



Non Communicable Diseases (NCD) Burden Globally and in Sri Lanka

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At the end of the session, the student should be able to

- Briefly describe an overview of NCD
- Compare Acute and chronic NCD
- Describe the impact of epidemiological, health, demographic transition and globalization of NCD epidemic
- Describe the four major NCDs and their risk factors
- Describe Burden of NCD to individual, family and country
- Describe Morbidity and mortality trends of NCD's globally and SL
- Describe DALY as a burden assessment
- Discuss WHO “best buys”

Overview of NCD

- NCDs are the leading cause of death globally
- Noncommunicable diseases (NCDs), also known as chronic diseases, tend to be of long duration and are the result of a combination of genetic, physiological, environmental and behavioural factors.
- Noncommunicable diseases (NCDs) kill 41 million people each year, equivalent to 74% of all deaths globally.
- Each year, 17 million people die from a NCD before age 70; 86% of these premature deaths occur in low- and middle-income countries.
- Of all NCD deaths, 77% are in low- and middle-income countries.
- Cardiovascular diseases account for most NCD deaths (17.9 million) people annually, followed by cancers (9.3 million), chronic respiratory diseases (4.1 million), and diabetes (2.0 million including kidney disease deaths caused by diabetes).
- These four groups of diseases account for over 80% of all premature NCD deaths.

- Tobacco use, physical inactivity, the harmful use of alcohol and unhealthy diets all increase the risk of dying from an NCD.
- Detection, screening and treatment of NCDs, as well as palliative care, are key components of the response to NCDs
- According to WHO's projections, the total annual number of deaths from noncommunicable diseases will increase to 55 million by 2030 if "business as usual" continues
- WHO Global Action plan for the prevention of NCDs 2013-2020
- Prepared 9 voluntary global targets to be attained by 2020 in alignment with 2030 Agenda for Sustainable Development

Risk factors for NCDs

- Rapid unplanned urbanization, globalization of unhealthy lifestyles and population ageing.

Metabolic risk factors

- Unhealthy diets, lack of physical activity may show up in people as raised blood pressure, increased blood glucose, elevated blood lipids and obesity.

Modifiable behavioural risk factors

- Tobacco use, physical inactivity, unhealthy diet and the harmful use of alcohol
- Tobacco accounts for over 8 million deaths every year (including from the effects of exposure to second-hand smoke)
- 1.8 million annual deaths have been attributed to excess salt/sodium intake
- More than half of the 3 million annual deaths attributable to alcohol use are from NCDs, including cancer.
- 830 000 deaths annually can be attributed to insufficient physical activity

Socioeconomic impact

- NCDs threaten progress towards the 2030 Agenda for Sustainable Development, which includes a target of reducing the probability of death from any of the four main NCDs between ages 30 and 70 years by one third by 2030.
- Poverty is closely linked with NCDs.
- The rapid rise in NCDs is predicted to impede poverty reduction initiatives in low-income countries, particularly by increasing household costs associated with health care.
- Vulnerable and socially disadvantaged people more affected, they are at greater risk of being exposed to harmful products, such as tobacco, or unhealthy dietary practices, and have limited access to health services.
- In low-resource settings, health-care costs for NCDs quickly drain household resources.
- Exorbitant treatment costs, often lengthy and expensive, combined with loss of income, will increase poverty

Prevention and control

- Focus on reducing the risk factors associated with these diseases.
- Low-cost solutions to reduce the common modifiable risk factors.
- Monitoring progress and trends of NCDs and their risk is important for guiding policy and priorities.
- A comprehensive approach is needed requiring all sectors, including health, finance, transport, education, agriculture, planning and others, to collaborate to reduce the risks associated with NCDs, and to promote interventions to prevent and control them.

Prevention and control (cont)

- Investing in better management of NCDs is critical.
- Detecting, screening and treating these diseases, and providing access to palliative care for people in need.
- Essential NCD interventions can be delivered through a primary health care approach to strengthen early detection and timely treatment.
- Evidence shows such interventions are excellent economic investments because, if provided early to patients, they can reduce the need for more expensive treatment.
- Countries with inadequate health care coverage are unlikely to provide universal access to essential NCD interventions.
- NCD management interventions are essential for achieving the SDG target on NCDs.

WHO's Global Action Plan for the Prevention and Control of NCDs 2013–2020.



A **25%** relative reduction in risk of premature mortality from cardiovascular diseases, cancer, diabetes, or chronic respiratory diseases.



At least **10%** relative reduction in the harmful use of alcohol, as appropriate, within the national context.



A **10%** relative reduction in prevalence of insufficient physical activity.



A **30%** relative reduction in mean population intake of salt/sodium.



A **30%** relative reduction in prevalence of current tobacco use in persons aged 15+ years.



A **30%** relative reduction in prevalence of current tobacco use in persons aged 15+ years.



A **25%** relative reduction in the prevalence of raised blood pressure or contain the prevalence of raised blood pressure, according to national circumstances.



Halt the rise in diabetes and obesity.



At least **50%** of eligible people receive drug therapy and counselling (including glycaemic control) to prevent heart attacks and strokes.



An **80%** availability of the affordable basic technologies and essential medicines, including generics, required to treat major noncommunicable diseases in both public and private facilities.

Differences between communicable and NCD

Communicable diseases

Meaning	Disease spread from person to another, can be spread through the air, water, etc.
Cause	Caused by pathogens and considered as highly infectious and vectors play the major role in spreading disease from one person to another
Infective agent	Bacteria and virus.
Inheritance	Cannot be inherited from one generation to another
Treatment	Treated by conventional methods
Type	Acute

Non Communicable Diseases

Meaning	Disease which does not spread from one person to another through any mode
Cause	Caused due to allergy, illness, malnutrition or abnormalities in cell proliferation, changes in lifestyle, environment play a significant role.
Infective agent	No infectious agent.
Inheritance	This disease can be inherited
Treatment	Conservatively or surgically
Type	Chronic

Non Communicable Diseases

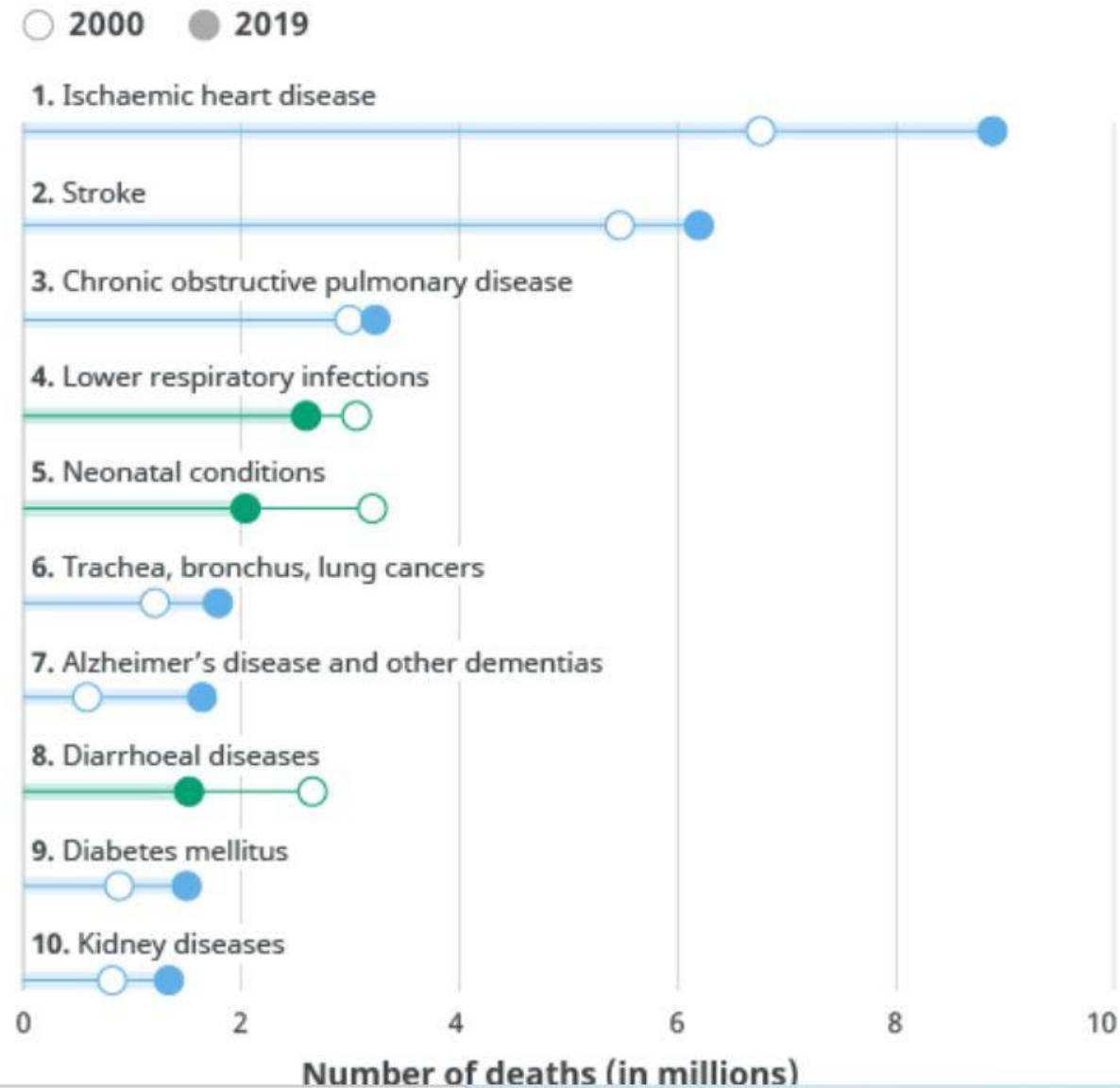
Chronic NCD

- Cardiovascular Diseases(Cerebrovascular accidents, coronary Heart Disease, Hypertension)
- Diabetes Mellitus
- Chronic Respiratory Disease
- Chronic Renal Disease
- Cancers

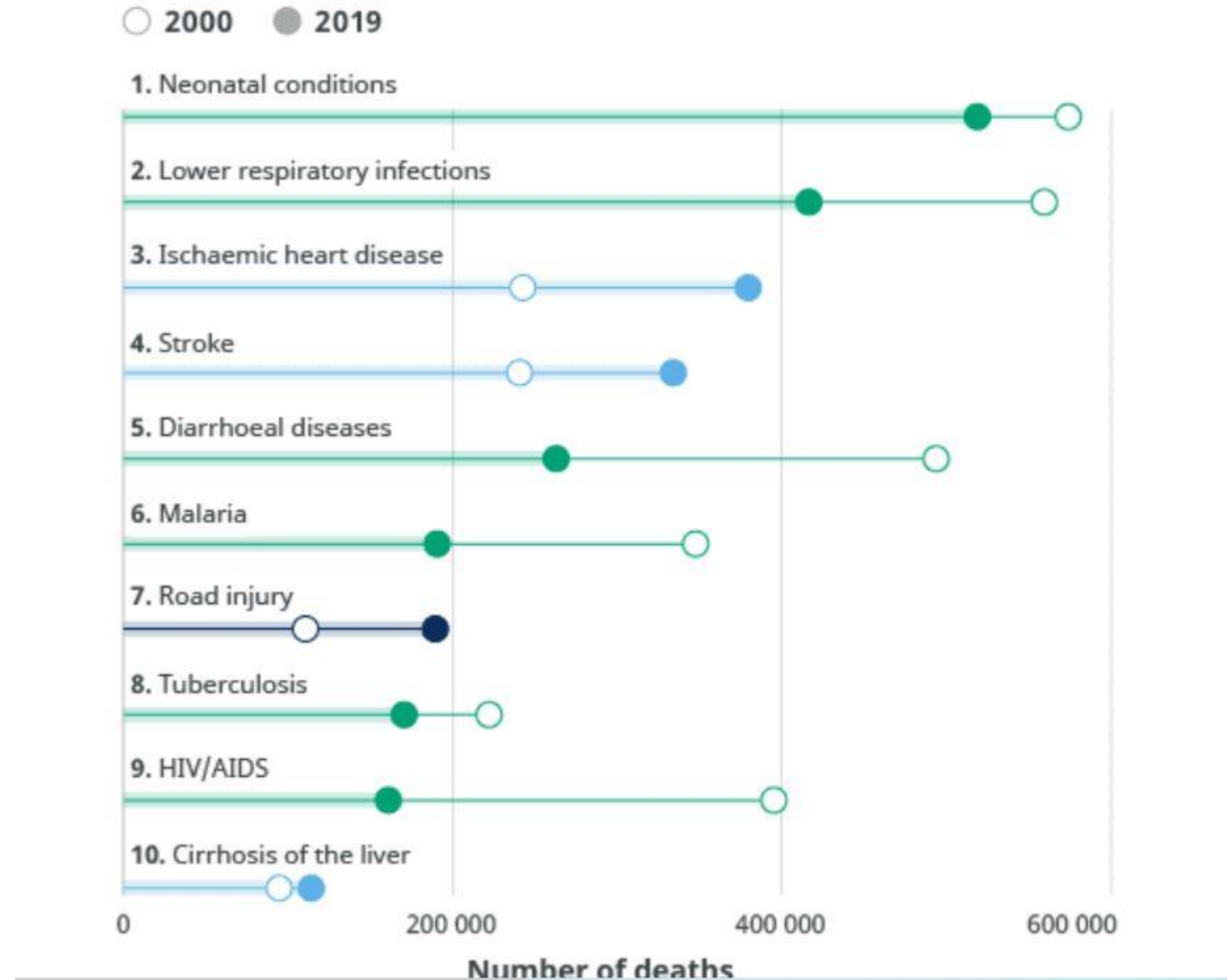
Acute NCD

Self-inflicted
Interpersonal violence
Collective violence
Unintentional
Road Traffic Injuries (RTI)
Drowning
Burns/Scalds
Falls
Poisoning
Suicide

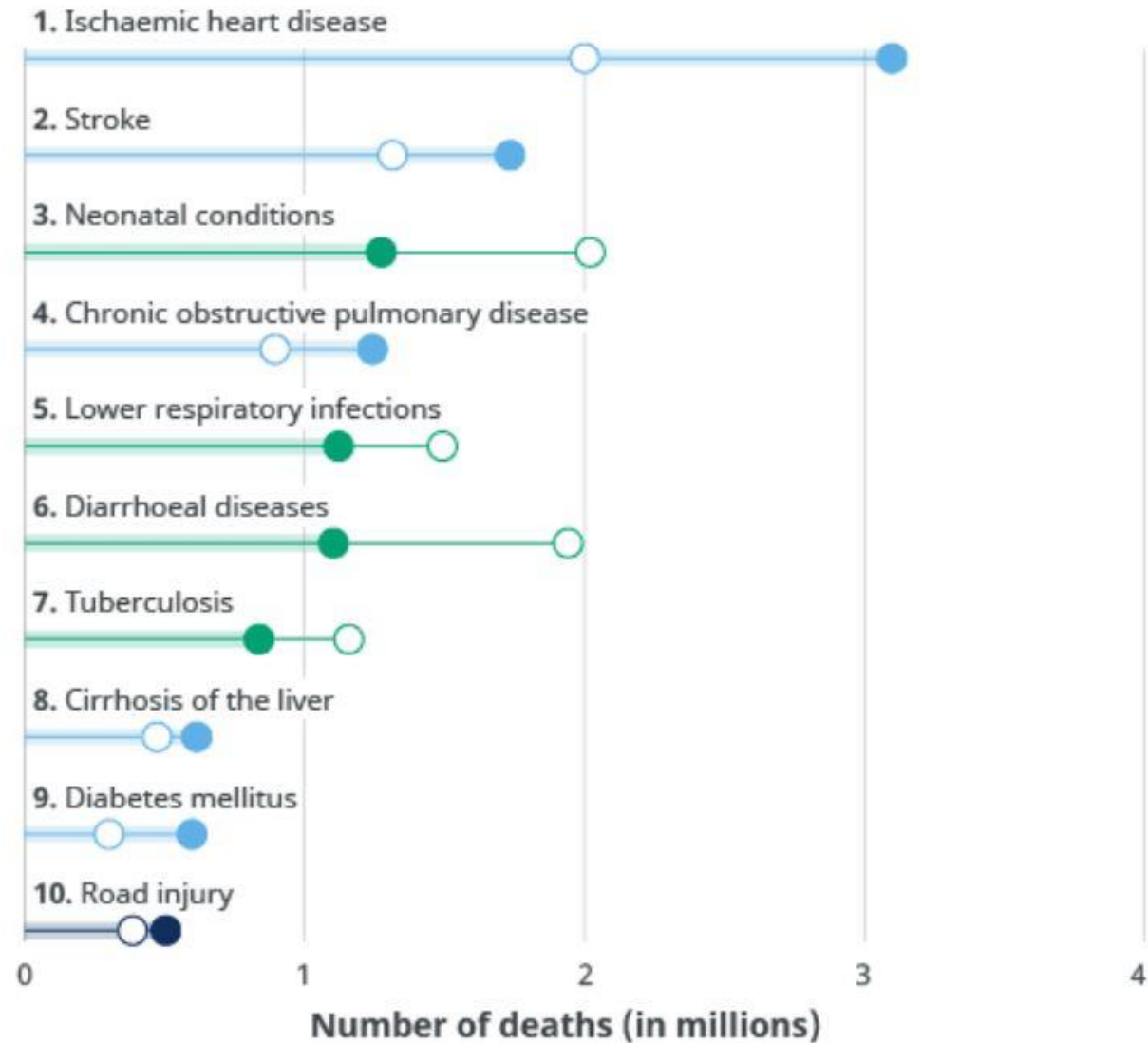
Leading COD globally 2000 and 2019



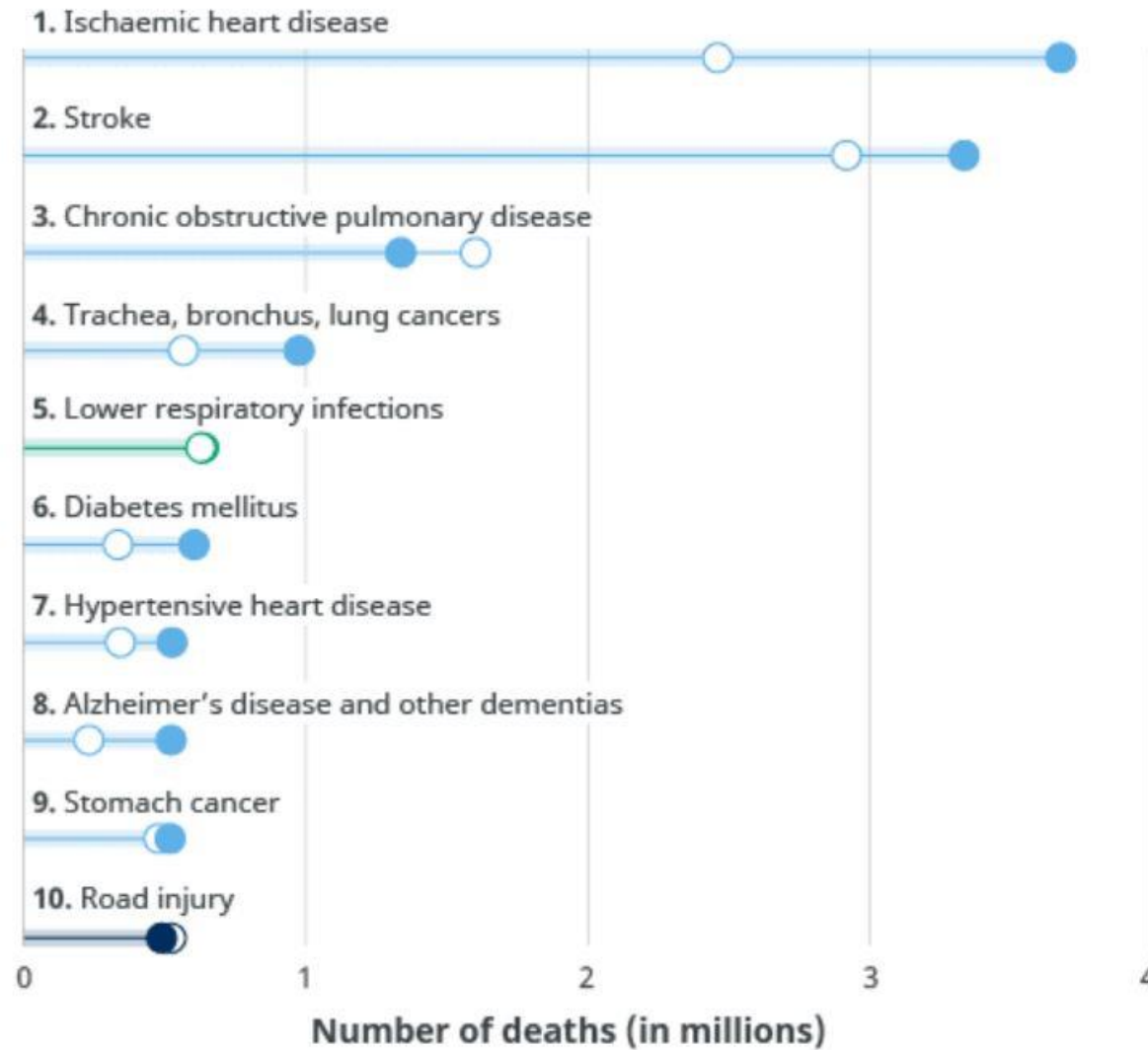
COD lower income countries 2000 and 2019



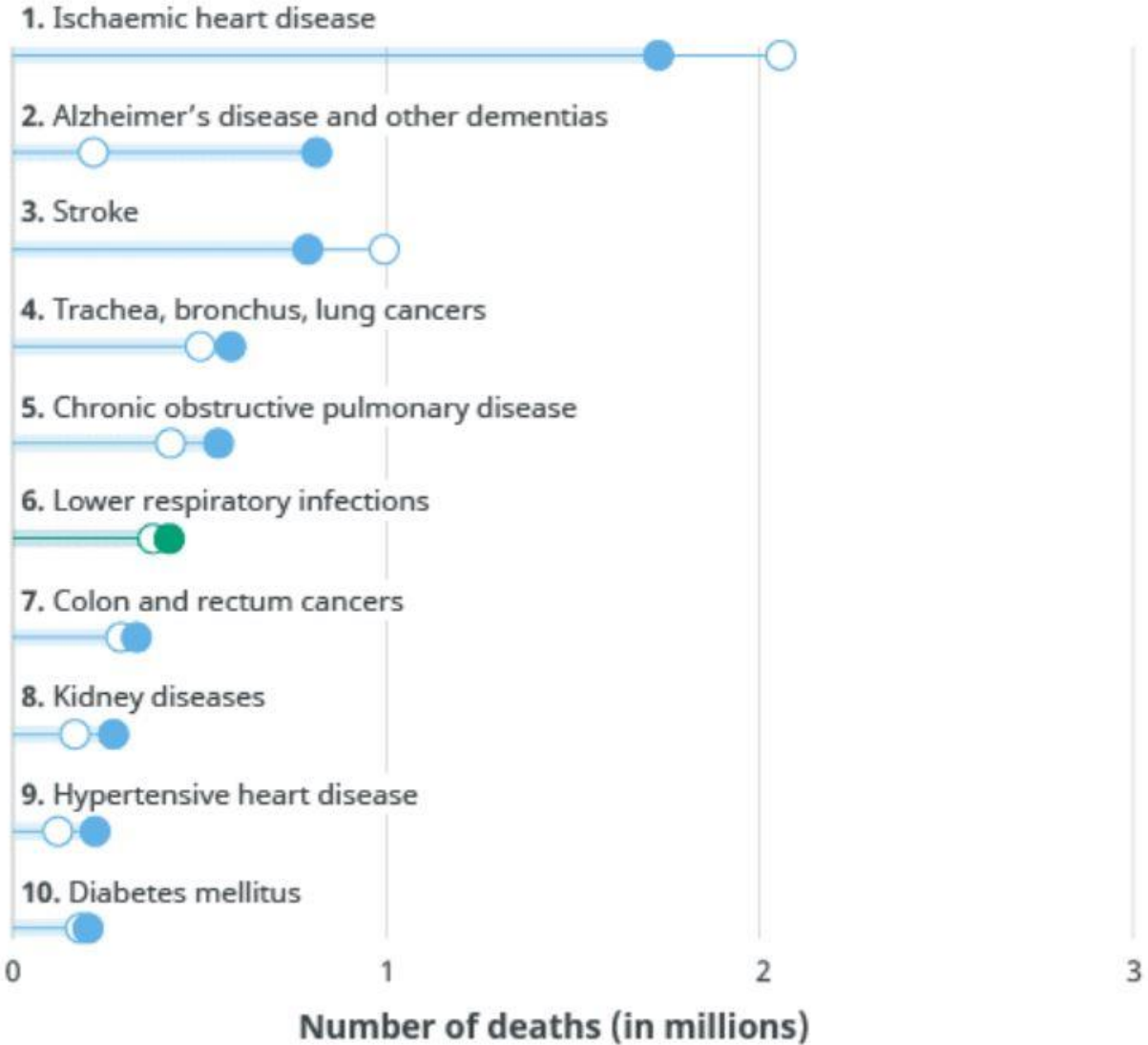
COD lower to middle income countries 2000 and 2019



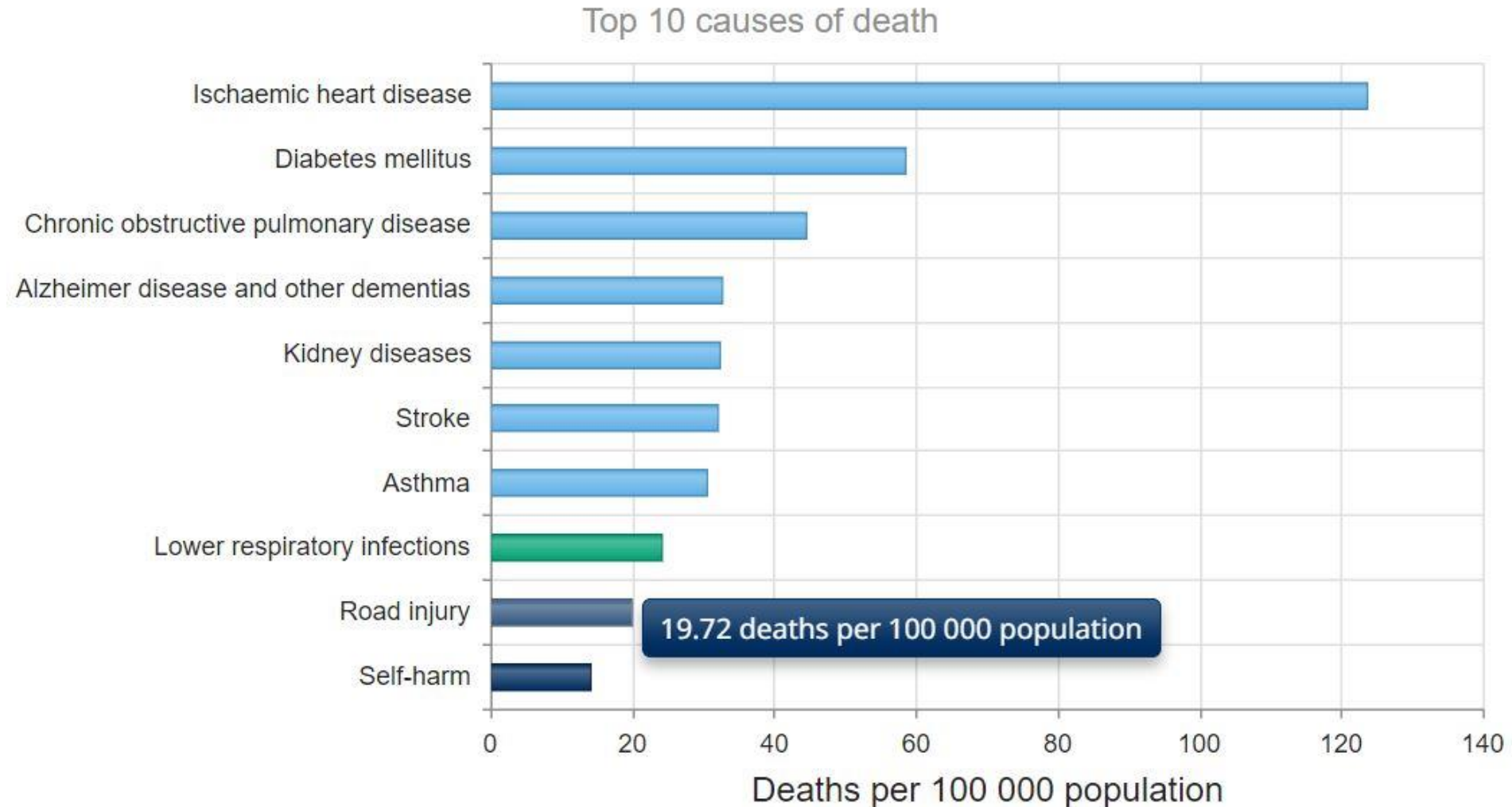
COD upper to middle income countries 2000 and 2019



COD high income countries 2000 and 2019



Leading COD in Sri Lanka AHB 2019



Leading COD in Sri Lanka by gender AHB 2019

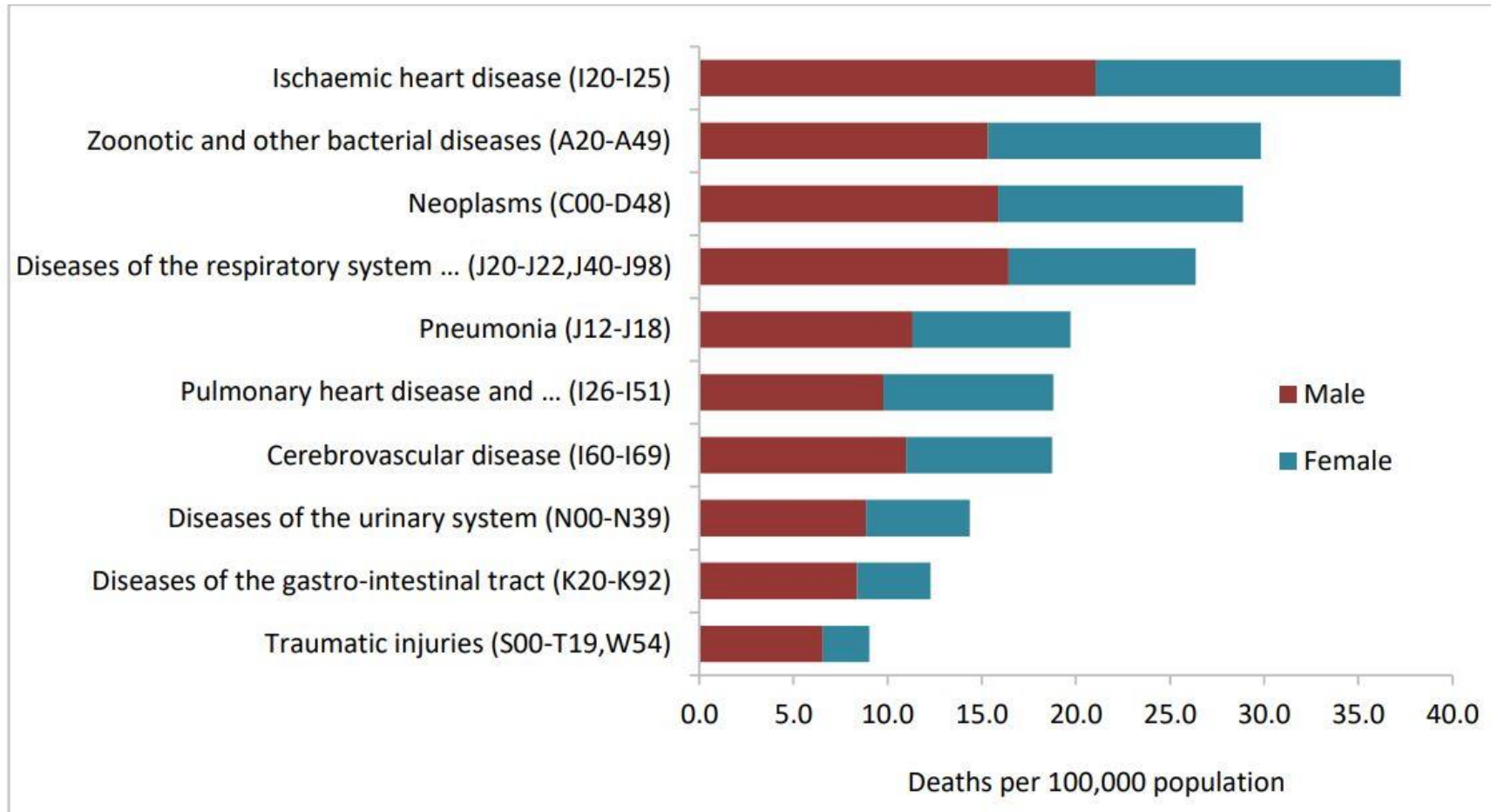


Figure 2.4 : Leading Causes of Hospital Deaths, 2019

Leading cause of hospitalization Sri Lanka AHB 2019

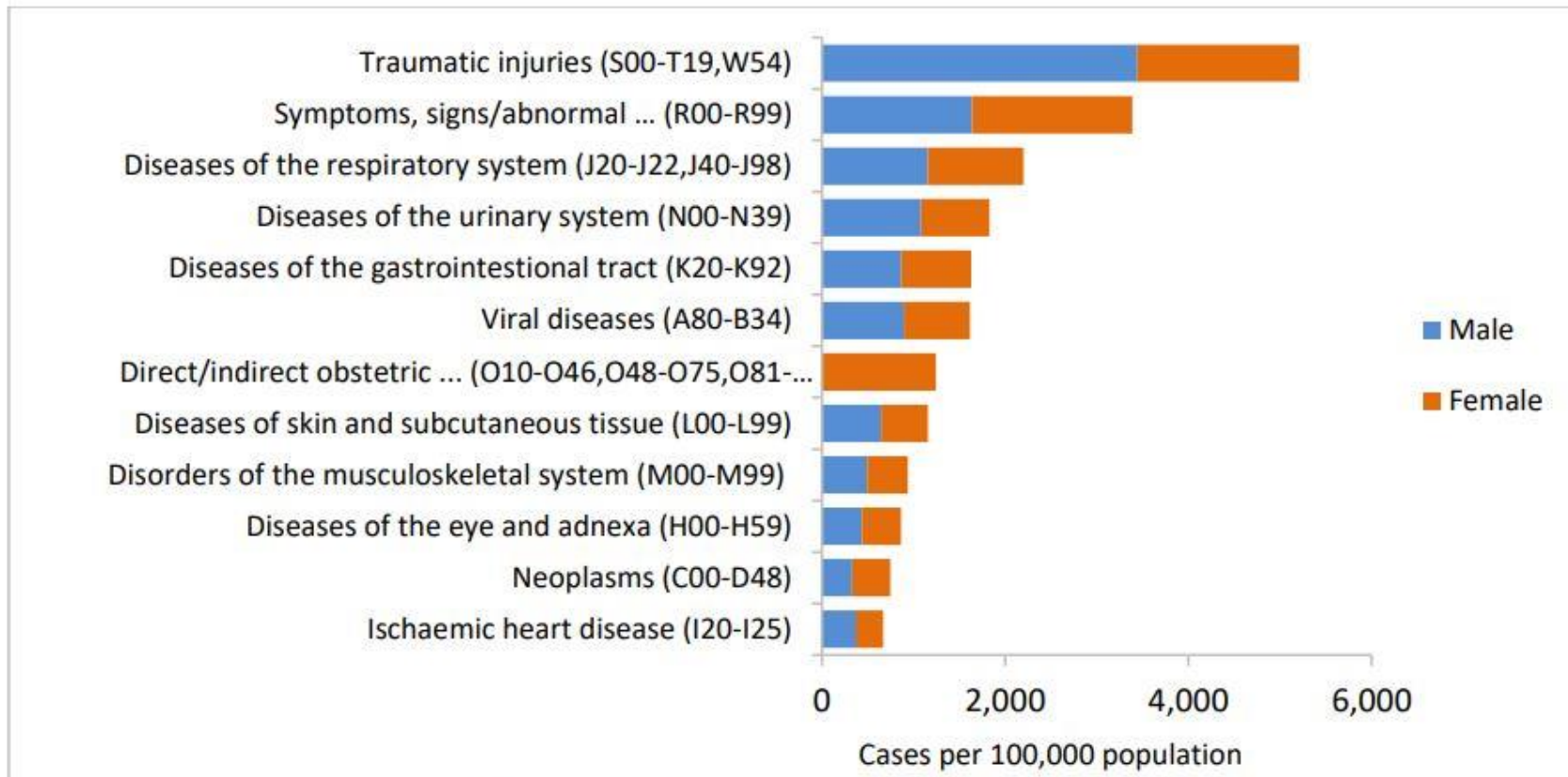


Figure 2.3 : Leading Causes of Hospitalization, 2019

Source: Medical Statistics Unit

NCD country profile - 2022

Sri Lanka

21,324,000

Total
population

83%

Percentage of
deaths from NCDs

120,500

Total number of
NCD deaths

13%

Probability of premature
mortality from NCDs

1

National NCD targets



2

Mortality data



3

Risk factor surveys



4

National integrated NCD policy/strategy/action plan



5

Tobacco demand-reduction measures:

increased excise taxes and prices



A

smoke-free policies



B

large graphic health warnings/plain packaging



C

bans on advertising, promotion and sponsorship



D

mass media campaigns



E

6

Harmful use of alcohol reduction measures:

restrictions on physical availability



A

advertising bans or comprehensive restrictions



B

increased excise taxes



C



Unhealthy diet reduction measures:

salt/sodium policies

saturated fatty acids and trans-fats policies

marketing to children restrictions

marketing of breast-milk substitutes restrictions

Public education and awareness campaign on physical activity

Guidelines for management of cancer, CVD, diabetes and CRD

Drug therapy/counselling to prevent heart attacks and strokes



● fully achieved ● partially achieved ○ not achieved

NCD trends SL –AHB 2019

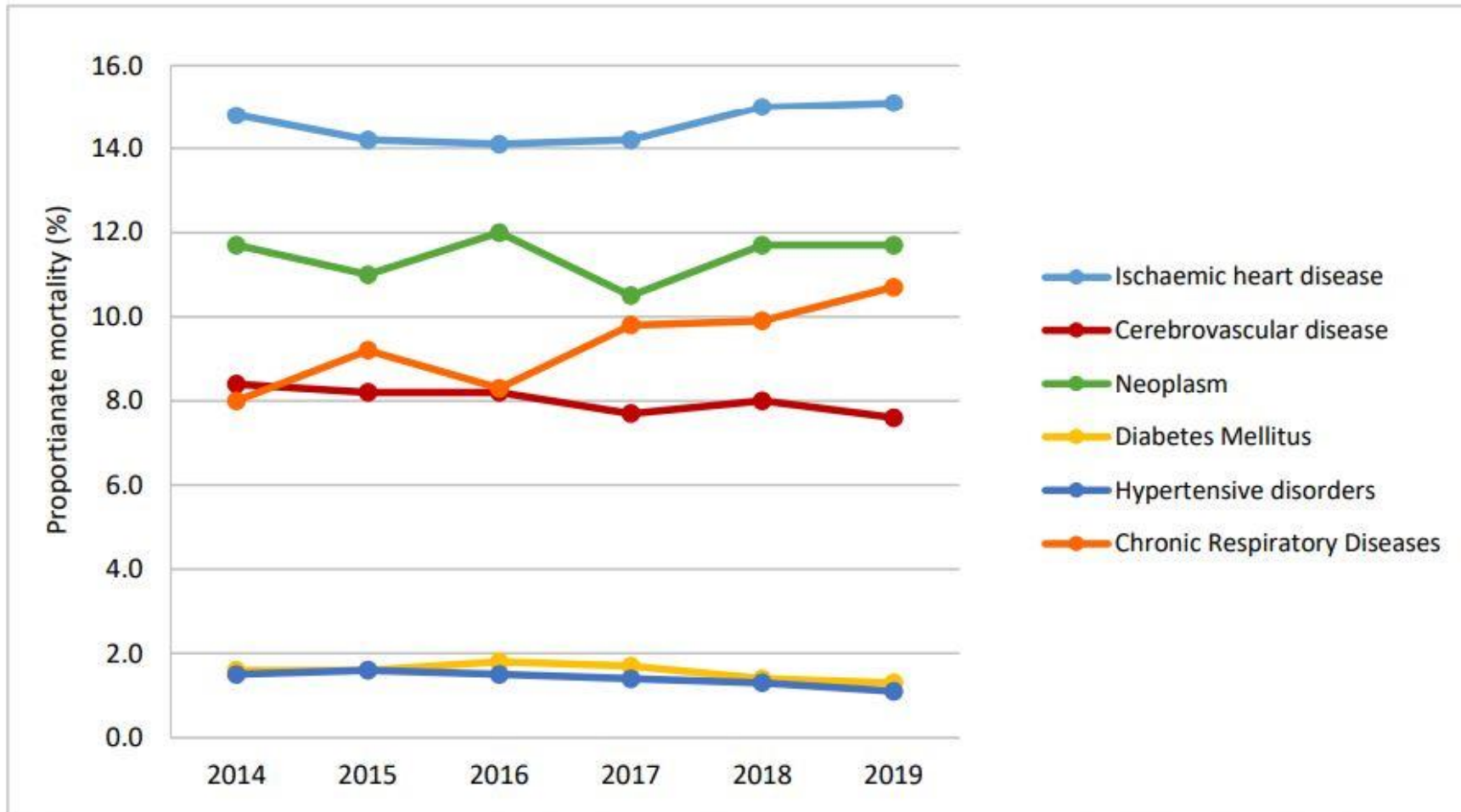


Figure 6.1 : Trends of Mortality due to Chronic NCDs in Government Hospitals, 2014 - 2019

Source: Medical Statistics Unit, Ministry of Health

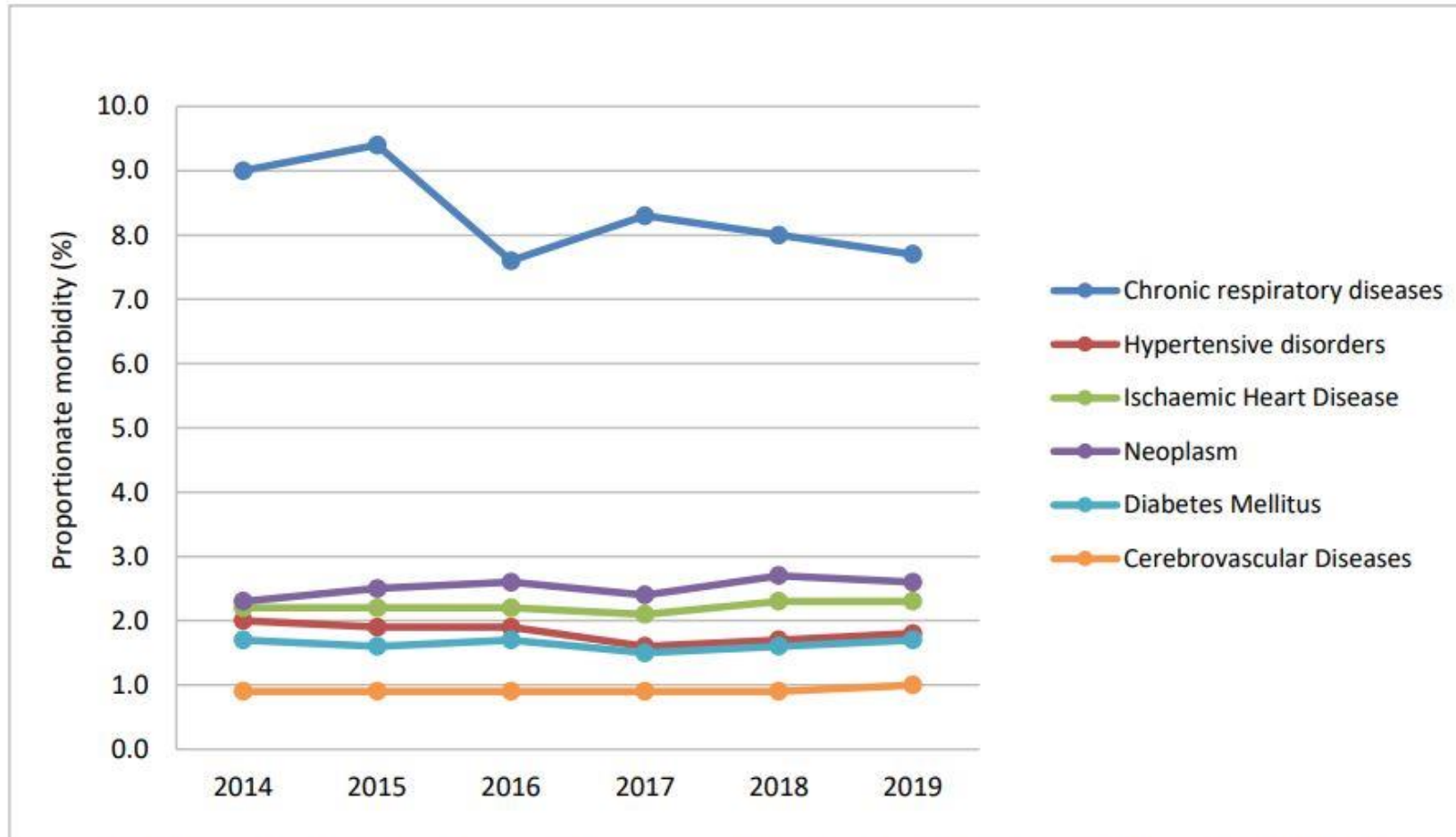


Figure 6.2 : Trends of Admissions to Government Hospitals due to Chronic NCDs, 2014 - 2019

Source: Medical Statistics Unit, Ministry of Health

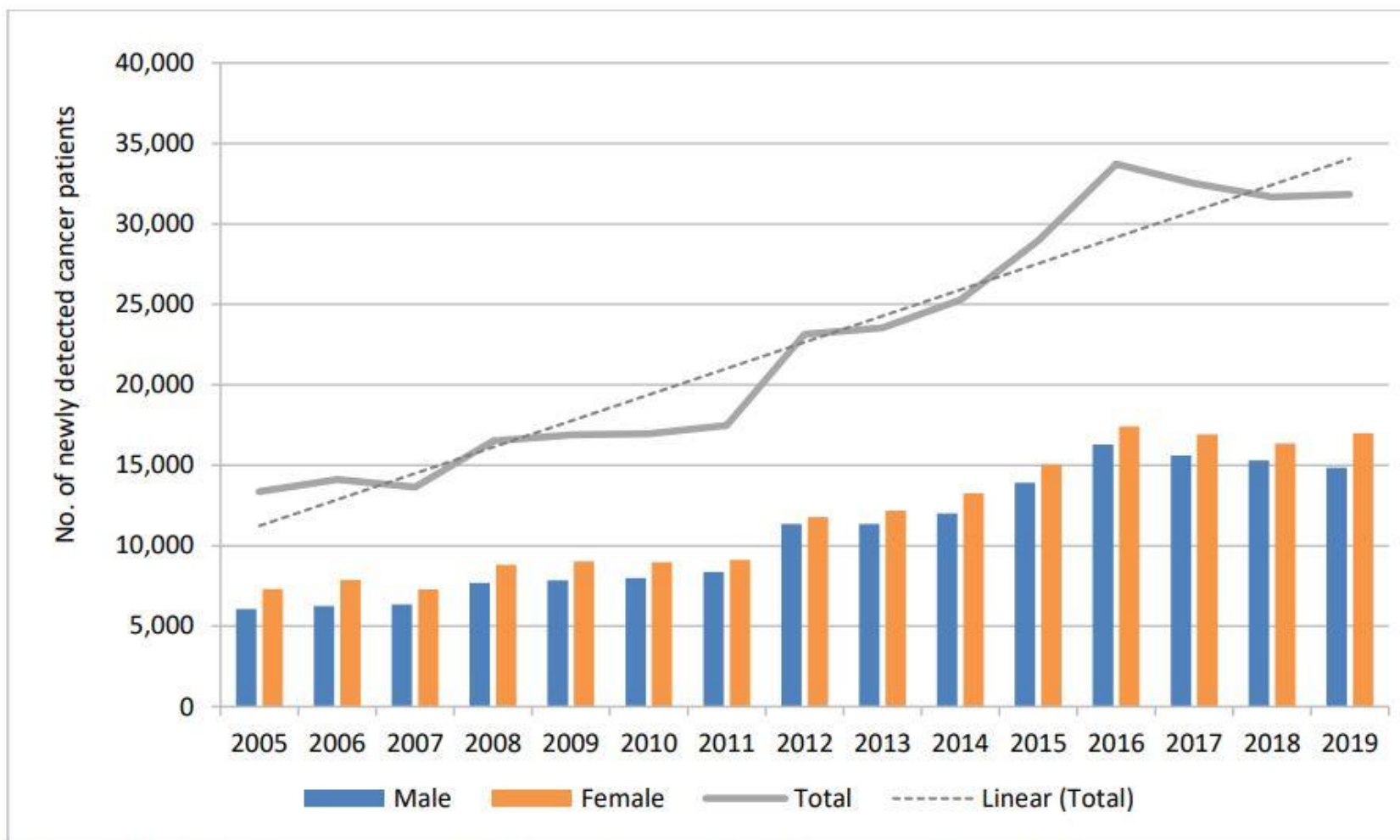


Figure 6.17 : Number of Cancer Patients Reported in Sri Lanka, 2005 - 2019

Source: National Cancer Control Programme

Leading Cancers among Males in Sri Lanka, 2019

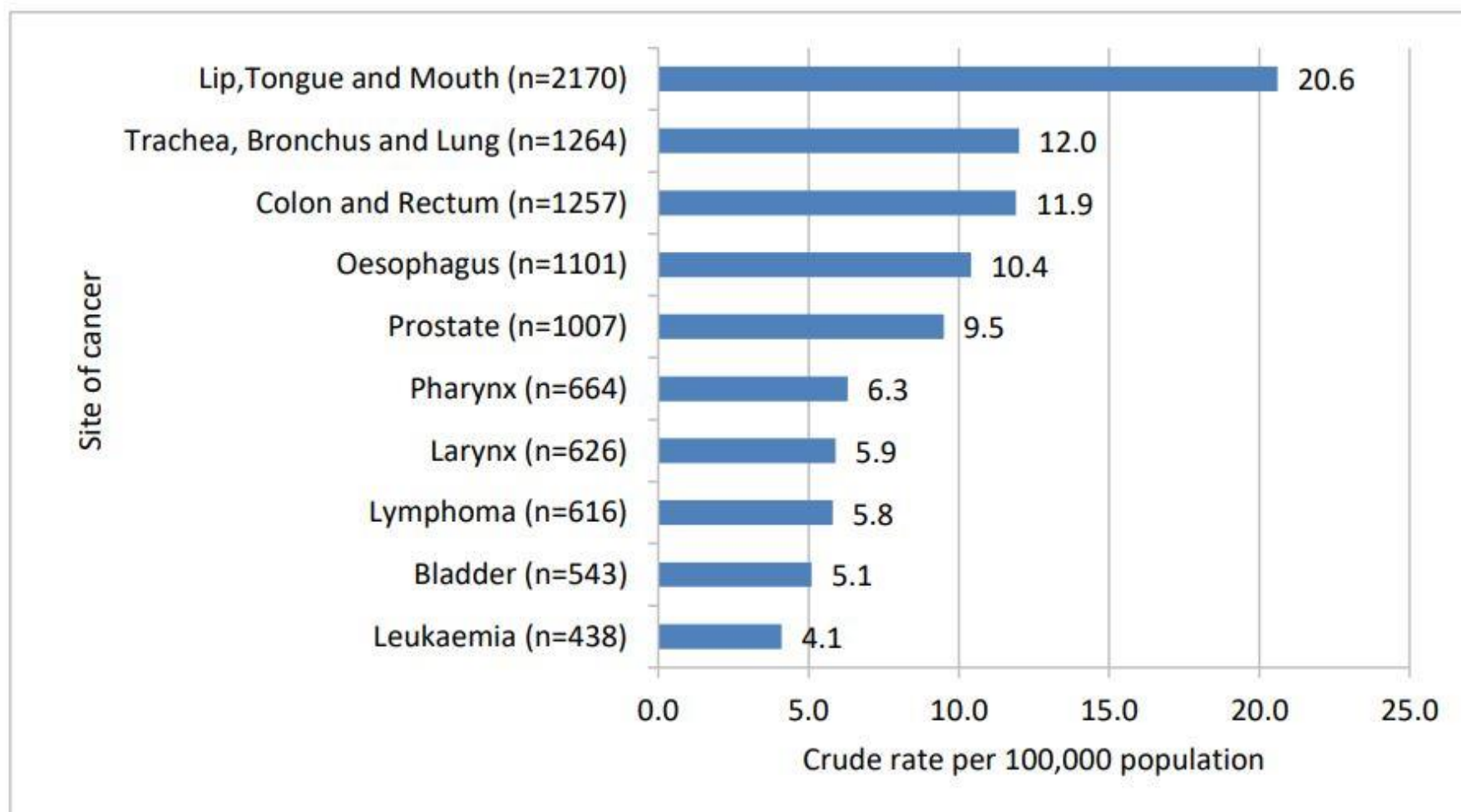
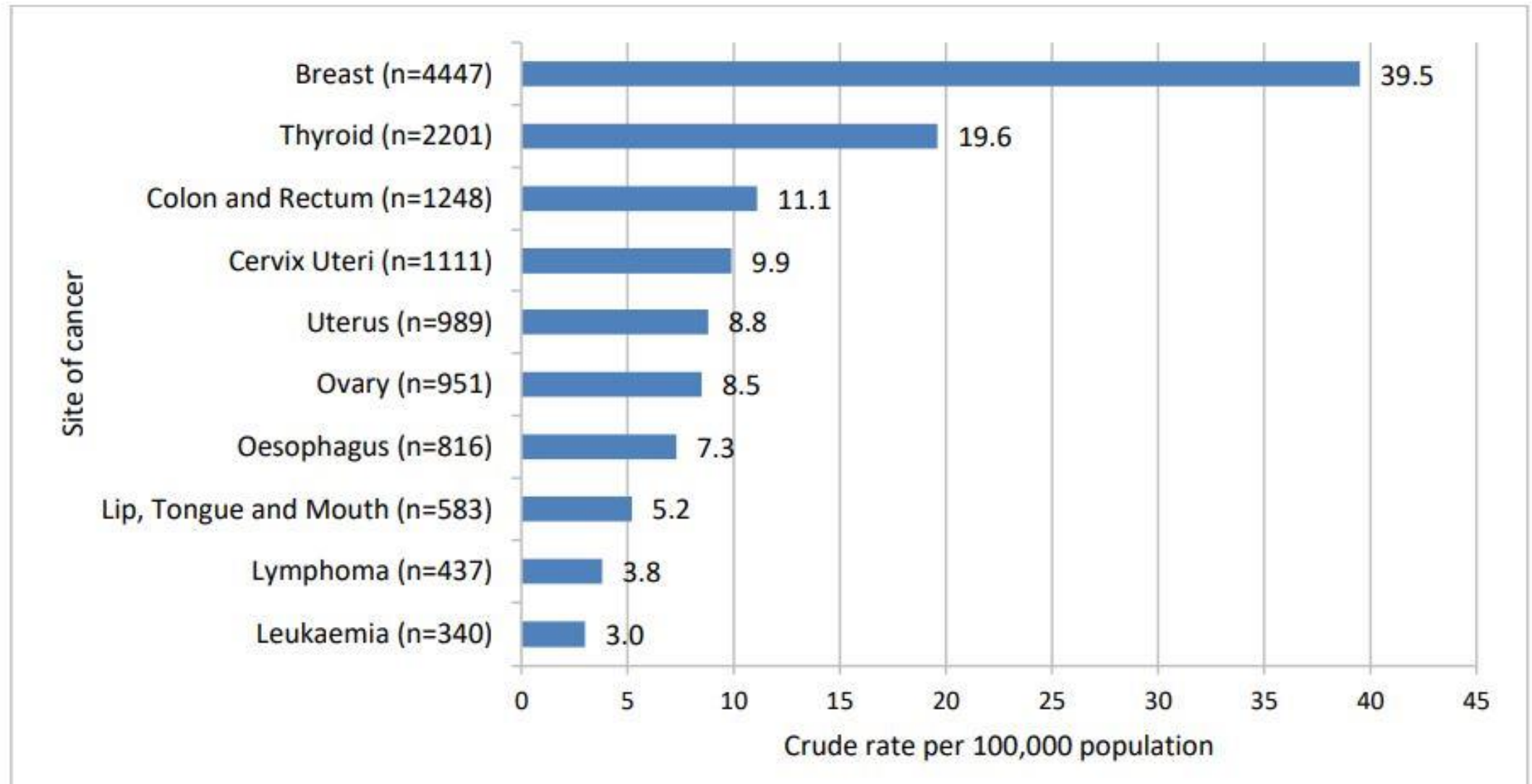
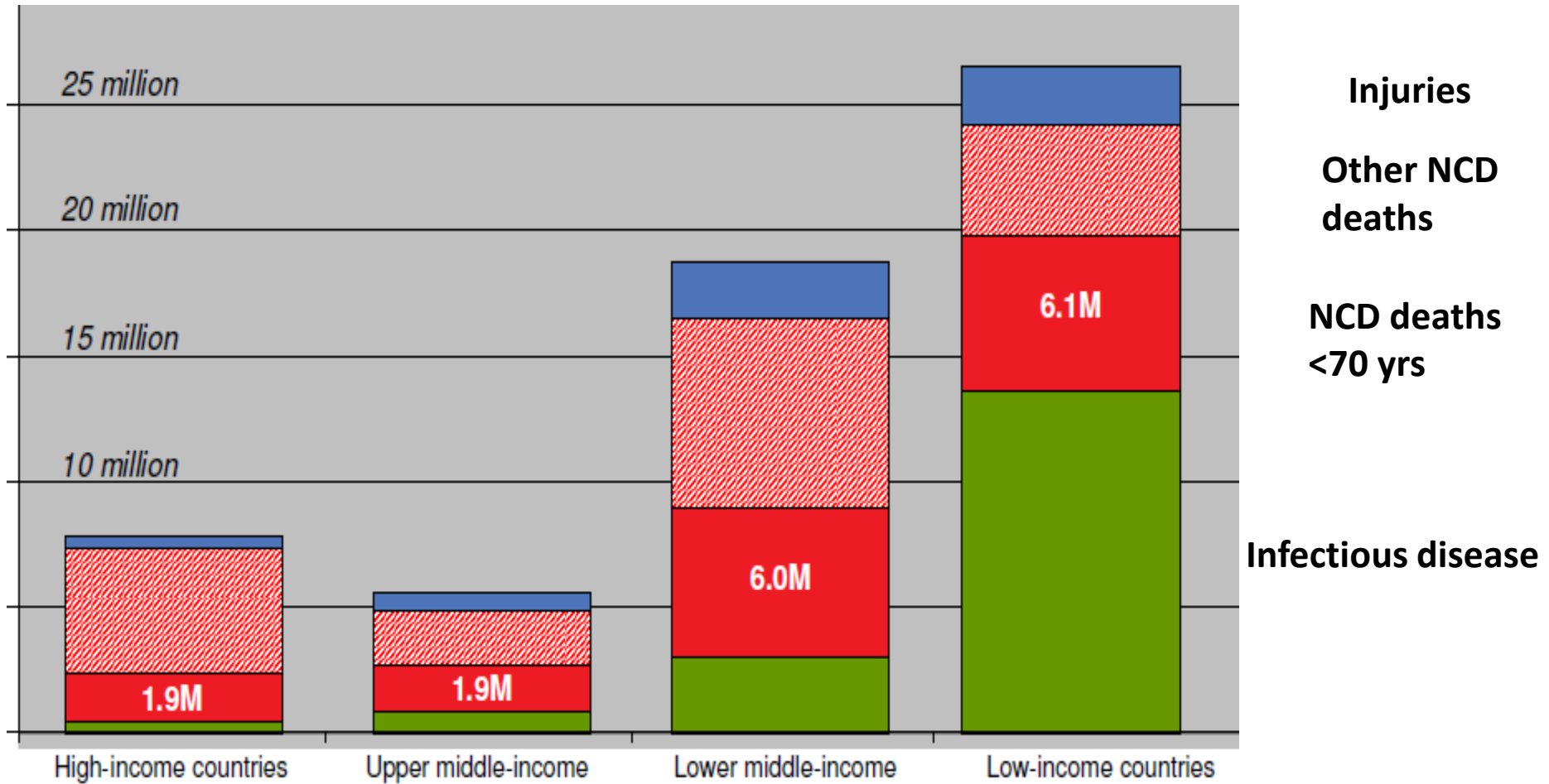


Figure 6.19 : Crude Incidence Rates of Leading Cancers among Males in Sri Lanka, 2019

Source: National Cancer Control Programme

Leading Cancers among Females in Sri Lanka, 2019





- Group III - Injuries
- ▨ Group II - Other deaths from non-communicable diseases
- Group II - Premature deaths from non-communicable diseases (below the age of 70), which are preventable
- Group I - Communicable diseases, maternal, perinatal and nutritional conditions

FIGURE 2: PROPORTION OF NCD DEATHS OCCURRING AMONG THOSE AGED 30 - 69 YEARS, BY INCOME GROUP, 2016

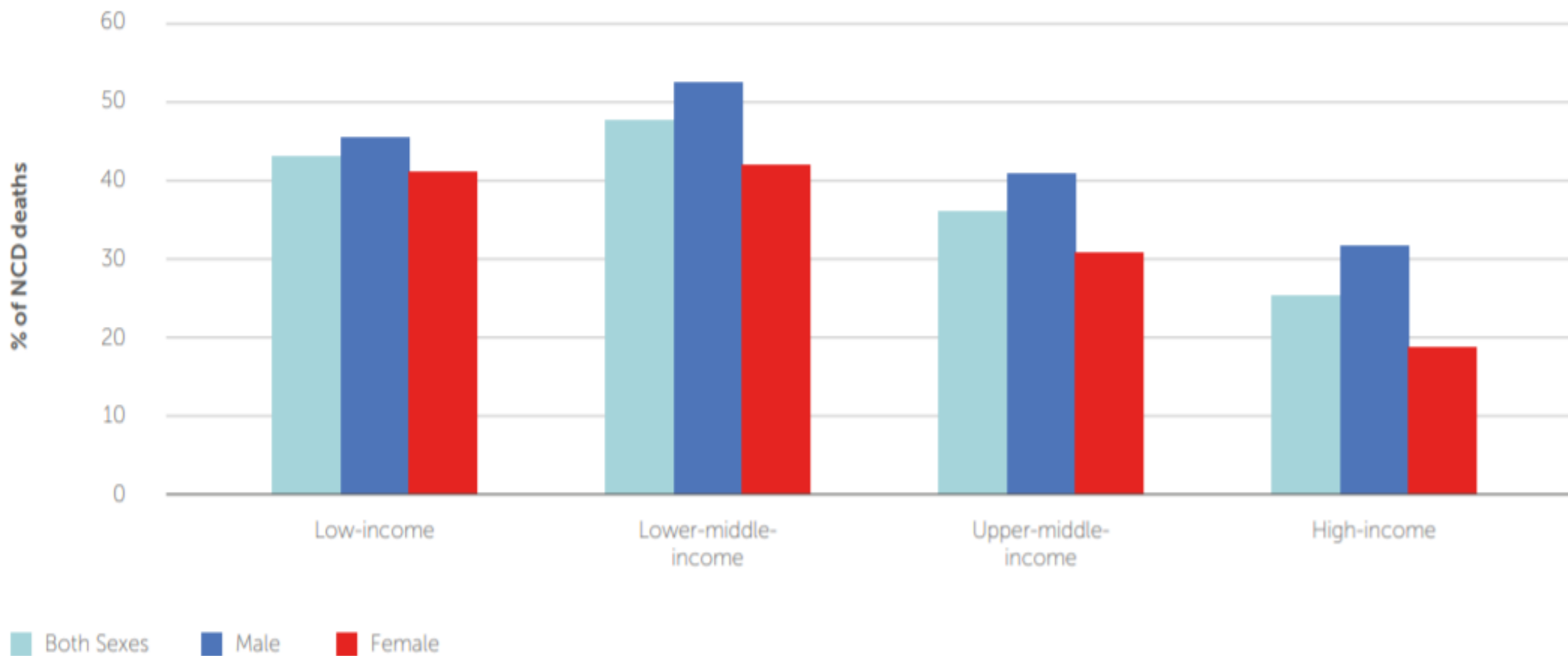
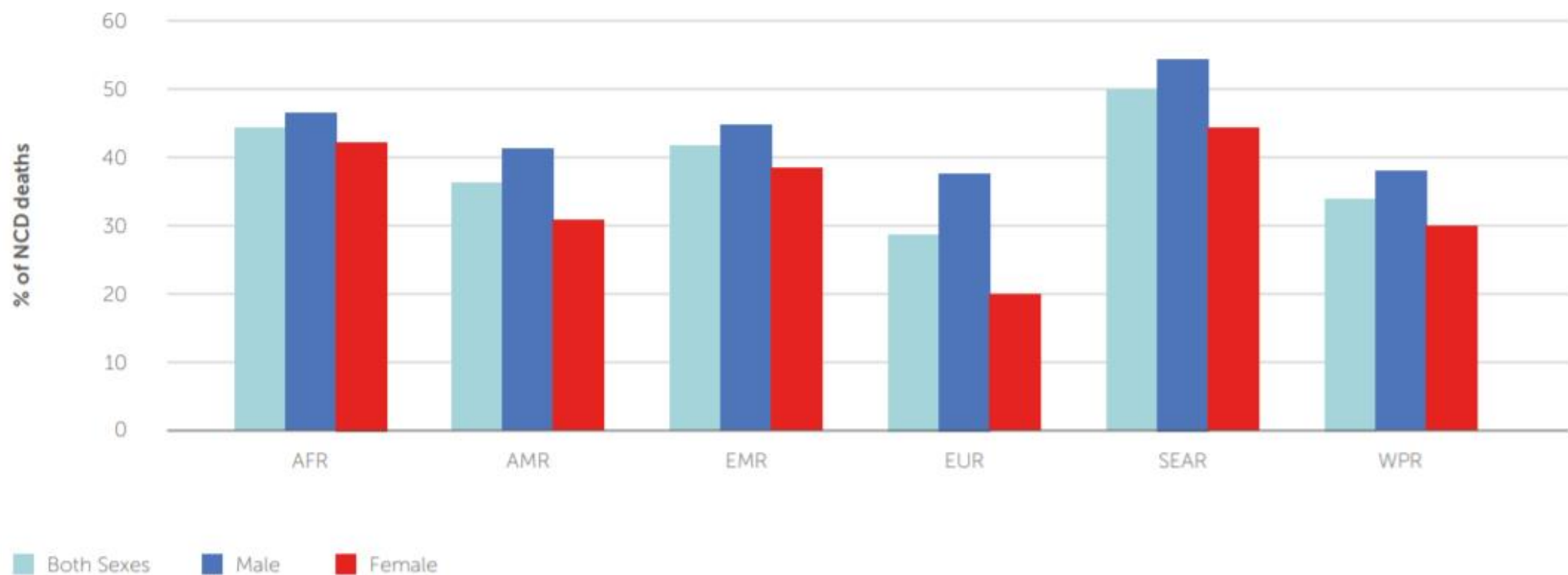
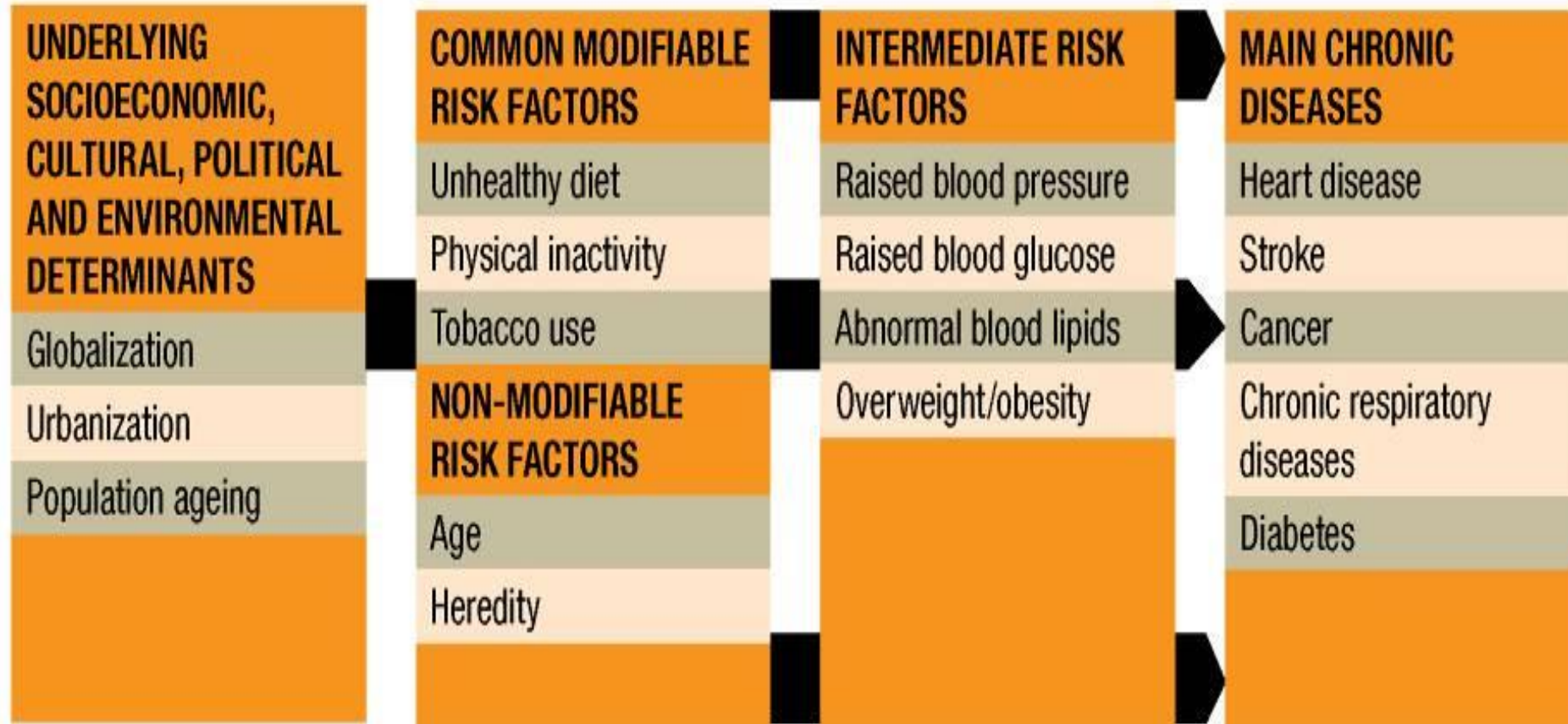


FIGURE 3: PROPORTION OF NCD DEATHS OCCURRING AMONG THOSE AGED 30 - 69 YEARS, BY WHO REGION, 2016



AFR: WHO African Region; AMR: WHO Region of the Americas; EMR: WHO Eastern Mediterranean Region; EUR: WHO European Region; SEAR: WHO South-East Asia Region; WPR: WHO Western Pacific Region.

Determinant of NCD

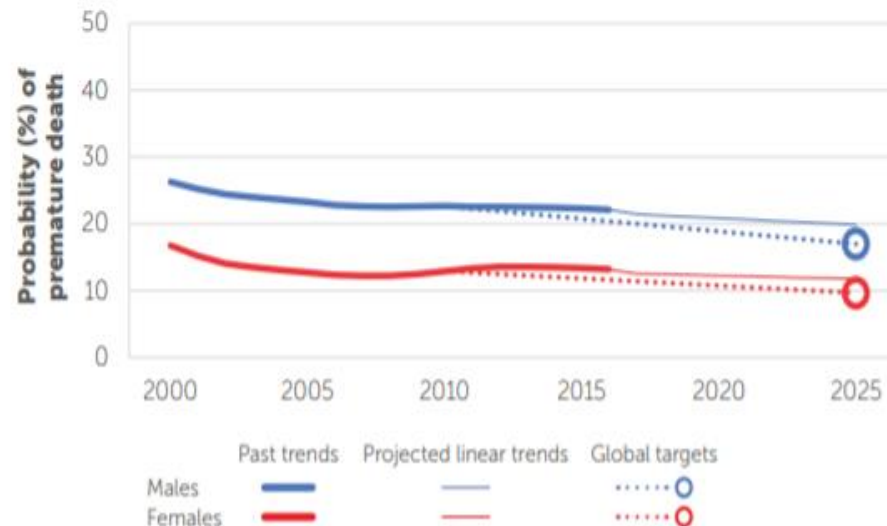


NCD country profile 2018

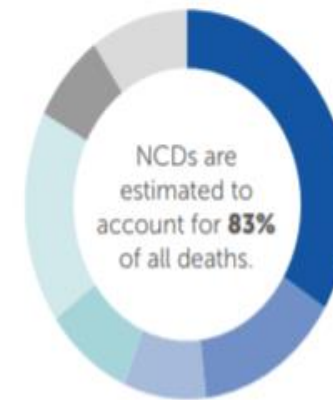
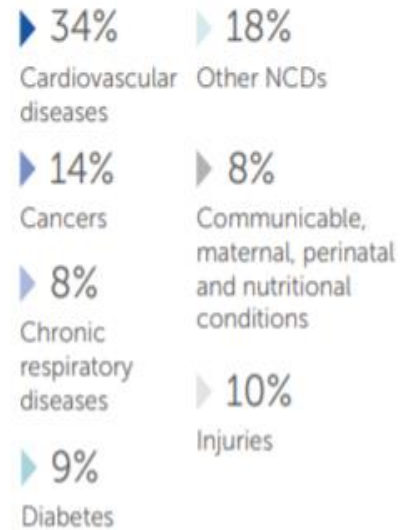
SRI LANKA

2016 TOTAL POPULATION: 20 798 000
2016 TOTAL DEATHS: 143 000

RISK OF PREMATURE DEATH DUE TO NCDs (%)*

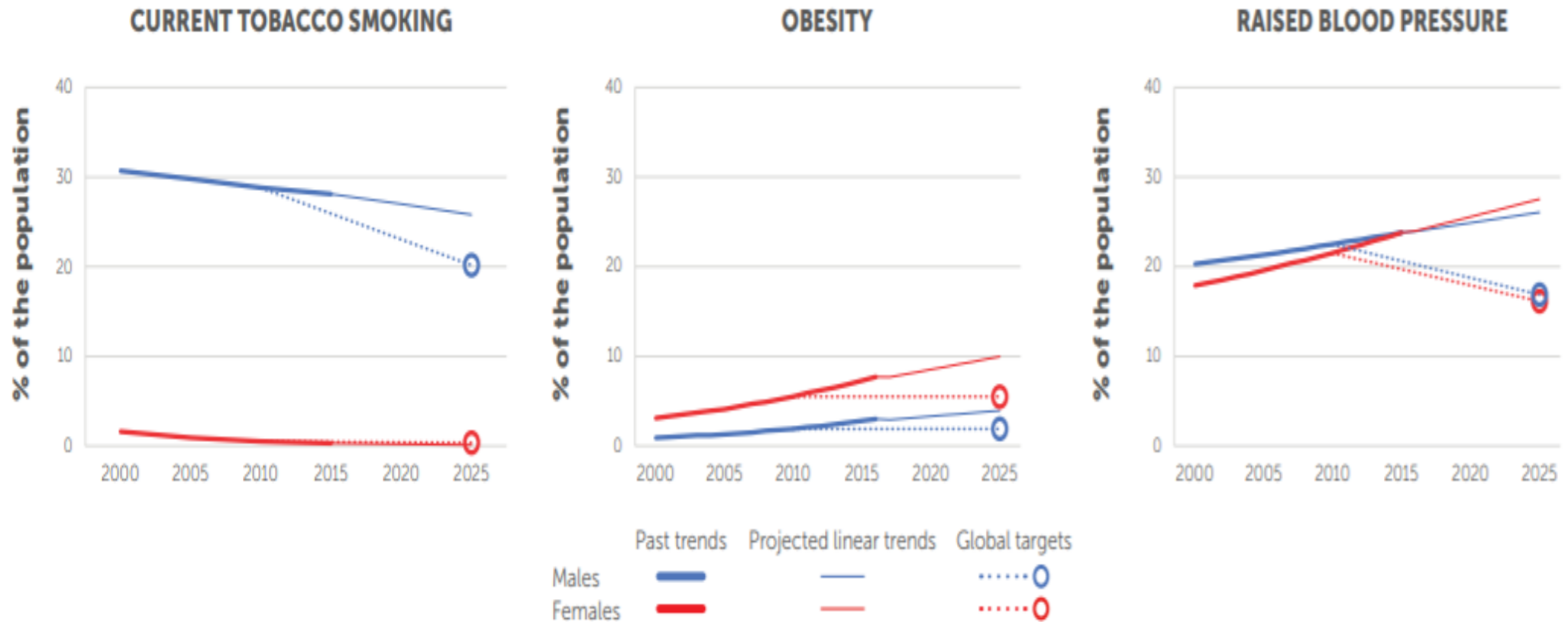


PROPORTIONAL MORTALITY*

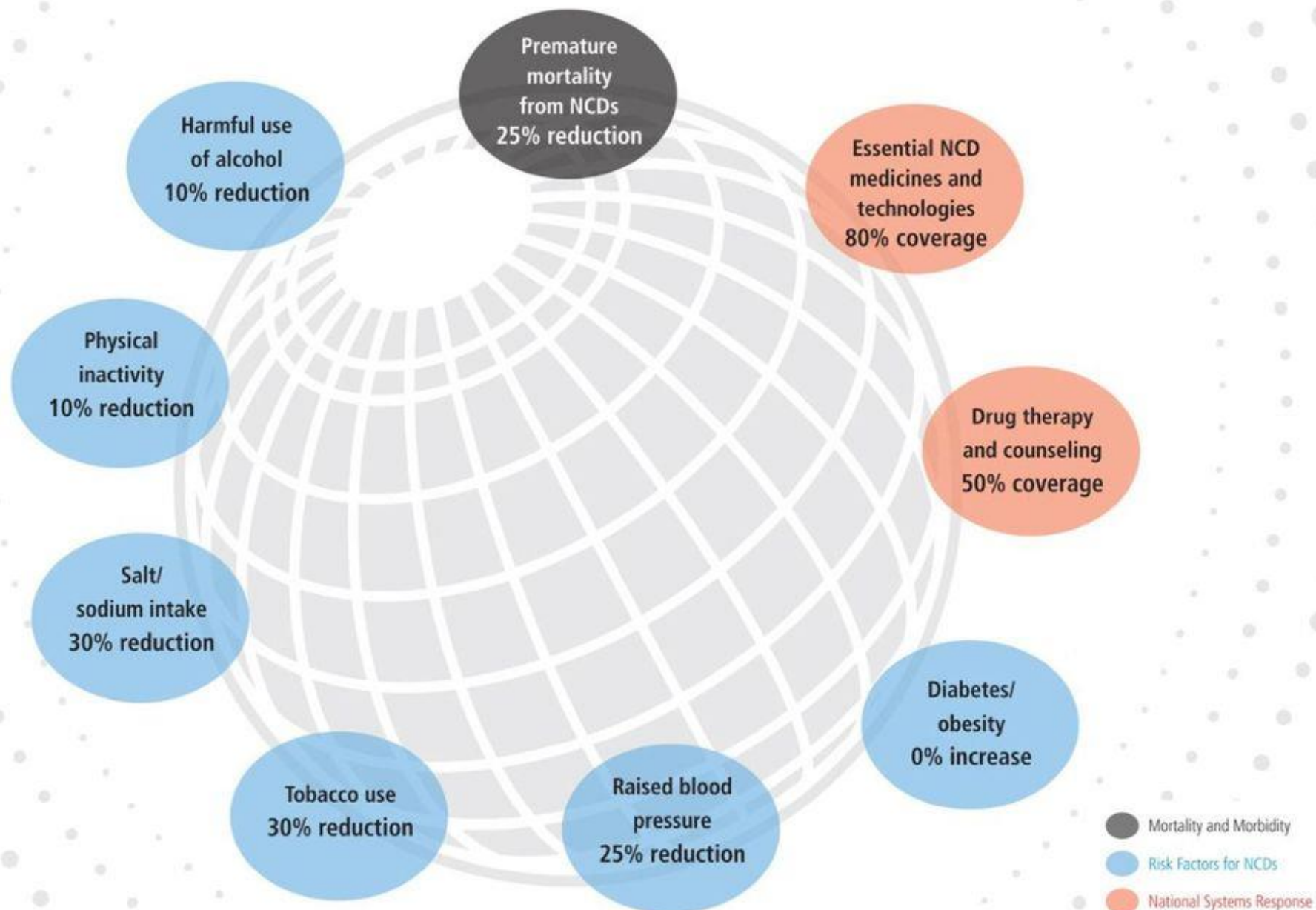


Selected adult risk factors

SELECTED ADULT RISK FACTOR TRENDS



Set of 9 voluntary global targets on NCDs for 2025



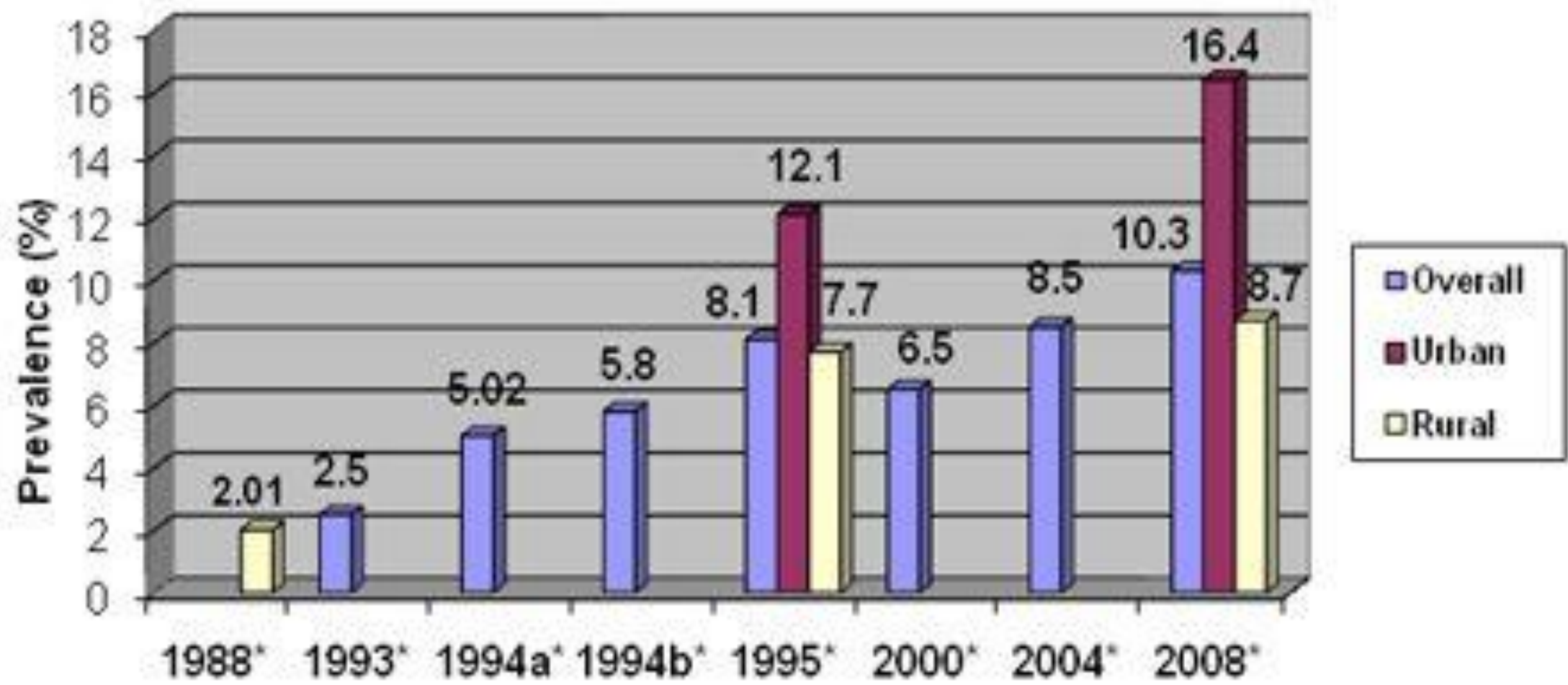
Obesity prevalence in Sri Lanka

- 2019 Somasundaram et al
- Global BMI cut off
 - 7.7% Under weight 39.6% normal
 - 37% overweight 15.8% obese
- Asian cut off values
 - 7.7% underweight 26.8% normal
 - 34.3% overweight 31.2% obese

- One in five adults in Sri Lanka has either diabetes or pre-diabetes
- One-third of those with diabetes are undiagnosed.

Prevalence and projections of diabetes and pre-diabetes, in adults in Sri Lanka—Sri Lanka Diabetes, Cardiovascular Study (SLDCS)
P. Katulanda*†, G. R. Constantine†, J. G. Mahesh†, R. Sheriff†, R. D. A. Seneviratne‡, S. Wijeratne§, M. Wijesuriya¶, M. I. McCarthy*, A. I. Adler** and D. R. Matthews*

Prevalence of Diabetes in Sri Lanka



Socio-economic differentials

- High current levels of disease burden even in the poor groups
- High current levels of Risk factors like tobacco and alcohol use, inadequate fruits and vegetable intake in the poor sections of the society and decreasing physical activity indicating higher future burden
- Rural-urban differentials are mainly due to socio-economic differences

Socio-economic impact

- High Costs as treatment is lifelong
- High health expenditure for chronic diseases
- Governments need to intervene on behalf of its poor

Summary

NCD burden rising all over the world. More prominent in low socio economic countries.

Four common NCDs-CVD, Diabetes, Cancers & Chronic Obstructive Lung Disease

Four common Risk Factors- Smoking, Alcohol, Unhealthy Diet, Lack of Exercise

WHO “ Best Buys” for NCDs

- WHO identified a package of 16 “best buys” intervention
- Cost effective, affordable, feasible and scalable in all settings
- “Best buys” were first implemented in 2011
- Updated in 2017 based on latest evidence of intervention impact and costs
- Implementing all 16 “best buys” in all countries between 2018 and 2025 would avoid 9.6 million premature deaths

WHO “Best buys”

Risk factor/ Disease to be addressed	Intervention	Detailed description
Reduce tobacco use	Tax	Increase tax and price of tobacco products
	Packaging	Large graphic health warnings on all tobacco packages
	Advertising, promotion and sponsorship	Enforce comprehensive bans on Advertising, promotion and sponsorship
	Smoke –free public places	Eliminate exposure to second hand tobacco smoke in all indoor workplaces, public places and transport
	Educate	Implement effective mass media campaigns about harmful effects of tobacco smoking/ use
Reduce armful use of alcohol	Tax	Increase tax on alcoholic beverages
	Advertising	Enforce bans/ restrictions on exposure to alcohol advertising
	Availability	Enforce restrictions on physical availability
Reduce physical activity	Educate	Community wide public education and awareness campaigns for physical activity, motivational programmes to support behavioural change of physical activity level

WHO “Best buys” (cont)

Risk factor/ diseases to be addressed	intervention	Detailed description
Reduce unhealthy diet	Reformulate food	Reduce salt intake through formulation of food products containing less salt
	Supportive environments	Reduce salt intake in established public institutions such as hospitals, schools, workplaces, nursing homes
	educate	reduce salt intake through behavior change communication and mass media
	packaging	Reduce salt intake through implementation of front of pack labelling
Manage cancer	vaccinate	Vaccinate against HPV (2 doses) of 11-12 year old girls
	screening	Pap smear screening of women aged 30-49 years Visual inspection of cervix HPV test every 5 years

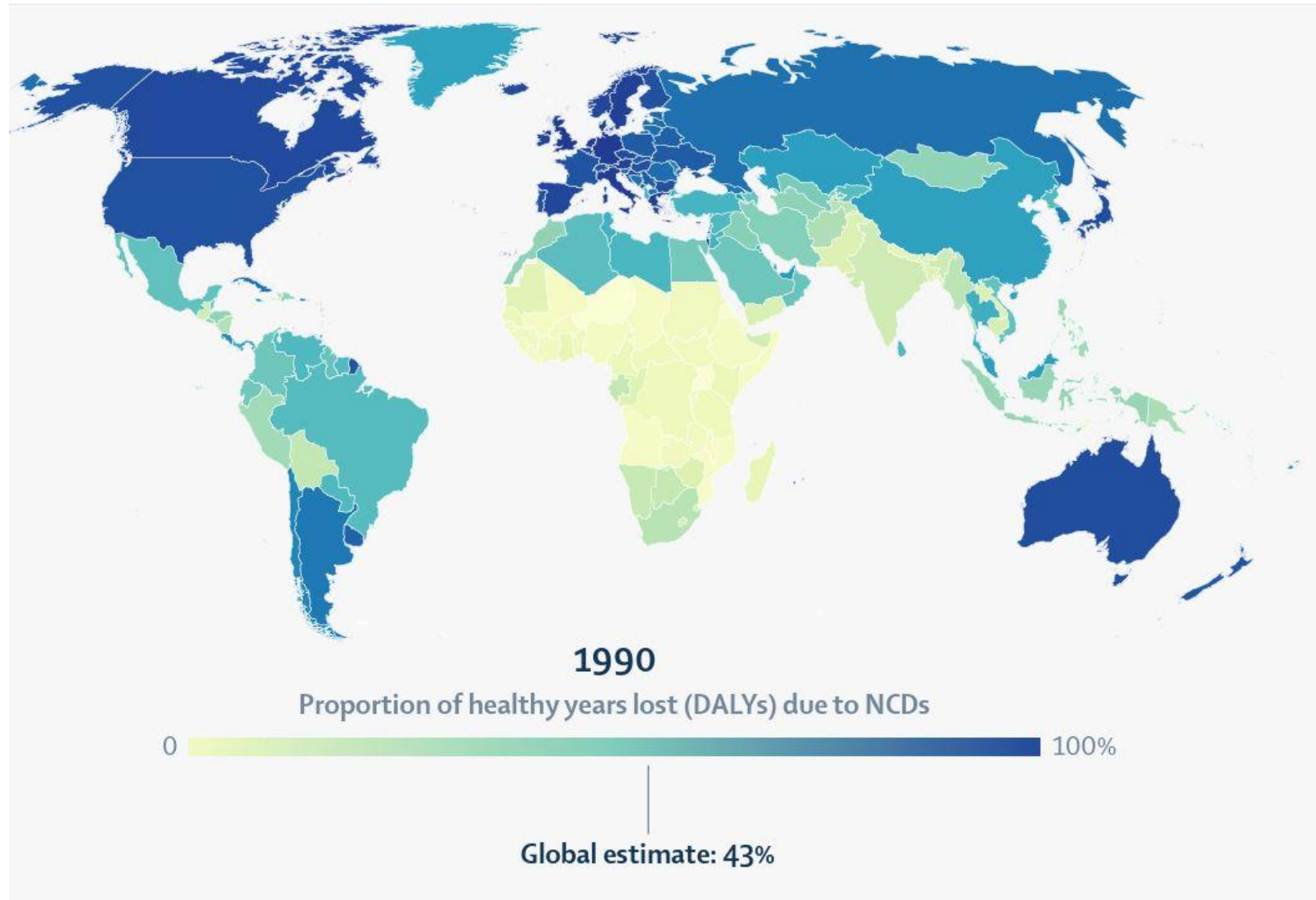
Burden of disease

- Traditionally by prevalence/incidence studies
 - Does not capture the suffering and the change in the quality of life due to these diseases
- Concept of Disability Adjusted Life Years (DALYs) to include this dimension in health assessment
- DALY is an indicator of time lived with a disability and time lost due to premature mortality due to that disease or condition.

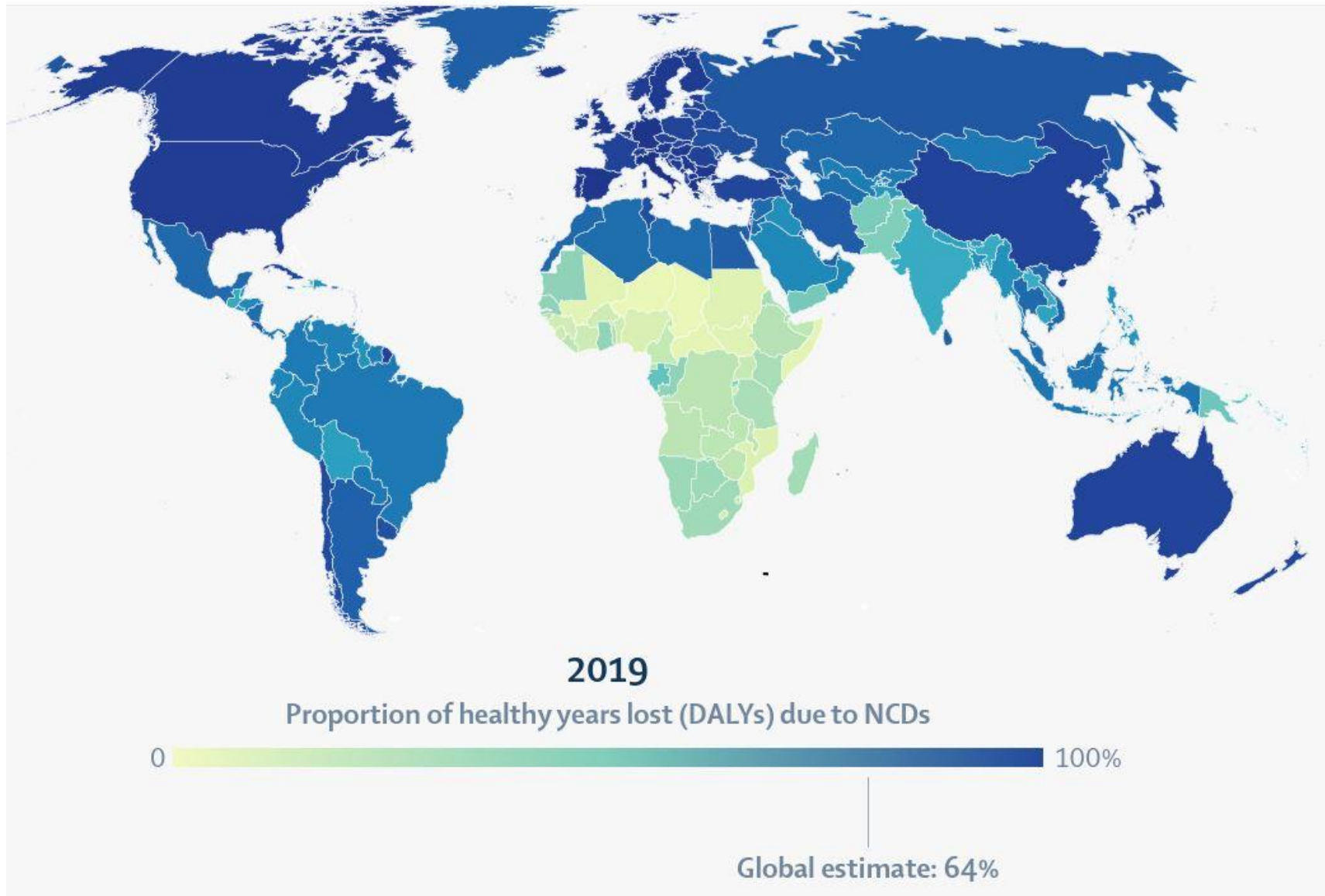
Disability Adjusted life Years (DALY)

- DALY is the only quantitative indicator that measures the burden of disease (**pre mature mortality**) or some degree of disability (**morbidity**) during a period of time
- Premature mortality is measured as years of life lost (YLLs)
- Morbidity is measured in terms of years lived with a disability (YLDs)
- $DALY = YLL + YLD$
- One DALY represent one lost year of healthy life

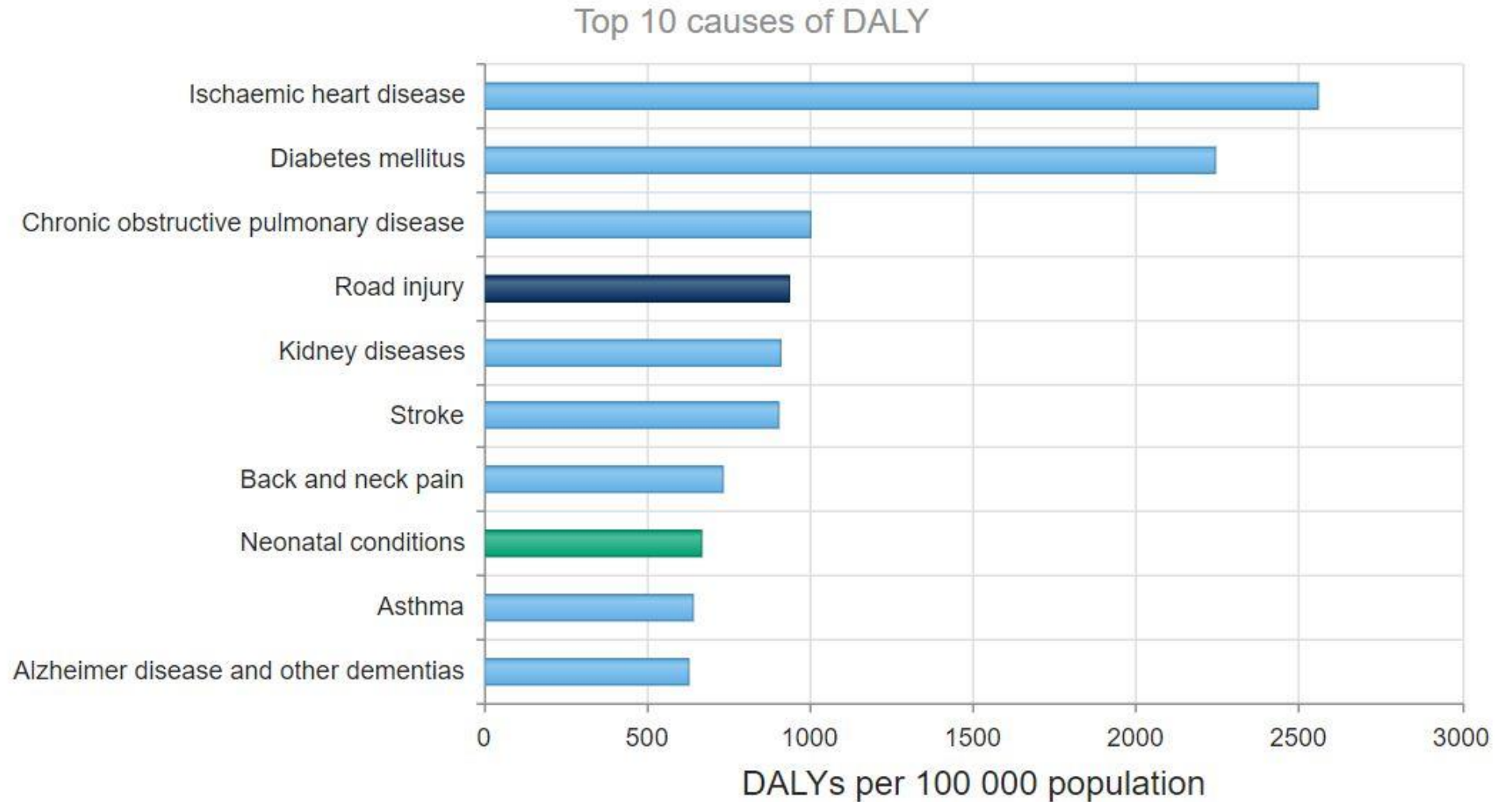
NCDs contributed less than half of overall global health loss.



2019



Top 10 causes of DALY – Sri Lanka AHB 2019



Differences between QALY and DALY (Both are used as measuring health)

QALYs

- Quality Adjusted life Years
- QALY measures quality of life in health gain
- QALY is expressed in either 1 or 0
- Where
 - 1 = Perfect health
 - 0 = Death

DALYs

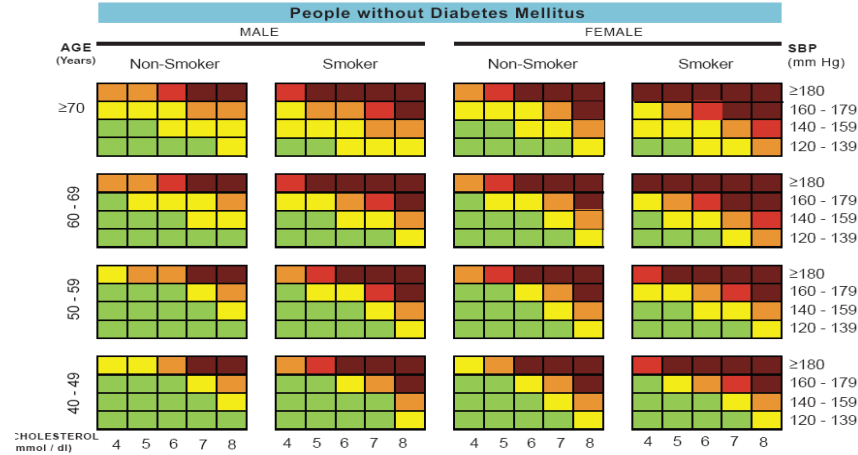
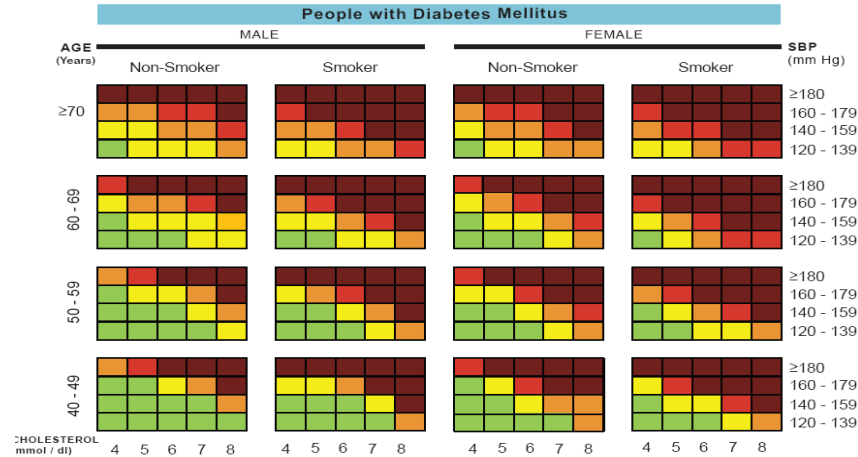
- Disability Adjusted life years
- DALY measures health lost in the quality of life
- DALY is expressed either in 1 or 0
- Where
 - 0 = Perfect health
 - 1 = Death

Healthy Lifestyle Centres

- Initiated the Healthy Lifestyle Centers (HLCs) in 2011
- (NCD) screening service through the lowest level of primary health-care institutions.
- The main objective - to reduce the risk of NCDs of people more than 35-year-old by detecting risk factors early and improving access to specialized care for those with a higher risk of cardiovascular disease (CVD).
- The screened clients are managed at HLCs, based on the total-risk approach to assess their 10-year CVD risk, using the WHO /International Society of Hypertension risk-prediction chart

WHO/ISH RISK PREDICTION CHART

■ < 10%
 ■ 10% to < 20%
 ■ 20% to < 30%
 ■ 30% to < 40%
 ■ ≥ 40%



WHO/ISH Risk Charts

Guidelines for Risk Prediction Chart

How do you use the charts to assess cardiovascular risk?

Before applying the chart to estimate the 10 year cardiovascular risk of an individual, the following information is necessary

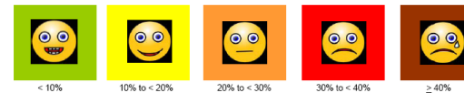
- Presence or absence of diabetes¹
- Gender
- Smoker or non-smoker²
- Age
- Systolic blood pressure (SBP)³
- Total blood cholesterol⁴

mmol/l	mg/dl
8	≥ 304
7	266 - 303
6	228 - 265
5	190 - 227
4	≤ 189

(If in mg/dl divide by 38 to convert to mmol/l)

Estimate the 10-year cardiovascular risk as follows:

- Step 1** - Select the appropriate chart depending on the presence or absence of diabetes
- Step 2** - Select male or female tables
- Step 3** - Select smoker or non-smoker boxes
- Step 4** - Select age group box (If age is 55; select 50 – 59 , if age is 60 ; select 60 – 69)
- Step 5** - Within this box find the nearest cell where the individuals systolic blood pressure (mmHg) and total blood cholesterol level (mmol/l) cross. The colour of this cell determines the 10 year cardiovascular risk.



¹ A person who has diabetes is defined as someone taking insulin or oral hypoglycemic drugs, or with a fasting plasma glucose concentration above 7.0 mmol/l (126 mg/dl) or a postprandial (approximately 2 hours after a main meal) plasma glucose concentration above 11.0 mmol/l (200mg/l) on two separate occasions. For very low resource settings urine sugar test may be used to screen for diabetes; if blood glucose assay is not feasible, if urine sugar test is positive a confirmatory blood glucose test need to be arranged to diagnose diabetes mellitus.

² All current smokers and those who quit smoking less than year before the assessment are considered smokers for assessing cardiovascular risk.

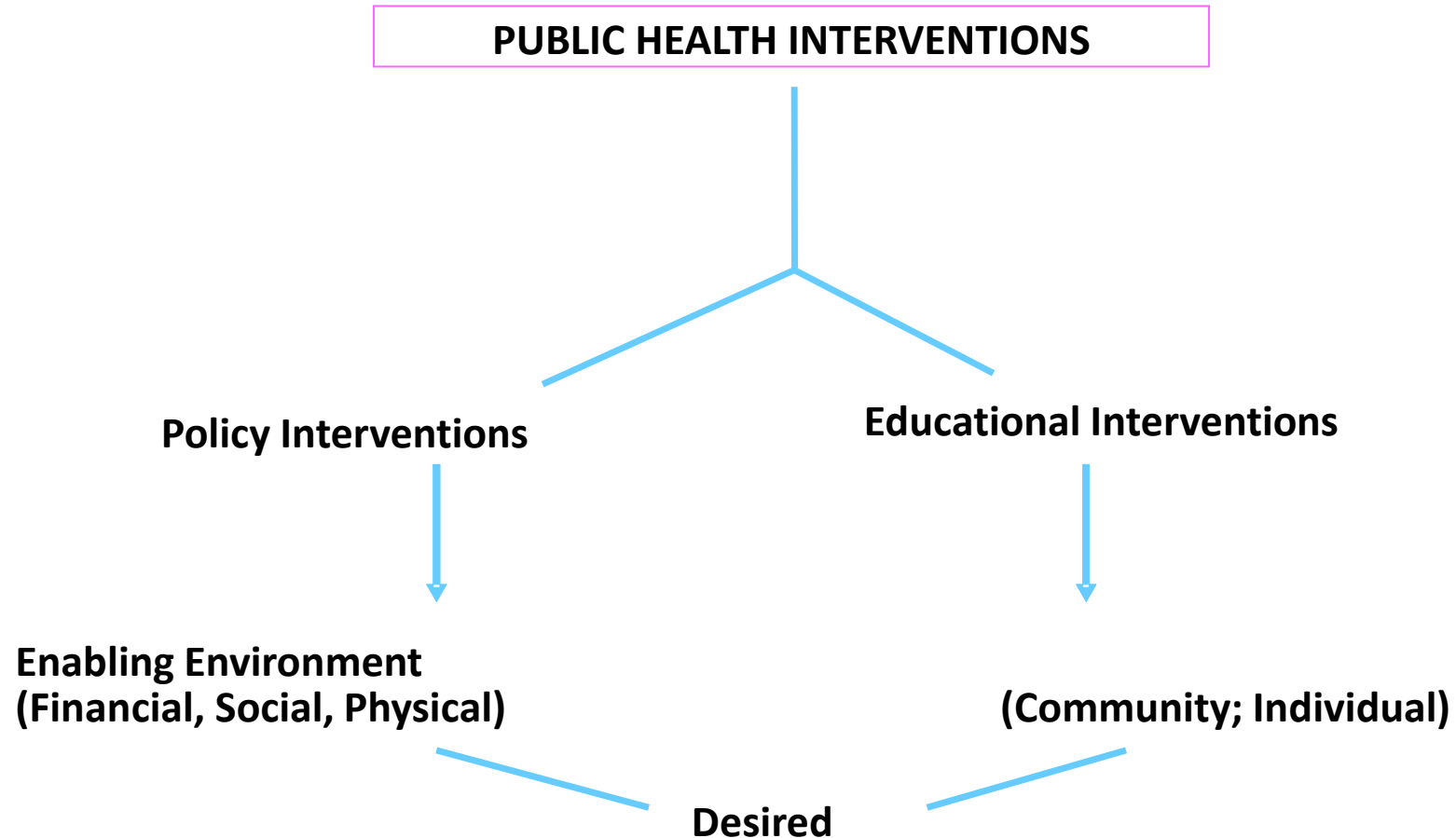
³ Systolic blood pressure, taken as the mean of two readings on each of two occasions, is sufficient for assessing risk but not for establishing a pretreatment baseline.

⁴ The mean of non-fasting measurements of serum cholesterol by dry chemistry, or one non-fasting laboratory measurement, is sufficient for assessing risk. If Serum Cholesterol value is not available, use a mean value of 5 mmol/dl

At the population level, policies and programmes should aim to:

- **promote healthy diets (calories appropriate to the level of physical activity) and avoidance of trans-fats, moderation in the intake of saturated fat, salt and refined sugar;**
- **high intake of fresh fruit and vegetables fish in preference to red meat in non-vegetarian diets)**
- **encourage adequate and regular physical activity**
- **control tobacco consumption (prevent primary uptake promote cessation)**
- **Avoid alcohol use**
- **increase general awareness of the dangers of overweight and obesity**
- **promote societal interventions which reduce individual stress**

Public Health Interventions Needed for Health Promotion



Individuals at high risk of disease should receive clinical services to:

- **Detect, assess and stratify risk, using methods which are appropriate to low resource settings**
- **reduce risk through cost-effective interventions which emphasize lifestyle measures and add inexpensive drugs where necessary**

Summary

Interventions to Prevent & control NCD

Basically at four levels ,primordial and primary prevention are more cost effective

Population Wide Interventions

- “Reducing Risks & Preventing disease”
- Achievable & cost effective
- Addresses the risk factors
- Responsibility of implementation lies with other sectors as well as health

Individual Interventions

- “Improving health care”
- Addresses the management of NCDs
- Responsibility of implementation lies with health ministry

National Policy For Prevention & Control of Chronic NCD

Policy Vision

A country that is not burdened with chronic non-communicable diseases (NCDs), deaths and disabilities.

NCD Policy Objective

To reduce premature mortality (less than 65 years) due to chronic NCDs by 2% annually over the next 10 years through expansion of evidence-based curative services, and individual and community-wide health promotion measures for reduction of risk factors.



Key nine strategic areas in NCD program



Strategies for Chronic NCDs prevention and control

- 1. Risk factor reduction
(Smoking, alcohol, unhealthy diet, physical inactivity, overweight)**
- 2. Screening programme for NCD risk factors**
- 3. Strengthening of health services (preventive and curative)**
- 4. Promotion of healthy lifestyle**
- 5. Human Resource development**
- 6. Establish a surveillance system**
- 7. Promote research on NCDs**
- 8. Sustainable finance support**
- 9. Multi-sectoral involvement**

References

- NCD country profile 2018 WHO
- Global action plan for prevention and control of NCD 2013-2020 WHO
- Global status report on NCD WHO 2014
- NCD progress monitor 2017
- Prevention and control of NCD- Lessons from Sri Lanka MoH
- AHB 2019