Noncommunicable Diseases

A Compendium

Supplement 1: Mortality trends and population attributable fractions

Edited by **Nick Banatvala** and **Pascal Bovet**

This Supplement provides a set of graphical images that describe trends in crude and age-adjusted NCD mortality as well as estimates of the total mortality that are attributable to increased levels of risk factors in the population. These figures have been produced to complement many of the tables that refer to NCD mortality in the compendium. Data on communicable diseases are included for comparative purposes.

Estimates are shown according to World Bank country income categories (high, upper–middle, lower–middle and low) in 1990 and 2019 and were generated using the Institute for Health Metrics and Evaluation's Global Disease Burden (IHME–GBD) Compare tool (https://vizhub.healthdata.org/gbd-compare/) between 14–16 May 2022. All figures displayed in the supplement are screenshots generated by the online IHME–GBD Compare tool.

For 2019, IHME–GBD identified 289 causes of death (and 369 diseases and injuries) and 87 modifiable risk factors in a hierarchy of 5 levels, from 0 (the broadest) to 4 (the most granular). For example: for causes of death, level 0 corresponds to all causes; NCDs are a level 1 cause; cardiovascular diseases are a level 2 cause; stroke is a level 3 cause, and ischaemic stroke is a level 4 cause. For risk factors, level 0 is the aggregate of all environmental/occupational, behavioural and metabolic risks; behavioural risks are for example a level 1 risk, with dietary risks a level 2 risk, diet high in sodium a level 3 risk. While there are no level 4 risks for diet, level 4 risks exist for other risk factors.

Chapter 1 of the compendium (Global burden of NCDs) provides further information on IHME–GBD and the reasons that these data are being used in the compendium.

Table of contents

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1. Global disease burden

Figure 1.1 Mortality by country income category in 2019 (cause of death: level 2)
Top left: high income; top right: upper middle income; bottom left: lower middle income; bottom right: low income.
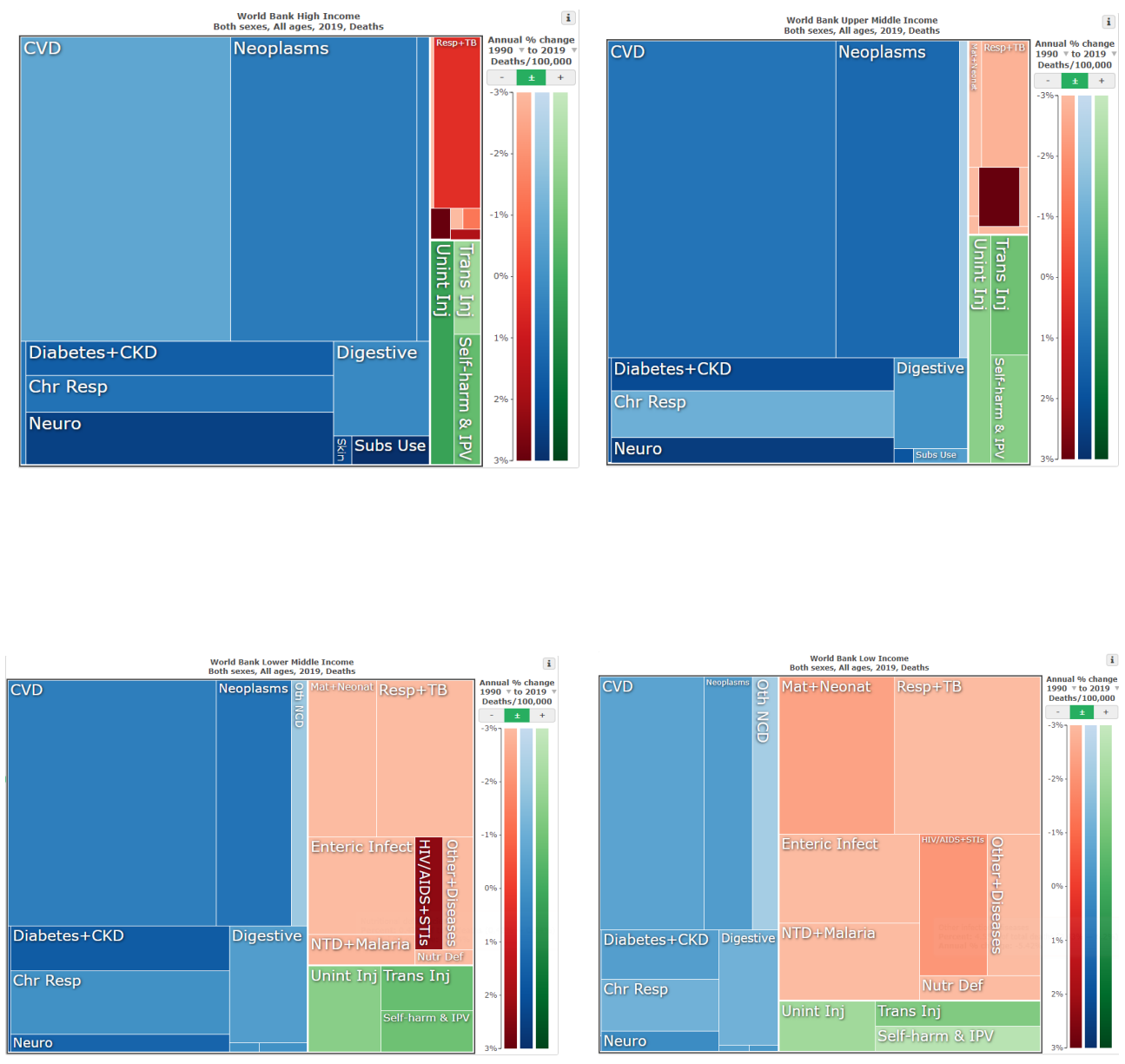
Figure 1.2 Mortality by country income category in 2019 (cause of death: level 3)

Top left: high income; top right: upper middle income; bottom left: lower middle income; bottom right: low income
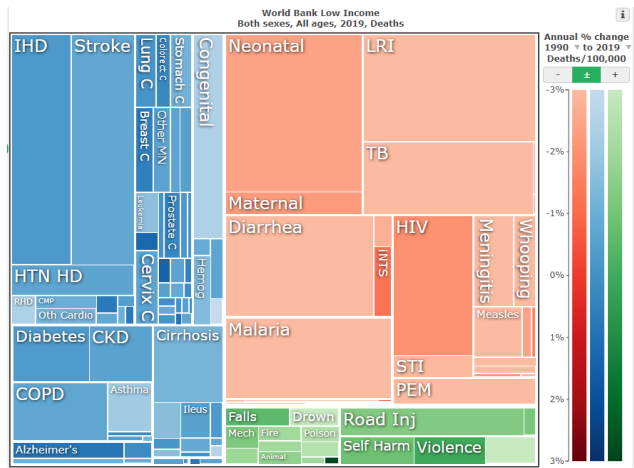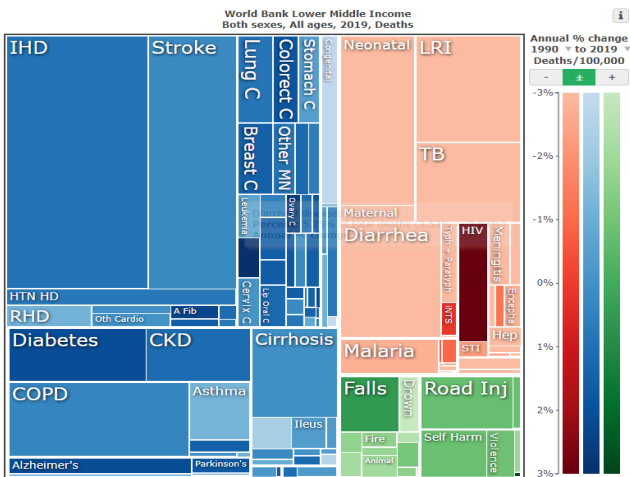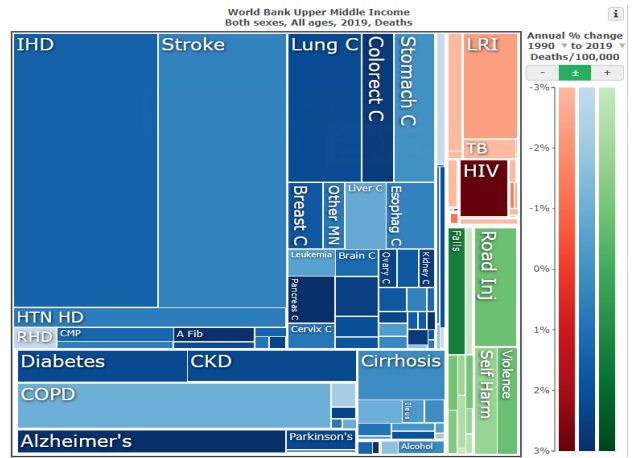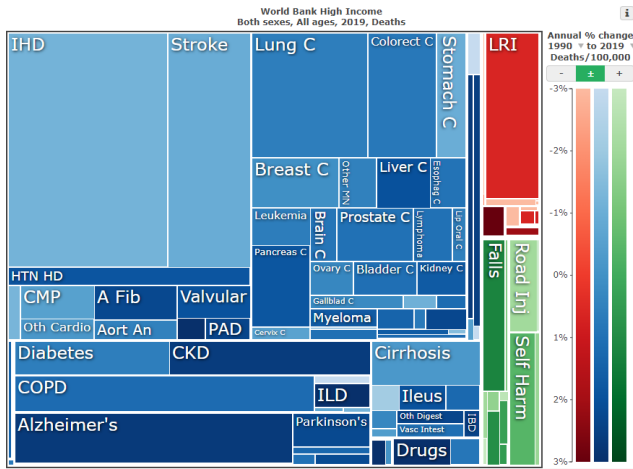
2. Trends over time of NCDs mortality by country income category

Figure 2.1 All main noncommunicable diseases
By World Bank country income category; left: % of all deaths, right: age-standardized rates
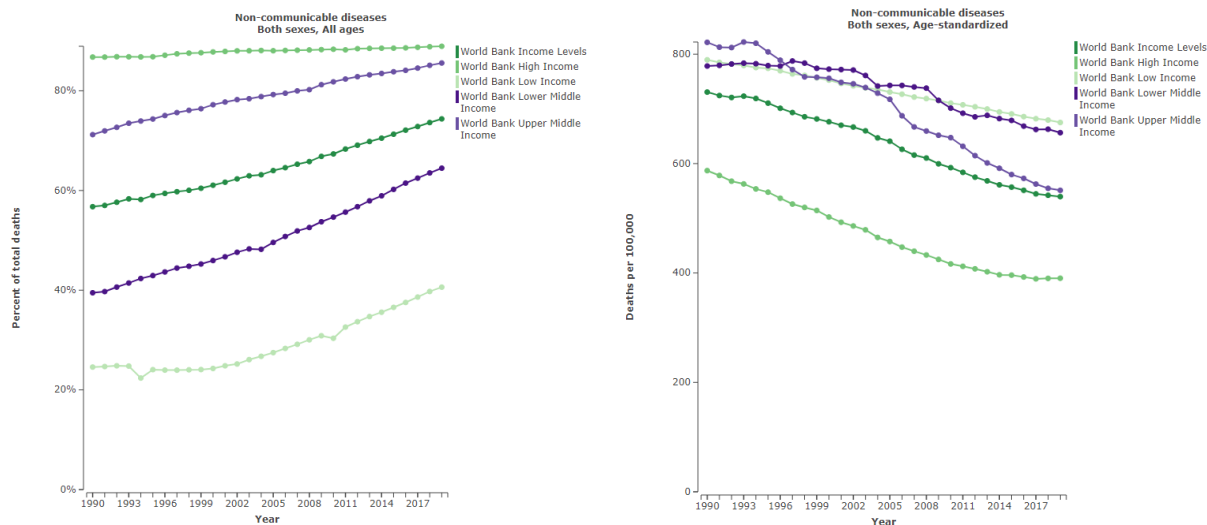
Figure 2.2 Communicable diseases (displayed for comparative purpose)
By World Bank country income category; left: % of all deaths, right: age-standardized rates
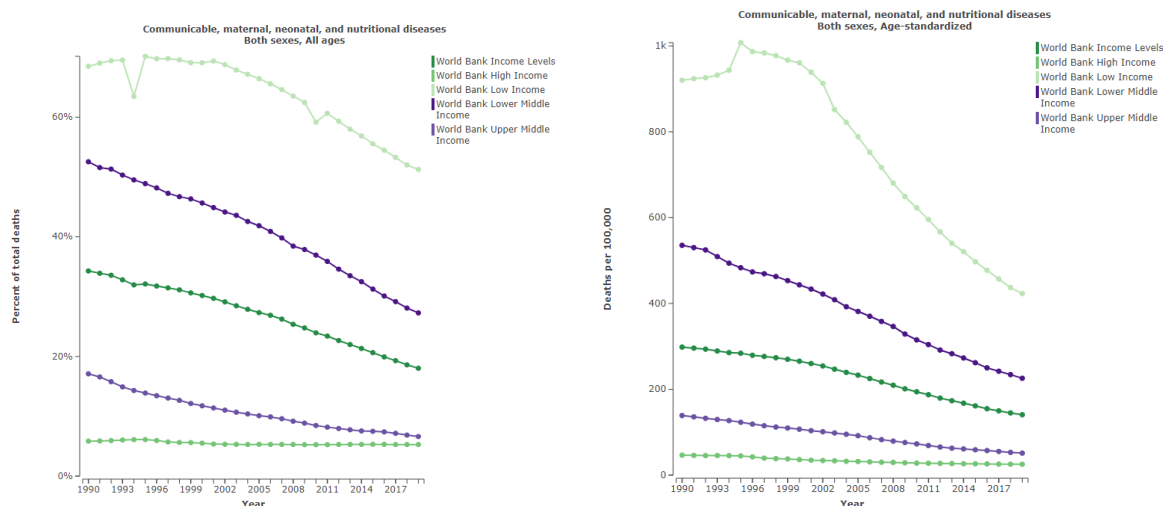
Figure 2.3 Cardiovascular disease
By World Bank country income category; percent of all deaths (left panel); age-standardized rates (right panel)
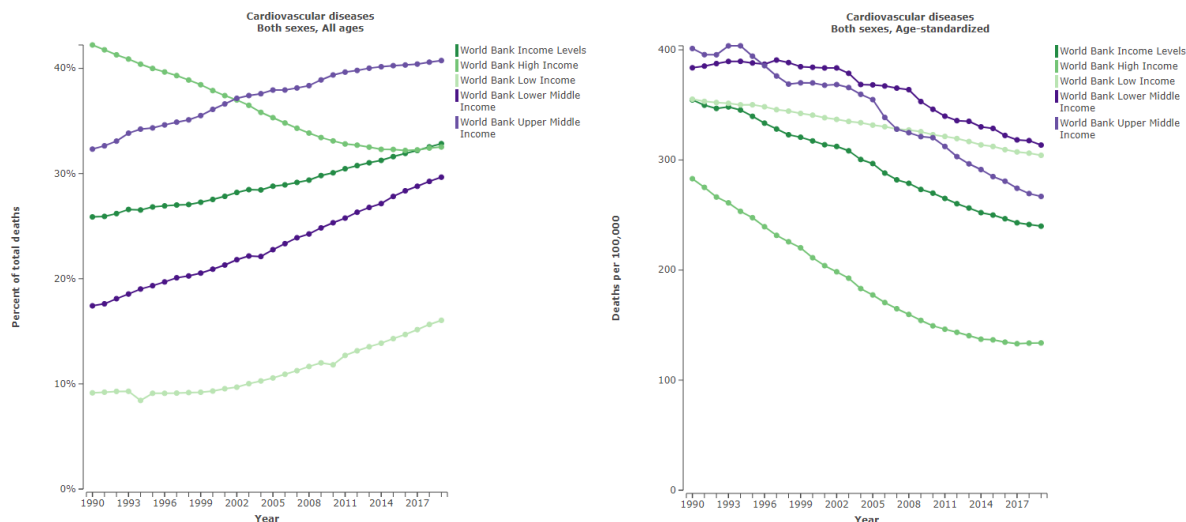
Figure 2.4 Ischaemic heart disease
By World Bank country income category; percent of all deaths (left panel); age-standardized rates (right panel)
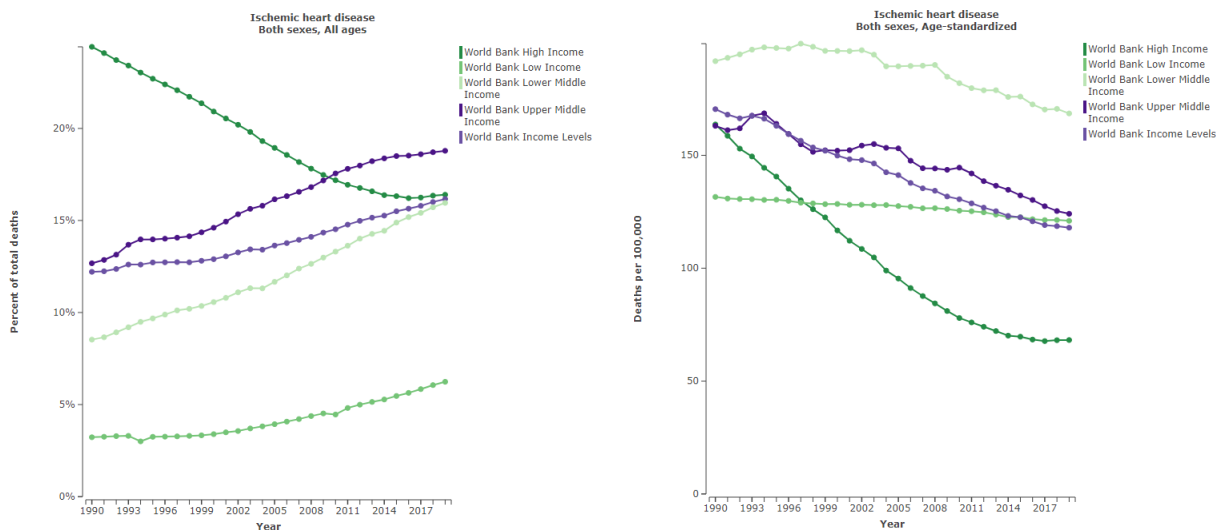
Figure 2.5 Stroke
By World Bank country income category; percent of all deaths (left panel); age-standardized rates (right panel)
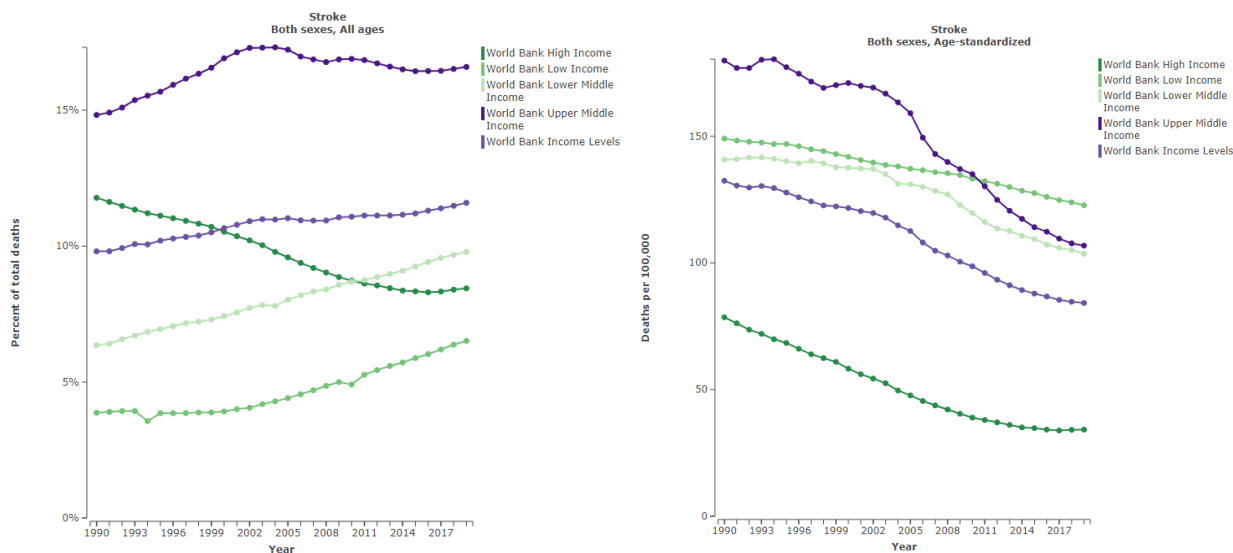
Figure 2.6 All cancers
By World Bank country income category; percent of all deaths (left panel); age-standardized rates (right panel)
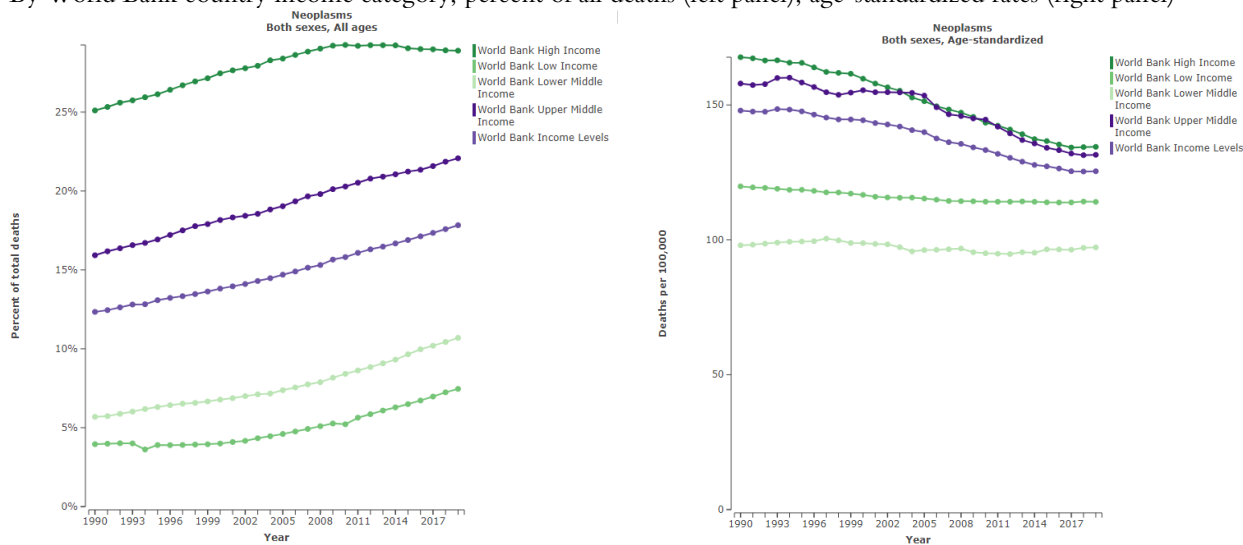
Figure 2.7 Colorectal cancer

By World Bank country income category; percent of all deaths (left panel); age-standardized rates (right panel)
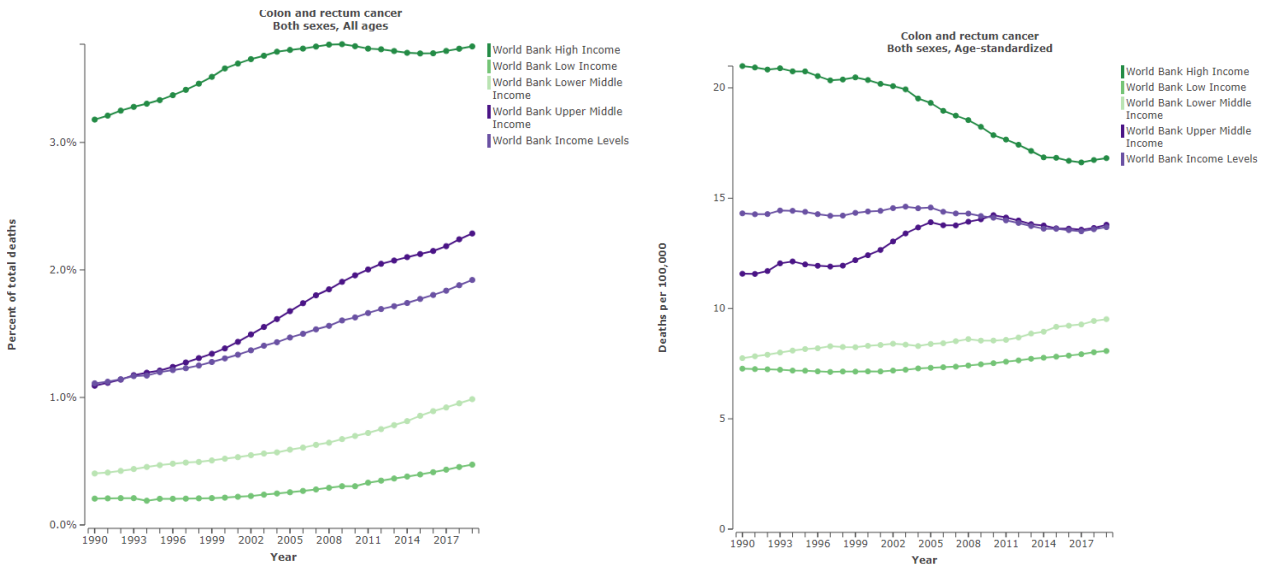
Figure 2.8 Breast cancer (among females)

By World Bank country income category; percent of all deaths (left panel); age-standardized rates (right panel)
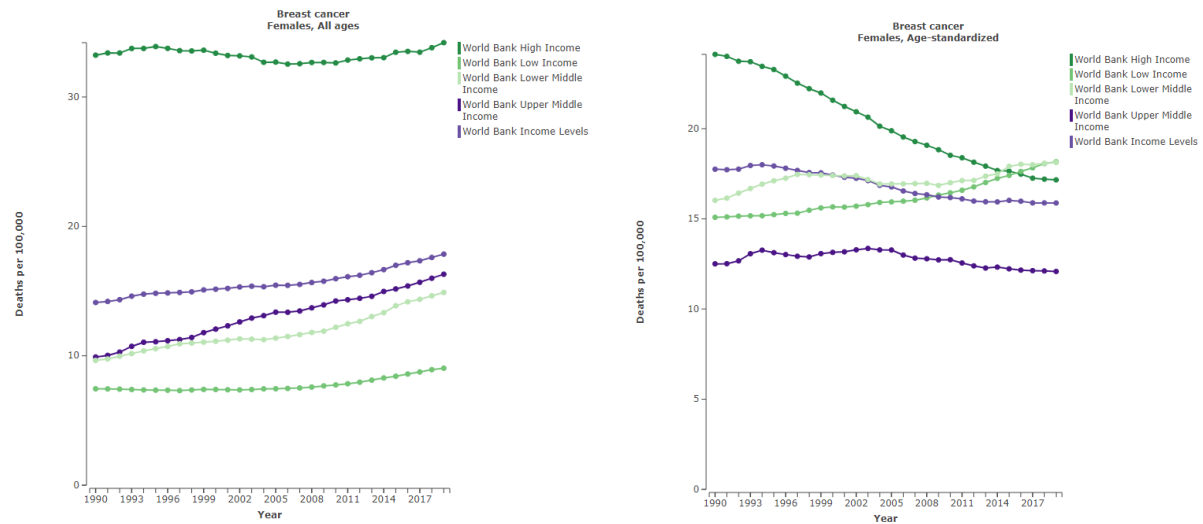
Figure 2.9 Prostate cancer (among males)

By World Bank country income category; percent of all deaths (left panel); age-standardized rates (right panel)
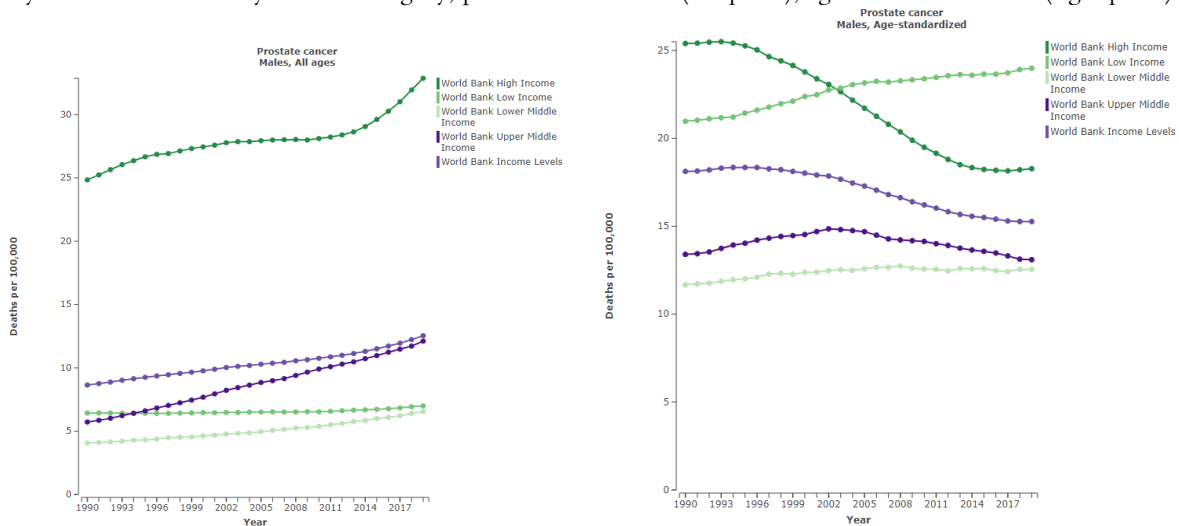
Figure 2.10 Cervical cancer (among females)
By World Bank country income category; percent of all deaths (left panel); age-standardized rates (right panel)
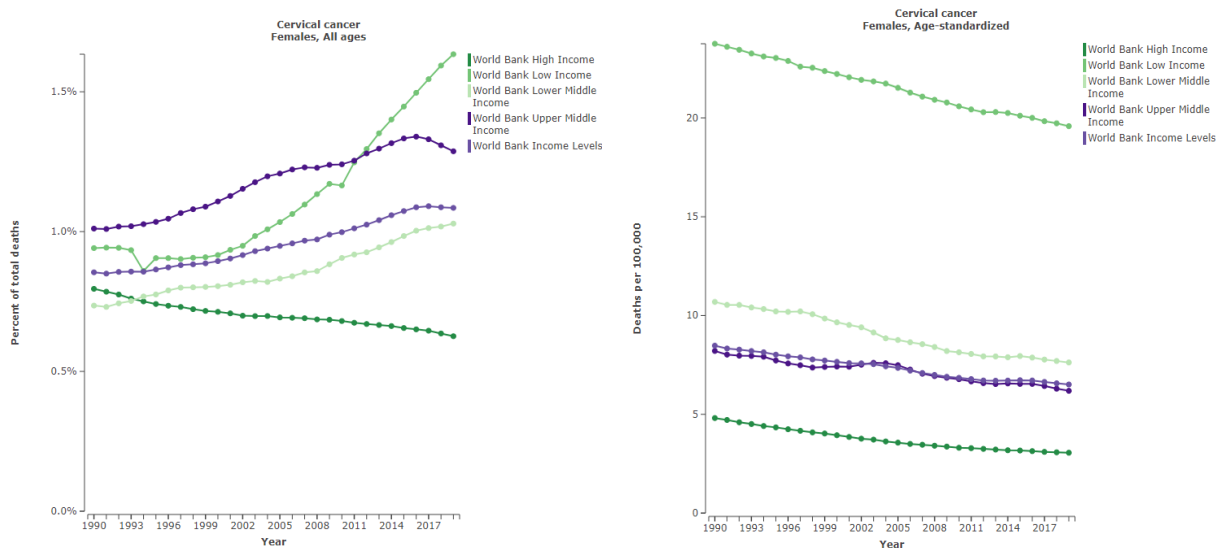
Figure 2.11 Chronic respiratory diseases
By World Bank country income category; percent of all deaths (left panel); age-standardized rates (right panel)
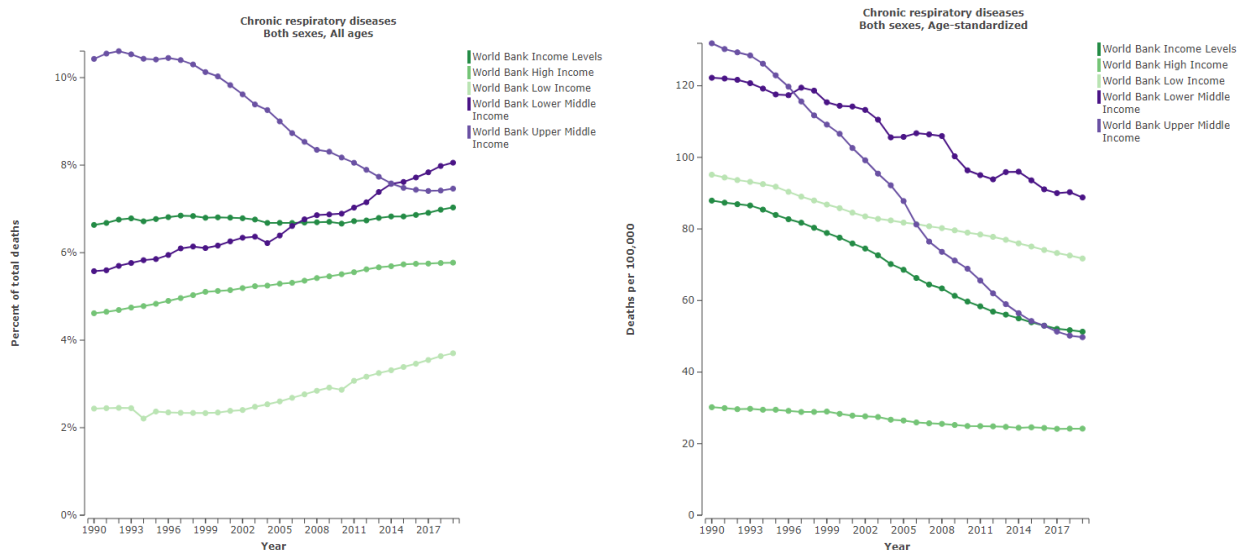
Figure 2.12 Diabetes (as a direct cause of death)
By World Bank country income category; percent of all deaths (left panel); age-standardized rates (right panel)
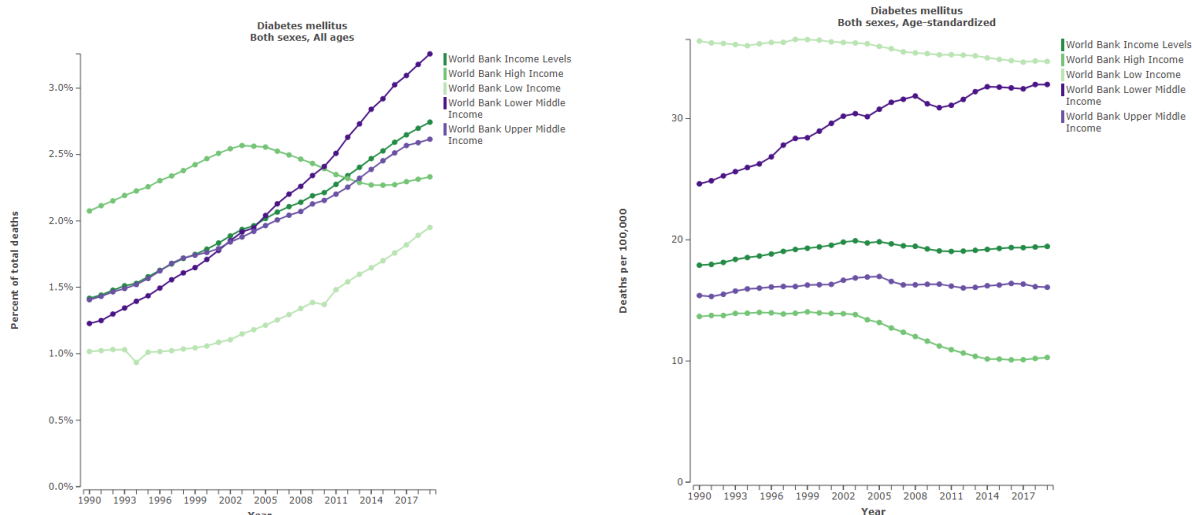
3. Trends over time of total mortality attributable to risk factors

3.1 Behavioural risks

Figure 3.1.1 Tobacco use
By World Bank country income category; percent of all deaths (left panel); age-standardized rates (right panel)
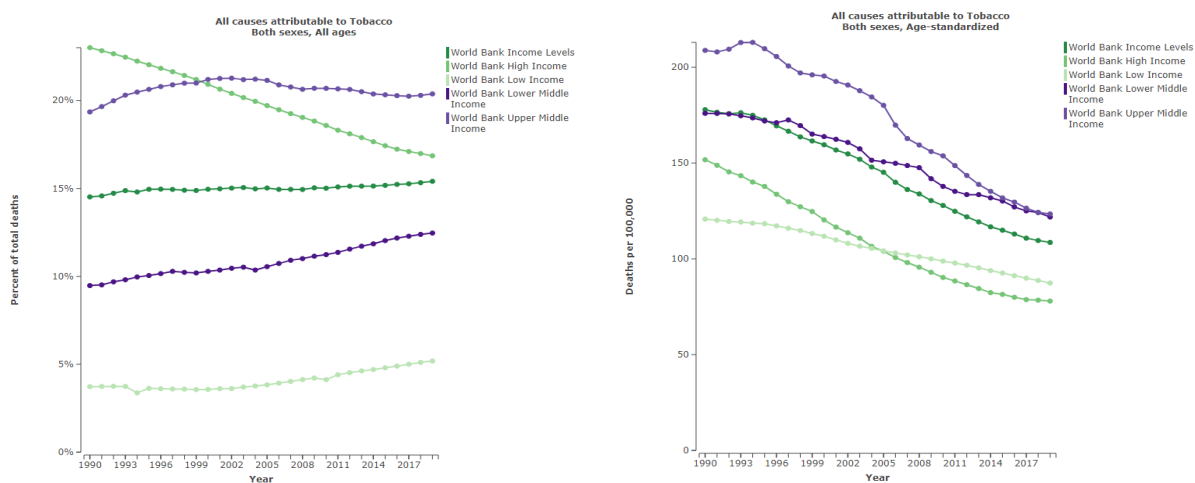
Figure 3.1.2 Dietary risk
By World Bank country income category; percent of all deaths (left panel); age-standardized rates (right panel)
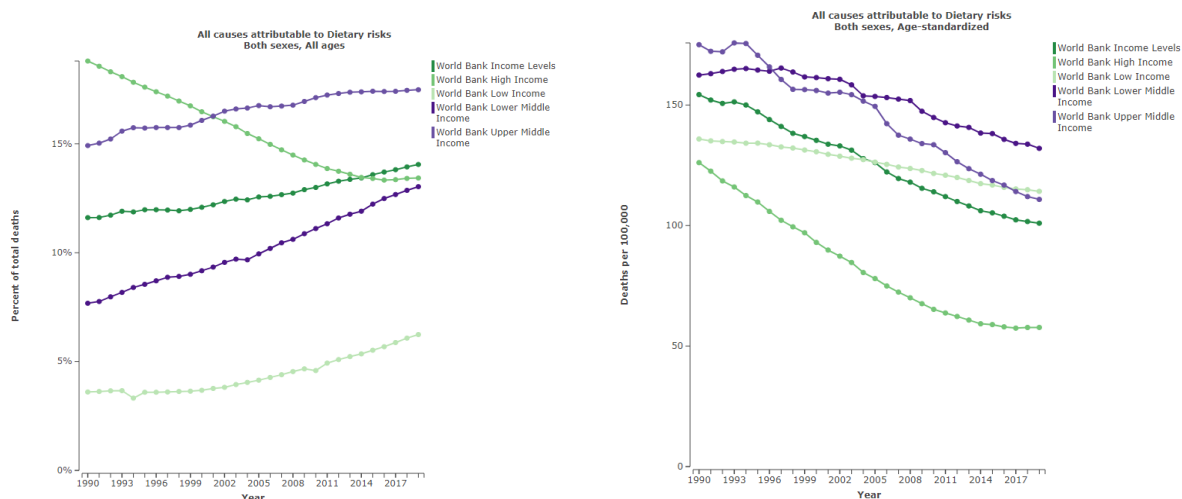
Figure 3.1.3 Diet high in sodium
By World Bank country income category; percent of all deaths (left panel); age-standardized rates (right panel)
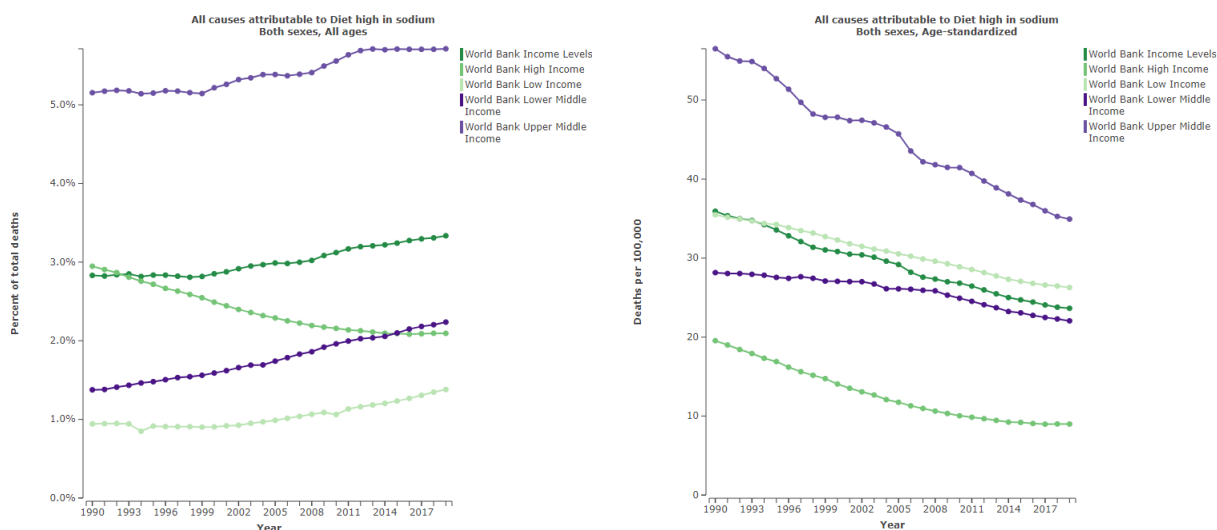
Figure 3.1.4 Diet high in sugar-sweetened beverages

By World Bank country income category; percent of all deaths (left panel); age-standardized rates (right panel)
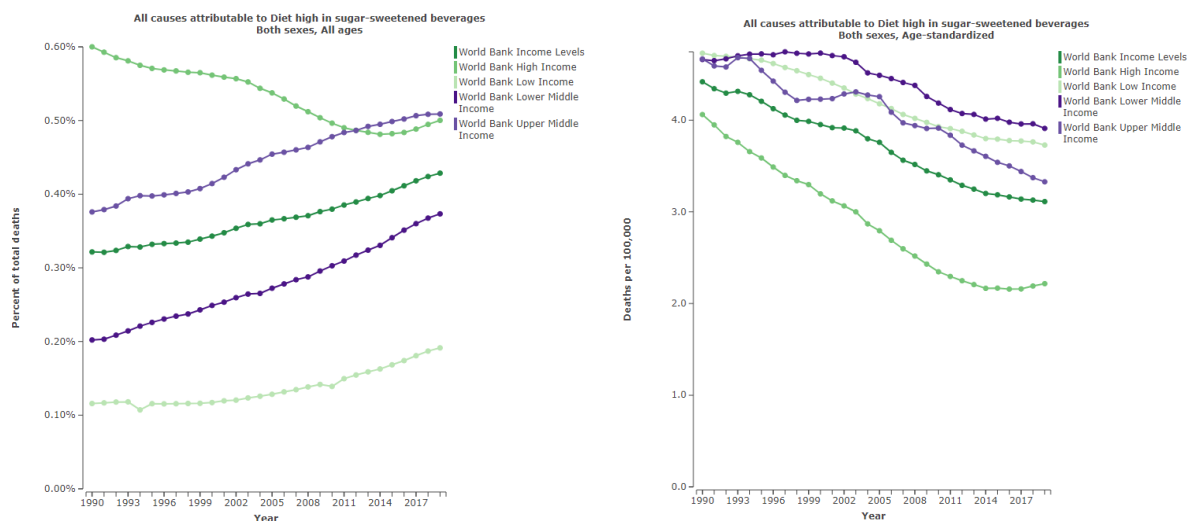
Figure 3.1.5 Diet high in trans fatty acids

By World Bank country income category; percent of all deaths (left panel); age-standardized rates (right panel)
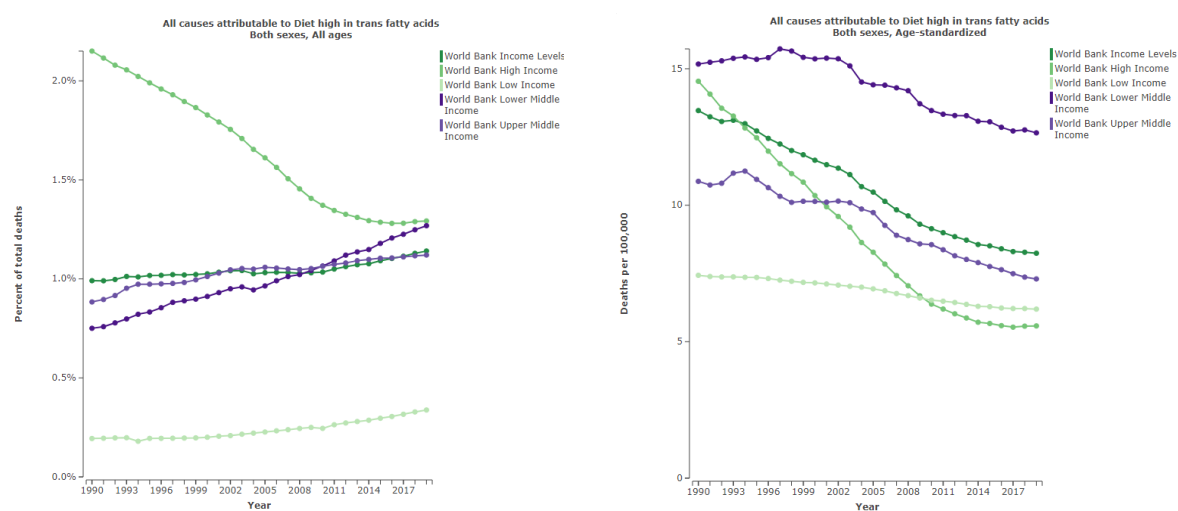
Figure 3.1.6 Alcohol use

By World Bank country income category; percent of all deaths (left panel); age-standardized rates (right panel)
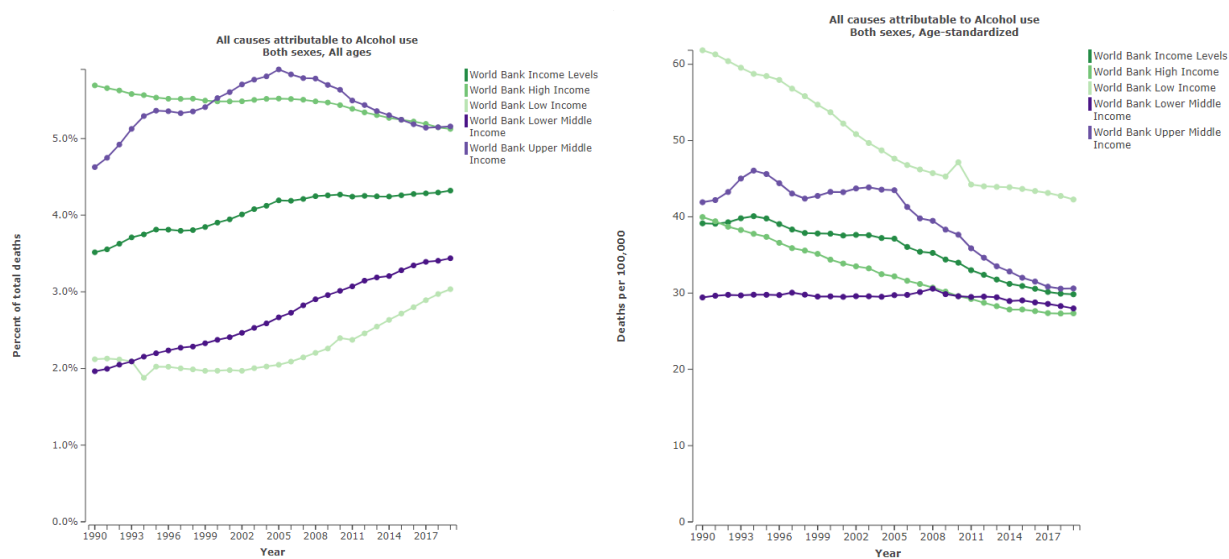
Figure 3.1.7 Low physical activity
By World Bank country income category; percent of all deaths (left panel); age-standardized rates (right panel)
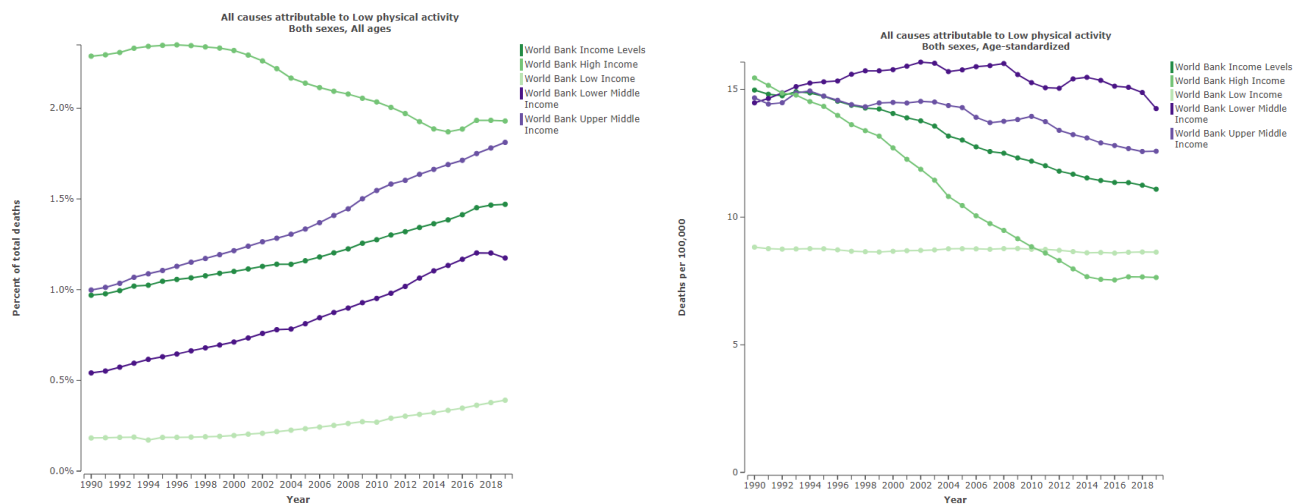
3.2 Metabolic risks

Figure 3.2.1 High systolic blood pressure
By World Bank country income category; percent of all deaths (left panel); age-standardized rates (right panel)
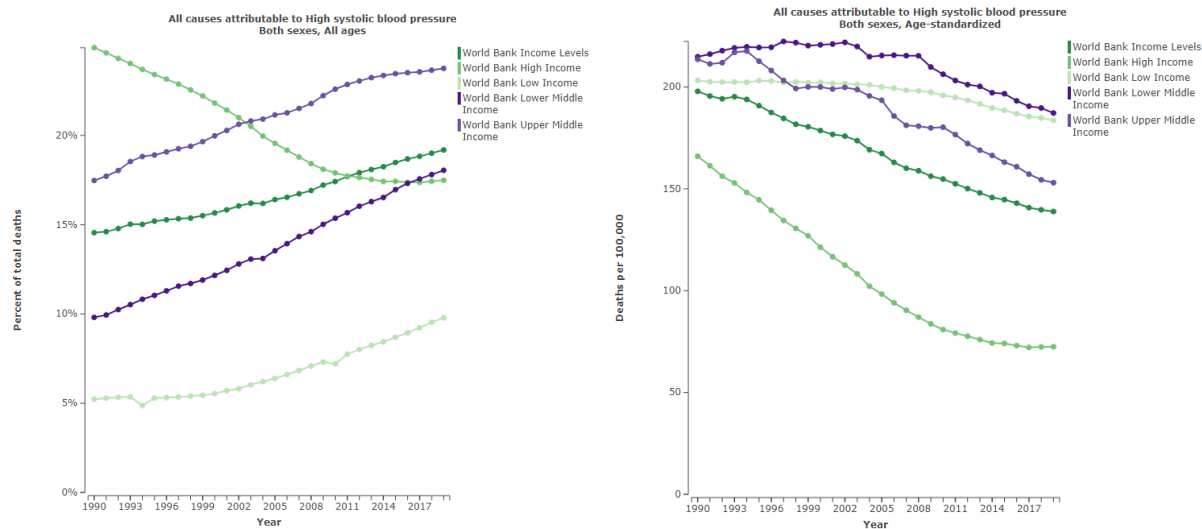
Figure 3.2.2 High body mass index
By World Bank country income category; percent of all deaths (left panel); age-standardized rates (right panel)
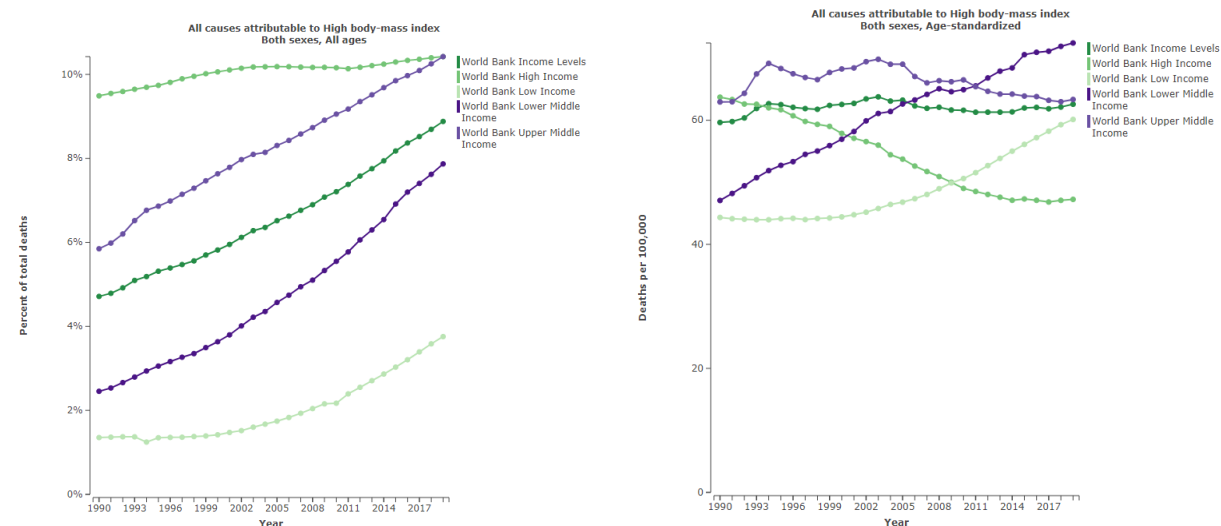
Figure 3.2.3 High blood glucose (as a risk factor)
By World Bank country income category; percent of all deaths (left panel); age-standardized rates (right panel)
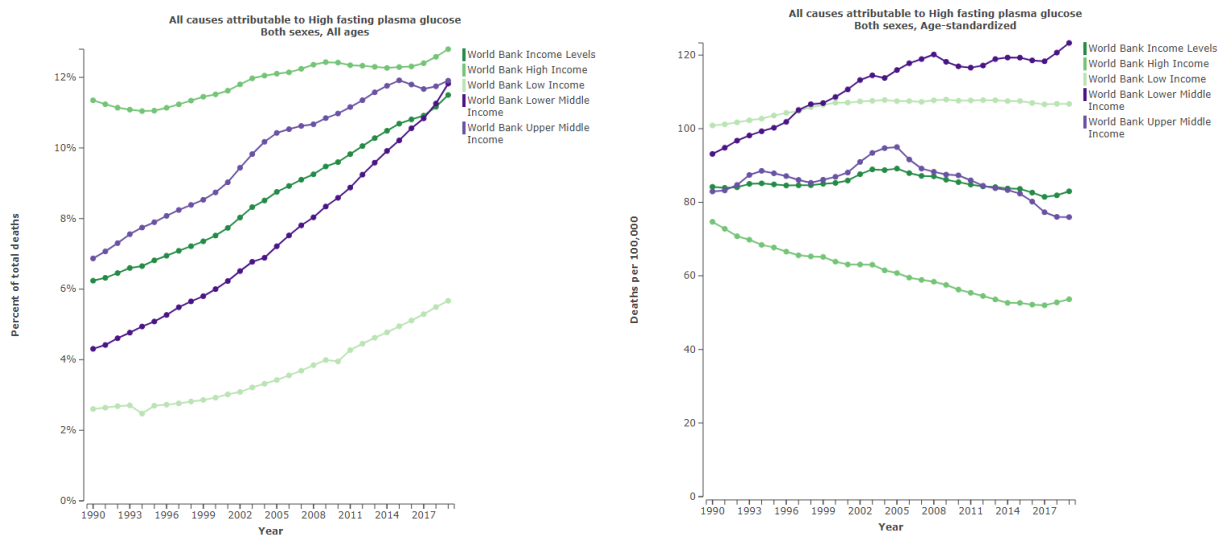
Figure 3.2.4 High LDL-cholesterol
By World Bank country income category; percent of all deaths (left panel); age-standardized rates (right panel)
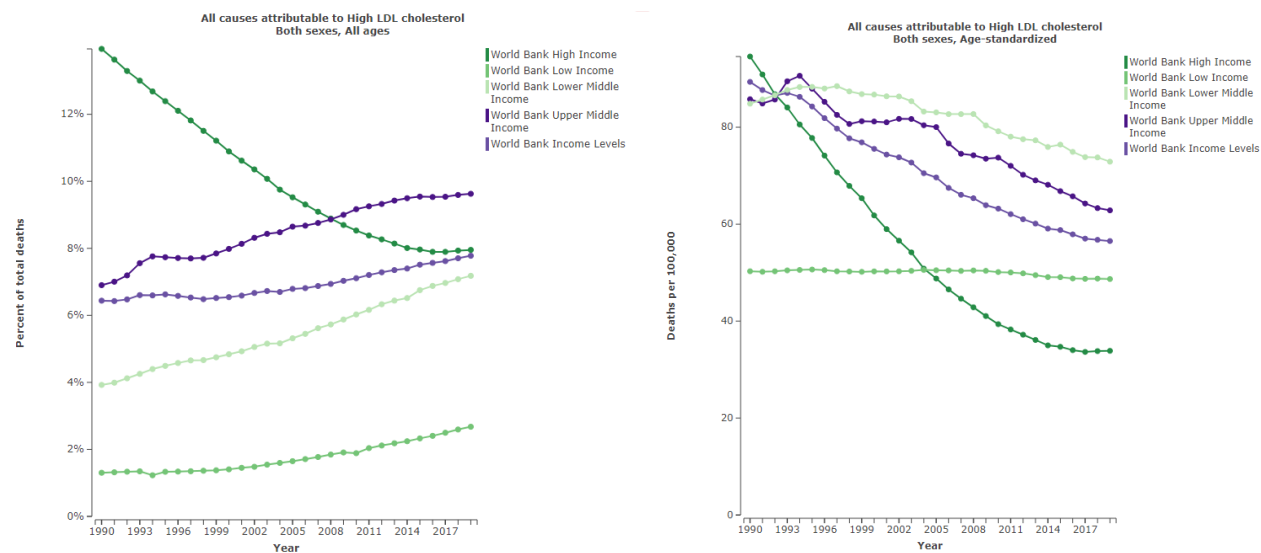
3.3 Environmental risks

Figure 3.3.1 Particulate matter pollution
By World Bank country income category; percent of all deaths (left panel); age-standardized rates (right panel)
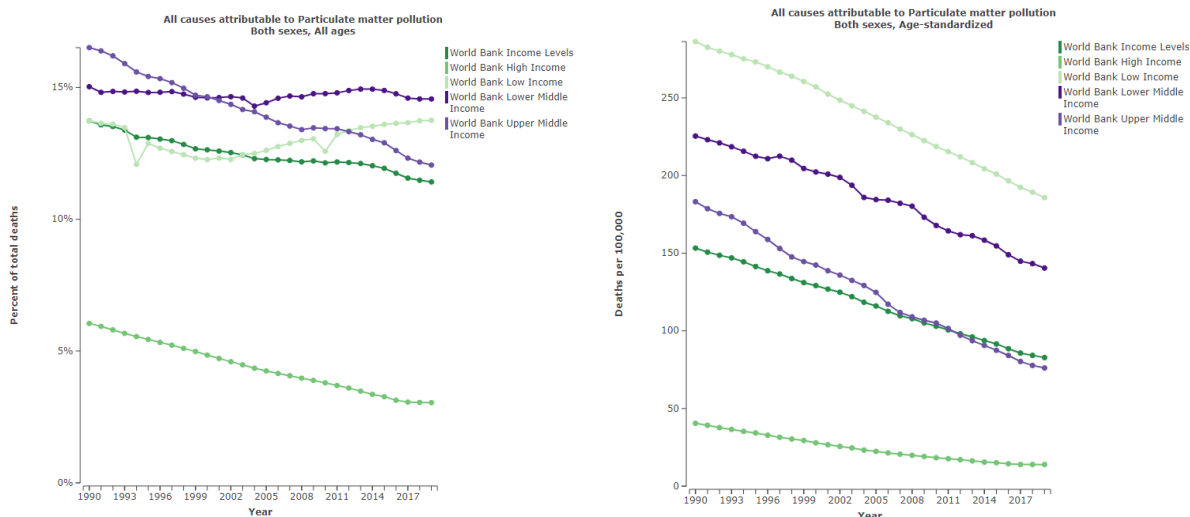
Figure 3.3.2 Ambient particulate matter pollution
By World Bank country income category; percent of all deaths (left panel); age-standardized rates (right panel)
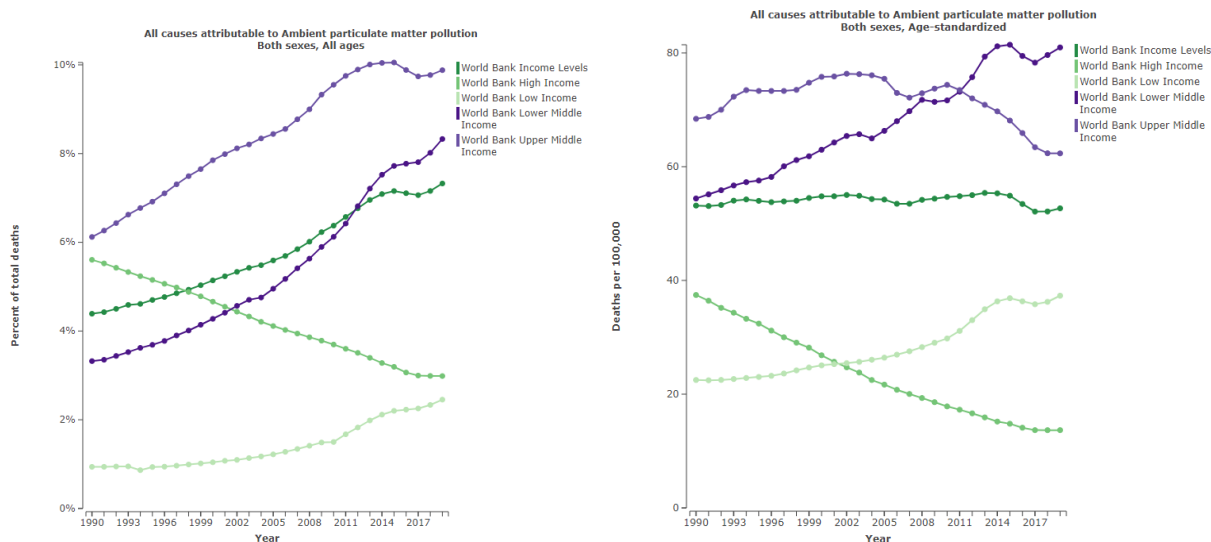
Figure 3.3.3 Household air pollution from solid fuels
By World Bank country income category; percent of all deaths (left panel); age-standardized rates (right panel)

13
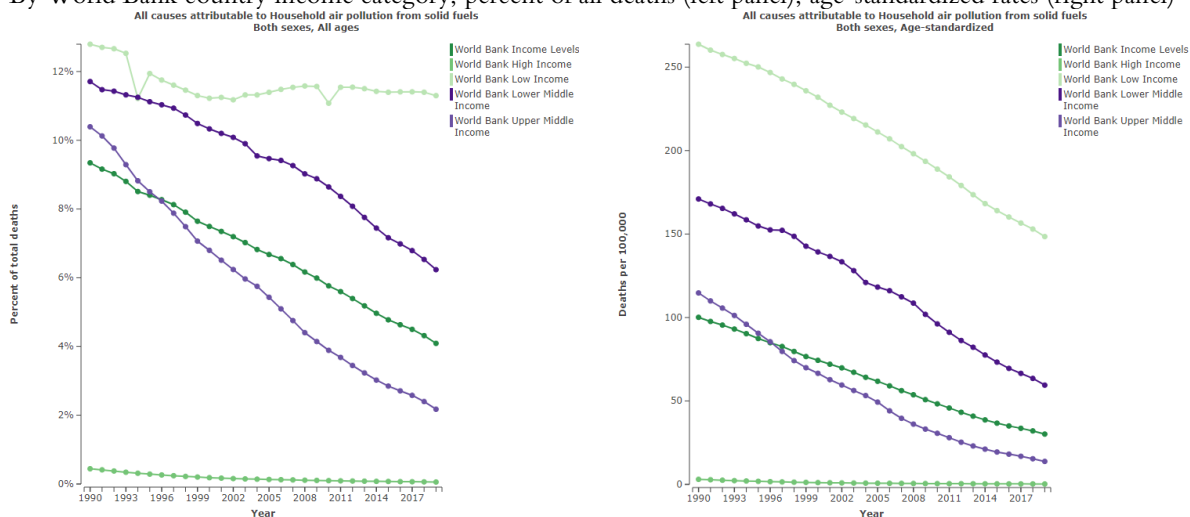
4. Deaths attributable to risk factors in the population in 2019

Figure 4.1 Deaths attributable to risk factors (level 2) worldwide
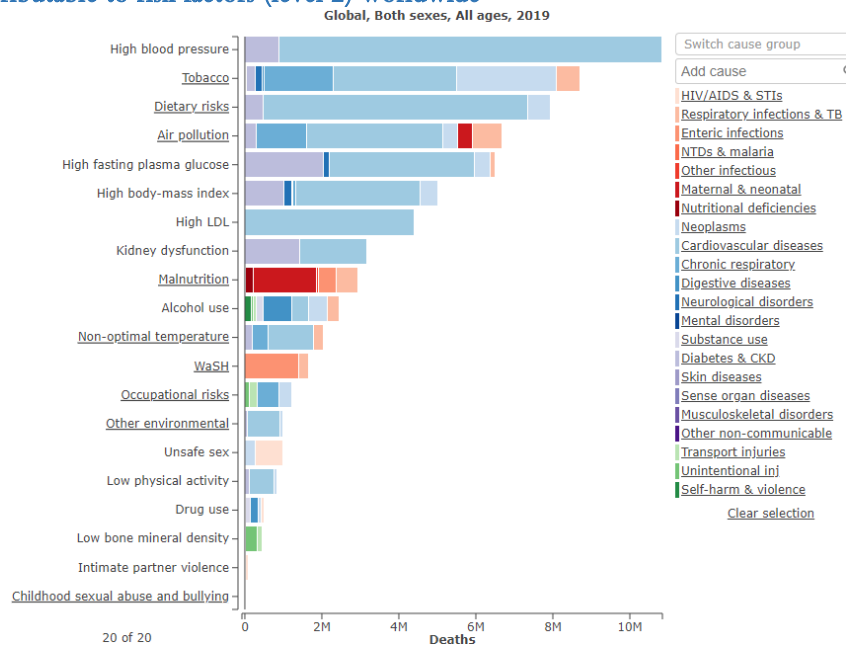
Figure 4.2 Deaths attributable to risk factors (level 2) by World Bank country income category
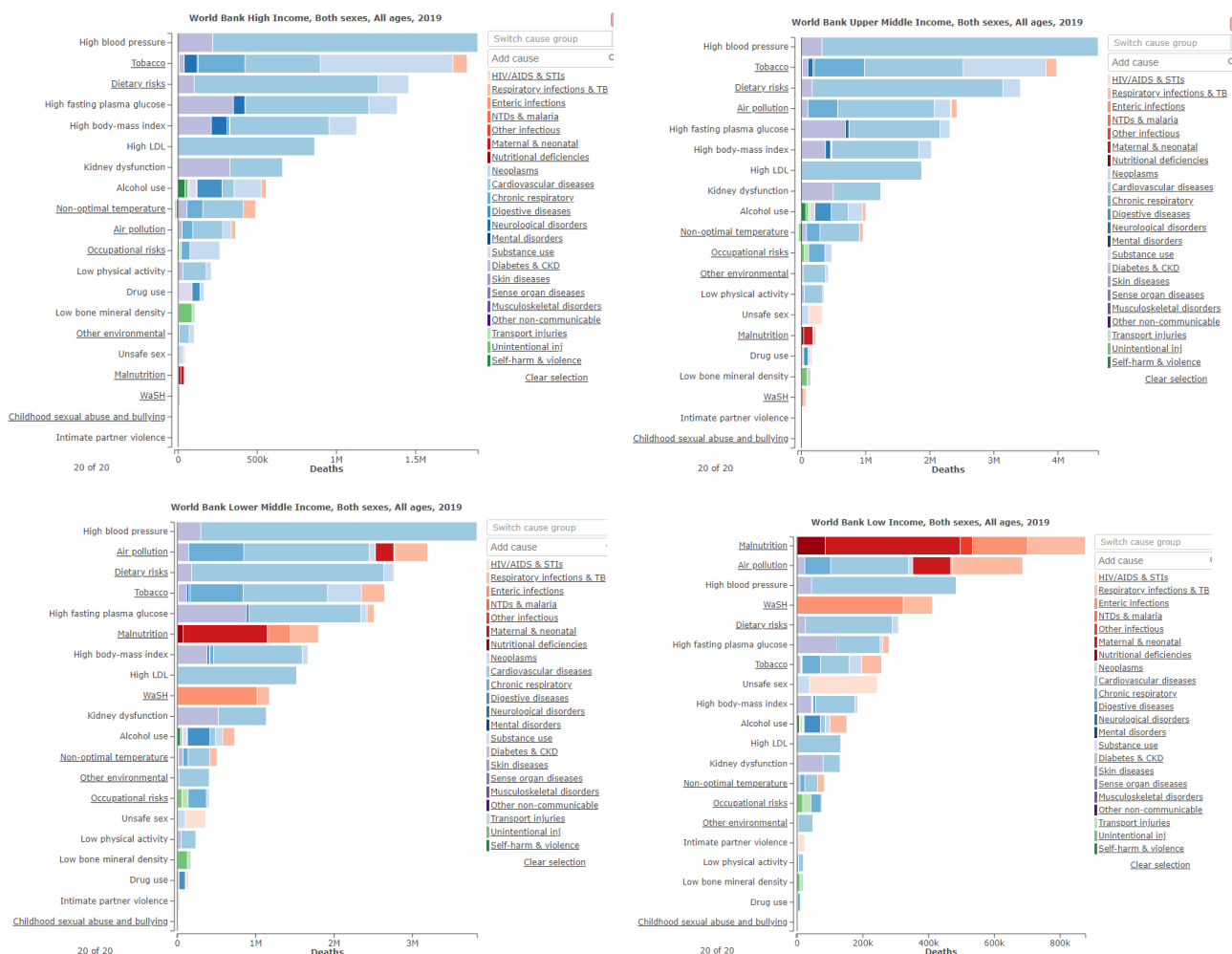
Figure 4.3 Deaths attributable to risk factors (level 3) worldwide
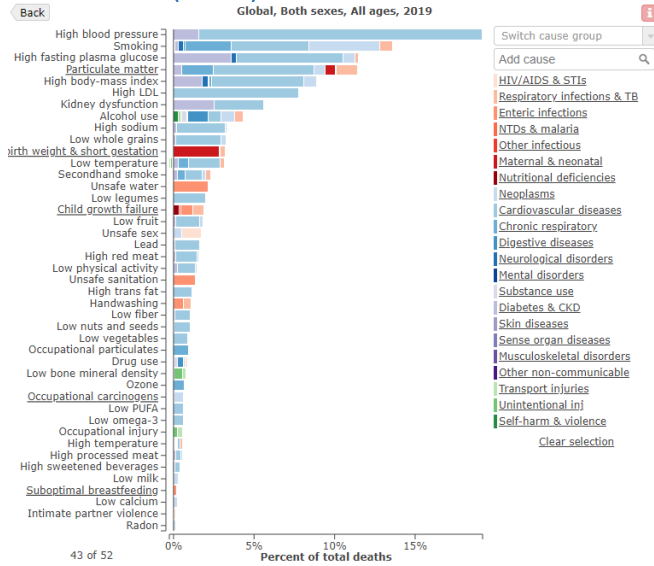
Figure 4.4 Proportion of deaths attributable to risk factors (level 3) by World Bank country income category

5. Ranking of broad-cause mortality in 1990 and 2019

Figure 5.1 Ranking of broad-cause mortality (level 2) in 1990 and 2019 worldwide

Global
Both sexes, All ages, Deaths

1990 rank	2019 rank
1 Cardiovascular diseases	1 Cardiovascular diseases
2 Neoplasms	2 Neoplasms
3 Respiratory infections & TB	3 Chronic respiratory
4 Maternal & neonatal	4 Respiratory infections & TB
5 Enteric infections	5 Diabetes & CKD
6 Chronic respiratory	6 Digestive diseases
7 Other infectious	7 Neurological disorders
8 Digestive diseases	8 Maternal & neonatal
9 Unintentional inj	9 Unintentional inj
10 Diabetes & CKD	10 Enteric infections
11 Other non-communicable	11 Transport injuries
12 Self-harm & violence	12 Self-harm & violence
13 Transport injuries	13 Other non-communicable
14 NTDs & malaria	14 HIV/AIDS & STIs
15 Neurological disorders	15 NTDs & malaria
16 Nutritional deficiencies	16 Other infectious
17 HIV/AIDS & STIs	17 Substance use
18 Substance use	18 Nutritional deficiencies
19 Musculoskeletal disorders	19 Musculoskeletal disorders
20 Skin diseases	20 Skin diseases
21 Mental disorders	21 Mental disorders

Communicable, maternal, neonatal, and nutritional diseases
Non-communicable diseases
Injuries

Figure 5.2 Ranking of broad-cause mortality (level 2) in 1990 and 2019 by World Bank country income category

World Bank High Income
Both sexes, All ages, Deaths

1990 rank	2019 rank
1 Cardiovascular diseases	1 Cardiovascular diseases
2 Neoplasms	2 Neoplasms
3 Chronic respiratory	3 Neurological disorders
4 Digestive diseases	4 Chronic respiratory
5 Neurological disorders	5 Diabetes & CKD
6 Respiratory infections & TB	6 Digestive diseases
7 Diabetes & CKD	7 Respiratory infections & TB
8 Unintentional inj	8 Unintentional inj
9 Transport injuries	9 Other non-communicable
10 Self-harm & violence	10 Self-harm & violence
11 Other non-communicable	11 Transport injuries
12 Maternal & neonatal	12 Substance use
13 HIV/AIDS & STIs	13 Musculoskeletal disorders
14 Substance use	14 Enteric infections
15 Other infectious	15 Skin diseases
16 Musculoskeletal disorders	16 Maternal & neonatal
17 Skin diseases	17 Other infectious
18 Enteric infections	18 Nutritional deficiencies
19 Nutritional deficiencies	19 HIV/AIDS & STIs
20 NTDs & malaria	20 NTDs & malaria
21 Mental disorders	21 Mental disorders

Communicable, maternal, neonatal, and nutritional diseases
Non-communicable diseases
Injuries

World Bank Upper Middle Income
Both sexes, All ages, Deaths

1990 rank	2019 rank
1 Cardiovascular diseases	1 Cardiovascular diseases
2 Neoplasms	2 Neoplasms
3 Chronic respiratory	3 Chronic respiratory
4 Respiratory infections & TB	4 Diabetes & CKD
5 Maternal & neonatal	5 Neurological disorders
6 Unintentional inj	6 Digestive diseases
7 Digestive diseases	7 Respiratory infections & TB
8 Self-harm & violence	8 Unintentional inj
9 Transport injuries	9 Transport injuries
10 Other non-communicable	10 Self-harm & violence
11 Diabetes & CKD	11 HIV/AIDS & STIs
12 Neurological disorders	12 Other non-communicable
13 Other infectious	13 Maternal & neonatal
14 Enteric infections	14 Substance use
15 Nutritional deficiencies	15 Other infectious
16 Substance use	16 Enteric infections
17 HIV/AIDS & STIs	17 Nutritional deficiencies
18 NTDs & malaria	18 Musculoskeletal disorders
19 Musculoskeletal disorders	19 Skin diseases
20 Skin diseases	20 NTDs & malaria
21 Mental disorders	21 Mental disorders

Communicable, maternal, neonatal, and nutritional diseases
Non-communicable diseases
Injuries

World Bank Lower Middle Income
Both sexes, All ages, Deaths

1990 rank	2019 rank
1 Cardiovascular diseases	1 Cardiovascular diseases
2 Respiratory infections & TB	2 Neoplasms
3 Enteric infections	3 Respiratory infections & TB
4 Maternal & neonatal	4 Chronic respiratory
5 Other infectious	5 Maternal & neonatal
6 Neoplasms	6 Enteric infections
7 Chronic respiratory	7 Diabetes & CKD
8 Digestive diseases	8 Digestive diseases
9 Unintentional inj	9 Unintentional inj
10 NTDs & malaria	10 Transport injuries
11 Other non-communicable	11 Other non-communicable
12 Nutritional deficiencies	12 Neurological disorders
13 Diabetes & CKD	13 Self-harm & violence
14 Transport injuries	14 Other infectious
15 Self-harm & violence	15 NTDs & malaria
16 Neurological disorders	16 HIV/AIDS & STIs
17 HIV/AIDS & STIs	17 Nutritional deficiencies
18 Substance use	18 Substance use
19 Skin diseases	19 Musculoskeletal disorders
20 Musculoskeletal disorders	20 Skin diseases
21 Mental disorders	21 Mental disorders

Communicable, maternal, neonatal, and nutritional diseases
Non-communicable diseases
Injuries

World Bank Low Income
Both sexes, All ages, Deaths

1990 rank	2019 rank
1 Respiratory infections & TB	1 Cardiovascular diseases
2 Enteric infections	2 Respiratory infections & TB
3 Maternal & neonatal	3 Maternal & neonatal
4 Other infectious	4 Enteric infections
5 Cardiovascular diseases	5 Neoplasms
6 NTDs & malaria	6 NTDs & malaria
7 HIV/AIDS & STIs	7 HIV/AIDS & STIs
8 Neoplasms	8 Other infectious
9 Nutritional deficiencies	9 Digestive diseases
10 Other non-communicable	10 Other non-communicable
11 Digestive diseases	11 Chronic respiratory
12 Self-harm & violence	12 Diabetes & CKD
13 Unintentional inj	13 Unintentional inj
14 Chronic respiratory	14 Transport injuries
15 Diabetes & CKD	15 Self-harm & violence
16 Transport injuries	16 Nutritional deficiencies
17 Neurological disorders	17 Neurological disorders
18 Substance use	18 Substance use
19 Skin diseases	19 Skin diseases
20 Musculoskeletal disorders	20 Musculoskeletal disorders
21 Mental disorders	21 Mental disorders

Communicable, maternal, neonatal, and nutritional diseases
Non-communicable diseases
Injuries

Figure 5.3 Ranking of broad-cause mortality (level 3) in 1990 and 2019 worldwide

Global
Both sexes, All ages, Deaths

1990 rank		2019 rank
1 Ischemic heart disease		1 Ischemic heart disease
2 Stroke		2 Stroke
3 Lower respiratory infect		3 COPD
4 Neonatal disorders		4 Lower respiratory infect
5 Diarrheal diseases		5 Lung cancer
6 COPD		6 Neonatal disorders
7 Tuberculosis		7 Alzheimer's disease
8 Road injuries		8 Diabetes
9 Lung cancer		9 Diarrheal diseases
10 Cirrhosis		10 Cirrhosis
11 Congenital defects		11 Chronic kidney disease
12 Malaria		12 Road injuries
13 Measles		13 Tuberculosis
14 Stomach cancer		14 Hypertensive heart disease
15 Self-harm		15 Colorectal cancer
16 Diabetes		16 Stomach cancer
17 Protein-energy malnutrition		17 HIV/AIDS
18 Hypertensive heart disease		18 Self-harm
19 Chronic kidney disease		19 Falls
20 Alzheimer's disease		20 Breast cancer
21 Colorectal cancer		21 Malaria
25 Falls		22 Congenital defects
26 Breast cancer		45 Protein-energy malnutrition
30 HIV/AIDS		77 Measles

Communicable, maternal, neonatal, and nutritional diseases
Non-communicable diseases
Injuries

Figure 5.4 Ranking of broad-cause mortality (level 3) in 1990 and 2019 by World Bank country income category

World Bank High Income
Both sexes, All ages, Deaths

1990 rank		2019 rank
1 Ischemic heart disease		1 Ischemic heart disease
2 Stroke		2 Stroke
3 Lung cancer		3 Lung cancer
4 COPD		4 Alzheimer's disease
5 Lower respiratory infect		5 COPD
6 Colorectal cancer		6 Lower respiratory infect
7 Alzheimer's disease		7 Colorectal cancer
8 Cirrhosis		8 Chronic kidney disease
9 Stomach cancer		9 Diabetes
10 Road injuries		10 Pancreatic cancer
11 Diabetes		11 Cirrhosis
12 Breast cancer		12 Hypertensive heart disease
13 Self-harm		13 Breast cancer
14 Chronic kidney disease		14 Prostate cancer
15 Prostate cancer		15 Stomach cancer
16 Cardiomyopathy		16 Falls
17 Pancreatic cancer		17 Self-harm
18 Falls		18 Atrial fibrillation
19 Hypertensive heart disease		19 Road injuries
20 Leukemia		20 Liver cancer
21 Neonatal disorders		21 Parkinson's disease
26 Liver cancer		22 Cardiomyopathy
27 Atrial fibrillation		24 Leukemia
30 Parkinson's disease		61 Neonatal disorders

Communicable, maternal, neonatal, and nutritional diseases
Non-communicable diseases
Injuries

World Bank Upper Middle Income
Both sexes, All ages, Deaths

1990 rank		2019 rank
1 Stroke		1 Ischemic heart disease
2 Ischemic heart disease		2 Stroke
3 COPD		3 COPD
4 Lower respiratory infect		4 Lung cancer
5 Neonatal disorders		5 Alzheimer's disease
6 Road injuries		6 Stomach cancer
7 Stomach cancer		7 Lower respiratory infect
8 Lung cancer		8 Hypertensive heart disease
9 Congenital defects		9 Diabetes
10 Hypertensive heart disease		10 Chronic kidney disease
11 Self-harm		11 Road injuries
12 Cirrhosis		12 Colorectal cancer
13 Tuberculosis		13 Cirrhosis
14 Liver cancer		14 Esophageal cancer
15 Diarrheal diseases		15 HIV/AIDS
16 Drowning		16 Liver cancer
17 Diabetes		17 Self-harm
18 Esophageal cancer		18 Falls
20 Chronic kidney disease		22 Neonatal disorders
21 Alzheimer's disease		28 Congenital defects
23 Colorectal cancer		33 Tuberculosis
24 Falls		34 Drowning
66 HIV/AIDS		48 Diarrheal diseases

Communicable, maternal, neonatal, and nutritional diseases
Non-communicable diseases
Injuries

World Bank Lower Middle Income
Both sexes, All ages, Deaths

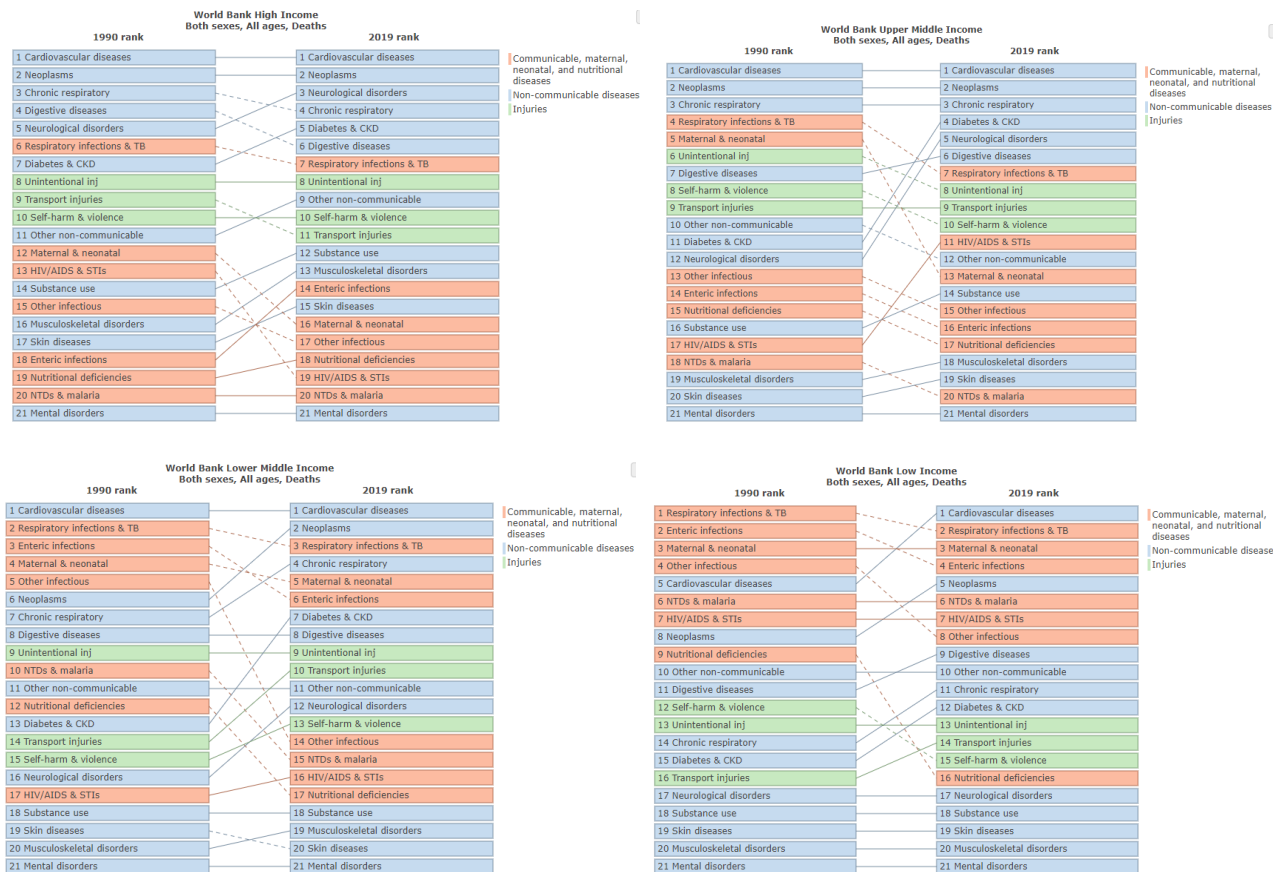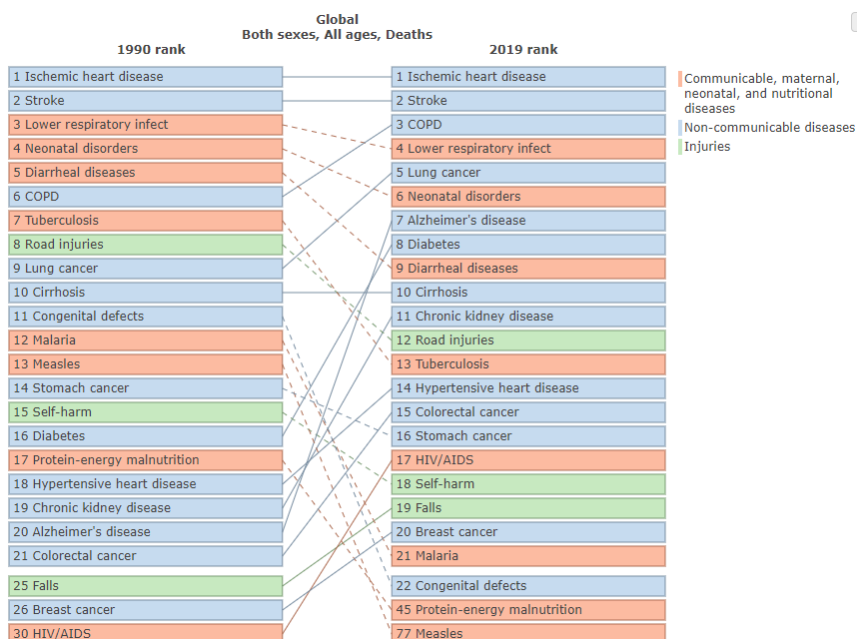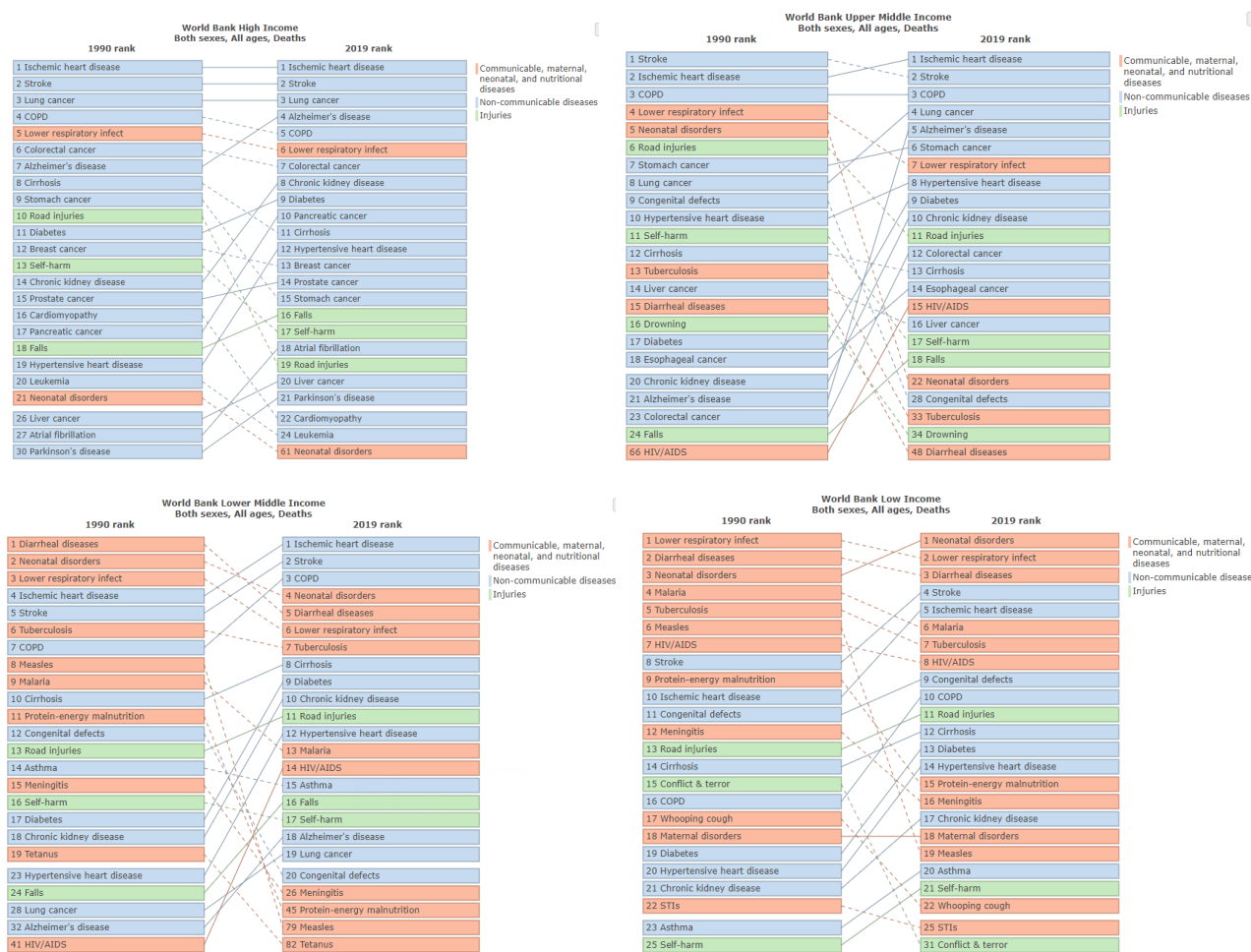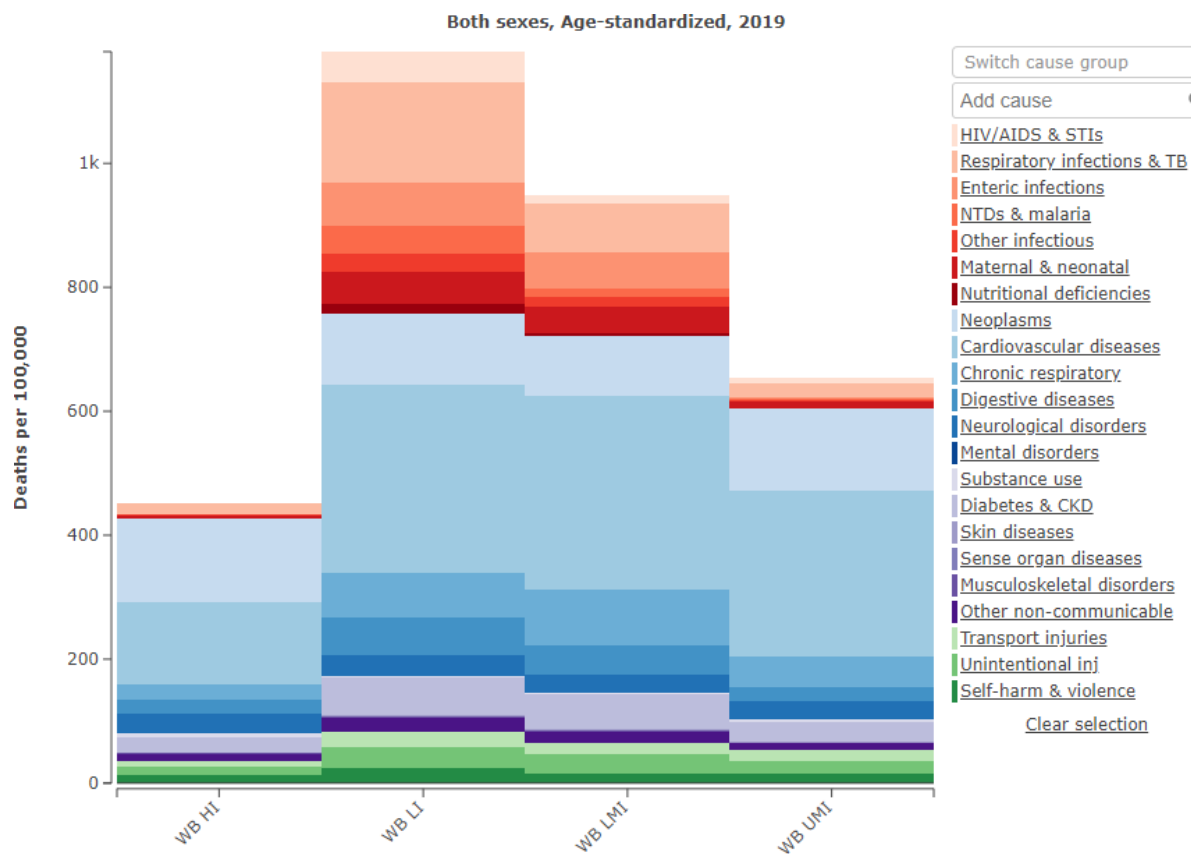| 1990 rank		2019 rank
1 Diarrheal diseases		1 Ischemic heart disease
2 Neonatal disorders		2 Stroke
3 Lower respiratory infect		3 COPD
4 Ischemic heart disease		4 Neonatal disorders
5 Stroke		5 Diarrheal diseases
6 Tuberculosis		6 Lower respiratory infect
7 COPD		7 Tuberculosis
8 Measles		8 Cirrhosis
9 Malaria		9 Diabetes
10 Cirrhosis		10 Chronic kidney disease
11 Protein-energy malnutrition		11 Road injuries
12 Congenital defects		12 Hypertensive heart disease
13 Road injuries		13 Malaria
14 Asthma		14 HIV/AIDS
15 Meningitis		15 Asthma
16 Self-harm		16 Falls
17 Diabetes		17 Self-harm
18 Chronic kidney disease		18 Alzheimer's disease
19 Tetanus		19 Lung cancer
23 Hypertensive heart disease		20 Congenital defects
24 Falls		26 Meningitis
28 Lung cancer		45 Protein-energy malnutrition
32 Alzheimer's disease		79 Measles
41 HIV/AIDS		82 Tetanus

Communicable, maternal, neonatal, and nutritional diseases
Non-communicable diseases
Injuries

World Bank Low Income
Both sexes, All ages, Deaths

1990 rank		2019 rank
1 Lower respiratory infect		1 Neonatal disorders
2 Diarrheal diseases		2 Lower respiratory infect
3 Neonatal disorders		3 Diarrheal diseases
4 Malaria		4 Stroke
5 Tuberculosis		5 Ischemic heart disease
6 Measles		6 Malaria
7 HIV/AIDS		7 Tuberculosis
8 Stroke		8 HIV/AIDS
9 Protein-energy malnutrition		9 Congenital defects
10 Ischemic heart disease		10 COPD
11 Congenital defects		11 Road injuries
12 Meningitis		12 Cirrhosis
13 Road injuries		13 Diabetes
14 Cirrhosis		14 Hypertensive heart disease
15 Conflict & terror		15 Protein-energy malnutrition
16 COPD		16 Meningitis
17 Whooping cough		17 Chronic kidney disease
18 Maternal disorders		18 Maternal disorders
19 Diabetes		19 Measles
20 Hypertensive heart disease		20 Asthma
21 Chronic kidney disease		21 Self-harm
22 STIs		22 Whooping cough
23 Asthma		25 STIs
25 Self-harm		31 Conflict & terror

Communicable, maternal, neonatal, and nutritional diseases
Non-communicable diseases
Injuries

17

Figure 6.1 Age-standardized mortality rates (including NCDs) by World Bank country income category in 2019

Both sexes, Age-standardized, 2019

7. Mortality by cause and age in 1990 and 2019

Figure 7.1 Deaths by cause and age in 1990 and 2019 worldwide
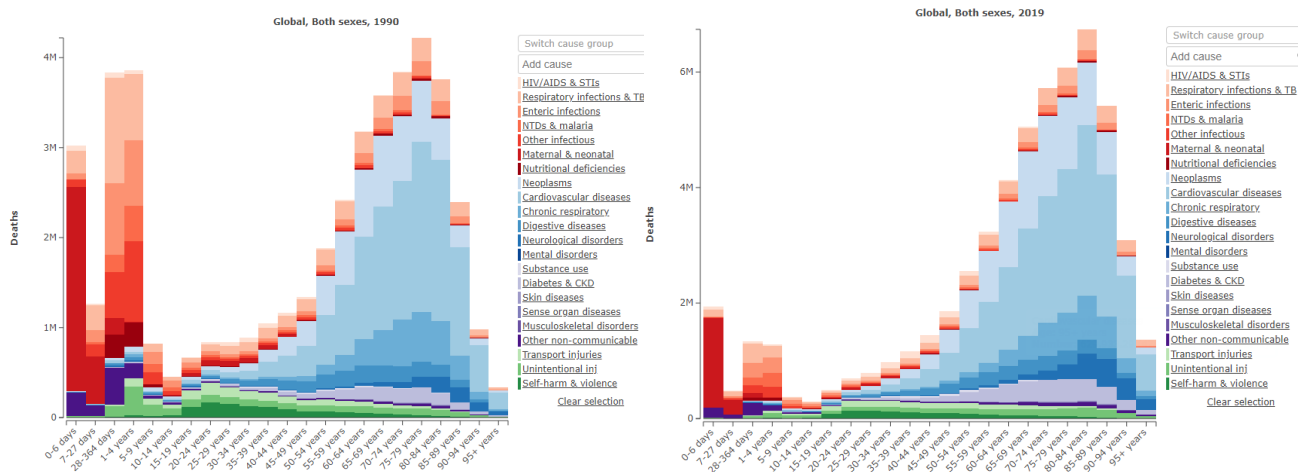

Figure 7.2 Deaths by cause and age by World Bank country income category (2019)