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MALAYSIAN BURDEN OF DISEASE AND INJURY STUDY

2015 - 2017
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The views expressed in this report are those of the authors alone and do not necessarily represent the opinions of the other investigators participating in the surveys, nor the view or policy of the Ministry of Health Malaysia.

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Preface

Disease burden measures burden of disease using Disability Adjusted Life Years (DALYs). This time-based measure combines years of life lost due to premature mortality and years of life lost due to time lived in states of less than full health.

This report provides a comprehensive result of the National Burden of Diseases and Injuries study in Malaysia. Our intention is to give a comprehensive overview of our approaches, results and some discussion on the results, suggestions and recommendations from the study for future planning in Ministry of Health Malaysia (MOH) especially in strengthening local data sources. Despite the complexity in the burden of disease methodology, in addition to moderate-quality data sources, we were still be able to produce reasonable results which can be used to guide the planning of programmes by the Ministry of Health.

Much effort was taken to improve the quality of data sources and hence the study itself. Hopefully, this report can be used as a powerful reference for future work to help in improving local data sources and to produce some valuable information for the Ministry of Health to use in policy-making efforts and planning. The Centre for Burden of Disease Research is ever-ready to collaborate with other organizations within the Ministry of Health in striving to produce the most accurate and comprehensive estimates of diseases burden in Malaysia.

In future, we hope to estimate the burden of disease attributable to various risk factors and produce projections of diseases burden in Malaysian for the next 10 years. It is hoped that it provides the foundation on which debates on national health priority setting can be based.

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Executive Summary

Developed by the Global Burden of Disease (GBD) study, Burden of Disease is a summary measure of population health. The overall burden of disease, measured in DALY, combines the potential Years of Life Lost (YLL) due to premature death and the Years Lost due to Disability (YLD), an equivalent of potential healthy years lost due to poor health, illness or disability.

Between 2015 and 2017, Cardiovascular and Circulatory Diseases, Malignant Neoplasms, and Unintentional Injuries contributed towards the leading causes of fatal burden of disease and injury in Malaysia between 2015 and 2017. Road Traffic Injuries contributed towards the leading cause of fatal burden among adult in Malaysia. Ischaemic Heart Disease was the most leading cause of fatal burden among male followed by Road Traffic Injuries and Cerebrovascular Diseases. Among females, Ischaemic Heart Disease were the leading cause of fatal burden followed by Cerebrovascular Diseases and Lower Respiratory Infections.

Non-fatal burden of disease and injury in Malaysia between 2015 and 2017 is mainly contributed by Mental and Behavioural Disorders, Diabetes Mellitus and Cardiovascular and Circulatory Diseases. Among both males and females, Diabetes Mellitus was the leading cause of non-fatal burden. Asthma and Drug Use Disorders were among the highest causes of non-fatal burden among males with Anxiety Disorders and Asthma the other leading causes among females.

Cardiovascular and Circulatory Diseases, Malignant Neoplasms and followed by Unintentional Injuries caused the highest total burden of disease and injury in Malaysia between 2015 and 2017. Ischaemic Heart Disease, Cerebrovascular Diseases, Diabetes Mellitus, Road Traffic Injuries, and Lower Respiratory Infections is the leading cause of the total burden in Malaysia. Ischemic Heart Disease and Road Traffic Injuries caused the highest burden among males while Diabetes Mellitus being the leading cause of total disease burden among females.

As average, people expected to life in healthy life for 2015 to 2017 is 68.49 years old with 6.9 years living with disabilities condition. Male has lower life expectancy as compared with female. Male has 7.07 years living with disabilities condition as compared with female, 6.73 years living with disabilities.

Burden of Disease study uses a macro level approach towards determining the burden of each disease, measuring the burden of diseases and injuries for a population at whole. The estimates presented in this study, though limited by availability of certain data, was derived from best available local data for Malaysia and through critical appraisal of available information. We believe that the estimates produced in this study is the most accurate representation of cause of death and disease burden in Malaysia.

1.0 Introduction

1.1 Research Summary

The growing demand for health services under limited resources poses a challenge for government to respond to people's health needs effectively. Inadequate information to guide decision-making on health policies and resource allocation is one of the obstacles for better policy development. Previously, a variety of epidemiological indicators such as mortality rates, incidence or prevalence of disease and injury as well as prevalence of disability (morbidity) have been employed to assess population health status. However, these epidemiological indicators address only a limited aspect of a population's health status. Therefore, the development of a more comprehensive and holistic framework which combines these indicators into summary measures of a population health to produce age-sex-cause-specific epidemiological estimates is of critical importance (Murray et al., 2002).

The World Bank commissioned the first Global Burden of Disease (GBD) study for its World Development Report 1993 (World Bank, 1993) and the study was carried out in a collaboration between the Harvard School of Public Health and the World Health Organization. This first GBD study quantified the health effects of more than 100 diseases and injuries for eight regions of the world in 1990 (Murray & Lopez, 1996). GBD generated comprehensive and internally consistent estimates of mortality and morbidity by age, sex and region. The study also introduced a new metric – the disability-adjusted life year (DALY) – as a single measure to quantify the burden of diseases, injuries and risk factors (Murray & Lopez, 1996). The DALY is based on years of life lost from premature death (fatal health outcomes) and years of life lived in disability (non-fatal health outcomes). This framework also help to assess the comparative risks of health and their outcomes in different demographic groups of the population (Murray et al., 2012).

Malaysia Burden of Disease (MBOD) study has been continuously produce starting in the year 2000. This report is the fourth instalment of the MBOD which covers on the year of 2015 until 2017. The concepts and the findings outline will be the same with the previous findings which covers on assessment of the magnitude and distribution of more than 100 disease conditions with additional of Healthy Adjusted Life Expectancies (HALEs) component. The MBOD study was carried out to assist stakeholders in the public health, health services and medical research in setting priorities and planning of services and resources. Therefore, the objective aims to provide a comprehensive assessment of premature mortality (fatal illness) and morbidity (non-fatal illness) attributable to diseases and injuries by age and sex specific for 2015 until 2017 in terms of DALYs. In addition, the findings were also aiming to provide a comprehensive assessment of Malaysia's Health Adjusted Life Expectancy (HALE) for 2015 until 2017.

1.2 Objectives

The present study aims to provide a comprehensive assessment of premature mortality and morbidity (non-fatal health outcomes) attributable to diseases and injuries by age and sex specific for 2015 until 2017. Therefore, the objectives can be specified as follow:

To calculate the burden of premature mortality (YLLs) by age and sex in Malaysia for 2015 until 2017.
To calculated the burden of morbidity (YLDs) by age and sex in Malaysia for 2015 until 2017.
To calculate the Disability Adjusted Life Years (DALYs) in Malaysia for 2015 until 2017.
To calculate the Health Adjusted Life Expectancy (HALE) in Malaysia for 2015 until 2017.

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2.0 Methodology

DISEASE AND INJURY CATEGORY LISTS

The disease and injury categories where follow the previous MBOD study (IPH 2017). All the list were reviewed by team researchers and expert to cover all fatal and non-fatal health outcomes, health priorities and policy interest relevant to Malaysia. The lists were determined by compared and referred to many sources such as previous MBOD studies, World Health Organization (WHO) Mortality Tabulation and Global Burden of Disease 2015 list.

A final disease and injury list consisting of 22 disease groups, under which 113 disease and injury categories were classified. Residual causes were included in each disease group to ensure health loss was captured for all conditions. The final disease groups and categories used in this MBOD is included in Appendix I (medical death) and Appendix II (non-medical death). The ICD-10 codes corresponding with each disease and injury category, as well as the disease group, are included.

YEARS OF LIFE LOST (YLL)

Years of Life Lost (YLL) represents the burden of fatal diseases and injuries. Mortality data, by age and gender, was used to determine the YLL for each disease and injury category. Years of Life Lost (YLL) was calculated by summing the number of deaths for the disease category at 5-year age

intervals, multiplied by the remaining life expectancy for the specific age group. As such, the formula as follow:

$$YLL(c,s,a,t) = N(c,s,a,t) \times LE(s,a,t)$$

Where:

N (c,s,a,t) is the number of deaths due to the cause; c, for the given age; a, and gender; s, in year; t

LE (s,a,t) is the life expectancy for the given age; a, gender; s, in year; t

Life expectancy for each of the years calculated and was obtained from the published figures from the Department of Statistics Malaysia. For mortality data, the data was obtained from vital registration under National Registration Department (NRD). In Malaysia, the mortality data were divided into two main death which were:

Medically certified deaths: Deaths that occur in health facilities and are certified as to cause of death by the attending physician. The deaths will be given specific code follow by the 10th edition of ICD 10 Code (Can refer to Appendix I).

Non-medically certified deaths: Deaths that occur outside health facilities and are reported to the local police station by the next of kin, who also provide a “lay” opinion of the cause of death. The death usually will code using Department of Statistics Malaysia (DOSM) death code (Can refer to Appendix II).

Before the mortality data can be used, several measurement steps were done to ensure the data was reliable and be used. The steps as follow:

2.2.1 Missing data redistribution

The number of deaths with missing age or gender were extremely low. Missing values were assigned to the most prevalent age group or gender for the cause of death. Gross errors in the mortality data were also identified and corrected similarly by carrying out age-specific diseases check and gender-specific diseases check prior to redistribution.

2.2.2 Garbage codes redistribution

The assigned cause of deaths may represent causes of death that do not accurately present the underlying cause of death. These inappropriate ICD codes for mortality, collectively known as “garbage codes”, compromise the usefulness of cause of death information from a policy perspective. These causes of death coded were listed as garbage codes if they represent;

Causes that are not underlying cause or unlikely as a cause of death
Intermediate causes of death
Immediate causes of death
Ill-defined or unspecified cause of death

Taking into consideration that Malaysia uses 3-character ICD-10 coding for causes of death and local practices of cause of death assignment, the team of Burden of Disease experts undertook to analyse the garbage codes listed by World Health Organization and Global Burden of Disease study. The ill-defined causes were then distributed either within specific disease groups, specific cause categories or all causes categories using Cause Specific Mortality Fractions (CSMF) (Byass, 2016). CSMF was applied on the medically and non-medically certified death with the derived from medical records review and verbal autopsy methods respectively. The redistribution was able to give more accurate estimations of mortality numbers and significantly reduced the number of ill-defined cause of deaths for all-cause redistribution. The final ill-defined cause of deaths was than redistributed pro-rata either to all disease categories with Group I and II, or to Group III for ill-defined injury causes. The final redistribution of the garbage codes using the CSMF is summarized in table as follow:

Table 2.1: *Cause of death redistribution*

Specific Cause Redistribution	
Other Infectious Diseases	A28, A48-A49, B82-B83, B94-B96, B99
Other Neonatal Conditions	P28, P96
Other Nutritional Disorders	E64
Mouth and Oropharynx Cancers	C14
Trachea, Bronchus and Lung Cancers	C39
Other Malignant Neoplasms	C26, C55, C57, C63, C68, C75-C76, C97
Benign Neoplasms	D09, D37-D41, D48
Diabetes mellitus	E14
Endocrine, Blood and Immune Disorders	E68, E85-E88
Other Neurological Conditions	G09, G80-G83, G91-G93
Cerebrovascular Diseases (Stroke)	I69
Other Circulatory Diseases	I27, I31, I44-I45, I47, I49-I51, I74, I81, I99
Other Respiratory Diseases	J80-J81, J86-J90, J93-J94, J98
Other Digestive Diseases	I85, K65-K66, K71-K72, K75, K92
Nephritis and Nephrosis	N18-N19
Other Musculoskeletal Diseases	M86
Other Chromosomal Disorders	Q99
Other Congenital Anomalies	Q89
Road Traffic Injuries	V99, Y85-Y86
Other Unintentional Injuries	X59
Disease Category Redistribution	
Redistribute to STDs excluding HIV	A64
Redistribute to all Mental & Behavioural Disorders	F99
Redistribute to all Neonatal Conditions	P95
Redistributed to all cancers	C80
Redistribute to circulatory causes	I10, I15, I70
All Cause Redistribution	
Redistribute to all causes (GROUP I & II) *Group I: Communicable Diseases, Maternal, Perinatal and Nutritional Condition *Group II: Non-Communicable Diseases	A40-A41, D65, I26, I46, J96, N17, R00-R99
Redistribute to all causes (GROUP III) *Group III: Injuries	S00-T98, Y10-Y34, Y87, Y89

YEARS LOST DUE TO DISABILITY (YLD)

Years Lost due to Disability (YLD) represents the non-fatal health outcomes of diseases and injuries. Prevalence estimates for each disease and injury, including breakdown of the severity proportion and percentage contributing to its sequelae, was calculated and estimated. This prevalence, together with a set of disability weights for each condition, was used to calculate the YLD.

2.3.1 Data source for YLD

There was no single and comprehensive source of prevalence data for all non-fatal disease and injury. The prevalence of diseases and injuries were drawn from a wide variety of sources. Where possible, national data sources and local studies were used to obtain the most reliable Malaysian estimates.

Administrative data sources, including disease surveillance data, diseases registries and hospitalization data, were evaluated for their representativeness and adjusted as necessary to estimate prevalence of certain diseases. Surveys, epidemiological studies, and local studies were evaluated for their representativeness and quality before being used to estimate the prevalence. Regional and international studies were used to produce estimates where local data was not available or deemed unreliable. Regional studies were preferred compared to studies and estimates from other regions based on the assumption that this reflected a more accurate local representation. Meta-analysis and systematic reviews, where available, were used to obtain the most accurate estimates in the absence of local and regional data.

Where disease prevalence or other parameters for estimates were not available from any reliable source, the incidence or prevalence estimates were obtained from Global Health Data Exchange GBD Results Tool from the Institute for Health Metrics and Evaluation (IHME). DISMOD-II was used to produce prevalence estimates from incidence, case fatality, remission or duration data that was available. DISMOD-II is a freely available software commonly used for burden of disease analysis. The Malaysian population structure and background mortality rates for each corresponding year is entered into DISMOD-II to produce these estimates. Details of the disease models and sequelae used in this study is included in Appendix III.

2.3.2 Severity Distribution and Disability Weights

Each disease consists of a conceptual model of health loss which depicts the major sources of health loss caused by different severity levels and stages of a disease. In most cases, the major sources of health loss, also called the sequelae, were based on GBD 2013.

The disability weight (DW) for each sequela was obtained from the GBD 2013 (Salomon et al., 2015). Where necessary or limited by data availability, composite and/or combined disability weights (CDW) were used based on disability weights for 235 unique health states in the Global Burden of Disease 2013 study. CDW were calculated according to the following formula:

$$CDW = 1 - \left(\Sigma \left(1 - DWx\right) \wedge y \right)$$

Where,

x: The sequence of disability weights in Global Burden of Disease

y: The sequence multiplied for every sequence listed

2.3.3 YLD calculations

Years Lost due to Disability (YLD) was calculated based on this two-formula depending on data sources obtain:

If the data source obtains had incidence and duration period;

$$YLD(c,s,a,t) = I(c,s,a,t) \times DW(c,s,a) \times L(c,s,a,t)$$

Where:

P(c,s,a,t) = number of prevalence for cause; c, age; a, and gender; s, in year; t

DW (c,s,a) = disability weight for cause; c, age; a and gender; s

L(c,s,a,t) = average duration of the case until remission or death (years)

If the data only had prevalence;

$$YLD(c,s,a,t) = P(c,s,a,t) \times DW(c,s,a)$$

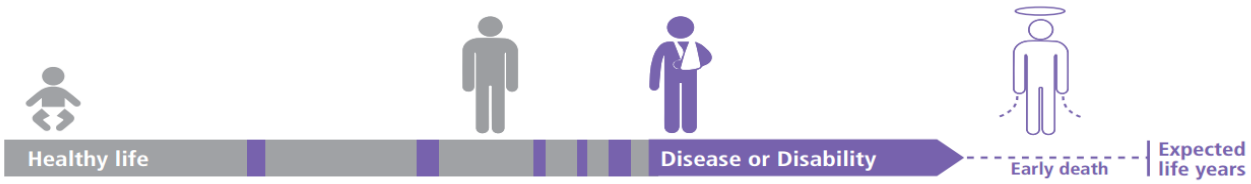
P(c,s,a,t) = number of incident cases for cause; c, age; a, and gender; s

DW (c,s,a) = disability weight for cause; c, age; a and gender; s

DISABILITY-ADJUSTED LIFE YEARS (DALYs)

Disability-Adjusted Life Years (DALYs) represents the total burden of the diseases and injuries. The DALY for each disease and injury was calculated by total sum of the Years of Life Lost (YLL) and Years Lost due to Disability (YLD) for the disease or injury. The burden of disease of a disease group was calculated by total sum of the DALYs across all the diseases or injury in the group. The total burden of disease was calculated by summing the DALYs across all conditions.

DALYs = YLL + YLD



HEALTH-ADJUSTED LIFE EXPECTANCY (HALE)

In this report, we used Sullivan's method to calculate Health-Adjusted Life Expectancy (HALE) (described by Jagger et al. 2006). This method is simple and intuitive. Sullivan's method requires age-specific proportions of time spent in different states of health and age-specific mortality information from a life table. Measures of HALE are calculated by adjusting estimates of the life expectancy of the population of interest proportionately to the average health of individuals in each age group.

$$HALE_{x,s} = \left(\sum_{x=0}^{100} (L'_{x,s})\right)/l_{x,s}$$

$$L'_{x,s} = L_{x,s}\ (1 - p_{x,s})$$

$$L'_{x,s} = L_{x,s}\ (H_{x,s})$$

where:
HALE is health-adjusted life expectancy
x is the exact age for which life expectancy or HALE is to be estimated
s refers to sex
$L_{x,s}$ refers to the number of person-years lived in the age group x, for sex, s
$L'_{x,s}$ refers to the health-adjusted number of person-years lived in the age group x, for sex, s

$l_{x,s}$ is the number of survivors in the age group x (as described above for the life table), for sex, s

$p_{x,s}$ represents the proportion of prevalence of ill health, estimated by YLD rate for each age group x, for sex, s

$H_{x,s}$ represents the complement of $p_{x,s}$ and is the average level of health-related quality of life; it has a value between 0 and 1, where a value of 1 indicates full health.

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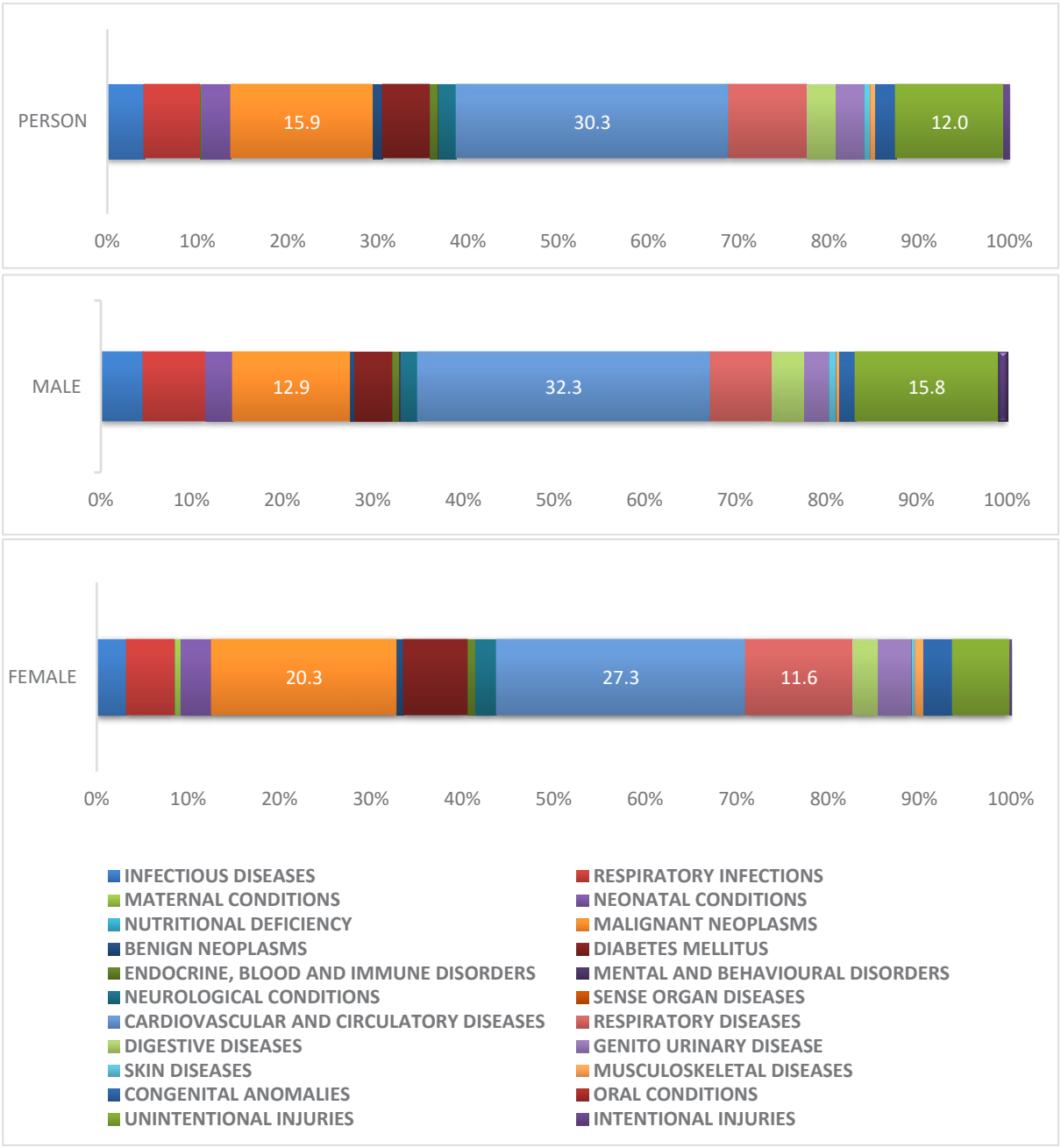
3.0 Years Of Life Lost (YLL)

YLL is a summary measure of premature mortality. Premature mortality is one of the indicators use in mortality epidemiology in terms of how many years loss before the expected age. The estimation could help in viewing the disease impacts on populations.

3.1 Years Of Life Lost (Yll) - 2015

3.1.1 Pattern of Years of Life Lost (YLL) by gender in 2015.

Figure 3.1: *Percentage (%) of fatal burden (YLL) by disease groups and gender, 2015.*



Overall, YLL was mostly contributed by Cardiovascular and Circulatory Diseases (1,043,781; 30.3%) followed by Malignant Neoplasms (545,095; 15.9%) and Unintentional Injuries (411,471; 12.0%). As for gender, YLL in male mostly contributed by Cardiovascular and Circulatory Diseases (672,555; 32.3%) followed by Unintentional Injuries (327,606; 15.8%) and Malignant Neoplasms (269,227; 12.9%). For female, YLL mostly contributed by Cardiovascular and Circulatory Diseases (371,226; 27.3%) followed by Malignant Neoplasms (275,868; 20.3%) and Respiratory Diseases (158,350; 11.6%) (**Figure 3.1**). All other categories can be seen in **Table 3.1**.

Table 3.1: *Fatal burden of disease and injury (YLL) by disease groups and by gender, 2015.*

Disease Categories	PERSON		MALE		FEMALE	
	YLL	%	YLL	%	YLL	%
INFECTIOUS DISEASES	141,456	4.11	97,727	4.70	43,729	3.22
RESPIRATORY INFECTIONS	214,051	6.22	141,620	6.81	72,431	5.33
MATERNAL CONDITIONS	8,526	0.25	-	0.00	8,526	0.63
NEONATAL CONDITIONS	109,349	3.18	63,392	3.05	45,957	3.38
NUTRITIONAL DEFICIENCY	517	0.02	264	0.01	254	0.02
MALIGNANT NEOPLASMS	545,095	15.85	269,227	12.94	275,868	20.29
BENIGN NEOPLASMS	18,107	0.53	9,013	0.43	9,094	0.67
DIABETES MELLITUS	182,380	5.30	86,810	4.17	95,570	7.03
ENDOCRINE, BLOOD AND IMMUNE DISORDERS	29,203	0.85	17,533	0.84	11,670	0.86
MENTAL AND BEHAVIOURAL DISORDERS	3,815	0.11	3,483	0.17	332	0.02
NEUROLOGICAL CONDITIONS	68,822	2.00	37,767	1.82	31,055	2.28
SENSE ORGAN DISEASES	200	0.01	158	0.01	42	0.00
CARDIOVASCULAR AND CIRCULATORY DISEASES	1,043,781	30.34	672,555	32.33	371,226	27.30
RESPIRATORY DISEASES	298,550	8.68	140,200	6.74	158,350	11.64
DIGESTIVE DISEASES	113,553	3.30	75,608	3.63	37,946	2.79
GENITO URINARY DISEASE	105,137	3.06	54,897	2.64	50,241	3.69
SKIN DISEASES	22,928	0.67	17,571	0.84	5,357	0.39
MUSCULOSKELETAL DISEASES	20,462	0.59	8,364	0.40	12,098	0.89
CONGENITAL ANOMALIES	79,596	2.31	36,056	1.73	43,540	3.20
ORAL CONDITIONS	422	0.01	146	0.01	276	0.02
UNINTENTIONAL INJURIES	411,471	11.96	327,606	15.75	83,865	6.17
INTENTIONAL INJURIES	22,485	0.65	20,091	0.97	2,394	0.18
TOTAL YLL	3,439,907	100	2,080,087	100	1,359,820	100

GROUP I: Communicable Disease, Maternal, Perinatal, Nutritional Status	GROUP II: Non-communicable Disease	GROUP III: Injury

3.1.2 Pattern of Years of Life Lost (YLL) by age in 2015.

Overall, 30.6 % of total YLL were contributed by productive age [15 to 49 years old (10.3 % for young adult and 20.3% for older adult)]. Pre-elderly age group (50 to 59 years old) contributed about 17.1% for total YLL. Among male, 34.8% of total YLL were contributed by productive age (15 to 49 years old), compared to female as 24.2%. About half of the total YLL (47.5%) in female was contributed by elderly age group (60 years and above) **(Figure 3.2)**.

In specific disease group, Unintentional Injuries become the most leading disease categories towards YLL in the age of young adult (15 to 29 years old) and children (5 to 14 years old). Starting at older adult age group (30-49 years old), Cardiovascular and Circulatory Disease become the most leading disease categories towards YLL until elderly age group (60 years and above) **(Figure 3.3)**. Male had the same pattern of fatal burden of YLL as compared with overall population **(Figure 3.4)**. Among female, Malignant Neoplasm become the most leading disease categories towards YLL in older adult (30 – 49 years old) to pre-elderly (50-59 years old) while Cardiovascular and Circulatory Diseases become the most leading disease categories towards YLL in elderly (60 years and above) **(Figure 3.5)**.

Figure 3.2: *Percentage (%) of fatal burden (YLL), by age group and gender, 2015.*

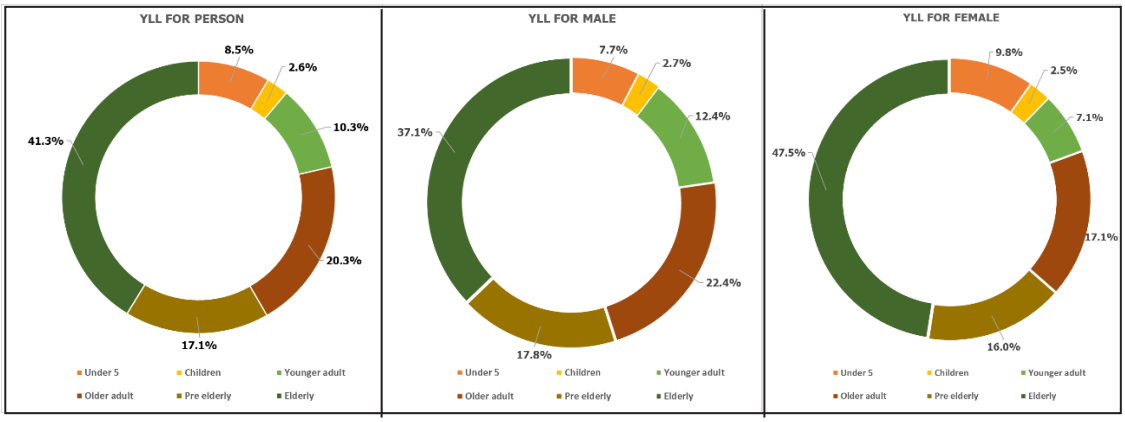


Figure 3.3: *Percentage (%) of fatal burden (YLL), by disease categories and age group, person, 2015.*

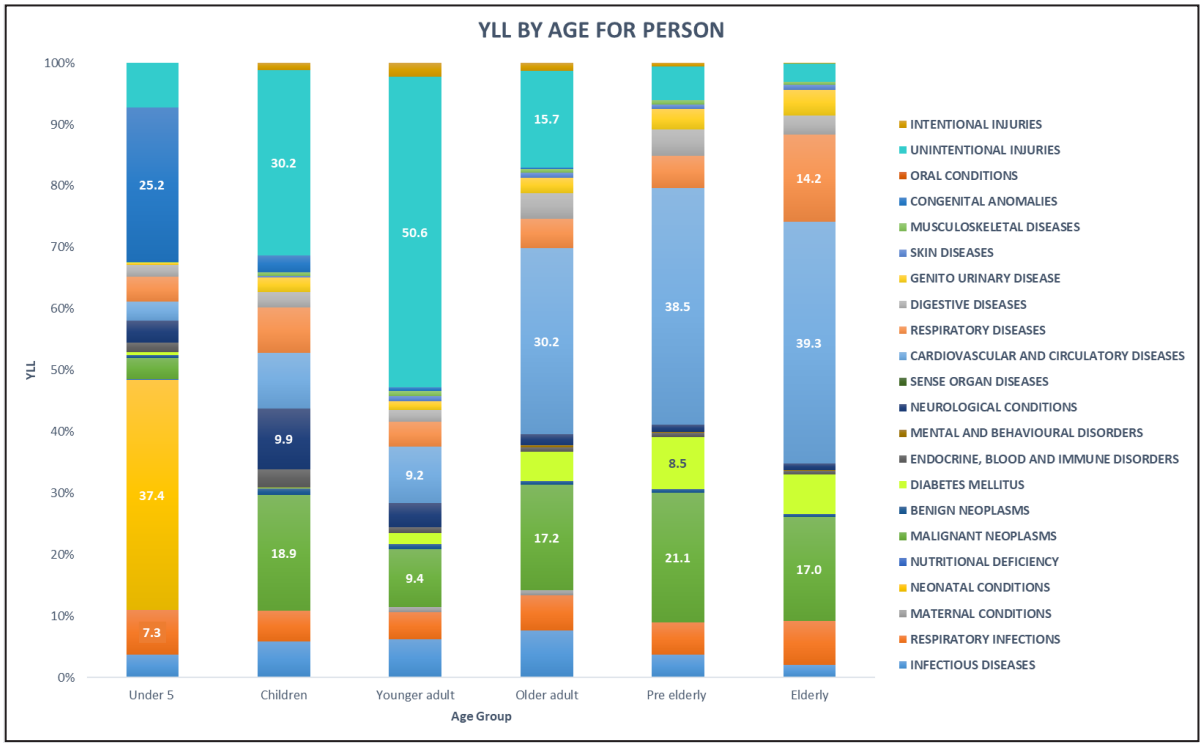


Figure 3.4: *Percentage (%) of fatal burden (YLL), by disease categories and age group, male, 2015.*

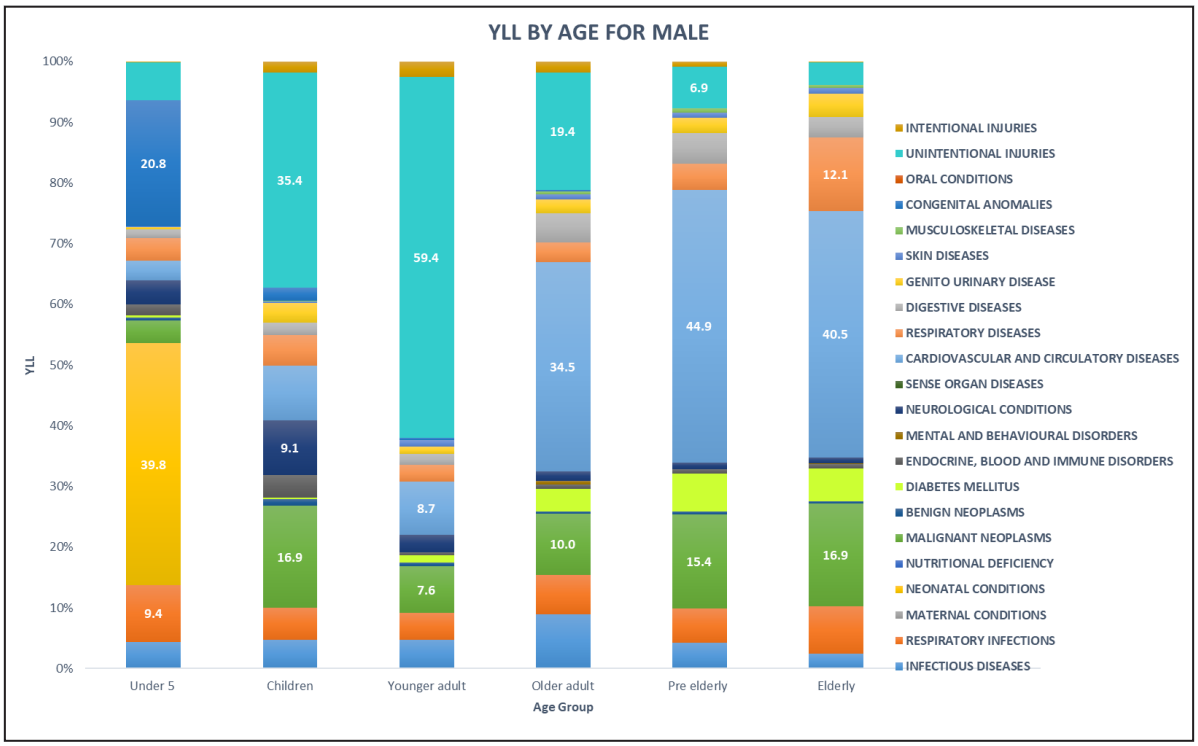
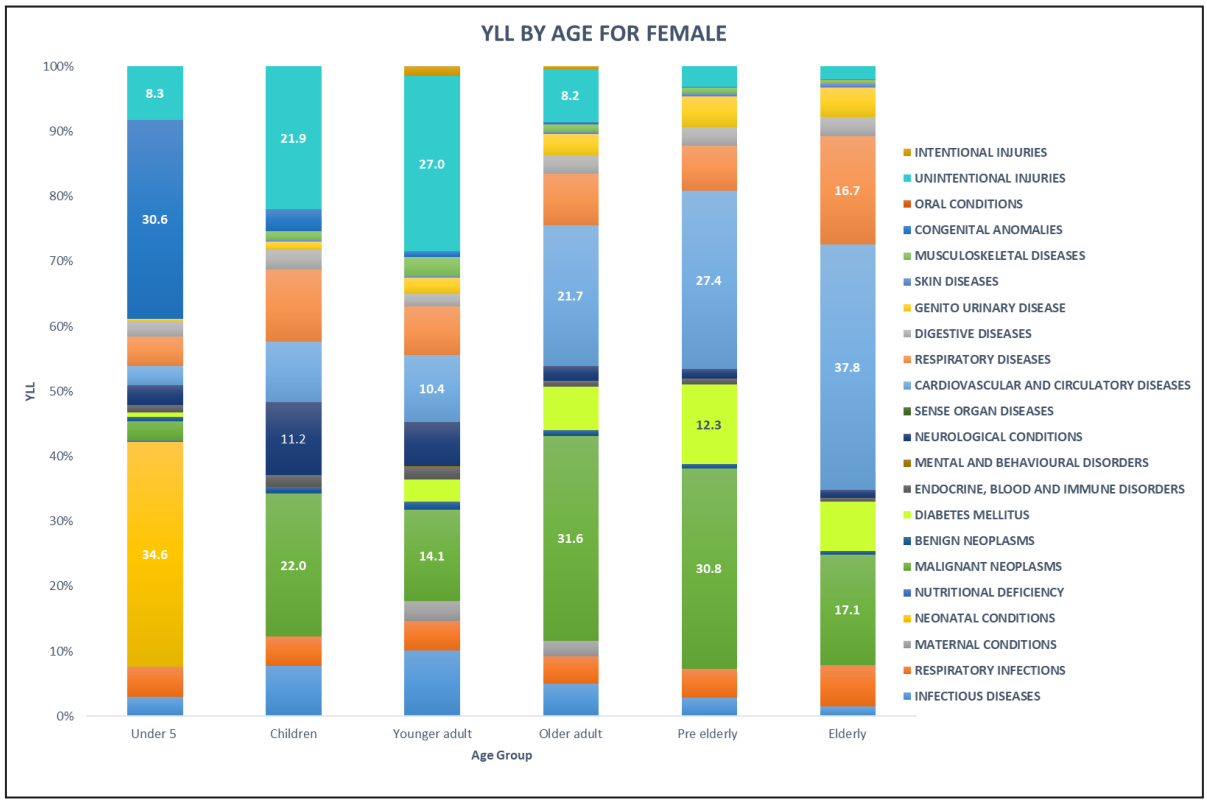


Figure 3.5: *Percentage (%) of fatal burden (YLL), by disease categories and age group, female, 2015.*



3.1.3 Leading Causes of Years of Life Lost (YLL) for 2015.

Ischemic Heart Disease was the leading cause of fatal burden in Malaysia for 2015, contributing 12.6% of the total YLL. This was followed by Cerebrovascular Diseases (Stroke), with 11.3%, Road Traffic Injuries (9.5%), Lower Respiratory Infections (6.2%) and Diabetes Mellitus (5.3%). For under 5 (0 to 4 years old), Low Birth Weight was the leading cause of fatal burden with 10.6% of total YLL, followed by Congenital Heart Disease, with 8.4% and Lower Respiratory Infections (7.2%). Road Traffic Injuries were the leading cause of fatal burden for children (5 to 14 years old) and young adult (15 to 29 years old) with 20.7% and 46.7% respectively. Ischemic Heart Disease was the leading cause of fatal burden with 15.5% of total YLL in older adult (30 to 49 years old), followed by Road Traffic Injuries with 12.5%. Ischemic Heart Disease was the leading cause of fatal burden with 19.5% of total YLL in pre-elderly (50 to 59 years old), followed by Cerebrovascular Diseases (Stroke) with 13.1%. However, the leading cause of fatal burden vary in elderly (60 years and above). Cerebrovascular Diseases (Stroke) was the leading cause of fatal burden with 16.1% followed by Ischemic Heart Disease with 14.3% **(Table 3.2)**.

Among male, Ischemic Heart Disease was the leading cause of fatal burden with 16.6% of total YLL, followed by Road Traffic Injuries with 12.9% and Cerebrovascular Diseases (Stroke) with 11.6%. For under 5 (0 to 4 years old), Low Birth Weight was the leading cause of fatal burden with 11.1% of total YLL, followed by Lower Respiratory Infections, with 9.3%. Road Traffic Injuries were the leading cause of fatal burden for children (5 to 14 years old) and young adult (15 to 29 years old) with 24.5% and 54.6% respectively. Ischemic Heart Disease was the leading cause of fatal burden with 20.4% of total YLL in older adult (30 to 49 years old), followed by Road Traffic Injuries with 15.7%. Ischemic Heart Disease was the leading cause of fatal burden with 26.2% of total YLL in pre-elderly (50 to 59 years old), followed by Cerebrovascular Diseases (Stroke) with 13.7%. Same leading cause also seen in elderly (60 years and above) whereas Ischemic Heart Disease was the leading cause of fatal burden with 18.8% of total YLL while Cerebrovascular Diseases (Stroke) as 17.5% **(Table 3.3)**.

Among female, Cerebrovascular Diseases (Stroke) was the leading cause of fatal burden with 10.8% of total YLL, followed by Diabetes Mellitus with 7.0% and Ischemic Heart Disease with 6.6%. For under 5 (0 to 4 years old), Low Birth Weight was the leading cause of fatal burden with 10.0% of total YLL, followed by Congenital Heart Diseases, with 9.2%. Road Traffic Injuries were the leading cause of fatal burden for children (5 to 14 years old) and young adult (15 to 29 years old) with 14.6% and 25.5% respectively. Breast Cancer was the leading cause of fatal burden with 11.6% of total YLL in older adult (30 to 49 years old), followed by Cerebrovascular Diseases (Stroke) with 9.5%. Diabetes Mellitus was the leading cause of fatal burden with 12.3% of total YLL in pre-elderly (50 to 59 years old), followed by Cerebrovascular Diseases (Stroke) with 11.9% and Breast Cancer with 10.9%. However, the leading cause of fatal burden vary in elderly (60 years and above). Cerebrovascular Diseases (Stroke) was the leading cause of fatal burden with 14.3% followed by Ischemic Heart Disease with 8.9% **(Table 3.4)**.

Person

Table 3.2: *Leading causes of fatal burden (total YLL; percentage %) for all population, by age group, 2015.*

Rank	Overall Age (0+ years old)	Under 5 (0-4 years old)	Children (5-14 years old)	Young Adult (15-29 years old)	Older Adult (30-49 years old)	Pre-Elderly (50-59 years old)	Elderly (60+ years old)
1	Ischaemic Heart Disease ***434,097; 12.6%***	Low Birth Weight ***31,053; 10.6%***	Road Traffic Injuries ***18,550; 20.7%***	Road Traffic Injuries ***165,581; 46.7%***	Ischaemic Heart Disease ***107,825; 15.5%***	Ischaemic Heart Disease ***114,261; 19.5%***	Cerebrovascular Diseases (Stroke) ***228,166; 16.1%***
2	Cerebrovascular Diseases (Stroke) ***387,055; 11.3%***	Congenital Heart Diseases ***24,497; 8.4%***	Brain and Other CNS Cancers ***6,601; 7.4%***	Lower Respiratory Infections ***15,726; 4.4%***	Road Traffic Injuries ***86,832; 12.5%***	Cerebrovascular Diseases (Stroke) ***76,789; 13.1%***	Ischaemic Heart Disease ***202,989; 14.3%***
3	Road Traffic Injuries ***325,239; 9.5%***	Lower Respiratory Infections ***21,099; 7.2%***	Leukaemia ***5,431; 6.1%***	Cerebrovascular Diseases (Stroke) ***12,854; 3.6%***	Cerebrovascular Diseases (Stroke) ***64,018; 9.2%***	Diabetes Mellitus ***50,143; 8.5%***	Lower Respiratory Infections ***101,460; 7.1%***
4	Lower Respiratory Infections ***213,508; 6.2%***	Birth Trauma and Asphyxia ***17,487; 6.0%***	Lower Respiratory Infections ***4,328; 4.8%***	Leukaemia ***9,458; 2.7%***	Lower Respiratory Infections ***39,953; 5.7%***	Lower Respiratory Infections ***30,493; 5.3%***	Diabetes Mellitus ***90,985; 6.4%***
5	Diabetes Mellitus ***182,380; 5.3%***	Neonatal Infections ***17,116; 5.9%***	Drowning ***4,087; 4.6%***	Ischaemic Heart Disease ***8,511; 2.4%***	Diabetes Mellitus ***33,123; 4.8%***	Road Traffic Injuries ***24,214; 4.1%***	Chronic Obstructive Pulmonary Disease ***78,248; 5.5%***
6	Chronic Obstructive Pulmonary Disease ***99,906; 2.9%***	Road Traffic Injuries ***8,160; 2.8%***	Epilepsy ***3,689; 4.1%***	Asthma ***7,422; 2.1%***	Breast Cancer ***26,856; 3.9%***	Breast Cancer ***23,761; 4.0%***	Trachea, Bronchus and Lung Cancers ***53,061; 3.7%***
7	Asthma ***92,243; 2.7%***	Anencephaly ***5,058; 1.7%***	Cerebrovascular Diseases (Stroke) ***2,916; 3.2%***	Epilepsy ***6,692; 1.9%***	Asthma ***17,360; 2.5%***	Trachea, Bronchus and Lung Cancers ***19,290; 3.3%***	Asthma ***52,568; 3.7%***
8	Trachea, Bronchus and Lung Cancers ***88,030; 2.6%***	Meningitis ***4,792; 1.6%***	Endocrine, Blood and Immune Disorders ***2,646; 2.9%***	Diabetes Mellitus ***6,399; 1.8%***	Trachea, Bronchus and Lung Cancers ***14,260; 2.0%***	Liver Cancers ***13,304; 2.3%***	Colon and Rectum Cancers ***34,977; 2.5%***
9	Breast Cancer ***71,267; 2.1%***	Chronic Obstructive Pulmonary Disease ***4,176; 1.6%***	Rheumatic Heart Disease ***2,212; 2.5%***	Self-Inflicted Injuries ***5,702; 1.6%***	Tuberculosis ***13,740; 2.0%***	Colon and Rectum Cancers ***12,262; 2.1%***	Nephritis and Nephrosis ***30,930; 2.2%***
10	Colon and Rectum Cancers ***61,109; 1.8%***	Endocrine, Blood and Immune Disorders ***4,334; 1.5%***	Asthma ***2,103; 2.3%***	Tuberculosis ***5,222; 1.5%***	HIV ***12,645; 1.8%***	Asthma ***11,601; 2.0%***	Liver Cancers ***23,530; 1.7%***

Male

Table 3.3: *Leading causes of fatal burden (total YLL; percentage %) for male, by age group, 2015.*

Rank	Overall Age (0+ years old)	Under 5 (0-4 years old)	Children (5-14 years old)	Young Adult (15-29 years old)	Older Adult (30-49 years old)	Pre-Elderly (50-59 years old)	Elderly (60+ years old)
1	Ischaemic Heart Disease ***344,702 ; 16.6%***	Low Birth Weight ***17,223 ; 11.1%***	Road Traffic Injuries ***13, 504 ; 24.5%***	Road Traffic Injuries ***140,932 ; 54.6%***	Ischaemic Heart Disease ***94,865 ; 20.4%***	Ischaemic Heart Disease ***96,876 ; 26.2%***	Ischaemic Heart Disease ***145,304 ; 18.8%***
2	Road Traffic Injuries ***269,295 ; 12.9%***	Lower Respiratory Infections ***14,837 ; 9.3%***	Leukaemia ***3,634 ; 6.6%***	Lower Respiratory Infections ***11,390 ; 4.4%***	Road Traffic Injuries ***73,252 ; 15.7%***	Cerebrovascular Diseases (Stroke) ***50,843 ; 13.7%***	Cerebrovascular Diseases (Stroke) ***135,506 ; 17.5%***
3	Cerebrovascular Diseases (Stroke) ***240,525 ; 11.6%***	Congenital Heart Diseases ***12,449 ; 7.7%***	Lower Respiratory Infections ***2,793 ; 5.1%***	Cerebrovascular Diseases (Stroke) ***9,175 ; 3.6%***	Cerebrovascular Diseases (Stroke) ***41,949 ; 9.0%***	Diabetes Mellitus ***23,362 ; 6.3%***	Lower Respiratory Infections ***60,692 ; 7.9%***
4	Lower Respiratory Infections ***141,186 ; 6.8%***	Birth Trauma and Asphyxia ***10,590 ; 6.6%***	Drowning ***2,334 ; 4.2%***	Ischaemic Heart Disease ***7,145 ; 2.8%***	Lower Respiratory Infections ***30,319 ; 6.5%***	Lower Respiratory Infections ***21,153 ; 5.7%***	Chronic Obstructive Pulmonary Disease ***53,296 ; 6.9%***
5	Diabetes Mellitus ***86,810 ; 4.2%***	Neonatal Infections ***10,296 ; 6.5%***	Brain and Other CNS Cancers ***2,294 ; 4.2%***	Leukaemia ***6,950 ; 2.7%***	Diabetes Mellitus ***17,595 ; 3.8%***	Road Traffic Injuries ***18,988 ; 5.1%***	Diabetes Mellitus ***41,949 ; 5.4%***
6	Chronic Obstructive Pulmonary Disease ***70,068 ; 3.4%***	Road Traffic Injuries ***4,685 ; 2.9%***	Endocrine, Blood and Immune Disorders ***2,013 ; 3.6%***	Self-Inflicted Injuries ***4,750 ; 1.8%***	HIV ***11,331 ; 2.4%***	Trachea, Bronchus and Lung Cancers ***13,280 ; 3.6%***	Trachea, Bronchus and Lung Cancers ***35,554 ; 4.6%***
7	Trachea, Bronchus and Lung Cancers ***58,359 ; 2.8%***	Chronic Obstructive Pulmonary Disease ***3,011 ; 1.9%***	Rheumatic Heart Disease ***1,993 ; 3.6%***	Asthma ***3,665 ; 1.4%***	Tuberculosis ***10,851 ; 2.3%***	Liver Cancers ***9,318 ; 2.5%***	Nephritis and Nephrosis ***21,020 ; 2.7%***
8	Nephritis and Nephrosis ***40,293 ; 1.9%***	Meningitis ***2,936 ; 1.8%***	Epilepsy ***1,809 ; 3.3%***	Epilepsy ***3,507 ; 1.4%***	Trachea, Bronchus and Lung Cancers ***8,669 ; 1.9%***	Chronic Obstructive Pulmonary Disease ***8,118 ; 2.2%***	Colon and Rectum Cancers ***20,369; 2.6%***
9	Colon and Rectum Cancers ***34,588 ; 1.7%***	Endocrine, Blood and Immune Disorders ***2,790 ; 1.8%***	Nephritis and Nephrosis ***1,735 ; 3.1%***	Diabetes Mellitus ***3,103 ; 1.2%***	Nephritis and Nephrosis ***7,559 ; 1.6%***	Colon and Rectum Cancers ***7,199 ; 1.9%***	Road Traffic Injuries ***17,933 ; 2.3%***
10	Asthma ***31,552 ; 1.5%***	Leukaemia ***2,780 ; 1.7%***	Cerebrovascular Diseases (Stroke) ***1,513 ; 2.7%***	Tuberculosis ***2,694 ; 1.0%***	Asthma ***6,146 ; 1.3%***	Nephritis and Nephrosis ***6,992 ; 1.9%***	Asthma ***16,244 ; 2.1%***

Female

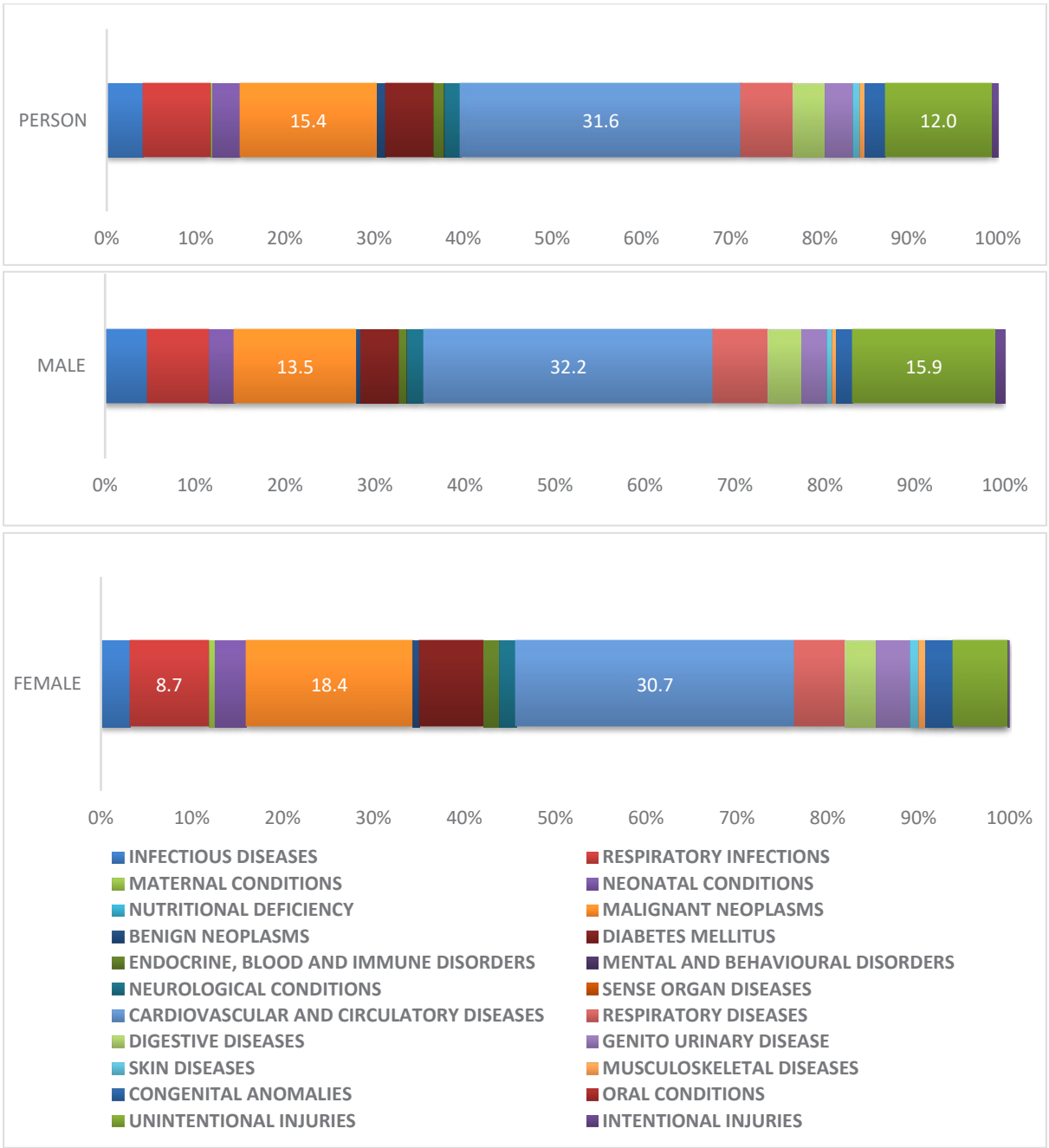
Table 3.4: *Leading causes of fatal burden (total YLL; percentage %) for female, by age group, 2015.*

Rank	Overall Age (0+ years old)	Under 5 (0-4 years old)	Children (5-14 years old)	Young Adult (15-29 years old)	Older Adult (30-49 years old)	Pre-Elderly (50-59 years old)	Elderly (60+ years old)
1	Cerebrovascular Diseases (Stroke) ***146,530 ; 10.8%***	Low Birth Weight ***13,330 ; 10.0%***	Road Traffic Injuries ***5,046 ; 14.6%***	Road Traffic Injuries ***24,469 ; 25.5%***	Breast Cancer ***26,856 ; 11.6%***	Diabetes Mellitus ***26,781 ; 12.3%***	Cerebrovascular Diseases (Stroke) ***92,660 ; 14.3%***
2	Diabetes Mellitus ***95,570 ; 7.0%***	Congenital Heart Diseases ***12,158 ; 9.2%***	Brain and Other CNS Cancers ***4,307 ; 12.5%***	Lower Respiratory Infections ***4.336 ; 4.5%***	Cerebrovascular Diseases (Stroke) ***22,069 ; 9.5%***	Cerebrovascular Diseases (Stroke) ***25,946 ; 11.9%***	Ischaemic Heart Disease ***57,685 ; 8.9%***
3	Ischaemic Heart Disease ***89,395 ; 6.6%***	Birth Trauma and Asphyxia ***6,897 ; 5.2%***	Epilepsy ***1,880 ; 5.4%***	Asthma ***3,757 ; 3.9%***	Diabetes Mellitus ***15,527 ; 6.7%***	Breast Cancer ***23,706 ; 10.9%***	Diabetes Mellitus ***49,035 ; 7.6%***
4	Lower Respiratory Infections ***72,322 ; 5.3%***	Neonatal Infections ***6,820 ; 5.1%***	Leukaemia ***1,797 ; 5.2%***	Cerebrovascular Diseases (Stroke) ***3,679 ; 3.8%***	Road Traffic Injuries ***13,579 ; 5.9%***	Ischaemic Heart Disease ***17,384 ; 8.0%***	Lower Respiratory Infections ***40,768 ; 6.3%***
5	Breast Cancer ***71,203 ; 5.2%***	Lower Respiratory Infections ***6,261 ; 4.7%***	Drowning ***1,753 ; 5.1%***	Diabetes Mellitus ***3,296 ; 3.4%***	Ischaemic Heart Disease ***12,960 ; 5.6%***	Lower Respiratory Infections ***9,790 ; 4.5%***	Asthma ***36,323 ; 5.6%***
6	Asthma ***60,691 ; 4.5%***	Road Traffic Injuries ***3,475 ; 2.6%***	Lower Respiratory Infections ***1,534 ; 4.4%***	Epilepsy ***3,184 ; 3.3%***	Asthma ***11,214 ; 4.8%***	Asthma ***7,793 ; 3.6%***	Chronic Obstructive Pulmonary Disease ***24,953 ; 3.9%***
7	Road Traffic Injuries ***55,945 ; 4.1%***	Anencephaly ***2,557 ; 1.9%***	Cerebrovascular Diseases (Stroke) ***1,403 ; 4.1%***	Tuberculosis ***2.528 ; 2.6%***	Lower Respiratory Infections ***9,634 ; 4.2%***	Trachea, Bronchus and Lung Cancers ***6,009 ; 2.8%***	Breast Cancer ***19,547 ; 3.0%***
8	Chronic Obstructive Pulmonary Disease ***29,838 ; 2.2%***	Fires, Heat and Hot Substances ***2,002 ; 1.5%***	Asthma ***1,218 ; 3.5%***	Leukaemia ***2,508 ; 2.6%***	Colon and Rectum Cancers ***6,155 ; 2.7%***	Road Traffic Injuries ***5,226 ; 2.4%***	Trachea, Bronchus and Lung Cancers ***17,506 ; 2.7%***
9	Trachea, Bronchus and Lung Cancers ***29,671 ; 2.2%***	Meningitis ***1,856 ; 1.4%***	Chronic Obstructive Pulmonary Disease ***838 ; 2.4%***	Brain and Other CNS Cancers ***2,368 ; 2.5%***	Trachea, Bronchus and Lung Cancers ***5,591 ; 2.4%***	Colon and Rectum Cancers ***5,063 ; 2.3%***	Colon and Rectum Cancers ***14,608 ; 2.3%***
10	Colon and Rectum Cancers ***26,521 ; 2.0%***	Brain and Other CNS Cancers ***1,850 ; 1.4%***	Dengue ***716 ; 2.1%***	Dengue ***2,124 ; 2.2%***	Cervix Cancer ***4,940 ; 2.1%***	Nephritis and Nephrosis ***4,138 ; 1.9%***	Liver Cancers ***10,925 ; 1.7%***

3.2 Years of Life Lost (YLL) - 2016

3.2.1 Pattern of Years of Life Lost (YLL) by gender in 2016.

Figure 3.6: *Percentage (%) of fatal burden (YLL) by disease groups and gender, 2016.*



Overall, YLL was mostly contributed by Cardiovascular and Circulatory Diseases (1,123,671; 31.6%) followed by Malignant Neoplasms (548,482; 15.4%) and Unintentional Injuries (427,600; 12.0%). As for gender, YLL in male mostly contributed by Cardiovascular and Circulatory Diseases (693,919; 32.2%) followed by Unintentional Injuries (345,516; 15.9%) and Malignant Neoplasms (291,380; 13.5%). For female, YLL mostly contributed by Cardiovascular and Circulatory Diseases (429,753; 30.7%) followed by Malignant Neoplasms (257,102; 18.4%) and Respiratory Infections (121,962; 8.7%) (**Figure 3.6**). All other categories can be seen in **Table 3.5**.

Table 3.5: *Fatal burden of disease and injury (YLL) by disease groups and by gender, 2016.*

Disease Categories	PERSON		MALE		FEMALE	
	YLL	%	YLL	%	YLL	%
INFECTIOUS DISEASES	145,935	4.11	101,555	4.72	44,380	3.17
RESPIRATORY INFECTIONS	269,513	7.59	147,551	6.86	121,962	8.71
MATERNAL CONDITIONS	8,855	0.25	-	0.00	8,855	0.63
NEONATAL CONDITIONS	108,252	3.05	59,949	2.79	48,303	3.45
NUTRITIONAL DEFICIENCY	909	0.03	580	0.03	330	0.02
MALIGNANT NEOPLASMS	548,482	15.44	291,380	13.54	257,102	18.37
BENIGN NEOPLASMS	18,990	0.53	9,479	0.44	9,512	0.68
DIABETES MELLITUS	191,570	5.39	92,698	4.31	98,872	7.06
ENDOCRINE, BLOOD AND IMMUNE DISORDERS	41,927	1.18	17,585	0.82	24,342	1.74
MENTAL AND BEHAVIOURAL DISORDERS	2,351	0.07	1,826	0.08	525	0.04
NEUROLOGICAL CONDITIONS	64,310	1.81	39,379	1.83	24,931	1.78
SENSE ORGAN DISEASES	90	0.00	-	0.00	90	0.01
CARDIOVASCULAR AND CIRCULATORY DISEASES	1,123,671	31.64	693,919	32.24	429,753	30.70
RESPIRATORY DISEASES	206,787	5.82	129,630	6.02	77,157	5.51
DIGESTIVE DISEASES	129,821	3.66	80,957	3.76	48,864	3.49
GENITO URINARY DISEASE	110,598	3.11	58,878	2.74	51,720	3.70
SKIN DISEASES	26,282	0.74	13,787	0.64	12,495	0.89
MUSCULOSKELETAL DISEASES	21,528	0.61	9,758	0.45	11,770	0.84
CONGENITAL ANOMALIES	80,853	2.28	39,013	1.81	41,840	2.99
ORAL CONDITIONS	139	0.00	60	0.00	80	0.01
UNINTENTIONAL INJURIES	427,600	12.04	342,516	15.92	85,084	6.08
INTENTIONAL INJURIES	23,362	0.66	21,642	1.01	1,720	0.12
TOTAL YLL	3,551,826	100	2,152,140	100	1,399,686	100

GROUP I: Communicable Disease, Maternal, Perinatal, Nutritional Status	GROUP II: Non-communicable Disease	GROUP III: Injury

3.2.2 Pattern of Years of Life Lost (YLL) by age in 2016.

Overall, 30.7 % of total YLL were contributed by productive age 15 to 49 years old [(10.4 % for young adult and 20.3% for older adult)]. Pre-elderly age group (50 to 59 years old) contributed about 17.0% for total YLL. Among male, 35.0% of total YLL were contributed by productive age (15 to 49 years old), compared to female as 23.8%. About half of the total YLL (47.5%) in female was contributed by elderly age group (60 years and above) **(Figure 3.7)**.

In specific disease group, Unintentional Injuries become the most leading disease categories towards YLL in the age of young adult (15 to 29 years old) and children (5 to 14 years old). Starting at older adult age group (30-49 years old), Cardiovascular and Circulatory Disease become the most leading disease categories towards YLL until elderly age group (60 years and above) **(Figure**

3.8). Male had the same pattern of fatal burden of YLL as compared with overall population **(Figure 3.9)**. Among female, Malignant Neoplasm become the most leading disease categories towards YLL in older adult (30 – 49 years old) while Cardiovascular and Circulatory Diseases become the most leading disease categories towards YLL in pre-elderly (50-59 years old) and elderly (60 years and above) **(Figure 3.10)**.

Figure 3.7: *Percentage (%) of fatal burden (YLL), by age group and gender, 2016.*

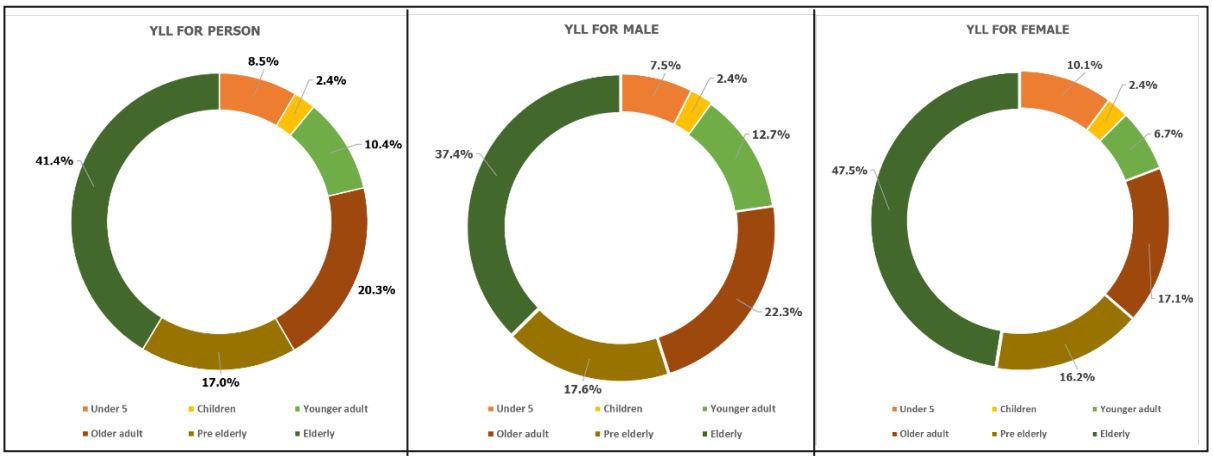


Figure 3.8: *Percentage (%) of fatal burden (YLL), by disease categories and age group, person, 2016.*

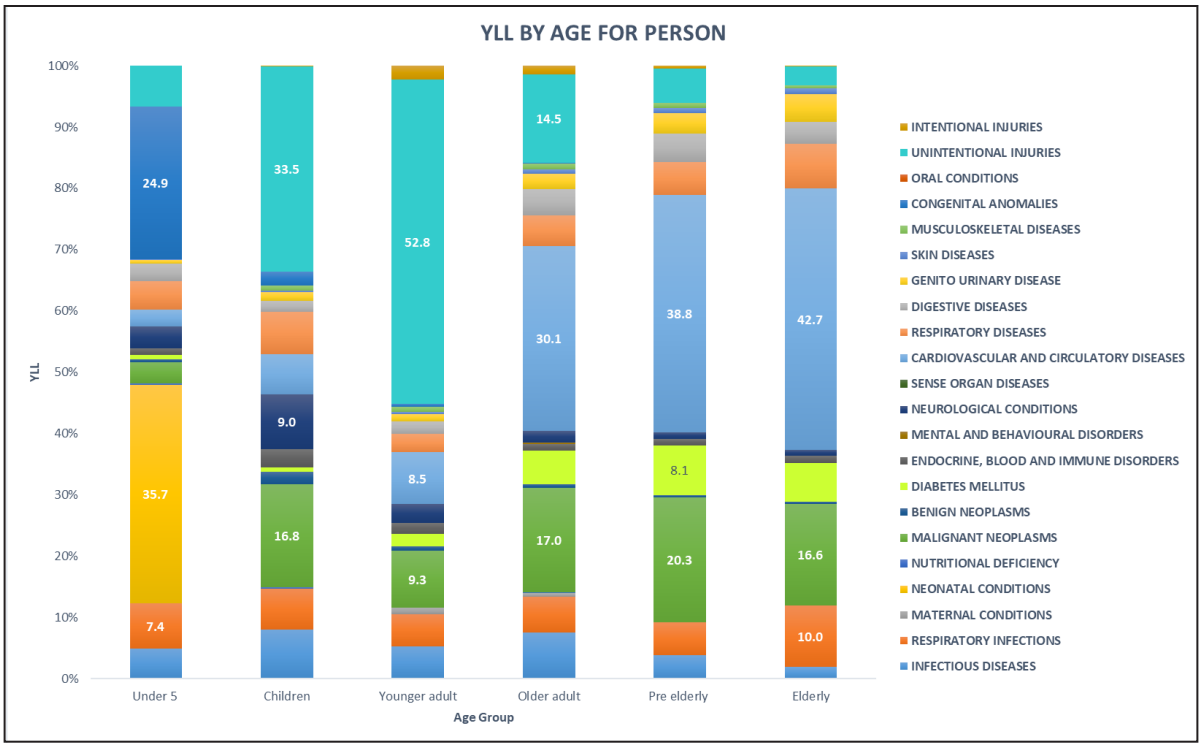


Figure 3.9: *Percentage (%) of fatal burden (YLL), by disease categories and age group, male, 2016.*

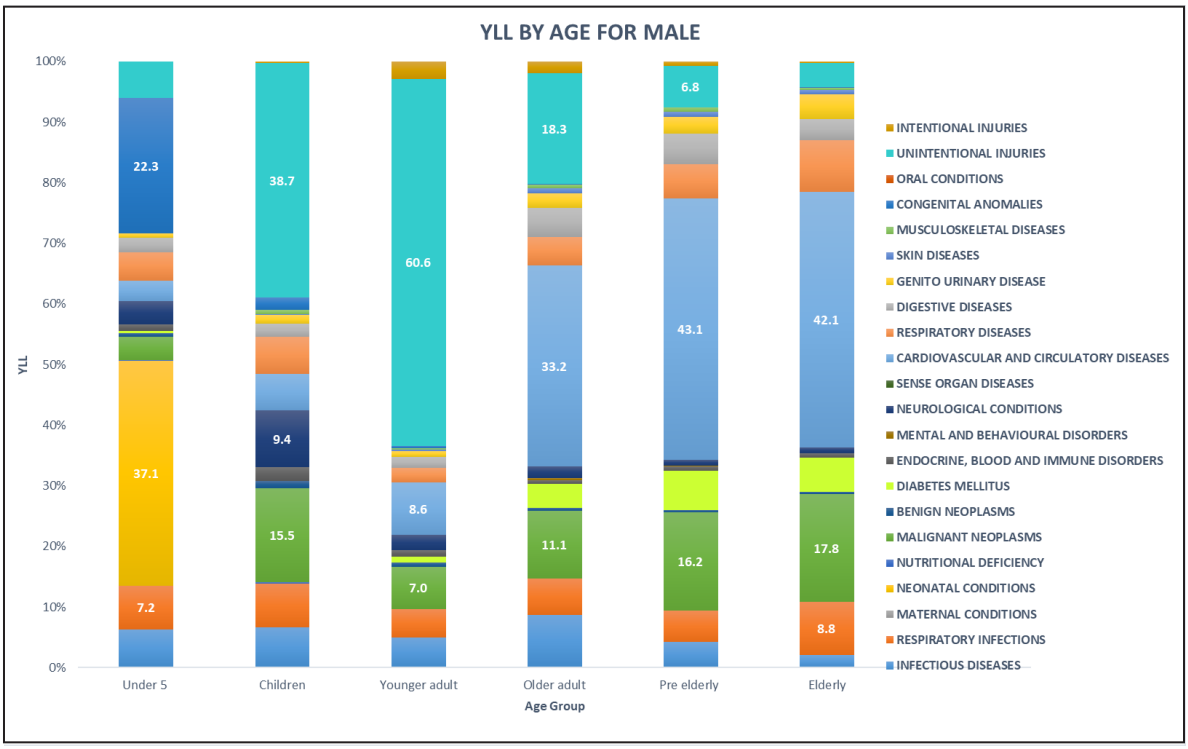
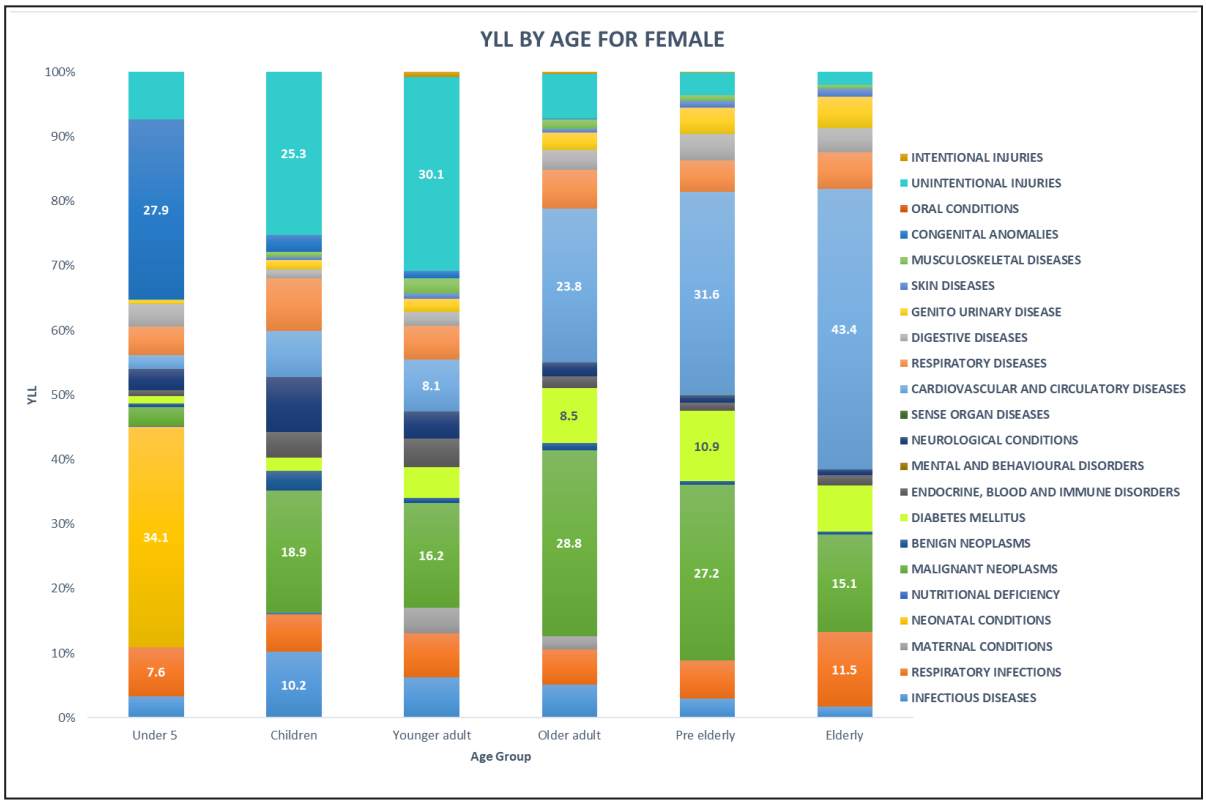


Figure 3.10: *Percentage (%) of fatal burden (YLL), by disease categories and age group, female, 2016.*



3.2.3 Leading Causes of Years of Life Lost (YLL) for 2016.

Ischemic Heart Disease was the leading cause of fatal burden in Malaysia for 2016, contributing 15.6% of the total YLL. This was followed by Cerebrovascular Diseases (Stroke), with 11.8%, Road Traffic Injuries (9.5%), Lower Respiratory Infections (7.5%) and Diabetes Mellitus (5.4%). For under 5 (0 to 4 years old), Low Birth Weight was the leading cause of fatal burden with 9.5% of total YLL, followed by Congenital Heart Disease, with 8.4% and Lower Respiratory Infections (7.0%). Road Traffic Injuries were the leading cause of fatal burden for children (5 to 14 years old) and young adult (15 to 29 years old) with 25.1% and 47.1% respectively. Ischemic Heart Disease was the leading cause of fatal burden with 15.8% of total YLL in older adult (30 to 49 years old), followed by Road Traffic Injuries with 11.9%. Ischemic Heart Disease was the leading cause of fatal burden with 21.6% of total YLL in pre-elderly (50 to 59 years old), followed by Cerebrovascular Diseases (Stroke) with 12.9%. Same leading cause can be seen in elderly (60 years and above) whereas Ischemic Heart Disease was the leading cause of fatal burden with 20.5% followed by Cerebrovascular Diseases (Stroke) with 10.0% **(Table 3.6)**.

Among male, Ischemic Heart Disease was the leading cause of fatal burden with 17.3% of total YLL, followed by Road Traffic Injuries with 13.2% and Cerebrovascular Diseases (Stroke) with 10.7%. For under 5 (0 to 4 years old), Low Birth Weight was the leading cause of fatal burden with 9.7% of total YLL, followed by Congenital Heart Diseases, with 8.1%. Road Traffic Injuries were the leading cause of fatal burden for children (5 to 14 years old) and young adult (15 to 29 years old) with 29.6% and 55.5% respectively. Ischemic Heart Disease was the leading cause of fatal burden with 18.9% of total YLL in older adult (30 to 49 years old), followed by Road Traffic Injuries with 15.1%. Ischemic Heart Disease was the leading cause of fatal burden with 25.9% of total YLL in pre-elderly (50 to 59 years old), followed by Cerebrovascular Diseases (Stroke) with 12.7%. Same leading cause also seen in elderly (60 years and above) whereas Ischemic Heart Disease was the leading cause of fatal burden with 21.8% of total YLL while Cerebrovascular Diseases (Stroke) as 15.8% **(Table 3.7)**.

Among female, Cerebrovascular Diseases (Stroke) was the leading cause of fatal burden with 13.3% of total YLL, followed by Ischemic Heart Disease with 13.1% and Lower Respiratory Infections with 8.6%. For under 5 (0 to 4 years old), Low Birth Weight was the leading cause of fatal burden with 9.3% of total YLL, followed by Congenital Heart Diseases, with 8.7%. Road Traffic Injuries were the leading cause of fatal burden for children (5 to 14 years old) and young adult (15 to 29 years old) with 18.0% and 22.8% respectively. Breast Cancer was the leading cause of fatal burden with 10.7% of total YLL in older adult (30 to 49 years old), followed by Cerebrovascular Diseases (Stroke) with 10.0%. Ischemic Heart Disease was the leading cause of fatal burden with 14.5% of total YLL in pre-elderly (50 to 59 years old), followed by Cerebrovascular Diseases (Stroke) with 13.2% and Diabetes Mellitus with 10.9%. However, the leading cause of fatal burden vary in elderly (60 years and above). Cerebrovascular Diseases (Stroke) was the leading cause of fatal burden with 19.3% followed by Ischemic Heart Disease with 18.9% **(Table 3.8)**.

Person

Table 3.6: *Top ten disease by age group for overall population in 2016.*

Rank	Overall Age (0+ years old)	Under 5 (0-4 years old)	Children (5-14 years old)	Young Adult (15-29 years old)	Older Adult (30-49 years old)	Pre-Elderly (50-59 years old)	Elderly (60+ years old)
1	Ischaemic Heart Disease ***555,313 ; 15.6%***	Low Birth Weight ***28,810 ; 9.5%***	Road Traffic Injuries ***21,580 ; 25.1%***	Road Traffic Injuries ***173,628 ; 47.1%***	Ischaemic Heart Disease ***113,927 ; 15.8%***	Ischaemic Heart Disease ***130,718 ; 21.6%***	Ischaemic Heart Disease ***300,960 ; 20.5%***
2	Cerebrovascular Diseases (Stroke) ***417,754 ; 11.8%***	Congenital Heart Diseases ***25,519 ; 8.4%***	Lower Respiratory Infections ***5,582 ; 6.5%***	Lower Respiratory Infections ***18,957 ; 5.1%***	Road Traffic Injuries ***85,476 ; 11.9%***	Cerebrovascular Diseases (Stroke) ***78,205 ; 12.9%***	Cerebrovascular Diseases (Stroke) ***255,167 ; 17.4%***
3	Road Traffic Injuries ***338,068 ; 9.5%***	Lower Respiratory Infections ***21,295 ; 7.0%***	Brain and Other CNS Cancers ***5,513 ; 6.4%***	Cerebrovascular Diseases (Stroke) ***11,269 ; 3.1%***	Cerebrovascular Diseases (Stroke) ***67,384 ; 9.4%***	Diabetes Mellitus ***48,965 ; 8.1%***	Lower Respiratory Infections ***147,230 ; 10.0%***
4	Lower Respiratory Infections ***266,334 ; 7.5%***	Birth Trauma and Asphyxia ***15,114 ; 5.0%***	Leukaemia ***5,162 ; 6.0%***	Ischaemic Heart Disease ***9,030 ; 2.5%***	Lower Respiratory Infections ***40,597 ; 5.6%***	Lower Respiratory Infections ***32,672 ; 5.4%***	Diabetes Mellitus ***92,630 ; 6.3%***
5	Diabetes Mellitus ***191,570 ; 5.4%***	Neonatal Infections ***14,406 ; 4.7%***	Drowning ***3,603 ; 4.2%***	Leukaemia ***8,283 ; 2.2%***	Diabetes Mellitus ***39,627 ; 5.5%***	Road Traffic Injuries ***22,657 ; 3.7%***	Trachea, Bronchus and Lung Cancers ***52,010 ; 3.5%***
6	Trachea, Bronchus and Lung Cancers ***87,800 ; 2.5%***	Road Traffic Injuries ***10,650 ; 3.5%***	Cerebrovascular Diseases (Stroke) ***2,992 ; 3.5%***	Diabetes Mellitus ***7,378 ; 2.0%***	Breast Cancer ***25,592 ; 3.6%***	Trachea, Bronchus and Lung Cancers ***21,471 ; 3.6%***	Chronic Obstructive Pulmonary Disease ***51,554 ; 3.5%***
7	Chronic Obstructive Pulmonary Disease ***78,706 ; 2.2%***	Chronic Obstructive Pulmonary Disease ***8,477 ; 2.8%***	Epilepsy ***2,534 ; 3.0%***	Endocrine, Blood and Immune Disorders ***6,916 ; 1.9%***	Asthma ***18,103 ; 2.5%***	Breast Cancer ***17,513 ; 2.9%***	Nephritis and Nephrosis ***44,501 ; 3.0%***
8	Nephritis and Nephrosis ***78,645 ; 2.2%***	Meningitis ***5,763 ; 1.9%***	Endocrine, Blood and Immune Disorders ***2,493 ; 2.9%***	Self-Inflicted Injuries ***6,116 ; 1.7%***	Tuberculosis ***16,339 ; 2.3%***	Colon and Rectum Cancers ***14,281 ; 2.4%***	Colon and Rectum Cancers ***38,299 ; 2.6%***
9	Colon and Rectum Cancers ***66,540 ; 1.9%***	Diarrhoeal Diseases ***5,681 ; 1.9%***	Asthma ***2,375 ; 2.8%***	Asthma ***5,587 ; 1.5%***	Nephritis and Nephrosis ***13,806 ; 1.9%***	Nephritis and Nephrosis ***14,233 ; 2.4%***	Road Traffic Injuries ***24,078 ; 1.6%***
10	Breast Cancer ***62,808 ; 1.8%***	Anencephaly ***5,163 ; 1.7%***	Diarrhoeal Diseases ***1,844 ; 2.1%***	Tuberculosis ***5,411 ; 1.5%***	HIV ***13,001 ; 1.8%***	Liver Cancers ***12,113 ; 2.0%***	Liver Cancers ***21,806 ; 1.5%***

Male

Table 3.7: *Top ten disease by age group for male population in 2016.*

Rank	Overall Age (0+ years old)	Under 5 (0-4 years old)	Children (5-14 years old)	Young Adult (15-29 years old)	Older Adult (30-49 years old)	Pre-Elderly (50-59 years old)	Elderly (60+ years old)
1	Ischaemic Heart Disease ***372,629 ; 17.3%***	Low Birth Weight ***15,629 ; 9.7%***	Road Traffic Injuries ***15,588 ; 29.6%***	Road Traffic Injuries ***152,127 ; 55.5%***	Ischaemic Heart Disease ***90,704 ; 18.9%***	Ischaemic Heart Disease ***97,823 ; 25.9%***	Ischaemic Heart Disease ***175,387 ; 21.8%***
2	Road Traffic Injuries ***283,326 ; 13.2%***	Congenital Heart Diseases ***13,125 ; 8.1%***	Leukaemia ***4,090 ; 7.8%***	Lower Respiratory Infections ***12,702 ; 4.6%***	Road Traffic Injuries ***72,415 ; 15.1%***	Cerebrovascular Diseases (Stroke) ***48,205 ; 12.7%***	Cerebrovascular Diseases (Stroke) ***127,495 ; 15.8%***
3	Cerebrovascular Diseases (Stroke) ***230,983 ; 10.7%***	Lower Respiratory Infections ***10,917 ; 6.8%***	Lower Respiratory Infections ***3,725 ; 7.1%***	Ischaemic Heart Disease ***8,038 ; 2.9%***	Cerebrovascular Diseases (Stroke) ***43,345 ; 9.0%***	Diabetes Mellitus ***24,359 ; 6.4%***	Lower Respiratory Infections ***70,735 ; 8.8%***
4	Lower Respiratory Infections ***145,632 ; 6.8%***	Birth Trauma and Asphyxia ***8,292 ; 5.1%***	Drowning ***1,981 ; 3.8%***	Cerebrovascular Diseases (Stroke) ***7,862 ; 2.9%***	Lower Respiratory Infections ***28,105 ; 5.9%***	Lower Respiratory Infections ***19,447 ; 5.1%***	Diabetes Mellitus ***45,570 ; 5.7%***
5	Diabetes Mellitus ***92,698 ; 4.3%***	Neonatal Infections ***7,118 ; 4.4%***	Cerebrovascular Diseases (Stroke) ***1,804 ; 3.4%***	Self-Inflicted Injuries ***5,956 ; 2.2%***	Diabetes Mellitus ***19,201 ; 4.0%***	Road Traffic Injuries ***17,841 ; 4.7%***	Chronic Obstructive Pulmonary Disease ***41,632 ; 5.2%***
6	Trachea, Bronchus and Lung Cancers ***63,813 ; 3.0%***	Road Traffic Injuries ***5,403 ; 3.3%***	Brain and Other CNS Cancers ***1,552 ; 3.0%***	Leukaemia ***5,687 ; 2.1%***	Tuberculosis ***13,012 ; 2.7%***	Trachea, Bronchus and Lung Cancers ***15,379 ; 4.1%***	Trachea, Bronchus and Lung Cancers ***37,927 ; 4.7%***
7	Chronic Obstructive Pulmonary Disease ***60,612 ; 2.8%***	Diarrhoeal Diseases ***4,832 ; 3.0%***	Asthma ***1,533 ; 2.9%***	Asthma ***3,483 ; 1.3%***	HIV ***11,109 ; 2.3%***	Liver Cancers ***9,158 ; 2.4%***	Nephritis and Nephrosis ***22,888 ; 2.8%***
8	Nephritis and Nephrosis ***43,220 ; 2.0%***	Chronic Obstructive Pulmonary Disease ***4,760 ; 2.9%***	Falls ***1,365 ; 2.6%***	Epilepsy ***3,333 ; 1.2%***	Asthma ***10,491 ; 2.2%***	Chronic Obstructive Pulmonary Disease ***8,822 ; 2.3%***	Colon and Rectum Cancers ***22,671 ; 2.8%***
9	Colon and Rectum Cancers ***38,207 ; 1.8%***	Meningitis ***3,519 ; 2.2%***	Epilepsy ***1,331 ; 2.5%***	Diabetes Mellitus ***2,907 ; 1.1%***	Trachea, Bronchus and Lung Cancers ***9,564 ; 2.0%***	Nephritis and Nephrosis ***8,021 ; 2.1%***	Road Traffic Injuries ***19,952 ; 2.5%***
10	Asthma ***30,860 ; 1.4%***	Anencephaly ***3.302 ; 2.0%***	Endocrine, Blood and Immune Disorders ***1,163 ; 2.2%***	Tuberculosis ***2,884 ; 1.1%***	Nephritis and Nephrosis ***8,780 ; 1.8%***	Colon and Rectum Cancers ***7,952 ; 2.1%***	Prostate Cancer ***15,214 1.9%***

Female

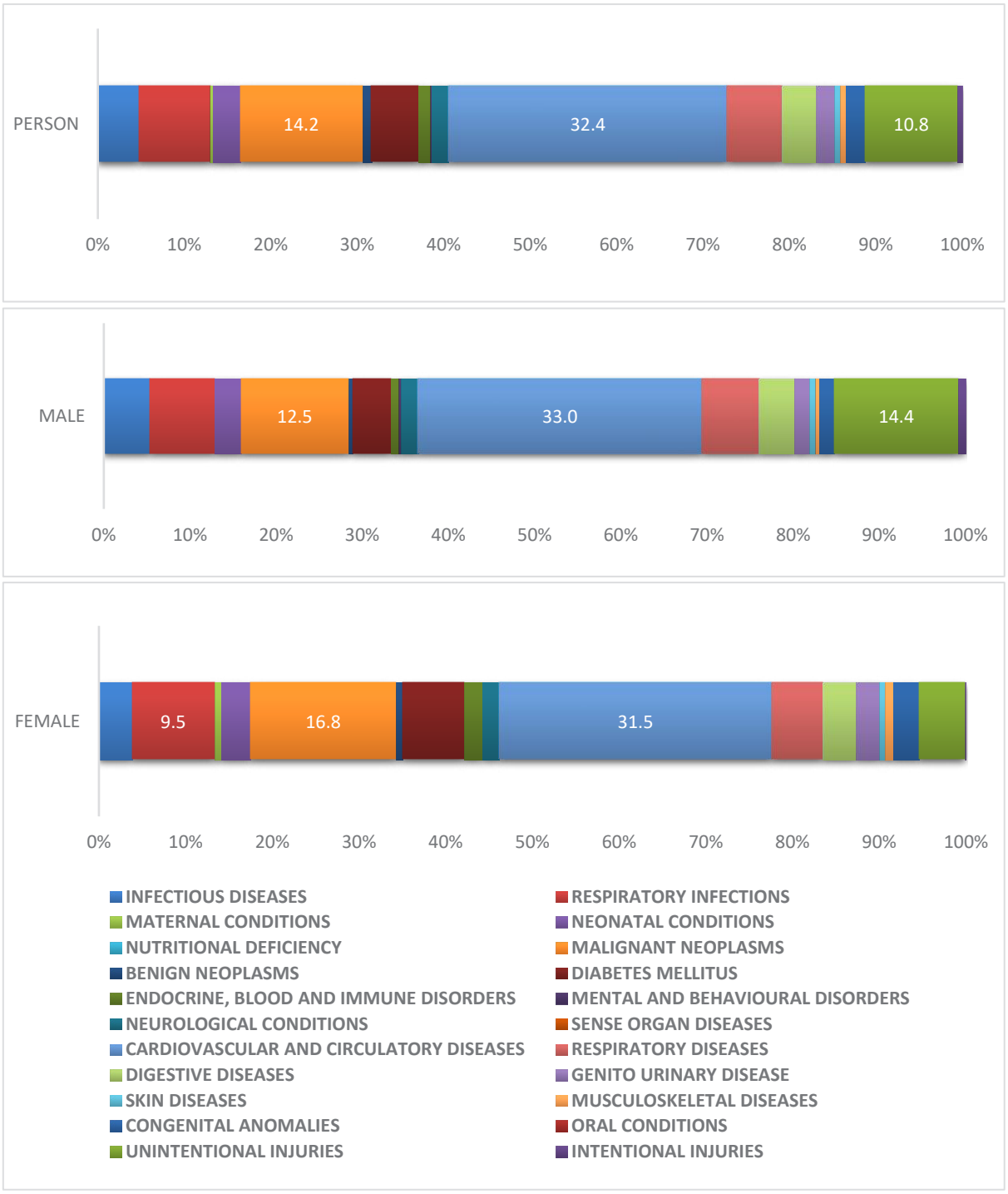
Table 3.8: *Top ten disease by age group for female population in 2016.*

Rank	Overall Age (0+ years old)	Under 5 (0-4 years old)	Children (5-14 years old)	Young Adult (15-29 years old)	Older Adult (30-49 years old)	Pre-Elderly (50-59 years old)	Elderly (60+ years old)
1	Cerebrovascular Diseases (Stroke) ***186,771 ; 13.3%***	Low Birth Weight ***13,180 ; 9.3%***	Road Traffic Injuries ***5,992 ; 18.0%***	Road Traffic Injuries ***21,501 ; 22.8%***	Breast Cancer ***25,592 ; 10.7%***	Ischaemic Heart Disease ***32,895 ; 14.5%***	Cerebrovascular Diseases (Stroke) ***127,672 ; 19.2%***
2	Ischaemic Heart Disease ***182,684 ;13.1%***	Congenital Heart Diseases ***12,394 ; 8.7%***	Brain and Other CNS Cancers ***3,961 ; 11.9%***	Lower Respiratory Infections ***6,255 ; 6.6%***	Cerebrovascular Diseases (Stroke) ***24,040 ; 10.0%***	Cerebrovascular Diseases (Stroke) ***30,000 ; 13.2%***	Ischaemic Heart Disease ***125,573 ; 18.9%***
3	Lower Respiratory Infections ***120,703 ; 8.6%***	Lower Respiratory Infections ***10,379 ; 7.3%***	Lower Respiratory Infections ***1,856 ; 5.6%***	Diabetes Mellitus ***4,471 ; 4.7%***	Ischaemic Heart Disease ***23,224 ; 9.7%***	Diabetes Mellitus ***24,605 ; 10.9%***	Lower Respiratory Infections ***76,495 ; 11.5%***
4	Diabetes Mellitus ***98,872 ; 7.1%***	Neonatal Infections ***7,288 ; 5.1%***	Drowning ***1,622 ; 4.9%***	Endocrine, Blood and Immune Disorders ***4,147 ; 4.4%***	Diabetes Mellitus ***20,426 ; 8.5%***	Breast Cancer ***17,513 ; 7.7%***	Diabetes Mellitus ***47,060 ; 7.1%***
5	Breast Cancer ***62,452 ; 4.5%***	Birth Trauma and Asphyxia ***6,823 ; 4.8%***	Diarrhoeal Diseases ***1,578 ; 4.7%***	Cerebrovascular Diseases (Stroke) ***3,407 ; 4.6%***	Road Traffic Injuries ***13,061 ; 5.4%***	Lower Respiratory Infections ***13,225 ; 5.8%***	Nephritis and Nephrosis ***21,613 ; 3.3%***
6	Road Traffic Injuries ***54,743 ; 3.9%***	Road Traffic Injuries ***5,247 ; 3.7%***	Endocrine, Blood and Immune Disorders ***1,330 ; 4.0%***	Brain and Other CNS Cancers ***3,184 ; 3.4%***	Lower Respiratory Infections ***12,492 ; 5.2%***	Colon and Rectum Cancers ***6,329 ; 2.8%***	Breast Cancer ***18,541 ; 2.8%***
7	Nephritis and Nephrosis ***35,426 ; 2.5%***	Chronic Obstructive Pulmonary Disease ***3,717 ; 2.6%***	Epilepsy ***1,203 ; 3.6%***	Leukaemia ***2,596 ; 2.8%***	Asthma ***7,612 ; 3.2%***	Nephritis and Nephrosis ***6,212 ; 2.7%***	Colon and Rectum Cancers ***15,628 ; 2.4%***
8	Colon and Rectum Cancers ***28,333 ; 2.0%***	Meningitis ***2,245 ; 1.6%***	Cerebrovascular Diseases (Stroke) ***1,188 ; 3.6%***	Tuberculosis ***2,527 ; 2.7%***	Colon and Rectum Cancers ***5,613 ; 2.3%***	Trachea, Bronchus and Lung Cancers ***6,092 ; 2.7%***	Trachea, Bronchus and Lung Cancers ***14,083 ; 2.1%***
9	Asthma ***26,221 ; 1.9%***	Anencephaly ***1,861 ; 1.3%***	Leukaemia ***1,072 ; 3.2%***	Asthma ***2,104 ; 2.2%***	Cervix Cancer ***5,425 ; 2.3%***	Road Traffic Injuries ***4,816 ; 2.1%***	Asthma ***10,641 ; 1.6%***
10	Endocrine, Blood and Immune Disorders ***24,342 ; 1.7%***	Diabetes Mellitus ***1,628 ; 1.1%***	Benign Neoplasms ***1,009 ; 3.0%***	Falls ***2,041 ; 2.2%***	Nephritis and Nephrosis ***5,026 ; 2.1%***	Cervix Cancer ***4,575 ; 2.0%***	Endocrine, Blood and Immune Disorders ***10,401 ; 1.5%***

3.3 Years of Life Lost (YLL) - 2017

3.3.1 Pattern of Years of Life Lost (YLL) by gender in 2017.

Figure 3.11: *Percentage (%) of fatal burden (YLL) by disease groups and gender, 2017.*



Overall, YLL was mostly contributed by Cardiovascular and Circulatory Diseases (1,212,647; 32.4%) followed by Malignant Neoplasms (531,830; 14.2%) and Unintentional Injuries (402,157; 10.8%). As for gender, YLL in male mostly contributed by Cardiovascular and Circulatory Diseases (744,822; 33.0%) followed by Unintentional Injuries (323,931; 14.4%) and Malignant Neoplasms (281,827; 12.5%). For female, YLL mostly contributed by Cardiovascular and Circulatory Diseases (467,825; 31.5%) followed by Malignant Neoplasms (250,003; 16.8%) and Respiratory Infections (141,485; 9.5%) (**Figure 3.11**). All other categories can be seen in **Table 3.9**.

Table 3.9: *Fatal burden of disease and injury (YLL) by disease groups and by gender, 2017.*

Disease Categories	PERSON		MALE		FEMALE	
	YLL	%	YLL	%	YLL	%
INFECTIOUS DISEASES	177,881	4.76	120,840	5.36	57,041	3.84
RESPIRATORY INFECTIONS	310,558	8.30	169,073	7.50	141,485	9.52
MATERNAL CONDITIONS	11,634	0.31	-	0.00	11,634	0.78
NEONATAL CONDITIONS	117,921	3.15	68,761	3.05	49,160	3.31
NUTRITIONAL DEFICIENCY	292	0.01	201	0.01	91	0.01
MALIGNANT NEOPLASMS	531,830	14.22	281,827	12.50	250,003	16.83
BENIGN NEOPLASMS	21,176	0.57	10,121	0.45	11,056	0.74
DIABETES MELLITUS	205,500	5.49	100,205	4.45	105,295	7.09
ENDOCRINE, BLOOD AND IMMUNE DISORDERS	51,020	1.36	20,504	0.91	30,516	2.05
MENTAL AND BEHAVIOURAL DISORDERS	6,404	0.17	5,765	0.26	639	0.04
NEUROLOGICAL CONDITIONS	72,813	1.95	44,198	1.96	28,615	1.93
SENSE ORGAN DISEASES	221	0.01	37	0.00	185	0.01
CARDIOVASCULAR AND CIRCULATORY DISEASES	1,212,647	32.43	744,822	33.04	467,825	31.49
RESPIRATORY DISEASES	235,611	6.30	148,583	6.59	87,027	5.86
DIGESTIVE DISEASES	148,941	3.98	92,676	4.11	56,265	3.79
GENITO URINARY DISEASE	79,125	2.12	38,227	1.70	40,898	2.75
SKIN DISEASES	25,334	0.68	16,260	0.72	9,074	0.61
MUSCULOSKELETAL DISEASES	26,039	0.70	11,190	0.50	14,849	1.00
CONGENITAL ANOMALIES	81,764	2.19	37,752	1.67	44,012	2.96
ORAL CONDITIONS	1,085	0.03	812	0.04	273	0.02
UNINTENTIONAL INJURIES	402,157	10.75	323,931	14.37	78,227	5.27
INTENTIONAL INJURIES	19,871	0.53	18,395	0.82	1,476	0.10
TOTAL YLL	3,739,825	100	2,254,181	100	1,485,644	100

GROUP I: Communicable Disease, Maternal, Perinatal, Nutritional Status	GROUP II: Non-communicable Disease	GROUP III: Injury

3.3.2 Pattern of Years of Life Lost (YLL) by age in 2017.

Overall, 29.6 % of total YLL were contributed by productive age [15 to 49 years old (9.8 % for young adult and 19.8% for older adult)]. Pre-elderly age group (50 to 59 years old) contributed about 17.1% for total YLL. Among male, 33.6% of total YLL in male were contributed by productive age (15 to 49 years old), compared to female as 23.5%. About half of the total YLL (47.7%) in female was contributed in elderly age group (60 years and above) **(Figure 3.12)**.

In specific disease group, Unintentional Injuries become the most leading disease categories towards YLL in the age of young adult (15 to 29 years old) and children (5 to 14 years old). Starting at older adult age group (30-49 years old), Cardiovascular and Circulatory Disease become the most leading disease categories towards YLL until elderly age group (60 years and above) **(Figure 3.13)**. Male had the same pattern of fatal burden of YLL as compared with overall population **(Figure 3.14)**. Among female, Malignant Neoplasm become the most leading disease categories towards YLL in older adult (30 – 49 years old) while Cardiovascular and Circulatory Diseases become the most leading disease categories towards YLL in pre-elderly (50-59 years old) and elderly (60 years and above) **(Figure 3.15)**.

Figure 3.12: *Percentage (%) of fatal burden (YLL), by age group and gender, 2017.*

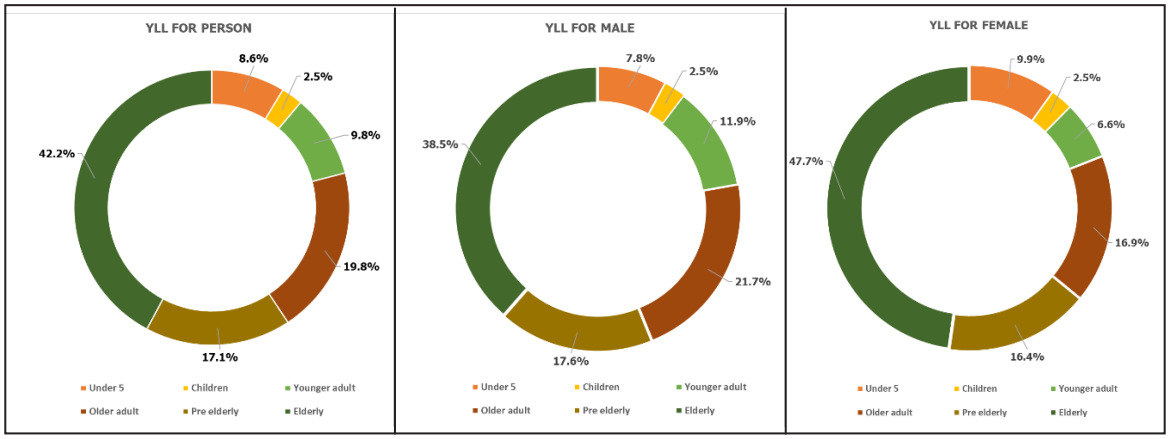


Figure 3.13: *Percentage (%) of fatal burden (YLL), by disease categories and age group, person, 2017.*

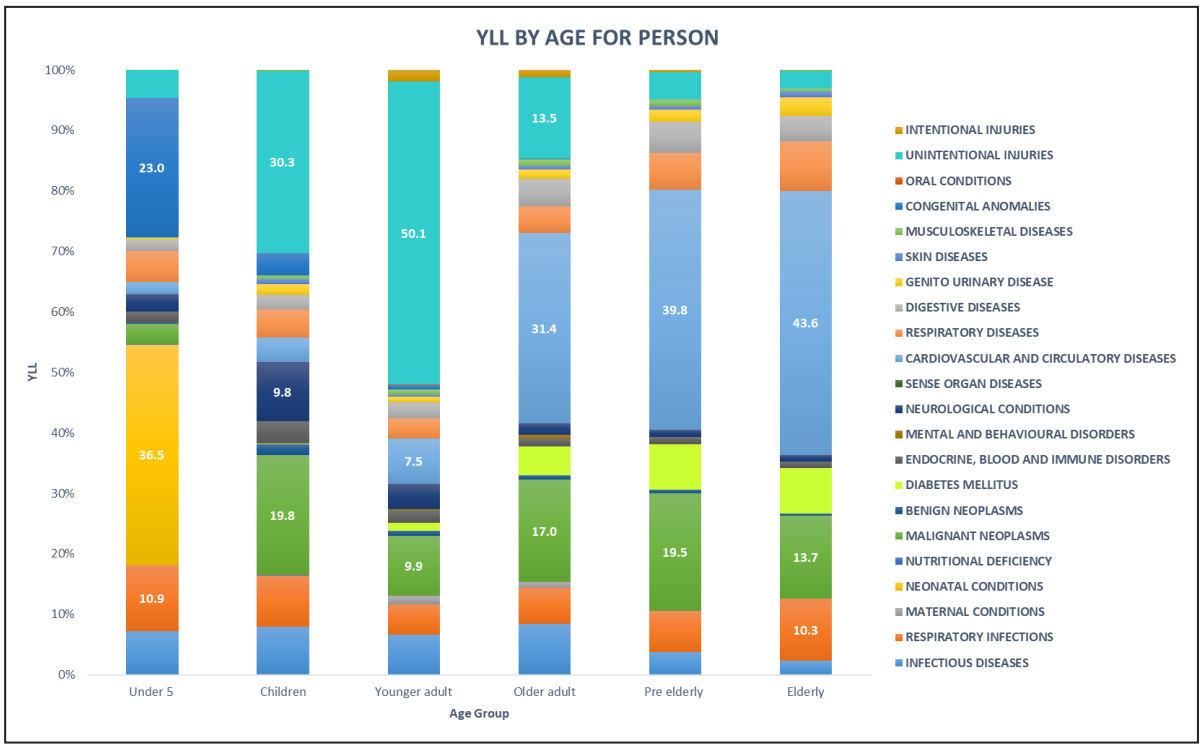


Figure 3.14: *Percentage (%) of fatal burden (YLL), by disease categories and age group, male, 2017.*

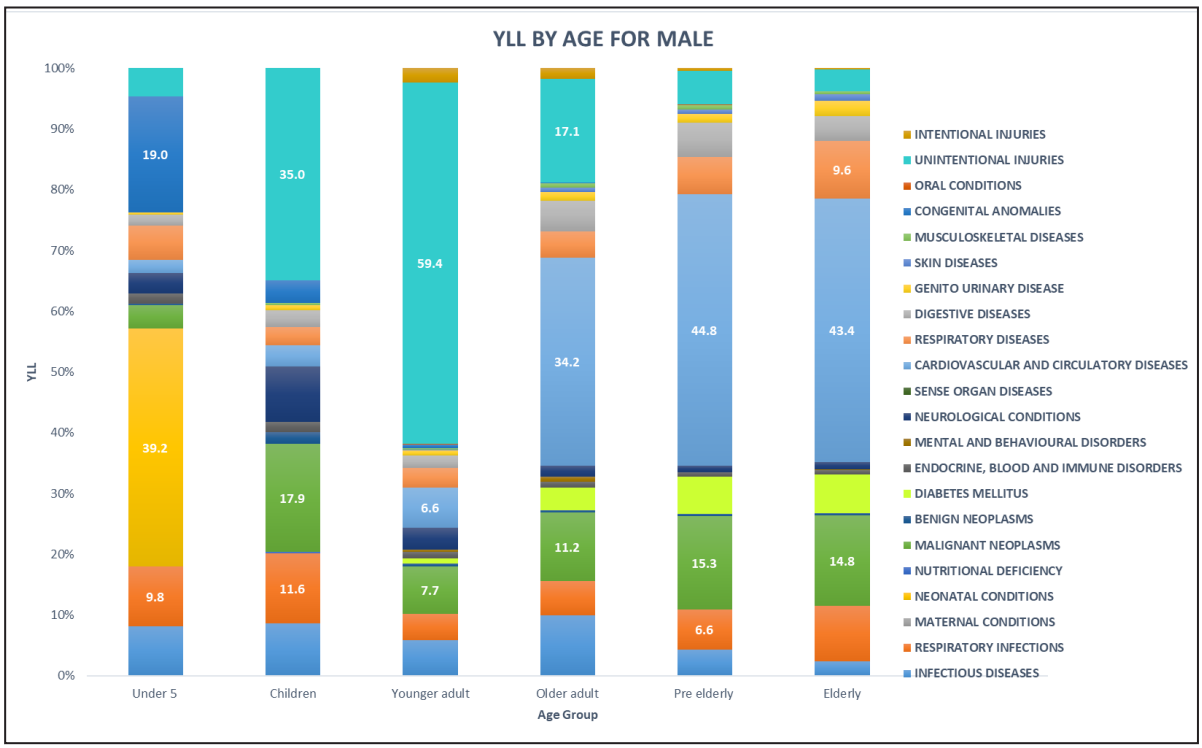
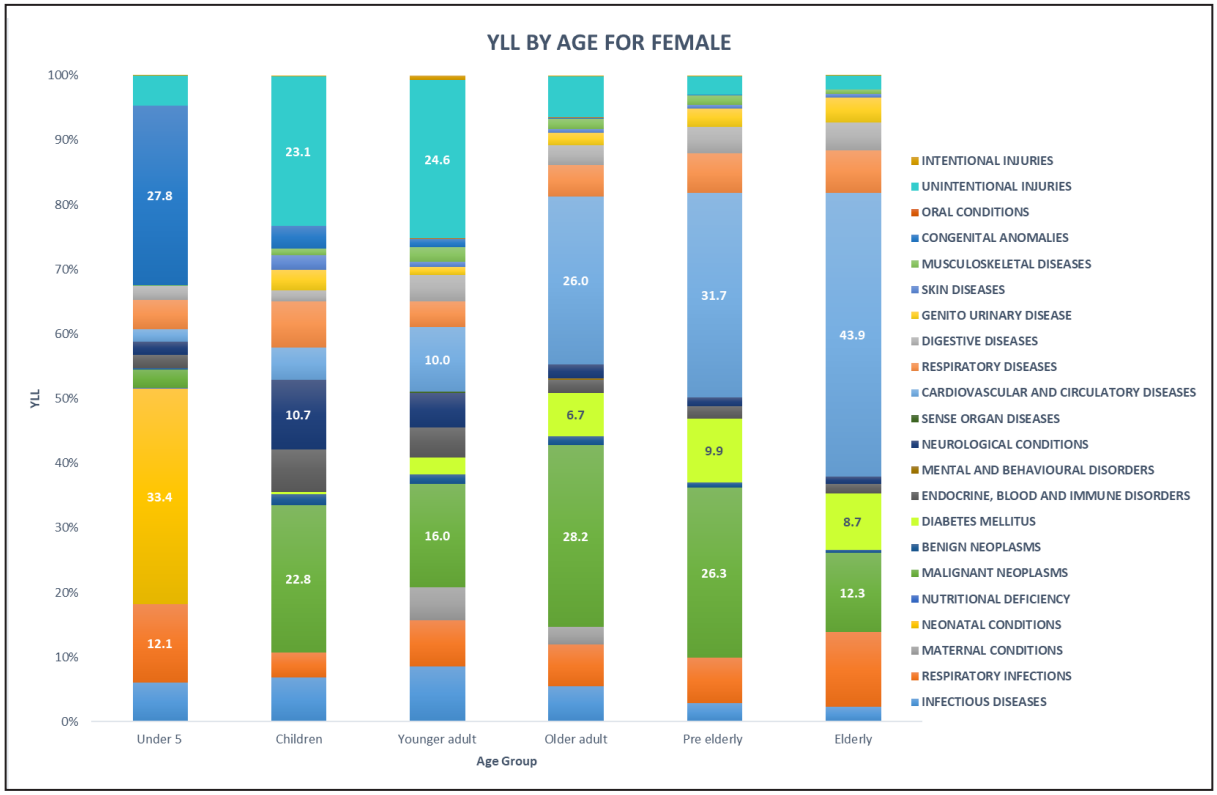


Figure 3.15: *Percentage (%) of fatal burden (YLL), by disease categories and age group, female, 2017.*



3.3.3 Leading Causes of Years of Life Lost (YLL) for 2017.

Ischemic Heart Disease was the leading cause of fatal burden in Malaysia for 2017, contributing 16.5% of the total YLL. This was followed by Cerebrovascular Diseases (Stroke), with 11.5%, Road Traffic Injuries (8.7%), Lower Respiratory Infections (8.3%) and Diabetes Mellitus (5.5%). For under 5 (0 to 4 years old), Lower Respiratory Infections was the leading cause of fatal burden with 10.9% of total YLL, followed by Low Birth Weight, with 9.9% and Congenital Heart Diseases (8.4%). Road Traffic Injuries were the leading cause of fatal burden for children (5 to 14 years old) and young adult (15 to 29 years old) with 21.1% and 46.3% respectively. Ischemic Heart Disease was the leading cause of fatal burden with 15.8% of total YLL in older adult (30 to 49 years old), followed by Road Traffic Injuries with 11.3%. Ischemic Heart Disease was the leading cause of fatal burden with 22.4% of total YLL in pre-elderly (50 to 59 years old), followed by Cerebrovascular Diseases (Stroke) with 13.1%. Same leading cause can be seen in elderly (60 years and above) whereas Ischemic Heart Disease was the leading cause of fatal burden with 21.9% followed by Cerebrovascular Diseases (Stroke) with 16.6% **(Table 3.10)**.

Among male, Ischemic Heart Disease was the leading cause of fatal burden with 17.6% of total YLL, followed by Road Traffic Injuries with 12.0% and Cerebrovascular Diseases (Stroke) with 11.0%. For

under 5 (0 to 4 years old), Low Birth Weight was the leading cause of fatal burden with 10.6% of total YLL, followed by Lower Respiratory Infections, with 9.8%. Road Traffic Injuries were the leading cause of fatal burden for children (5 to 14 years old) and young adult (15 to 29 years old) with 25.2% and 54.9% respectively. Ischemic Heart Disease was the leading cause of fatal burden with 17.8% of total YLL in older adult (30 to 49 years old), followed by Road Traffic Injuries with 14.4%. Ischemic Heart Disease was the leading cause of fatal burden with 27.3% of total YLL in pre-elderly (50 to 59 years old), followed by Cerebrovascular Diseases (Stroke) with 13.0%. Same leading cause also seen in elderly (60 years and above) whereas Ischemic Heart Disease was the leading cause of fatal burden with 22.4% of total YLL while Cerebrovascular Diseases (Stroke) as 16.0% **(Table 3.11)**.

Among female, Ischemic Heart Disease was the leading cause of fatal burden with 14.8% of total YLL, followed by Cerebrovascular Diseases (Stroke) with 13.1% and Lower Respiratory Infections with 9.5%. For under 5 (0 to 4 years old), Lower Respiratory Infections was the leading cause of fatal burden with 12.1% of total YLL, followed by Low Birth Weight, with 9.0%. Road Traffic Injuries were the leading cause of fatal burden for children (5 to 14 years old) and young adult (15 to 29 years old) with 15.0% and 23.0% respectively. Ischemic Heart Disease was the leading cause of fatal burden with 12.0% of total YLL in older adult (30 to 49 years old), followed by Cerebrovascular Diseases (Stroke) with 10.2% and Breast Cancer (8.4%). Ischemic Heart Disease was the leading cause of fatal burden with 14.5% of total YLL in pre-elderly (50 to 59 years old), followed by Cerebrovascular Diseases (Stroke) with 13.1% and Diabetes Mellitus with 9.9 Same leading cause also seen in elderly (60 years and above) whereas Ischemic Heart Disease was the leading cause of fatal burden with 21.2% followed by Cerebrovascular Diseases (Stroke) with 18.9% **(Table 3.12)**.

Person

Table 3.10: *Leading causes of fatal burden (total YLL; percentage %) for all population, by age group, 2017.*

Rank	Overall Age (0+ years old)	Under 5 (0-4 years old)	Children (5-14 years old)	Young Adult (15-29 years old)	Older Adult (30-49 years old)	Pre-Elderly (50-59 years old)	Elderly (60+ years old)
1	Ischaemic Heart Disease ***615,517 ; 16.5%***	Lower Respiratory Infections ***35,090 ; 10.9%***	Road Traffic Injuries ***19,968 ; 21.1%***	Road Traffic Injuries ***169,561 ; 46.3%***	Ischaemic Heart Disease ***116,665 ; 15.8%***	Ischaemic Heart Disease ***143,681 ; 22.4%***	Ischaemic Heart Disease ***345,475 ; 21.9%***
2	Cerebrovascular Diseases (Stroke) ***429,569 ; 11.5%***	Low Birth Weight ***31,824 ; 9.9%***	Leukaemia ***8,604 ; 9.1%***	Lower Respiratory Infections ***18,611 ; 5.1%***	Road Traffic Injuries ***83,720 ; 11.3%***	Cerebrovascular Diseases (Stroke) ***83,596 ; 13.1%***	Cerebrovascular Diseases (Stroke) ***261,785 ; 16.6%***
3	Road Traffic Injuries ***324,009 ; 8.7%***	Congenital Heart Diseases ***26,994 ; 8.4%***	Lower Respiratory Infections ***8,046 ; 8.5%***	Leukaemia ***10,308 ; 2.8%***	Cerebrovascular Diseases (Stroke) ***78,363 ; 10.6%***	Diabetes Mellitus ***48,410 ; 7.6%***	Lower Respiratory Infections ***161,731 ; 10.3%***
4	Lower Respiratory Infections ***310,309 ; 8.3%***	Birth Trauma and Asphyxia ***20,602 ; 6.4%***	Brain and Other CNS Cancers ***5,618 ; 5.9%***	Ischaemic Heart Disease ***9,696 ; 2.6%***	Lower Respiratory Infections ***43,816 ; 5.9%***	Lower Respiratory Infections ***43,015 ; 6.7%***	Diabetes Mellitus ***116,913 ; 7.4%***
5	Diabetes Mellitus ***205,500 ; 5.5%***	Neonatal Infections ***17,590 ; 5.5%***	Endocrine, Blood and Immune Disorders ***3,434 ; 3.6%***	Endocrine, Blood and Immune Disorders ***7,438 ; 2.0%***	Diabetes Mellitus ***35,289 ; 4.8%***	Road Traffic Injuries ***21,447 ; 3.4%***	Chronic Obstructive Pulmonary Disease ***60,945 ; 3.9%***
6	Trachea, Bronchus and Lung Cancers ***92,284 ; 2.5%***	Diarrhoeal Diseases ***15,157 ; 4.7%***	Drowning ***3,193 ; 3.4%***	Epilepsy ***7,157 ; 2.0%***	Breast Cancer ***21,153 ; 2.9%***	Trachea, Bronchus and Lung Cancers ***19,175 ; 3.0%***	Trachea, Bronchus and Lung Cancers ***51,882 ; 3.3%***
7	Chronic Obstructive Pulmonary Disease ***88,812 ; 2.4%***	Chronic Obstructive Pulmonary Disease ***7,753 ; 2.4%***	Fires, Heat and Hot Substances ***2,535 ; 2.7%***	Tuberculosis ***7,051 ; 1.9%***	Trachea, Bronchus and Lung Cancers ***20,196 ; 2.7%***	Breast Cancer ***18,323 ; 2.9%***	Nephritis and Nephrosis ***25,820 ; 1.6%***
8	Breast Cancer ***52,569 ; 1.4%***	Road Traffic Injuries ***7,584 ; 2.4%***	Epilepsy ***2,467 ; 2.6%***	Cerebrovascular Diseases (Stroke) ***5,826 ; 1.6%***	HIV ***18,769 ; 2.5%***	Chronic Obstructive Pulmonary Disease ***12,873 ; 2.0%***	Road Traffic Injuries ***21,728 ; 1.4%***
9	Endocrine, Blood and Immune Disorders ***51,020 ; 1.4%***	Endocrine, Blood and Immune Disorders ***5,788 ; 1.8%***	Dengue ***2,354 ; 2.5%***	Diabetes Mellitus ***4,751 ; 1.3%***	Tuberculosis ***16,493 ; 2.2%***	Liver Cancers ***10,115 ; 1.6%***	Asthma ***17,239 ; 1.1%***
10	Leukaemia ***48,788 ; 1.3%***	Leukaemia ***5,491 ; 1.7%***	Diarrhoeal Diseases ***2,071 ; 2.2%***	Asthma ***4,682 ; 1.3%***	Asthma ***11,959 ; 1.6%***	Mouth and Oropharynx Cancers ***9,648 ; 1.5%***	Falls ***17,224 ; 1.1%***

Male

Table 3.11: Leading causes of fatal burden (total YLL; percentage %) for male, by age group, 2017.

Rank	Overall Age (0+ years old)	Under 5 (0-4 years old)	Children (5-14 years old)	Young Adult (15-29 years old)	Older Adult (30-49 years old)	Pre-Elderly (50-59 years old)	Elderly (60+ years old)
1	Ischaemic Heart Disease ***396,031 ; 17.6%***	Low Birth Weight ***18,586 ; 10.6%***	Road Traffic Injuries ***14,340 ; 25.2%***	Road Traffic Injuries ***147,036 ; 54.9%***	Ischaemic Heart Disease ***86,695 ; 17.8%***	Ischaemic Heart Disease ***108,416 ; 27.3%***	Ischaemic Heart Disease ***194,814 ; 22.4%***
2	Road Traffic Injuries ***269,954 ; 12.0%***	Lower Respiratory Infections ***17,237 ; 9.8%***	Lower Respiratory Infections ***6,621 ; 11.6%***	Lower Respiratory Infections ***11,550 ; 4.3%***	Road Traffic Injuries ***70,320 ; 14.4%***	Cerebrovascular Diseases (Stroke) ***51,706 ; 13.0%***	Cerebrovascular Diseases (Stroke) ***139,404 ; 16.0%***
3	Cerebrovascular Diseases (Stroke) ***247,741 ; 11.0%***	Congenital Heart Diseases ***14,386 ; 8.2%***	Leukaemia ***6,498 ; 11.4%***	Leukaemia ***6,730 ; 2.5%***	Cerebrovascular Diseases (Stroke) ***52,828 ; 10.5%***	Lower Respiratory Infections ***26,050 ; 6.6%***	Lower Respiratory Infections ***79,921 ; 9.2%***
4	Lower Respiratory Infections ***168,974 ; 7.5%***	Birth Trauma and Asphyxia ***12,782 ; 7.3%***	Diarrhoeal Diseases ***1,925 ; 3.4%***	Ischaemic Heart Disease ***6,106 ; 2.3%***	Lower Respiratory Infections ***27,595 ; 5.7%***	Diabetes Mellitus ***24,275 ; 6.1%***	Diabetes Mellitus ***55,228 ; 6.4%***
5	Diabetes Mellitus ***100,205 ; 4.4%***	Neonatal Infections ***9,770 ; 5.6%***	Drowning ***1,787 ; 3.1%***	Epilepsy ***4,438 ; 1.7%***	Diabetes Mellitus ***18,473 ; 3.8%***	Road Traffic Injuries ***16,494 ; 4.2%***	Chronic Obstructive Pulmonary Disease ***48,743 ; 5.6%***
6	Chronic Obstructive Pulmonary Disease ***70,703 ; 3.1%***	Diarrhoeal Diseases ***9,754 ; 5.6%***	Brain and Other CNS Cancers ***1,348 ; 2.4%***	Self-Inflicted Injuries ***4,011 ; 1.5%***	HIV ***16,084 ; 3.3%***	Trachea, Bronchus and Lung Cancers ***14,437 ; 3.6%***	Trachea, Bronchus and Lung Cancers ***39,807 ; 4.6%***
7	Trachea, Bronchus and Lung Cancers ***67,644 ; 3.0%***	Chronic Obstructive Pulmonary Disease ***5,432 ; 3.1%***	Congenital Heart Diseases ***1,269 ; 2.2%***	Cerebrovascular Diseases (Stroke) ***3,803 ; 1.4%***	Trachea, Bronchus and Lung Cancers ***12,728 ; 2.6%***	Chronic Obstructive Pulmonary Disease ***10,927 ; 2.8%***	Road Traffic Injuries ***18,108 ; 2.1%***
8	Leukaemia ***31,757 ; 1.4%***	Leukaemia ***3,798 ; 2.2%***	Fires, Heat and Hot Substances ***1,106 ; 1.9%***	Asthma ***3,746 ; 1.4%***	Tuberculosis ***12,620 ; 2.6%***	Liver Cancers ***7,674 ; 1.9%***	Prostate Cancer ***15,013 ; 1.7%***
9	Tuberculosis ***29,216 ; 1.3%***	Road Traffic Injuries ***3,655 ; 2.1%***	Epilepsy ***1,047 ; 1.8%***	Tuberculosis ***3,703 ; 1.4%***	Asthma ***7,376 ; 1.5%***	Mouth and Oropharynx Cancers ***7,372 ; 1.9%***	Nephritis and Nephrosis ***10,884 ; 1.3%***
10	Asthma ***24,451 ; 1.1%***	Anencephaly ***3,085 ; 1.8%***	Benign Neoplasms ***1,047 ; 1.8%***	HIV ***3,302 ; 1.2%***	Mouth and Oropharynx Cancers ***6,291 ; 1.3%***	Tuberculosis ***5,793 ; 1.5%***	Liver Cancers ***10,347 ; 1.2%***

Female

Table 3.12: *Leading causes of fatal burden (total YLL; percentage %) for female, by age group, 2017.*

Rank	Overall Age (0+ years old)	Under 5 (0-4 years old)	Children (5-14 years old)	Young Adult (15-29 years old)	Older Adult (30-49 years old)	Pre-Elderly (50-59 years old)	Elderly (60+ years old)
1	Ischaemic Heart Disease ***219,485 ; 14.8%***	Lower Respiratory Infections ***17,853 ; 12.1%***	Road Traffic Injuries ***5,628 ; 15.0%***	Road Traffic Injuries ***22,525 ; 23.0%***	Ischaemic Heart Disease ***29,970 ; 12.0%***	Ischaemic Heart Disease ***35,265 ; 14.5%***	Ischaemic Heart Disease ***150,661 ; 21.2%***
2	Cerebrovascular Diseases (Stroke) ***181,828 ; 12,2%***	Low Birth Weight ***13,238 ; 9.0%***	Brain and Other CNS Cancers ***4,271 ; 11.4%***	Lower Respiratory Infections ***7,060 ; 7.2%***	Cerebrovascular Diseases (Stroke) ***25,536 ; 10.2%***	Cerebrovascular Diseases (Stroke) ***31,889 ; 13.1%***	Cerebrovascular Diseases (Stroke) ***122,381 ; 17.3%***
3	Lower Respiratory Infections ***141,335 ; 9.5%***	Congenital Heart Diseases ***12,608 ; 8.6%***	Endocrine, Blood and Immune Disorders ***2,491 ; 6.6%***	Endocrine, Blood and Immune Disorders ***4,551 ; 4.6%***	Breast Cancer ***21,153 ; 8.4%***	Diabetes Mellitus ***24,135 ; 9.9%***	Lower Respiratory Infections ***81,811 ; 11.5%***
4	Diabetes Mellitus ***105,295 ; 7.1%***	Birth Trauma and Asphyxia ***7,819 ; 5.3%***	Leukaemia ***2,106 ; 5.6%***	Ischaemic Heart Disease ***3,590 ; 3.7%***	Diabetes Mellitus ***16,817 ; 6.7%***	Breast Cancer ***18,323 ; 7.5%***	Diabetes Mellitus ***61,685 ; 8.7%***
5	Road Traffic Injuries ***54,055 ; 3.6%***	Neonatal Infections ***7,819 ; 5.3%***	Fires, Heat and Hot Substances ***1,430 ; 3.8%***	Leukaemia ***3,577 ; 3.6%***	Lower Respiratory Infections ***16,220 ; 6.5%***	Lower Respiratory Infections ***16,965 ; 7.0%***	Nephritis and Nephrosis ***14,936 ; 2.1%***
6	Breast Cancer ***52,569 ; 3.5%***	Diarrhoeal Diseases ***5,404 ; 3.7%***	Lower Respiratory Infections ***1,425 ; 3.8%***	Tuberculosis ***3,348 ; 3.4%***	Road Traffic Injuries ***13,401 ; 5.3%***	Cervix Cancer ***5,519 ; 2.3%***	Breast Cancer ***12,560 ; 1.8%***
7	Endocrine, Blood and Immune Disorders ***30,516 ; 2.1%***	Road Traffic Injuries ***3,928 ; 2.7%***	Epilepsy ***1,421 ; 3.8%***	Epilepsy ***2,718 ; 2.8%***	Trachea, Bronchus and Lung Cancers ***7,468 ; 3.0%***	Road Traffic Injuries ***4,953 ; 2.0%***	Chronic Obstructive Pulmonary Disease ***12,202 ; 1.7%***
8	Trachea, Bronchus and Lung Cancers ***24,641 ; 1.7%***	Endocrine, Blood and Immune Disorders ***2,857 ; 1.9%***	Drowning ***1,406 ; 3.7%***	Diabetes Mellitus ***2,522 ; 2.6%***	Cervix Cancer ***7,068 ; 2.8%***	Asthma ***4,772 ; 2.0%***	Trachea, Bronchus and Lung Cancers ***12,075 ; 1.7%***
9	Nephritis and Nephrosis ***21,237 ; 1.4%***	Chronic Obstructive Pulmonary Disease ***2,321 ; 1.6%***	Dengue ***1,406 ; 3.7%***	Lymphoma ***2,514 ; 2.6%***	Endocrine, Blood and Immune Disorders ***5,321 ; 2.1%***	Trachea, Bronchus and Lung Cancers ***4,739 ; 1.9%***	Endocrine, Blood and Immune Disorders ***10,626 ; 1.5%***
10	Asthma ***20,793 ; 1.4%***	Meningitis ***1,698 ; 1.2%***	Nephritis and Nephrosis ***1,168 ; 3.1%***	Cerebrovascular Diseases (Stroke) ***2,023 ; 2.1%***	Asthma ***4,583 ; 1.8%***	Endocrine, Blood and Immune Disorders ***4,671 ; 1.9%***	Asthma ***9,141 ; 1.3%***

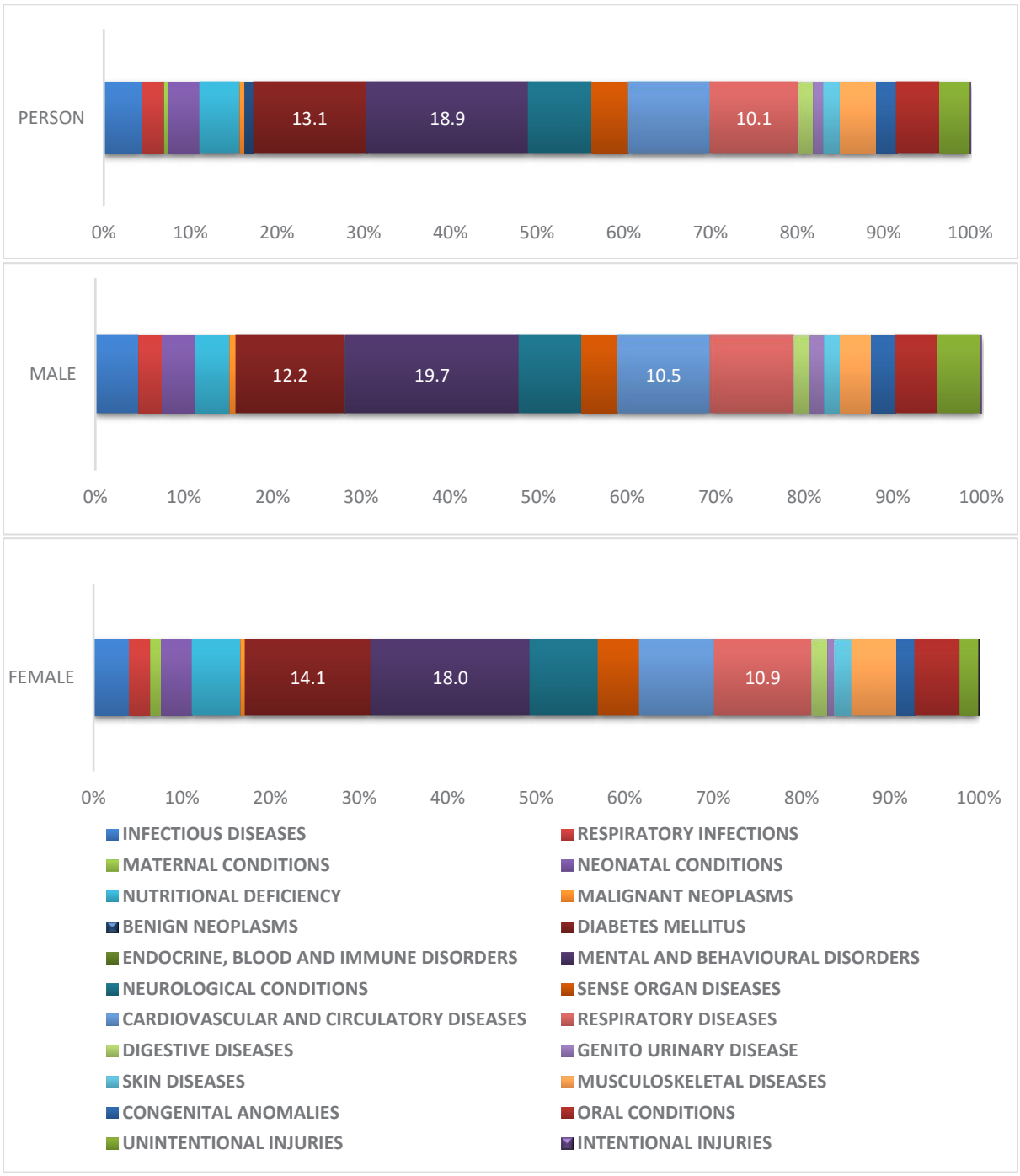
4.0 Years Lost Due to Disablity(YLD)

The Years Lost due to Disability are the number of years that a subject life with some disease. It depends on the severity of the disability that the disease causes to the affected individual. Chronic disease disables an individual once disease is diagnosed, and the years that he or she lives until death are the number of years lived with disability. The estimation could help in viewing the disease impacts on populations.

4.1 Years Lost due to Disability (YLD) - 2015

4.1.1 Pattern of Years Lost due to Disability (YLD) by gender in 2015.

Figure 4.1: *Percentage (%) of non-fatal burden (YLD) by disease groups and gender, 2015.*



Overall, YLD was mostly contributed by Mental and Behavioural Disorder (369,021; 18.9%) followed by Diabetes Mellitus (256,389; 13.1%) and Respiratory Diseases (198,344; 10.1%). As for gender, YLD in male mostly contributed by Mental and Behavioural Disorder (205,063; 19.7%) followed by Diabetes Mellitus (127,501; 12.2%) and Cardiovascular and Circulatory Diseases (109,257; 10.5%). For female,

YLD mostly contributed by Mental and Behavioural Disorder (163,957; 18.0%) followed by Diabetes Mellitus (128,888; 14.1%) and Respiratory Diseases (99,519; 10.9%) (**Figure 4.1**). All other categories can be seen in **Table 4.1**.

Table 4.1: *Non-fatal burden of disease and injury (YLD) by disease groups and by gender, 2015.*

Disease Categories	PERSON		MALE		FEMALE	
	YLD	%	YLD	%	YLD	%
INFECTIOUS DISEASES	87,350	4.47	50,949	4.88	36,402	3.99
RESPIRATORY INFECTIONS	49,838	2.55	27,997	2.68	21,841	2.39
MATERNAL CONDITIONS	11,498	0.59	-	0.00	11,498	1.26
NEONATAL CONDITIONS	69,855	3.57	38,009	3.64	31,847	3.49
NUTRITIONAL DEFICIENCY	90,557	4.63	41,012	3.93	49,546	5.43
MALIGNANT NEOPLASMS	12,647	0.65	7,373	0.71	5,274	0.58
BENIGN NEOPLASMS	493	0.03	221	0.02	272	0.03
DIABETES MELLITUS	256,389	13.11	127,501	12.22	128,888	14.13
ENDOCRINE, BLOOD AND IMMUNE DISORDERS	1,474	0.08	983	0.09	491	0.05
MENTAL AND BEHAVIOURAL DISORDERS	369,021	18.87	205,063	19.66	163,957	17.97
NEUROLOGICAL CONDITIONS	143,164	7.32	72,712	6.97	70,452	7.72
SENSE ORGAN DISEASES	84,538	4.32	42,419	4.07	42,119	4.62
CARDIOVASCULAR AND CIRCULATORY DISEASES	186,943	9.56	109,257	10.47	77,686	8.51
RESPIRATORY DISEASES	198,344	10.14	98,824	9.47	99,519	10.91
DIGESTIVE DISEASES	35,027	1.79	18,069	1.73	16,958	1.86
GENITO URINARY DISEASE	24,367	1.25	17,921	1.72	6,447	0.71
SKIN DISEASES	36,739	1.88	17,855	1.71	18,884	2.07
MUSCULOSKELETAL DISEASES	82,762	4.23	37,128	3.56	45,634	5.00
CONGENITAL ANOMALIES	47,682	2.44	28,552	2.74	19,130	2.10
ORAL CONDITIONS	96,263	4.92	49,790	4.77	46,473	5.09
UNINTENTIONAL INJURIES	68,570	3.51	50,132	4.81	18,438	2.02
INTENTIONAL INJURIES	2,053	0.10	1,345	0.13	707	0.08
TOTAL YLD	1,955,575	100	1,043,112	100	912,463	100

GROUP I: Communicable Disease, Maternal, Perinatal, Nutritional Status	GROUP II: Non-communicable Disease	GROUP III: Injury

4.1.2 Pattern of Years Lost due to Disability (YLD) by age in 2015.

Overall, 47.7 % of total YLD were contributed by productive age 15 to 49 years old [(19.7 % for young adult and 28.0 % for older adult)]. Pre-elderly age group (50 to 59 years old) contributed towards 14.7% of total YLD. Among male, 48.4% of total YLD were contributed by productive age (15 to 49 years old), compared to female as 46.8% **(Figure 4.2)**.

In specific disease group, Nutritional Deficiency become the most leading disease categories towards YLD for under 5 years old (0 to 4 years old) while Mental and Behavioural Disorders become the most leading disease categories towards YLD in the age of young adult (15 to 29 years old) and older adult (30 to 49 years old). Starting at pre-elderly age group (50-59 years old), Diabetes Mellitus become the most leading disease categories towards YLD with the disease start to occur during the younger adult. Cardiovascular and Circulatory Diseases become the most leading disease categories towards YLD at elderly age group (60 years and above) **(Figure 4.3)**. Male had the same pattern of non-fatal burden of YLD as compared with overall population **(Figure 4.4)**. Among female, Diabetes Mellitus become the most leading disease categories towards YLD in older adult age group (30 – 49 years old) to elderly age group (60 years old and above) **(Figure 4.5)**.

Figure 4.2: *Percentage (%) of non-fatal burden (YLD), by age group and gender, 2015.*

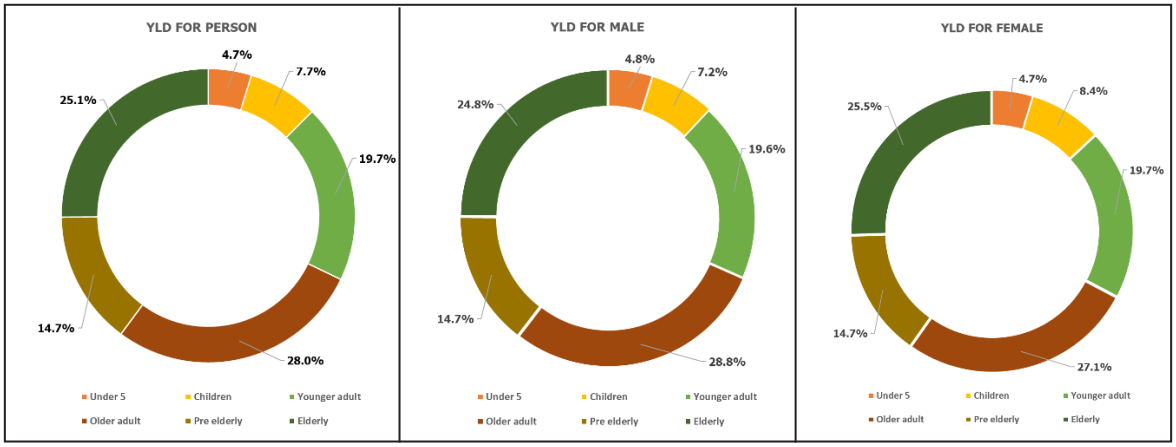


Figure 4.3: *Percentage (%) of non-fatal burden (YLD), by disease categories and age group, person, 2015.*

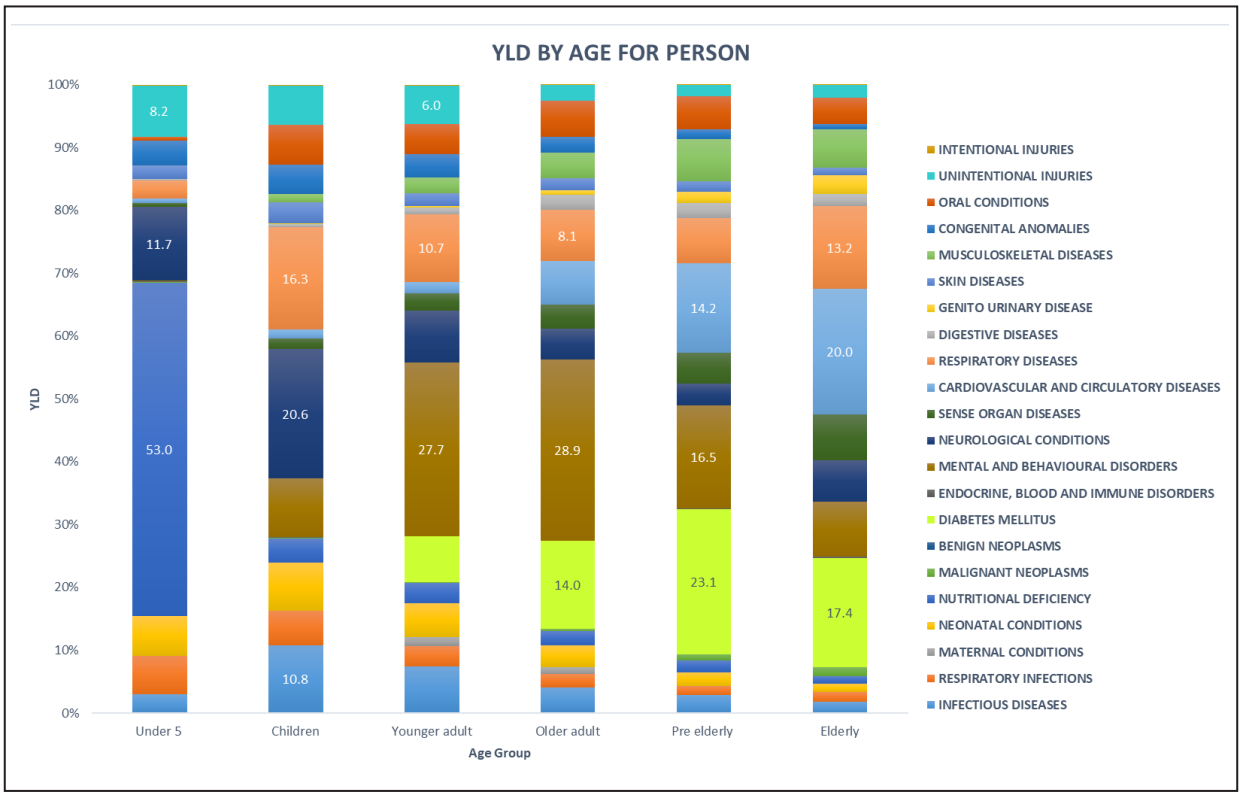


Figure 4.4: *Percentage (%) of non-fatal burden (YLD), by disease categories and age group, male, 2015.*

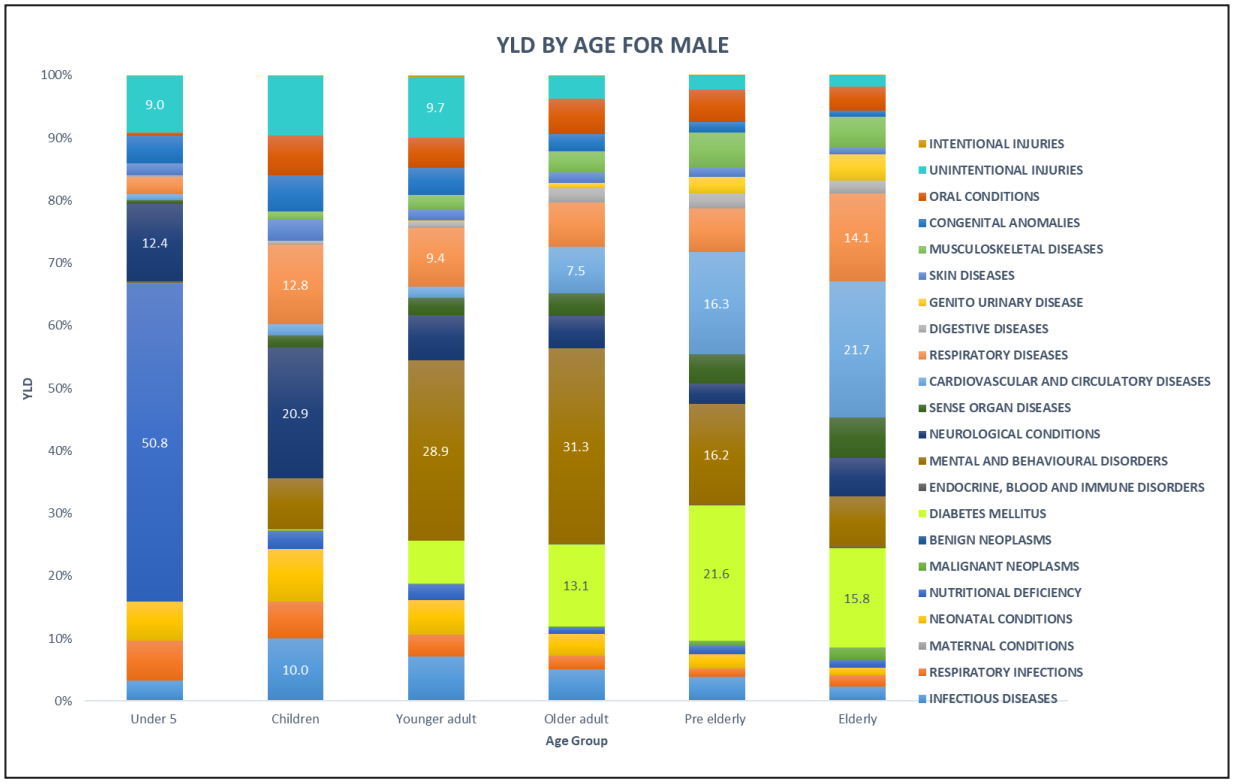
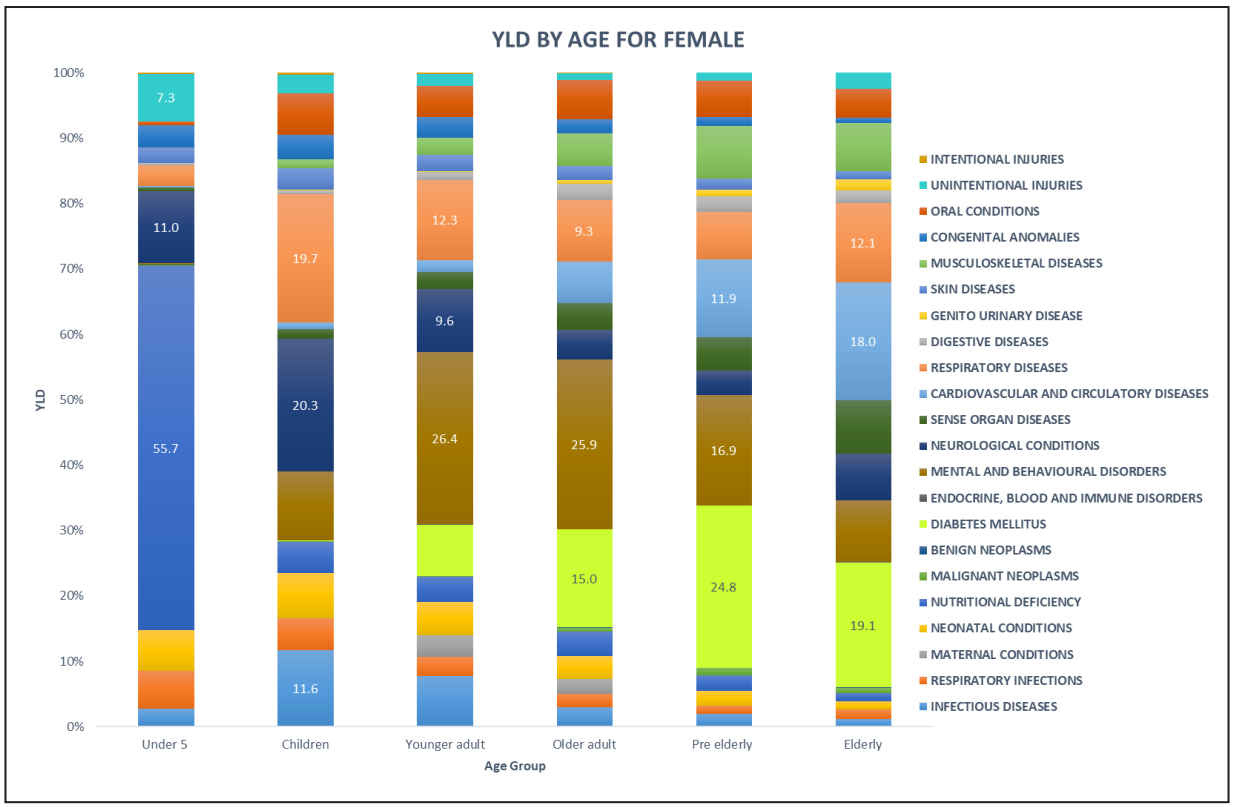


Figure 4.5: *Percentage (%) of non-fatal burden (YLD), by disease categories and age group, female, 2015.*



4.1.3 Leading Causes of Years Lost due to Disability (YLD) for 2015.

Diabetes Mellitus was the leading cause of non-fatal burden in Malaysia for 2015, contributing 13.1% of the total YLD. This was followed by Asthma, with 4.9%, Ischemic Heart Disease (4.7%), Unipolar Depressive Disorders (4.1%) and Schizophrenia (3.7%). For under 5 (0 to 4 years old), Protein-energy Malnutrition was the leading cause of non-fatal burden with 42.9% of total YLD, followed by Nutritional Anaemias, with 10.1%. Diarrhoeal diseases were the leading cause of non-fatal burden in children (5 to 14 years old), contributing 9.2% of total YLD, followed by Asthma with 7.3%. Diabetes Mellitus was the leading cause of non-fatal burden with 7.3% of total YLD in young adult (15 to 29 years old), 14.0% of total YLD in older adult (30 to 49 years old), 23.1% of total YLD in pre-elderly (50 to 59 years old) and 17.4% of total YLD in elderly (60 years and above) **(Table 4.2)**.

Among male, Diabetes Mellitus was the leading cause of non-fatal burden with 12.2% of total YLD, followed by Ischemic Heart Disease with 5.8% and Asthma with 4.8%. For under 5 (0 to 4 years old), Protein-energy Malnutrition was the leading cause of non-fatal burden with 41.4% of total YLD, followed by Nutritional Anaemias, with 9.3%. Asthma was the leading cause of non-fatal burden in children (5 to 14 years old), contributing 8.7% of total YLD, followed by Diarrhoeal Diseases with 8.3%. In young adult (15 to 29 years old), Asthma become leading cause of non-fatal burden with 7.4%, followed by Diabetes Mellitus with 6.8%. Diabetes Mellitus was the leading cause of non-fatal burden with 13.1% of total YLD in older adult (30 to 49 years old), 21.6% of total YLD in pre-elderly (50 to 59 years old) and 15.8% of total YLD in elderly (60 years and above) **(Table 4.3)**.

Among female, Diabetes Mellitus was the leading cause of non-fatal burden with 14.1% of total YLD, followed by Asthma with 5.0% and Anxiety Disorders with 4.9%. For under 5 (0 to 4 years old), Protein-energy Malnutrition was the leading cause of non-fatal burden with 44.7% of total YLD, followed by Nutritional Anaemias, with 11.0%. Diarrhoeal diseases were the leading cause of non-fatal burden in children (5 to 14 years old), contributing 10.1% of total YLD, followed by Asthma with 5.9%. Diabetes Mellitus was the leading cause of non-fatal burden with 7.8% total YLD in young adult (15 to 29 years old), 15.0% of total YLD in older adult (30 to 49 years old), 24.8% of total YLD in pre-elderly (50 to 59 years old) and 19.1% of total YLD in elderly (60 years and above) (**Table 4.4)**.

Person

Table 4.2: *Leading causes of non-fatal burden (total YLD; percentage %) for all population, by age group, 2015.*

Rank	Overall Age (0+ years old)	Under 5 (0-4 years old)	Children (5-14 years old)	Young Adult (15-29 years old)	Older Adult (30-49 years old)	Pre-Elderly (50-59 years old)	Elderly (60+ years old)
1	Diabetes Mellitus ***256,389 ; 13.1%***	Protein-Energy Malnutrition ***39,807 ; 42.9%***	Diarrhoeal Diseases ***13,914 ; 9.2%***	Diabetes Mellitus ***27,908 ; 7.3%***	Diabetes Mellitus ***76,481 ; 14.0%***	Diabetes Mellitus ***66,553 ; 23.1%***	Diabetes Mellitus ***85,364 ; 17.4%***
2	Asthma ***95,677 ; 4.9%***	Nutritional Anaemias ***9,372 ; 10.1%***	Asthma ***11,063 ; 7.3%***	Asthma ***26,189 ; 6.8%***	Schizophrenia ***35,255 ; 6.4%***	Ischaemic Heart Disease ***20,715 ; 7.2%***	Ischaemic Heart Disease ***54,296 ; 11.0%***
3	Ischaemic Heart Disease ***92,096 ; 4.7%***	Epilepsy ***3,678 ; 4.0%***	Epilepsy ***7,698 ; 5.1%***	Unipolar Depressive Disorders ***25,017 ; 6.5%***	Drug Use Disorders ***30,651 ; 5.6%***	Schizophrenia ***12,349 ; 4.3%***	Cerebrovascular Diseases (Stroke) ***28,144 ; 5.7%***
4	Unipolar Depressive Disorders ***79,708 ; 4.1%***	Fires, Heat and Hot Substances ***3,674 ; 4.0%***	Birth Trauma and Asphyxia ***7,597 ; 5.0%***	Anxiety Disorders ***21,842 ; 5.7%***	Asthma ***29,221 ; 5.3%***	Asthma ***12,226 ; 4.2%***	Chronic Obstructive Pulmonary Disease ***26,658 ; 5.4%***
5	Schizophrenia ***73,146 ; 3.7%***	Birth Trauma and Asphyxia ***3,440 ; 3.7%***	Anxiety Disorders ***6,593 ; 4.4%***	Diarrhoeal Diseases ***16,664 ; 4.3%***	Unipolar Depressive Disorders ***25,990 ; 4.7%***	Cerebrovascular Diseases (Stroke) ***11,528 ; 4.0%***	Dementia ***20,023 ; 4.1%***
6	Anxiety Disorders ***70,601 ; 3.6%***	Upper Respiratory Infections ***3,155 ; 3.4%***	Upper Respiratory Infections ***6,001 ; 4.0%***	Schizophrenia ***14,941 ; 3.9%***	Anxiety Disorders ***25,264 ; 4.6%***	Hearing Loss ***11,334 ; 3.9%***	Hearing Loss ***19,425 ; 4.0%***
7	Hearing Loss ***60,546 ; 3.1%***	Skin and Subcutaneous Diseases ***1,994 ; 2.1%***	Nutritional Anaemias ***5,844 ; 3.9%***	Drug Use Disorders ***13,619 ; 3.5%***	Hearing Loss ***18,144 ; 3.3%***	Osteoarthritis ***11,334 ; 3.9%***	Osteoarthritis ***18,756 ; 3.8%***
8	Cerebrovascular Diseases (Stroke) ***52,205 ; 2.7%***	Lower Respiratory Infections ***1,742 ; 1.9%***	Unipolar Depressive Disorders ***5,550 ; 3.7%***	Birth Trauma and Asphyxia ***13,548 ; 3.5%***	Ischaemic Heart Disease ***16,225 ; 3.0%***	Unipolar Depressive Disorders ***10,328 ; 3.6%***	Asthma ***15,479 ; 3.1%***
9	Nutritional Anaemias ***50,750 ; 2.6%***	Asthma ***1,499 ; 1.6%***	Skin and Subcutaneous Diseases ***5,036 ; 3.3%***	Epilepsy ***12,741 ; 3.3%***	Bipolar Affective Disorders ***13,760 ; 2.5%***	Anxiety Disorders ***8,478 ; 2.9%***	Cataract ***13,249 ; 2.7%***
10	Drug Use Disorders ***48,805 ; 2.5%***	Diarrhoeal Diseases ***1,494 ; 1.6%***	Road Traffic Injuries ***2,259 ; 1.5%***	Nutritional Anaemias ***12,287 ; 3.2%***	Periodontitis ***13,114 ; 2.4%***	Periodontitis ***5,913 ; 2.1%***	Unipolar Depressive Disorders ***12,693 ; 2.6%***

Male

Table 4.3: *Leading causes of non-fatal burden (total YLD; percentage %) for male, by age group, 2015.*

Rank	Overall Age (0+ years old)	Under 5 (0-4 years old)	Children (5-14 years old)	Young Adult (15-29 years old)	Older Adult (30-49 years old)	Pre-Elderly (50-59 years old)	Elderly (60+ years old)
1	Diabetes Mellitus ***127,501 ; 12.2%***	Protein Energy Malnutrition ***20,783 ; 41.4%***	Asthma ***6,532 ; 8.7%***	Asthma ***15,163 ; 7.4%***	Diabetes Mellitus ***39,362 ; 13.1%***	Diabetes Mellitus ***33,192 ; 21.6%***	Diabetes Mellitus ***41,035 ; 15.8%***
2	Ischemic Heart Disease ***60,382 ; 5.8%***	Nutritional Anaemias ***4,682 ; 9.3%***	Diarrhoeal Diseases ***6,177 ; 8.3%***	Diabetes Mellitus ***13,850 ; 6.8%***	Drug Use Disorders ***29,835 ; 9.9%***	Ischemic Heart Disease ***14,082 ; 9.2%***	Ischemic Heart Disease ***33,432 ; 12.9%***
3	Asthma ***50,488 ; 4.8%***	Fires, Heat and Hot Substances ***2,165 ; 4.3%***	Birth Trauma and Asphyxia ***4,246 ; 5.7%***	Drug Use Disorders ***13,104 ; 6.4%***	Schizophrenia ***18,501 ; 6.2%***	Cerebrovascular Diseases (Stroke) ***6,863 ; 4.5%***	Chronic Obstructive Pulmonary Disease ***19,240 ; 7.4%***
4	Drug Use Disorders ***47,373 ; 4.5%***	Epilepsy ***2,085 ; 4.2%***	Epilepsy ***4,090 ; 5.5%***	Unipolar Depressive Disorders ***12,050 ; 5.9%***	Asthma ***15,688 ; 5.2%***	Schizophrenia ***6,322 ; 4.1%***	Cerebrovascular Diseases (Stroke) ***14,966 ; 5.8%***
5	Unipolar Depressive Disorders ***38,766 ; 3.7%***	Birth Trauma and Asphyxia ***1,933 ; 3.9%***	Upper Respiratory Infections ***3,230 ; 4.3%***	Road Traffic Injuries ***9,042 ; 4.4%***	Unipolar Depressive Disorders ***13,054 ; 4.3%***	Hearing Loss ***5,974 ; 3.9%***	Hearing Loss ***9,619 ; 3.7%***
6	Schizophrenia ***38,010 ; 3.6%***	Upper Respiratory Infections ***1,781 ; 3.5%***	Anxiety Disorders ***2,486 ; 3.3%***	Anxiety Disorders ***8,125 ; 4.0%***	Ischemic Heart Disease ***12,202 ; 4.1%***	Asthma ***5,844 ; 3.8%***	Dementia ***8,990 ; 3.5%***
7	Hearing Loss ***31,999 ; 3.1%***	Lower Respiratory Infections ***1,021 ; 2.0%***	Skin and Subcutaneous Diseases ***2,451 ; 3.3%***	Birth Trauma and Asphyxia ***7,722 ; 3.8%***	Hearing Loss ***9,789 ; 3.3%***	Osteoarthritis ***5,019 ; 3.3%***	Osteoarthritis ***8,085 ; 3.1%***
8	Cerebrovascular Diseases (Stroke) ***29,750 ; 2.9%***	Skin and Subcutaneous Diseases ***978 ; 1.9%***	Unipolar Depressive Disorders ***2,399 ; 3.2%***	Schizophrenia ***7,709; 3.8%***	Anxiety Disorders ***9,263 ; 3.1%***	Unipolar Depressive Disorders ***4,980 ; 3.2%***	Benign Prostatic Hypertrophy ***6,717; 2.6%***
9	Chronic Obstructive Pulmonary Disease ***29,152 ; 2.8%***	Asthma ***915 ; 1.8%***	Nutritional Anaemias ***2,154 ; 2.9%***	Diarrhoeal Diseases ***7,519 ; 3.7%***	Birth Trauma and Asphyxia ***7,065 ; 2.3%***	Drug Use Disorders ***3,801 ; 2.5%***	Asthma ***6,346 ; 2.4%***
10	Anxiety Disorders ***25,739 ; 2.5%***	Diarrhoeal Diseases ***807 ; 1.6%***	Road Traffic Injuries ***1,772 ; 2.4%***	Epilepsy ***7,440 ; 3.6%***	Periodontitis ***6,783 ; 2.3%***	Chronic Obstructive Pulmonary Disease ***3,594 ; 2.3%***	Unipolar Depressive Disorders ***6,228 ; 2.4%***

Female

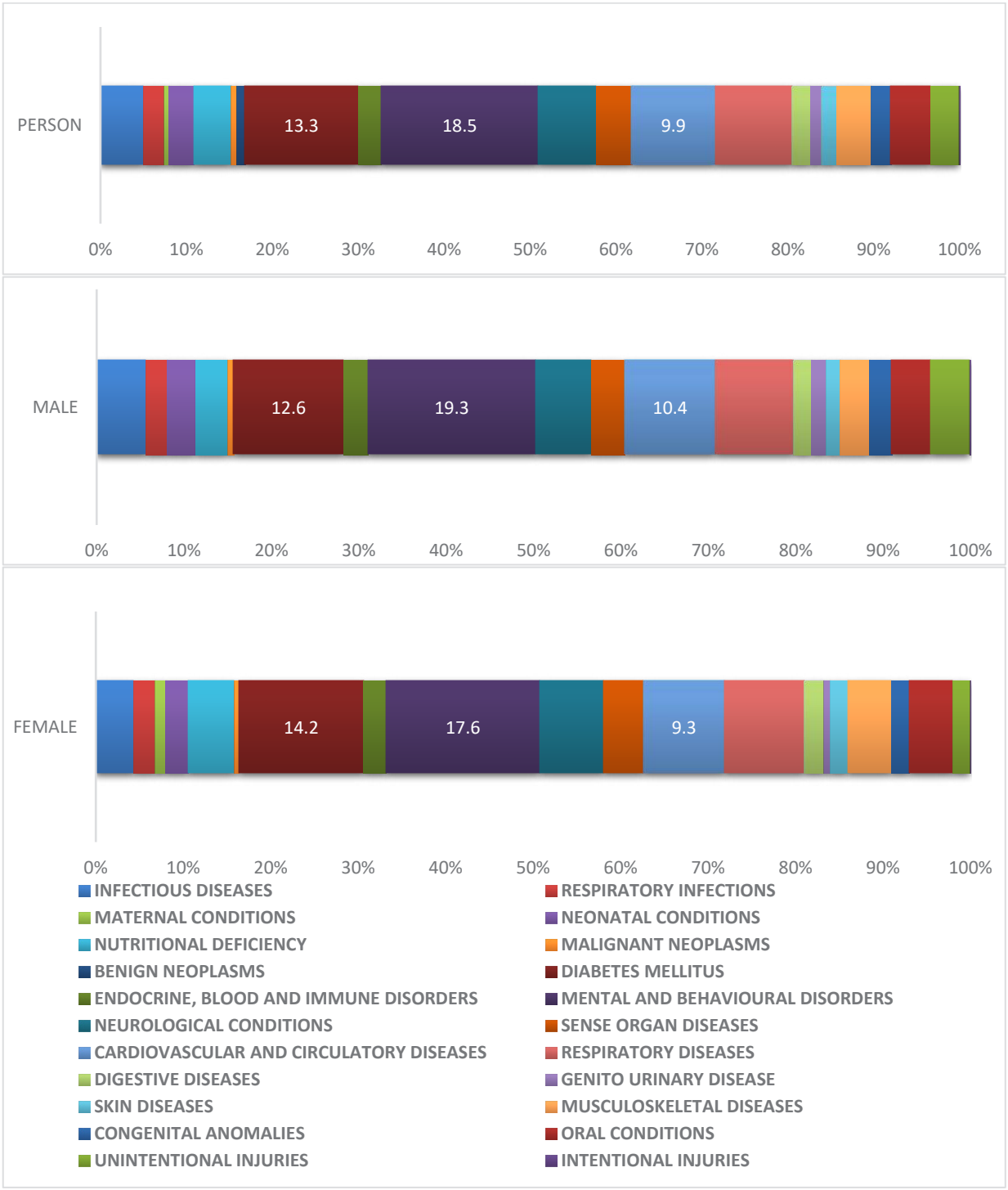
Table 4.4: *Leading causes of non-fatal burden (total YLD; percentage %) for female, by age group, 2015.*

Rank	Overall Age (0+ years old)	Under 5 (0-4 years old)	Children (5-14 years old)	Young Adult (15-29 years old)	Older Adult (30-49 years old)	Pre-Elderly (50-59 years old)	Elderly (60+ years old)
1	Diabetes Mellitus ***128,888 ; 14.1%***	Protein Energy Malnutrition ***19,025 ; 44.7%***	Diarrhoeal Diseases ***7,737 ; 10.1%***	Diabetes Mellitus ***14,058 ; 7.8%***	Diabetes Mellitus ***37,119 ; 15.0%***	Diabetes Mellitus ***33,361 ; 24.8%***	Diabetes Mellitus ***44,329 ; 19.1%***
2	Asthma ***45,189 ; 5.0%***	Nutritional Anaemias ***4,691 ; 11.0%***	Asthma ***4,532 ; 5.9%***	Asthma ***11,026 ; 6.1%***	Asthma ***13,533 ; 5.5%***	Ischemic Heart Disease ***6,633 ; 4.9%***	Ischaemic Heart Disease ***20,864 ; 9.0%***
3	Anxiety Disorders ***44,862 ; 4.9%***	Epilepsy ***1,593 ; 3.7%***	Nutritional Anaemias ***3,691 ; 4.8%***	Diarrhoeal Diseases ***9,145 ; 5.1%***	Nutritional Anaemias ***9,060 ; 3.7%***	Asthma ***6,382 ; 4.8%***	Cerebrovascular Diseases (Stroke) ***13,178 ; 5.7%***
4	Unipolar Depressive Disorders ***40,942 ; 4.5%***	Fires, Heat and Hot Substances ***1,509 ; 3.5%***	Epilepsy ***3,607 ; 4.7%***	Nutritional Anaemias ***6,998 ; 3.9%***	Hearing Loss ***8,355 ; 3.4%***	Osteoarthritis ***6,315 ; 4.7%***	Dementia ***11,033 ; 4.7%***
5	Schizophrenia ***35,136 ; 3.9%***	Birth Trauma and Asphyxia ***1,507 ; 3.5%***	Birth Trauma and Asphyxia ***3,351 ; 4.4%***	Birth Trauma and Asphyxia ***5,826 ; 3.2%***	Periodontitis ***6,331 ; 2.6%***	Hearing Loss ***5,360 ; 4.0%***	Osteoarthritis ***10,671 ; 4.6%***
6	Ischemic Heart Disease ***31,715 ; 3.5%***	Upper Respiratory Infections ***1,374 ; 3.2%***	Upper Respiratory Infections ***2,771 ; 3.6%***	Epilepsy ***5,301 ; 3.0%***	Skin and Subcutaneous Diseases ***5,485 ; 2.2%***	Cerebrovascular Diseases (Stroke) ***4,665 ; 3.5%***	Hearing Loss ***9,805 ; 4.2%***
7	Nutritional Anaemias ***30,521 ; 3.3%***	Skin and Subcutaneous Diseases ***1,016 ; 2.4%***	Skin and Subcutaneous Diseases ***2,585 ; 3.4%***	Skin and Subcutaneous Diseases ***4,382 ; 2.4%***	Birth Trauma and Asphyxia ***5,452 ; 2.2%***	Nutritional Anaemias ***3,246 ; 2.4%***	Asthma ***9,132 ; 3.9%***
8	Hearing Loss ***28,547 ; 3.1%***	Lower Respiratory Infections ***721 ; 1.7%***	Neonatal Infections ***1,003 ; 1.3%***	Hearing Loss ***4,051 ; 2.3%***	Epilepsy ***4,881 ; 2.0%***	Periodontitis ***2,884 ; 2.1%***	Chronic Obstructive Pulmonary Disease ***7,418 ; 3.2%***
9	Cerebrovascular Diseases (Stroke) ***22,455 ; 2.5%***	Diarrhoeal Diseases ***688 ; 1.6%***	Low Birth Weight ***961 ; 1.3%***	Upper Respiratory Infections ***3,688 ; 2.1%***	Ischemic Heart Diseases ***4,023 ; 1.6%***	Edentulism ***2,680 ; 2.0%***	Cataract ***7,407 ; 3.2%***
10	Osteoarthritis ***20,521 ; 2.2%***	Asthma ***584 ; 1.4%***	Back and Neck Pain ***931 ; 1.2%***	Abortion ***2,387 ; 1.3%***	Cerebrovascular Diseases (Stroke) ***3,772 ; 1.5%***	Skin and Subcutaneous Diseases ***2,349 ; 1.7%***	Edentulism ***6,064 ; 2.6%***

4.2 Years Lost due to Disability (YLD) - 2016

4.2.1 Pattern of Years Lost due to Disability (YLD) by gender in 2016.

Figure 4.6: *Percentage (%) of non-fatal burden (YLD) by disease groups and gender, 2016.*



Overall, YLD was mostly contributed by Mental and Behavioural Disorders (386,765; 18.5%) followed by Diabetes Mellitus (278,851; 13.3%) and Cardiovascular and Circulatory Diseases (206,765; 9.9%). As for gender, YLD in male mostly contributed by Mental and Behavioural Disorders (219,372; 19.3%) followed by Diabetes Mellitus (143,718; 12.6%) and Cardiovascular and Circulatory Diseases (118,731;

10.4%). For female, YLD mostly contributed by Mental and Behavioural Disorders (167,394; 17.6%) followed by Diabetes Mellitus (135,133; 14.2%) and Cardiovascular and Circulatory Diseases (88,033; 9.3%) (**Figure 4.6**). All other categories can be seen in **Table 4.5**.

Table 4.5: *Non-fatal burden of disease and injury (YLD) by disease groups and by gender, 2016.*

Disease Categories	PERSON		MALE		FEMALE	
	YLD	%	YLD	%	YLD	%
INFECTIOUS DISEASES	105,911	5.06	64,511	5.66	41,400	4.35
RESPIRATORY INFECTIONS	50,513	2.41	27,569	2.42	22,944	2.41
MATERNAL CONDITIONS	11,318	0.54	-	0.00	11,318	1.19
NEONATAL CONDITIONS	61,922	2.96	36,969	3.24	24,952	2.62
NUTRITIONAL DEFICIENCY	91,293	4.36	41,582	3.65	49,711	5.22
MALIGNANT NEOPLASMS	13,306	0.64	7,738	0.68	5,568	0.58
BENIGN NEOPLASMS	497	0.02	226	0.02	271	0.03
DIABETES MELLITUS	278,851	13.33	143,718	12.61	135,133	14.20
ENDOCRINE, BLOOD AND IMMUNE DISORDERS	56,039	2.68	31,339	2.75	24,700	2.59
MENTAL AND BEHAVIOURAL DISORDERS	386,765	18.49	219,372	19.25	167,394	17.58
NEUROLOGICAL CONDITIONS	141,777	6.78	72,159	6.33	69,619	7.31
SENSE ORGAN DISEASES	87,048	4.16	43,643	3.83	43,404	4.56
CARDIOVASCULAR AND CIRCULATORY DISEASES	206,765	9.88	118,731	10.42	88,033	9.25
RESPIRATORY DISEASES	188,213	9.00	101,429	8.90	86,783	9.12
DIGESTIVE DISEASES	44,776	2.14	23,514	2.06	21,262	2.23
GENITO URINARY DISEASE	26,325	1.26	19,080	1.67	7,245	0.76
SKIN DISEASES	37,462	1.79	18,218	1.60	19,245	2.02
MUSCULOSKELETAL DISEASES	85,499	4.09	38,504	3.38	46,995	4.94
CONGENITAL ANOMALIES	48,460	2.32	28,996	2.54	19,464	2.04
ORAL CONDITIONS	98,341	4.70	50,863	4.46	47,478	4.99
UNINTENTIONAL INJURIES	68,812	3.29	50,454	4.43	18,358	1.93
INTENTIONAL INJURIES	1,912	0.09	1,241	0.11	671	0.07
TOTAL YLD	2,091,805	100	1,139,857	100	951,948	100

GROUP I: Communicable Disease, Maternal, Perinatal, Nutritional Status	GROUP II: Non-communicable Disease	GROUP III: Injury

4.2.2 Pattern of Years Lost due to Disability (YLD) by age in 2016.

Overall, 47.9 % of total YLD were contributed by productive age [15 to 49 years old (19.2 % for young adult and 28.7 % for older adult)]. Pre-elderly age group (50 to 59 years old) contributed about 13.8% of total YLD. Among male, 48.2% of total YLD were contributed by productive age (15 to 49 years old), compared to female as 47.5% **(Figure 4.7)**.

In specific disease group, Nutritional Deficiency become the most leading disease categories towards YLD for under 5 (0 to 4 years old) while Mental and Behavioural Disorders become the most leading disease categories towards YLD in the age of young adult (15 to 29 years old) and older adult (30 to 49 years old). Starting at pre-elderly age group (50-59 years old), Diabetes Mellitus become the most leading disease categories towards YLD with the disease start to occur during the younger adult. Cardiovascular and Circulatory Diseases become the most leading disease categories towards YLD at elderly age group (60 years and above) **(Figure 4.8)**. Both male and female had the same pattern of non-fatal burden of YLD as compared with overall population **(Figure 4.9; Figure 4.10)**.

Figure 4.7: *Percentage (%) of non-fatal burden (YLD), by age group and gender, 2016*

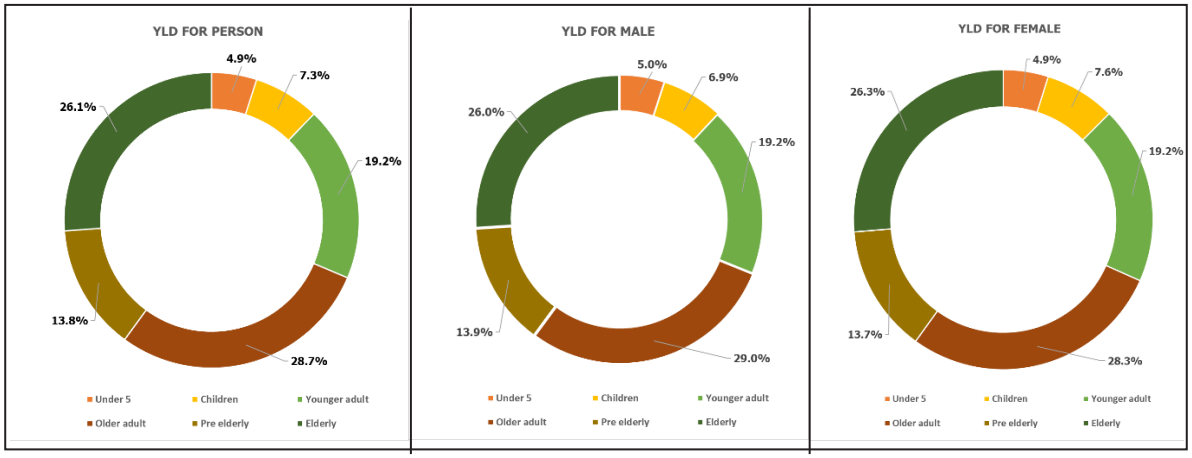


Figure 4.8: *Percentage (%) of non-fatal burden (YLD), by disease categories and age group, person, 2016.*

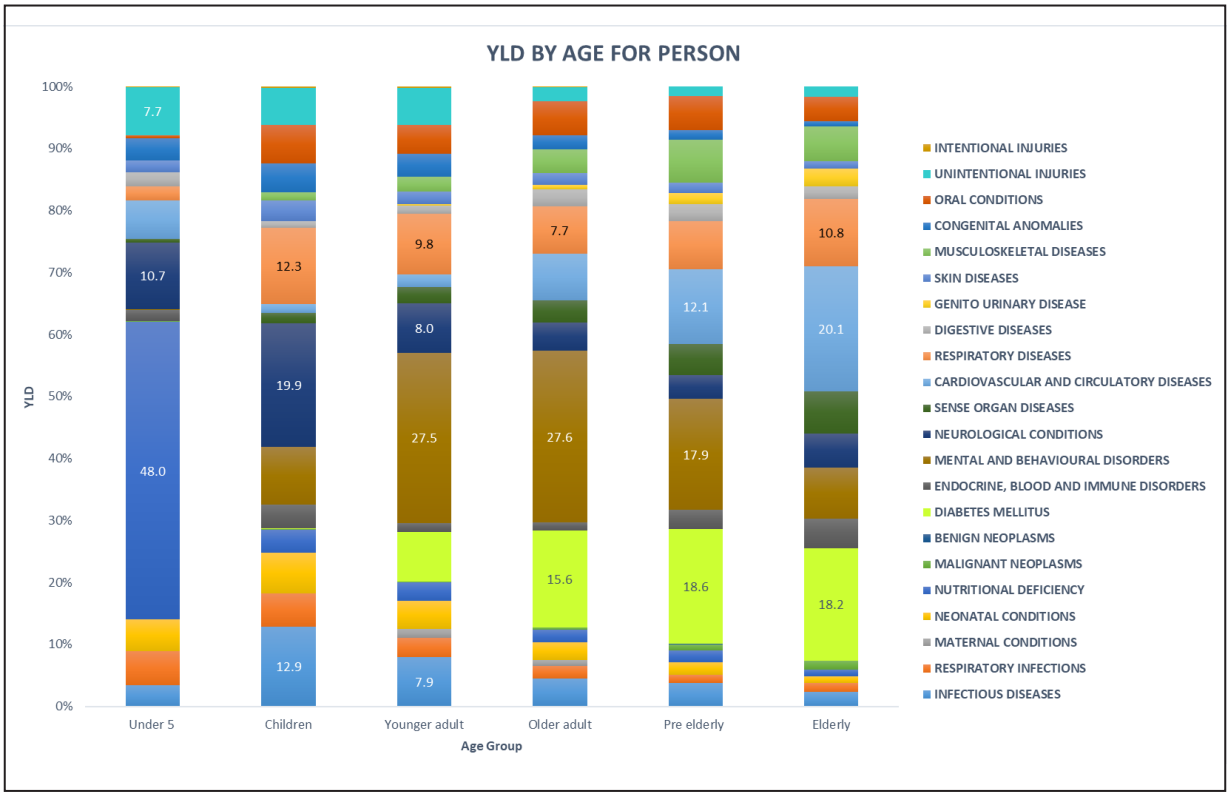


Figure 4.9: *Percentage (%) of non-fatal burden (YLD), by disease categories and age group, male, 2016.*

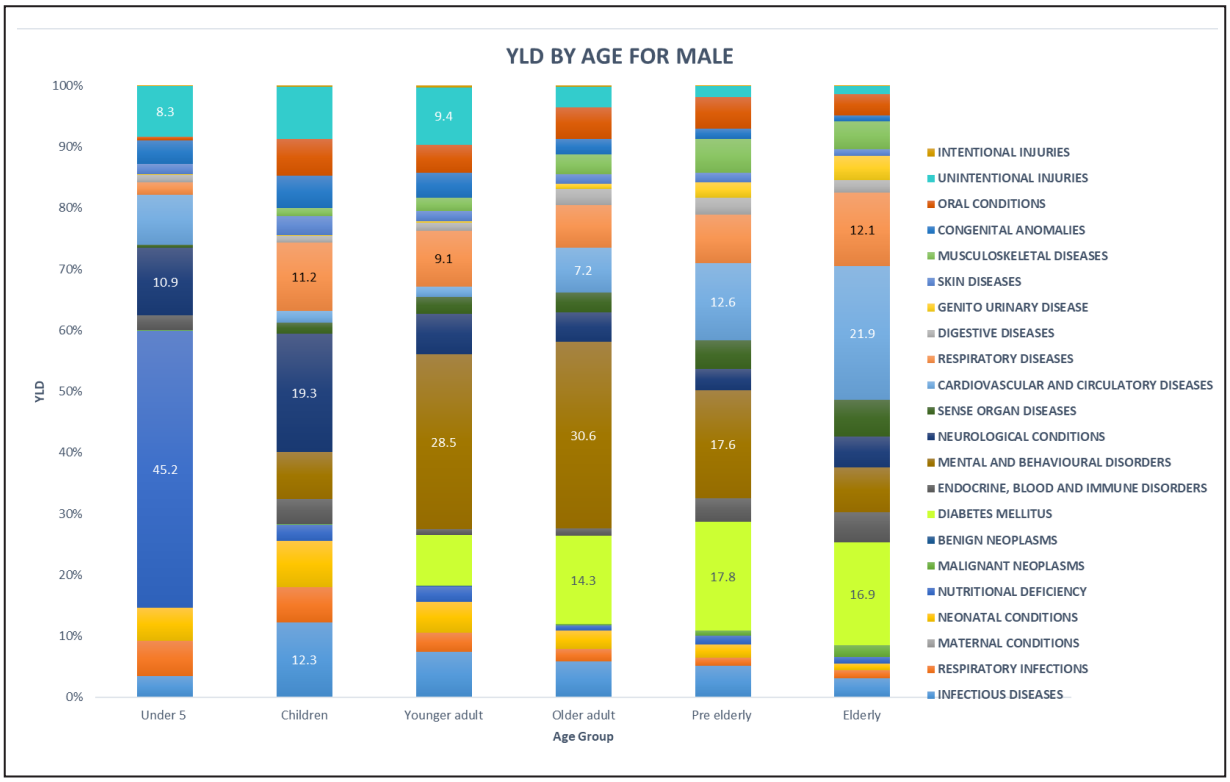
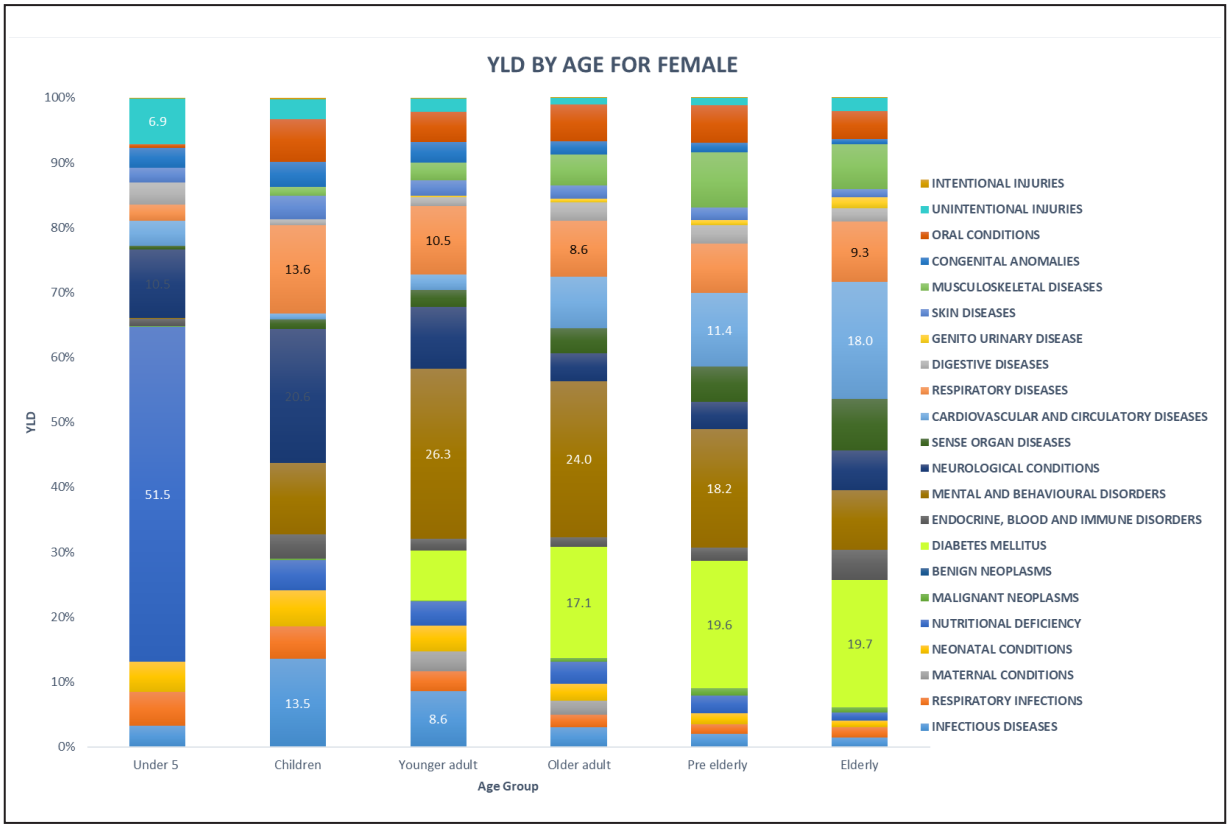


Figure 4.10: *Percentage (%) of non-fatal burden (YLD), by disease categories and age group, female, 2016.*



4.2.3 Leading Causes of Years Lost due to Disability (YLD) for 2016.

Diabetes Mellitus was the leading cause of non-fatal burden in Malaysia for 2016, contributing 12.8% of the total YLD. This was followed by Asthma, with 5.0%, Unipolar Depressive Disorders (3.9%), Schizophrenia (3.6%) and Anxiety Disorders (3.4%). For under 5 (0 to 4 years old), Protein-energy Malnutrition was the leading cause of non-fatal burden with 36.9% of total YLD, followed by Nutritional Anaemias, with 9.1%. Diarrhoeal diseases were the leading cause of non-fatal burden in children (5 to 14 years old), contributing 11.4% of total YLD, followed by Asthma with 7.6%. Diabetes Mellitus was the leading cause of non-fatal burden with 8.0% of total YLD in young adult (15 to 29 years old), 15.6% of total YLD in older adult (30 to 49 years old), 18.6% of total YLD in pre-elderly (50 to 59 years old) and 18.2% of total YLD in elderly (60 years and above) **(Table 4.6)**.

Among male, Diabetes Mellitus was the leading cause of non-fatal burden with 12.6% of total YLD, followed by Drug Use Disorders with 5.1% and Asthma with 4.7%. For under 5 (0 to 4 years old), Protein-energy Malnutrition was the leading cause of non-fatal burden with 36.8% of total YLD, followed by Nutritional Anaemias, with 8.4%. Diarrhoeal Disease were the leading cause of non-fatal burden in children (5 to 14 years old), contributing 10.5% of total YLD, followed by Asthma with 8.5%. Diabetes Mellitus was the leading cause of non-fatal burden with 8.3% of total YLD in young adult (15 to 29 years old), 14.3% of total YLD in older adult (30 to 49 years old), 17.8% of total YLD in pre-elderly (50 to 59 years old) and 16.9% of total YLD in elderly (60 years and above) **(Table 4.7)**.

Among female, Diabetes Mellitus was the leading cause of non-fatal burden with 14.2% of total YLD, followed by Asthma with 5.4% and Anxiety Disorders with 4.8%. For under 5 (0 to 4 years old), Protein-energy Malnutrition was the leading cause of non-fatal burden with 41.5% of total YLD, followed by Nutritional Anaemias, with 10.0%. Diarrhoeal diseases were the leading cause of non-fatal burden in children (5 to 14 years old), contributing 12.4% of total YLD, followed by Asthma with 6.7%. Diabetes Mellitus was the leading cause of non-fatal burden with 7.7% total YLD in young adult (15 to 29 years old), 17.1% of total YLD in older adult (30 to 49 years old), 19.6% of total YLD in pre-elderly (50 to 59 years old) and 19.7% of total YLD in elderly (60 years and above) **(Table 4.8)**.

Person

Table 4.6: *Leading causes of non-fatal burden (total YLD; percentage %) for all population, by age group, 2016.*

Rank	Overall Age (0+ years old)	Under 5 (0-4 years old)	Children (5-14 years old)	Young Adult (15-29 years old)	Older Adult (30-49 years old)	Pre-Elderly (50-59 years old)	Elderly (60+ years old)
1	Diabetes Mellitus ***265,788 ; 12.8%***	Protein-Energy Malnutrition ***40,247 ; 38.9%***	Diarrhoeal Diseases ***17,365 ; 11.4%***	Diabetes Mellitus ***32,225 ; 8.0%***	Diabetes Mellitus ***93,545 ; 15.6%***	Diabetes Mellitus ***53,709 ; 18.6%***	Diabetes Mellitus ***99,294 ; 18.2%***
2	Asthma ***104,667 ; 5.0%***	Nutritional Anaemias ***9,411 ; 9.1%***	Asthma ***11,557 ; 7.6%***	Asthma ***28,580 ; 7.4%***	Drug Use Disorders ***37,782 ; 6.3%***	Asthma ***13,416 ; 4.6%***	Ischaemic Heart Disease ***42,528 ; 7.8%***
3	Unipolar Depressive Disorders ***81,850 ; 3.9%***	Epilepsy ***3,744 ; 3.6%***	Epilepsy ***7,643 ; 5.0%***	Unipolar Depressive Disorders ***25,372 ; 6.5%***	Schizophrenia ***35,481 ; 5.9%***	Schizophrenia ***13,277 ; 4.6%***	Cerebrovascular Diseases (Stroke) ***33,428 ; 6.1%***
4	Schizophrenia ***75,025 ; 3.6%***	Fires, Heat and Hot Substances ***3,707 ; 3.6%***	Anxiety Disorders ***6,478 ; 4.3%***	Anxiety Disorders ***21,693 ; 5.6%***	Asthma ***32,310 ; 5.4%***	Ischemic Heart Disease ***12,684 ; 4.4%***	Chronic Obstructive Pulmonary Disease ***29,814 ; 5.5%***
5	Anxiety Disorders ***70,313 ; 3.4%***	Upper Respiratory Infections ***3,190 ; 3.1%***	Birth Trauma and Asphyxia ***6,049 ; 4.0%***	Diarrhoeal Diseases ***19,954 ; 5.1%***	Unipolar Depressive Disorders ***26,264 ; 4.4%***	Osteoarthritis ***11,613 ; 4.0%***	Endocrine, Blood and Immune Diseases ***25,985 ; 4.8%***
6	Ischemic Heart Disease ***69,464 ; 3.3%***	Birth Trauma and Asphyxia ***2,794 ; 2.7%***	Upper Respiratory Infections ***6,019 ; 4.0%***	Drug Use Disorders ***16,444 ; 4.2%***	Anxiety Disorders ***24,782 ; 4.1%***	Hearing Loss ***11,604 ; 4.0%***	Hearing Loss ***20,327 ; 3.7%***
7	Cerebrovascular Diseases (Stroke) ***65,256 ; 3.1%***	Diarrhoeal Diseases ***2,068 ; 2.0%***	Endocrine, Blood and Immune Diseases ***5,865 ; 3.9%***	Schizophrenia ***15,169 ; 3.9%***	Hearing Loss ***18,495 ; 3.1%***	Cerebrovascular Diseases (Stroke) ***11,564 ; 4.0%***	Osteoarthritis ***19,627; 3.6%***
8	Hearing Loss ***62,156 ; 3.0%***	Skin and Subcutaneous Diseases ***2,017 ; 2.0%***	Unipolar Depressive Disorders ***5,567 ; 3.7%***	Epilepsy ***12,843 ; 3.3%***	Cerebrovascular Diseases (Stroke) ***16,297 ; 2.7%***	Unipolar Depressive Disorders ***11,165 ; 3.9%***	Asthma ***17,392; 3.2%***
9	Drug Use Disorders ***60,348 ; 2.9%***	Endocrine, Blood and Immune Diseases ***1,846 ; 1.8%***	Nutritional Anaemias ***5,548 ; 3.7%***	Nutritional Anaemias ***12,148 ; 3.1%***	Bipolar Affective Disorder ***13,862 ; 2.3%***	Endocrine, Blood and Immune Diseases ***8,873 ; 3.1%***	Dementia ***17,259; 3.2%***
10	Endocrine, Blood and Immune Diseases ***56,039 ; 2.7%***	Lower Respiratory Infections ***1,762 ; 1.7%***	Skin and Subcutaneous Diseases ***5,042 ; 3.3%***	Bipolar Affective Disorder ***11,470; 3.0%***	Ischemic Heart Disease ***13,668 ; 2.3%***	Anxiety Disorders ***8,706 ; 3.0%***	Cataract ***13,866 ; 2.5%***

Male

Table 4.7: *Leading causes of non-fatal burden (total YLD; percentage %) for male, by age group, 2016.*

Rank	Overall Age (0+ years old)	Under 5 (0-4 years old)	Children (5-14 years old)	Young Adult (15-29 years old)	Older Adult (30-49 years old)	Pre-Elderly (50-59 years old)	Elderly (60+ years old)
1	Diabetes Mellitus ***143,718 ; 12.6%***	Protein Energy Malnutrition ***21,024 ; 36.8%***	Diarrhoeal Diseases ***8,321 ; 10.5%***	Diabetes Mellitus ***18,151 ; 8.3%***	Diabetes Mellitus ***47,395 ; 14.3%***	Diabetes Mellitus ***28,075 ; 17.8%***	Diabetes Mellitus ***50,069 ; 16.9%***
2	Drug Use Disorders ***58,490 ; 5.1%***	Nutritional Anaemias ***4,795 ; 8.4%***	Asthma ***6,707 ; 8.5%***	Asthma ***16,269 ; 7.4%***	Drug Use Disorders ***36,718 ; 11.1%***	Ischemic Heart Disease ***9,633 ; 6.1%***	Ischemic Heart Disease ***28,753 ; 9.7%***
3	Asthma ***54,052 ; 4.7%***	Fires, Heat and Hot Substances ***2,201 ; 3.9%***	Epilepsy ***4,052 ; 5.1%***	Drug Use Disorders ***15,793 ; 7.2%***	Schizophrenia ***18,495 ; 5.6%***	Schizophrenia ***6,865 ; 4.3%***	Chronic Obstructive Pulmonary Disease ***21,462 ; 7.2%***
4	Ischemic Heart Disease ***49,286 ; 4.3%***	Epilepsy ***2,130 ; 3.7%***	Birth Trauma and Asphyxia ***3,940 ; 5.0%***	Unipolar Depressive Disorders ***12,177 ; 5.6%***	Asthma ***16,987 ; 5.1%***	Asthma ***6,306 ; 4.0%***	Cerebrovascular Diseases (Stroke) ***19,516 ; 6.6%***
5	Unipolar Depressive Disorders ***39,681 ; 3.5%***	Birth Trauma and Asphyxia ***1,828 ; 3.2%***	Upper Respiratory Infections ***3,250 ; 4.1%***	Road Traffic Injuries ***9,032 ; 4.1%***	Unipolar Depressive Disorders ***13,091 ; 4.0%***	Endocrine, Blood and Immune Disorders ***6,208 ; 3.9%***	Endocrine, Blood and Immune Disorders ***14,409 ; 4.9%***
6	Schizophrenia ***38,888 ; 3.4%***	Upper Respiratory Infections ***1,802 ; 3.2%***	Endocrine, Blood and Immune Disorders ***3,205 ; 4.0%***	Diarrhoeal Diseases ***8,736 ; 4.0%***	Ischemic Heart Disease ***10,474 ; 3.2%***	Hearing Loss ***6,103 ; 3.9%***	Hearing Loss ***10,065 ; 3.4%***
7	Hearing Loss ***32,820 ; 2.9%***	Endocrine, Blood and Immune Disorders ***1,347 ; 2.4%***	Skin and Subcutaneous Diseases ***2,454 ; 3.1%***	Anxiety Disorders ***8,042 ; 3.7%***	Hearing Loss ***9,978 ; 3.0%***	Unipolar Depressive Disorders ***5,448 ; 3.4%***	Osteoarthritis ***8,458 ; 2.9%***
8	Cerebrovascular Diseases (Stroke) ***32,660 ; 2.9%***	Diarrhoeal Diseases ***1,110 ; 1.9%***	Anxiety Disorders ***2,450 ; 3.1%***	Schizophrenia ***7,824; 3.6%***	Anxiety Disorders ***9,050 ; 2.7%***	Osteoarthritis ***5,131 ; 3.2%***	Dementia ***7,705; 2.6%***
9	Endocrine, Blood and Immune Disorders ***31,339 ; 2.7%***	Lower Respiratory Infections ***1,108 ; 1.9%***	Unipolar Depressive Disorders ***2,405 ; 3.0%***	Epilepsy ***7,507 ; 3.4%***	HIV/AIDS ***8,428 ; 2.6%***	Cerebrovascular Diseases (Stroke) ***5,104 ; 3.2%***	Benign Prostatic Hypertrophy ***7,126 ; 2.4%***
10	Chronic Obstructive Pulmonary Disease ***29,521 ; 2.6%***	Skin and Subcutaneous Diseases ***989 ; 1.7%***	Nutritional Anaemias ***2,126 ; 2.7%***	Birth Trauma and Asphyxia ***7,298 ; 3.3%***	Periodontitis ***6,915 ; 2.1%***	Drug Use Disorders ***5,036 ; 3.2%***	Asthma ***6,923 ; 2.3%***

Female

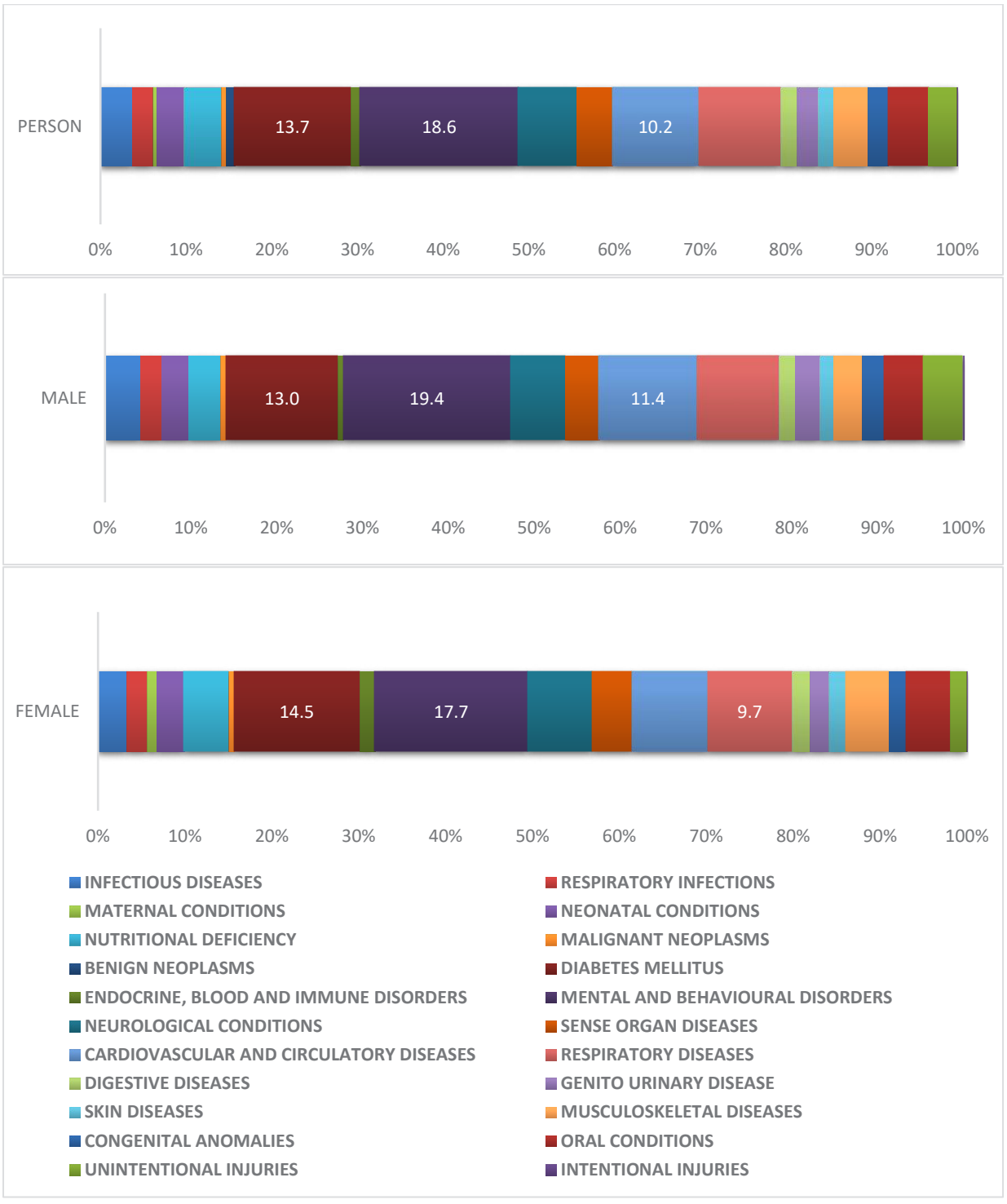
Table 4.8: Leading causes of non-fatal burden (total YLD; percentage %) for female, by age group, 2016.

Rank	Overall Age (0+ years old)	Under 5 (0-4 years old)	Children (5-14 years old)	Young Adult (15-29 years old)	Older Adult (30-49 years old)	Pre-Elderly (50-59 years old)	Elderly (60+ years old)
1	Diabetes Mellitus ***135,133 ; 14.2%***	Protein Energy Malnutrition ***19,223 ; 41.5%***	Diarrhoeal Diseases ***9,044 ; 12.4%***	Diabetes Mellitus ***14,075 ; 7.7%***	Diabetes Mellitus ***46,150 ; 17.1%***	Diabetes Mellitus ***25,634 ; 19.6%***	Diabetes Mellitus ***49,224 ; 19.7%***
2	Asthma ***50,615 ; 5.4%***	Nutritional Anaemias ***4,617 ; 10.0%***	Asthma ***4,850 ; 6.7%***	Asthma ***12,311 ; 6.7%***	Asthma ***15,323 ; 5.7%***	Asthma ***7,110 ; 5.4%***	Cerebrovascular Diseases (Stroke ***13,912 ; 5.6%***
3	Anxiety Disorders ***44,684 ; 4.8%***	Epilepsy ***1,614 ; 3.5%***	Epilepsy ***3,591 ; 4.9%***	Diarrhoeal Diseases ***11,218 ; 6.2%***	Cerebrovascular Diseases (Stroke) ***9,942 ; 3.7%***	Osteoarthritis ***6,483 ; 5.0%***	Ischaemic Heart Disease ***13,776 ; 5.5%***
4	Unipolar Depressive Disorders ***42,169 ; 4.5%***	Fires, Heat and Hot Substances ***1,506 ; 3.3%***	Nutritional Anaemias ***3,422 ; 4.7%***	Nutritional Anaemias ***6,799 ; 3.7%***	Nutritional Anaemias ***9,230 ; 3.4%***	Cerebrovascular Diseases (Stroke) ***6,460 ; 4.9%***	Endocrine, Blood and Immune Disorders ***11,576 ; 4.6%***
5	Schizophrenia ***36,137 ; 3.8%***	Upper Respiratory Infections ***1,389 ; 3.0%***	Upper Respiratory Infections ***2,769 ; 3.8%***	Epilepsy ***5,336 ; 2.9%***	Hearing Loss ***8,517 ; 3.2%***	Hearing Loss ***5,501 ; 4.2%***	Osteoarthritis ***11,169 ; 4.5%***
6	Cerebrovascular Diseases (Stroke) ***32,595 ; 3.5%***	Skin and Subcutaneous Diseases ***1,028 ; 2.2%***	Endocrine, Blood and Immune Disorders ***2,661 ; 3.7%***	Skin and Subcutaneous Diseases ***4,395 ; 2.4%***	Periodontitis ***6,453 ; 2.4%***	Nutritional Anaemias ***3,439; 2.6%***	Asthma ***10,469 ; 4.2%***
7	Nutritional Anaemias ***30,488 ; 3.2%***	Birth Trauma and Asphyxia ***966 ; 2.1%***	Skin and Subcutaneous Diseases ***2,588 ; 3.6%***	Hearing Loss ***4,088 ; 2.2%***	Skin and Subcutaneous Diseases ***5,605 ; 2.1%***	Ischaemic Heart Disease ***3,052 ; 2.3%***	Hearing Loss ***10,263 ; 4.1%***
8	Hearing Loss ***29,336 ; 3.1%***	Diarrhoeal Diseases ***958 ; 2.1%***	Birth Trauma and Asphyxia ***2,109 ; 2.9%***	Upper Respiratory Infections ***3,757 ; 2.1%***	Epilepsy ***5,124 ; 1.9%***	Periodontitis ***2,959 ; 2.3%***	Dementia ***9,554 ; 3.8%***
9	Endocrine, Blood and Immune Disorders ***24,700 ; 2.6%***	Lower Respiratory Infections ***653 ; 1.4%***	Low Birth Weight ***940 ; 1.3%***	Birth Trauma and Asphyxia ***3,727 ; 2.0%***	Endocrine, Blood and Immune Disorders ***3,971 ; 1.5%***	Edentulism ***2,752 ; 2.1%***	Chronic Obstructive Pulmonary Disease ***8,353 ; 3.3%***
10	Diarrhoeal Diseases ***23,772 ; 2.5%***	Asthma ***552 ; 1.2%***	Back and Neck Pain ***932 ; 1.3%***	Endocrine, Blood and Immune Disorders ***3,328 ; 1.8%***	Osteoarthritis ***3,586 ; 1.3%***	Endocrine, Blood and Immune Disorders ***2,665 ; 2.0%***	Cataract ***7,743 ; 3.1%***

4.3 Years Lost due to Disability (YLD) - 2017

4.3.1 Pattern of Years Lost due to Disability (YLD) by gender in 2017.

Figure 4.11: *Percentage (%) of non-fatal burden (YLD) by disease groups and gender, 2017.*



Overall, YLD was mostly contributed by Mental and Behavioural Disorders (392,769; 18.6%) followed by Diabetes Mellitus (289,073; 13.7%) and Cardiovascular and Circulatory Diseases (214,654; 10.2%). As for gender, YLD in male mostly contributed by Mental and Behavioural Disorders (222,471; 19.4%) followed by Diabetes mellitus (149,141; 13.0%) and Cardiovascular and Circulatory Diseases (130,863; 11.4%). For female, YLD mostly contributed by Mental and Behavioural Disorders (170,298; 17.7%) followed by Diabetes Mellitus (139,932; 14.5%) and Respiratory Diseases (93,709; 9.7%) (**Figure 4.11**). All other categories can be seen in **Table 4.9**.

Table 4.9: *Non-fatal burden of disease and injury (YLD) by disease groups and by gender, 2017.*

Disease Categories	PERSON		MALE		FEMALE	
	YLD	%	YLD	%	YLD	%
INFECTIOUS DISEASES	78,735	3.74	46,986	4.11	31,750	3.29
RESPIRATORY INFECTIONS	51,513	2.44	28,562	2.50	22,951	2.38
MATERNAL CONDITIONS	10,441	0.50	-	0.00	10,441	1.08
NEONATAL CONDITIONS	66,873	3.17	36,478	3.19	30,395	3.15
NUTRITIONAL DEFICIENCY	91,161	4.32	41,657	3.64	49,503	5.14
MALIGNANT NEOPLASMS	12,909	0.61	7,524	0.66	5,385	0.56
BENIGN NEOPLASMS	501	0.02	231	0.02	270	0.03
DIABETES MELLITUS	289,073	13.71	149,141	13.04	139,932	14.52
ENDOCRINE, BLOOD AND IMMUNE DISORDERS	23,451	1.11	7,202	0.63	16,250	1.69
MENTAL AND BEHAVIOURAL DISORDERS	392,769	18.63	222,471	19.45	170,298	17.67
NEUROLOGICAL CONDITIONS	144,107	6.84	73,236	6.40	70,872	7.35
SENSE ORGAN DISEASES	89,540	4.25	44,822	3.92	44,718	4.64
CARDIOVASCULAR AND CIRCULATORY DISEASES	214,654	10.18	130,863	11.44	83,791	8.69
RESPIRATORY DISEASES	203,022	9.63	109,313	9.56	93,709	9.72
DIGESTIVE DISEASES	41,239	1.96	21,156	1.85	20,084	2.08
GENITO URINARY DISEASE	52,232	2.48	32,178	2.81	20,054	2.08
SKIN DISEASES	38,190	1.81	18,579	1.62	19,611	2.03
MUSCULOSKELETAL DISEASES	86,340	4.10	38,941	3.40	47,398	4.92
CONGENITAL ANOMALIES	49,090	2.33	29,355	2.57	19,735	2.05
ORAL CONDITIONS	100,408	4.76	51,892	4.54	48,516	5.03
UNINTENTIONAL INJURIES	69,705	3.31	51,980	4.54	17,724	1.84
INTENTIONAL INJURIES	1,887	0.09	1,297	0.11	591	0.06
TOTAL YLD	2,107,838	100	1,143,862	100	963,977	100

GROUP I: Communicable Disease, Maternal, Perinatal, Nutritional Status	GROUP II: Non-communicable Disease	GROUP III: Injury

4.3.2 Pattern of Years Lost due to Disability (YLD) by age in 2017.

Overall, 47.4 % of total YLD were contributed by productive age [15 to 49 years old (18.9 % for young adult and 28.5 % for older adult)]. Pre-elderly age group contributed towards 13.8% of total YLD. Among male, 48.2% of total YLD were contributed by productive age (15 to 49 years old), compared to female as 46.6% **(Figure 4.12)**.

In specific disease group, Nutritional Deficiency become the most leading disease categories towards YLD for under 5 (0 to 4 years old) while Mental and Behavioural Disorders become the most leading disease categories towards YLD in the age of young adult (15 to 29 years old) and older adult (30 to 49 years old). Starting at pre-elderly age group (50-59 years old), Diabetes Mellitus become the most leading disease categories towards YLD with the disease start to occur during the younger adult. Cardiovascular and Circulatory Diseases become the most leading disease categories towards YLD at elderly age group (60 years and above) **(Figure 4.13)**. Both male and female same pattern of non-fatal burden of YLD as compared with overall population **(Figure 4.14; Figure 4.15)**.

Figure 4.12: *Percentage (%) of non-fatal burden (YLD), by age group and gender, 2017.*

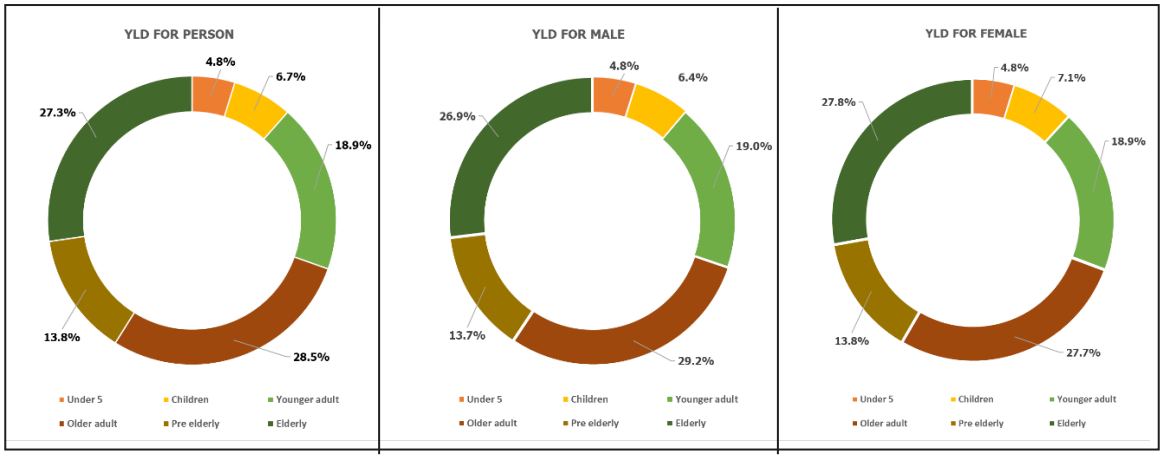


Figure 4.13: *Percentage (%) of non-fatal burden (YLD), by disease categories and age group, person, 2017.*

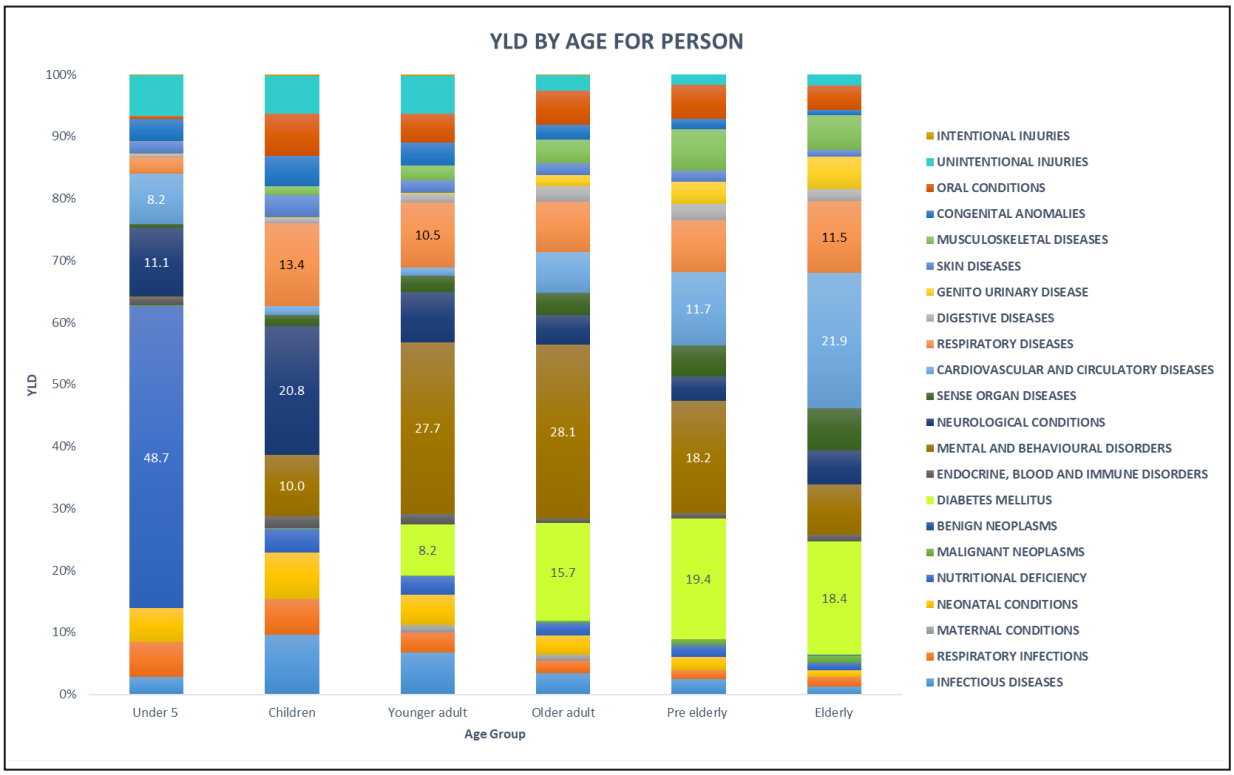


Figure 4.14: *Percentage (%) of non-fatal burden (YLD), by disease categories and age group, male, 2017.*

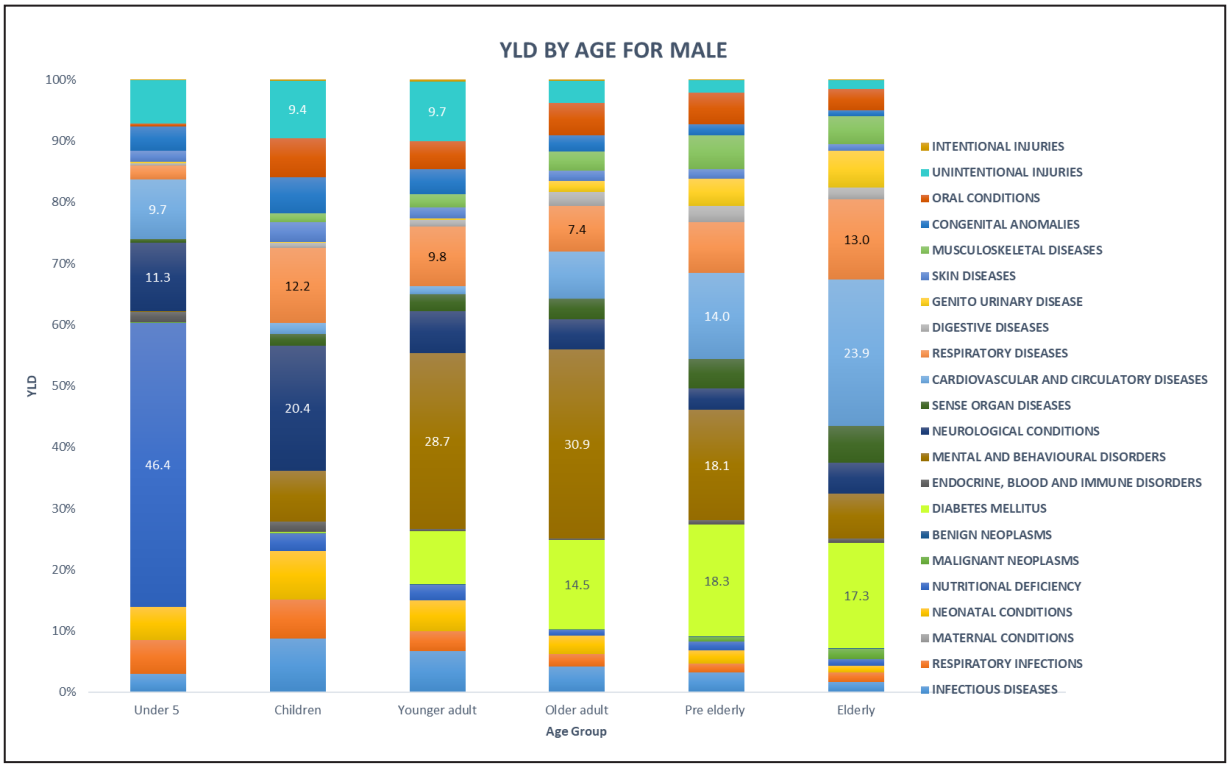
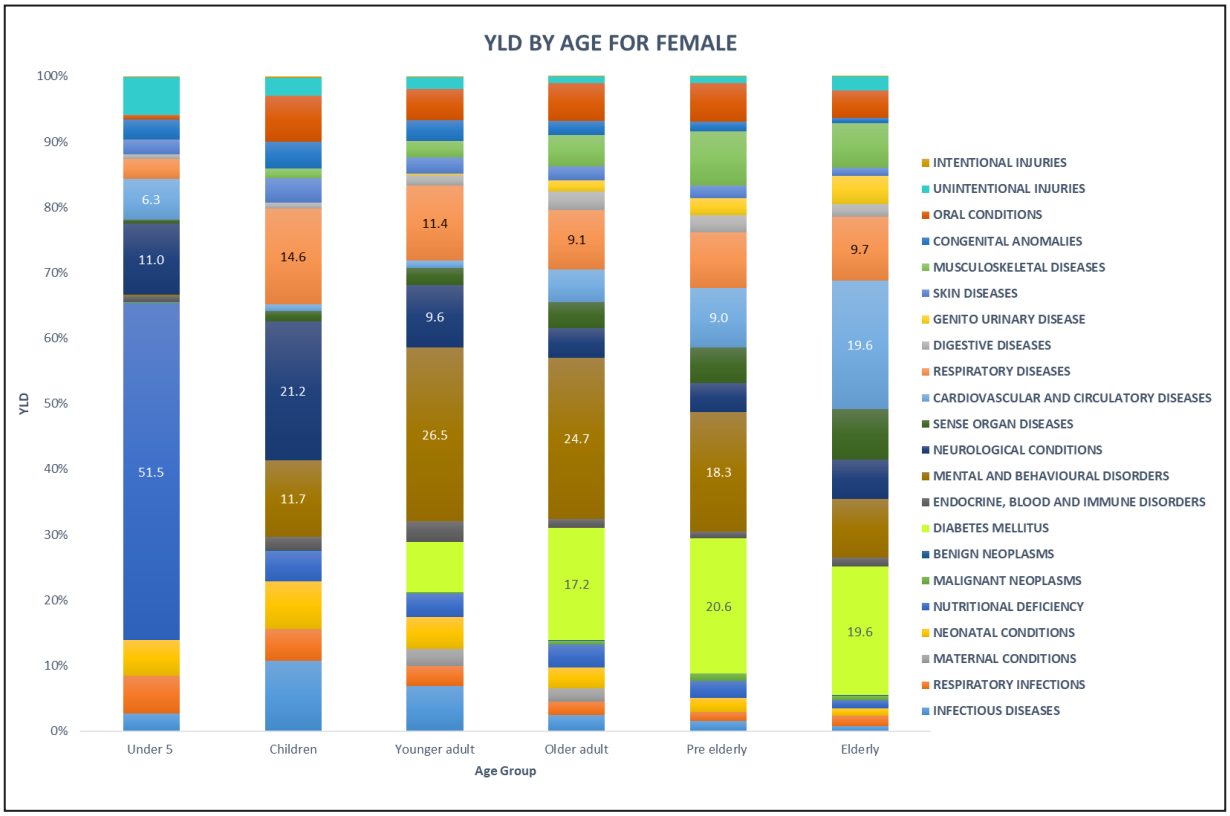


Figure 4.15: *Percentage (%) of non-fatal burden (YLD), by disease categories and age group, female, 2017.*



4.3.3 Leading Causes of Years Lost due to Disability (YLD) for 2017.

Diabetes Mellitus was the leading cause of non-fatal burden in Malaysia for 2017, contributing 13.7% of the total YLD. This was followed by Asthma, with 5.0%, Unipolar Depressive Disorders (4.0%), Schizophrenia (3.6%) and Ischemic Heart Disease (3.5%). For under 5 (0 to 4 years old), Protein-energy Malnutrition was the leading cause of non-fatal burden with 39.5% of total YLD, followed by Nutritional Anaemias, with 9.2%. Diarrhoeal diseases were the leading cause of non-fatal burden in children (5 to 14 years old), contributing 8.3% of total YLD, followed by Asthma with 8.1%. Diabetes Mellitus was the leading cause of non-fatal burden with 8.2% of total YLD in young adult (15 to 29 years old), 15.7% of total YLD in older adult (30 to 49 years old), 19.4% of total YLD in pre-elderly (50 to 59 years old) and 18.4% of total YLD in elderly (60 years and above) **(Table 4.10)**.

Among male, Diabetes Mellitus was the leading cause of non-fatal burden with 13.0% of total YLD, followed by Drug Use Disorders with 5.2% and Asthma with 4.8%. For under 5 (0 to 4 years old), Protein-energy Malnutrition was the leading cause of non-fatal burden with 37.7% of total YLD, followed by Nutritional Anaemias, with 8.7%. Asthma was the leading cause of non-fatal burden in children (5 to 14 years old), contributing 9.1% of total YLD, followed by Diarrhoeal Diseases with 7.2%. Diabetes Mellitus was the leading cause of non-fatal burden with 8.7% total YLD in young adult (15 to 29 years old), 14.5% of total YLD in older adult (30 to 49 years old), 18.3% of total YLD in pre-elderly (50 to 59 years old) and 17.3% of total YLD in elderly (60 years and above) **(Table 4.11)**.

Among female, Diabetes Mellitus was the leading cause of non-fatal burden with 14.5% of total YLD, followed by Asthma with 5.3% and Anxiety Disorders with 4.6%. For under 5 (0 to 4 years old), Protein-energy Malnutrition was the leading cause of non-fatal burden with 41.7% of total YLD, followed by Nutritional Anaemias, with 9.8%. Diarrhoeal diseases were the leading cause of non-fatal burden in children (5 to 14 years old), contributing 9.6% of total YLD, followed by Asthma with 7.1%. Diabetes Mellitus was the leading cause of non-fatal burden with 7.7% total YLD in young adult (15 to 29 years old), 17.2% of total YLD in older adult (30 to 49 years old), 20.6% of total YLD in pre-elderly (50 to 59 years old) and 19.6% of total YLD in elderly (60 years and above) (**Table 4.12)**.

Person

Table 4.10: *Leading causes of non-fatal burden (total YLD; percentage %) for all population, by age group, 2017.*

Rank	Overall Age (0+ years old)	Under 5 (0-4 years old)	Children (5-14 years old)	Young Adult (15-29 years old)	Older Adult (30-49 years old)	Pre-Elderly (50-59 years old)	Elderly (60+ years old)
1	Diabetes Mellitus ***289,073 ; 13.7%***	Protein-Energy Malnutrition ***39,988 ; 39.5%***	Diarrhoeal Diseases ***11,792 ; 8.3%***	Diabetes Mellitus ***32,899 ; 8.2%***	Diabetes Mellitus ***94,211 ; 15.7%***	Diabetes Mellitus ***56,141 ; 19.4%***	Diabetes Mellitus ***105,738 ; 18.4%***
2	Asthma ***106,204 ; 5.0%***	Nutritional Anaemias ***9.287 ; 9.2%***	Asthma ***11,516 ; 8.1%***	Asthma ***28,799 ; 6.8%***	Drug Use Disorders ***38,568 ; 6.4%***	Asthma ***13,626 ; 4.7%***	Ischaemic Heart Disease ***46,071 ; 8.0%***
3	Unipolar Depressive Disorders ***83,926 ; 4.0%***	Epilepsy ***3,745 ; 3.7%***	Epilepsy ***7,632 ; 5.4%***	Unipolar Depressive Disorders ***25,644 ; 6.4%***	Schizophrenia ***36,248 ; 6.0%***	Schizophrenia ***13,599 ; 4.7%***	Cerebrovascular Diseases (Stroke) ***41,264 ; 7.2%***
4	Schizophrenia ***76,795 ; 3.6%***	Fires, Heat and Hot Substances ***3,241 ; 3.2%***	Birth Trauma and Asphyxia ***6,912 ; 4.9%***	Anxiety Disorders ***21,464 ; 5.4%***	Asthma ***32,863 ; 5.5%***	Ischaemic Heart Disease ***12,882 ; 4.4%***	Chronic Obstructive Pulmonary Disease ***30,044 ; 5.2%***
5	Ischaemic Heart Disease ***73,077 ; 3.5%***	Upper Respiratory Infections ***3,190 ; 3.2%***	Anxiety Disorders ***6,402 ; 4.5%***	Diarrhoeal Diseases ***16,442 ; 4.1%***	Unipolar Depressive Disorders ***26,992 ; 4.5%***	Osteoarthritis ***11,864 ; 4.1%***	Nephritis and Nephrosis ***25,017 ; 4.3%***
6	Anxiety Disorders ***69,899 ; 3.3%***	Birth Trauma and Asphyxia ***3,178 ; 3.1%***	Upper Respiratory Infections ***5,933 ; 4.2%***	Drug Use Disorders ***16,401 ; 4.1%***	Anxiety Disorders ***24,606 ; 4.1%***	Hearing Loss ***11,841 ; 4.1%***	Hearing Loss ***21,262 ; 3.7%***
7	Hearing Loss ***63,729 ; 3.0%***	Skin and Subcutaneous Diseases ***2,034 ; 2.0%***	Unipolar Depressive Disorders ***5,616 ; 4.0%***	Schizophrenia ***15,348 ; 3.8%***	Hearing Loss ***18,836 ; 3.1%***	Unipolar Depressive Disorders ***11,509 ; 4.0%***	Osteoarthritis ***20,531 ; 3.6%***
8	Cerebrovascular Diseases (Stroke) ***62,341 ; 3.0%***	Lower Respiratory Infections ***1,750 ; 1.7%***	Nutritional Anaemias ***5,288 ; 3.7%***	Epilepsy ***12,903 ; 3.2%***	Bipolar Affective Disorders ***14,149 ; 2.4%***	Cerebrovascular Diseases (Stroke) ***9,208 ; 3.2%***	Dementia ***18,138 ; 3.1%***
9	Drug Use Disorders ***61,195 ; 2.9%***	Diarrhoeal Diseases ***1,423 ; 1.4%***	Skin and Subcutaneous Diseases ***5,036 ; 3.6%***	Birth Trauma and Asphyxia ***12,661 ; 3.2%***	Ischaemic Heart Disease ***13,636 ; 2.3%***	Anxiety Disorders ***8,547 ; 2.9%***	Asthma ***17,988 ; 3.1%***
10	Nutritional Anaemias ***51,173 ; 2.4%***	Asthma ***1,412 ; 1.4%***	Endocrine, Blood and Immune Disorders ***2,587 ; 1.8%***	Nutritional Anaemias ***11,965 ; 3.0%***	Periodontitis ***13,620 ; 2.3%***	Nephritis and Nephrosis ***7,734 ; 2.7%***	Cataract ***14,512 ; 2.5%***

Male

Table 4.11: *Leading causes of non-fatal burden (total YLD; percentage %) for male, by age group, 2017.*

Rank	Overall Age (0+ years old)	Under 5 (0-4 years old)	Children (5-14 years old)	Young Adult (15-29 years old)	Older Adult (30-49 years old)	Pre-Elderly (50-59 years old)	Elderly (60+ years old)
1	Diabetes Mellitus ***149,141 ; 13.0%***	Protein Energy Malnutrition ***20,869 ; 37.7%***	Asthma ***6,689 ; 9.1%***	Diabetes Mellitus ***18,808 ; 8.7%***	Diabetes Mellitus ***48,436 ; 14.5%***	Diabetes Mellitus ***28,790 ; 18.3%***	Diabetes Mellitus ***53,075 ; 17.3%***
2	Drug Use Disorders ***59,291 ; 5.2%***	Nutritional Anaemias ***4,818 ; 8.7%***	Diarrhoeal Diseases ***5,262 ; 7.2%***	Asthma ***16,416 ; 7.6%***	Drug Use Disorders ***37,469 ; 11.2%***	Ischemic Heart Disease ***9,988 ; 6.4%***	Ischemic Heart Disease ***31,305 ; 10.2%***
3	Asthma ***54,837 ; 4.8%***	Epilepsy ***2,135 ; 3.9%***	Epilepsy ***4,036 ; 5.5%***	Drug Use Disorders ***15,744 ; 7.3%***	Schizophrenia ***18,854 ; 5.7%***	Schizophrenia ***6,991 ; 4.5%***	Cerebrovascular Diseases (Stroke) ***24,336 ; 7.9%***
4	Ischemic Heart Disease ***52,442 ; 4.6%***	Fires, Heat and Hot Substances ***1,950 ; 3.5%***	Birth Trauma and Asphyxia ***3,881 ; 5.3%***	Unipolar Depressive Disorders ***12,266 ; 5.6%***	Asthma ***17,290 ; 5.2%***	Asthma ***6,392 ; 4.1%***	Chronic Obstructive Pulmonary Disease ***21,682 ; 7.0%***
5	Unipolar Depressive Disorders ***40,546 ; 3.5%***	Upper Respiratory Infections ***1,802 ; 3.3%***	Upper Respiratory Infections ***3,337 ; 4.6%***	Road Traffic Injuries ***9,197 ; 4.2%***	Unipolar Depressive Disorders ***13,423 ; 4.0%***	Hearing Loss ***6,207 ; 4.0%***	Nephritis and Nephrosis ***13,663 ; 4.4%***
6	Schizophrenia ***36,690 ; 3.5%***	Birth Trauma and Asphyxia ***1,791 ; 3.2%***	Skin and Subcutaneous Diseases ***2,451 ; 3.4%***	Anxiety Disorders ***7,932 ; 3.7%***	Ischemic Heart Disease ***10,754 ; 3.2%***	Cerebrovascular Diseases (Stroke) ***6,040 ; 3.8%***	Hearing Loss ***10,515 ; 3.4%***
7	Cerebrovascular Diseases (Stroke) ***38,318 ; 3.3%***	Skin and Subcutaneous Diseases ***998 ; 1.8%***	Anxiety Disorders ***2,428 ; 3.3%***	Schizophrenia ***7,916 ; 3.6%***	Hearing Loss ***10,161 ; 3.0%***	Unipolar Depressive Disorders ***5,590 ; 3.6%***	Osteoarthritis ***8,836 ; 2.9%***
8	Hearing Loss ***33,600 ; 2.9%***	Endocrine, Blood and Immune Disorders ***892 ; 1.6%***	Unipolar Depressive Disorders ***2,423 ; 3.3%***	Diarrhoeal Diseases ***7,906 ; 3.6%***	Anxiety Disorders ***9,000 ; 2.7%***	Osteoarthritis ***5,223 ; 3.3%***	Dementia ***8,075; 2.6%***
9	Chronic Obstructive Pulmonary Disease ***29,815 ; 2.6%***	Asthma ***861 ; 1.6%***	Nutritional Anaemias ***2,109 ; 2.9%***	Epilepsy ***7,551 ; 3.5%***	Periodontitis ***7,044 ; 2.1%***	Drug Use Disorders ***5,118 ; 3.3%***	Asthma ***7,190 ; 2.3%***
10	Anxiety Disorders ***25,461 ; 2.2%***	Lower Respiratory Infections ***860 ; 1.6%***	Road Traffic Injuries ***1,602 ; 2.2%***	Birth Trauma and Asphyxia ***7,262 ; 3.3%***	Cerebrovascular Diseases (Stroke) ***7,019 ; 2.1%***	Nephritis and Nephrosis ***4,192 ; 2.7%***	Unipolar Depressive Disorders ***6,788 ; 2.2%***

Female

Table 4.12: Leading causes of non-fatal burden (total YLD; percentage %) for female, by age group, 2017.

Rank	Overall Age (0+ years old)	Under 5 (0-4 years old)	Children (5-14 years old)	Young Adult (15-29 years old)	Older Adult (30-49 years old)	Pre-Elderly (50-59 years old)	Elderly (60+ years old)
1	Diabetes Mellitus ***139,932 ; 14.5%***	Protein Energy Malnutrition ***19,119 ; 41.7%***	Diarrhoeal Diseases ***6,531 ; 9.6%***	Diabetes Mellitus ***14,091 ; 7.7%***	Diabetes Mellitus ***45,775 ; 17.2%***	Diabetes Mellitus ***27,351 ; 20.6%***	Diabetes Mellitus ***52,664 ; 19.6%***
2	Asthma ***51,367 ; 5.3%***	Nutritional Anaemias ***4,469 ; 9.8%***	Asthma ***4,827 ; 7.1%***	Asthma ***12,383 ; 6.8%***	Asthma ***15,573 ; 5.8%***	Asthma ***7,235 ; 5.4%***	Cerebrovascular Diseases (Stroke) ***16,928 ; 6.3%***
3	Anxiety Disorders ***44,438 ; 4.6%***	Epilepsy ***1,610 ; 3.5%***	Epilepsy ***3,596 ; 5.3%***	Diarrhoeal Diseases ***8,536 ; 4.7%***	Nutritional Anaemias ***9,499 ; 3.6%***	Osteoarthritis ***6,641 ; 5.0%***	Ischaemic Heart Disease ***14,766 ; 5.5%***
4	Unipolar Depressive Disorders ***43,380 ; 4.5%***	Upper Respiratory Infections ***1,389 ; 3.0%***	Nutritional Anaemias ***3,179 ; 4.6%***	Nutritional Anaemias ***6,573 ; 3.6%***	Hearing Loss ***8,675 ; 3.3%***	Hearing Loss ***5,635 ; 4.2%***	Osteoarthritis ***11,695 ; 4.4%***
5	Schizophrenia ***37,105 ; 3.8%***	Birth Trauma and Asphyxia ***1,387 ; 3.0%***	Birth Trauma and Asphyxia ***3,031 ; 4.4%***	Endocrine, Blood and Immune Disorders ***5,892 ; 3.2%***	Periodontitis ***6,575 ; 2.5%***	Nephritis and Nephrosis ***3,542 ; 2.7%***	Nephritis and Nephrosis ***11,355 ; 4.2%***
6	Nutritional Anaemias ***31,715 ; 3.5%***	Fires, Heat and Hot Substances ***1,291 ; 2.8%***	Upper Respiratory Infections ***2,596 ; 3.8%***	Birth Trauma and Asphyxia ***5,399 ; 3.0%***	Skin and Subcutaneous Diseases ***5,728 ; 2.1%***	Nutritional Anaemias ***3,529; 2.7%***	Asthma ***10,797 ; 4.0%***
7	Hearing Loss ***30,521 ; 3.3%***	Skin and Subcutaneous Diseases ***1,036 ; 2.3%***	Skin and Subcutaneous Diseases ***2,585 ; 3.8%***	Epilepsy ***5,352 ; 2.9%***	Epilepsy ***5,428 ; 2.0%***	Cerebrovascular Diseases (Stroke) ***3,168 ; 2.4%***	Hearing Loss ***10,747 ; 4.0%***
8	Cerebrovascular Diseases (Stroke ***28,547 ; 3.1%***	Lower Respiratory Infections ***890 ; 1.9%***	Endocrine, Blood and Immune Disorders ***1,342 ; 2.0%***	Skin and Subcutaneous Diseases ***4,416 ; 2.4%***	Birth Trauma and Asphyxia ***5,189 ; 1.9%***	Periodontitis ***3,030 ; 2.3%***	Dementia ***10,063 ; 3.8%***
9	Osteoarthritis ***22,455 ; 2.5%***	Diarrhoeal Diseases ***650 ; 1.4%***	Back and Neck Pain ***906 ; 1.3%***	Hearing Loss ***4,111 ; 2.3%***	Nephritis and Nephrosis ***4,405 ; 1.7%***	Ischaemic Heart Disease ***2,893 ; 2.2%***	Chronic Obstructive Pulmonary Disease ***8,362 ; 3.1%***
10	Ischaemic Heart Disease ***20,521 ; 2.2%***	Asthma ***552 ; 1.2%***	Hearing Loss ***840 ; 1.2%***	Upper Respiratory Infections ***3,576 ; 2.0%***	Osteoarthritis ***3,633 ; 1.4%***	Edentulism ***2,820 ; 2.1%***	Cataract ***8,103 ; 3.0%***

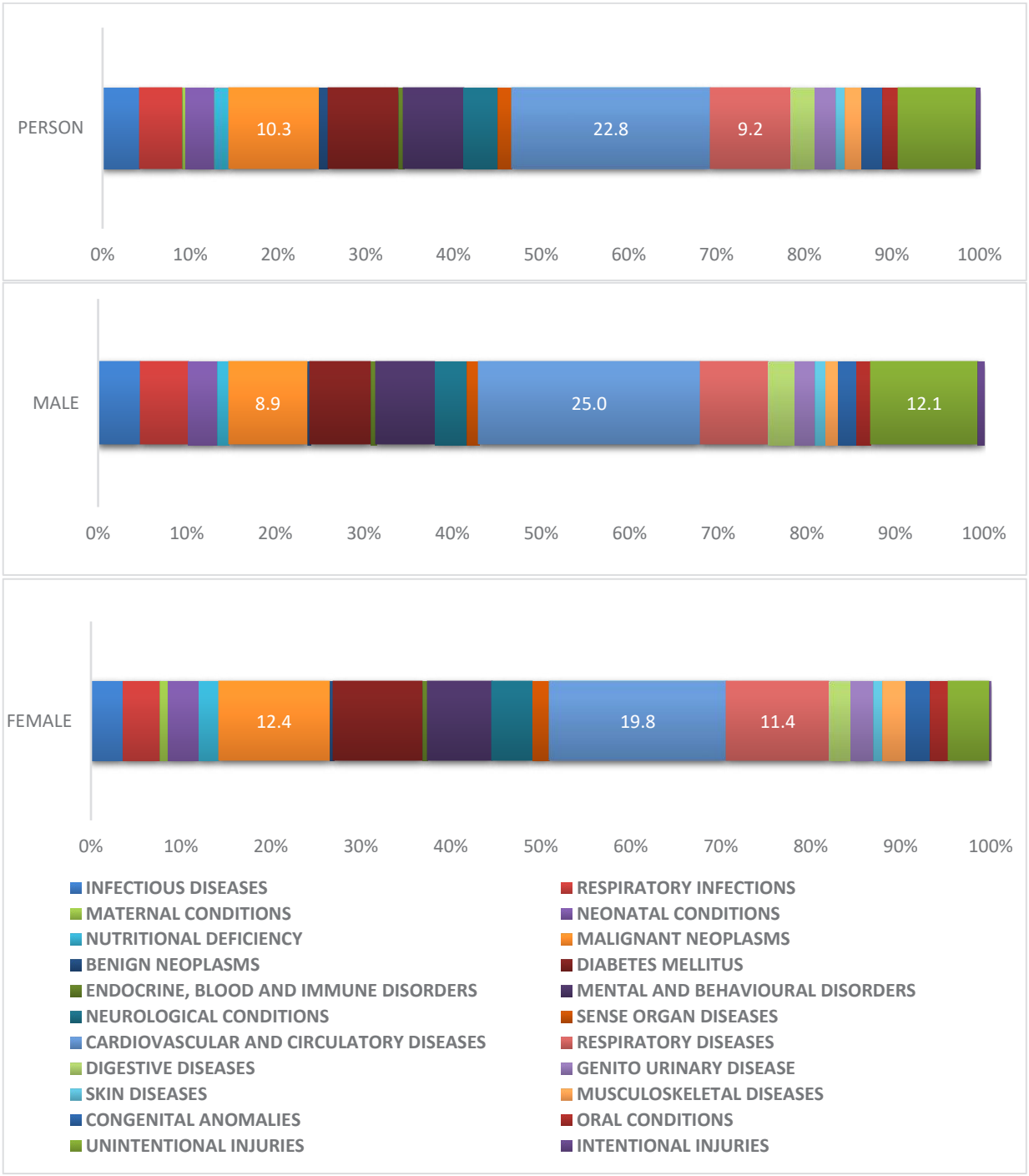
5.0 Disability Adjusted Life Years (DALYs)

The World Health Organization (WHO) summarises the DALYs as “one DALY can be thought of as one lost year of ‘healthy’ life. The sum of these DALYs across the population, or the burden of disease, can be thought of as a measurement of the gap between the current health status and an ideal health situation where the entire population lives to an advanced age, free of disease and disability”.

5.1 Disability-Adjusted Life Years (DALYs) - 2015

5.1.1 Pattern of Disability-Adjusted Life Years (DALYs) by gender in 2015.

Figure 5.1: Percentage (%) of total burden (DALYs) by disease groups and gender, 2015.



Overall, DALYs was mostly contributed by Cardiovascular and Circulatory Diseases (1,230,723; 22.8%) followed by Malignant Neoplasms (557,745; 10.3%) and Respiratory Diseases (496,894; 9.2%). As for gender, DALYs in male mostly contributed by Cardiovascular and Circulatory Diseases (781,812; 25.0%) followed by Unintentional Injuries (377,738; 12.1%) and Malignant Neoplasms (276,602; 8.9%). For female, DALYs mostly contributed by Cardiovascular and Circulatory Diseases (448,912; 19.8%) followed by Malignant Neoplasms (281,142; 12.4%) and Respiratory Diseases (257,869; 11.4%) (**Figure 5.1**). All other categories can be seen in **Table 5.1**.

Table 5.1: *Total of burden of disease and injury (DALYs) by disease groups and by gender, 2015.*

Disease Categories	PERSON		MALE		FEMALE	
	DALYs	%	DALYs	%	DALYs	%
INFECTIOUS DISEASES	228,807	4.24	148,676	4.76	80,131	3.53
RESPIRATORY INFECTIONS	263,889	4.89	169,617	5.43	94,272	4.15
MATERNAL CONDITIONS	20,024	0.37	-	0.00	20,024	0.88
NEONATAL CONDITIONS	179,205	3.32	101,401	3.25	77,803	3.42
NUTRITIONAL DEFICIENCY	91,075	1.69	41,275	1.32	49,800	2.19
MALIGNANT NEOPLASMS	557,745	10.34	276,602	8.86	281,142	12.37
BENIGN NEOPLASMS	18,600	0.34	9,234	0.30	9,366	0.41
DIABETES MELLITUS	438,769	8.13	214,311	6.86	224,458	9.88
ENDOCRINE, BLOOD AND IMMUNE DISORDERS	30,676	0.57	18,516	0.59	12,160	0.54
MENTAL AND BEHAVIOURAL DISORDERS	372,836	6.91	208,546	6.68	164,289	7.23
NEUROLOGICAL CONDITIONS	211,986	3.93	110,480	3.54	101,506	4.47
SENSE ORGAN DISEASES	84,739	1.57	42,577	1.36	42,162	1.86
CARDIOVASCULAR AND CIRCULATORY DISEASES	1,230,723	22.81	781,812	25.03	448,912	19.76
RESPIRATORY DISEASES	496,894	9.21	239,025	7.65	257,869	11.35
DIGESTIVE DISEASES	148,580	2.75	93,677	3.00	54,903	2.42
GENITO URINARY DISEASE	129,505	2.40	72,817	2.33	56,687	2.49
SKIN DISEASES	59,667	1.11	35,426	1.13	24,241	1.07
MUSCULOSKELETAL DISEASES	103,225	1.91	45,492	1.46	57,732	2.54
CONGENITAL ANOMALIES	127,278	2.36	64,608	2.07	62,670	2.76
ORAL CONDITIONS	96,686	1.79	49,936	1.60	46,749	2.06
UNINTENTIONAL INJURIES	480,042	8.90	377,738	12.09	102,303	4.50
INTENTIONAL INJURIES	24,537	0.45	21,436	0.69	3,102	0.14
TOTAL DALYs	5,395,484	100	3,123,202	100	2,272,283	100

GROUP I: Communicable Disease, Maternal, Perinatal, Nutritional Status	GROUP II: Non-communicable Disease	GROUP III: Injury

5.1.2 Pattern of Disability-Adjusted Life Years (DALYs) by age in 2015.

Overall, 36.8% of total DALYs were contributed by productive age [15 to 49 years old (13.7 % for young adult and 23.1 % for older adult)]. Pre-elderly age group (50 to 59 years old) contributed towards 16.2% of total DALYs while elderly age group (60 years old and above) contributed 35.4% of total DALYs. Among male, 39.3% of total DALYs were contributed by productive age (15 to 49 years old), compared to female as 33.3% **(Figure 5.2)**.

In disease categories, Neonatal Condition become the most leading disease categories towards DALYs for under 5 (0 to 4 years old) while Unintentional Injuries become the most leading disease categories for the age of young adult (15 to 29 years old). Cardiovascular and Circulatory Diseases become the most leading disease categories starting at older adult age group (30 to 49 years old) onwards **(Figure 5.3)**. Male had the same pattern of total burden of DALYs as compared with overall population **(Figure 5.4)**. Among female, mental and behaviours disorders become the most leading disease categories towards DALYs for young adult age group (15 to 29 years old). Malignant Neoplasms become the most leading disease categories starting at older adult age group (30 to 49 years old). Starting pre-elderly age group (50 to 59 years old), Cardiovascular and Circulatory Diseases become the most leading disease categories until elderly age group (60 years and above) **(Figure 5.5)**.

Figure 5.2: *Percentage (%) of total burden (DALYs), by age group and gender, 2015.*

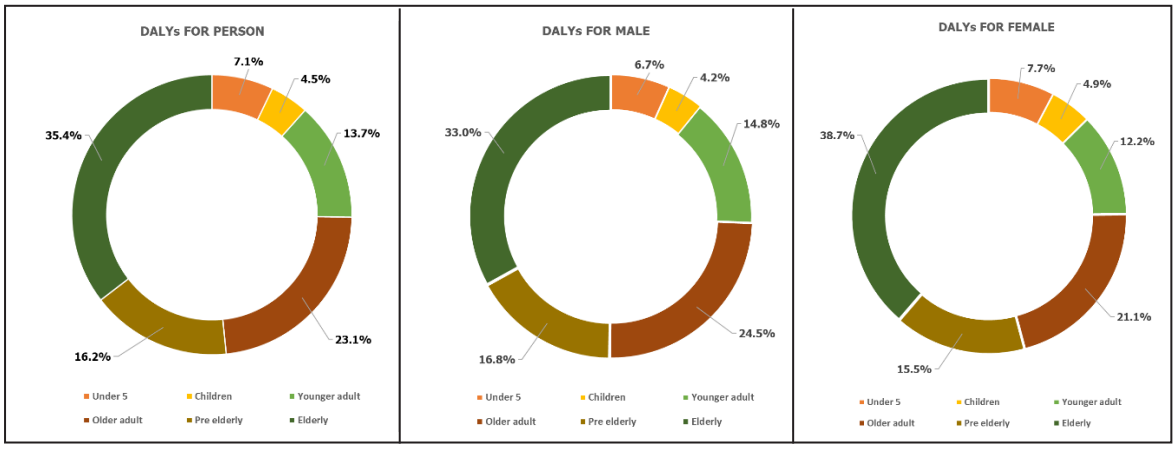


Figure 5.3: *Percentage (%) of total burden (DALYs), by disease categories and age group, person, 2015.*

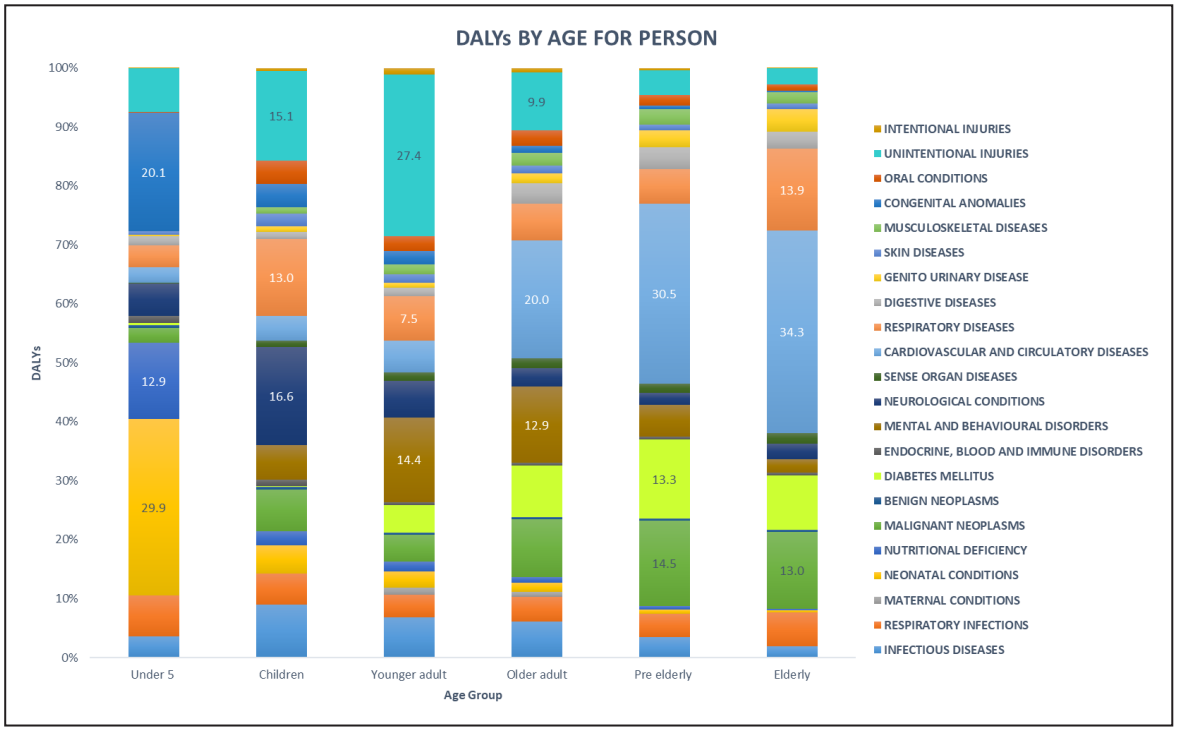


Figure 5.4: *Percentage (%) of total burden (DALYs), by disease categories and age group, male, 201*

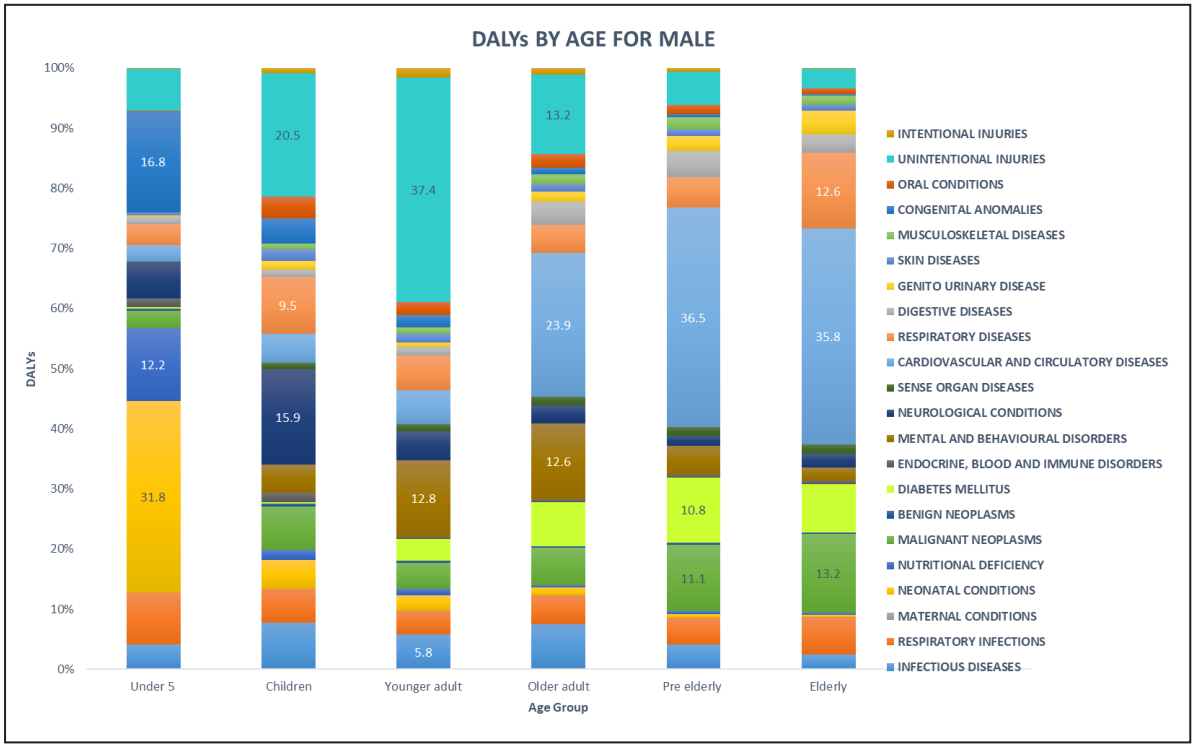
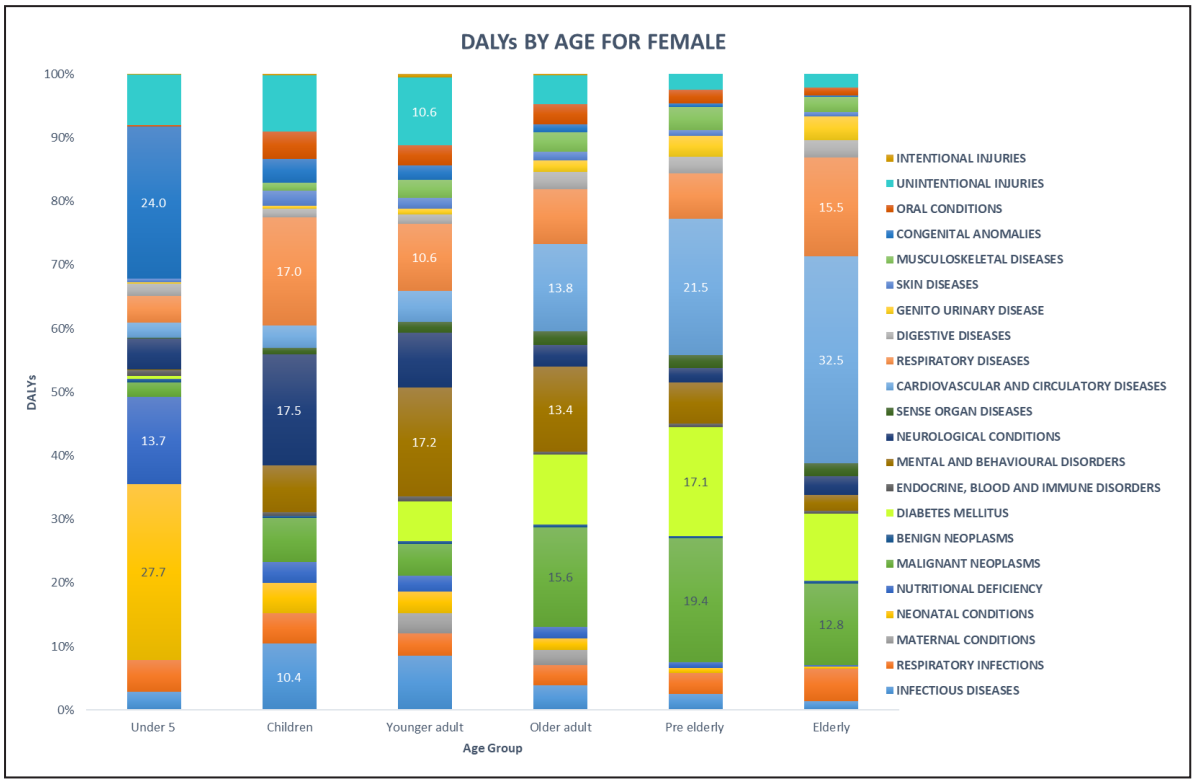


Figure 5.5: *Percentage (%) of total burden (DALYs), by disease categories and age group, female, 2015.*



5.1.3 Leading Causes of Disability-Adjusted Life Years (DALYs) for 2015.

Ischemic Heart Disease was the leading cause of total burden in Malaysia for 2015, contributing 9.8% of the total DALYs. This was followed by Cerebrovascular Diseases (Stroke), with 8.1%, Diabetes Mellitus (8.1%), Road Traffic Injuries (6.4%) and Lower Respiratory Infections (4.1%). For under 5 (0 to 4 years old), Protein-Energy Malnutrition was the leading cause of total burden with 10.4% of total DALYs, followed by Low Birth Weight with 8.3% and Congenital Heart Diseases (6.4%). Road Traffic Injuries were the leading cause of total burden for children (5 to 14 years old) and young adult (15 to 29 years old) with 8.6% and 23.8% respectively. Ischemic Heart Disease was the leading cause of total burden with 10.0% of total DALYs in older adult (30 to 49 years old), followed by Diabetes Mellitus with 8.8% and Road Traffic Injuries (7.3%). Ischemic Heart Disease was the leading cause of total burden with 10.0% of total DALYs in pre-elderly (50 to 59 years old), followed by Diabetes Mellitus with 13.3% and Cerebrovascular Diseases (Stroke) (10.1%). However, the leading cause of total burden vary in elderly (60 years and above). Ischemic Heart Disease was the leading cause of total burden with 13.5% followed by Cerebrovascular Diseases (Stroke) (13.4%) and Diabetes Mellitus (9.2%) **(Table 5.2)**.

Among male, Ischemic Heart Disease was the leading cause of total burden with 13.0% of total DALYs, followed by Road Traffic Injuries with 9.2% and Cerebrovascular Diseases (Stroke) (8.7%). For under 5 (0 to 4 years old), Protein-Energy Malnutrition was the leading cause of total burden with 10.0% of total DALYs, followed by Low Birth Weight with 8.7% and Lower Respiratory Infections (7.6%). Road Traffic Injuries were the leading cause of total burden for children (5 to 14 years old) and young adult (15 to 29 years old) with 11.8% and 32.4% respectively. Ischemic Heart Disease was the leading cause of total burden with 14.0% of total DALYs in older adult (30 to 49 years old), followed by Road Traffic Injuries with 10.0% and Diabetes Mellitus (7.4%). Ischemic Heart Disease was the leading cause of total burden with 21.2% of total DALYs in pre-elderly (50 to 59 yearsold), followed by Cerebrovascular Diseases (Stroke) with 11.0% and Diabetes Mellitus (10.8%). Same leading cause also seen in elderly (60 years and above) whereas Ischemic Heart Disease was the leading cause of total burden with 17.3% of total DALYs while Cerebrovascular Diseases (Stroke) as 14.6% and Diabetes Mellitus (8.0%) **(Table 5.3)**.

Among female, Diabetes Mellitus was the leading cause of total burden with 9.9% of total DALYs, followed by Cerebrovascular Diseases (Stroke) with 7.4% and Ischemic Heart Disease (5.3%). For under 5 (0 to 4 years old), Protein-Energy Malnutrition was the leading cause of total burden with 11.0% of total DALYs, followed by Low Birth Weight with 7.8% and Congenital Heart Diseases (7.0%). Diarrhoeal Diseases was the leading cause of total burden for children (5 to 14 years old) with 7.1%, while Road Traffic Injuries was the leading cause of total burden in young adult (15 to 29 years old) with 9.4%. Diabetes Mellitus was the leading cause of total burden with 11.0% of total DALYs in older adult (30 to 49 years old), followed by Breast Cancer with 5.8% and Cerebrovascular Diseases (Stroke) (5.4%). Diabetes Mellitus was the leading cause of total burden with 17.1% of total DALYs in pre-elderly (50 to 59 years old), followed by Cerebrovascular Diseases (Stroke) with 8.7% and Breast Cancer with 6.9%. However, the leading cause of total burden vary in elderly (60 years and above). Cerebrovascular Diseases (Stroke) was the leading cause of total burden with 12.0% of total DALYs, followed by Diabetes Mellitus with 10.6% and Ischemic Heart Disease (8.9%) **(Table 5.4)**.

Person

Table 5.2: *Leading causes of total burden (total DALYs; percentage %) for all population, by age group, 2015.*

Rank	Overall Age (0+ years old)	Under 5 (0-4 years old)	Children (5-14 years old)	Young Adult (15-29 years old)	Older Adult (30-49 years old)	Pre-Elderly (50-59 years old)	Elderly (60+ years old)
1	Ischemic Heart Disease ***526,194 ; 9.8%***	Protein-Energy Malnutrition ***40,113 ; 10.4%***	Road Traffic Injuries ***20,809 ; 8.6%***	Road Traffic Injuries ***176,010 ; 23.8%***	Ischaemic Heart Disease ***124,050 ; 10.0%***	Ischaemic Heart Disease ***134,975 ; 15.4%***	Ischaemic Heart Disease ***257,284 ; 13.5%***
2	Cerebrovascular Diseases (Stroke) ***439,260 ; 8.1%***	Low Birth Weight ***31,921 ; 8.3%***	Diarrhoeal Diseases ***14,179 ; 5.9%***	Diabetes Mellitus ***34,307 ; 4.6%***	Diabetes Mellitus ***109,603 ; 8.8%***	Diabetes Mellitus ***116,696 ; 13.3%***	Cerebrovascular Diseases (Stroke) ***256,310 ; 13.4%***
3	Diabetes Mellitus ***438,769 ; 8.1%***	Congenital Heart Diseases ***24,639 ; 6.4%***	Asthma ***13,166 ; 5.5%***	Asthma ***33,611 ; 4.5%***	Road Traffic Injuries ***91,233 ; 7.3%***	Cerebrovascular Diseases (Stroke) ***88,317 ; 10.1%***	Diabetes Mellitus ***176,349 ; 9.2%***
4	Road Traffic Injuries ***345,877 ; 6.4%***	Lower Respiratory Infections ***22,841 ; 5.9%***	Epilepsy ***11,387 ; 4.7%***	Unipolar Depressive Disorders ***25,017 ; 3.4%***	Cerebrovascular Diseases (Stroke) ***73,858 ; 5.9%***	Lower Respiratory Infections ***31,364 ; 3.6%***	Lower Respiratory Infections ***106,267 ; 5.6%***
5	Lower Respiratory Infections ***223,841 ; 4.1%***	Birth Trauma and Asphyxia ***20,927 ; 5.4%***	Birth Trauma and Asphyxia ***7,597 ; 3.2%***	Anxiety Disorders ***21,842 ; 3.0%***	Asthma ***46,581 ; 3.7%***	Road Traffic Injuries ***25,660 ; 2.9%***	Chronic Obstructive Pulmonary Disease ***104,906 ; 5.5%***
6	Asthma ***187,919 ; 3.5%***	Neonatal Infections ***18,053 ; 4.7%***	Brain and Other CNS Cancers ***6,665 ; 2.8%***	Epilepsy ***19,443 ; 2.6%***	Lower Respiratory Infections ***41,203 ; 3.3%***	Breast Cancer ***24,407 ; 2.8%***	Asthma ***68,046 ; 3.6%***
7	Chronic Obstructive Pulmonary Disease ***141,895 ; 2.6%***	Nutritional Anaemias ***9,372 ; 2.4%***	Anxiety Disorders ***6,593 ; 2.7%***	Diarrhoeal Diseases ***18,539 ; 2.5%***	Schizophrenia ***35,379 ; 2.8%***	Asthma ***23,827 ; 2.7%***	Trachea, Bronchus and Lung Cancers ***53,303 ; 2.8%***
8	Trachea, Bronchus and Lung Cancers ***88,496 ; 1.6%***	Road Traffic Injuries ***8,608 ; 2.2%***	Upper Respiratory Infections ***6,140 ; 2.5%***	Lower Respiratory Infections ***17,079 ; 2.3%***	Drug Use Disorders ***32,698 ; 2.6%***	Trachea, Bronchus and Lung Cancers ***19,422 ; 2.2%***	Nephritis and Nephrosis ***38,882 ; 2.0%***
9	Unipolar Depressive Disorders ***79,735 ; 1.5%***	Epilepsy ***6,074 ; 1.6%***	Nutritional Anaemias ***5,884 ; 2.4%***	Cerebrovascular Diseases (Stroke) ***15,011 ; 2.0%***	Breast Cancer ***27,684 ; 2.2%***	Chronic Obstructive Pulmonary Disease ***14,385 ; 1.6%***	Colon and Rectum Cancers ***36,120 ; 1.9%***
10	Schizophrenia ***73,482 ; 1.4%***	Fires, Heat and Hot Substances ***5,676 ; 1.5%***	Unipolar Depressive Disorders ***5,550 ; 2.3%***	Schizophrenia ***14,941 ; 2.0%***	Unipolar Depressive Disorders ***25,990 ; 2.1%***	Nephritis and Nephrosis ***13,636 ; 1.6%***	Liver Cancers ***23,722 ; 1.2%***

Male

Table 5.3: Leading causes of total burden (total DALYs; percentage %) for male, by age group, 2015.

Rank	Overall Age (0+ years old)	Under 5 (0-4 years old)	Children (5-14 years old)	Young Adult (15-29 years old)	Older Adult (30-49 years old)	Pre-Elderly (50-59 years old)	Elderly (60+ years old)
1	Ischemic Heart Disease ***405,084 ; 13.0%***	Protein-Energy Malnutrition ***20,856 ; 10.0%***	Road Traffic Injuries ***15,276 ; 11.8%***	Road Traffic Injuries ***149,974 ; 32.4%***	Ischaemic Heart Disease ***107,067 ; 14.0%***	Ischaemic Heart Disease ***110,959 ; 21.2%***	Ischaemic Heart Disease ***178,736 ; 17.3%***
2	Road Traffic Injuries ***286,333 ; 9.2%***	Low Birth Weight ***18,159 ; 8.7%***	Asthma ***7,416 ; 5.7%***	Asthma ***18,828 ; 4.1%***	Road Traffic Injuries ***76,919 ; 10.0%***	Cerebrovascular Diseases (Stroke) ***57,705 ; 11.0%***	Cerebrovascular Diseases (Stroke) ***150,472 ; 14.6%***
3	Cerebrovascular Diseases (Stroke) ***270,275 ; 8.7%***	Lower Respiratory Infections ***15,858 ; 7.6%***	Diarrhoeal Diseases ***6,305 ; 4.9%***	Diabetes Mellitus ***16,953 ; 3.7%***	Diabetes Mellitus ***56,957 ; 7.4%***	Diabetes Mellitus ***56,554 ; 10.8%***	Diabetes Mellitus ***82,984 ; 8.0%***
4	Diabetes Mellitus ***214,311 ; 6.9%***	Birth Trauma and Asphyxia ***12,523 ; 6.0%***	Epilepsy ***5,900 ; 4.5%***	Drug Use Disorders ***13,104 ; 2.8%***	Cerebrovascular Diseases (Stroke) ***48,018 ; 6.3%***	Lower Respiratory Infections ***21,450 ; 4.1%***	Chronic Obstructive Pulmonary Disease ***72,535 ; 7.0%***
5	Lower Respiratory Infections ***148,016 ; 4.7%***	Congenital Heart Diseases ***12,419 ; 5.9%***	Birth Trauma and Asphyxia ***4,246 ; 3.3%***	Lower Respiratory Infections ***12,379 ; 2.7%***	Drug Use Disorders ***31,881 ; 4.2%***	Road Traffic Injuries ***20,097 ; 3.8%***	Lower Respiratory Infections ***63,752 ; 6.2%***
6	Chronic Obstructive Pulmonary Disease ***99,220 ; 3.2%***	Neonatal Infections ***10,782 ; 5.1%***	Leukaemia ***3,648 ; 2.8%***	Unipolar Depressive Disorders ***12,050 ; 2.6%***	Lower Respiratory Infections ***31,290 ; 4.1%***	Trachea, Bronchus and Lung Cancers ***13,374 ; 2.6%***	Trachea, Bronchus and Lung Cancers ***35,701 ; 3.5%***
7	Asthma ***82,040 ; 2.6%***	Road Traffic Injuries ***4,955 ; 2.4%***	Upper Respiratory Infections ***3,368 ; 2.6%***	Epilepsy ***10,947 ; 2.4%***	Asthma ***21,834 ; 2.9%***	Chronic Obstructive Pulmonary Disease ***11,712 ; 2.2%***	Nephritis and Nephrosis ***25,234 ; 2.4%***
8	Trachea, Bronchus and Lung Cancers ***58,668 ; 1.9%***	Nutritional Anaemias ***4,682 ; 2.2%***	Lower Respiratory Infections ***3,288 ; 2.5%***	Cerebrovascular Diseases (Stroke) ***10,673 ; 2.3%***	Schizophrenia ***18,533 ; 2.4%***	Asthma ***9,653 ; 1.8%***	Asthma ***22,590 ; 2.2%***
9	Drug Use Disorders ***49,830 ; 1.6%***	Epilepsy ***3,476 ; 1.7%***	Falls ***2,634 ; 2.0%***	Diarrhoeal Diseases ***8,130 ; 1.8%***	HIV/AIDS ***15,909 ; 2.1%***	Liver Cancers ***9,355 ; 1.8%***	Colon and Rectum Cancers ***21,035 ; 2.0%***
10	Nephritis and Nephrosis ***47,425 ; 1.5%***	Chronic Obstructive Pulmonary Disease ***3,289 ; 1.6%***	Skin and Subcutaneous Diseases ***2,580 ; 2.0%***	Anxiety Disorders ***8,125 ; 1.8%***	Tuberculosis ***14,252 ; 1.9%***	Nephritis and Nephrosis ***8,260 ; 1.6%***	Road Traffic Injuries ***19,111 ; 1.9%***

Female

Table 5.4: *Leading causes of total burden (total DALYs; percentage %) for female, by age group, 2015.*

Rank	Overall Age (0+ years old)	Under 5 (0-4 years old)	Children (5-14 years old)	Young Adult (15-29 years old)	Older Adult (30-49 years old)	Pre-Elderly (50-59 years old)	Elderly (60+ years old)
1	Diabetes Mellitus ***224,458 ; 9.9%***	Protein-Energy Malnutrition ***19,257 ; 11.0%***	Diarrhoeal Diseases ***7,873 ; 7.1%***	Road Traffic Injuries ***26,036 ; 9.4%***	Diabetes Mellitus ***52,646 ; 11.0%***	Diabetes Mellitus ***60,142 ; 17.1%***	Cerebrovascular Diseases (Stroke) ***105,838 ; 12.0%***
2	Cerebrovascular Diseases (Stroke) ***168,985 ; 7.4%***	Low Birth Weight ***13,762 ; 7.8%***	Asthma ***5,750 ; 5.2%***	Diabetes Mellitus ***17,354 ; 6.3%***	Breast Cancer ***27,683 ; 5.8%***	Cerebrovascular Diseases (Stroke) ***30,611 ; 8.7%***	Diabetes Mellitus ***93,364 ; 10.6%***
3	Ischemic Heart Disease ***121,110 ; 5.3%***	Congenital Heart Diseases ***12,220 ; 7.0%***	Road Traffic Injuries ***5,533 ; 5.0%***	Asthma ***14,784 ; 5.4%***	Cerebrovascular Diseases (Stroke) ***25,840 ; 5.4%***	Breast Cancer ***24,350 ; 6.9%***	Ischaemic Heart Disease ***74,549 ; 8.9%***
4	Asthma ***105,879 ; 4.7%***	Birth Trauma and Asphyxia ***8,404 ; 4.8%***	Epilepsy ***5,487 ; 4.9%***	Diarrhoeal Diseases ***10,409 ; 3.8%***	Asthma ***24,747 ; 5.2%***	Ischaemic Heart Disease ***24,017 ; 6.8%***	Asthma ***45,456 ; 5.2%***
5	Lower Respiratory Infections ***75,825 ; 3.3%***	Neonatal Infections ***7,271 ; 4.1%***	Brain and Other CNS Cancers ***4,336 ; 3.9%***	Epilepsy ***8,485 ; 3.1%***	Ischaemic Heart Disease ***16,984 ; 3.5%***	Asthma ***14,175 ; 4.0%***	Lower Respiratory Infections ***42,515 ; 4.8%***
6	Breast Cancer ***73,320 ; 3.2%***	Lower Respiratory Infections ***6,983 ; 4.0%***	Nutritional Anaemias ***3,691 ; 3.3%***	Nutritional Anaemias ***6,998 ; 2.5%***	Road Traffic Injuries ***14,314 ; 3.0%***	Lower Respiratory Infections ***9,914 ; 2.8%***	Chronic Obstructive Pulmonary Disease ***32,371 ; 3.7%***
7	Road Traffic Injuries ***59,544 ; 2.6%***	Nutritional Anaemias ***4,691 ; 2.7%***	Birth Trauma and Asphyxia ***3,351 ; 3.0%***	Birth Trauma and Asphyxia ***5,826 ; 2.1%***	Lower Respiratory Infections ***9,914 ; 2.1%***	Osteoarthritis ***6,315 ; 1.8%***	Breast Cancer ***20,160 ; 2.3%***
8	Anxiety Disorders ***44,887 ; 2.0%***	Road Traffic Injuries ***3,653 ; 2.1%***	Upper Respiratory Infections ***2,771 ; 2.5%***	Lower Respiratory Infections ***4,700 ; 1.7%***	Nutritional Anaemias ***9,060 ; 1.9%***	Trachea, Bronchus and Lung Cancers ***6,048 ; 1.7%***	Trachea, Bronchus and Lung Cancers ***17,602 ; 2.0%***
9	Chronic Obstructive Pulmonary Disease ***42,675 ; 1.9%***	Fires, Heat and Hot Substances ***3,0511 ; 2.0%***	Skin and Subcutaneous Diseases ***2,653 ; 2.4%***	Skin and Subcutaneous Diseases ***4,616 ; 1.7%***	Hearing Loss ***8,355 ; 1.7%***	Road Traffic Injuries ***5,563 ; 1.6%***	Colon and Rectum Cancers ***15,085 ; 1.7%***
10	Unipolar Depressive Disorders ***40,942 ; 1.8%***	Epilepsy ***2,598 ; 1.5%***	Leukaemia ***1,806 ; 1.6%***	Cerebrovascular Diseases (Stroke) ***4,338 ; 1.6%***	Epilepsy ***6,839 ; 1.4%***	Nephritis and Nephrosis ***5,376 ; 1.5%***	Nephritis and Nephrosis ***13,648 ; 1.6%***

5.2 Disability-Adjusted Life Years (DALYs) - 2016

5.2.1 Pattern of Disability-Adjusted Life Years (DALYs) by gender in 2016.

Figure 5.6: *Percentage (%) of total burden (DALYs) by disease groups and gender, 2016.*

Overall, DALYs was mostly contributed by Cardiovascular and Circulatory Diseases (1,330,436; 23.7%) followed by Malignant Neoplasms (534,091; 9.5%) and Unintentional Injuries (496,412; 8.8%). As for gender, DALYs in male mostly contributed by Cardiovascular and Circulatory Diseases (812,650; 24.9%) followed by Unintentional Injuries (392,970; 12.0%) and Malignant Neoplasms (271,421; 8.3%). For female, DALYs mostly contributed by Cardiovascular and Circulatory Diseases (517,786; 22.0%) followed by Malignant Neoplasms (262,670; 11.2%) and Diabetes Mellitus (234,005; 10.0%) (**Figure 5.6**). All other categories can be seen in **Table 5.5**.

Table 5.5: Total of burden of disease and injury (DALYs) by disease groups and by gender, 2016.

Disease Categories	PERSON		MALE		FEMALE	
	DALYs	%	DALYs	%	DALYs	%
INFECTIOUS DISEASES	251,846	4.5	166,067	5.1	85,780	3.6
RESPIRATORY INFECTIONS	320,518	5.7	175,612	5.4	144,906	6.2
MATERNAL CONDITIONS	20,172	0.4	-	0.0	20,172	0.9
NEONATAL CONDITIONS	170,174	3.0	96,918	3.0	73,255	3.1
NUTRITIONAL DEFICIENCY	92,202	1.6	42,162	1.3	50,041	2.1
MALIGNANT NEOPLASMS	534,091	9.5	271,421	8.3	262,670	11.2
BENIGN NEOPLASMS	19,487	0.3	9,704	0.3	9,783	0.4
DIABETES MELLITUS	470,421	8.4	236,417	7.2	234,005	10.0
ENDOCRINE, BLOOD AND IMMUNE DISORDERS	97,966	1.7	48,924	1.5	49,042	2.1
MENTAL AND BEHAVIOURAL DISORDERS	389,116	6.9	221,197	6.8	167,919	7.1
NEUROLOGICAL CONDITIONS	206,088	3.7	111,538	3.4	94,550	4.0
SENSE ORGAN DISEASES	87,138	1.6	43,643	1.3	43,495	1.8
CARDIOVASCULAR AND CIRCULATORY DISEASES	1,330,436	23.7	812,650	24.9	517,786	22.0
RESPIRATORY DISEASES	395,000	7.0	231,060	7.1	163,940	7.0
DIGESTIVE DISEASES	174,598	3.1	104,471	3.2	70,126	3.0
GENITO URINARY DISEASE	136,923	2.4	77,958	2.4	58,965	2.5
SKIN DISEASES	63,744	1.1	32,004	1.0	31,740	1.3
MUSCULOSKELETAL DISEASES	107,027	1.9	48,262	1.5	58,765	2.5
CONGENITAL ANOMALIES	129,313	2.3	68,009	2.1	61,304	2.6
ORAL CONDITIONS	98,480	1.8	50,922	1.6	47,558	2.0
UNINTENTIONAL INJURIES	496,412	8.8	392,970	12.0	103,442	4.4
INTENTIONAL INJURIES	25,274	0.4	22,883	0.7	2,390	0.1
TOTAL DALYs	5,616,427	100	3,264,793	100	2,351,634	100

GROUP I: Communicable Disease, Maternal, Perinatal, Nutritional Status	GROUP II: Non-communicable Disease	GROUP III: Injury

5.2.2 Pattern of Disability-Adjusted Life Years (DALYs) by age in 2016.

Overall, 37.2% of total DALYs were contributed by productive age [15 to 49 years old (13.7 % for young adult and 23.5 % for older adult)]. Pre-elderly age group (50 to 59 years old) contributed towards 15.9% of total DALYs while elderly age group (60 years old and above) contributed 35.4% of total DALYs. Among male, 39.9% of total DALYs were contributed by productive age (15 to 49 years old), compared to female as 33.5% **(Figure 5.7)**.

In disease categories, Neonatal Condition become the most leading disease categories towards DALYs for under 5 (0 to 4 years old) while Unintentional Injuries become the most leading disease categories for the age of young adult (15 to 29 years old). Cardiovascular and Circulatory Diseases become the most leading disease categories starting at older adult age group (30 to 49 years old) onwards **(Figure 5.8)**. Male had the same pattern of total burden of DALYs as compared with overall population **(Figure 5.9)**. Among female, mental and behaviours disorders become the most leading disease categories towards DALYs for young adult age group (15 to 29 years old). Cardiovascular and Circulatory Diseases become the most leading disease categories starting at older adult age group (30 to 49 years old) until elderly age group (60 years and above) **(Figure 5.10)**.

Figure 5.7: *Percentage (%) of total burden (DALYs), by age group and gender, 2016.*

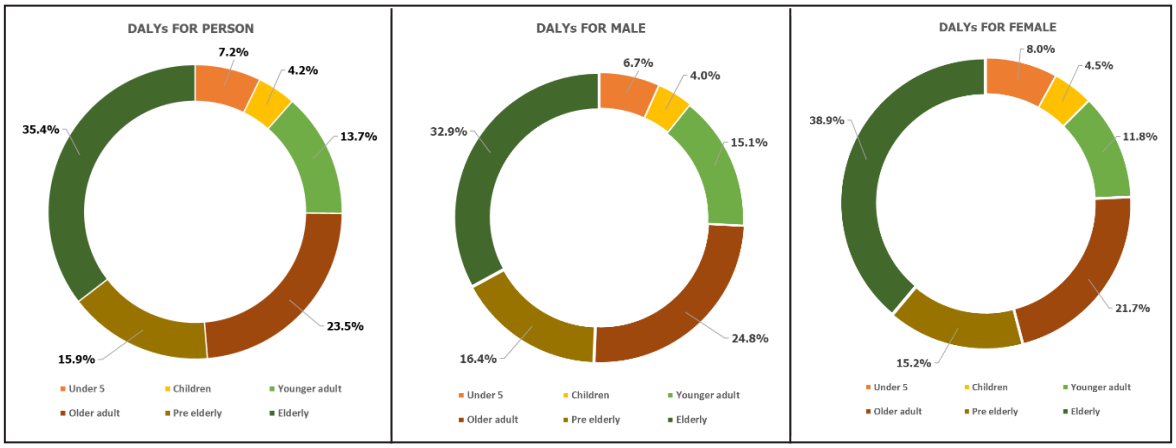


Figure 5.8: *Percentage (%) of total burden (DALYs), by disease categories and age group, male, 2016.*

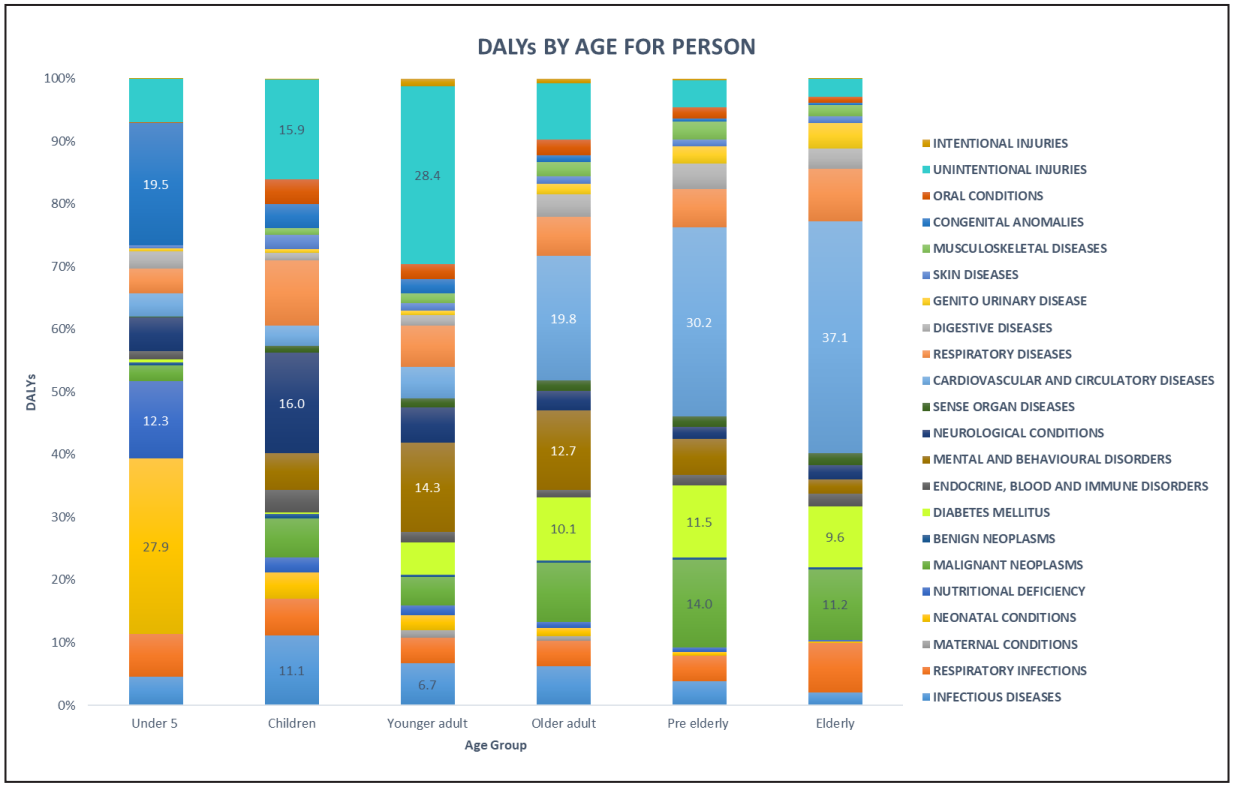


Figure 5.9: *Percentage (%) of total burden (DALYs), by disease categories and age group, male, 2016.*

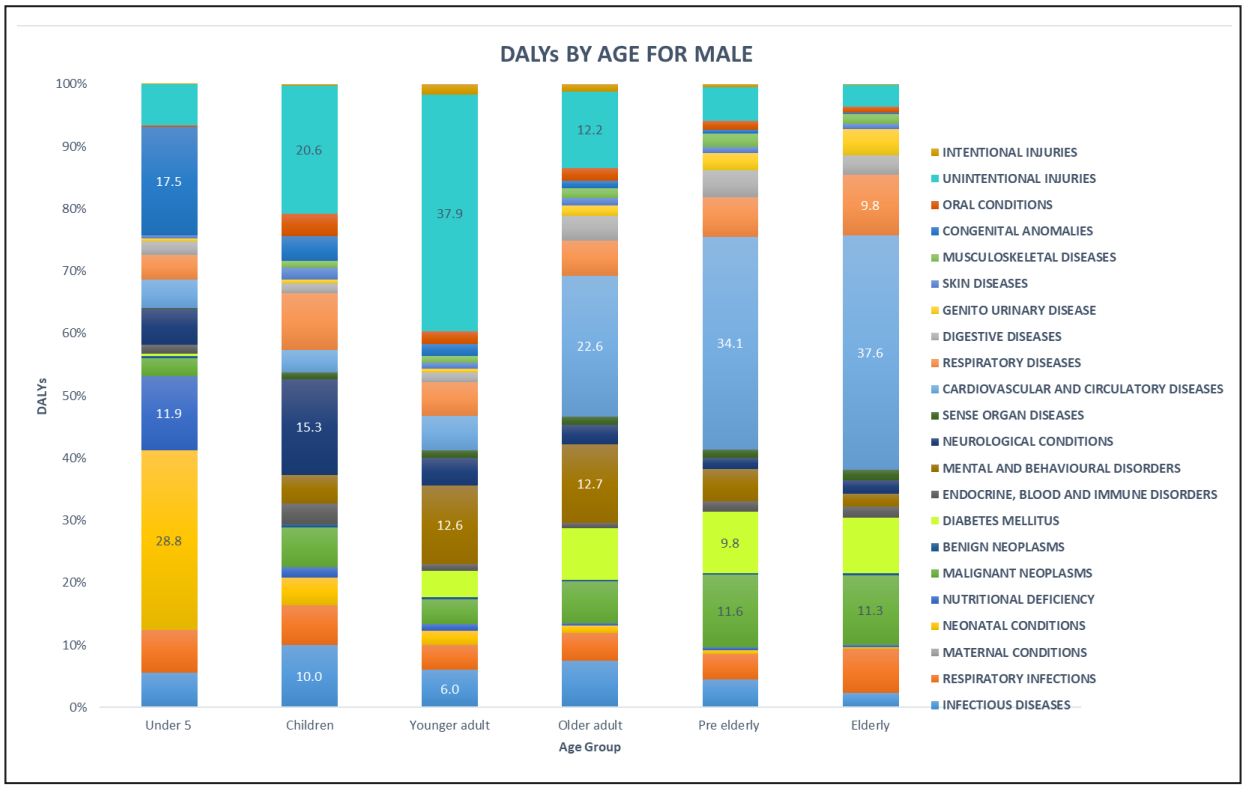
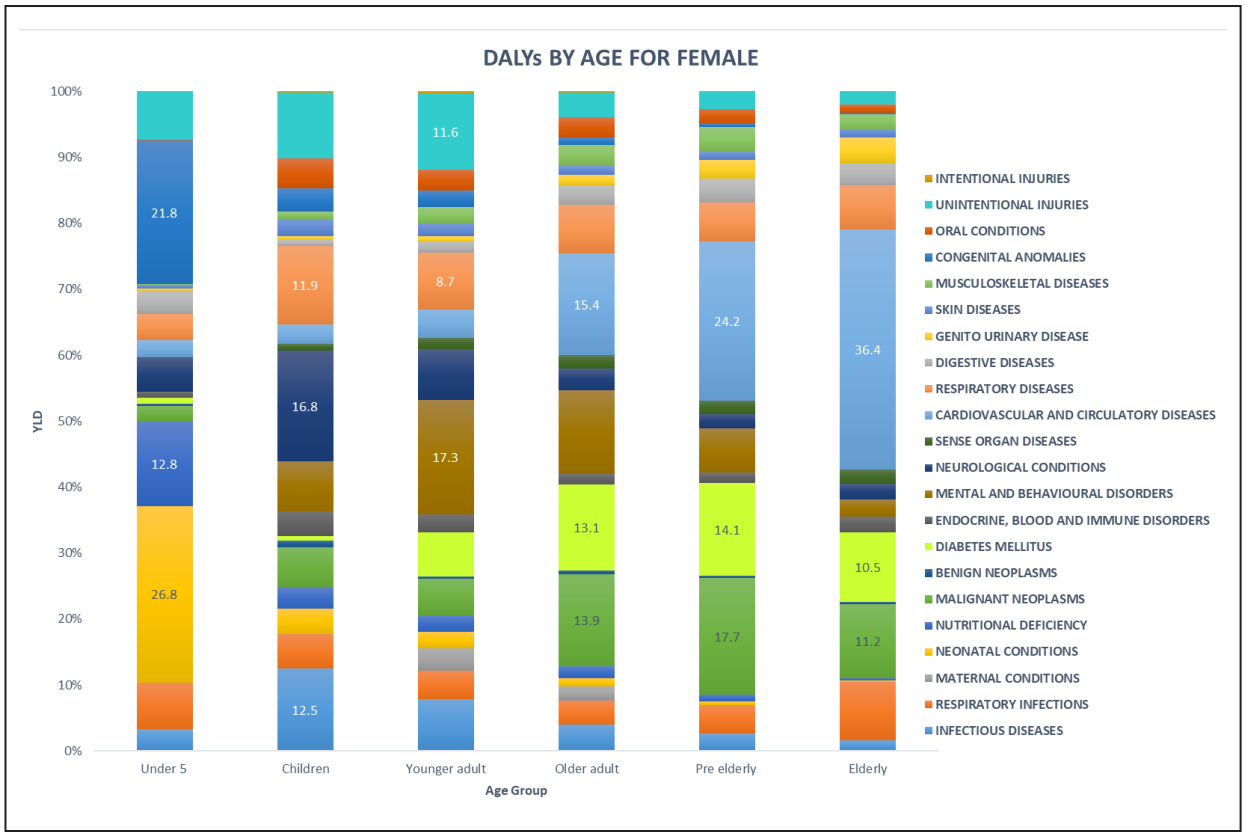


Figure 5.10: *Percentage (%) of total burden (DALYs), by disease categories and age group, female, 2016.*



5.2.3 Leading Causes of Disability-Adjusted Life Years (DALYs) for 2016.

Ischemic Heart Disease was the leading cause of total burden in Malaysia for 2016, contributing 11.1% of the total DALYs. This was followed by Cerebrovascular Diseases (Stroke), with 8.6%, Diabetes Mellitus (8.4%), Road Traffic Injuries (6.4%) and Lower Respiratory Infections (4.9%). For under 5 (0 to 4 years old), Protein-Energy Malnutrition was the leading cause of total burden with 10.0% of total DALYs, followed by Low Birth Weight with 7.3% and Congenital Heart Diseases (6.3%). Road Traffic Injuries were the leading cause of total burden for children (5 to 14 years old) and young adult (15 to 29 years old) with 10.0% and 23.9% respectively. Diabetes Mellitus was the leading cause of total burden with 10.1% of total DALYs in older adult (30 to 49 years old), followed by Ischemic Heart Disease with 9.7% and Road Traffic Injuries (6.8%). Ischemic Heart Disease was the leading cause of total burden with 16.0% of total DALYs in pre-elderly (50 to 59 years old), followed by Diabetes Mellitus with 11.5% and Cerebrovascular Diseases (Stroke) (10.0%). Same leading cause also seen in elderly (60 years and above) whereas Ischemic Heart Disease was the leading cause of total burden with 17.3% while Cerebrovascular Diseases (Stroke) as 14.5% and Diabetes Mellitus (9.6%) **(Table 5.6)**.

Among male, Ischemic Heart Disease was the leading cause of total burden with 12.9% of total DALYs, followed by Road Traffic Injuries with 9.2% and Cerebrovascular Diseases (Stroke) (8.1%). For under 5 (0 to 4 years old), Protein-Energy Malnutrition was the leading cause of total burden with 9.7% of total DALYs, followed by Low Birth Weight with 7.3% and Congenital Heart Diseases (6.0%). Road Traffic Injuries were the leading cause of total burden for children (5 to 14 years old) and young adult (15 to 29 years old) with 13.1% and 32.7% respectively. Ischemic Heart Disease was the leading cause of total burden with 12.5% of total DALYs in older adult (30 to 49 years old), followed by Road Traffic Injuries with 9.4% and Diabetes Mellitus (8.2%). Ischemic Heart Disease was the leading cause of total burden with 20.0% of total DALYs in pre-elderly (50 to 59 years old), followed by Cerebrovascular Diseases (Stroke) with 9.9% and Diabetes Mellitus (9.8%). Same leading cause also seen in elderly (60 years and above) whereas Ischemic Heart Disease was the leading cause of total burden with 19.0% of total DALYs while Cerebrovascular Diseases (Stroke) as 13.7% and Diabetes Mellitus (8.9%) **(Table 5.7)**.

Among female, Diabetes Mellitus was the leading cause of total burden with 10.0% of total DALYs, followed by Cerebrovascular Diseases (Stroke) with 9.3% and Ischemic Heart Disease (8.6%). For under 5 (0 to 4 years old), Protein-Energy Malnutrition was the leading cause of total burden with 10.3% of total DALYs, followed by Low Birth Weight with 7.2% and Congenital Heart Diseases (6.6%). Diarrhoeal Diseases was the leading cause of total burden for children (5 to 14 years old) with 10.0%, while Road Traffic Injuries was the leading cause of total burden in young adult (15 to 29 years old) with 8.3%. Diabetes Mellitus was the leading cause of total burden with 13.1% of total DALYs in older adult (30 to 49 years old), followed by Cerebrovascular Diseases (Stroke) with 6.7% and Ischemic Heart Disease (5.2%). Diabetes Mellitus was the leading cause of total burden with 14.1% of total DALYs in pre-elderly (50 to 59 years old), followed by Cerebrovascular Diseases (Stroke) with 10.2% and Ischemic Heart Disease with 10.1%. However, the leading cause of total burden vary in elderly (60 years and above). Cerebrovascular Diseases (Stroke) was the leading cause of total burden with 15.5% of total DALYs, followed by Ischemic Heart Disease with 15.2% and Diabetes Mellitus (10.5%) (**Table 5.8)**.

Person

Table 5.6: Leading causes of total burden (total DALYs; percentage %) for all population, by age group, 2016.

Rank	Overall Age (0+ years old)	Under 5 (0-4 years old)	Children (5-14 years old)	Young Adult (15-29 years old)	Older Adult (30-49 years old)	Pre-Elderly (50-59 years old)	Elderly (60+ years old)
1	Ischemic Heart Disease ***624,777 ; 11.1%***	Protein-Energy Malnutrition ***40,693 ; 10.0%***	Road Traffic Injuries ***23,698 ; 10.0%***	Road Traffic Injuries ***184,075 ; 23.9%***	Diabetes Mellitus ***133,172 ; 10.1%***	Ischaemic Heart Disease ***143,402 ; 16.0%***	Ischaemic Heart Disease ***343,489 ; 17.3%***
2	Cerebrovascular Diseases (Stroke) ***483,010 ; 8.6%***	Low Birth Weight ***29,686 ; 7.3%***	Diarrhoeal Diseases ***19,209 ; 8.1%***	Diabetes Mellitus ***39,604 ; 5.1%***	Ischaemic Heart Disease ***127,596 ; 9.7%***	Diabetes Mellitus ***102,674 ; 11.5%***	Cerebrovascular Diseases (Stroke) ***288,595 ; 14.5%***
3	Diabetes Mellitus ***470,421 ; 8.4%***	Congenital Heart Diseases ***25,662 ; 6.3%***	Asthma ***13,933 ; 5.9%***	Asthma ***34,167 ; 4.4%***	Road Traffic Injuries ***89,882 ; 6.8%***	Cerebrovascular Diseases (Stroke) ***89,769 ; 10.0%***	Diabetes Mellitus ***191,924 ; 9.6%***
4	Road Traffic Injuries ***358,061 ; 6.4%***	Lower Respiratory Infections ***23,057 ; 5.7%***	Epilepsy ***10,177 ; 4.3%***	Unipolar Depressive Disorders ***25,372 ; 3.3%***	Cerebrovascular Diseases (Stroke) ***83,682 ; 6.3%***	Lower Respiratory Infections ***33,103 ; 3.7%***	Lower Respiratory Infections ***152,274 ; 7.7%***
5	Lower Respiratory Infections ***276,965 ; 4.9%***	Birth Trauma and Asphyxia ***17,908 ; 4.4%***	Endocrine, Blood and Immune Disorders ***8,358 ; 3.5%***	Anxiety Disorders ***21,693 ; 2.8%***	Asthma ***50,413 ; 3.8%***	Road Traffic Injuries ***23,823 ; 2.7%***	Chronic Obstructive Pulmonary Disease ***81,369 ; 4.1%***
6	Asthma ***161,747 ; 2.9%***	Neonatal Infections ***15,361 ; 3.8%***	Anxiety Disorders ***6,478 ; 2.7%***	Diarrhoeal Diseases ***21,590 ; 2.8%***	Lower Respiratory Infections ***41,874 ; 3.2%***	Asthma ***23,224 ; 2.6%***	Nephritis and Nephrosis ***53,056 ; 2.7%***
7	Chronic Obstructive Pulmonary Disease ***120,371 ; 2.1%***	Road Traffic Injuries ***11,087 ; 2.7%***	Lower Respiratory Infections ***6,335 ; 2.7%***	Lower Respiratory Infections ***20,322 ; 2.6%***	Drug Use Disorders ***37,984 ; 2.9%***	Trachea, Bronchus and Lung Cancers ***21,612 ; 2.4%***	Trachea, Bronchus and Lung Cancers ***52,264 ; 2.6%***
8	Endocrine, Blood and Immune Disorders ***97,966 ; 1.7%***	Nutritional Anaemias ***9,411 ; 2.3%***	Upper Respiratory Infections ***6,156 ; 2.6%***	Epilepsy ***17,824 ; 2.3%***	Schizophrenia ***35,481 ; 2.7%***	Breast Cancer ***18,174 ; 2.0%***	Endocrine, Blood and Immune Disorders ***42,235 ; 2.1%***
9	Nephritis and Nephrosis ***92,461 ; 1.6%***	Chronic Obstructive Pulmonary Disease ***8,753 ; 2.2%***	Birth Trauma and Asphyxia ***6,049 ; 2.5%***	Drug Use Disorders ***16,444 ; 2.1%***	Breast Cancer ***26,391 ; 2.0%***	Nephritis and Nephrosis ***16,275 ; 1.8%***	Colon and Rectum Cancers ***39,548 ; 2.0%***
10	Unipolar Depressive Disorders ***81,850 ; 1.5%***	Diarrhoeal Diseases ***7,749 ; 1.9%***	Brain and Other CNS Cancers ***5,630 ; 2.4%***	Schizophrenia ***15,169 ; 2.0%***	Unipolar Depressive Disorders ***26,264 ; 2.0%***	Chronic Obstructive Pulmonary Disease ***15,319 ; 1.7%***	Asthma ***37,476 ; 1.9%***

Male

Table 5.7: *Leading causes of total burden (total DALYs; percentage %) for male, by age group, 2016.*

Rank	Overall Age (0+ years old)	Under 5 (0-4 years old)	Children (5-14 years old)	Young Adult (15-29 years old)	Older Adult (30-49 years old)	Pre-Elderly (50-59 years old)	Elderly (60+ years old)
1	Ischemic Heart Disease ***421,915 ; 12.9%***	Protein-Energy Malnutrition ***21,316 ; 9.7%***	Road Traffic Injuries ***17,269 ; 13.1%***	Road Traffic Injuries ***161,159 ; 32.7%***	Ischaemic Heart Disease ***101,178 ; 12.5%***	Ischaemic Heart Disease ***107,455 ; 20.0%***	Ischaemic Heart Disease ***204,140 ; 19.0%***
2	Road Traffic Injuries ***299,906 ; 9.2%***	Low Birth Weight ***16,074 ; 7.3%***	Diarrhoeal Diseases ***8,587 ; 6.5%***	Diabetes Mellitus ***21,058 ; 4.3%***	Road Traffic Injuries ***76,072 ; 9.4%***	Cerebrovascular Diseases (Stroke) ***53,309 ; 9.9%***	Cerebrovascular Diseases (Stroke) ***147,011 ; 13.7%***
3	Cerebrovascular Diseases (Stroke) ***263,644 ; 8.1%***	Congenital Heart Diseases ***13,206 ; 6.0%***	Asthma ***8,240 ; 6.3%***	Asthma ***19,752 ; 4.0%***	Diabetes Mellitus ***66,596 ; 8.2%***	Diabetes Mellitus ***52,435 ; 9.8%***	Diabetes Mellitus ***95,639 ; 8.9%***
4	Diabetes Mellitus ***236,417 ; 7.2%***	Lower Respiratory Infections ***12,025 ; 5.5%***	Epilepsy ***5,383 ; 4.1%***	Drug Use Disorders ***15,793 ; 3.2%***	Cerebrovascular Diseases (Stroke) ***49,699 ; 6.1%***	Lower Respiratory Infections ***19,715 ; 3.7%***	Lower Respiratory Infections ***73,414 ; 6.8%***
5	Lower Respiratory Infections ***152,059 ; 4.7%***	Birth Trauma and Asphyxia ***10,119 ; 5.9%***	Endocrine, Blood and Immune Disorders ***4,367 ; 3.3%***	Lower Respiratory Infections ***16,604 ; 2.8%***	Drug Use Disorders ***36,920 ; 4.6%***	Road Traffic Injuries ***18,730 ; 3.5%***	Chronic Obstructive Pulmonary Disease ***63,094 ; 5.9%***
6	Chronic Obstructive Pulmonary Disease ***90,133 ; 2.8%***	Neonatal Infections ***7,611 ; 3.5%***	Lower Respiratory Infections ***4,290 ; 3.3%***	Unipolar Depressive Disorders ***12,177 ; 2.5%***	Lower Respiratory Infections ***29,009 ; 3.6%***	Trachea, Bronchus and Lung Cancers ***15,481 ; 2.9%***	Trachea, Bronchus and Lung Cancers ***38,090 ; 3.5%***
7	Asthma ***84,912 ; 2.6%***	Diarrhoeal Diseases ***5,942 ; 2.7%***	Leukaemia ***4,108 ; 3.1%***	Epilepsy ***10,840 ; 2.2%***	Asthma ***27,478 ; 3.4%***	Chronic Obstructive Pulmonary Disease ***12,503 ; 2.3%***	Nephritis and Nephrosis ***27,426 ; 2.6%***
8	Drug Use Disorders ***58,828 ; 1.8%***	Road Traffic Injuries ***5,671 ; 2.6%***	Birth Trauma and Asphyxia ***3,940 ; 3.0%***	Diarrhoeal Diseases ***9,925 ; 2.0%***	HIV/AIDS ***19,536 ; 2.4%***	Asthma ***11,633 ; 2.2%***	Colon and Rectum Cancers ***23,381 ; 2.2%***
9	Nephritis and Nephrosis ***50,512 ; 1.5%***	Chronic Obstructive Pulmonary Disease ***4,921 ; 2.2%***	Upper Respiratory Infections ***3,319 ; 2.5%***	Cerebrovascular Diseases (Stroke) ***9,219 ; 1.9%***	Schizophrenia ***18,495 ; 2.3%***	Endocrine, Blood and Immune Disorders ***9,206 ; 1.7%***	Road Traffic Injuries ***21,004 ; 2.0%***
10	Endocrine, Blood and Immune Disorders ***48,924 ; 1.5%***	Nutritional Anaemias ***4,795 ; 2.2%***	Falls ***2,541 ; 1.9%***	Ischaemic Heart Disease ***8,449 ; 1.7%***	Tuberculosis ***16,552 ; 2.0%***	Liver Cancers ***9,194 ; 1.7%***	Endocrine, Blood and Immune Disorders ***20,257 ; 1.9%***

Female

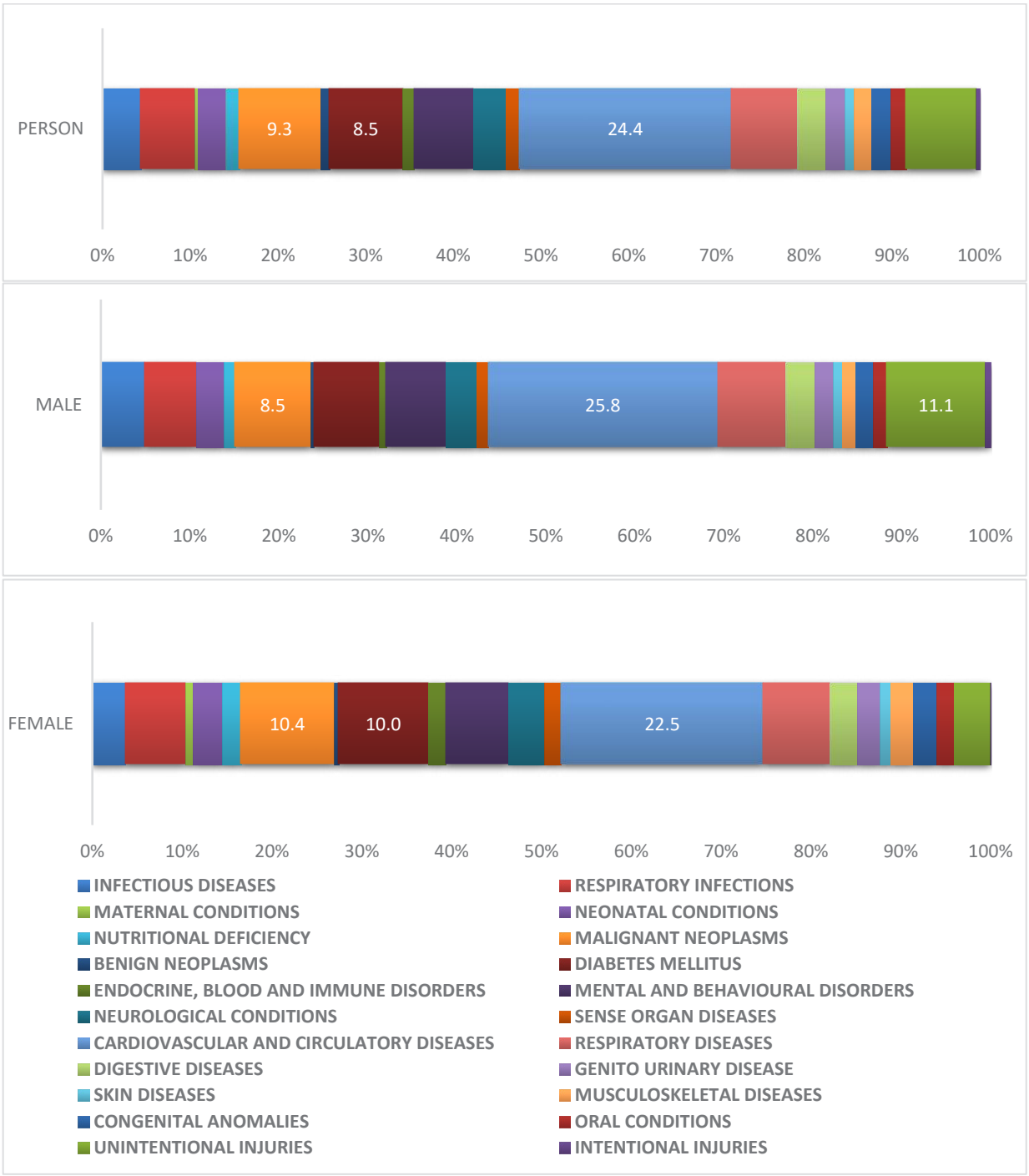
Table 5.8: *Leading causes of total burden (total DALYs; percentage %) for female, by age group, 2016.*

Rank	Overall Age (0+ years old)	Under 5 (0-4 years old)	Children (5-14 years old)	Young Adult (15-29 years old)	Older Adult (30-49 years old)	Pre-Elderly (50-59 years old)	Elderly (60+ years old)
1	Diabetes Mellitus ***234,005 ; 10.0%***	Protein-Energy Malnutrition ***19,377 ; 10.3%***	Diarrhoeal Diseases ***10,622 ; 10.0%***	Road Traffic Injuries ***22,917 ; 8.3%***	Diabetes Mellitus ***66,576 ; 13.1%***	Diabetes Mellitus ***50,239 ; 14.1%***	Cerebrovascular Diseases (Stroke) ***141,583 ; 15.5%***
2	Cerebrovascular Diseases (Stroke) ***219,367 ; 9.3%***	Low Birth Weight ***13,612 ; 7.2%***	Road Traffic Injuries ***6,429 ; 6.1%***	Diabetes Mellitus ***18,546 ; 6.7%***	Cerebrovascular Diseases (Stroke) ***33,982 ; 6.7%***	Cerebrovascular Diseases (Stroke) ***36,460 ; 10.2%***	Ischaemic Heart Disease ***139,349 ; 15.2%***
3	Ischemic Heart Disease ***202,861 ; 8.6%***	Congenital Heart Diseases ***12,457 ; 6.6%***	Asthma ***5,693 ; 5.4%***	Asthma ***14,415 ; 5.2%***	Ischaemic Heart Disease ***26,418 ; 5.2%***	Ischaemic Heart Disease ***35,947 ; 10.1%***	Diabetes Mellitus ***96,284 ; 10.5%***
4	Lower Respiratory Infections ***124,906 ; 5.3%***	Lower Respiratory Infections ***11,032 ; 5.9%***	Epilepsy ***4,794 ; 4.5%***	Diarrhoeal Diseases ***11,665 ; 4.2%***	Breast Cancer ***26,389 ; 5.2%***	Breast Cancer ***18,173 ; 5.1%***	Lower Respiratory Infections ***78,859 ; 8.6%***
5	Asthma ***76,835 ; 3.3%***	Birth Trauma and Asphyxia ***7,789 ; 4.1%***	Brain and Other CNS Cancers ***4,022 ; 3.8%***	Endocrine, Blood and Immune Disorders ***7,475 ; 2.7%***	Asthma ***22,935 ; 4.5%***	Lower Respiratory Infections ***13,387 ; 3.7%***	Nephritis and Nephrosis ***25,630 ; 2.8%***
6	Breast Cancer ***64,612 ; 2.7%***	Neonatal Infections ***7,750 ; 4.1%***	Endocrine, Blood and Immune Disorders ***3,990 ; 3.8%***	Epilepsy ***6,984 ; 2.5%***	Road Traffic Injuries ***13,810 ; 2.7%***	Asthma ***11,591 ; 3.2%***	Endocrine, Blood and Immune Disorders ***21,977 ; 2.4%***
7	Road Traffic Injuries ***58,156 ; 2.5%***	Road Traffic Injuries ***5,416 ; 2.9%***	Nutritional Anaemias ***3,422 ; 3.2%***	Nutritional Anaemias ***6,799 ; 2.5%***	Lower Respiratory Infections ***12,865 ; 2.5%***	Nephritis and Nephrosis ***7,191 ; 2.0%***	Asthma ***21,110 ; 2.3%***
8	Endocrine, Blood and Immune Disorders ***49,042 ; 2.1%***	Nutritional Anaemias ***4,617 ; 2.5%***	Upper Respiratory Infections ***2,837 ; 2.7%***	Lower Respiratory Infections ***6,718 ; 2.4%***	Nutritional Anaemias ***9,230 ; 1.8%***	Colon and Rectum Cancers ***6,628 ; 1.9%***	Breast Cancer ***19,205 ; 2.1%***
9	Anxiety Disorders ***44,684 ; 1.9%***	Chronic Obstructive Pulmonary Disease ***3,832 ; 2.0%***	Skin and Subcutaneous Diseases ***2,730 ; 2.6%***	Cerebrovascular Diseases (Stroke) ***5,389 ; 1.9%***	Hearing Loss ***8,517 ; 1.7%***	Osteoarthritis ***6,483 ; 1.8%***	Chronic Obstructive Pulmonary Disease ***18,275 ; 2.0%***
10	Unipolar Depressive Disorders ***42,169 ; 1.8%***	Meningitis ***2,420 ; 1.5%***	Birth Trauma and Asphyxia ***2,109 ; 2.0%***	Skin and Subcutaneous Diseases ***5,081 ; 1.8%***	Endocrine, Blood and Immune Disorders ***8,155 ; 1.6%***	Trachea, Bronchus and Lung Cancers ***6,131 ; 1.7%***	Colon and Rectum Cancers ***16,167 ; 1.8%***

5.3 Disability-Adjusted Life Years (DALYs) - 2017

5.3.1 Pattern of Disability-Adjusted Life Years (DALYs) by gender in 2017.

Figure 5.11: *Percentage (%) of total burden (DALYs) by disease groups and gender, 2017.*



Overall, DALYs was mostly contributed by Cardiovascular and Circulatory Diseases (1,427,301; 24.4%) followed by Malignant Neoplasms (544,754; 9.3%) and Unintentional Injuries (494,573; 8.5%). As for gender, DALYs in male mostly contributed by Cardiovascular and Circulatory Diseases (875,686; 25.8%) followed by Unintentional Injuries (375,911; 11.1%) and Malignant Neoplasms (289,366; 8.5%). For female, DALYs mostly contributed by Cardiovascular and Circulatory Diseases (551,616; 22.5%) followed by Malignant Neoplasms (255,388; 10.4%) and Diabetes Mellitus (245,226; 10.0%) (**Figure 5.11**). All other categories can be seen in **Table 5.9**.

Table 5.9: *Total of burden of disease and injury (DALYs) by disease groups and by gender, 2017.*

Disease Categories	PERSON		MALE		FEMALE	
	DALYs	%	DALYs	%	DALYs	%
INFECTIOUS DISEASES	256,617	4.4	167,825	4.9	88,791	3.6
RESPIRATORY INFECTIONS	362,071	6.2	197,636	5.8	164,435	6.7
MATERNAL CONDITIONS	22,075	0.4	-	0.0	22,075	0.9
NEONATAL CONDITIONS	184,794	3.2	105,238	3.1	79,556	3.2
NUTRITIONAL DEFICIENCY	91,453	1.6	41,858	1.2	49,594	2.0
MALIGNANT NEOPLASMS	544,754	9.3	289,366	8.5	255,388	10.4
BENIGN NEOPLASMS	21,677	0.4	10,351	0.3	11,325	0.5
DIABETES MELLITUS	494,573	8.5	249,346	7.3	245,226	10.0
ENDOCRINE, BLOOD AND IMMUNE DISORDERS	74,472	1.3	27,706	0.8	46,766	1.9
MENTAL AND BEHAVIOURAL DISORDERS	399,173	6.8	228,235	6.7	170,937	7.0
NEUROLOGICAL CONDITIONS	216,920	3.7	117,434	3.5	99,486	4.1
SENSE ORGAN DISEASES	89,762	1.5	44,859	1.3	44,903	1.8
CARDIOVASCULAR AND CIRCULATORY DISEASES	1,427,301	24.4	875,686	25.8	551,616	22.5
RESPIRATORY DISEASES	438,632	7.5	257,896	7.6	180,736	7.4
DIGESTIVE DISEASES	190,180	3.3	113,832	3.3	76,348	3.1
GENITO URINARY DISEASE	131,357	2.2	70,405	2.1	60,952	2.5
SKIN DISEASES	63,524	1.1	34,839	1.0	28,685	1.2
MUSCULOSKELETAL DISEASES	112,378	1.9	50,131	1.5	62,247	2.5
CONGENITAL ANOMALIES	130,854	2.2	67,107	2.0	63,747	2.6
ORAL CONDITIONS	101,493	1.7	52,704	1.6	48,789	2.0
UNINTENTIONAL INJURIES	471,862	8.1	375,911	11.1	95,951	3.9
INTENTIONAL INJURIES	21,758	0.4	19,692	0.6	2,066	0.1
TOTAL DALYs	5,847,679	100	3,398,058	100	2,449,621	100

GROUP I: Communicable Disease, Maternal, Perinatal, Nutritional Status	GROUP II: Non-communicable Disease	GROUP III: Injury

5.3.2 Pattern of Disability-Adjusted Life Years (DALYs) by age in 2017.

Overall, 36.0% of total DALYs were contributed by productive age [15 to 49 years old (13.1 % for young adult and 22.9 % for older adult)]. Pre-elderly age group (50 to 59 years old) contributed towards 15.9% of total DALYs while elderly age group (60 years old and above) contributed 36.8% of total DALYs. Among male, 38.5% of total DALYs were contributed by productive age (15 to 49 years old), compared to female as 32.5% **(Figure 5.12)**.

In disease categories, Neonatal Condition become the most leading disease categories towards DALYs for under 5 (0 to 4 years old) while Unintentional Injuries become the most leading disease categories for the age of young adult (15 to 29 years old). Cardiovascular and Circulatory Diseases become the most leading disease categories starting at older adult age group (30 to 49 years old) onwards **(Figure 5.13)**. Male had the same pattern of total burden of DALYs as compared with overall population **(Figure 5.14)**. Among female, mental and behaviours disorders become the most leading disease categories towards DALYs for young adult age group (15 to 29 years old). Cardiovascular and Circulatory Diseases become the most leading disease categories starting at older adult age group (30 to 49 years old) until elderly age group (60 years and above) **(Figure 5.15)**.

Figure 5.12: *Percentage (%) of total burden (DALYs), by age group and gender, 2017.*

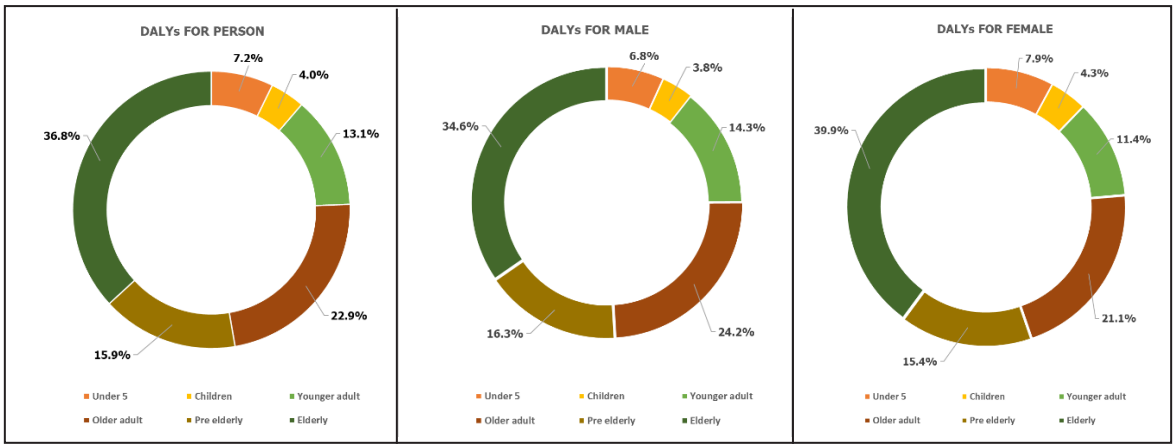


Figure 5.13: *Percentage (%) of total burden (DALYs), by disease categories and age group, male, 2017.*

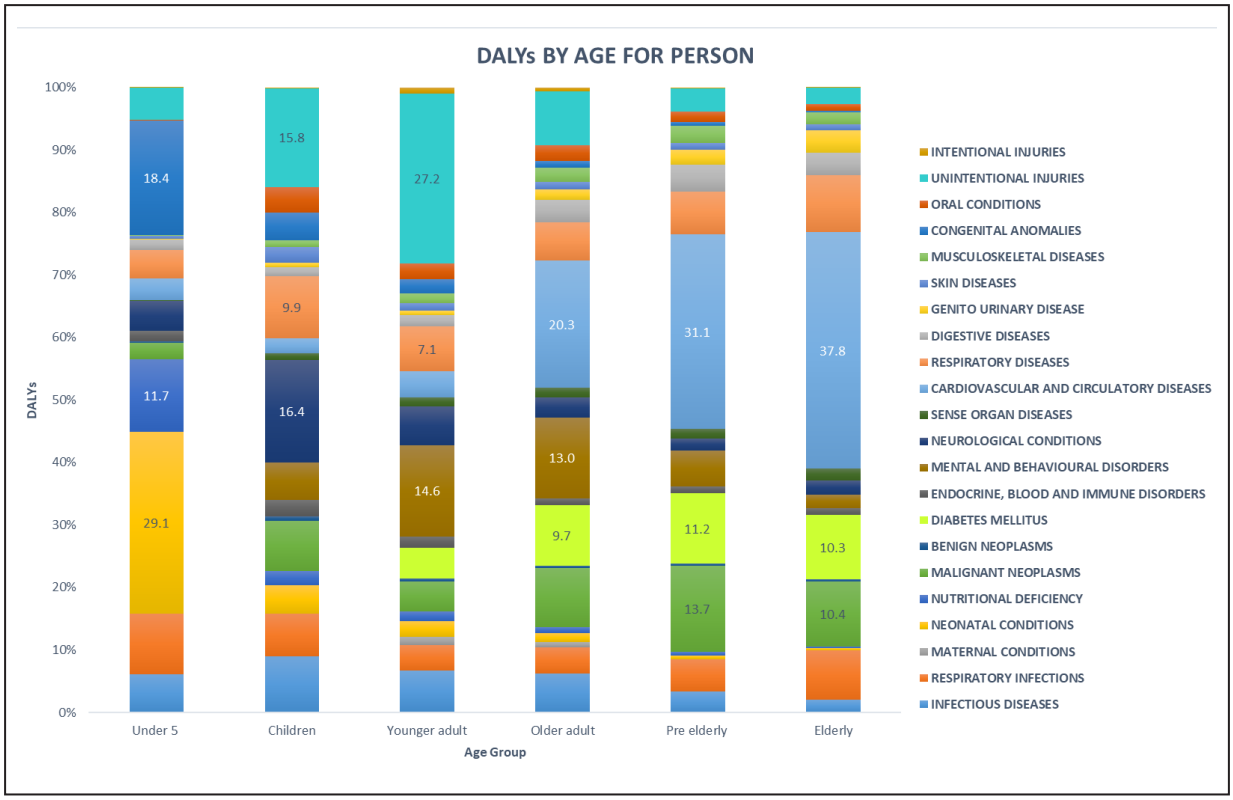


Figure 5.14: *Percentage (%) of total burden (DALYs), by disease categories and age group, male, 2017.*

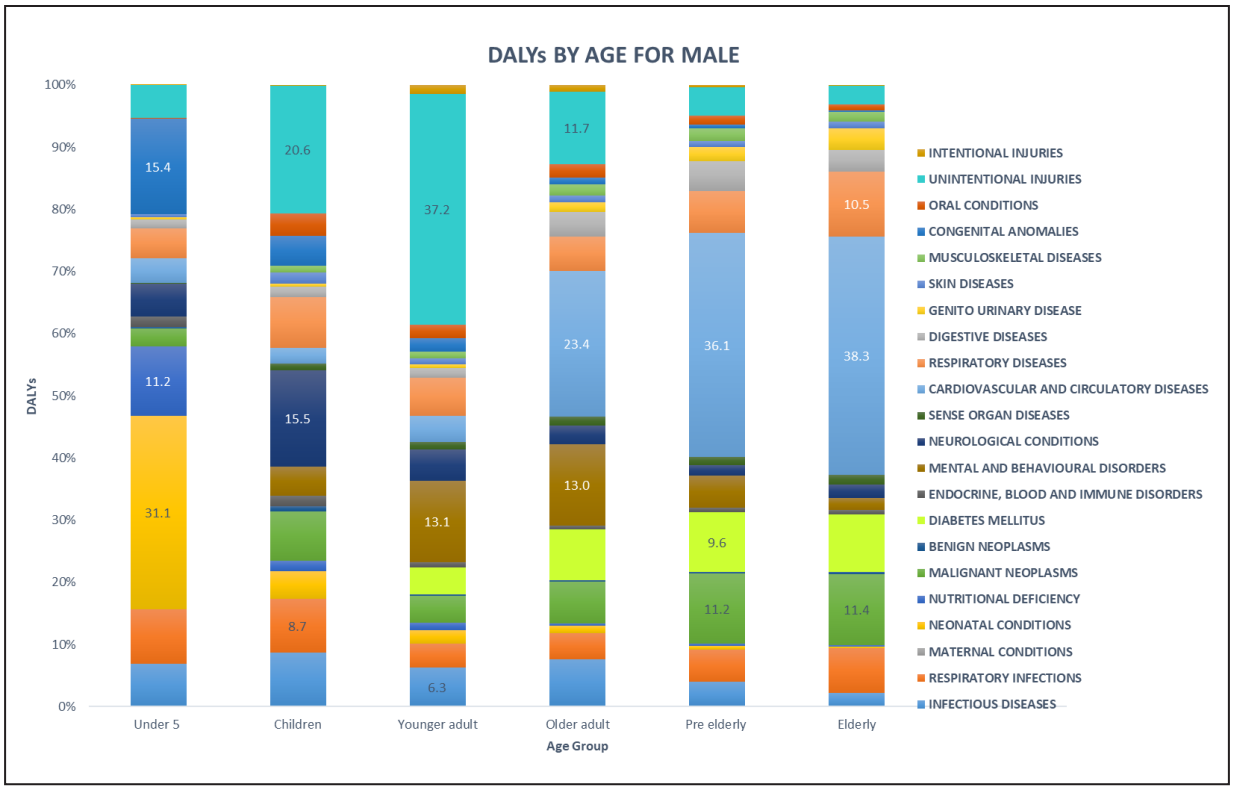
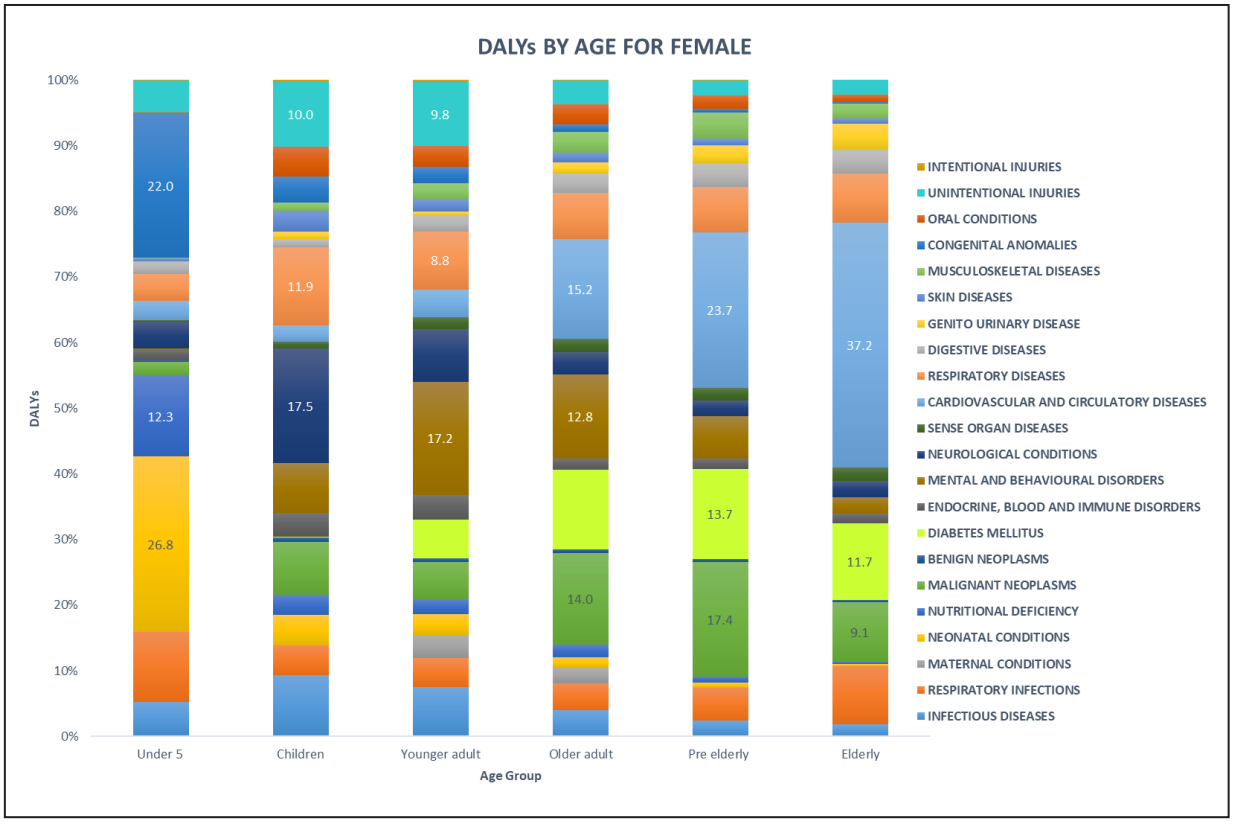


Figure 5.15: *Percentage (%) of total burden (DALYs), by disease categories and age group, female, 2017.*



5.3.3 Leading Causes of Disability-Adjusted Life Years (DALYs) for 2017.

Ischemic Heart Disease was the leading cause of total burden in Malaysia for 2017, contributing 11.8% of the total DALYs. This was followed by Diabetes Mellitus, with 8.5%, Cerebrovascular Diseases (Stroke) (8.4%), Road Traffic Injuries (5.9%) and Lower Respiratory Infections (5.5%). For under 5 (0 to 4 years old), Protein-Energy Malnutrition was the leading cause of total burden with 9.5% of total DALYs, followed by Lower Respiratory Infections with 8.7% and Low Birth Weight (7.7%). Road Traffic Injuries were the leading cause of total burden for children (5 to 14 years old) and young adult (15 to 29 years old) with 9.3% and 23.5% respectively. Ischemic Heart Disease was the leading cause of total burden with 9.7% of total DALYs in older adult (30 to 49 years old), followed by Diabetes Mellitus with 9.7%, Cerebrovascular Diseases (Stroke) (6.6%) and Road Traffic Injuries (6.6%). Ischemic Heart Disease was the leading cause of total burden with 16.8% of total DALYs in pre-elderly (50 to 59 years old), followed by Diabetes Mellitus with 11.2% and Cerebrovascular Diseases (Stroke) (10.0%). However, the leading cause of total burden vary in elderly (60 years and above). Ischemic Heart Disease was the leading cause of total burden with 18.2% while Cerebrovascular Diseases (Stroke) as 14.1% and Diabetes Mellitus (10.3%) **(Table 5.10)**.

Among male, Ischemic Heart Disease was the leading cause of total burden with 13.2% of total DALYs, followed by Road Traffic Injuries with 8.4% and Cerebrovascular Diseases (Stroke) (8.4%). For under 5 (0 to 4 years old), Protein-Energy Malnutrition was the leading cause of total burden with 9.1% of total DALYs, followed by Low Birth Weight with 8.2% and Lower Respiratory Infections (7.8%). Road Traffic Injuries were the leading cause of total burden for children (5 to 14 years old) and young adult (15 to 29 years old) with 12.3% and 32.2% respectively. Ischemic Heart Disease was the leading cause of total burden with 11.9% of total DALYs in older adult (30 to 49 years old), followed by Road Traffic Injuries with 9.0% and Diabetes Mellitus (8.1%). Ischemic Heart Disease was the leading cause of total burden with 21.4% of total DALYs in pre-elderly (50 to 59 years old), followed by Cerebrovascular Diseases (Stroke) with 10.4% and Diabetes Mellitus (9.6%). Same leading cause also seen in elderly (60 years and above) whereas Ischemic Heart Disease was the leading cause of total burden with 19.2% of total DALYs while Cerebrovascular Diseases (Stroke) as 13.9% and Diabetes Mellitus (9.2%) **(Table 5.11)**.

Among female, Diabetes Mellitus was the leading cause of total burden with 10.0% of total DALYs, followed by Ischemic Heart Disease with 9.8% and Cerebrovascular Diseases (Stroke) (8.4%). For under 5 (0 to 4 years old), Protein-Energy Malnutrition was the leading cause of total burden with 9.9% of total DALYs, followed by Lower Respiratory Infections with 9.7% and Low Birth Weight (7.1%). Diarrhoeal Diseases was the leading cause of total burden for children (5 to 14 years old) with 6.3%, while Road Traffic Injuries was the leading cause of total burden in young adult (15 to 29 years old) with 8.5%. Diabetes Mellitus was the leading cause of total burden with 12.1% of total DALYs in older adult (30 to 49 years old), followed by Ischemic Heart Disease with 6.4% and Cerebrovascular Diseases (Stroke) (5.6%). Diabetes Mellitus was the leading cause of total burden with 13.7% of total DALYs in pre-elderly (50 to 59 years old), followed by Ischemic Heart Disease with 10.1% and Cerebrovascular Diseases (Stroke) with 9.3%. However, the leading cause of total burden vary in elderly (60 years and above). Ischemic Heart Disease was the leading cause of total burden with 16.9% of total DALYs, followed by Cerebrovascular Diseases (Stroke) with 14.3% and Diabetes Mellitus (11.7%) (**Table 5.12)**.

Person

Table 5.10: Leading causes of total burden (total DALYs; percentage %) for all population, by age group, 2017.

Rank	Overall Age (0+ years old)	Under 5 (0-4 years old)	Children (5-14 years old)	Young Adult (15-29 years old)	Older Adult (30-49 years old)	Pre-Elderly (50-59 years old)	Elderly (60+ years old)
1	Ischemic Heart Disease ***688,594 ; 11.8%***	Protein-Energy Malnutrition ***40,138 ; 9.5%***	Road Traffic Injuries ***21,913 ; 9.3%***	Road Traffic Injuries ***180,031 ; 23.5%***	Ischaemic Heart Disease ***130,301 ; 9.7%***	Ischaemic Heart Disease ***156,562 ; 16.8%***	Ischaemic Heart Disease ***391,546 ; 18.2%***
2	Diabetes Mellitus ***494,573 ; 8.5%***	Lower Respiratory Infections ***36,840 ; 8.7%***	Diarrhoeal Diseases ***13,864 ; 5.9%***	Diabetes Mellitus ***37,650 ; 4.9%***	Diabetes Mellitus ***129,500 ; 9.7%***	Diabetes Mellitus ***104,551 ; 11.2%***	Cerebrovascular Diseases (Stroke) ***303,049 ; 14.1%***
3	Cerebrovascular Diseases (Stroke) ***491,910 ; 8.4%***	Low Birth Weight ***32,681 ; 7.7%***	Asthma ***13,073 ; 5.5%***	Asthma ***33,481 ; 4.4%***	Cerebrovascular Diseases (Stroke) ***88,899 ; 6.6%***	Cerebrovascular Diseases (Stroke) ***92,804 ; 10.0%***	Diabetes Mellitus ***222,651 ; 10.3%***
4	Road Traffic Injuries ***344,312 ; 5.9%***	Congenital Heart Diseases ***27,137 ; 6.4%***	Epilepsy ***10,099 ; 4.3%***	Unipolar Depressive Disorders ***25,644 ; 3.4%***	Road Traffic Injuries ***88,482 ; 6.6%***	Lower Respiratory Infections ***43,454 ; 4.7%***	Lower Respiratory Infections ***167,012 ; 7.8%***
5	Lower Respiratory Infections ***321,206 ; 5.5%***	Birth Trauma and Asphyxia ***23,780 ; 5.6%***	Lower Respiratory Infections ***8,797 ; 3.7%***	Anxiety Disorders ***21,464 ; 2.8%***	Lower Respiratory Infections ***45,118 ; 3.4%***	Asthma ***22,900 ; 2.5%***	Chronic Obstructive Pulmonary Disease ***90,989 ; 4.2%***
6	Asthma ***151,448 ; 2.6%***	Neonatal Infections ***18,470 ; 4.4%***	Leukaemia ***8,630 ; 3.7%***	Epilepsy ***20,060 ; 2.6%***	Asthma ***44,822 ; 3.3%***	Road Traffic Injuries ***22,666 ; 2.4%***	Trachea, Bronchus and Lung Cancers ***52,136 ; 2.4%***
7	Chronic Obstructive Pulmonary Disease ***130,823 ; 2.2%***	Diarrhoeal Diseases ***16,581 ; 3.9%***	Birth Trauma and Asphyxia ***6,912 ; 2.9%***	Lower Respiratory Infections ***19,984 ; 2.6%***	Drug Use Disorders ***42,436 ; 3.2%***	Trachea, Bronchus and Lung Cancers ***19,312 ; 2.1%***	Nephritis and Nephrosis ***50,837 ; 2.4%***
8	Trachea, Bronchus and Lung Cancers ***92,768 ; 1.6%***	Nutritional Anaemias ***9,287 ; 2.2%***	Anxiety Disorders ***6,402 ; 2.7%***	Diarrhoeal Diseases ***17,167 ; 2.2%***	Schizophrenia ***36,429 ; 2.7%***	Breast Cancer ***18,977 ; 2.0%***	Asthma ***35,226 ; 1.6%***
9	Nephritis and Nephrosis ***85,167 ; 1.5%***	Chronic Obstructive Pulmonary Disease ***8,029 ; 1.9%***	Endocrine, Blood and Immune Disorders ***6,021 ; 2.6%***	Drug Use Disorders ***16,550 ; 2.2%***	Unipolar Depressive Disorders ***26,992 ; 2.0%***	Chronic Obstructive Pulmonary Disease ***17,649 ; 1.9%***	Road Traffic Injuries ***23,290 ; 1.1%***
10	Unipolar Depressive Disorders ***83,926 ; 1.4%***	Road Traffic Injuries ***7,930 ; 1.9%***	Upper Respiratory Infections ***5,933 ; 2.5%***	Schizophrenia ***15,348 ; 2.0%***	Anxiety Disorders ***24,606 ; 1.8%***	Schizophrenia ***13,799 ; 1.5%***	Endocrine, Blood and Immune Disorders ***22,738 ; 1.1%***

Male

Table 5.11: *Leading causes of total burden (total DALYs; percentage %) for male, by age group, 2017.*

Rank	Overall Age (0+ years old)	Under 5 (0-4 years old)	Children (5-14 years old)	Young Adult (15-29 years old)	Older Adult (30-49 years old)	Pre-Elderly (50-59 years old)	Elderly (60+ years old)
1	Ischemic Heart Disease ***448,474 ; 13.2%***	Protein-Energy Malnutrition ***20,943 ; 9.1%***	Road Traffic Injuries ***15,942 ; 12.3%***	Road Traffic Injuries ***156,233 ; 32.2%***	Ischaemic Heart Disease ***97,450 ; 11.9%***	Ischaemic Heart Disease ***118,404 ; 21.4%***	Ischaemic Heart Disease ***226,119 ; 19.2%***
2	Road Traffic Injuries ***287,110 ; 8.4%***	Low Birth Weight ***19,025 ; 8.2%***	Asthma ***7,346 ; 5.6%***	Diabetes Mellitus ***21,037 ; 4.3%***	Road Traffic Injuries ***74,338 ; 9.0%***	Cerebrovascular Diseases (Stroke) ***57,747 ; 10.4%***	Cerebrovascular Diseases (Stroke) ***163,740 ; 13.9%***
3	Cerebrovascular Diseases (Stroke) ***286,059 ; 8.4%***	Lower Respiratory Infections ***18,098 ; 7.8%***	Lower Respiratory Infections ***7,249 ; 5.6%***	Asthma ***20,161 ; 4.2%***	Diabetes Mellitus ***66,909 ; 8.1%***	Diabetes Mellitus ***53,065 ; 9.6%***	Diabetes Mellitus ***108,303 ; 9.2%***
4	Diabetes Mellitus ***249,346 ; 7.3%***	Birth Trauma and Asphyxia ***14,574 ; 6.3%***	Diarrhoeal Diseases ***7,187 ; 5.5%***	Drug Use Disorders ***15,894 ; 3.3%***	Cerebrovascular Diseases (Stroke) ***59,847 ; 7.3%***	Lower Respiratory Infections ***26,324 ; 4.8%***	Lower Respiratory Infections ***82,737 ; 7.0%***
5	Lower Respiratory Infections ***175,278 ; 5.2%***	Congenital Heart Diseases ***14,466 ; 6.3%***	Leukaemia ***6,513 ; 5.0%***	Lower Respiratory Infections ***12,418 ; 2.6%***	Drug Use Disorders ***41,337 ; 5.0%***	Road Traffic Injuries ***17,464 ; 3.2%***	Chronic Obstructive Pulmonary Disease ***70,425 ; 6.0%***
6	Chronic Obstructive Pulmonary Disease ***99,888 ; 2.9%***	Diarrhoeal Diseases ***10,528 ; 4.6%***	Epilepsy ***5,082 ; 3.9%***	Unipolar Depressive Disorders ***12,266 ; 2.5%***	Lower Respiratory Infections ***28,452 ; 3.5%***	Chronic Obstructive Pulmonary Disease ***14,638 ; 2.6%***	Trachea, Bronchus and Lung Cancers ***39,968 ; 3.4%***
7	Asthma ***79,288 ; 2.3%***	Neonatal Infections ***10,218 ; 4.4%***	Birth Trauma and Asphyxia ***3,881 ; 3.0%***	Epilepsy ***11,990 ; 2.5%***	Asthma ***24,666 ; 3.0%***	Trachea, Bronchus and Lung Cancers ***14,535 ; 2.6%***	Nephritis and Nephrosis ***24,547 ; 2.1%***
8	Trachea, Bronchus and Lung Cancers ***67,971 ; 2.0%***	Chronic Obstructive Pulmonary Disease ***5,593 ; 2.4%***	Upper Respiratory Infections ***3,337 ; 2.6%***	Diarrhoeal Diseases ***8,234 ; 1.7%***	HIV/AIDS ***19,242 ; 2.3%***	Asthma ***10,894 ; 2.0%***	Road Traffic Injuries ***19,267 ; 1.6%***
9	Drug Use Disorders ***63,309 ; 1.9%***	Nutritional Anaemias ***4,818 ; 2.1%***	Skin and Subcutaneous Diseases ***2,451 ; 1.9%***	Anxiety Disorders ***7,932 ; 1.6%***	Schizophrenia ***18,854 ; 2.3%***	Liver Cancers ***7,710 ; 1.4%***	Prostate Cancer ***18,725 ; 1.6%***
10	Nephritis and Nephrosis ***44,060 ; 1.3%***	Road Traffic Injuries ***3,865 ; 1.7%***	Anxiety Disorders ***2,428 ; 1.9%***	Schizophrenia ***7,916 ; 1.6%***	Tuberculosis ***15,116 ; 1.8%***	Mouth and Oropharynx Cancers ***7,456 ; 1.3%***	Asthma ***15,288 ; 1.3%***

Female

Table 5.12: *Leading causes of total burden (total DALYs; percentage %) for female, by age group, 2017.*

Rank	Overall Age (0+ years old)	Under 5 (0-4 years old)	Children (5-14 years old)	Young Adult (15-29 years old)	Older Adult (30-49 years old)	Pre-Elderly (50-59 years old)	Elderly (60+ years old)
1	Diabetes Mellitus ***245,226 ; 10.0%***	Protein-Energy Malnutrition ***19,195 ; 9.9%***	Diarrhoeal Diseases ***6,677 ; 6.3%***	Road Traffic Injuries ***23,798 ; 8.5%***	Diabetes Mellitus ***62,592 ; 12.1%***	Diabetes Mellitus ***51,486 ; 13.7%***	Ischaemic Heart Disease ***165,427 ; 16.9%***
2	Ischemic Heart Disease ***240,120 ; 9.8%***	Lower Respiratory Infections ***18,743 ; 9.7%***	Road Traffic Injuries ***5,970 ; 5.6%***	Diabetes Mellitus ***16,613 ; 5.9%***	Ischaemic Heart Disease ***32,852 ; 6.4%***	Ischaemic Heart Disease ***38,158 ; 10.1%***	Cerebrovascular Diseases (Stroke) ***139,309 ; 14.3%***
3	Cerebrovascular Diseases (Stroke) ***205,851 ; 8.4%***	Low Birth Weight ***13,656 ; 7.1%***	Asthma ***5,727 ; 5.4%***	Asthma ***13,319 ; 4.8%***	Cerebrovascular Diseases (Stroke) ***29,052 ; 5.6%***	Cerebrovascular Diseases (Stroke) ***35,057 ; 9.3%***	Diabetes Mellitus ***114,348 ; 11.7%***
4	Lower Respiratory Infections ***145,928 ; 6.0%***	Congenital Heart Diseases ***12,670 ; 6.6%***	Epilepsy ***5,017 ; 4.7%***	Endocrine, Blood and Immune Disorders ***10,444 ; 3.7%***	Breast Cancer ***21,965 ; 4.2%***	Breast Cancer ***18,975 ; 5.0%***	Lower Respiratory Infections ***84,275 ; 8.6%***
5	Asthma ***72,160 ; 2.9%***	Birth Trauma and Asphyxia ***9,206 ; 4.8%***	Brain and Other CNS Cancers ***4,307 ; 4.1%***	Diarrhoeal Diseases ***8,934 ; 3.2%***	Asthma ***20,156 ; 3.9%***	Lower Respiratory Infections ***17,130 ; 4.6%***	Nephritis and Nephrosis ***26,290 ; 2.7%***
6	Road Traffic Injuries ***57,202 ; 2.3%***	Neonatal Infections ***8,252 ; 4.3%***	Endocrine, Blood and Immune Disorders ***3,832 ; 3.6%***	Epilepsy ***8,070 ; 2.9%***	Lower Respiratory Infections ***16,665 ; 3.2%***	Asthma ***12,006 ; 3.2%***	Chronic Obstructive Pulmonary Disease ***20,564 ; 2.1%***
7	Breast Cancer ***54,708 ; 2.2%***	Diarrhoeal Diseases ***6,053 ; 3.1%***	Skin and Subcutaneous Diseases ***3,461 ; 3.3%***	Lower Respiratory Infections ***7,566 ; 2.7%***	Road Traffic Injuries ***14,144 ; 2.7%***	Osteoarthritis ***6,641 ; 1.8%***	Asthma ***19,938 ; 2.0%***
8	Endocrine, Blood and Immune Disorders ***46,766 ; 1.9%***	Nutritional Anaemias ***4,469 ; 2.3%***	Nutritional Anaemias ***3,179 ; 3.0%***	Nutritional Anaemias ***6,573 ; 2.3%***	Nutritional Anaemias ***9,499 ; 1.8%***	Nephritis and Nephrosis ***6,591 ; 1.8%***	Endocrine, Blood and Immune Disorders ***14,305 ; 1.5%***
9	Anxiety Disorders ***44,438 ; 1.8%***	Road Traffic Injuries ***4,065 ; 2.1%***	Birth Trauma and Asphyxia ***3,031 ; 2.9%***	Birth Trauma and Asphyxia ***5,399 ; 1.9%***	Endocrine, Blood and Immune Disorders ***8,842 ; 1.7%***	Endocrine, Blood and Immune Disorders ***6,079 ; 1.6%***	Breast Cancer ***13,198 ; 1.4%***
10	Unipolar Depressive Disorders ***43,380 ; 1.8%***	Endocrine, Blood and Immune Disorders ***3,264 ; 1.7%***	Upper Respiratory Infections ***2,596 ; 2.5%***	Skin and Subcutaneous Diseases ***5,101 ; 1.8%***	Hearing Loss ***8,675 ; 1.7%***	Hearing Loss ***5,635 ; 1.5%***	Dementia ***12,252 ; 1.3%***

6.0 Health-Adjusted Life Expectancy (HALE)

Health-Adjusted Life Expectancy (HALE) refers to the average number of years, at each age or age group, expected to be lived in full health; that is, without the health consequences of disease and injury. Substantial resources are devoted to reducing the incidence, duration and severity of major diseases that cause morbidity but not mortality and to reducing their impact on people's lives. It is important to capture both fatal and non-fatal health outcomes in a summary measure of average levels of population health. HALE at birth adds up expectation of life for different health states, adjusted for severity distribution making it sensitive to changes over time or differences between countries in the severity distribution of health states.

In person, HALE at birth was higher in 2015 with 68.74 years, giving a gap of 6.71 years of full health. Among male, HALE at birth was higher in 2015 with 66.80 years, giving a gap of 6.80 years of full health as compared with female with 70.94 years. Male had the highest gap of full health with 7.23 years in 2016 **(Table 6.1)**.

Table 6.1: *Health-Adjusted Life Expectancy (HALE) in Malaysia, 2015 to 2017.*

Year	Life Expectancy (LE) at Birth			Health-Adjusted Life Years (HALE) at Birth			Estimation life years with disability at Birth		
	Person	Male	Female	Person	Male	Female	Person	Male	Female
2015	75.45	73.59	77.58	68.74	66.80	70.94	6.71	6.80	6.63
2016	75.36	73.41	77.60	68.36	66.18	70.83	7.00	7.23	6.77
2017	75.37	73.48	77.52	68.38	66.29	70.73	6.99	7.19	6.79

6.1 Pattern of Health-Adjusted Life Expectancy (HALE) in 2015.

Group 2 (Non-Communicable Diseases) had the higher gap of full health with 5.75 years in all population, followed by Group 1 (Communicable Disease, Maternal, Perinatal, Nutritional Status) with 0.76 years and Group 3 (Injuries) with 0.20 years. Male had the higher reduction gap of healthy life expectancy as compared to female **(Figure 6.1)**.

Among male, Cardiovascular and Circulatory Diseases had the higher gap of full health, followed by Mental and Behavioural Disorders and Diabetes Mellitus. For female, Diabetes Mellitus had the higher gap of full health, followed by Mental and Behavioural Disorders and Cardiovascular and Circulatory Diseases **(Figure 6.2)**.

Figure 6.1: *Reduction in healthy life expectancy by GBD group in 2015.*

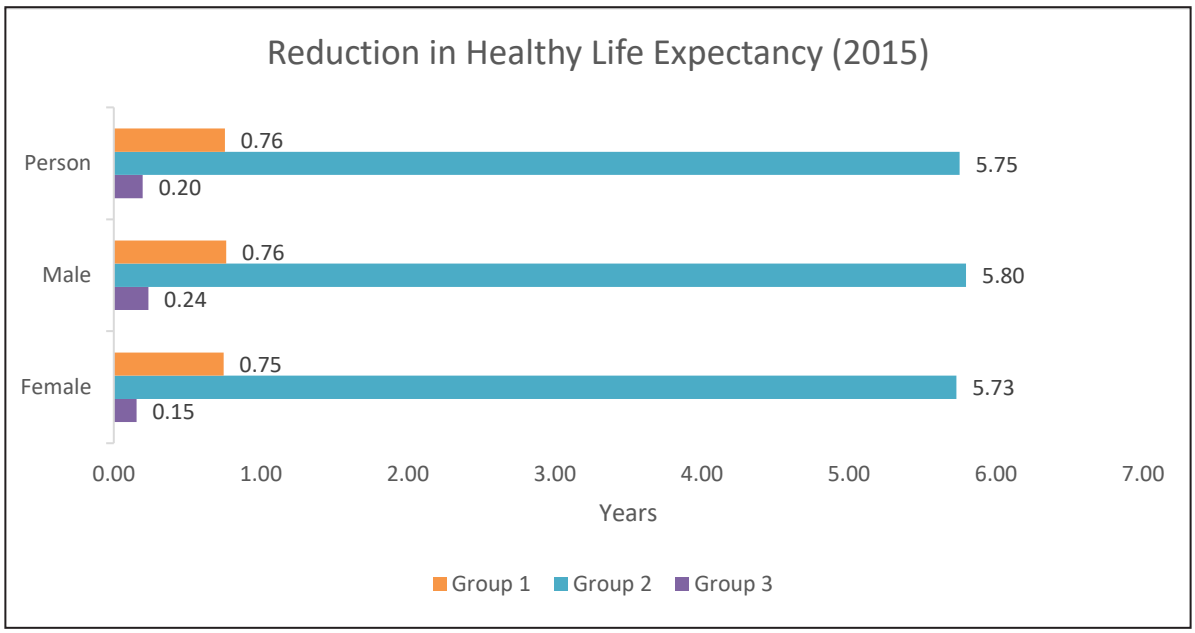
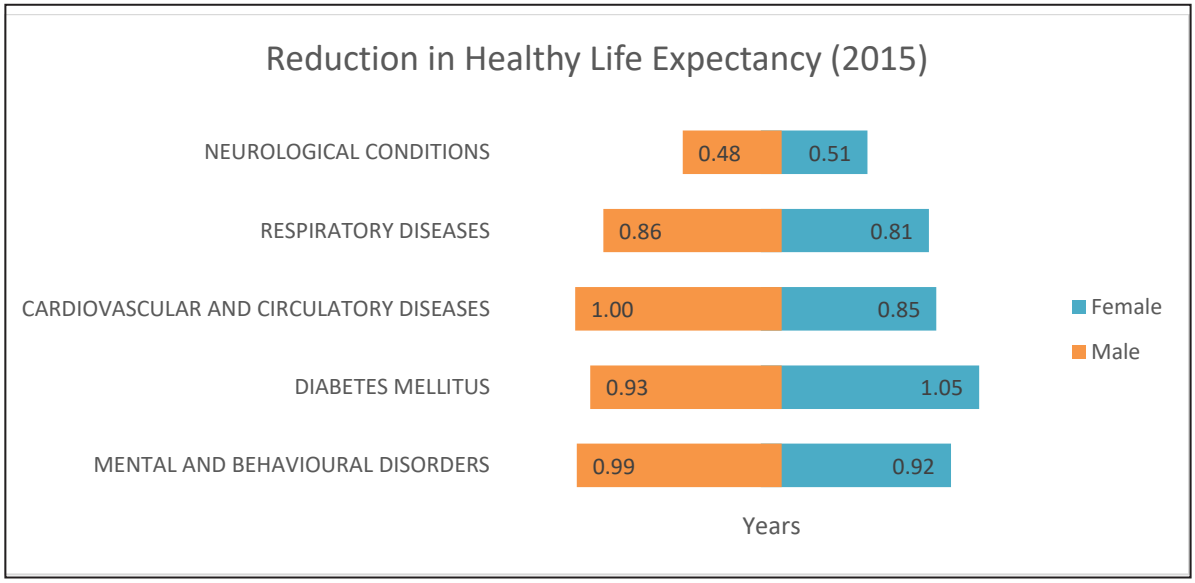


Figure 6.2: *Reduction in healthy life expectancy by leading cause of disability in 2015.*



6.2 Pattern of Health-Adjusted Life Expectancy (HALE) in 2016.

Group 2 (Non-Communicable Diseases) had the higher gap of full health with 6.03 years in all population, followed by Group 1 (Communicable Disease, Maternal, Perinatal, Nutritional Status) with 0.79 years and Group 3 (Injuries) with 0.19 years. Male had the higher reduction gap of healthy life expectancy as compared to female **(Figure 6.3)**.

Among male, Cardiovascular and Circulatory Diseases had the higher gap of full health, followed by Mental and Behavioural Disorders and Diabetes Mellitus. For female, Diabetes Mellitus had the higher gap of full health, followed by Mental and Behavioural Disorders and Cardiovascular and Circulatory Diseases **(Figure 6.4)**.

Figure 6.3: *Reduction in healthy life expectancy by GBD group in 2016.*

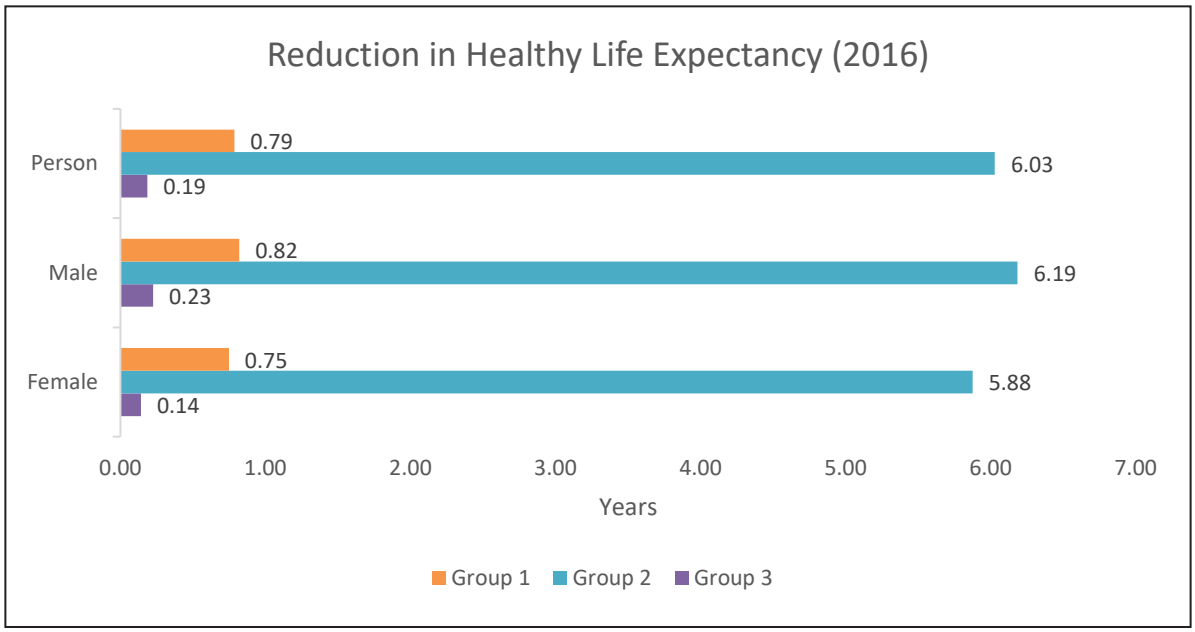
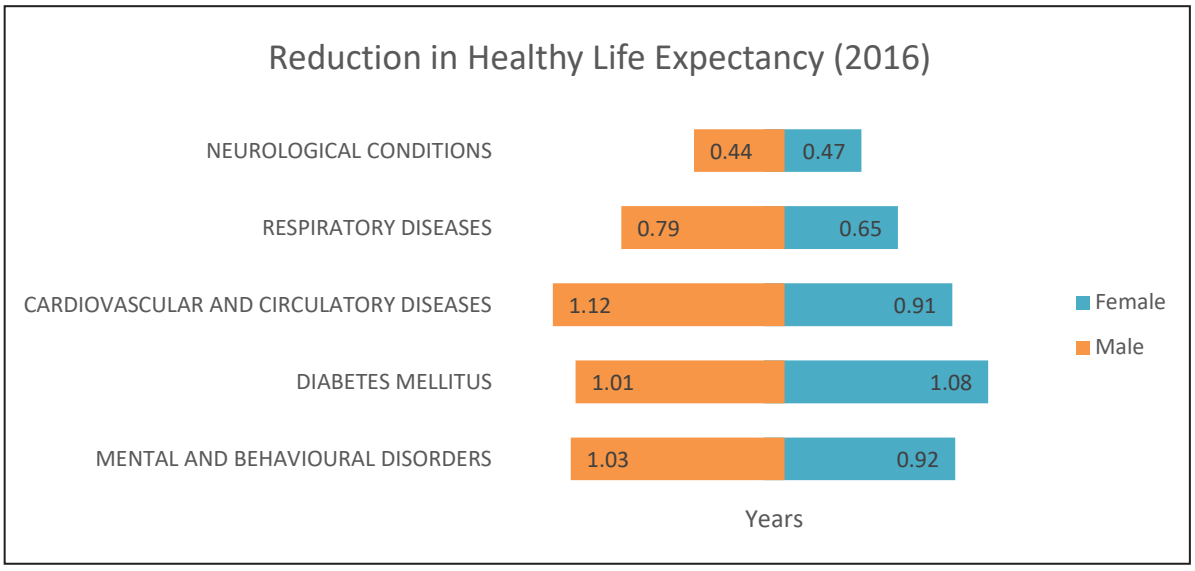


Figure 6.4: *Reduction in healthy life expectancy by leading cause of disability in 2016.*



6.3 Pattern of Health-Adjusted Life Expectancy (HALE) in 2017.

Group 2 (Non-Communicable Diseases) had the higher gap of full health with 6.09 years in all population, followed by Group 1 (Communicable Disease, Maternal, Perinatal, Nutritional Status) with 0.71 years and Group 3 (Injuries) with 0.19 years. Male had the higher reduction gap of healthy life expectancy as compared to female **(Figure 6.5)**.

Among male, Cardiovascular and Circulatory Diseases had the higher gap of full health, followed by Mental and Behavioural Disorders and Diabetes Mellitus. For female, Diabetes Mellitus had the higher gap of full health, followed by Mental and Behavioural Disorders and Cardiovascular and Circulatory Diseases **(Figure 6.4)**.

Figure 6.5: Reduction in healthy life expectancy by GBD group in 2017.

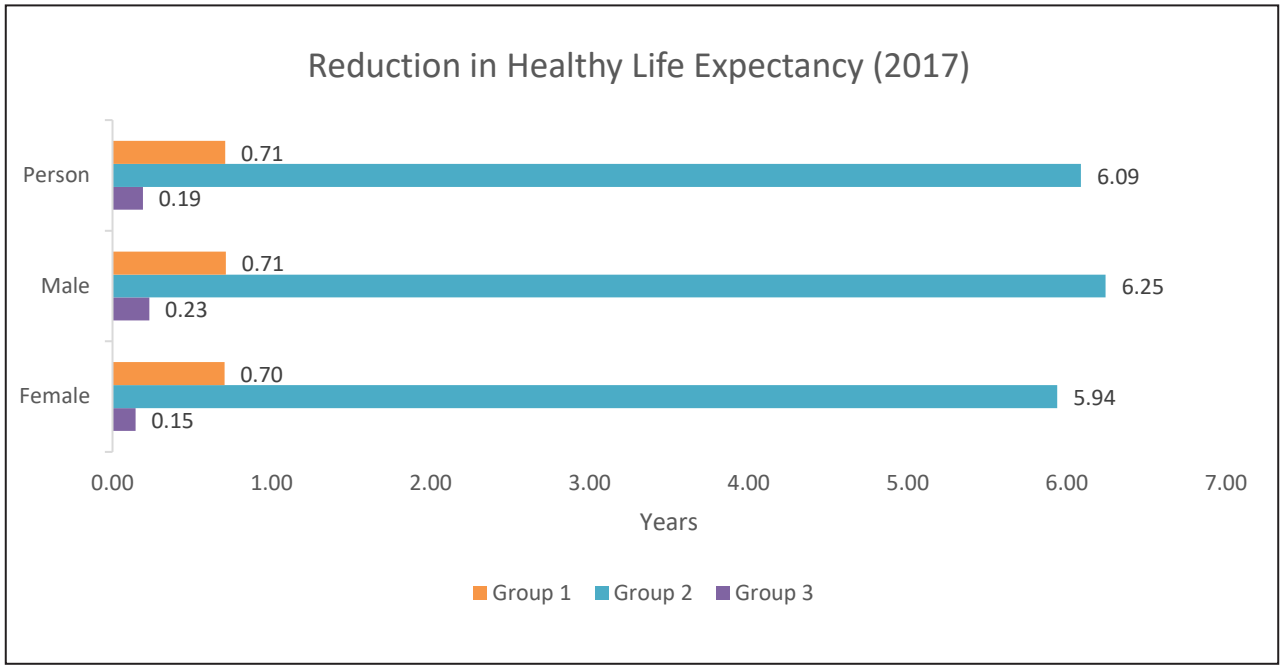
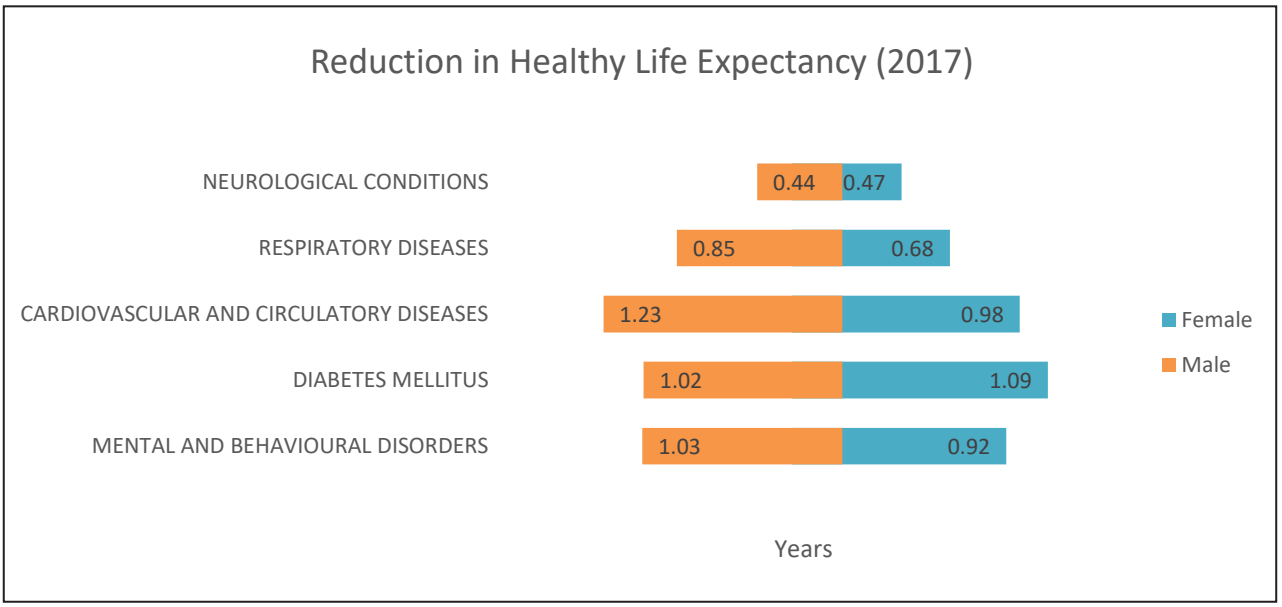


Figure 6.6: Reduction in healthy life expectancy by leading cause of disability in 2017.



7.0 Discussion and Conclusion

Malaysian Burden of Disease and Injury has undertaken it's fourth study after the previous study conducted in 2000, 2008 and lastly 2009 until 2014. The estimates presented in this study, though limited by availability of data, was derived from best available local data for Malaysia and through critical appraisal of available information.

With the implementation of verbal autopsy which derived from previous study on the study on Determination of Cause of Deaths in Malaysia 2013, better local mortality estimates have been produced. The cause of death estimates produced in this report is the first time cause specific mortality fractions (CSMF) from verbal autopsy were applied on non-medically certified deaths to produce a more accurate representation of non-hospital deaths in Malaysia. The accuracy of medically certified deaths has also been enhanced by using the findings of medical records reviews to derive better estimates of the underlying cause of deaths in Malaysia. We believe that these data manipulations have enabled us to obtain the most accurate representation of cause of death and fatal disease burden in Malaysia.

This study uses local data as far as possible, and secondary data sources with no new primary data collection for the sole purpose of this study. The estimates for a large number of diseases in Malaysia is now available through the extensive and vigorous data collection by the Ministry of Health Malaysia. Other than the notification data of certain diseases and hospital in-patient data available, the National Health Surveys carried out yearly have significantly improved the local prevalence estimates of several diseases. Registries such as the National Diabetic Registry and Cancer Registry have been essential towards deriving the burden of these diseases in Malaysia.

However, we need to also acknowledge that data from primary healthcare providers and health service providers outside of Ministry of Health is still limited. Several of the disease registries in Malaysia needs to be expanded to include a larger representation of both government and private hospitals in Malaysia to enable meaningful use of the data collected. Estimates for some diseases have also had to be made based on international data and disease modelling estimates. This is notably so especially for Mental and Behavioural Disorders, one of the leading causes of non-fatal burden, where there is no reliable local data or data source to derive accurate estimates specific for the Malaysian population.

We have presented this report in 4 main sections which are Fatal Burden, Non-Fatal Burden, Total Burden and Healthy Life Expectancy. This approach is undertaken as we believe each of these sections present essential information to the different stakeholders. Furthermore, understanding the differences within the fatal and non-fatal burden, beyond looking only at the total burden with additional on healthy life expectancy would assist stakeholders in policy formulation, planning of resources, executing interventions and guiding future research in these areas.

Burden of Disease study uses a macro level approach towards determining the burden of each disease. The aim is to measure the burden of these diseases and injuries as a population at whole, rather than at an individual level. Thus, even though this generalization may not be accurate for an individual inflicted with the health problem, the estimate derived for the whole population would ultimately average out to a reasonable approximation. Furthermore, the absolute number of DALYs is an arbitrary figure that is difficult to interpret and not necessarily comparable between studies due to methodological differences in the calculation. DALYs presented in this report is mainly presented as relative numbers to gain insight on the proportion of a particular disease to the overall disease burden.

As the methodological approach of burden of disease study is to measure the objective health status of the population, we acknowledge that there are many other factors policy makers would and should take into accounting when considering the improvement of the population health status. Inequalities in health, health service delivery and health gains, effectiveness and affordability from interventions are all essential scopes within health policy and priority setting that is not explored in a burden of disease study.

Understanding the burden of some chronic and degenerative diseases, such as Dementia, would not benefit in planning for an intervention or treatment of the diseases, as none such exist. It might however aid in setting up necessary social and support services for these conditions.

The information on the burden of disease and injury is only as good as the data inputs used to derive these estimates. Beyond the systematic assessment of disease burden, undertaking a national level burden of disease study also identifies the gaps in health information system. The data needed for this analysis, would also serve as data potentially required by policy makers or should be provided to policy makers to enable them to make an informed and evidence-based decision.

Continuous improvements need to be implemented to strengthen the vital statistics and cause of death certification in Malaysia. Data collection within the Ministry of Health needs to be further improved, addressing the problems of under-reporting and developing a unified database utilizing primary healthcare provider in government and private sector as well as other healthcare service providers such as rehabilitative and laboratory services. We also recommend that quality control measures are instituted by the relevant divisions collecting these data to ensure accuracy of data as well as produce their own estimates for their service needs as well as provide a more accurate national representation of disease prevalence.

APPENDICES

APPENDIX I:
Disease categories by medically certified death

Disease Categories	ICD-10 Codes
A. INFECTIOUS DISEASES	**A00 - A39, A42 - B99, G00 - G03, G14**
1. Tuberculosis	A15 - A19, B90
2. STDs Excluding HIV	
a. Syphilis	A50 - A53
b. Chlamydia	A55 - A56
c. Gonorrhoea	A54
3. HIV	B20 - B24
4. Diarrhoeal Diseases	A00 - A04, A06 - A09
5. EPI-Cluster	
a. Diphtheria	A36
b. Pertussis	A37
c. Tetanus	A33 - A35
d. Polio	A80, B91
e. Measles	B05
6. Meningitis	G00 - G03
7. Hepatitis	
a. Hepatitis A	B15
b. Hepatitis B	B16
c. Other Hepatitis	B17 - B19
8. Parasitic and Vector Disease	
a. Malaria	B50 - B54
b. Dengue	A90 - A91
9. Other Infectious Diseases	A05, A20 - A32, A38 - A39, A42 - A49, A57 - A63, A65 - A79, A81 - A89, A92 - B04, B06 - B09, B25 - B49, B55 - B89, B92 - B99, G14
B. RESPIRATORY INFECTIONS	**H65 - H66, J00 - J22**
1. Lower Respiratory Infections	J09 - J22
2. Upper Respiratory Infections	J00 - J06
3. Otitis Media	H65 - H66

Disease Categories	ICD-10 Codes
C. MATERNAL CONDITIONS	**O00 - O99**
1. Maternal Haemorrhage	O44 - O46, O67, O72
2. Maternal Sepsis	O85 - O86
3. Hypertensive Disorders of Pregnancy	O10 - O11, O13 - O16
4. Obstructed Labour	O64 - O66
5. Abortion	O00 - O08
6. Other Maternal Conditions	O12, O20 - O43, O47 - O63, O68 - O71, O73 - O84, O87 - O99
D. NEONATAL CONDITIONS	**P00 - P96, R95**
1. Low Birth Weight	P05, P07
2. Birth Trauma and Asphyxia	P03, P10 - P15, P20 - P22, P24 - P26
3. Neonatal Infections	P35 - P39
4. Sudden Infant Death Syndrome	R95
5. Other Neonatal Conditions	P00 - P02, P04, P08, P23, P27 - P29, P50 - P94, P96
E. NUTRITIONAL DEFICIENCY	**D50 - D53, E00 - E02, E40 - E64**
1. Protein-Energy Malnutrition	E40 - E46
2. Nutritional Anaemias	D50 - D53
3. Other Nutritional Disorders	E00 - E02, E50 - E64
F. MALIGNANT NEOPLASMS	**C00 - C97**
1. Mouth and Oropharynx Cancers	C00 - C14
2. Oesophagus Cancer	C15
3. Stomach Cancer	C16
4. Colon and Rectum Cancers	C18 - C21
5. Liver Cancers	C22
6. Pancreas Cancer	C25
7. Trachea, Bronchus and Lung Cancers	C33 - C34, C39
8. Breast Cancer	C50
9. Cervix Cancer	C53
10. Ovary Cancer	C56
11. Prostate Cancer	C61
12. Bladder Cancer	C67
13. Brain and Other CNS Cancers	C70 - C72
14. Lymphoma	C81 - C86

Disease Categories	ICD-10 Codes
15. Leukaemia	C91 - C95
16. Other Malignant Neoplasms	C17, C23 - C24, C26 - C32, C37 - C38, C40 - C49, C51 - C52, C54 - C55, C57 - C60, C62 - C66, C68 - C69, C73 - C79, C88, C90, C96 - C97
G. BENIGN NEOPLASM	**D00 - D48**
1. Benign Neoplasms	D00 - D48
H. DIABETES MELLITUS	**E10 - E14**
1. Diabetes Mellitus	E10 - E14
I. ENDOCRINE, BLOOD AND IMMUNE DISORDERS	**D55 - D64, D66 - D89, E03 - E07, E15 - E35, E65 - E90**
1. Endocrine, Blood and Immune Disorders	D55 - D64, D66 - D89, E03 - E07, E15 - E35, E65 - E90
J. MENTAL AND BEHAVIOURAL DISORDER	**F04 - F69, F80 - F99**
1. Unipolar Depressive Disorder	F32 - F33
2. Bipolar Affective Disorder	F30 - F31
3. Schizophrenia	F20 - F29
4. Alcohol Use Disorders	F10
5. Drug Use Disorders	F11 - F16, F18 - F19
6. Anxiety Disorders	F40 - F44
7. Other Mental and Behavioural Disorders	F04 - F09, F17, F34 - F39, F45 - F69, F80 - F98
K. NEUROLOGICAL CONDITIONS	**F00 - F03, F70 - F79, G04 - G13, G20 - G99**
1. Epilepsy	G40 - G41
2. Dementia	F00 - F03, G30 - G32
3. Parkinson Disease	G20 - G22
4. Mental Retardation	F70 - F79
5. Other Neurological Conditions	G04 - G13, G23 - G26, G35 - G37, G43 - G99
L. SENSE ORGAN DISEASES	**H00 - H61, H68 - H95**
1. Glaucoma	H40
2. Cataract	H25 - H26
3. Hearing Loss	H90 - H91
4. Other Sense Organ Disorder	H00 - H21, H27 - H36, H43 - H61, H68 - H83, H92 - H95

Disease Categories	ICD-10 Codes
M. CARDIOVASCULAR AND CIRCULATORY DISEASES	**I00 - I25, I27 - I45, I47 - I99**
1. Rheumatic Heart Disease	I01 - I09
2. Hypertensive Heart Disease	I11 - I14
3. Ischaemic Heart Disease	I20 - I25
4. Cerebrovascular Diseases (Stroke)	I60 - I69
5. Pericarditis, Endocarditis and Myocarditis	I30, I32 - I33, I38, I40 - I42
6. Other Circulatory Diseases	I00, I27 - I28, I31, I34 - I37, I44 - I45, I47 - I51, I71 - I84, I86 - I99
N. RESPIRATORY DISEASES	**J30 - J95, J97 - J98**
1. Chronic Obstructive Pulmonary Disease	J40 - J44
2. Asthma	J45 - J46
3. Other Respiratory Diseases	J30 - J39, J47 - J95, J97 - J98
O. DIGESTIVE DISEASES	**K20 - K92**
1. Peptic Ulcer Disease	K25 - K27
2. Appendicitis	K35 - K37
3. Cirrhosis of the Liver	K70, K74
4. Other Digestive Diseases	I85, K20 - K22, K28 - K31, K38 - K66, K71 - K73, K75 - K92
P. GENITO URINARY DISEASE	**N00 - N16, N18 - N99**
1. Nephritis and Nephrosis	N00 - N16, N18 - N19
2. Benign Prostatic Hypertrophy	N40
3. Other Urinary Diseases	N20 - N39, N41 - N99
Q. SKIN DISEASES	**L00 - L98**
1. Skin and subcutaneous diseases	L00 - L98
R. MUSCULOSKELETAL DISEASES	**M00 - M99**
1. Rheumatoid Arthritis	M05 - M06
2. Osteoarthritis	M15 - M19
3. Back and Neck Pain	M50 - M54
4. Gout	M10
5. Other Musculoskeletal Disorders	M00 - M02, M07 - M08, M11 - M13, M20 - M48, M60 - M99

Disease Categories	ICD-10 Codes
S. CONGENITAL ANOMALIES	**Q00 - Q99**
1. Congenital Heart Diseases	Q20 - Q28
2. Down Syndrome	Q90
3. Other Chromosomal Disorders	Q91 - Q99
4. Cleft Lip and Palate	Q35 - Q37
5. Spina Bifida	Q05
6. Anencephaly	Q00
7. Other Congenital Anomalies	Q01 - Q04, Q06 - Q18, Q30 - Q34, Q38 - Q89
T. ORAL CONDITIONS	**K00 - K14**
1. Dental Caries	K02
2. Periodontitis	K05
3. Edentulism	K06
4. Other Oral Diseases	K00 - K01, K03 - K04, K07 - K14
U. UNINTENTIONAL INJURIES	**V01 - X59, Y40 - Y86, Y88**
1. Road Traffic Injuries	V01 - V89, V99, Y85 - Y86
2. Poisonings	X40 - X49
3. Falls	W00 - W19
4. Fires, Heat and Hot Substances	X00 - X19
5. Drowning	W65 - W74
6. Other Unintentional Injuries	V90 - V98, W20 - W64, W75 - W99, X20 - X39, X50 - X59, Y40 - Y84, Y88
V. INTENTIONAL INJURIES	**X60 - Y09, Y35 - Y36,**
1. Self-Inflicted Injuries	X60 - X84,
2. Interpersonal Violence /Homicide	X85 - Y09,
3. Other intentional injuries	Y35 - Y36

APPENDIX II:
Disease categories by non-medically certified death

Disease Categories	DOSM Code	ICD-10 Code
INFECTIOUS DISEASES		
1. Cholera	001	A00
2. Typhoid	002	A01
3. Food Poisoning	003	A05
4. Dysentery / Diarrhoea	004	A09
5. Tuberculosis	005	A18
6. Plague	006	A20
7. Anthrax	007	A22
8. Leprosy	008	A30
9. Tetanus	009	A33
10. Diphtheria	010	A36
11. Whooping Cough	011	A37
12. Septicaemia	012	A41
13. Syphilis	013	A50
14. Gonorrhoea	014	A54
15. Cancroid	015	A57
16. Relapsing Fever	016	A68
17. Typhus	017	A75
18. Acute Poliomyelitis	018	A80
19. Rabies	019	A82
20. Viral Encephalitis	020	A83
21. Dengue Fever	021	A90
22. Dengue Haemorrhagic Fever	022	A91
23. Chikungunya	023	A92
24. Yellow Fever	024	A95
25. Ebola	025	A98
26. Chicken Pox	026	B01
27. Shingles	027	B02
28. Measles / Rubella	028	B05

Disease Categories	DOSM Code	ICD-10 Code
29. Hand, Foot and Mouth Disease	029	B08
30. Hepatitis A, B and C	030	B19
31. AIDS / HIV	031	B24
32. Mumps	032	B26
33. Tinea	033	B35
34. Candidiasis	034	B37
35. Malaria	035	B54
36. Filariasis	036	B74
37. Worm infestation	037	B83
38. Scabies	038	B86
39. Other infections	039	B99
CANCER		
1. Tongue Cancer	100	C02
2. Gum Cancer	101	C03
3. Mouth / Oral Cancer	102	C06
4. Salivary Gland Cancer	103	C08
5. Tonsil Cancer	104	C09
6. Throat Cancer	105	C14
7. Oesophagus Cancer	110	C15
8. Stomach Cancer	111	C16
9. Intestine Cancer / Colon Cancer	112	C19
10. Rectum Cancer	113	C20
11. Liver Cancer / Bile Duct Cancer	114	C22
12. Gallbladder Cancer	115	C23
13. Pancreas Cancer	116	C25
14. Spleen Cancer	117	C26
15. Other Digestive System Cancers	119	C26
16. Larynx Cancer	120	C32
17. Respiratory Tract Cancer	121	C33
18. Lung Cancer	122	C34
19. Heart Cancer	123	C38
20. Other Respiratory Tract Cancers	124	C39
21. Bone Cancer	125	C41

Disease Categories	DOSM Code	ICD-10 Code
22. Skin Cancer	126	C44
23. Nerve Cancer	127	C46
24. Other Connective and Soft Tissue Cancer	128	C49
25. Breast Cancer	130	C50
26. Vulva Cancer	131	C51
27. Vaginal Cancer	132	C52
28. Cervix Cancer	133	C53
29. Uterus Cancer	134	C55
30. Ovary Cancer	135	C56
31. Other Female Reproductive Organ Cancers	139	C57
32. Penis Cancer	140	C60
33. Prostate Cancer	141	C61
34. Testis Cancer	142	C62
35. Other Male Reproductive Organ Cancers	144	C63
36. Kidney Cancer	145	C64
37. Urinary Bladder Cancer	146	C67
38. Other Urinary Tract System Cancers	149	C68
39. Eye Cancer	150	C69
40. Brain Cancer	151	C71
41. Other Central Nervous System Cancers	154	C72
42. Thyroid Cancer	155	C73
43. Other Endocrine Gland Cancers	159	C75
44. Cancer of Non-Specific Site	160	C76
45. Secondary Cancer of Other Sites	161	C79
46. Cancer - Primary Site Not Mentioned	162	C80
47. Lymphoma	165	C85
48. Leukaemia	166	C95
49. Other Lymphoid, Blood and Tissue Cancers	169	C96
50. Neoplasm of Uncertain or Unknown Behaviour	170	D48
DISEASES OF THE BLOOD AND BLOOD FORMING ORGANS		
1. Thalassemia	200	D56
2. Anaemia	201	D64
3. Other Blood and Blood Forming Organ Diseases	204	D75

Disease Categories	DOSM Code	ICD-10 Code
ENDOCRINE, NUTRITIONAL AND METABOLIC DISEASES		
1. Thyroid	205	E07
2. Diabetes	206	E14
3. Dehydration	207	E86
4. Other Endocrine, Nutritional and Metabolic Diseases	209	E87
MENTAL AND BEHAVIOURAL DISORDERS		
1. Dementia	210	F03
2. Alcoholism	211	F10
3. Drug Addiction	212	F19
4. Schizophrenia	213	F20
5. Affective Disorder	214	F31
6. Reaction to Severe Stress and Adjustment Disorder	215	F43
7. Mental and Behavioural Disorders Associated with Puerperium	216	F53
8. Mental Retardation	217	F79
9. Other Mental and Behavioural Disorders	219	F99
DISEASES OF THE NERVOUS SYSTEM		
1. Meningitis and Encephalitis	220	G03
2. Parkinson	221	G20
3. Alzheimer's Disease	222	G30
4. Epilepsy	223	G41
5. Paralysis	224	G83
6. Hydrocephalus	225	G91
7. Other Disorders of Brain	226	G93
8. Nerve Diseases	227	G98
9. Other Nervous System Disease	229	G99
DISEASES OF THE CIRCULATORY SYSTEM		
1. Hypertension	230	I10
2. Heart Attack	231	I21
3. Chronic Ischaemic Heart Disease	232	I25
4. Heart Failure	233	I50
5. Other Heart Diseases	234	I51
6. Brain Haemorrhage	235	I62
7. Stroke	236	I64

Disease Categories	DOSM Code	ICD-10 Code
8. Haemorrhoids	237	I84
9. Hypotension	238	I95
10. Other Circulatory System Diseases	239	I99
DISEASES OF THE RESPIRATORY SYSTEM		
1. Pneumonia	240	J18
2. Asthma	241	J45
3. Pulmonary Oedema	242	J81
4. Difficulty in Breathing (Neonatal Death 28 - 362 days)	243	J21
5. Lung Disease	244	J98
6. Other Respiratory System Diseases	249	J99
DISEASES OF THE DIGESTIVE SYSTEM		
1. Ulcer	250	K12
2. Gastric Ulcer	251	K27
3. Appendix	252	K37
4. Hernia	253	K46
5. Intestine Disease	254	K63
6. Liver Disease	255	K73
7. Diseases of Biliary Tract	256	K87
8. Gastrointestinal Haemorrhage	257	K92
9. Other Digestive System Diseases	259	K93
DISEASES OF THE SKIN AND SUBCUTANEOUS TISSUE		
1. Skin Infection	260	L99
DISEASES OF THE MUSCULOSKELETAL SYSTEM AND CONNECTIVE TISSUE		
1. Gout	261	M10
2. Joint Pain	262	M25
3. Back Pain	263	M54
4. Bone Pain	264	M89
5. Other Musculoskeletal System and Connective Tissue Diseases	269	M79
DISEASES OF THE GENITOURINARY SYSTEM		
1. Renal Failure	270	N19
2. Renal Calculi	271	N20
3. Other Kidney Disease	272	N28
4. Other Genitourinary System Diseases	274	N39

Disease Categories	DOSM Code	ICD-10 Code
MATERNAL DEATH RELATED TO PREGNANCY, CHILDBIRTH AND THE PUERPERIUM		
1. Maternal Death	275	O75
CERTAIN CONDITIONS ORIGINATING IN THE PERINATAL PERIOD		
1. Premature	276	P07
2. Birth Asphyxia	277	P21
3. Others	279	P96
CONGENITAL MALFORMATIONS, DEFORMATIONS AND CHROMOSAL ABNORMALITIES		
1. Congenital Heart Disease	280	Q24
2. Down's Syndrome	281	Q90
3. Other Congenital Malformations and Chromosomal Abnormalities	284	Q38
SYMPTOMS, SIGNS AND ABNORMAL FINDINGS		
1. Other Symptoms Affecting Circulatory and Respiratory System	285	R09
2. Abdominal Pain	286	R10
3. Jaundice	287	R17
4. Ascites	288	R18
5. Other Symptoms Affecting Digestive System and Abdomen	289	R19
6. Other Symptoms Affecting Skin and Subcutaneous Tissue	290	R23
7. Other Symptoms Affecting Urinary System	291	R39
8. Other Symptoms Affecting Cognition, Emotional State and Behaviour	292	R46
9. Fever	293	R50
10. Old Age (65 years and Above)	294	R54
11. Others General Symptoms and Signs	298	R69
12. Other Ill-Defined and Unspecified Causes of Mortality	299	R99
EXTERNAL CAUSES OF MORBIDITY AND MORTALITY		
1. Road Accidents	300	V89
2. Railway Accidents	301	V81
3. Water Accidents	302	V94
4. Air Accidents	303	V97
5. Other Transport Accidents	304	V99
6. Falls	305	W19
7. Struck by Object	306	W20
8. Contact with Animal	307	W59

Disease Categories	DOSM Code	ICD-10 Code
9. Drowning	308	W74
10. Milk Aspiration	309	W79
11. Aspiration of Food	310	W79
12. Electrocution	311	W87
13. Burn	312	X09
14. Forces of Nature	313	X39
15. Lightning Strike	314	X33
16. Accident at Work Place	315	X59
17. Other Accidents	319	X58
18. Poisoning	320	X49
19. Suicide	322	X84
20. Homicide	323	Y09

Appendix III: Diseases and injuries model

Models and methods used for calculating disability for each of the disease and injury covered in this study are listed as below. Methods used in the Global Burden of Disease Study 2015 was adopted for most of the conditions, but modified where necessary based on the availability and nature of local data and in consultation with local disease experts.

A Infectious Diseases

A1. Tuberculosis - Incidence estimates for Tuberculosis were based on Malaysian notification data. We assumed that the notifications were a reasonable approximation of all new cases in Malaysia. We used DisMod II to determine the prevalence using mortality data and remission rate. The HIV positive in Tuberculosis was distributed proportional to the prevalence of HIV/AIDS in Malaysia. The disability weights from GBD 2015 were used.

A2a. Syphilis - Incidence estimates for Syphilis were based on Malaysian notification data. The figures from the notifications register were blown up to include underreporting based on the assumption that only 10% of symptomatic patients attended clinics and only 20% of clinic attendees were reported to the Ministry of Health Malaysia. We assumed 1.32% of all reported cases of syphilis represent adult tertiary syphilis and was applied to those age 15 years and above. The disability weights from GBD 2015 were used.

A2b. Chlamydia - There is no notification surveillance or registry for chlamydia infection in Malaysia. Prevalence for Chlamydia in Malaysia was obtained from estimates reported by the Institute for Health Metrics and Evaluation (IHME). We assumed that 70% of cases in males were symptomatic and 70% of cases in females were asymptomatic with epididymo-orchitis in 1.5% of symptomatic males. Chronic Pelvic Inflammatory Disease (PID) was assumed to occur in 4% of symptomatic females, with 50% mild, 40% moderate and 10% severe PID. Approximately 3% of infection was believed to lead to primary infertility and 2% to secondary infertility in both males and females with the disability for infertility not calculated for females 45 years of age and above. The disability weights from GBD 2015 were used.

A2c. Gonorrhea - Incidence estimates for Gonorrhoea were based on Malaysian notification data. We assumed all notified cases were symptomatic cases. The figures from the notifications register were blown up to include underreporting based on the assumption that only 10% of symptomatic patients attended clinics and only 20% of clinic attendees were reported to the Ministry of Health Malaysia. We assumed that 90% of cases in males were symptomatic and 65% of cases in females were asymptomatic with occurrence of epididymo-orchitis in 1.5% of symptomatic males. Chronic Pelvic Inflammatory Disease (PID) was assumed to occur in 20% of infected females, with 50% mild, 40% moderate and 10% severe PID. Approximately 3% of infection was believed to lead to primary infertility and 2% to secondary infertility in both males and females with the disability for infertility not calculated for females 45 years of age and above. The disability weights from GBD 2015 were used.

A3. HIV - Incidence estimates for HIV were based on Malaysian notification data. We assumed that the notifications were a reasonable approximation of all new cases in Malaysia. We used DisMod II to determine the prevalence, using mortality data and zero remission, with the prevalence for HIV and AIDS proportional to the reported incidence of HIV and AIDS. The percentage of AIDS patients on anti-retroviral therapy (ART) was based on the reported rate in the HIV and AIDS Data Hub for Asia-Pacific. The disability weights from GBD 2015 were used.

A4. Diarrheal Diseases - The prevalence of diarrheal diseases for under-5 years of age were determined by prevalence obtained in the National Health and Morbidity Survey Malaysia 2016. Proportion of diarrheal diseases for the other age groups reported in Malaysian Burden of Disease Study 2008 was used to estimate the prevalence in other age groups. Severity levels of diarrheal cases were split based on GBD proportions, with 24.3% mild, 61.7% moderate and 14.0% severe cases. The disability weights from GBD 2015 were used.

A5a. Diphtheria - Incidence estimates for Diphtheria were based on Malaysian notification data. We assumed that the notifications were a reasonable approximation of all new cases in Malaysia. Severity levels of diphtheria cases were split based on GBD proportions, with 70% moderate and 30% severe cases. The disability weights from GBD 2015 were used.

A5b. Pertussis - Incidence estimates for Pertussis were based on Malaysian notification data. We assumed that the notifications were a reasonable approximation of all new cases in Malaysia. Based on GBD study, we assumed all notified cases were moderate episodes of acute infectious disease. The disability weights from GBD 2015 were used.

A5c. Tetanus - Incidence estimates for Tetanus were based on Malaysian notification data. We assumed that the notifications were a reasonable approximation of all new cases in Malaysia. Based on GBD study, we assumed all notified cases were severe episodes of acute infectious disease. The disability weights from GBD 2015 were used.

A5d. Polio - We did not calculate the disability for polio as there were no notification for polio in Malaysia from 2015 – 2017.

A5e. Measles - Incidence estimates for Measles were based on Malaysian notification data. We assumed that the notifications were a reasonable approximation of all new cases in Malaysia. Severity levels of measles cases were split based on GBD proportions, with 50% moderate and 50% severe cases. The disability weights from GBD 2015 were used.

A6. Meningitis - Data on overall incidence of meningitis was drawn from the Hospital Inpatient Information Dataset (HMIS) which captures all admissions to government hospitals in Malaysia. We assumed that 70% of admissions were into government hospitals and data was blown up to include the private and other hospitals in Malaysia. All cases were assumed to be acute cases and to have long term acute effects. The sequela of meningitis was assumed to occur in only those 0 to 14 years of age at a rate of 3% hearing loss, 1% VP shunt, 1% mental retardation only, 2% mental retardation with motor deficit, 1% seizure disorder and 18% less

severe developmental disorder. Scarring and deformity was assumed to occur in 7% of all ages. The disability weights from GBD 2015 were used.

A7a. Hepatitis A - Incidence estimates for Hepatitis A were based on Malaysian notification data. We assumed all notified cases were symptomatic cases. The figures from the notifications register were blown up 10% to include underreporting. Data on overall incidence of Hepatitis A was drawn from the Hospital Inpatient Information Dataset (HMIS) which captures all admissions to government hospitals in Malaysia, and these cases were assumed to represent the prevalence of severe Hepatitis A. The disability weights from GBD 2015 were used.

A7b. Hepatitis B - Incidence estimates for Hepatitis B were based on Malaysian notification data. We assumed all notified cases were symptomatic cases. The figures from the notifications register were blown up 10% to include underreporting. Data on overall incidence of Hepatitis B was drawn from the Hospital Inpatient Information Dataset (HMIS) which captures all admissions to government hospitals in Malaysia, and these cases were assumed to represent the prevalence of severe Hepatitis B. The disability weights from GBD 2015 were used.

A7c. Other Hepatitis - Incidence estimates for Other Hepatitis were based on Malaysian notification data for Hepatitis C and Other Hepatitis. We assumed all notified cases were symptomatic cases. The figures from the notifications register were blown up 10% to include underreporting. Data on overall incidence of Other Hepatitis was drawn from the Hospital Inpatient Information Dataset (HMIS) which captures all admissions to government hospitals in Malaysia, and these cases were assumed to represent the prevalence of severe Other Hepatitis. The disability weights from GBD 2015 were used.

A8a. Malaria - Incidence estimates for Malaria were based on Malaysian notification data. We assumed that the notifications were a reasonable approximation of all new cases in Malaysia. Data on overall incidence of Malaria was drawn from the Hospital Inpatient Information Dataset (HMIS) which captures all admissions to government hospitals in Malaysia, and these cases were assumed to represent the prevalence of moderate and severe malaria, with 80% of these cases with moderate infection and 20% with severe infection. We assume 0.1% of infected people age 0 to 4 years will develop neurological impairment. The disability weights from GBD 2015 were used.

A8b. Dengue - Incidence estimates for Dengue were based on Malaysian notification data. We assumed that the notifications were a reasonable approximation of all new and symptomatic cases in Malaysia. All notification for dengue were assumed to be moderate infections and all notification for dengue haemorrhagic fever were assumed to be severe infections. Based on GBD proportion, we assumed 8.4% of all symptomatic infection will develop post dengue chronic fatigue syndrome. The disability weights from GBD 2015 were used.

A9. Other Infectious Disease - Disability for Other Infectious Disease was estimated by calculating the YLL/YLD ratio for Other Infectious Disease in Malaysia Burden of Disease Study 2014 and applied the same ratio to the current YLL of Other Infectious Disease.

B Respiratory Infections

B1. Lower Respiratory Tract Infection - We assumed the prevalence of Lower Respiratory Tract Infection in under 5 years of age to be 1.06%, 5 to 64 years of age to be 0.23% and 65 years and above to be 4.04%. Gender distribution of cases was based on mortality distribution by gender and age for Lower Respiratory Tract Infection. Severity levels of Lower Respiratory Tract Infection were split based on GBD proportions, with 85% moderate and 15% severe cases. The disability weights from GBD 2015 were used.

B2. Upper Respiratory Tract Infection - The prevalence of Upper Respiratory Tract Infection for under-5 years of age were determined by prevalence obtained in the National Health and Morbidity Survey Malaysia 2016. Proportion of Upper Respiratory Tract Infection reported by the Institute for Health Metrics and Evaluation (IHME) was used to estimate the prevalence in other age groups. Severity levels of Upper Respiratory Tract Infection were split based on GBD proportions. The disability weights from GBD 2015 were used.

B3. Otitis Media - The prevalence of acute and chronic Otitis Media was determined by prevalence obtained in the National Hearing and Ear Disorders Survey Malaysia 2009. Based on GBD proportions, we assumed all acute Otitis Media experience pain, 97% of chronic Otitis Media were asymptomatic, 2.9% chronic Otitis Media had vertigo and 0.05% of chronic Otitis Media had complications. The disability weights from GBD 2015 were used.

C Maternal Conditions

C1. Maternal Haemorrhage - The incidence of Maternal Haemorrhage was obtained from Hospital Inpatient Information Dataset (HMIS) data. We assume that maternal haemorrhage with more than 1L blood loss occur in 1.26% of live births, with the remaining maternal haemorrhage as 500ml to 1L blood loss. Mild anaemia due to maternal haemorrhage was estimated to occur in 0.58% of live births, with moderate anaemia in 0.13% and severe anaemia in 0.18% of live births. The disability weights from GBD 2015 were used.

C2. Maternal Sepsis - The incidence of Maternal Sepsis was obtained from Hospital Inpatient Information Dataset (HMIS) data. Incidence of puerperal sepsis and other maternal infections were drawn from HMIS data. We assumed that 2.5% of maternal infections leads to infertility. The disability weights from GBD 2015 were used.

C3. Hypertensive Disorders of Pregnancy - The prevalence of Hypertensive Disorders of Pregnancy (HDoP) was obtained from Malaysian National Health and Morbidity Survey 2016. Based on GBD proportions, we assume 2% of HDoP leads to severe pre-eclampsia. Incidence of eclampsia was drawn from Hospital Inpatient Information Dataset (HMIS) data. We assume 90% of severe preeclampsia and eclampsia develop long term sequelae. The disability weights from GBD 2015 were used.

C4. Obstructed Labour - The incidence of Obstructed Labour was obtained from Hospital Inpatient Information Dataset (HMIS) data. We assumed obstetric fistula occurs in 0.29 of 1000 live births and the proportion of rectovaginal fistula and vesico-vaginal fistula was based on GBD proportions. The disability weights from GBD 2015 were used.

C5. Abortion - The incidence of Abortion was obtained from Hospital Inpatient Information Dataset (HMIS) data. The disability weights from GBD 2015 were used.

C6. Other Maternal Conditions - YLD for Other Maternal Conditions was estimated by determining the YLL/YLD ratio for Other Maternal Conditions in Malaysia Burden of Disease study 2014 and applying the same ratio to the current YLLs of Other Maternal Conditions from 20015- 2017.

D Neonatal Conditions

D1. Low Birth Weight - The prevalence of Low Birth Weight for age under 1 year was obtained from Hospital Inpatient Information Dataset (HMIS) data. We reduced the prevalence by 30%, based on expert consultation, for repeat admissions. We assumed mild motor plus cognitive impairment occur in 14.0%, mild motor impairment in 4.1%, moderate motor impairment in 5.5%, severe motor impairment in 9.2%, mild/moderate distance vision impairment in 0.7% and severe vision impairment/blindness in 1.9% of Low Birth Weight. We used DisMod II to derive prevalence estimates, by using inputs of prevalence for under 1 year, zero remission and excess mortality was assumed to be from severe motor impairment. The disability weights and combined disability weights from GBD 2015 were used.

D2. Birth Trauma and Asphyxia - The prevalence of Birth Trauma and Asphyxia for age under 1 year was obtained from Hospital Inpatient Information Dataset (HMIS) data. We reduced the prevalence by 30%, based on expert consultation, for repeat admissions. We assumed mild motor plus cognitive impairment occurs in 2.4%, mild motor impairment in 0.9%, moderate motor impairment in 1.4%, severe motor impairment in 24.0%, and distance vision impairment in 12.0% of Birth Trauma and Asphyxia. We used DisMod II to derive prevalence estimates, by using inputs of prevalence for under 1 year, zero remission and excess mortality was assumed to be from severe motor impairment. The disability weights and combined disability weights from GBD 2015 were used.

D3. Neonatal Infections - The prevalence of Neonatal Infections for age under 1 year was obtained from Hospital Inpatient Information Dataset (HMIS) data. We reduced the prevalence by 30%, based on expert consultation, for repeat admissions. We assumed motor impairment occurs in 12.4% and distance vision impairment in 12.5% of Neonatal Infections. We used DisMod II to derive prevalence estimates, by using inputs of prevalence for under 1 year, zero remission and zero excess mortality. The combined disability weights from GBD 2015 were used.

D4. Sudden Infant Death Syndrome - Disability for Sudden Infant Death Syndrome was not calculated as infants with this condition die immediately upon birth.

D5. Other Neonatal Conditions - YLD for Other Neonatal Conditions was estimated by determining the YLL/YLD ratio for Other Neonatal Conditions in Malaysia Burden of Disease study 2014 and applying the same ratio to the current YLLs of Other Neonatal Conditions from 2015- 2017.

E Nutritional Deficiency

E1. Protein-Energy Malnutrition - The prevalence for Protein-Energy Malnutrition in Malaysia was obtained from prevalence estimates reported by the Institute for Health Metrics and Evaluation (IHME). We used DisMod II to derive better estimates, by using inputs of prevalence, duration of 1 year and mortality rate. The disability weights from GBD 2015 were used.

E2. Nutritional Anaemias - The prevalence and severity of Nutritional Anaemias were determined by data obtained in the National Health and Morbidity Survey Malaysia 2015. The disability weights from GBD 2015 were used.

E3. Other Nutritional Disorders - Disability for Other Nutritional Disorders was estimated by calculating the YLL/YLD ratio for Other Nutritional Disorders in GBD and applied the same ratio to the current YLL of Other Nutritional Disorders.

F Malignant Neoplasms

The incidence cases by age, gender and cancer site were derived from Malaysian National Cancer Registry Report 2012-2016 and was used to estimate the incidence rates from 2015 to 2017. The age-gender specific cure rate and the age-gender specific average time to death for those not cured was used to estimate the disability. For most cancers, patients surviving five years were assumed to be cured and was taken as the cure rate. Those who were cured of cancer were assumed to have negligible disability after the five-year period. For the fatal cancer cases, the survival time to death was assumed to follow an exponential distribution and the mean survival time was estimated by fitting the distribution to available survival data. In the absence of Malaysian follow-up data, we used figures from the South Australian Cancer Registry between 1977 and 1995 to estimate the 5-year survival rate. The disability weights from GBD 2015 were used.

G Benign Neoplasms

There is no registry or reliable source to estimate Benign Neoplasms in Malaysia. Disability for Benign Neoplasms was estimated by calculating the YLL/YLD ratio for Benign Neoplasms in Malaysia Burden of Disease Study 2014 and applied the same ratio to the current YLL of Benign Neoplasms.

H Diabetes Mellitus

The prevalence of Diabetes Mellitus was obtained from the National Health and Morbidity Survey Malaysia 2015. The proportion of complications arising from this disease, including retinopathy, cataract, glaucoma, nephropathy, neuropathy, diabetic foot and amputations were derived from the Malaysian National Diabetic Registry. The disability weights from GBD 2015 were used.

I Endocrine, Blood and Immune Disorders

The prevalence for Endocrine, Blood and Immune Disorders in Malaysia was obtained from prevalence estimates reported by the Institute for Health Metrics and Evaluation (IHME). We used DisMod II to derive better estimates, by using inputs of prevalence, duration of 0.5 years and mortality data. The disability weights from GBD 2015 were used.

J Mental and Behavioural Disorders

J1. Unipolar Major Depressive Disorders - The prevalence for unipolar major depressive disorders in Malaysia was obtained from modelling of the disease was done starting as 2009. The reason applied based on data evidence which was lack for Malaysia. The disability weight for the disease was followed GBD 2015. Duration applied to overcome the prevalence number generate from the modelling incase overestimated. The proportion of the severity and disability weights from GBD 2015 were used.

J2. Bipolar Affective Disorder - The prevalence for bipolar affective disorders in Malaysia was obtained from modelling of the disease was done starting as 2009. The reason applied based on data evidence which was lack for Malaysia. The disability weight for the disease was followed GBD 2015. Duration applied to overcome the prevalence number generate from the modelling incase overestimated. The proportion of the severity and disability weights from GBD 2015 were used.

J3. Schizophrenia - The prevalence for schizophrenia in Malaysia was obtained from modelling of the disease was done starting as 2009. The reason applied based on data evidence which was lack for Malaysia. The disability weight for the disease was followed GBD 2015. Duration applied to overcome the prevalence number generate from the modelling incase overestimated. The proportion of the severity and disability weights from GBD 2015 were used.

J4. Alcohol Use Disorders - The prevalence for alcohol use disorder in Malaysia was obtained from modelling of the disease was done starting as 2009. The reason applied based on data evidence which was lack for Malaysia. The disability weight for the disease was followed GBD 2015. Duration applied to overcome the prevalence number generate from the modelling incase overestimated. The proportion of the severity and disability weights from GBD 2015 were used.

J5. Drug Use Disorders - The prevalence of drug use disorders was obtained from modelling of the disease was done starting as 2009. The reason applied based on data evidence which was lack for Malaysia. The disability weight for the disease was followed GBD 2015. Duration applied to overcome the prevalence number generate from the modelling incase overestimated. The proportion of the severity and disability weights from GBD 2015 were used.

J6. Anxiety Disorders - The prevalence for anxiety disorders in Malaysia was obtained from modelling of the disease was done starting as 2009. The reason applied based on data evidence which was lack for Malaysia. The disability weight for the disease was followed GBD 2015. Duration applied to overcome the prevalence number generate from the modelling incase overestimated. The proportion of the severity and disability weights from GBD 2015 were used.

J7. Other Mental and Behavioural Disorders - In view of no reliable source of data to estimate the prevalence of other mental and behavioural disorders as well as no deaths was assigned to this category, we used the YLD as reported by the Institute for Health Metrics and Evaluation (IHME) to estimate the YLD based on the population.

K Neurological Conditions

K1. Epilepsy - There is no registry or reliable source to estimate Epilepsy in Malaysia. Prevalence for Epilepsy in Malaysia was obtained from modelling of the disease was done starting as 2009. The reason applied based on data evidence which was lack for Malaysia. The disability weight for the disease was followed GBD 2015. Duration applied to overcome the prevalence number generate from the modelling incase overestimated. The proportion of the severity and disability weights from GBD 2015 were used.

K2. Dementia - There is no registry or reliable source to estimate Dementia in Malaysia. Prevalence for Dementia in Malaysia was obtained from modelling of the disease was done starting as 2009. The reason applied based on data evidence which was lack for Malaysia. The disability weight for the disease was followed GBD 2015. Duration applied to overcome the prevalence number generate from the modelling incase overestimated. The proportion of the severity and disability weights from GBD 2015 were used.

K3. Parkinson Disease - There is no registry or reliable source to estimate Parkinson disease in Malaysia. Prevalence for Parkinson Disease in Malaysia was obtained from modelling of the disease was done starting as 2009. The reason applied based on data evidence which was lack for Malaysia. The disability weight for the disease was followed GBD 2015. Duration applied to overcome the prevalence number generate from the modelling incase overestimated. The proportion of the severity and disability weights from GBD 2015 were used.

K4. Mental Retardation – There is no registry or reliable source to estimate mental retardation in Malaysia. In view of no reliable source of data to estimate the prevalence of mental retardation as well as no deaths was assigned to this category, we used the YLD as reported by the Institute for Health Metrics and Evaluation (IHME).

K5. Other Neurological Conditions - YLD for Other Neurological Conditions was estimated by determining the YLL/YLD ratio for Other Neurological Conditions as reported by the Institute for Health Metrics and Evaluation (IHME) and applying the same ratio to the current YLLs of Other Neurological Conditions from 2015- 2017 to estimate the YLD.

L Sense Organ Diseases

L1. Glaucoma – National prevalence for Glaucoma was obtained from Institute for Health Metrics and Evaluation (IHME). Proportion of Glaucoma cases for the other age groups reported in Malaysian Burden of Disease Study 2014 was used to estimate the prevalence in other age groups. We used DisMod II to derive better estimates, by using inputs of prevalence, zero remission and RR mortality of one. We combined the sequelae and used a composite disability weight of 0.134.

L2. Cataract - National prevalence for Glaucoma was obtained from Institute for Health Metrics and Evaluation (IHME). Proportion of Cataract cases for the other age groups reported in Malaysian Burden of Disease Study 2014 was used to estimate the prevalence in other age groups. We used DisMod II to derive better estimates, by using inputs of prevalence, duration of 2 years and RR mortality of one. We combined the sequelae and used a composite disability weight of 0.134.

L3. Hearing Loss - The prevalence of Hearing Loss was determined by prevalence obtained from the National Hearing and Ear Disorders Survey 2009. We used DisMod II to derive better estimates of the prevalence for mild, moderate, severe and profound hearing loss by using inputs of prevalence, zero remission and RR mortality of one. The disability weights from GBD 2015 were used.

L4. Other Sense Organ Disorder - The estimated prevalence for Other Sense Organs was obtained from the Institute for Health Metrics and Evaluation (IHME). We used DisMod II to derive better estimates, by using inputs of prevalence, remission of 0.25 and zero mortality. We combined the sequelae and used a composite disability weight of 0.009.

M Cardiovascular and Circulatory Diseases

M1. Rheumatic Heart Disease - The prevalence of Rheumatic Heart Disease was obtained from Hospital Inpatient Information Dataset (HMIS) data. We assumed that the hospital admissions reflect the prevalence of symptomatic disease. We used DisMod II to derive better estimates, by using inputs of prevalence, remission rates estimated from the number of valve replacements in hospital data and mortality rates. We combined the sequelae and used a composite disability weight of 0.046.

M2. Hypertensive Heart Disease - Hospital admission data on Hypertensive Heart Disease was very low and was believed to not truly reflect the prevalence of the disease in Malaysia. Prevalence for Hypertensive Heart Disease in Malaysia was obtained from estimates reported by the Institute for Health Metrics and Evaluation (IHME). We used DisMod II to derive better estimates, by using inputs of prevalence, zero remission and mortality rates. We combined the sequelae and used a composite disability weight of 0.046.

M3. Ischaemic Heart Disease - The starting point for this condition was assumed to be acute myocardial infarction (AMI) or angina pectoris. Although these two conditions relate to the same disease process, we model them independently due to insufficient data to do otherwise. The incidence of AMI was obtained from Hospital Inpatient Information Dataset (HMIS) data. The incidence of angina pectoris was estimated to be 1.5 times that of AMI. We assumed that angina pectoris has recurring symptoms until death, with possible remission from treatment and that AMI results in one of the following: death, heart failure, new or continuing angina pectoris, or recovery with no residual disability. We used DisMod II to derive prevalence estimates, by using inputs of incidence, remission rates as in the previous MBOD study and mortality rates. We assume 50% receive treatment of AMI and that 15% gets heart failure following AMI. The disability weights from GBD 2015 were used.

M4. Cerebrovascular Diseases (Stroke) - The incidence of Cerebrovascular Diseases was obtained from Hospital Inpatient Information Dataset (HMIS) data. We used DisMod II to derive prevalence estimates, by using inputs of incidence, zero remission and mortality rates. The proportion of stroke sequelae was based on the Scottish Burden of Disease. The disability weights from GBD 2015 were used.

M5. Pericarditis, Endocarditis and Myocarditis - The incidence of Pericarditis, Endocarditis and Myocarditis was obtained from Hospital Inpatient Information Dataset (HMIS) data. We used DisMod II to derive prevalence estimates, by using inputs of incidence, zero remission and mortality rates. The disability weights from GBD 2015 were used.

M6. Other Circulatory Diseases - YLD for Other Circulatory Diseases was estimated by determining the YLL/YLD ratio for Other Circulatory Diseases as reported by the Institute for Health Metrics and Evaluation (IHME) and applying the same ratio to the current YLLs of Other Circulatory Diseases from 2015- 2017.

N Respiratory Diseases

N1. Chronic Obstructive Pulmonary Disease – The incidence of chronic obstructive pulmonary disease was based on hospital admission by Health Informatic Centres MOH. We used DisMod II to derive better estimates, by using inputs of prevalence, zero remission and mortality data. The proportion of the severity and disability weights from GBD 2015 was used.

N2. Asthma - The incidence of asthma was based on hospital admission by Health Informatic Centres MOH. We used DisMod II to derive better estimates, by using inputs of prevalence, zero remission and mortality data. The proportion of the severity and disability weights from GBD 2015 was used.

N3. Other Respiratory Diseases - YLD for Other Respiratory Diseases was estimated by determining the YLL/YLD ratio for Other Respiratory Diseases as reported by the Institute for Health Metrics and Evaluation (IHME) and applying the same ratio to the current YLLs of Other Respiratory Diseases from 2015- 2017 to estimate the YLD.

O Digestive Diseases

O1. Peptic Ulcer Disease - The prevalence for peptic ulcer disease in Malaysia was obtained from prevalence estimates reported by the Institute for Health Metrics and Evaluation (IHME). We used DisMod II to derive better estimates, by using inputs of prevalence, remission rate of 0.5 and mortality data. The disability weights from GBD 2013 were used.

O2. Appendicitis - The prevalence for appendicitis in Malaysia was obtained from prevalence estimates reported by the Institute for Health Metrics and Evaluation (IHME). We used DisMod II to derive better estimates, by using inputs of prevalence, duration of 2 weeks and mortality data. The disability weights from GBD 2013 were used.

O3. Cirrhosis of the Liver - The prevalence for asthma in Malaysia was obtained from prevalence estimates reported by the Institute for Health Metrics and Evaluation (IHME). We used DisMod II to derive better estimates, by using inputs of prevalence, zero remission and mortality data. The proportion of the severity and disability weights from GBD 2013 were used.

04. Other Digestive Diseases - YLD for Other Digestive Diseases was estimated by determining the YLL/YLD ratio for Other Digestive Diseases as reported by the Institute for Health Metrics and Evaluation (IHME) and applying the same ratio to the current YLLs of Other Digestive Diseases from 2015- 2017.

P Genito-Urinary Disease

P1. Nephritis and Nephrosis - The calculation of the YLD for nephritis and nephrosis was based on the following condition: ESRF with Dialysis & ESRF with Transplant. The estimated prevalence was calculated using DISMOD II with the following input (Incidence rate as reported in the Report of The Malaysian Dialysis & Transplant Registry (2009 – 2014) with mortality rate as in the Malaysian Cause of Deaths). As majority of ESRF is caused by Diabetis Mellitus, we subtracted the YLD of ESRF due to DM since Nephropathy was calculated as one of the complications of DM. We used the GBD 2015 weightage.

P2. Benign Prostatic Hypertrophy (BPH) - There is no registry or reliable source to estimate Benign Prostatic Hypertrophy (BPH) in Malaysia. Prevalence for BPH in Malaysia was obtained from prevalence estimates reported by the Institute for Health Metrics and Evaluation (IHME). We used DisMod II to derive better estimates, by using inputs of prevalence, age-specific remission and RR Mortality of one. The disability weight from GBD 2015 were used.

P3. Other Urinary Diseases - YLD for Other Urinary Diseases was estimated by determining the YLL/YLD ratio for Other Urinary as reported by the Institute for Health Metrics and Evaluation (IHME) and applying the same ratio to the current YLLs of Other Urinary Diseases from 2015-2017.

Q Skin Diseases

We sub-categorized the skin diseases into 4 major categories (dermatitis, psoriasis, viral infection & other skin diseases) as in the Scottish Burden of Disease Study. Prevalence estimates reported by the Institute for Health Metrics and Evaluation (IHME) was used. We used DisMod II to derive better estimates. Since the skin disease are an acute episode, we assumed the duration of illness for 2 months except for psoriasis for which the duration was assumed for 1 year. The proportion of the severity and disability weights from GBD 2015 were used.

R Musculoskeletal Diseases

R1. Rheumatoid Arthritis - There is no registry or reliable source to estimate Rheumatoid Arthritis in Malaysia. Prevalence for Rheumatoid Arthritis in Malaysia was obtained from prevalence estimates reported by the Institute for Health Metrics and Evaluation (IHME). We used DisMod II to derive better estimates, by using inputs of prevalence, remission of 0.04, and mortality rate. Severity distribution of Rheumatoid Arthritis were based on the Scottish Burden of Disease. The disability weight from GBD 2015 were used.

R2. Osteoarthritis - There is no registry or reliable source to estimate Osteoarthritis in Malaysia. Prevalence for Osteoarthritis in Malaysia was obtained from prevalence estimates reported by the Institute for Health Metrics and Evaluation (IHME). We used DisMod II to derive better estimates, by using inputs of prevalence, zero remission and mortality rate. Severity distribution of Osteoarthritis were based on the Scottish Burden of Disease, whereby 75% of Osteoarthritis cases were mild, 24% were moderate and 1% were severe. The disability weight from GBD 2015 were used.

R3. Back and Neck Pain - There is no registry or reliable source to estimate Back and Neck Pain in Malaysia. Prevalence for Back and Neck Pain in Malaysia was obtained from prevalence estimates reported by the Institute for Health Metrics and Evaluation (IHME). We used DisMod II to derive better estimates, by using inputs of prevalence, zero remission and duration of 0.5 years. Severity distribution of Back and Neck Pain were based on the Scottish Burden of Disease. The disability weight from GBD 2015 were used.

R4. Gout - There is no registry or reliable source to estimate Gout in Malaysia. Prevalence for Gout in Malaysia was obtained from prevalence estimates reported by the Institute for Health Metrics and Evaluation (IHME). We used DisMod II to derive better estimates, by using inputs of prevalence, zero remission and duration of 0.25 years. The disability weight from GBD 2015 were used.

R5. Other Musculoskeletal Disorders - YLD for Other Musculoskeletal Disorders was estimated by determining the YLL/YLD ratio for Other Musculoskeletal Disorders in Malaysia Burden of Disease study 2008 and applying the same ratio to the current YLLs of Other Musculoskeletal Disorders from 2015- 2017.

S Congenital Anomalies

S1. Congenital Heart Disease - We assumed that Congenital Heart Disease occurred in 7.3 per 1,000 live births, with 52% occurrence in females. We used DisMod II to derive prevalence estimates, by using inputs of incidence, mortality data and zero remission. We assumed that heart failure occurred in 6% of children with Congenital Heart Disease and 25% in adults, with 58.2% mild heart failure, 36.3% moderate heart failure and 5.5% severe heart failure. The disability weights from GBD 2015 were used.

S2. Down Syndrome - We assumed that Down Syndrome occurred in 4.4 per 10,000 live births. We used DisMod II to derive prevalence estimates, by using inputs of incidence, mortality data and zero remission. We assumed that congenital heart disease occurred in 49.3%, intellectual disability within 9.8% to 37.3% and dementia between 9.0% to 50.0% (age 40 and above) among those with Down Syndrome. The disability weights from GBD 2015 were used.

S3. Other Chromosomal Disorders - We assumed that Other Chromosomal Disorders occurred in 3.5 per 10,000 live births. We used DisMod II to derive prevalence estimates, by using inputs of incidence, mortality data and zero remission. We combined the sequelae and used a composite disability weight of 0.137.

S4. Cleft Lip and Palate - We assumed that Cleft Lip and Palate occurred in 11.9% of birth defects, with 57% occurrence in females. Birth defects were estimated to occur in 14.3 per 1,000 live births. We used DisMod II to derive prevalence estimates, by using inputs of incidence, RR mortality of one and zero remission. We assumed that 86.5% were cleft lip with or without cleft palate, and 91.3% were cleft palate with or without cleft lip. The disability weights from GBD 2013 were used.

S5. Spina Bifida - We assumed that Spina Bifida occurred in 0.11 per 1,000 live births. We used DisMod II to derive prevalence estimates, by using inputs of incidence, mortality data and zero remission. We assumed that mild intellectual disability occurred in 12.5% of cases, moderate intellectual disability in 7.5% of cases and severe intellectual disability in 17.5% of cases. Moderate motor impairment was estimated to occur in 27.3% of cases with severe motor impairment in 45.5% of cases. Incontinence due to Spina Bifida was estimated to occur in 62.2% of cases. The disability weights from GBD 2013 were used.

S6. Anencephaly - Anencephaly is an invariably fatal condition. Disability for Anencephaly was not calculated as infants with this condition typically die immediately upon birth.

S7. Other Congenital Anomalies - We assumed that Congenital Anomalies occurred in 14.3% per 1,000 live births. We used DisMod II to derive prevalence estimates, by using inputs of incidence, mortality data and zero remission. We combined the sequelae and used a composite disability weight of 0.137.

T Oral Conditions

T1. Dental Caries - The prevalence for Dental Caries was determined by prevalence obtained in the National Oral Health Survey of School Children 2007 (NOHSS 2007) and National Oral Health Survey of Adults 2010 (NOHSA 2010). We used DisMod II to derive better estimates, by using inputs of prevalence, zero remission and duration. The disability weight from GBD 2015 were used.

T2. Periodontitis - The prevalence for Periodontitis was determined by prevalence obtained in the National Oral Health Survey of Adults 2010 (NOHSA 2010). We used DisMod II to derive better estimates, by using inputs of prevalence, zero remission and mortality, taking into account the population without edentulism. The disability weight from GBD 2015 were used.

T3. Edentulism - The prevalence for Edentulism was determined by prevalence obtained in the National Oral Health Survey of Adults 2010 (NOHSA 2010). We used DisMod II to derive better estimates, by using inputs of prevalence, zero remission and mortality. The disability weight from GBD 2013 was used for untreated Edentulism and the disability weight of 0.001, from the previous MBOD, was used for treated Edentulism.

T4. Other Oral Diseases - YLD for Other Oral Diseases was estimated by determining the YLL/ YLD ratio for Other Oral Diseases in Malaysia Burden of Disease study 2008 and applying the same ratio to the current YLLs of Other Oral Diseases from 2015- 2017.

Injuries

We model disability from injuries in only those people with an injury severe enough to warrant hospital admission with assumption that injuries treated as outpatient or outside the hospital system do not result in significant disability. The incidence of each Injury and its sequelae was obtained from Hospital Inpatient Information Dataset (HMIS) data. Ill-defined injuries were redistributed pro-rate within the age and gender. The duration for each cause was based on the previous Malaysian BOD study. The disability weight from GBD 2015 was used.