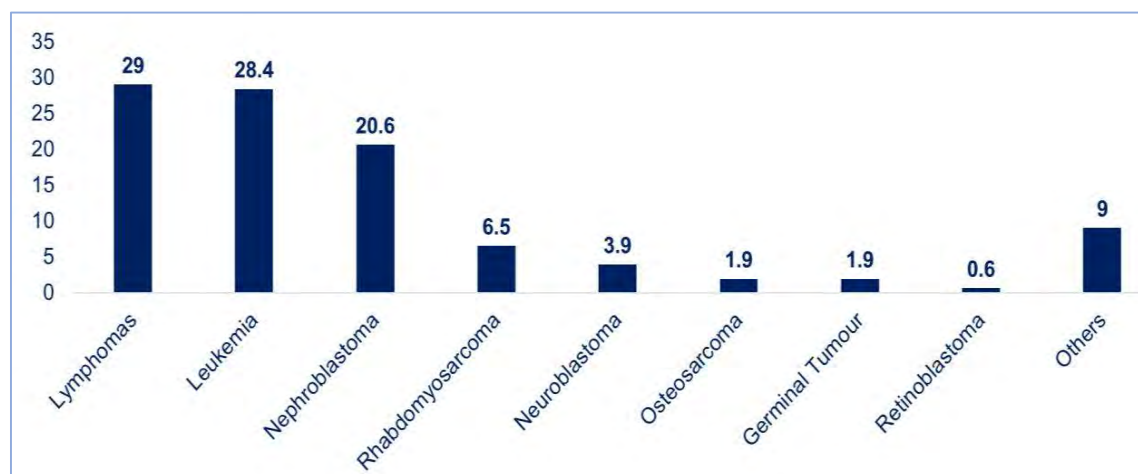


Figure 23: Proportion of pediatric cancer cases diagnosed in reference pediatric cancer treatment center in Cameroon (Pondy *et al.* 2019)

2.4.3. CHRONIC RESPIRATORY DISEASES

The GBD study estimates for chronic respiratory diseases in Cameroon are quite lower compared to that in high income countries. Indeed, the mortality ratio due to chronic respiratory diseases in Cameroon versus HIC is 0.35. Chronic obstructive pulmonary diseases (COPD) account for over half (55.72%) of respiratory disease mortality attributed to chronic respiratory diseases in Cameroon. Overall, the prevalence of asthma in Cameroon is still unknown¹⁶. However, the local prevalence of asthma in the political capital (Yaoundé) was estimated at 2.3% in 2015¹⁷. According to the GBD database, nearly half (46%) of chronic respiratory diseases in Cameroon are not attributed to GBD risk factors, highlighting the necessity for research on chronic respiratory diseases risk factors in Cameroon.

2.4.4. DIABETES MELLITUS (DM)

According to GBD database, the prevalence of DM is estimated at 2.03% in the entire population, accounting for 1.36% of NCDI DALY and contributing to 2.5% of all causes of death¹⁸. In Cameroon, the overall prevalence of DM was estimated between 6-8%, with approximately 80% of the population being undiagnosed¹⁹. A study conducted in urban city dwellers in Yaoundé-Cameroon outlined key risk factors associated with type 2 DM, including abdominal obesity, general obesity, and

¹⁶ Ministry of Public Health. Plan National de Développement Sanitaire PND 2016-2020 | MINSANTE [Internet]. 2020 [cité 5 oct 2022]. Disponible sur : <https://www.minsante.cm/site/?q=fr/content/plan-national-de-d%C3%A9veloppement-sanitaire-pnds-2016-2020>

¹⁷ Pefura-Yone EW, Kengne AP, Balkissou AD, Boulelys-Nana JR, Efe-de-Melingui NR, Ndjéutcheu-Moualeu PI, et al. Prevalence of Asthma and Allergic Rhinitis among Adults in Yaounde, Cameroon. PLoS ONE. 8 avr 2015 ;10(4):e0123099.

¹⁸ Institute for Health Metrics and Evaluation (IHME). Institute for Health Metrics and Evaluation (IHME) [Internet]. Institute for Health Metrics and Evaluation, 2019 [cité 27 sept 2022]. Disponible sur: <https://www.healthdata.org/cameroon>

¹⁹ World diabetes foundation. Cameroon National Diabetes and Hypertension Programme, WDF16-1429 [Internet]. World diabetes foundation. 2017 [cité 5 oct 2022]. Disponible sur: <https://www.worlddiabetesfoundation.org/projects/cameroon-wdf16-1429>

hypertension, with prevalence rates of 34.9%, 28.4% and 26.6% respectively²⁰. To date, few studies have sort to investigate the prevalence of DM in relation to economic status. In addition, the task force could not find reliable national data on type 1 DM prevalence estimates. However, the

2.4.5. DIGESTIVE DISEASES

According to the Institute of health metrics and evaluation (IHME), digestive diseases constitute over 3% mortality in Cameroun. Cirrhosis and chronic liver diseases appeared to be the leading causes of mortality (2%) due to digestive disorders. This is followed by upper digestive tract diseases (0.4%) and then paralytic ileus, intestinal obstruction, and peptic ulcer disease. Gastritis and duodenitis are the least contributors to mortality due to digestive tract disease conditions, accounting for 0.05% and 0.03% respectively. The taskforce did not find relevant studies on the burden on digestive diseases in Cameroon.

2.4.6. INJURIES

Injuries are responsible for an approximately 8% of NCDI mortality, with a DALY rate estimated at over 3,300 per 100,000 inhabitants as per IHME. This burden is 16% greater than the corresponding value for HICs (2,831 per 100,000). Amongst the different injury types, transport injuries and falls are the most common, with mortality rates of over 3% and 0.5%, respectively. In a survey on the patterns of injury and violence from administrative records of the Yaoundé central hospital, over two thirds (71%) of injured victims were males, with a mean age of 29 years. Road traffic accidents (RTA) was the most common mechanism of injury (60%), amongst which pedestrian injuries constituted majority (46%). The second most common mechanism of injury was intentional injuries (22.5%) amongst which unarmed assaults constitute over half (55%)²¹.

2.4.7. NEUROLOGICAL AND MENTAL HEALTH DISORDERS

In 2019, neurological (6.1%) and mental health (~9%) disorders caused significant NCDI burden in Cameroon. Indeed, migraines (2.8%) and epilepsy (1.7%) were responsible for the highest neurological DALY burden²² while major depressive disorders (2.7%) accounted for the highest mental health DALY. In a cross-sectional analysis in northern Cameroon, about two thirds (60%) of evaluated youths met the criteria for psychiatric and anxiety disorders (24.3%). In addition, stress-related disorders (17.0%) and mood disorders at (8.0%)²³ were relatively common. Despite these findings, the paucity of data in these thematic areas suggest that additional research efforts are needed to gather primary data on neurological and mental health disorders in Cameroon.

²⁰ Kufe CN, Klipstein-Grobusch K, Leopold F, Assah F, Ngufor G, Mbeh G, et al. Risk factors of impaired fasting glucose and type 2 diabetes in Yaoundé, Cameroon: a cross sectional study. *BMC Public Health*. 31 janv 2015;15(1):59.

²¹ Juillard C, Etoundi Mballa GA, Bilounga Ndongo C, Stevens KA, Hyder AA. Patterns of injury and violence in Yaoundé Cameroon: an analysis of hospital data. *World J Surg*. janv 2011;35(1):1-8.

²² Institute for Health Metrics and Evaluation (IHME). Institute for Health Metrics and Evaluation (IHME) [Internet]. Institute for Health Metrics and Evaluation. 2019 [cité 27 sept 2022]. Disponible sur: <https://www.healthdata.org/cameroon>

²³ Djatche JM, Herrington OD, Nzebou D, Galusha D, Boum Y, Hassan S. A cross-sectional analysis of mental health disorders in a mental health services-seeking population of children, adolescents, and young adults in the context of ongoing violence and displacement in northern Cameroon. *Compr Psychiatry*. 1 févr 2022;113:152293.

2.4.8. SENSE ORGAN DISORDERS

Oral, ocular, and auditory disorders are the major sense organs with common disorders. In 2011, the prevalence of oral, ocular, and auditory disorders was 3,5%, 2,2%, and 1,2% respectively. With regards to oral disorders, their recent prevalence in Cameroon is still unknown and there exist neither a national policy nor a control plan for oral health. Concerning ocular disorders, the MOH has already established a national program for the fight against blindness under the department of disease control, epidemics, and pandemics. However, this program is plagued by several health system challenges, including insufficient material and human resources among others. Like many other sensory disorders, there is dearth of data concerning auditory disorders in Cameroon.

2.4.9. SICKLE CELL DISEASE

According to WHO, Sickle cell disease is a common genetic condition and serious public health problem that requires urgent attention in geographical areas where malaria is widespread. In Cameroon, around 20% of the population carries the sickle cell trait²⁴ and the disease prevalence is estimated at 0.6% in the general population²⁵. There is no dedicated clinic, center, or structured program for sickle cell in the country and established policies for diagnosis, prevention and management are still lacking. About two-thirds of those suffering from the disease are classified as poor²⁶ and most patients and families cannot afford treatment and the required nutritional balance. Testing for sickle cell disorder and carrier status, including newborns, is not yet a routine clinical practice and health promotion to increase awareness is not yet optimal.

Unpublished data estimates indicate that almost 4000 babies will be born with a major sickle cell syndrome each year and in one study in Yaoundé involving 703 babies, 0.75% were Hb S/S (homozygous) and 16.8% heterozygous Hb A/S (heterozygous). The carrier rate (frequency) is said to be in the 20-25% range and an estimated 4500 sickle cell patients are monitored in one center in Yaoundé²⁷. Children under 10 years with sickle cell disease, make an average of 4 to 6 hospital visits a month.

2.5. POVERTY ASSOCIATED DISEASE BURDEN IN CAMEROON

With an estimated population of 28 million inhabitants, Cameroon is ranked 153rd of 189 countries according to the 2020 Human Development Index (40). Over half (55%) of Cameroonians live in poverty and over one third (38%) are severely impoverished. This impoverishment significantly impacts the living conditions of the population, especially in rural areas²⁸. Indeed, according to the World Food Program (WFP), poverty incidence in Cameroon is particularly high in rural parts especially in the Far North and Eastern regions. In addition, these regions are characterized

²⁴ Ama V, Kengne AP, Nansseu NJR, Nouthé B, Sobngwi E. Would sickle cell trait influence the metabolic control in sub-Saharan individuals with type 2 diabetes? *Diabet Med.* 2012;29(9):e334–7.

²⁵ Alima Yanda, A.N., Nansseu, J.R.N., Mbassi Awa, H.D. et al. Burden and spectrum of bacterial infections among sickle cell disease children living in Cameroon. *BMC Infect Dis* 17, 211 (2017). <https://doi.org/10.1186/s12879-017-2317-9>

²⁶ <http://www.curesicklecelldisease.com/TheWorld/cameroon.htm>

²⁷ [Sickle Cell Disease Prevalence in Cameroon – Sickle Cell International Foundation \(scintf.org\)](http://www.sicklecellinternational.org/cameroon)

²⁸ World Food Programme. Cameroon | World Food Programme [Internet]. [cité 18 oct 2022]. Disponible sur: <https://www.wfp.org/countries/cameroon>

by structural underdevelopment and unfavorable climatic conditions, including floods and droughts. These adversities significantly impact not only the health status but also the populations abilities to thrive. Figures 24, 25 & 26 illustrates the geographical distribution of the severely impoverished in Cameroon. The red zones represent the most impacted poverty regions while the green displays zones of lower poverty impact.

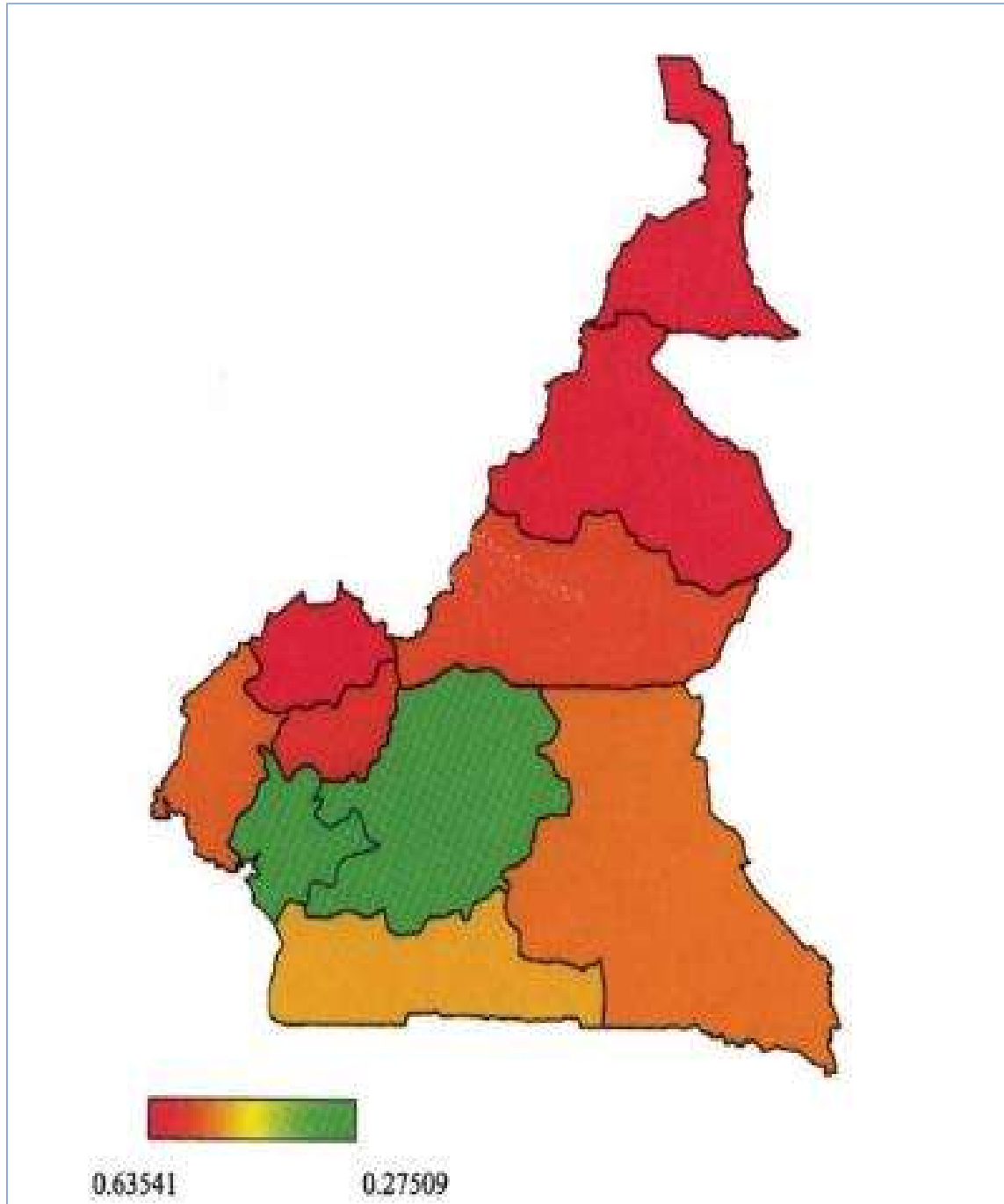


Figure 24: Regional distribution of the severely impoverished in Cameroon (ECAM II household survey data)

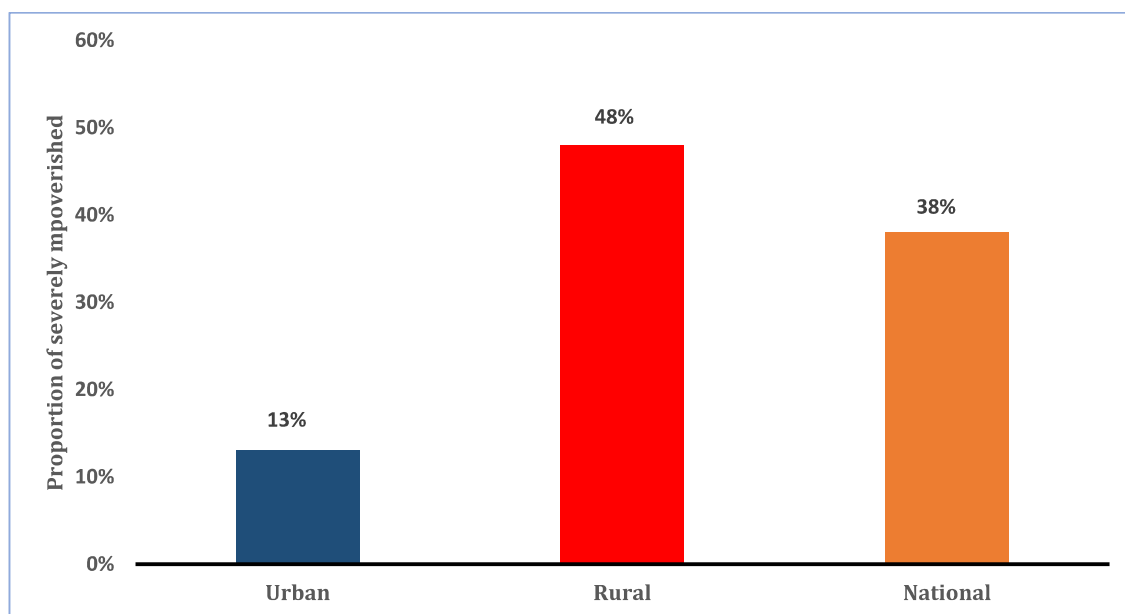


Figure 25: Proportion of severely impoverished Cameroonians- Urban Vs Rural (World Bank 2020)

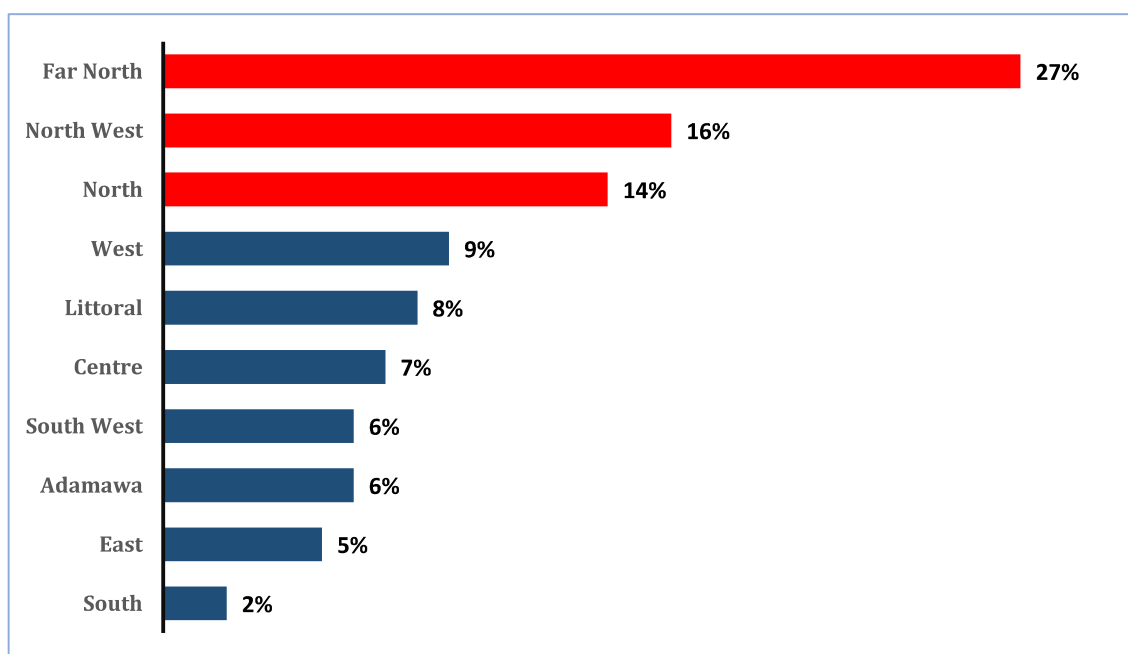


Figure 26: Distribution of the severely poor in Cameroon by region (World Bank 2020)

In Cameroon, there is a scarcity of national data on both the frequency and trends of NCDs. As a result, little is known about the overall distribution of NCDs per socio-economic quintiles of the Cameroonian society. Regarding cardiovascular disorders, a ten-year survey on the systolic blood pressure (SBP) showed significant increase amongst rural population (+18.2mmhg for rural women and +18.8mmhg in rural men) compared to urban population (+8.1mmhg for rural women

and +6.5mmhg in urban men)²⁹. Concerning chronic respiratory diseases, wheezing ranged between 1.3% to 2.5% in adults and occurred twice as more in children (0.8% to 5.4%)³⁰. With reference to diabetes, there were little to no reports/surveys in Cameroon specifically stratifying its prevalence into rural (poor) and urban. However, an age-standardized survey in 1994 showed that adult diabetes prevalence in rural and urban communities ranged from 0.8% to 1.6%³¹ and **increased over threefold**, three years later now ranging from 2.9% to 6.2%³². This highlights the rapid rising diabetes burden in Cameroon.

2.6. NCDI FINANCING IN CAMEROON

NCDs are, apparently, not given the priority they deserve within public investment priority, despite their rising burden in Cameroon. Indeed, health financing is predominantly private, and out-of-pocket (OOP) spending accounts for about three quarters (73%) of the expenditure per Capita of Total Health Expenditure (THE)³³ as illustrated in Figure 27. In addition, government expenditure was less than 5% of the gross domestic product (GDP), representing less than one third of the 15% target agreed upon at the Abuja Declaration over two decades ago³⁴.

²⁹ Echouffo-Tcheugui JB, Kengne AP. Chronic non-communicable diseases in Cameroon - burden, determinants and current policies. *Glob Health*. 23 nov 2011;7(1):44.

³⁰ idem

³¹ Mbanya JC, Ngogang J, Salah JN, Minkoulou E, Balkau B. Prevalence of NIDDM and impaired glucose tolerance in a rural and an urban population in Cameroon. *Diabetologia*. juill 1997;40(7):824-9.

³² Sobngwi E, Mbanya JCN, Unwin NC, Kengne AP, Fezeu L, Minkoulou EM, et al. Physical activity and its relationship with obesity, hypertension and diabetes in urban and rural Cameroon. *Int J Obes Relat Metab Disord J Int Assoc Study Obes*. juill 2002;26(7):1009-16.

³³ WHO Global Health Expenditure Database. <https://apps.who.int/nha/database/Select/Indicators/en> THE – Total Health Expenditure

³⁴ Ministry of Public Health. National Integrated and Multisector Strategic Plan for the Control of NCDs in Cameroon 2011-2015. Cameroon. 2011.

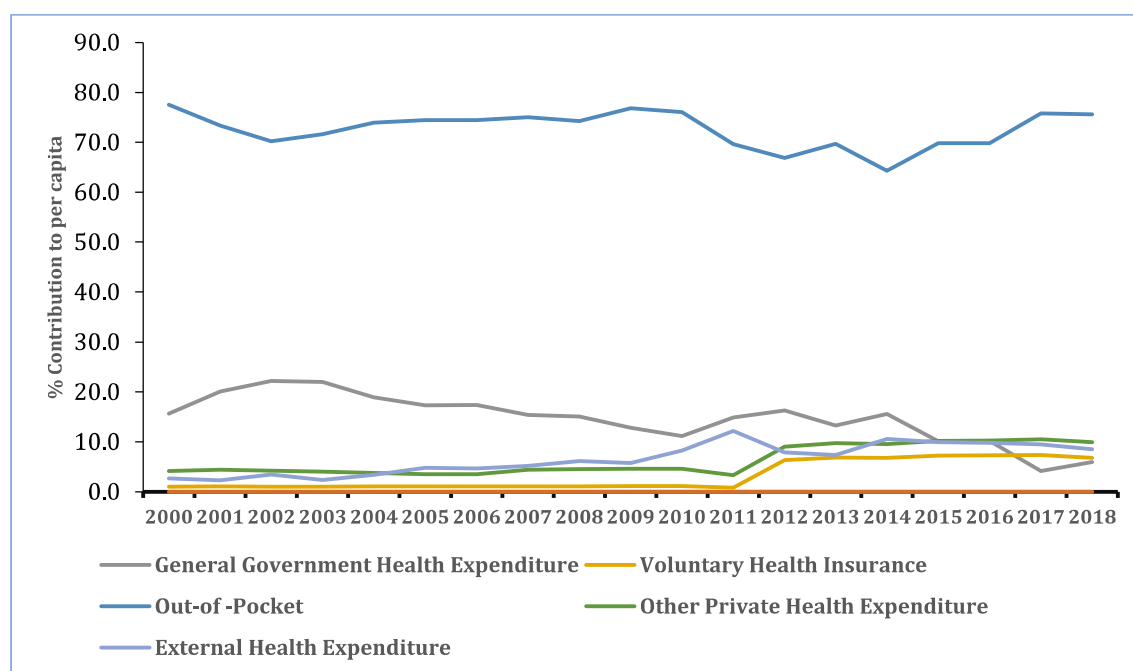


Figure 27: Financing Sources of Health Expenditure as a proportion of THE per Capita (Cameroon): (WHO Global Health Expenditure Database, 2022)

<https://apps.who.int/nha/database/Select/Indicators/en>

Priority is given to maternal and child health as well as infectious diseases (Malaria, HIV/AIDS, Tuberculosis etc.). According to the National Health Development Plan (PNDP) 2016-2020, only about 6% of the prevention budget was attributed to NCD as opposed to 64% for infectious diseases and 19% for vaccine preventable diseases and other public health interventions as shown in Figure 28. There is need to re-distribute funding to reflect the burden of the different disease groups.

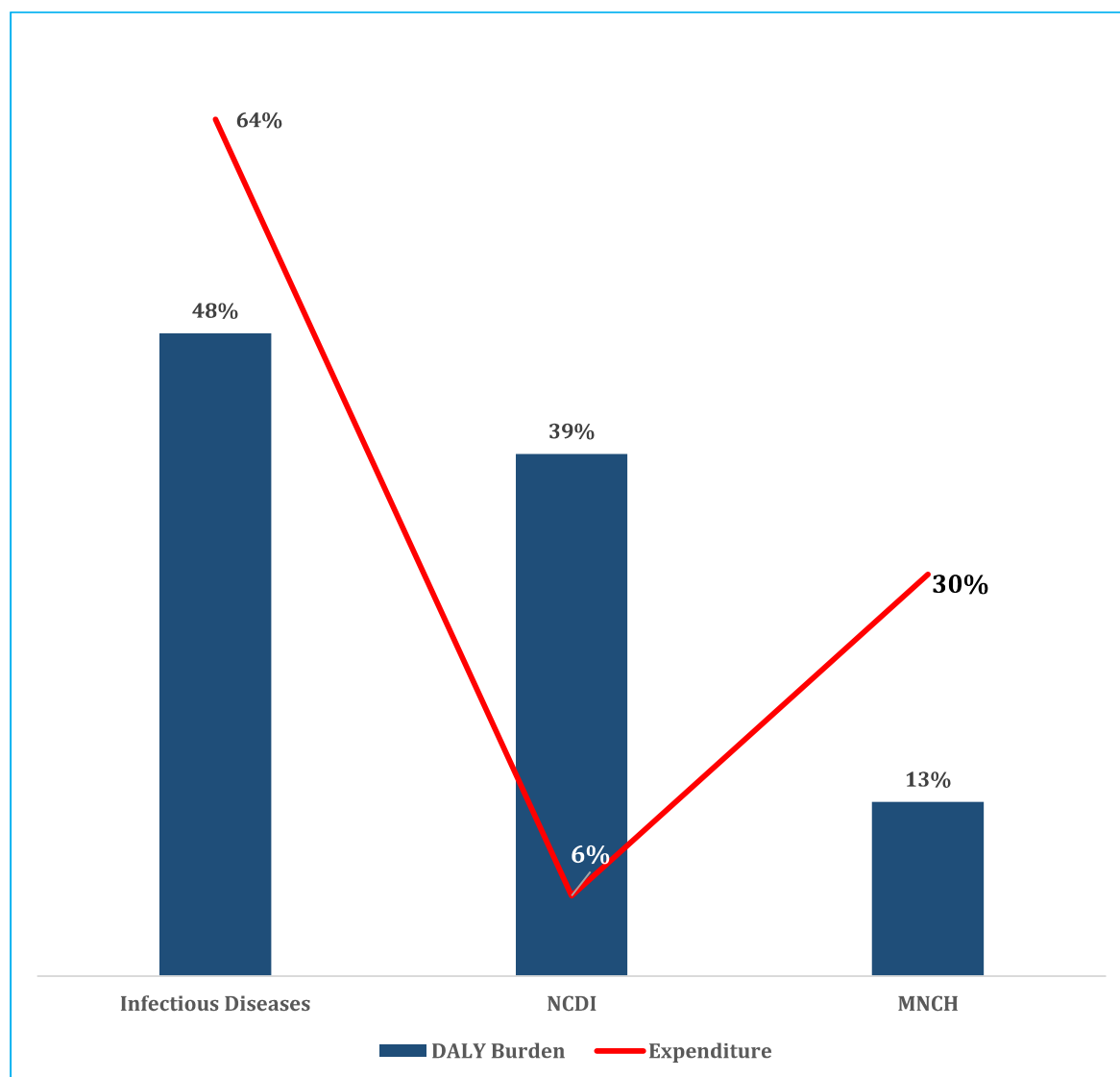


Figure 28: Relationship between DALY burden and expenditure attributed (PNDS 2016-2020, IHME 2019)

NCDI: Non-Communicable Diseases and Injuries

MNCH: Maternal Neonatal and Child Health

VPD: Vaccine Preventable Diseases

NS: Nutritional Supplements

3. PRIORITY SETTING

The national NCDI poverty commission conducted the priority setting process in two phases; the first phase involved defining priority conditions and the second phase involved defining priority interventions.

3.1. DEFINING PRIORITY CONDITIONS

Using data from the GBD 2019 data base, four criteria (Burden, Severity, Disability and Equity) were used to assign scores to 234 NCD conditions as follows:

- Burden:** The total DALY was used to estimate which among the NCD conditions caused Cameroonians to lose the most health years. Conditions were grouped per DALY range and a score was attributed to each group as shown in Table 1-DALY range. According to this grouping, conditions with highest DALY had a high score of 5 and those with lowest DALY had a score of 1.
- Severity:** This was a mortality criterion defined as a life expectancy matrix focusing on the years of life lost (YLL) per death. The ratio between the YLL and the number of deaths for each of the 234 conditions was computed and the conditions were then grouped, and attributed scores as shown in Table 1-Severity Ratio. Conditions with ratios greater than 1.5 had the highest scores while those with ratios less than 0.01 had the lowest scores.
- Disability:** The disability criterion was a morbidity matrix defined as the years of life with disability (YLD) per case. The ratio between the YLD and the number of cases for each condition was determined. The conditions were then grouped into four categories and scored as shown in Table 1-Disability Ratio. A disability score was attributed to each category such that conditions with a ratio greater than 1 had the highest score of 4 while conditions with ratios less than 0.01 had a score of 1.
- Equity:** This was a poverty related matrix determined by comparing the DALY per population in Cameroon versus HICs. This ratio was computed for each of the 234 disease conditions and then grouped into three and scored as shown in

Table 1: Criterion for defining priority conditions

DALY Range	Score	n
Greater than 10	5	10
between 3 and 10	4	30
between 2 and 3	3	25
between 1 and 2	2	42
less than 1	1	127
		234

Severity Ratio	Score	n
Greater than 1.50	5	11
between 1.1 & 1.5	4	40
between 0.66 & 1.00	3	62
between 0.01 & 0.65	2	56
Less than 0.01	1	65
		234

Disability Ratio	Score	n
Greater than 1	4	85
between 0.33 and 0.55	3	83
between 0.01 and 0.55	2	50
Less than 0.01	1	16
		234

Equity Ratio	Score	n
Greater than 1	3	58
between 0.3 and 0.9	2	81
less than 0.3	1	95
		234

n = number of disease conditions

Table 1-Equity Ratio. Conditions with ratio greater than 1, had the highest equity score of 3 while conditions with ratio less than 0.3 had an equity score of 1.

A composite score was calculated by summing the individual scores for burden, severity, disability, and equity for all conditions which were then rearranged (ranked) based on their composite scores. Ranked conditions were reviewed by the national secretariat to sort out nonspecific conditions or conditions for which a public health intervention could not be attributed (e.g poisoning by other means, exposure to forces of nature, non-venomous animal contact, other congenital birth defects, adverse effect of medical treatment, other exposure to mechanical forces, poisoning by other means etc). The top 100 conditions were further assessed using three criteria: importance of the condition, feasibility of a public health intervention and the integration into national policies. Only conditions with a significant or intermediate outcome were considered as exemplified in Table 2. The remaining bottom 100 conditions were again reviewed by the taskforce to identify conditions which should be added to the list of priorities.

Table 2: Criteria for prioritizing conditions

CAUSE DISEASES	Importance of condition	Feasibility of Public Health Intervention	Incorporation into National Policies	Outcome
Neural tube defects	Minimal	Intermediate	Minimal	Minimal
Congenital heart anomalies	Significant	Minimal	Minimal	Minimal
Idiopathic epilepsy	Significant	Significant	Significant	Significant
Motor vehicle road injuries	Significant	Significant	Significant	Significant
Conflict and terrorism	Intermediate	Minimal	Minimal	Minimal
Congenital MSK & limb anomalies	Minimal	Minimal	Minimal	Minimal
Motorcyclist road injuries	Significant	Significant	Significant	Significant
Sickle cell disorders	Significant	Significant	Significant	Significant
Cervical cancer	Significant	Significant	Significant	Significant
CKD due to glomerulonephritis	Significant	Significant	Significant	Significant
Leukemia	Significant	Significant	Significant	Significant

A final list of 49 conditions was validated by the national taskforce after members identified specific conditions that did not feature in the initial priority list. Table 3 shows the alphabetical arrangement of the disease categories and the prioritized conditions in order of preference.

Table 3: Prioritized NCD conditions in Cameroon.

Disease Category	Prioritized conditions by the NCDI Poverty Commission
Cardiovascular	Stroke, Cardiomyopathy and Myocarditis, Hypertensive heart Disease, Rheumatic Heart Disease, Ischemic Heart Disease,
Congenital	Sickle Cell, Congenital Heart Anomalies
Endocrine	Diabetes Mellitus,
Digestive	Oral Disorders, Peptic Ulcer Disease, Obesity
Injuries	RTA, Violence, Poisoning,
Mental	Major Depressive Disorder, Anxiety Disorders, Substance Use Disorders, Bipolar disorders,
Musculoskeletal	Low back Pain, Osteoarthritis, Rheumatoid Arthritis
Neurologic	Epilepsy, Migraine,
Neoplasms	Cervical, Brain and CNS Tumors, NHL, Stomach, Tracheal, Bronchus and lung, Breast, Colorectal, Hodgkin lymphoma, Nasopharynx, Prostate, Esophageal, Liver,
Pediatric Neoplasms	Acute Lymphoid Leukemia, Burkitt's Lymphoma, Nephroblastoma, Retinoblastoma
Renal	Chronic Kidney Disease, Acute Kidney Injury,
Respiratory	Asthma, COPD,
Sense Organs	Hearing Loss, Vision Loss,
Surgical	Appendicitis, Inguinal hernia, femoral hernia, abdominal hernia, Genital Prolapse,

3.2. DEFINING PRIORITY INTERVENTIONS

The taskforce proceeded to define priority interventions using the web based FairChoices tool, the DCP analytics Tool version 2.1. This tool was jointly developed by the University of Bergen (Norway), the University of Washington and the Center for Integration Science in Global Health Equity, to facilitate prioritization of NCDI interventions. The tool provides support to policy makers in designing essential health care packages based on principles of cost-effectiveness and an increase in health budget. It offers 21 evidence-informed packages of health interventions synthesized into a model package of 218 interventions and a complementary list of 77 intersectoral interventions developed by the third edition of the Disease Control Priorities project (DCP3).

The taskforce populated the budget space section of the tool with relevant information, including baseline government spending on health, percentage growth of GDP, baseline and target donor spending, baseline and target out of pocket spending (OOP) and baseline and target percentage insurance. These generated the GDP per capita spent on health and a corresponding increase in per capita GDP as illustrated in Figure 28.

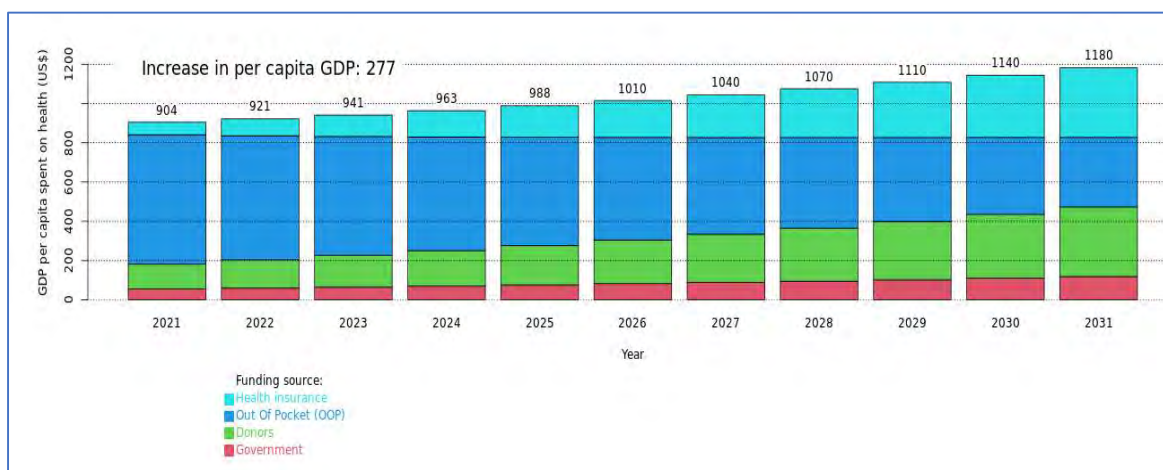


Figure 29: Increase in per capita GDP spent on health

Following the budget space, the tool automatically generated the 21 evidence-informed benefit packages of health interventions. The taskforce reviewed the entire set of NCDI interventions in the benefit package, focusing and prioritizing interventions using three criteria:

1. Interventions with DALYs (10 years) greater than 20,000. (n=82),
2. Interventions with baseline coverage greater than 30% (n=11) and,
3. Interventions for which the annual population in need is greater than 50,000 (n=16).

After prioritization, the commissioners identified other interventions (n=14) that were relevant but did not meet the above criteria. These interventions were included into the final list of 123 recommended health interventions towards improving NCDI burden in Cameroon. The list of interventions grouped per disease conditions is illustrated as follows.

Table 4: List of interventions per disease condition

SN	Interventions	Baseline Coverage	Target Coverage	Platform
Cardiovascular Disease Interventions				
1.	Management of acute coronary syndromes (aspirin, unfractionated heparin, thrombolytics...)	31%	70%	Referral and Specialty Hospital
2.	Management of chronic heart failure; diuretics, beta-blockers, ACEI, & anta-mineralocorticoids)	31%	80%	Referral and Specialty Hospital
3.	Secondary prevention of stroke	31%	80%	Health Center
4.	Management of acute heart failure (diuretics, oxygen, after-load reduction, medication optimization.)	31%	80%	District Hospital
5.	Secondary prevention of ischemic heart disease (IHD)	31%	80%	Health Center
6.	CVD, primary prevention with absolute CVD risk > 30% (antihypertensives, statins)	31%	80%	Health Center

SN	Interventions	Baseline Coverage	Target Coverage	Platform
7.	Aspirin for all cases of high-risk chest pain	31%	80%	Referral and Specialty Hospital
8.	Heparin-revascularization treatment of acute limb ischemia	31%	60%	District Hospital
9.	Secondary prophylaxis with penicillin for rheumatic fever or known rheumatic heart disease	31%	80%	Health Center
10.	Rheumatic heart disease, cardiac surgery	31%	40%	Referral and Specialty Hospital
11.	CVD targeted screening at facility	31%	80%	Community
12.	CVD risk prevention and screening in community	31%	80%	Community
13.	Treatment of acute pharyngitis in children to prevent rheumatic heart disease	31%	90%	Health Center
14.	Rehabilitation of stroke patients			Referral and Specialty Hospital
Interventions Specific to Diabetes				
1.	Diabetes opportunistic screening	31%	80%	Health Center
2.	Diabetes type 1 insulin	31%	80%	Health Center
3.	Diabetes type 2, antidiabetic drugs and insulin	31%	80%	Health Center
4.	Screening of diabetes during pregnancy	31%	80%	Health Center
5.	Diabetes self-management education			
Interventions to manage Injuries				
1.	Using common cure agents for poisoning and intoxication	8%	80%	District Hospital
2.	Tube thoracostomy	3%	60%	District Hospital
3.	Urgent orthopedic management of injuries with e.g., ORIF	3%	80%	Referral and Specialty Hospital
4.	Acute intracranial pressure relief	3%	70%	District Hospital
5.	Urgent management of abdominal injuries (Trauma Laparotomy)	3%	90%	District Hospital
Mental Health Interventions				
1.	Tobacco cessation counselling (including nicotine agonist treatment)	31%	80%	Health Center

SN	Interventions	Baseline Coverage	Target Coverage	Platform
2.	Psychosocial support and centrally acting stimulant (CAS) medication	2%	50%	Health Center
3.	Intensive psychosocial treatment and anti-depressant medication for anxiety disorders (moderate-severe cases)	2%	60%	Referral and Specialty Hospital
4.	Alcohol use disorders, opportunistic screening, and brief intervention	1%	50%	Health Center
5.	Basic psychosocial treatment & anti-depressant medication for anxiety disorders (mod. cases)	2%	80%	Health Center
6.	Intensive psychosocial treatment and anti-depressant medication of recurrent moderate-severe cases on an episodic/maintenance basis	2%	60%	Referral and Specialty Hospital
7.	Opioid Agonist Treatment (OAT) and psychosocial support*	1%	60%	Community
8.	Intensive psychosocial treatment and anti-depressant medication of first episode severe cases	2%	60%	Referral and Specialty Hospital
9.	Basic psychosocial treatment for anxiety disorders (mild cases)	4%	60%	Health Center
10.	Drug use disorders, opportunistic screening, and brief intervention	1%	60%	Health Center
11.	Basic psychosocial treatment, advice, & FU for bipolar disorder, mood-stabilizing medication	4%	70%	Health Center
12.	Basic psychosocial treatment for mild depression	2%	60%	Health Center
13.	Basic psychosocial treatment, advice, and follow-up for PTSD	4%	50%	Health Center
14.	Basic psychosocial support and anti-psychotic medication	2%	60%	Health Center
15.	Screening of mental disorders in targeted population			Community
Interventions to Manage Musculoskeletal Disorders				
1.	Combination therapy for moderate to severe rheumatoid arthritis, low dose corticosteroids, folic acid supplementation, DMARDS	8%	80%	District Hospital
2.	Primary prevention of osteoporosis in high-risk individuals (physical activity, Ca, & Vitamin D supplementation)	8%	80%	Health Center
Neurological Interventions				
1.	Drugs for Parkinson's disease (levodopa)	8%	50%	Referral and Specialty Hospital
2.	Stabilization of acute seizures	50%	90%	District Hospital

SN	Interventions	Baseline Coverage	Target Coverage	Platform
3.	Long term management of epilepsy	50%	80%	Health Center
4.	Diagnosis of epilepsy	50%	90%	Health Center
5.	Diagnostics for Parkinson's disease	8%	40%	Referral and Specialty Hospital
Cancer Interventions				
1.	Cryotherapy or LEEP	20%	60%	District Hospital
2.	Treatment of early-stage cervical cancer: Stage I & Stage II	20%	90%	Referral and Specialty Hospital
3.	Human Papilloma virus (HPV) immunization	20%	80%	Community
4.	Organized screening for cervical cancer: VIA ± HPV 5-yearly for females aged 30-70	20%	90%	Health Center
5.	Palliative care for late-stage cervical cancer Stage III & Stage IV	20%	60%	Referral and Specialty Hospital
6.	Confirmatory breast cancer diagnostics and staging	20%	90%	Referral and Specialty Hospital
7.	Treatment of Hodgkin Lymphoma	8%	80%	Referral and Specialty Hospital
8.	Palliative care for late-stage colorectal cancer: Stage III and stage IV	20%	60%	Referral and Specialty Hospital
9.	Treatment of early-stage colorectal cancer: Stage I and Stage II	20%	80%	Referral and Specialty Hospital
10.	Treatment of early-stage breast cancer: Stage I & Stage II	20%	80%	Referral and Specialty Hospital
11.	Education on early warning signs of common and curable pediatric cancers	25%	90%	Community
12.	Treatment of Wilms tumor	8%	80%	Referral and Specialty Hospital

SN	Interventions	Baseline Coverage	Target Coverage	Platform
13.	Treatment of non-Hodgkin lymphoma	8%	80%	Referral and Specialty Hospital
14.	Treatment of acute lymphoblastic leukemia	8%	80%	Referral and Specialty Hospital
Kidney Disease Interventions				
1.	Chronic Kidney Disease (CKD) risk prevention and screening in the community			Community
2.	Albuminuric kidney disease, screening of diabetic patients and management	31%	80%	Health Center
3.	Treatment of hypertension in kidney disease, with use of ACEi or ARBs in albuminuric kidney disease			
Respiratory Disease Interventions				
1.	Chronic respiratory disease, vaccination	8%	60%	Health Center
2.	Emergency care of severe asthma and COPD (ventilator Bi-PAP)	8%	70%	Referral and Specialty Hospital
3.	Asthma and COPD emergency care (steroids inhalators antibiotics oxygen)	8%	80%	Referral and Specialty Hospital
4.	Management of stable COPD (Inhalators anticholinergic agent Smoking cessation	8%	70%	District Hospital
5.	Management of stable asthma (Inhalators steroids theophylline	8%	80%	Health Center
Sense Organs Interventions				
1.	Retinopathy screening and photocoagulation	31%	80%	District Hospital
2.	Surgery for trachomatous trichiasis	3%	80%	Referral and Specialty Hospital
3.	Glasses for vision problems	20%	60%	Referral and Specialty Hospital
4.	Cataract extraction and insertion of intraocular lens	3%	80%	Referral and Specialty Hospital
Surgical Interventions				
1.	Colostomy due to colon cancer	3%	80%	District Hospital

SN	Interventions	Baseline Coverage	Target Coverage	Platform
2.	Surgical repair of cleft lip and cleft palate	3%	90%	Referral and Specialty Hospital
3.	Surgical repair of club foot	3%	50%	Referral and Specialty Hospital
4.	Surgical management of anorectal malformation	3%	50%	Referral and Specialty Hospital
5.	Management of bowel obstruction	3%	80%	District Hospital
6.	Treatment of caries	3%	70%	Health Center
7.	Surgery for filarial hydrocele	3%	90%	District Hospital
8.	Surgery of female genital mutilation complications	50%	90%	Health Center
9.	Urinary catheterization, suprapubic cystostomy	3%	80%	District Hospital
10.	Hernia repair	3%	80%	District Hospital
11.	Management of osteomyelitis, including surgical debridement for refractory cases	3%	80%	District Hospital
12.	Drainage of dental abscess	3%	80%	Health Center
13.	Dental extraction	3%	60%	Health Center
14.	Appendectomy	3%	90%	District Hospital
Cross Cutting Interventions				
1.	Integrated Management of Childhood illness	48%	80%	Health Center
2.	School based education on sexual health, nutrition, and healthy lifestyle	33%	80%	Community
3.	Early childhood development rehabilitation	8%	80%	Community
4.	Life skills training in schools to build social & emotional competencies for children & adolescents	33%	80%	Community
5.	Education of school children on oral health	33%	80%	Community
6.	Mass media messages on sexual & reproductive health & mental health for adolescents	33%	80%	Population based health interventions

4.0. CONCLUSION AND RECOMMENDATIONS

4.1. CONCLUSION

This report presents an overview of the burden and priority setting of NCDI in Cameroon based on modelled data. It highlights that mortality due to NCDs are mainly caused by cardiovascular diseases, neoplasms, diabetes, and chronic kidney diseases while NCDI morbidity is principally caused by mental and neurological disorders, substance use disorders as well as transport and unintentional injuries. This rising burden of NCDs are caused by multiple risk factors, half of which are metabolic, behavioral, and environmental factors. The reports also highlights that a significant burden of NCDIs is borne by people below 40 years-old- the most economically viable segment of the population. In addition, the report emphasizes the disturbing high proportion of out-of-pocket (OOP) spending on health as well as the slow national progress towards attaining the 15% health expenditure target. Furthermore, this report underscores governments low prioritization of NCDIs compared to communicable diseases and other public health interventions. Indeed, only 6% of government funding is allocated for the prevention of NCDIs as opposed to 64% for communicable diseases and 19% for vaccine preventable diseases and other public health interventions.

4.2. RECOMMENDATIONS

Five key recommendations were formulated to address findings revealed by this situational analysis.

1. Expand NCDI service delivery across the three tiers of the Healthcare system

- Determine and rollout evidence-based, high priority, integrated NCDI service packages for implementation across the tiers of the health system.
- Support the decentralization of selected high priority NCDI services to targeted levels of the health pyramid through a tailored mentoring approach.

2. Improve Financing of NCDIs in Cameroon

- Advocate for incremental government funding allocation and seek external funding for the prevention and control of NCDIs in Cameroon.
- Implement evidence-based measures to enable substantial decrease in out-of-pocket spending on health.
- Establish sustainable funding mechanisms to support the prevention of NCDI, including taxes on some key products that are risk factors for NCDI like sugar.

3. Improve Data Systems for capturing transmission and data analytics for decision making on NCDIs

- Revise existing national data platform to include targeted NCDI variables to capture reliable NCDI data for enhanced policy making.
- Reinforce data management systems at health facility levels, ensuring it captures key elements of the broadened NCDI agenda.

- Support periodic data reviews and production of usable annual NCDI progress reports from existing vertical programs.
- Conduct additional surveys, such as STEPS, SARA/SPA, DHS with NCD variables or establish surveillance sites or vital statistics reporting.

4. Improve Policy Formulation for NCDI and its Implementation

- Promote intersectoral collaboration to include stakeholders not directly involved in health such as town planning and urbanization, physical education, and climate change among others.
- Strengthen regulatory bodies and address key structural risk factors through new policy formulation and adoption.

5. Improve Research outputs from NCDIs

- Focus NCDI initiatives towards the rural poor, selecting conditions with high out-of-pocket cost for patients.
- Population-based/household surveys should integrate prioritized NCDI conditions and socioeconomic information

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