ESTIMATION OF THE INDONESIAN BURDEN OF DISEASE, INJURIES AND RISK FACTORS: LEVELS, TRENDS AND POLICY IMPLICATIONS

Collaboration of the NIHRD, Indonesian MoH

&

IHME, Univ. of Washington – Seattle, USA

Presented at the Seminar on the
Indonesian BoD, Ministry of Health –
Jakarta, 30th April 2013

Needs for Better Evidence

- National strategic decision-making
- Informing programme managers to improve implementation
- Dynamic monitoring critical outcomes -- key to accountability
- Building the evidence base on determinants and interventions for health

Burden of Disease

- Burden of disease analysis provides a standardized framework for integrating all available information on mortality, causes of death, individual health status, and condition-specific epidemiology to provide an overview of the the levels and causes of population health

GBD Approach

1. Measure loss of health due to comprehensive set of disease,injury and risk factor causes in a comparable way
2. Decouple epidemiological assessment and advocacy
3. Inject non-fatal health outcomes into health policy debate
4. Use a common metric for burden of disease assessment and cost-effectiveness analysis

Steps in Analysis

- Demographic baseline
- Cause of death analysis
- Epidemiological description of non-fatal outcomes
- Internal consistency of epidemiological estimates
- Calculation of Calculation of other summary measures
- Comparative risk assessment
- Sensitivity analysis
- YLL and YLD

Decide on levels of analysis

- National or regional
- Subpopulations (area, other)
- Year of reference
- Age groups
- Disease groups
- Risk factors
- Scope of study (projections, etc)

GBD Classification System

- Group I, consisting of communicable diseases, maternal causes, conditions arising in the perinatal period and nutritional deficiencies
- Group II, encompassing the non-communicable diseases
- Group III, comprising all injuries

- Group I (the pre-transitional causes), consists of the cluster of conditions that typically decline at a faster pace than all cause mortality during the process of the epidemiological transition.
- The non-communicable diseases clustered in group II are the most important health problems in population that have undergone the epidemiological transition.
- Injuries are separately classified into Group III, because their etiology is very different from that of most diseases and also because there is no generalized pattern of change in injury mortality that accompanies the epidemiological transition

- Each group is divided into several major sub categories of disease and injury that are mutually exclusive and exhaustive.

Outline

- What is the GBD 2010?
- Some Key Global Results
- Indonesia Results
- Benchmarking Indonesia
- Continuous Updating
- Policy Implications

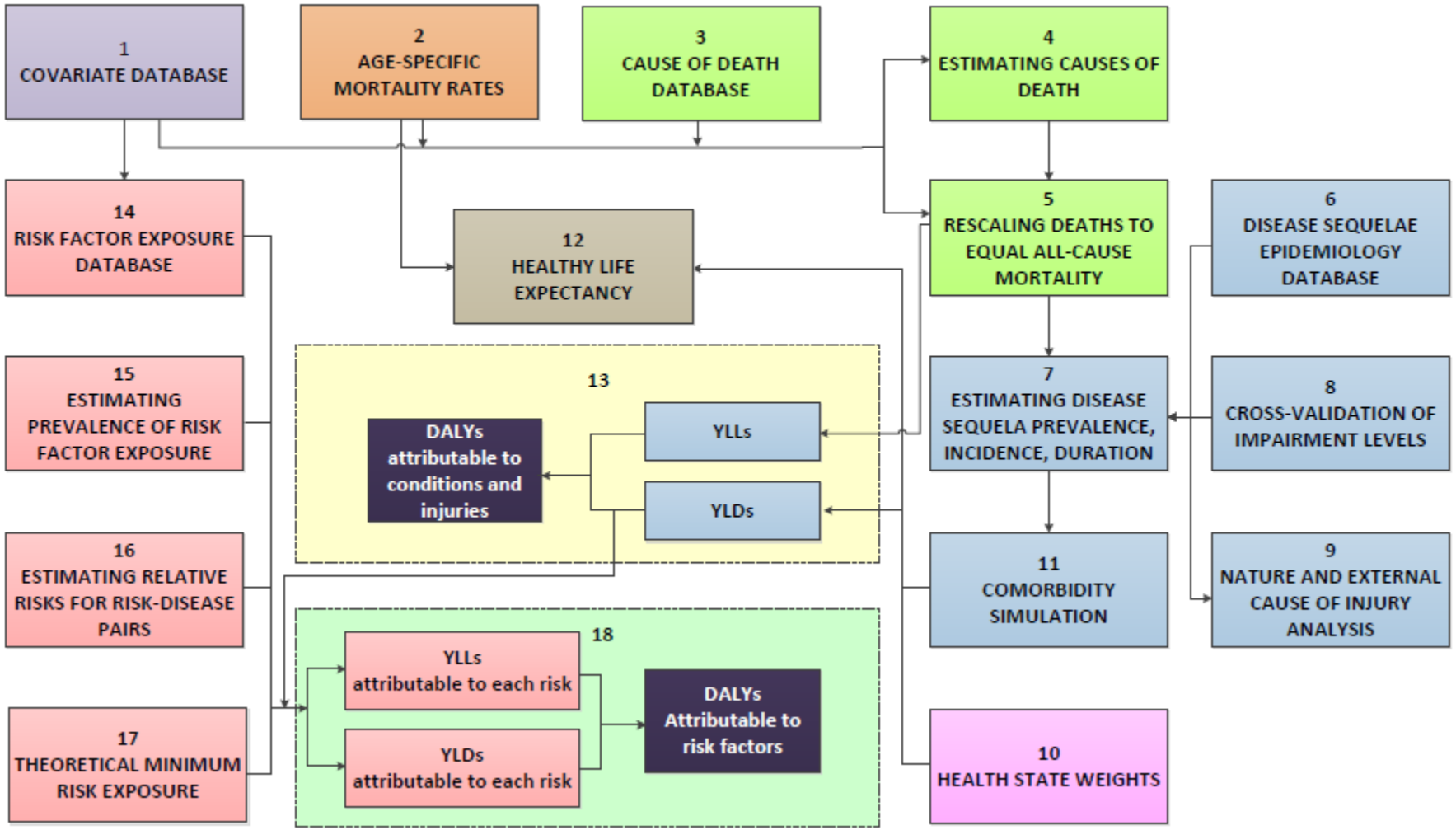
Global Burden of Disease 2010

1. A ***systematic scientific*** effort to quantify the ***comparative*** magnitude of ***health loss*** for 187 countries from 1990 to 2010***.***
2. Covering 291 diseases and injuries, 1,160 sequelae of these diseases and injuries, and 67 risk factors or clusters of risk factors.
3. GBD 2010 study initiated in 2007 funded by Bill & Melinda Gates Foundation.
4. Summary papers published in a dedicated triple issue of *The Lancet*, December 15, 2012.
5. Global scientific collaboration: 488 authors from 303 institutions in 50 countries.

GBD 2010 Team

488 authors from 303 institutions in 50 countries.

Figure 3. GBD 2010 Data and Model Flow Chart



Some GBD Terminology

1. **Years of life lost** due to premature mortality (YLLs) – count the number of years lost at each age compared to a reference life expectancy of 86 at birth.
2. **Years lived with disability** for a cause in an age-sex group equals the prevalence of the condition times the disability weight for that condition (YLDs).
3. **DALYs** are the sum of YLLs and YLDs and are an overall metric of the burden of disease.

Outline

What is the GBD 2010?

Some Key Global Results

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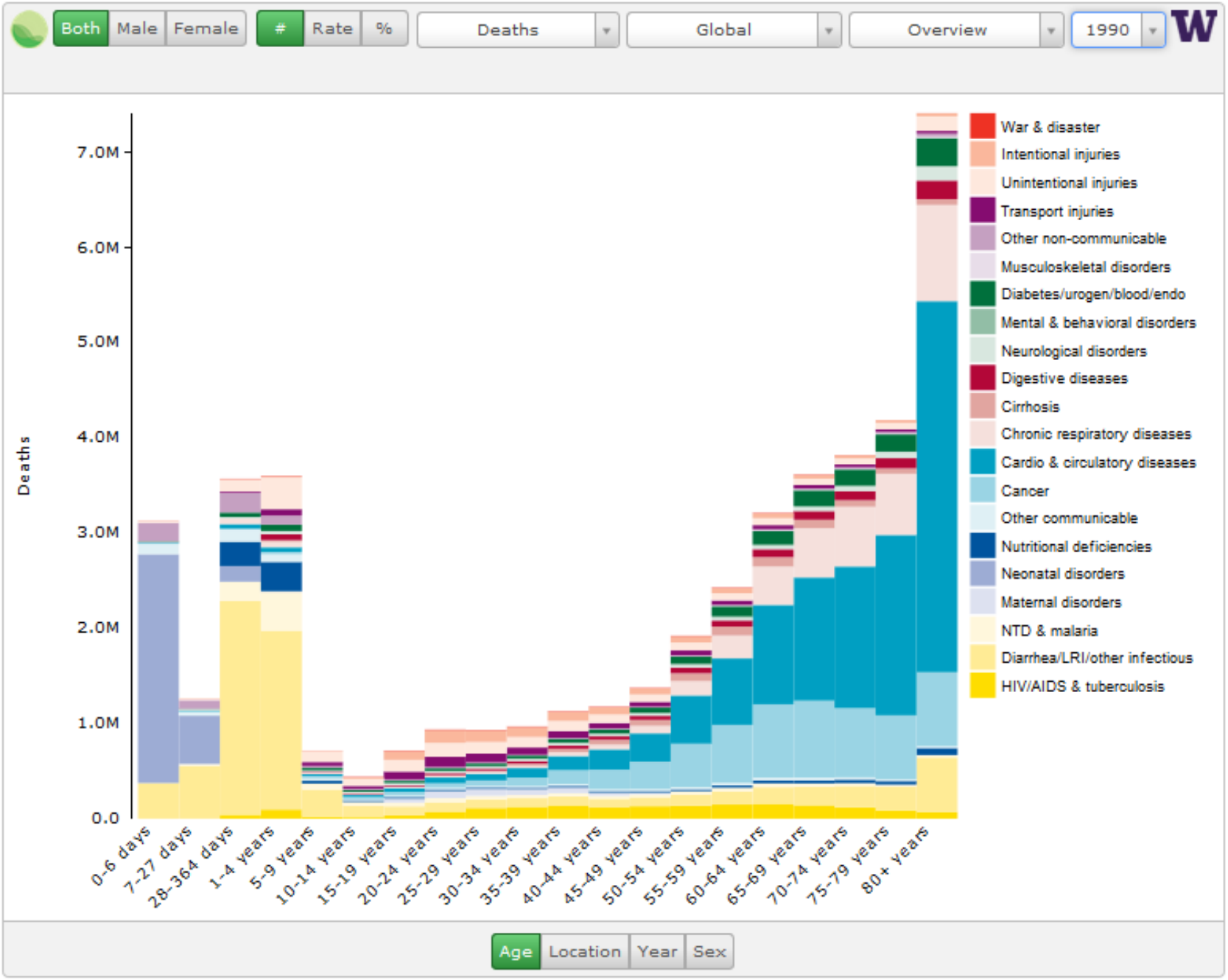
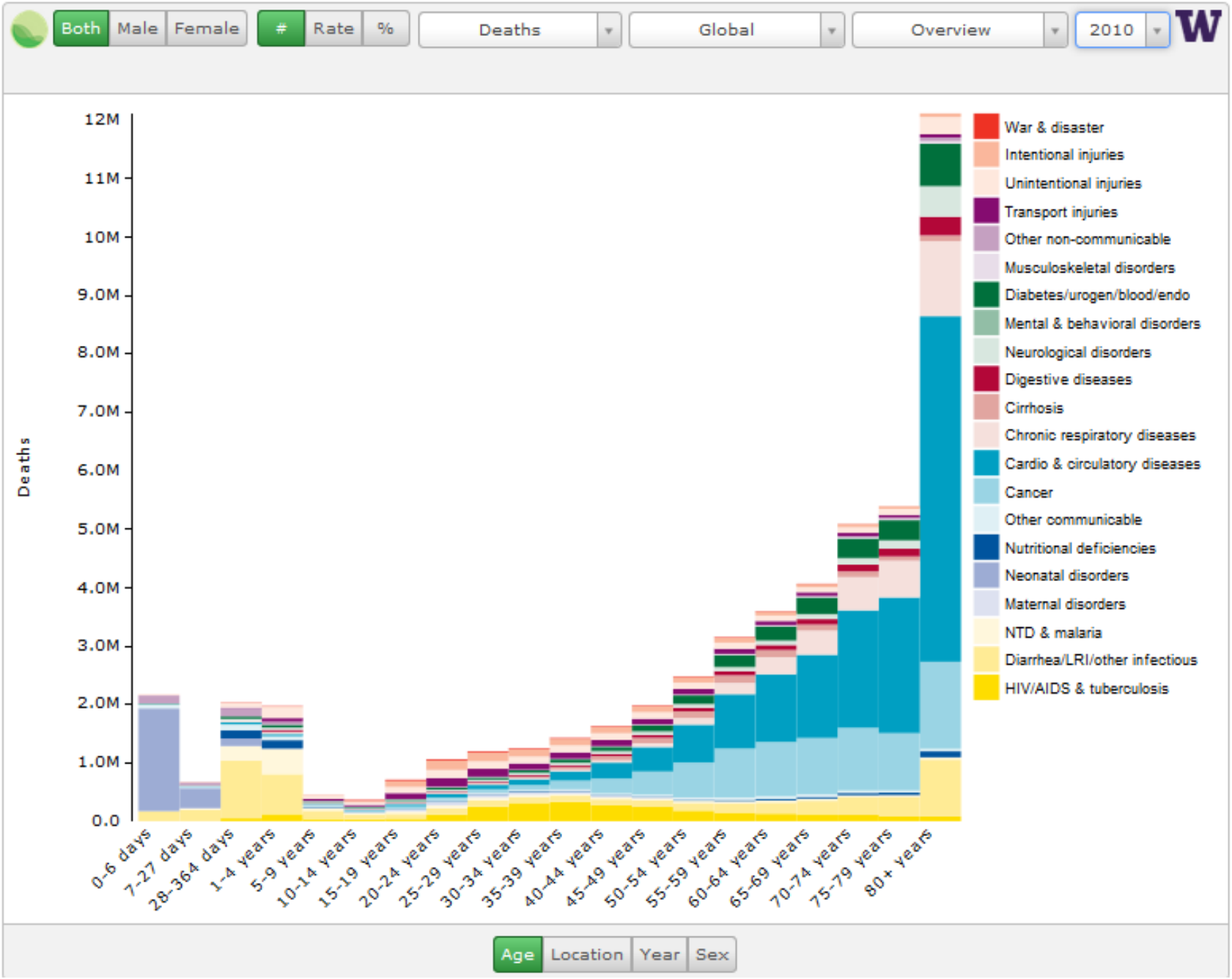
Continuous Updating


Both
Male
Female
#
Rate
%
Deaths
Global
Overview
1990
Deaths
7.0M
6.0M
5.0M
4.0M
3.0M
2.0M
1.0M
0.0
0-6 days
7-27 days
28-364 days
1-4 years
5-9 years
10-14 years
15-19 years
20-24 years
25-29 years
30-34 years
35-39 years
40-44 years
45-49 years
50-54 years
55-59 years
60-64 years
65-69 years
70-74 years
75-79 years
80+ years
War & disaster
Intentional injuries
Unintentional injuries
Transport injuries
Other non-communicable
Musculoskeletal disorders
Diabetes/urogen/blood/endo
Mental & behavioral disorders
Neurological disorders
Digestive diseases
Cirrhosis
Chronic respiratory diseases
Cardio & circulatory diseases
Cancer
Other communicable
Nutritional deficiencies
Neonatal disorders
Maternal disorders
NTD & malaria
Diarrhea/LRI/other infectious
HIV/AIDS & tuberculosis
Age
Location
Year
Sex


Both
Male
Female
#
Rate
%
Deaths
Global
Overview
2010
Deaths
12M
11M
10M
9.0M
8.0M
7.0M
6.0M
5.0M
4.0M
3.0M
2.0M
1.0M
0.0
0-6 days
7-27 days
28-364 days
1-4 years
5-9 years
10-14 years
15-19 years
20-24 years
25-29 years
30-34 years
35-39 years
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Cancer
Other communicable
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Neonatal disorders
Maternal disorders
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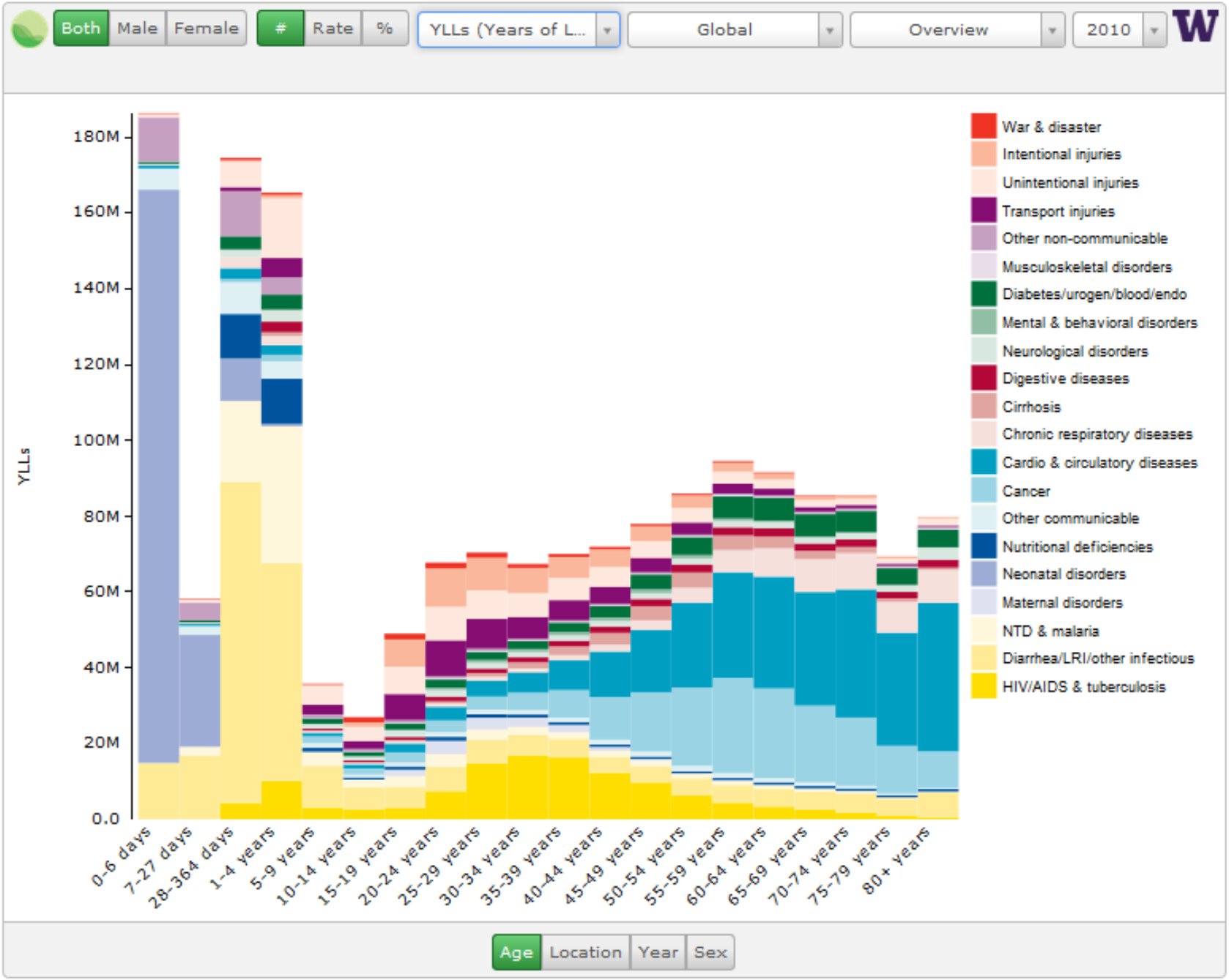
HIV/AIDS & tuberculosis
Age
Location
Year
Sex


Both
Male
Female
#
Rate
%
YLLs (Years of L...
Global
Overview
2010
YLLs
180M
160M
140M
120M
100M
80M
60M
40M
20M
0.0
0-6 days
7-27 days
28-364 days
1-4 years
5-9 years
10-14 years
15-19 years
20-24 years
25-29 years
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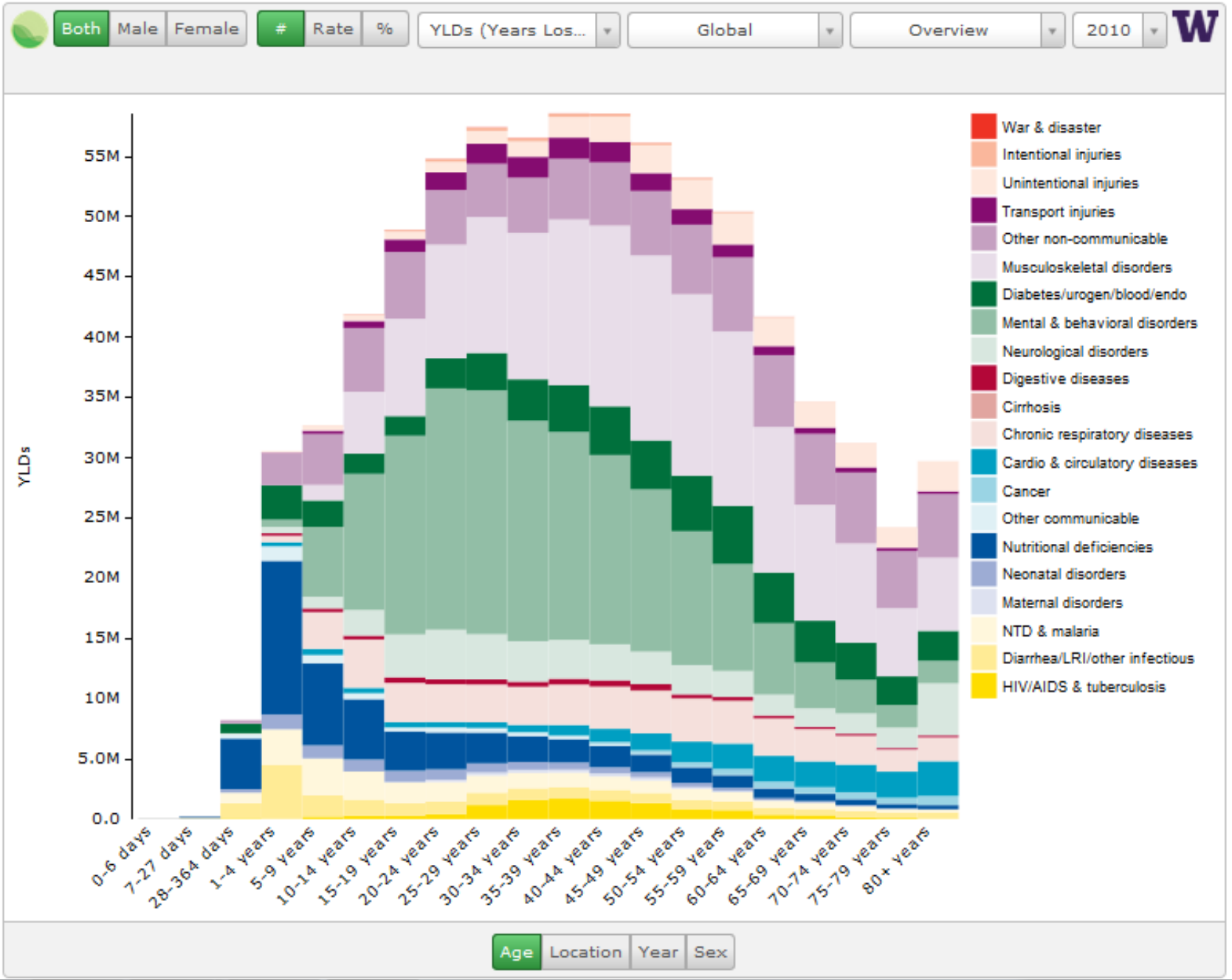
Both
Male
Female
#
Rate
%
YLDs (Years Los...
Global
Overview
2010
YLDs
55M
50M
45M
40M
35M
30M
25M
20M
15M
10M
5.0M
0.0
0-6 days
7-27 days
28-364 days
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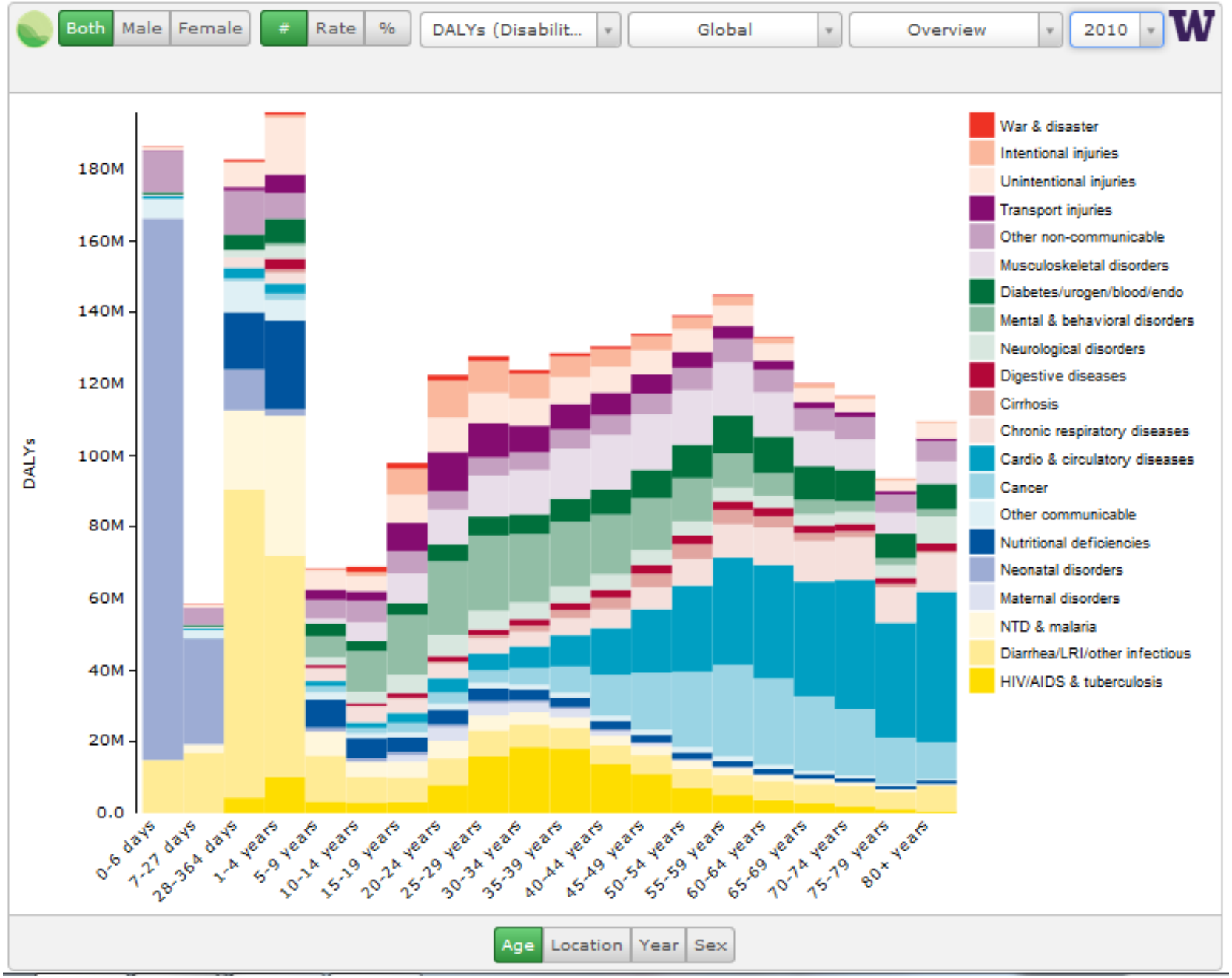
Both
Male
Female
#
Rate
%
DALYs (Disabilit...
Global
Overview
2010
DALYs
180M
160M
140M
120M
100M
80M
60M
40M
20M
0.0
0-6 days
7-27 days
28-364 days
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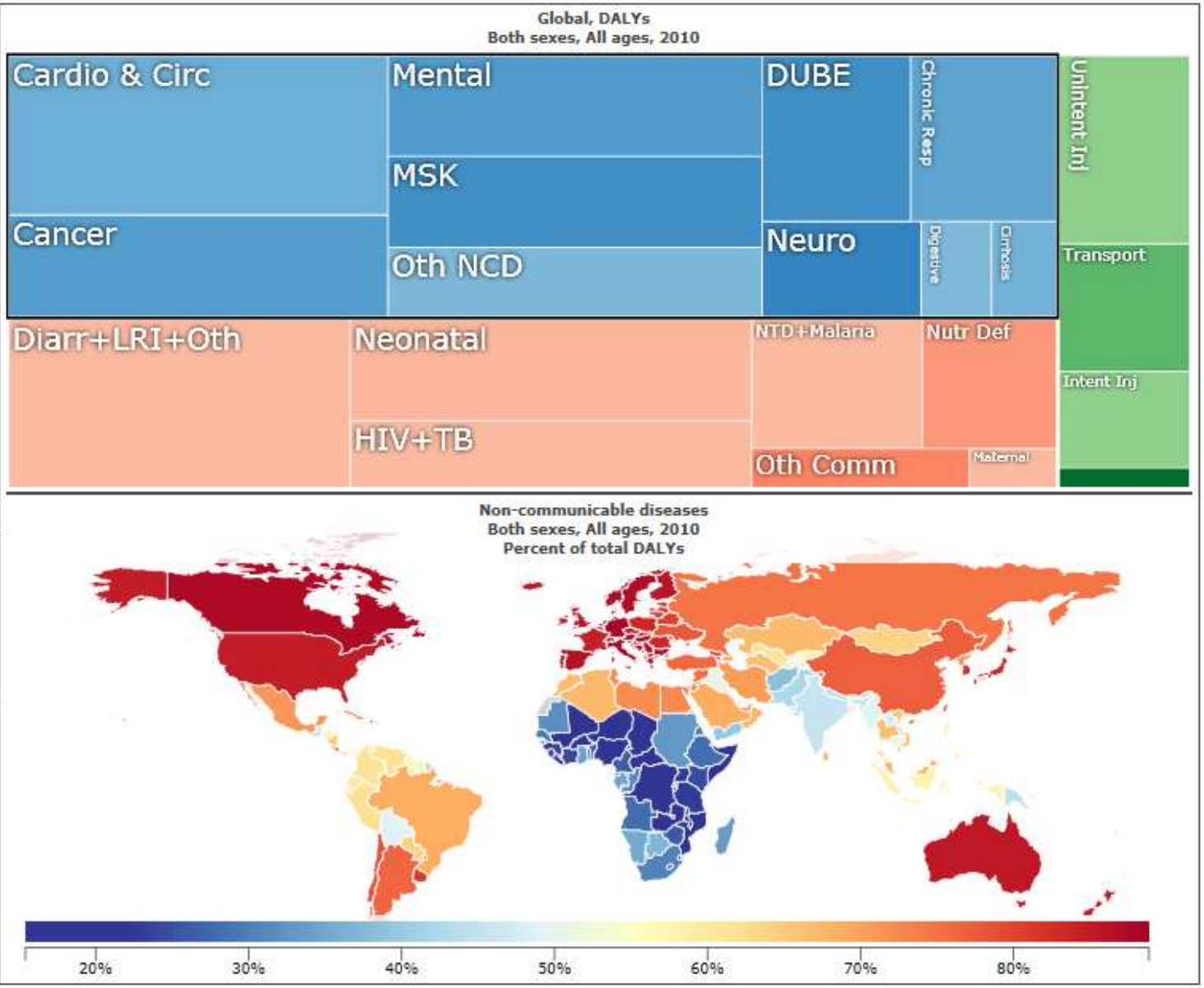
Diarrhea/LRI/other infectious
HIV/AIDS & tuberculosis
Age
Location
Year
Sex

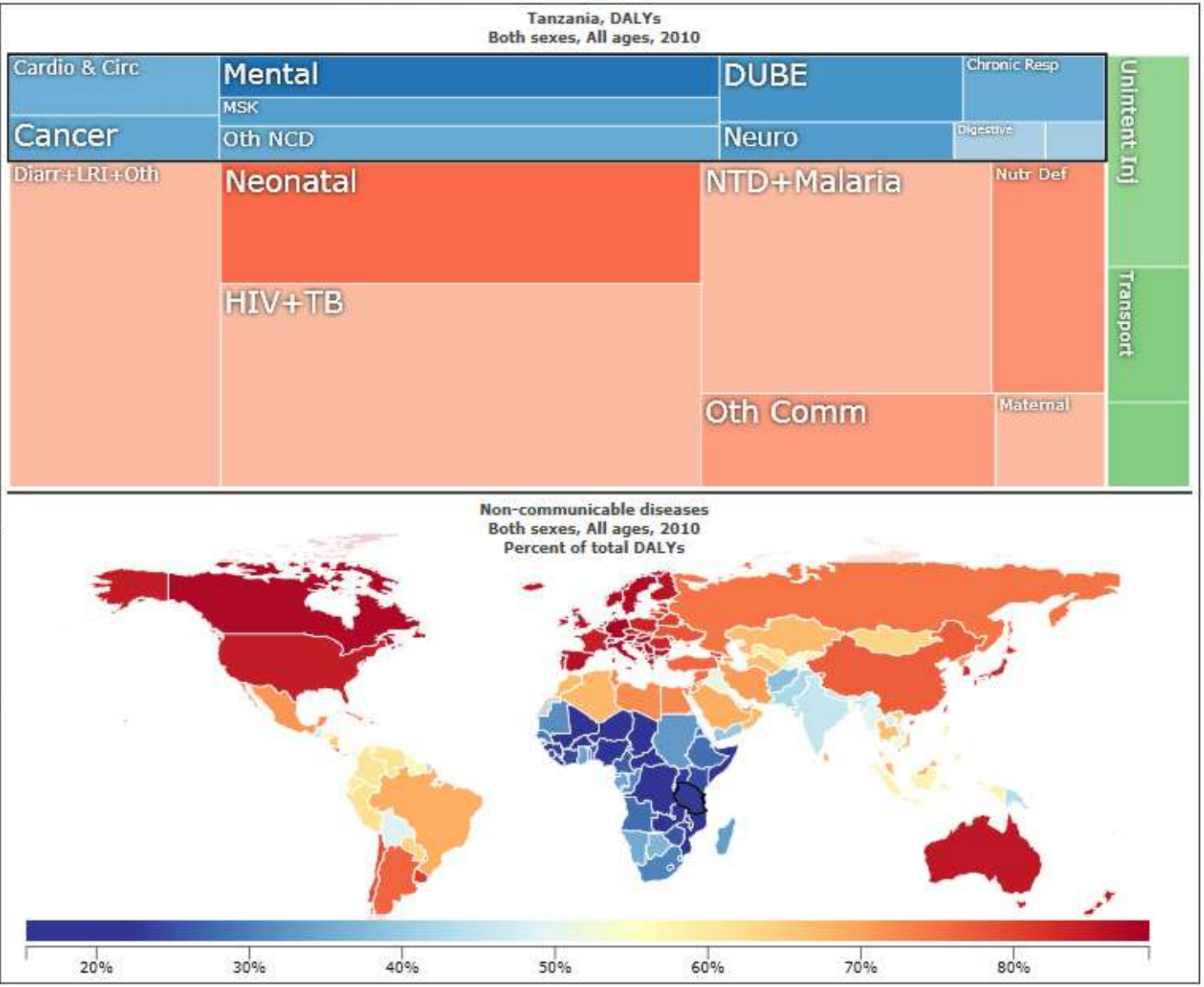
Top Chart: Treemap
Cause of Disease or Injury: B. Non-communicable di...
Metric: DALYs (Disability...
Place: Global
Year: 2010
Age: All ages
Sex: Both | Male | Female
Depth: 2
Color: Rate of Change

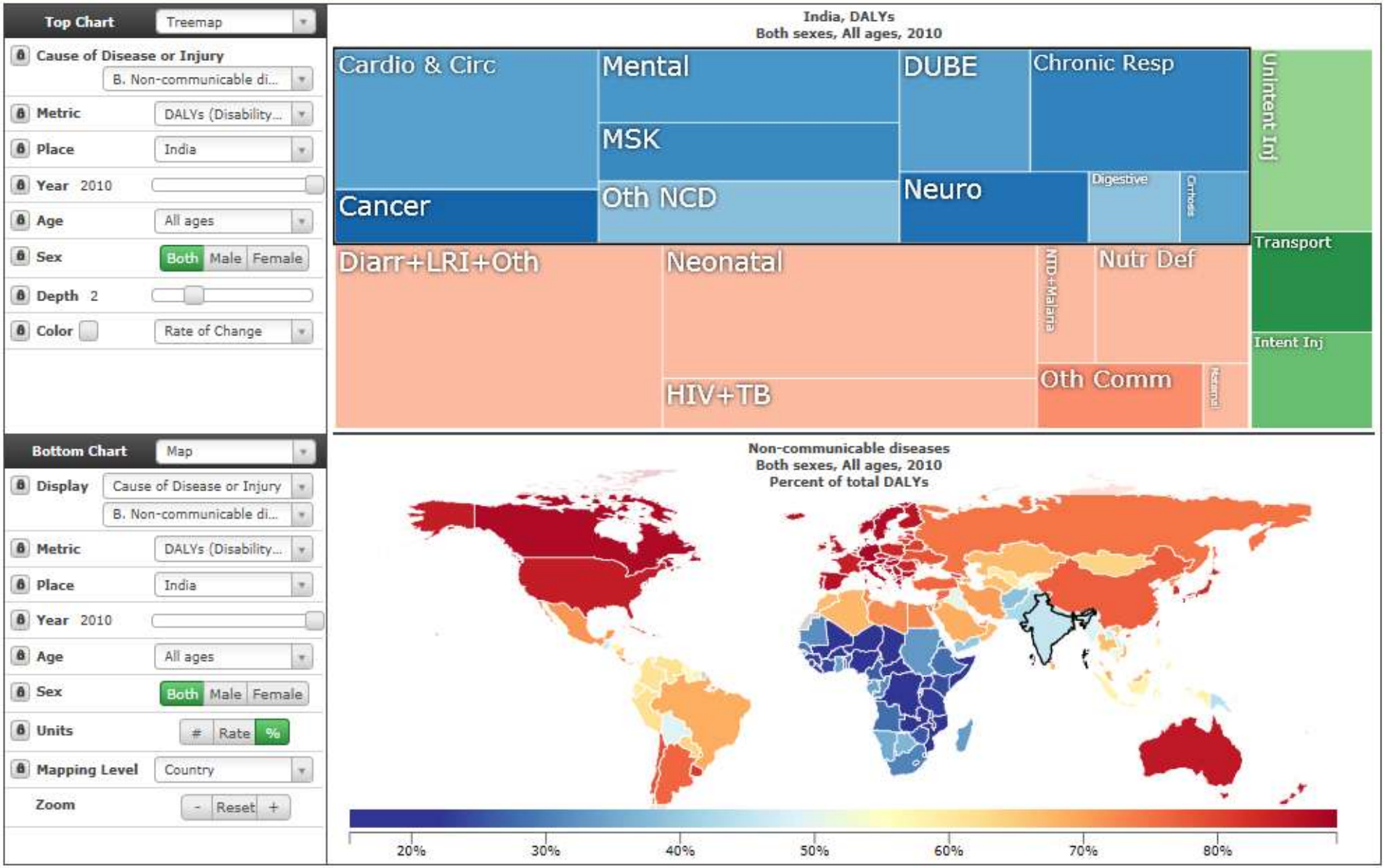
Bottom Chart: Map
Display: Cause of Disease or Injury
B. Non-communicable di...
Metric: DALYs (Disability...
Place: Global
Year: 2010
Age: All ages
Sex: Both | Male | Female
Units: # | Rate | %
Mapping Level: Country
Zoom: - | Reset | +

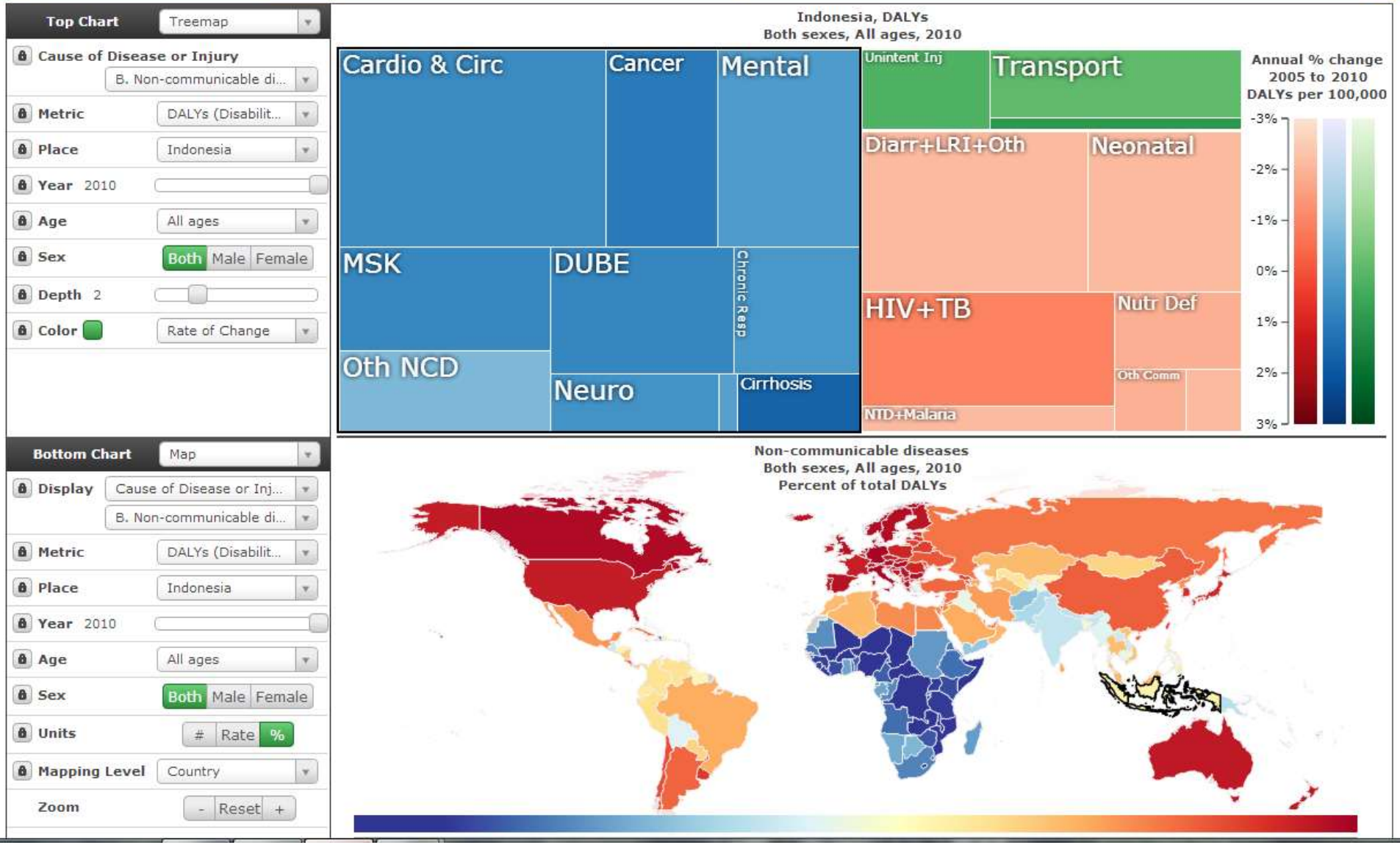


Top Chart: Treemap
Cause of Disease or Injury: B. Non-communicable di...
Metric: DALYs (Disability...
Place: Tanzania
Year: 2010
Age: All ages
Sex: Both | Male | Female
Depth: 2
Color: Rate of Change

Bottom Chart: Map
Display: Cause of Disease or Injury
B. Non-communicable di...
Metric: DALYs (Disability...
Place: Tanzania
Year: 2010
Age: All ages
Sex: Both | Male | Female
Units: # | Rate | %
Mapping Level: Country
Zoom: - | Reset | +




Top Chart
Treemap
Cause of Disease or Injury
B. Non-communicable di...
Metric
DALYs (Disability...
Place
India
Year 2010
Age
All ages
Sex
Both Male Female
Depth 2
Color
Rate of Change
Bottom Chart
Map
Display
Cause of Disease or Injury
B. Non-communicable di...
Metric
DALYs (Disability...
Place
India
Year 2010
Age
All ages
Sex
Both Male Female
Units
Rate %
Mapping Level
Country
Zoom
- Reset +
India, DALYs
Both sexes, All ages, 2010
Cardio & Circ
Mental
DUBE
Chronic Resp
MSK
Cancer
Oth NCD
Neuro
Digestive
Cirrhosis
Unintent Inj
Transport
Intent Inj
Diarr+LRI+Oth
Neonatal
NTD+Malaria
Nutr Def
HIV+TB
Oth Comm
Hemoglobi
Non-communicable diseases
Both sexes, All ages, 2010
Percent of total DALYs
20%
30%
40%
50%
60%
70%
80%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Cause of Disease or Injury
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Metric
DALYs (Disabilit...
Place
Indonesia
Year 2010
Age
All ages
Sex
Both Male Female
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Map
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Cause of Disease or Inj...
B. Non-communicable di...
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Indonesia
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Age
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Indonesia, DALYs
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Oth NCD
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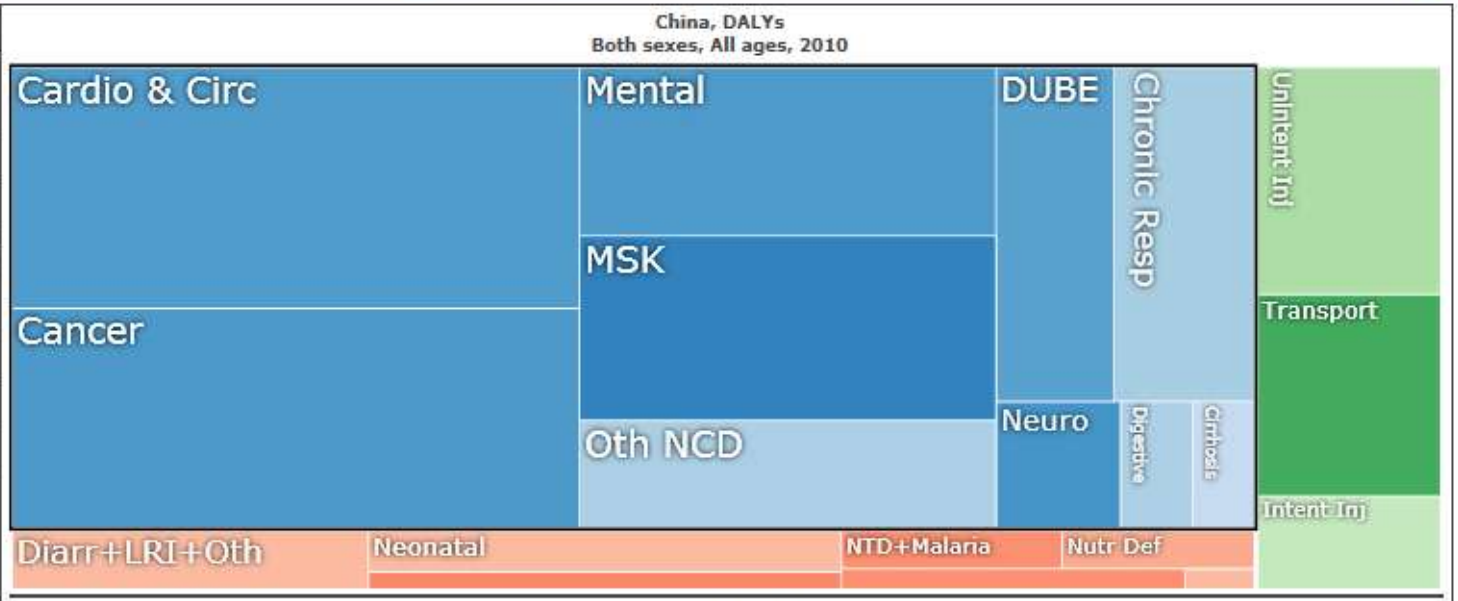
Cirrhosis
Unintent Inj
Transport
Diarr+LRI+Oth
Neonatal
HIV+TB
Nutr Def
Oth Comm
NTD+Malaria
Annual % change
2005 to 2010
DALYs per 100,000
-3%
-2%
-1%
0%
1%
2%
3%
Non-communicable diseases
Both sexes, All ages, 2010
Percent of total DALYs

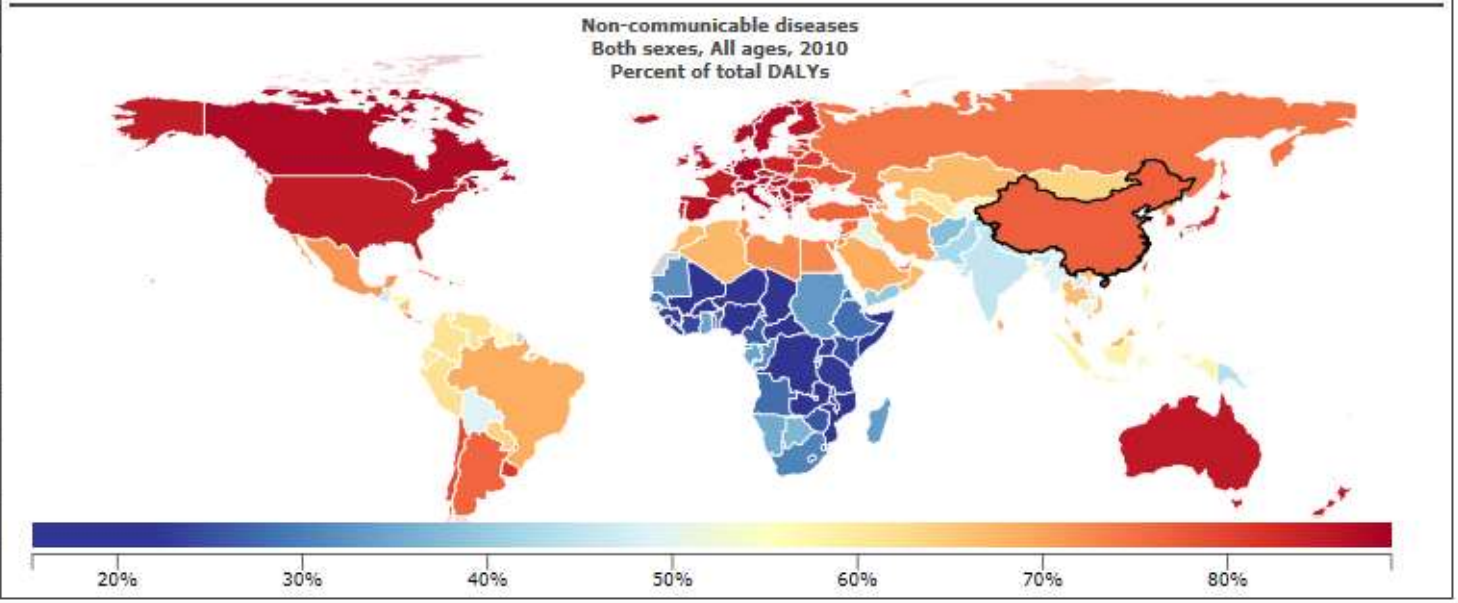
Top Chart Treemap

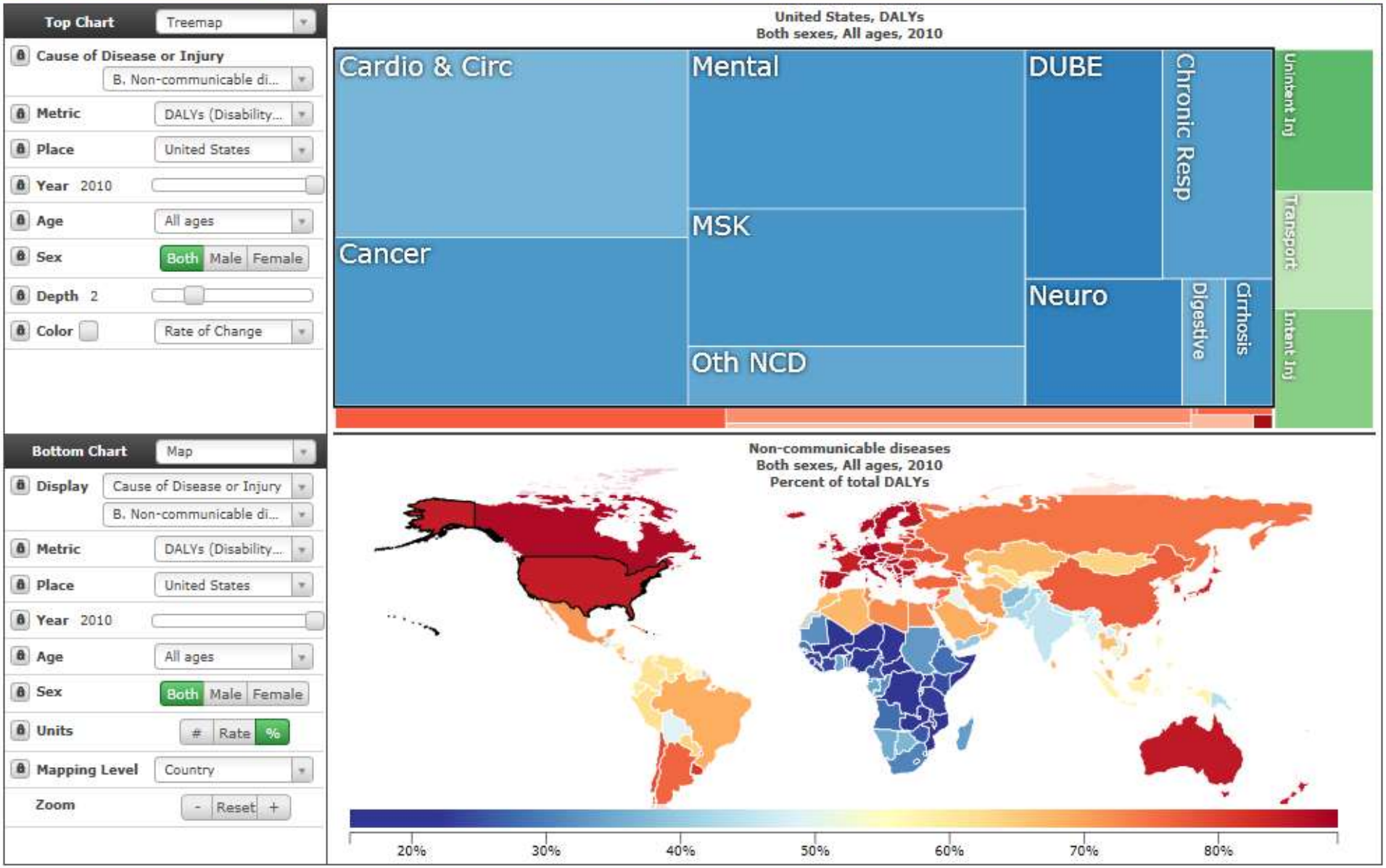
- Cause of Disease or Injury: B. Non-communicable di...
- Metric: DALYs (Disability...
- Place: China
- Year 2010
- Age: All ages
- Sex: Both | Male | Female
- Depth 2
- Color: Rate of Change

Bottom Chart Map

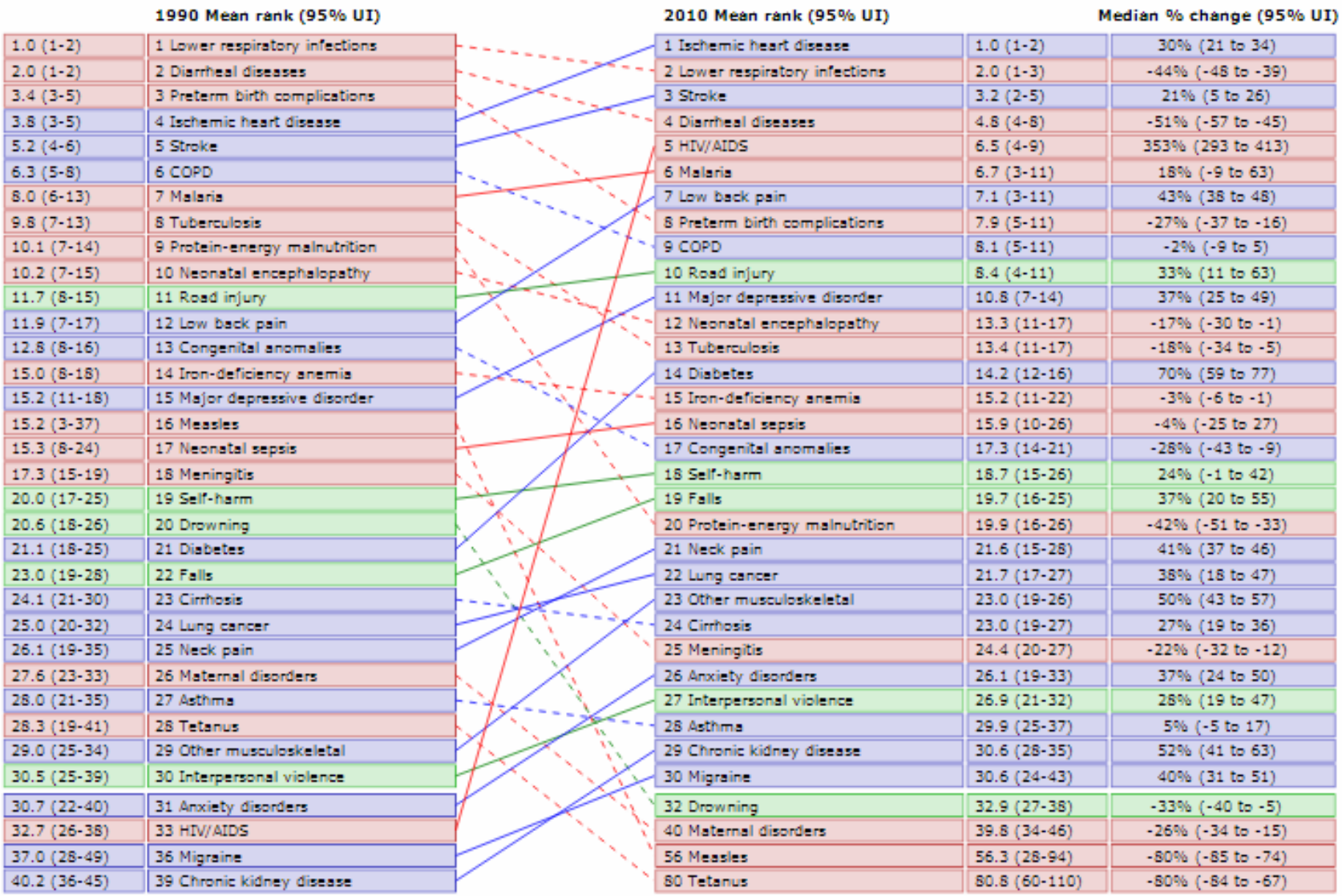
- Display: Cause of Disease or Injury — B. Non-communicable di...
- Metric: DALYs (Disability...
- Place: China
- Year 2010
- Age: All ages
- Sex: Both | Male | Female
- Units: # | Rate | %
- Mapping Level: Country
- Zoom: - | Reset | +



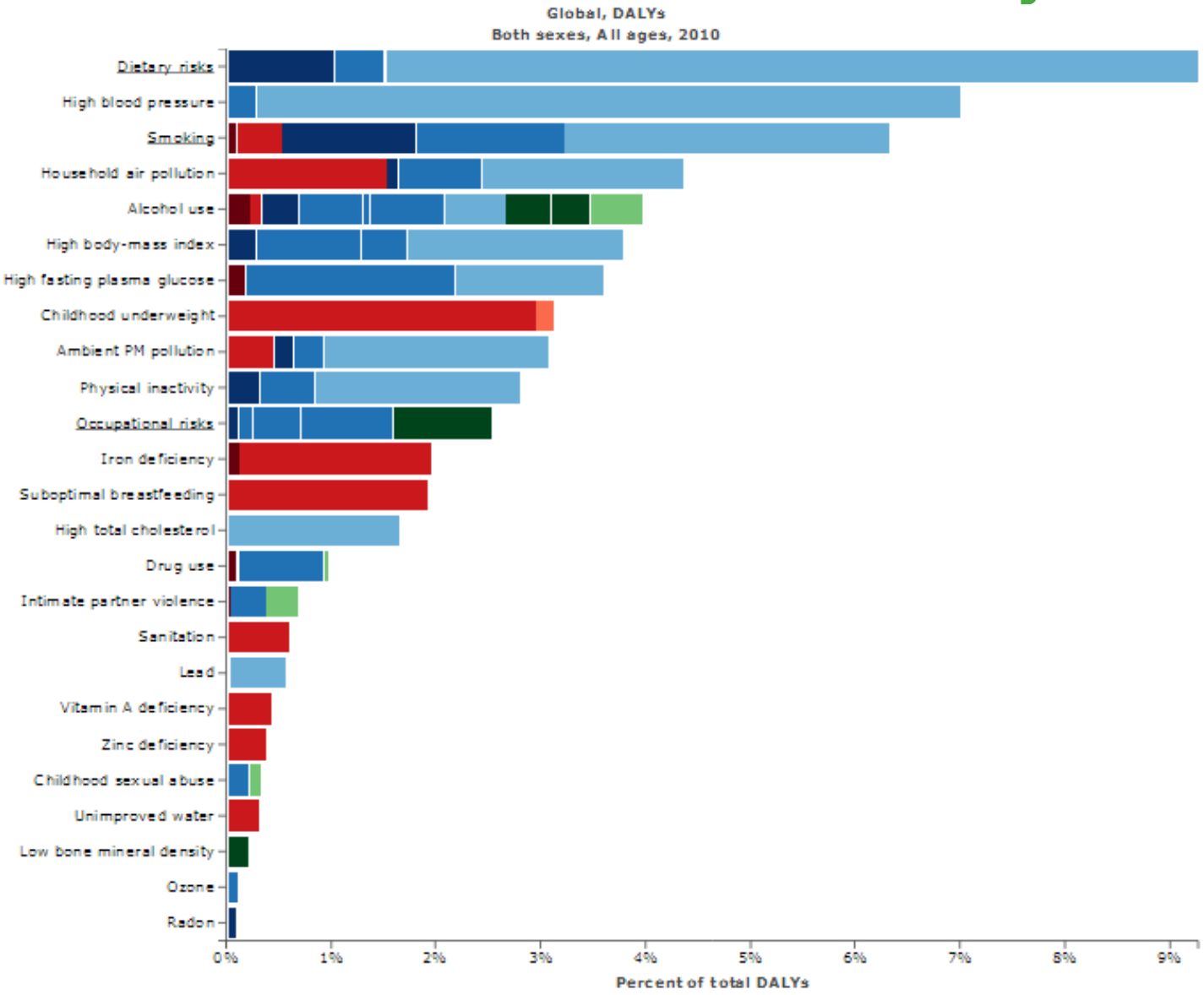



Top Chart
Treemap
Cause of Disease or Injury
B. Non-communicable di...
Metric
DALYs (Disability...
Place
United States
Year 2010
Age
All ages
Sex
Both Male Female
Depth 2
Color
Rate of Change
Bottom Chart
Map
Display
Cause of Disease or Injury
B. Non-communicable di...
Metric
DALYs (Disability...
Place
United States
Year 2010
Age
All ages
Sex
Both Male Female
Units
Rate %
Mapping Level
Country
Zoom
- Reset +
United States, DALYs
Both sexes, All ages, 2010
Cardio & Circ
Cancer
Mental
MSK
Oth NCD
DUBE
Neuro
Chronic Resp
Digestive
Cirrhosis
Unintent Inj
Transport
Intent Inj
Non-communicable diseases
Both sexes, All ages, 2010
Percent of total DALYs
20%
30%
40%
50%
60%
70%
80%

Global DALYs 1990 to 2010



Global DALYs Attributable to Major Risks



Outline

What is the GBD 2010?

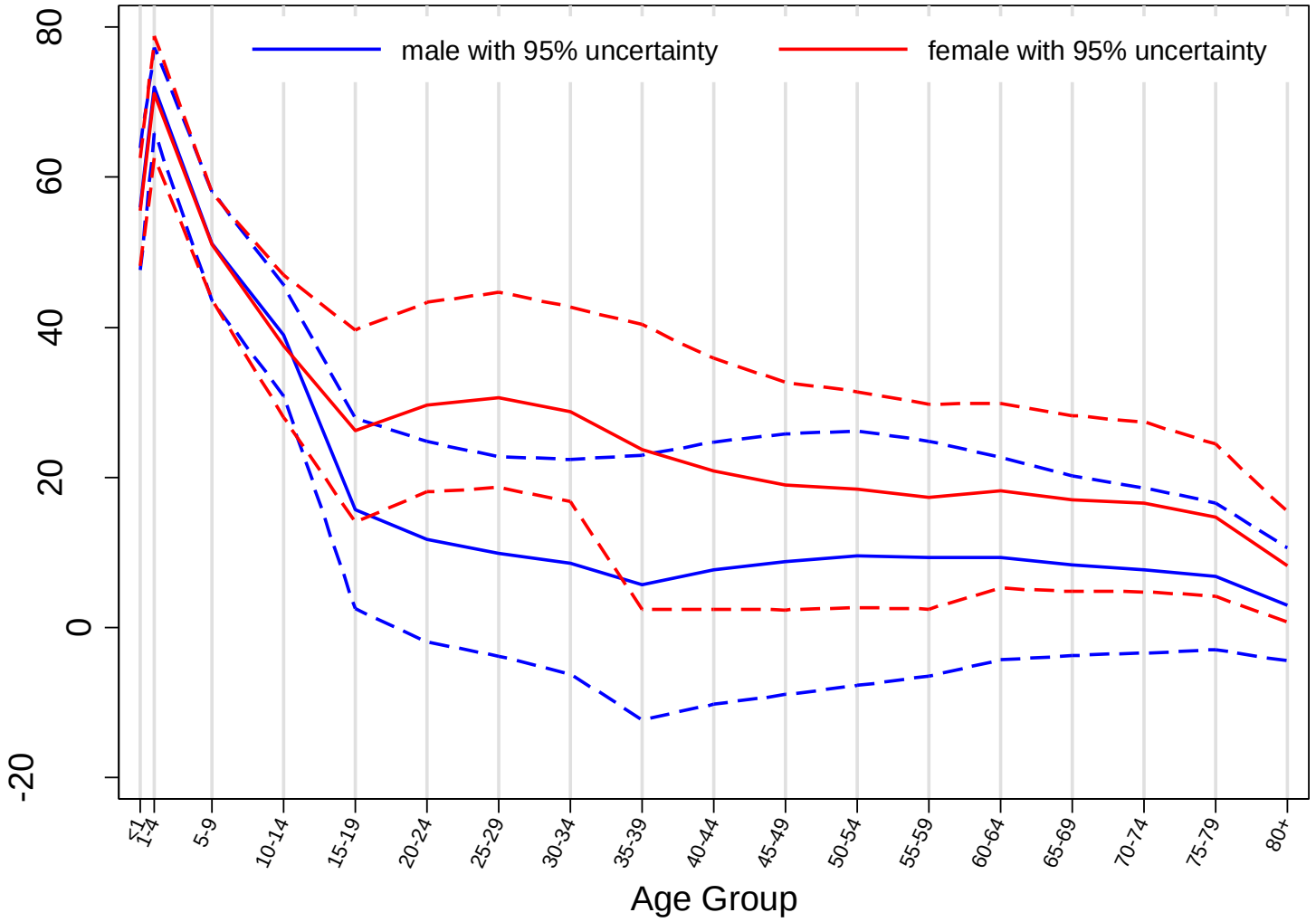
Some Key Global Results

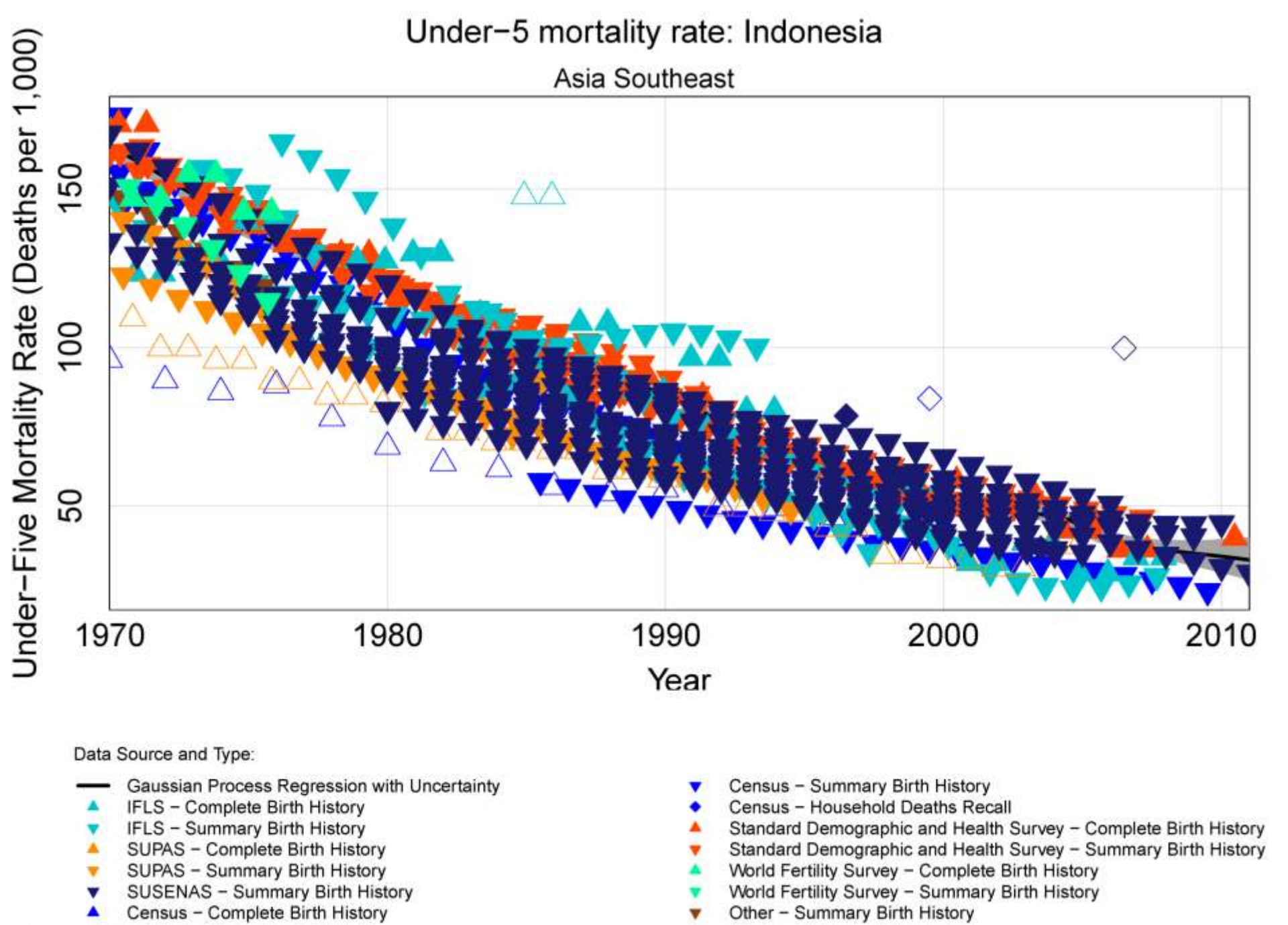
Indonesia Results

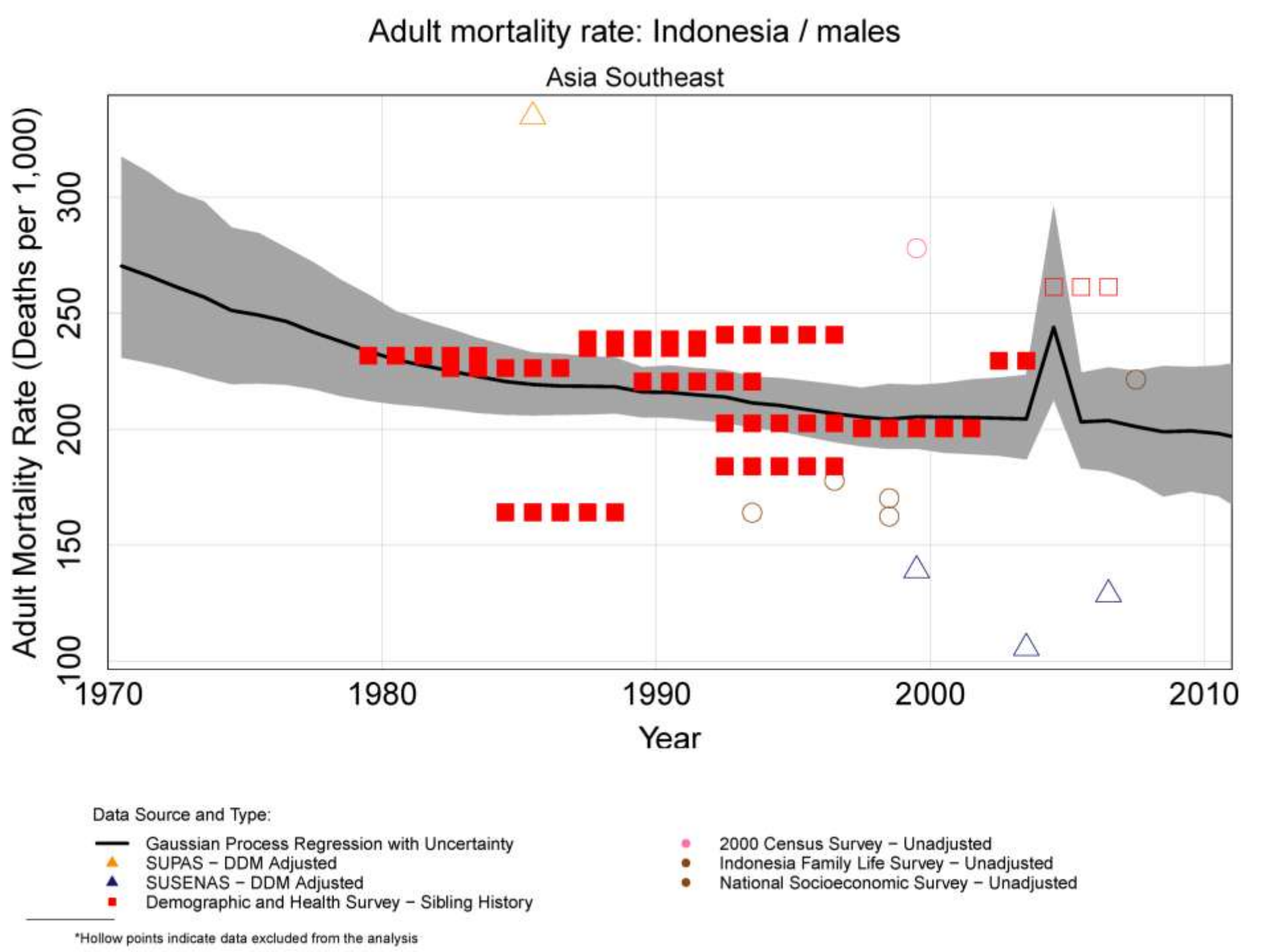
Benchmarking the Indonesia

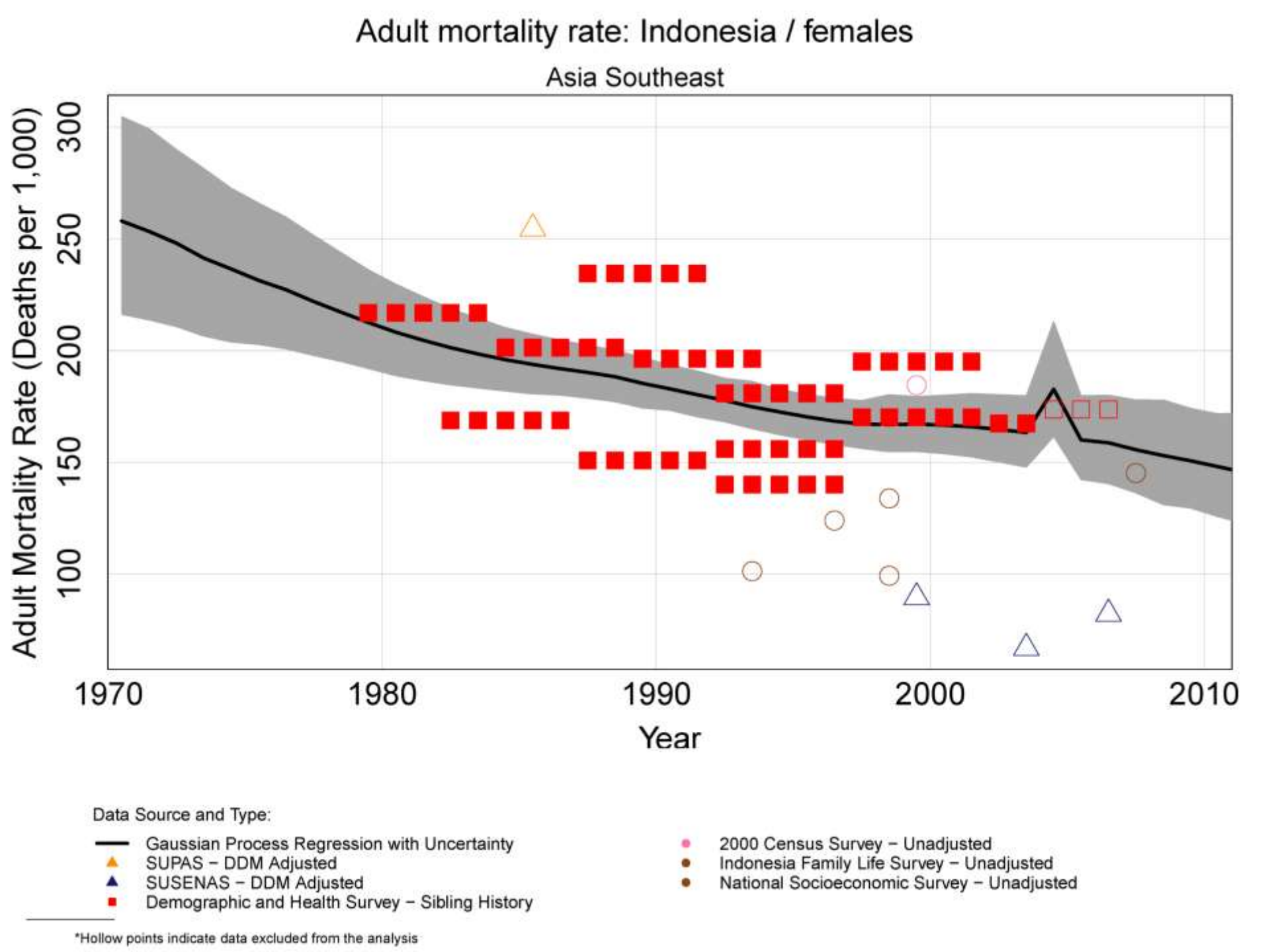
Continuous Updating

Percent change in Indonesia age-specific mortality by sex from 1990 to 2010

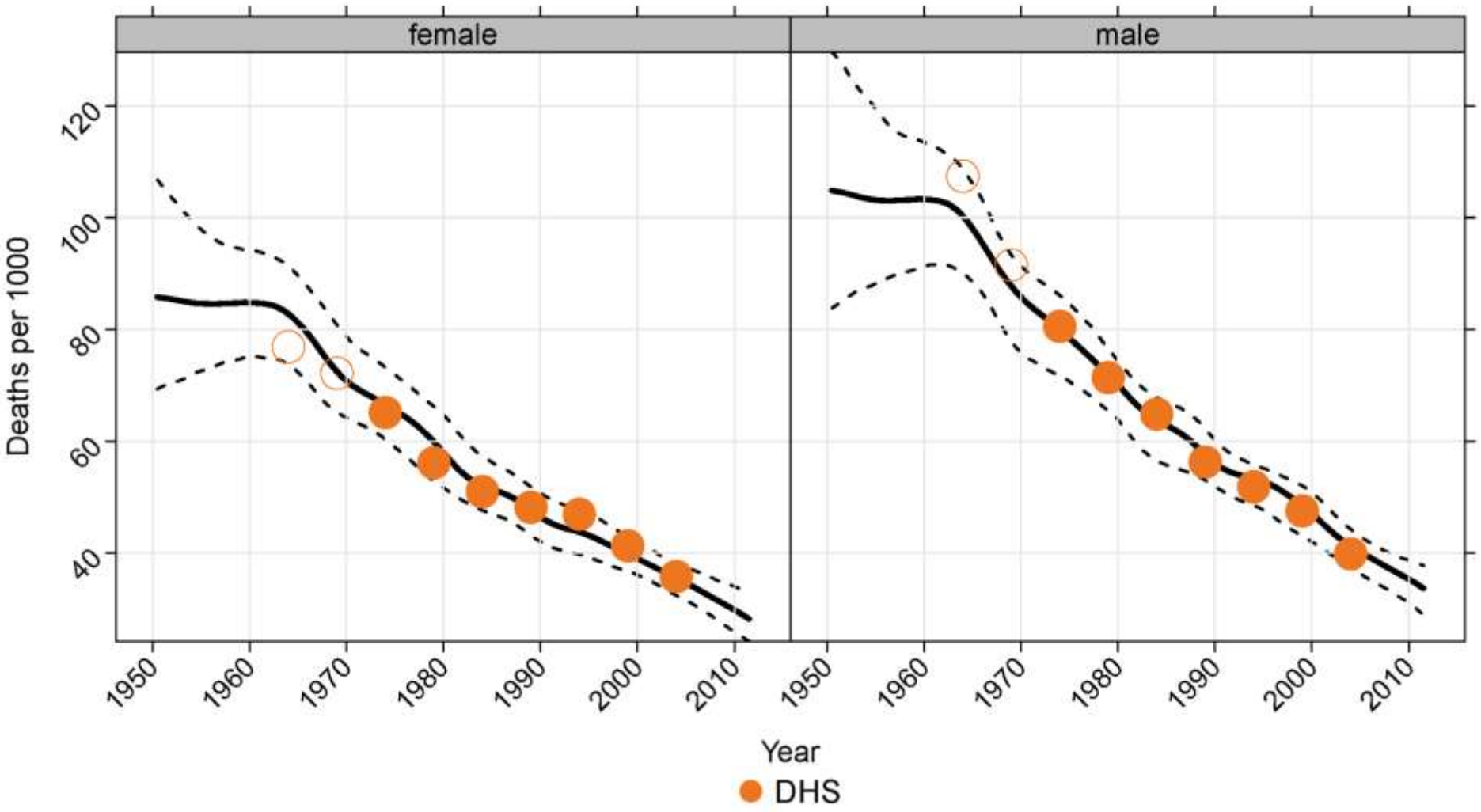



Under−5 mortality rate: Indonesia
Asia Southeast
Under−Five Mortality Rate (Deaths per 1,000)
50
100
150
1970
1980
1990
2000
2010
Year
Data Source and Type:
Gaussian Process Regression with Uncertainty
IFLS − Complete Birth History
IFLS − Summary Birth History
SUPAS − Complete Birth History
SUPAS − Summary Birth History
SUSENAS − Summary Birth History
Census − Complete Birth History
Census − Summary Birth History
Census − Household Deaths Recall
Standard Demographic and Health Survey − Complete Birth History
Standard Demographic and Health Survey − Summary Birth History
World Fertility Survey − Complete Birth History
World Fertility Survey − Summary Birth History
Other − Summary Birth History
*Hollow points indicate data excluded from the analysis

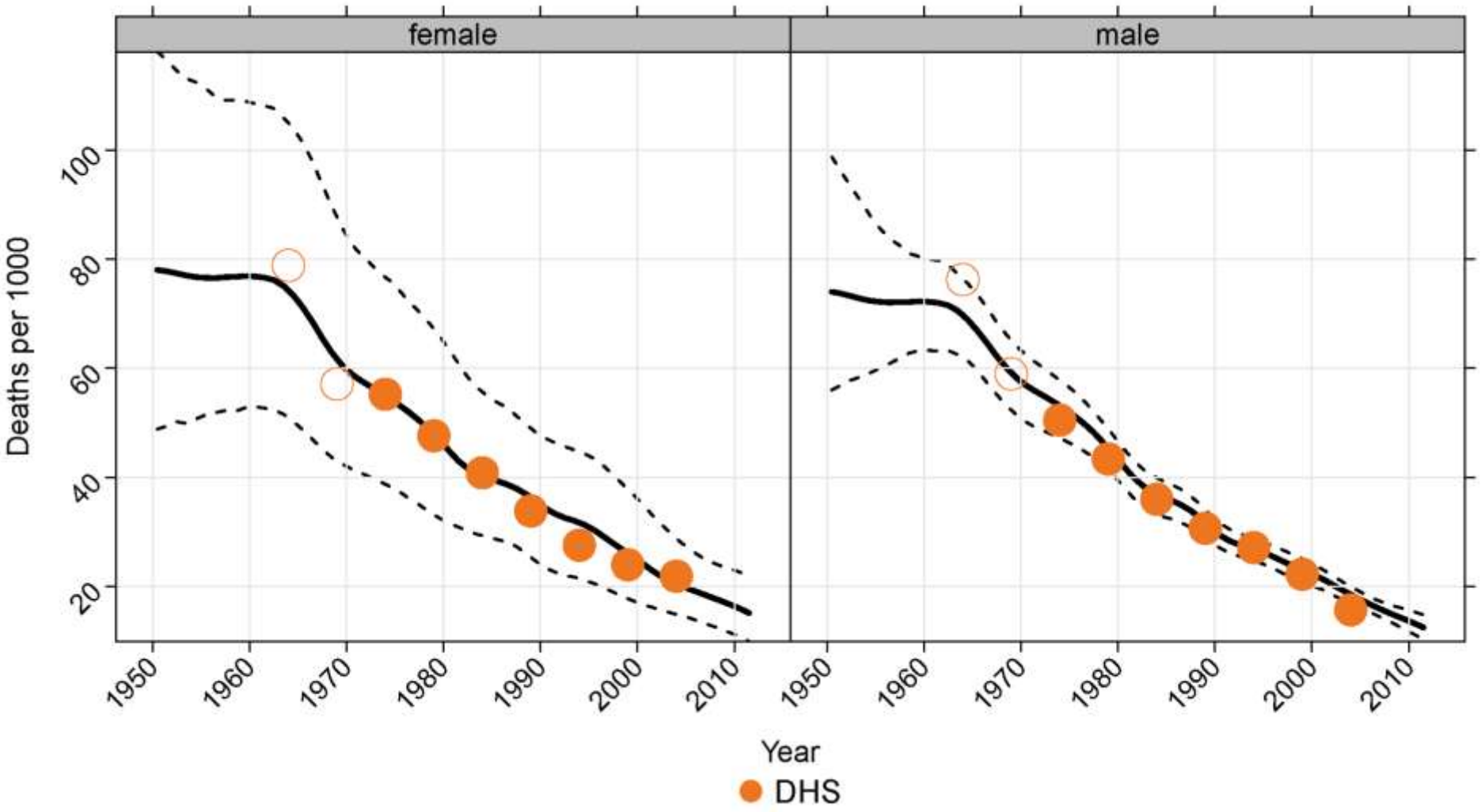

Adult mortality rate: Indonesia / males
Asia Southeast
Adult Mortality Rate (Deaths per 1,000)
100
150
200
250
300
1970
1980
1990
2000
2010
Year
Data Source and Type:
Gaussian Process Regression with Uncertainty
SUPAS − DDM Adjusted
SUSENAS − DDM Adjusted
Demographic and Health Survey − Sibling History
2000 Census Survey − Unadjusted
Indonesia Family Life Survey − Unadjusted
National Socioeconomic Survey − Unadjusted
*Hollow points indicate data excluded from the analysis


Adult mortality rate: Indonesia / females
Asia Southeast
Adult Mortality Rate (Deaths per 1,000)
100
150
200
250
300
1970
1980
1990
2000
2010
Year
Data Source and Type:
Gaussian Process Regression with Uncertainty
SUPAS − DDM Adjusted
SUSENAS − DDM Adjusted
Demographic and Health Survey − Sibling History
2000 Census Survey − Unadjusted
Indonesia Family Life Survey − Unadjusted
National Socioeconomic Survey − Unadjusted
*Hollow points indicate data excluded from the analysis

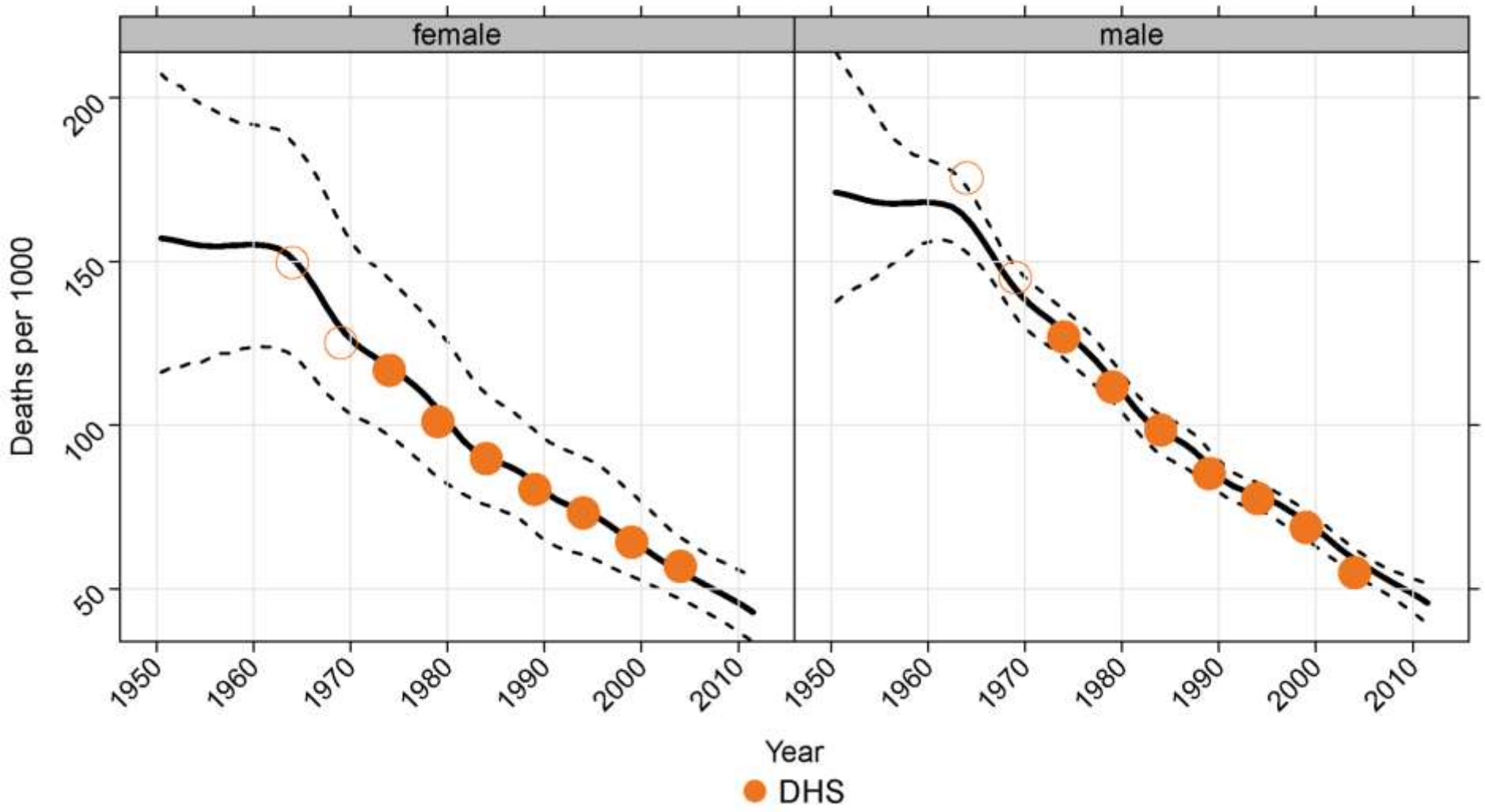
Indonesia – neonatal mortality rate

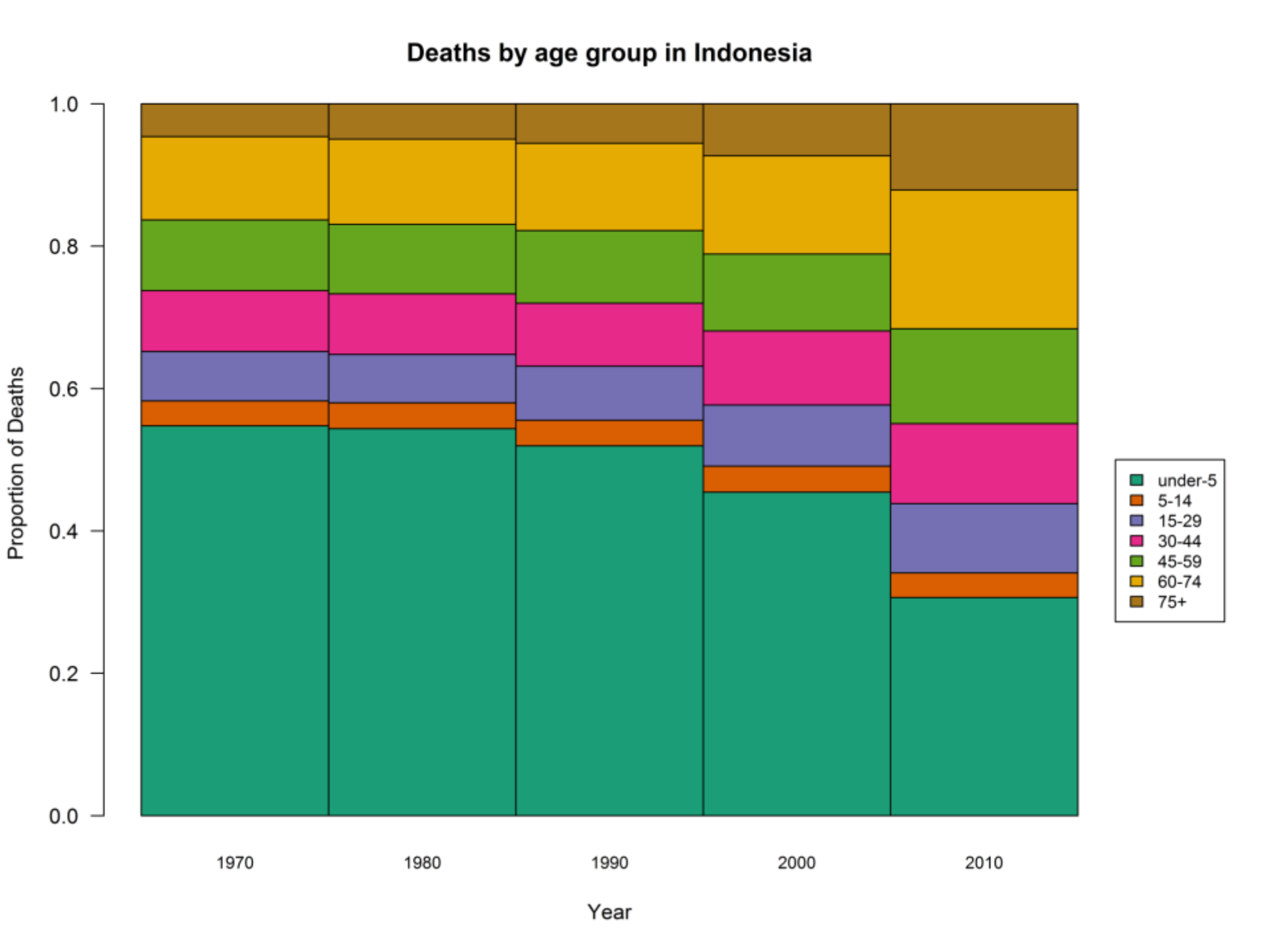


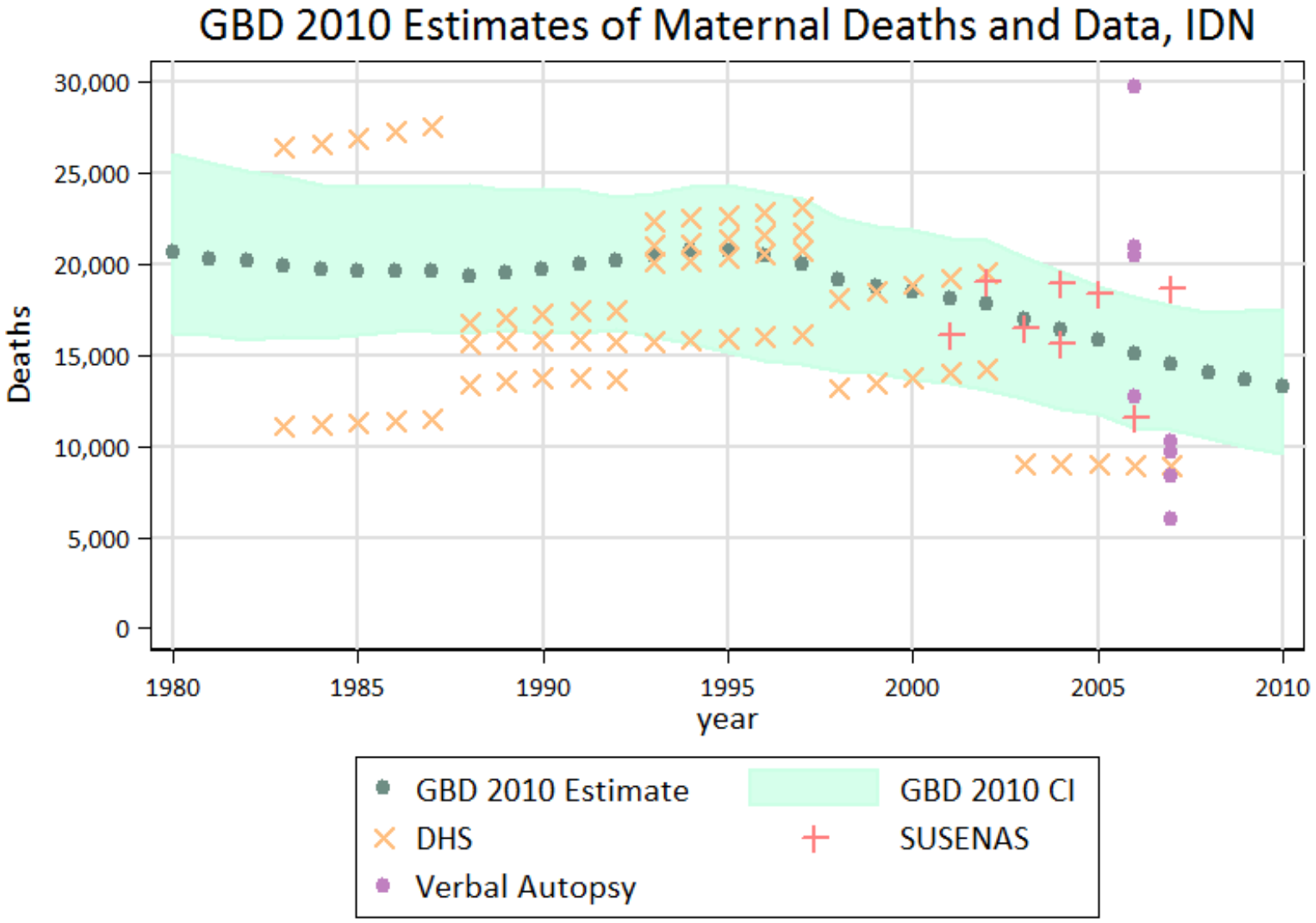
Indonesia – postneonatal mortality rate



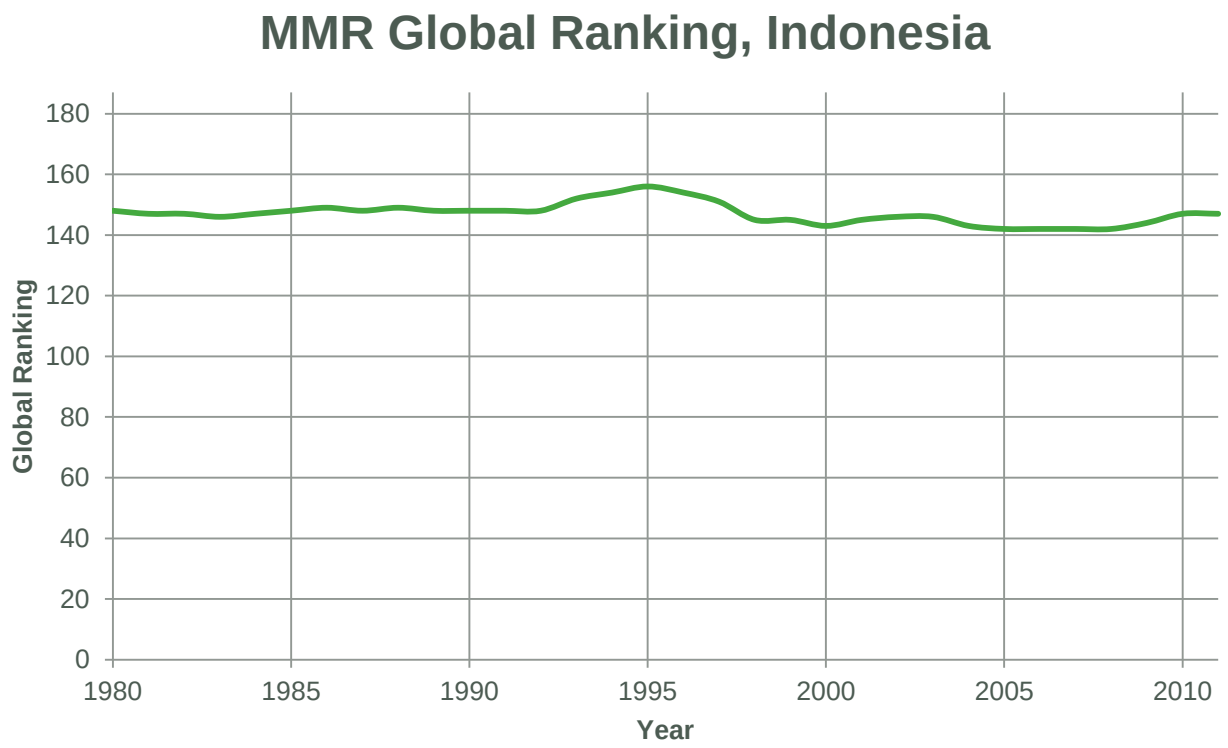
Indonesia – infant mortality rate



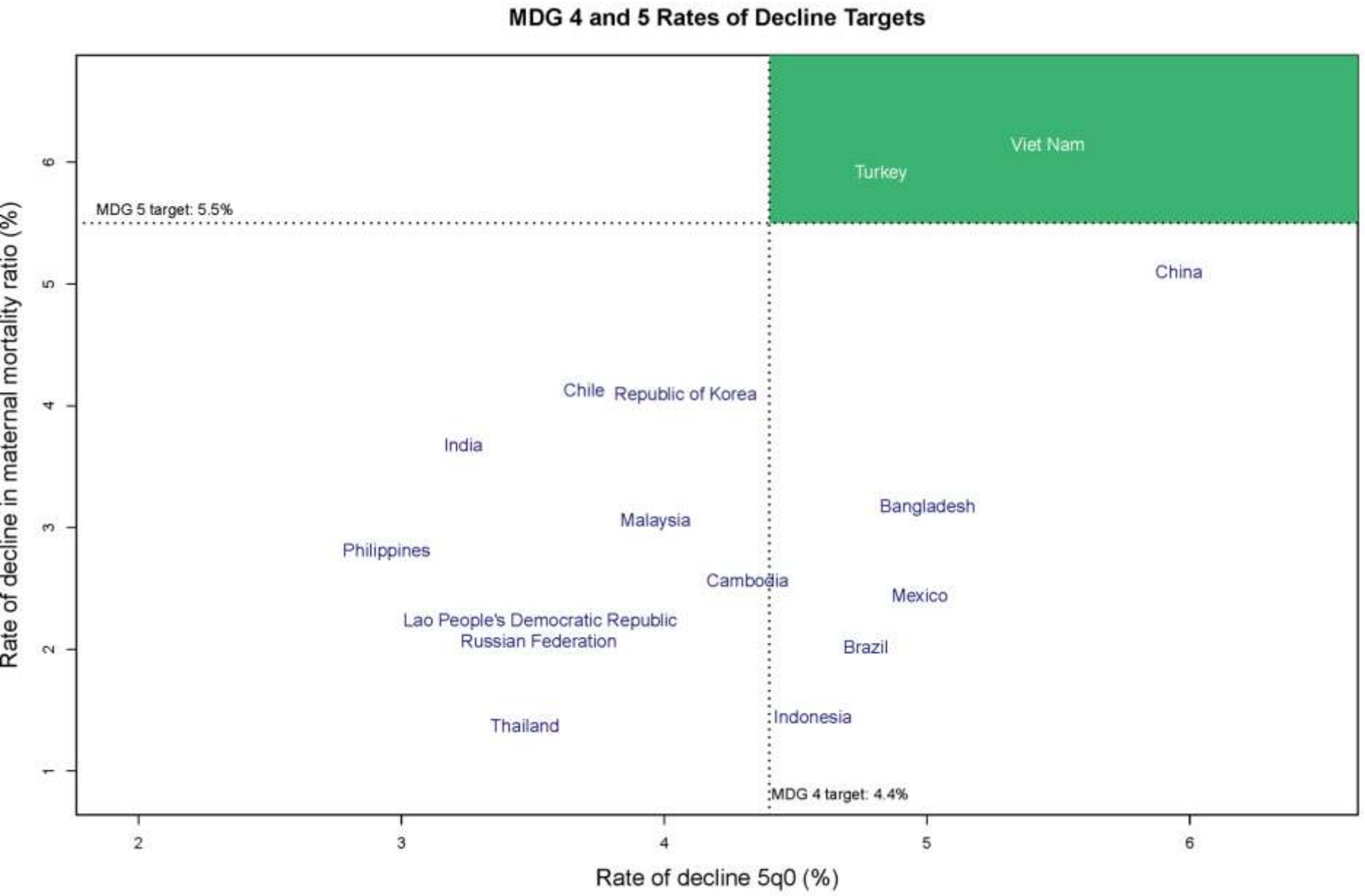

Deaths by age group in Indonesia
Proportion of Deaths
1.0
0.8
0.6
0.4
0.2
0.0
1970
1980
1990
2000
2010
Year
under-5
5-14
15-29
30-44
45-59
60-74
75+

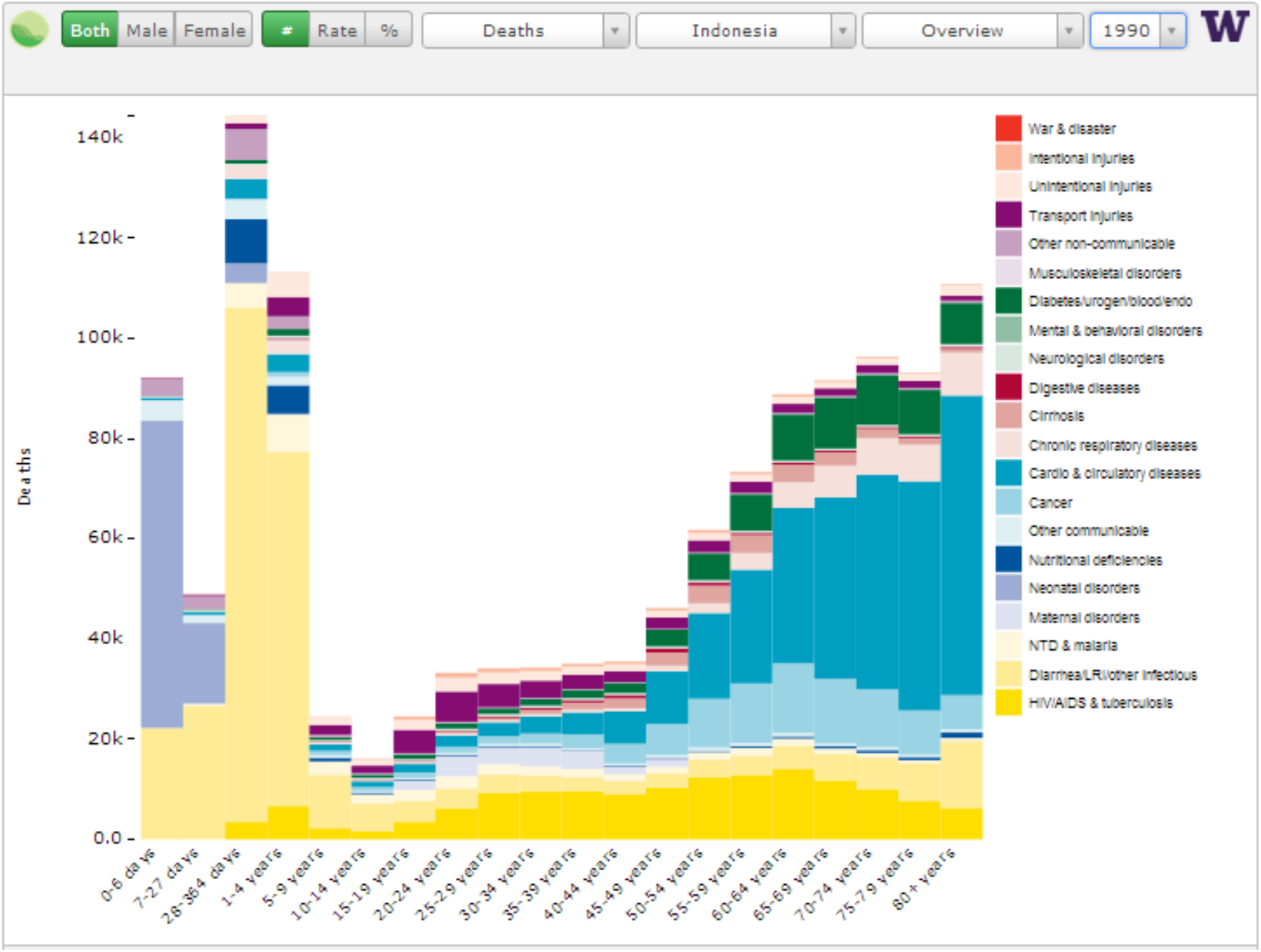

GBD 2010 Estimates of Maternal Deaths and Data, IDN
Deaths
30,000
25,000
20,000
15,000
10,000
5,000
0
1980
1985
1990
1995
2000
2005
2010
year
GBD 2010 Estimate
GBD 2010 CI
DHS
SUSENAS
Verbal Autopsy

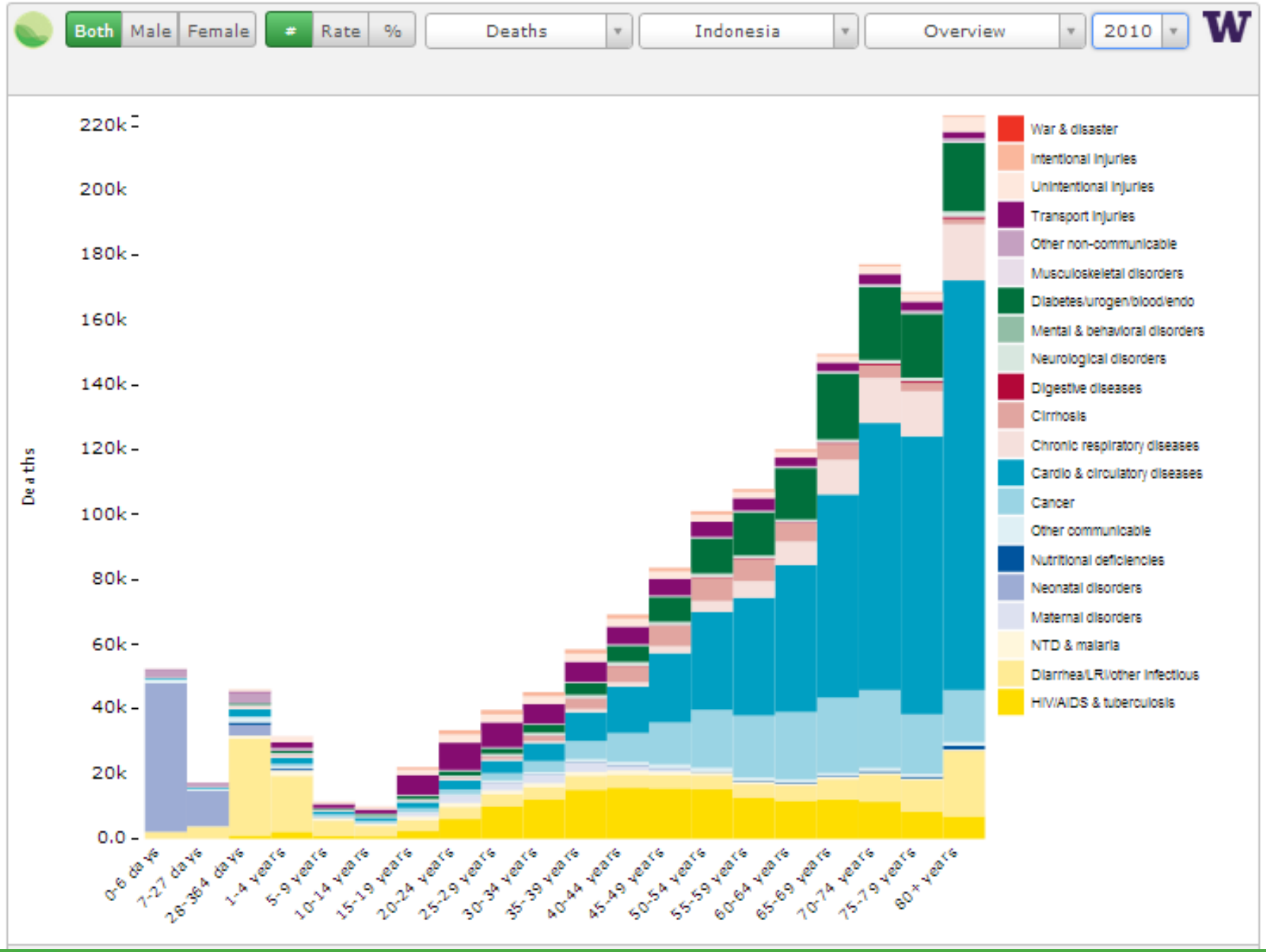
- Annualized % decline in MMR 2000-2011: 2.6
  - On track to meet MDG 5 Target by 2015: 5.5
- 2010 MMR = 309.5

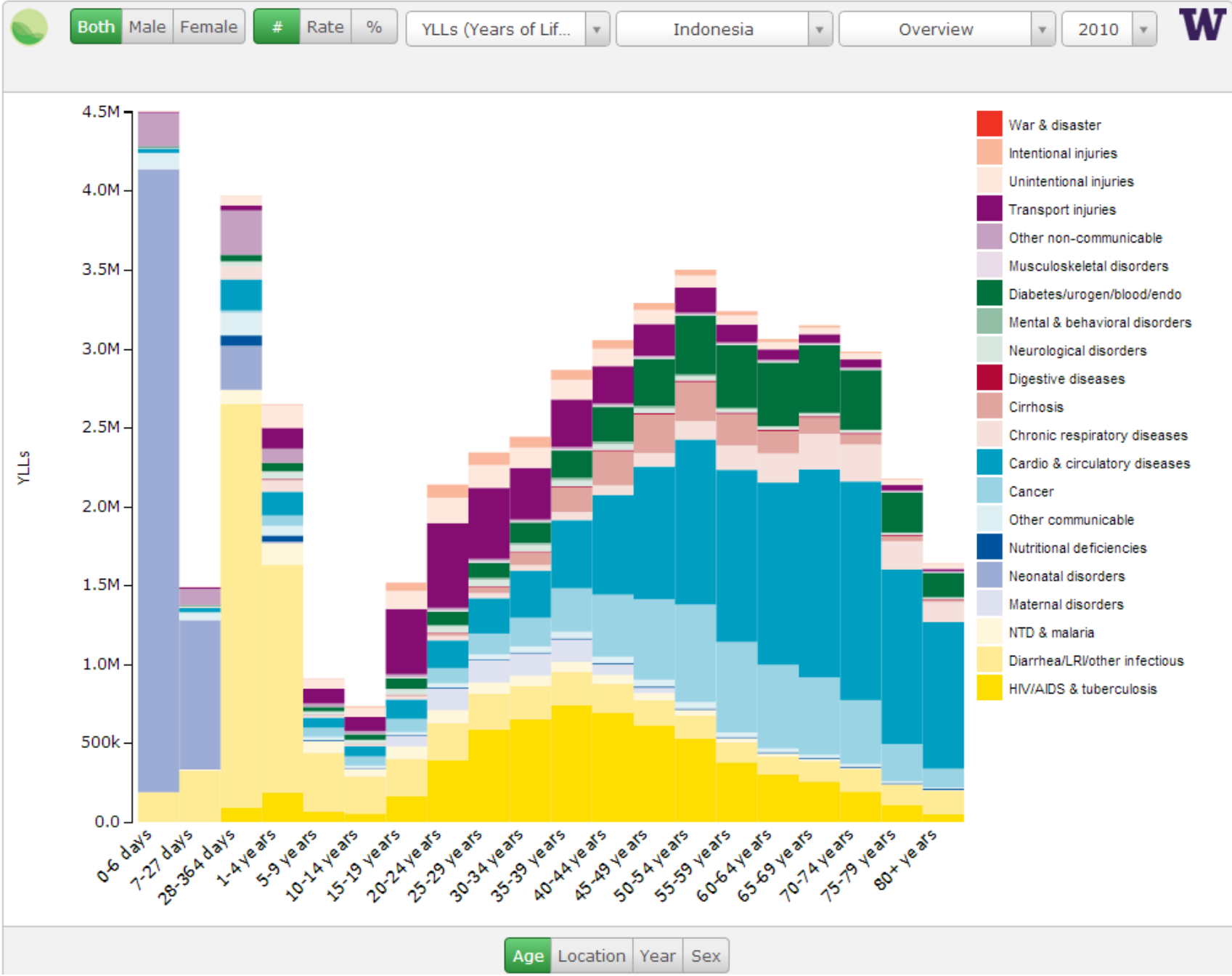


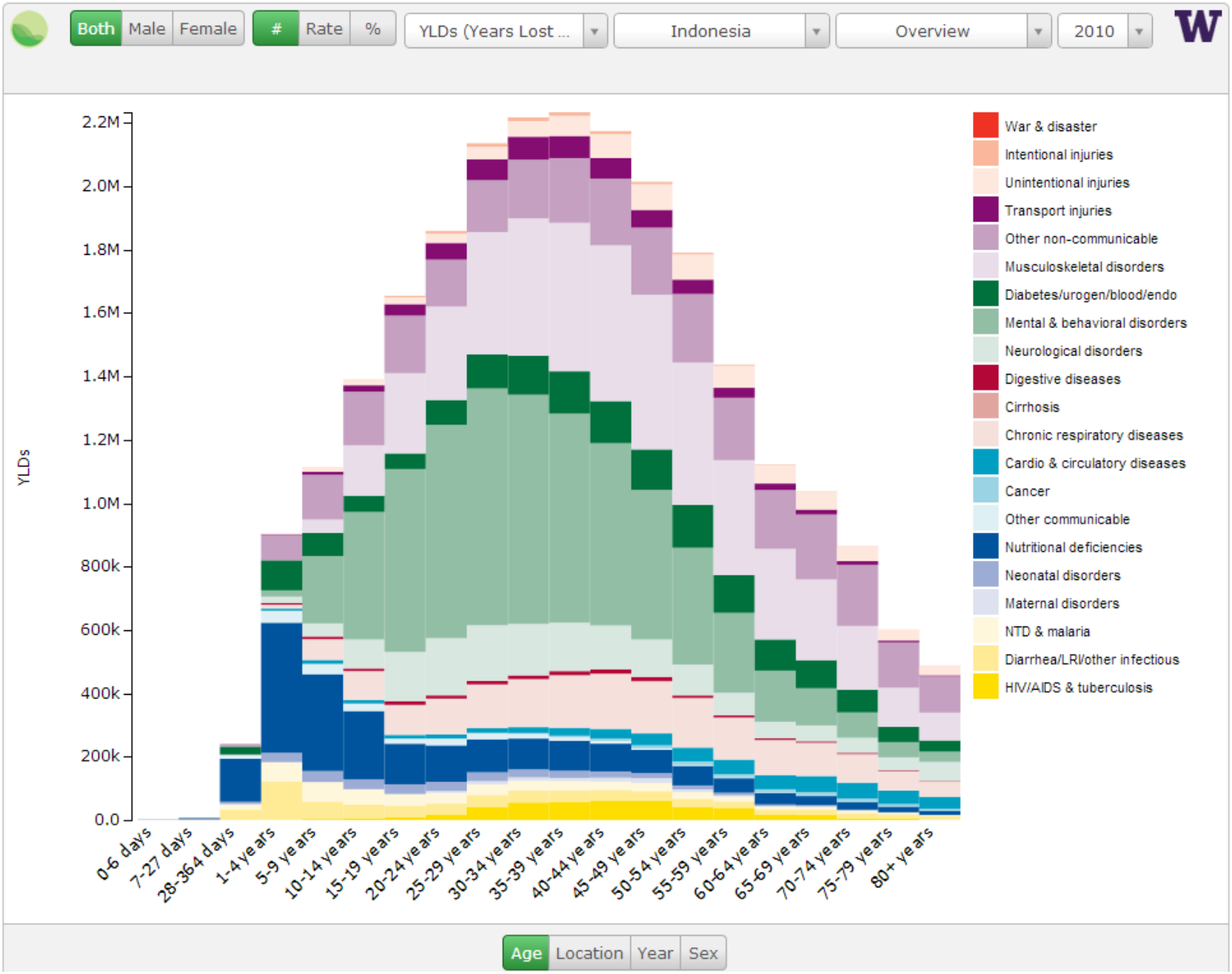
- 147th of 187 countries for 2010
- Countries with similar MMR:
  - Togo (322), Kenya (317),Benin (306), Ghana (304), Laos (299)

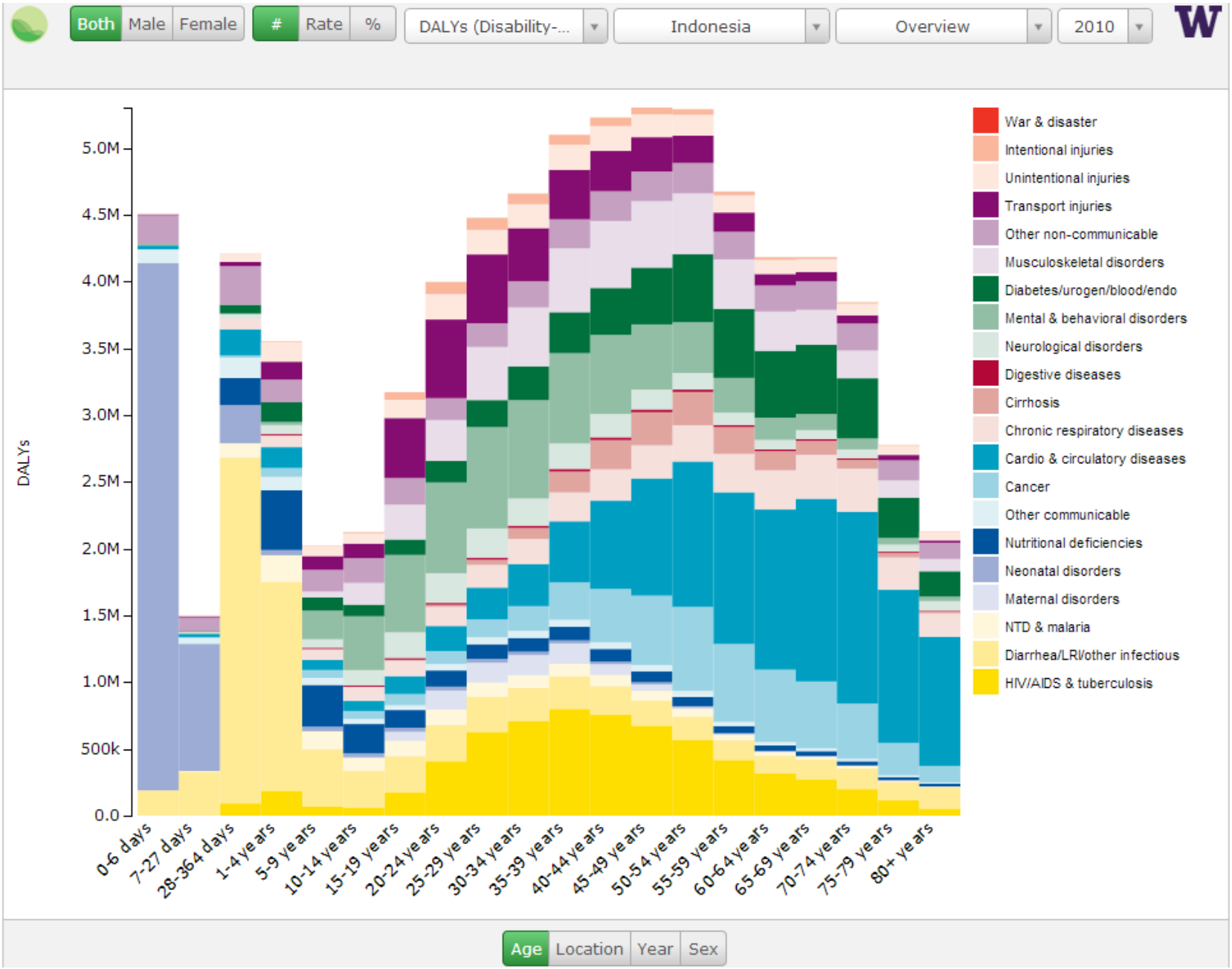

MDG 4 and 5 Rates of Decline Targets
Rate of decline in maternal mortality ratio (%)
Rate of decline 5q0 (%)
MDG 5 target: 5.5%
MDG 4 target: 4.4%
Viet Nam
Turkey
China
Chile
Republic of Korea
India
Bangladesh
Malaysia
Philippines
Cambodia
Mexico
Lao People's Democratic Republic
Russian Federation
Brazil
Indonesia
Thailand
1
2
3
4
5
6


Both
Male
Female
#
Rate
%
Deaths
Indonesia
Overview
1990
Deaths
140k
120k
100k
80k
60k
40k
20k
0.0
0-6 days
7-27 days
28-364 days
1-4 years
5-9 years
10-14 years
15-19 years
20-24 years
25-29 years
30-34 years
35-39 years
40-44 years
45-49 years
50-54 years
55-59 years
60-64 years
65-69 years
70-74 years
75-79 years
80+ years
War & disaster
Intentional injuries
Unintentional injuries
Transport injuries
Other non-communicable
Musculoskeletal disorders
Diabetes/urogen/blood/endo
Mental & behavioral disorders
Neurological disorders
Digestive diseases
Cirrhosis
Chronic respiratory diseases
Cardio & circulatory diseases
Cancer
Other communicable
Nutritional deficiencies
Neonatal disorders
Maternal disorders
NTD & malaria
Diarrhea/LRI/other infectious
HIV/AIDS & tuberculosis


Both
Male
Female
#
Rate
%
Deaths
Indonesia
Overview
2010
Deaths
220k
200k
180k
160k
140k
120k
100k
80k
60k
40k
20k
0.0
0-6 days
7-27 days
28-364 days
1-4 years
5-9 years
10-14 years
15-19 years
20-24 years
25-29 years
30-34 years
35-39 years
40-44 years
45-49 years
50-54 years
55-59 years
60-64 years
65-69 years
70-74 years
75-79 years
80+ years
War & disaster
Intentional injuries
Unintentional injuries
Transport injuries
Other non-communicable
Musculoskeletal disorders
Diabetes/urogen/blood/endo
Mental & behavioral disorders
Neurological disorders
Digestive diseases
Cirrhosis
Chronic respiratory diseases
Cardio & circulatory diseases
Cancer
Other communicable
Nutritional deficiencies
Neonatal disorders
Maternal disorders
NTD & malaria
Diarrhea/LRI/other infectious
HIV/AIDS & tuberculosis

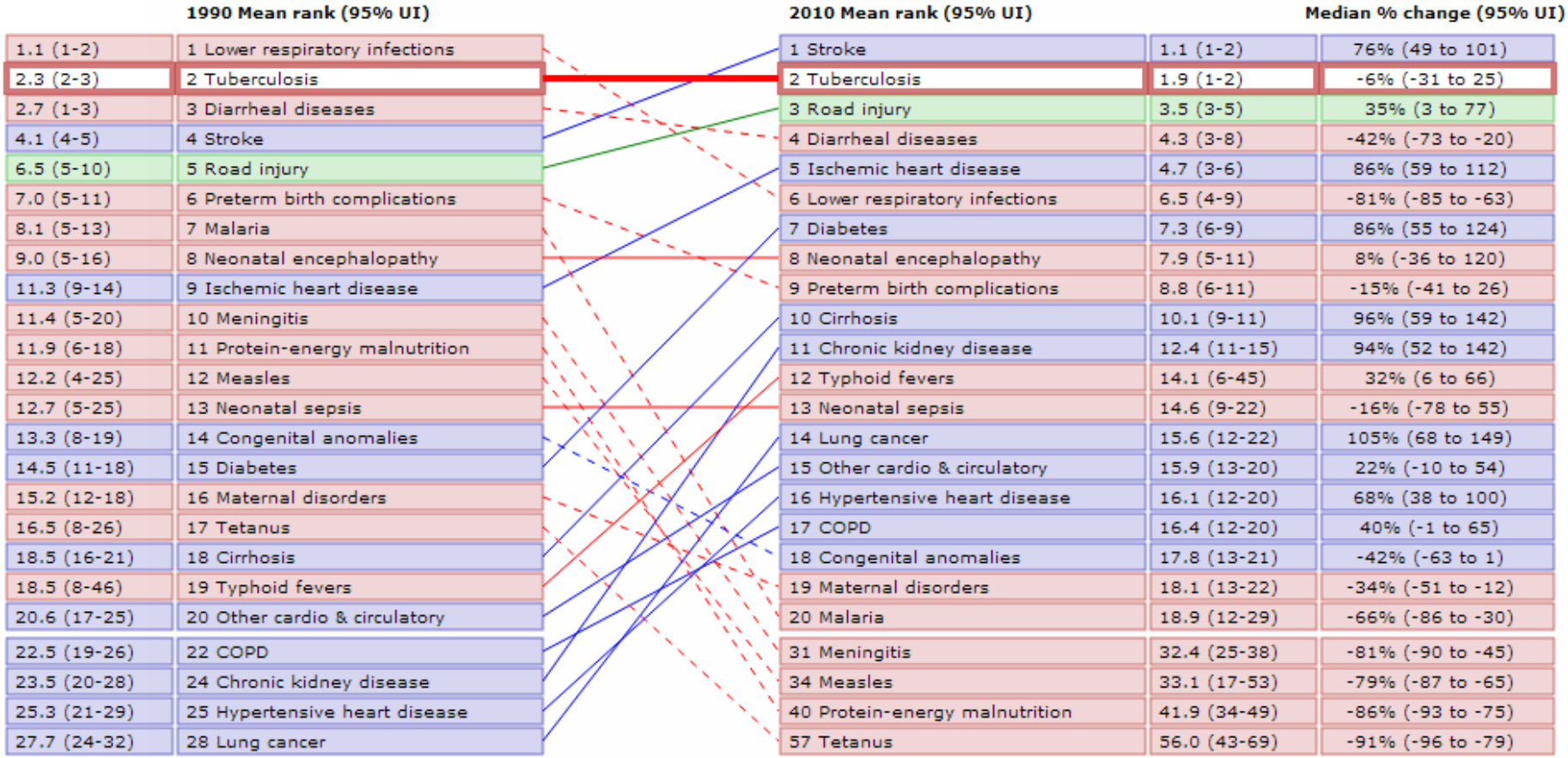

Both
Male
Female
#
Rate
%
YLLs (Years of Lif...
Indonesia
Overview
2010
4.5M
4.0M
3.5M
3.0M
2.5M
2.0M
1.5M
1.0M
500k
0.0
YLLs
0-6 days
7-27 days
28-364 days
1-4 years
5-9 years
10-14 years
15-19 years
20-24 years
25-29 years
30-34 years
35-39 years
40-44 years
45-49 years
50-54 years
55-59 years
60-64 years
65-69 years
70-74 years
75-79 years
80+ years
War & disaster
Intentional injuries
Unintentional injuries
Transport injuries
Other non-communicable
Musculoskeletal disorders
Diabetes/urogen/blood/endo
Mental & behavioral disorders
Neurological disorders
Digestive diseases
Cirrhosis
Chronic respiratory diseases
Cardio & circulatory diseases
Cancer
Other communicable
Nutritional deficiencies
Neonatal disorders
Maternal disorders
NTD & malaria
Diarrhea/LRI/other infectious
HIV/AIDS & tuberculosis
Age
Location
Year
Sex


Both
Male
Female
#
Rate
%
YLDs (Years Lost ...
Indonesia
Overview
2010
YLDs
2.2M
2.0M
1.8M
1.6M
1.4M
1.2M
1.0M
800k
600k
400k
200k
0.0
0-6 days
7-27 days
28-364 days
1-4 years
5-9 years
10-14 years
15-19 years
20-24 years
25-29 years
30-34 years
35-39 years
40-44 years
45-49 years
50-54 years
55-59 years
60-64 years
65-69 years
70-74 years
75-79 years
80+ years
War & disaster
Intentional injuries
Unintentional injuries
Transport injuries
Other non-communicable
Musculoskeletal disorders
Diabetes/urogen/blood/endo
Mental & behavioral disorders
Neurological disorders
Digestive diseases
Cirrhosis
Chronic respiratory diseases
Cardio & circulatory diseases
Cancer
Other communicable
Nutritional deficiencies
Neonatal disorders
Maternal disorders
NTD & malaria
Diarrhea/LRI/other infectious
HIV/AIDS & tuberculosis
Age
Location
Year
Sex


Both
Male
Female
#
Rate
%
DALYs (Disability-...
Indonesia
Overview
2010
DALYs
5.0M
4.5M
4.0M
3.5M
3.0M
2.5M
2.0M
1.5M
1.0M
500k
0.0
0-6 days
7-27 days
28-364 days
1-4 years
5-9 years
10-14 years
15-19 years
20-24 years
25-29 years
30-34 years
35-39 years
40-44 years
45-49 years
50-54 years
55-59 years
60-64 years
65-69 years
70-74 years
75-79 years
80+ years
War & disaster
Intentional injuries
Unintentional injuries
Transport injuries
Other non-communicable
Musculoskeletal disorders
Diabetes/urogen/blood/endo
Mental & behavioral disorders
Neurological disorders
Digestive diseases
Cirrhosis
Chronic respiratory diseases
Cardio & circulatory diseases
Cancer
Other communicable
Nutritional deficiencies
Neonatal disorders
Maternal disorders
NTD & malaria
Diarrhea/LRI/other infectious
HIV/AIDS & tuberculosis
Age
Location
Year
Sex

Indonesia | Top 20 | Causes | Risks

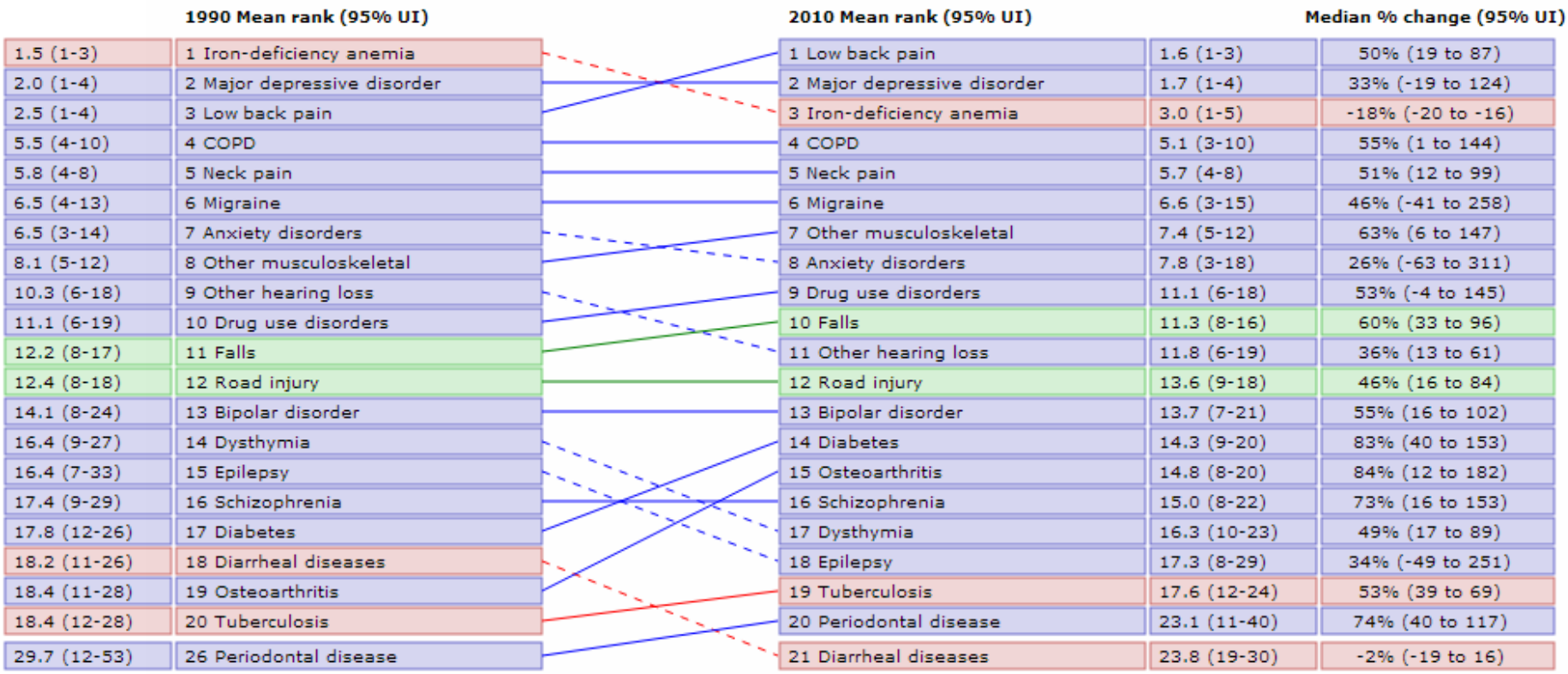
Both | Male | Female | YLL (Years of Life Lost) | All ages



1990 Mean rank (95% UI)		2010 Mean rank (95% UI)		Median % change (95% UI)
1.1 (1-2)	1 Lower respiratory infections	1 Stroke	1.1 (1-2)	76% (49 to 101)
2.3 (2-3)	2 Tuberculosis	2 Tuberculosis	1.9 (1-2)	-6% (-31 to 25)
2.7 (1-3)	3 Diarrheal diseases	3 Road injury	3.5 (3-5)	35% (3 to 77)
4.1 (4-5)	4 Stroke	4 Diarrheal diseases	4.3 (3-8)	-42% (-73 to -20)
6.5 (5-10)	5 Road injury	5 Ischemic heart disease	4.7 (3-6)	86% (59 to 112)
7.0 (5-11)	6 Preterm birth complications	6 Lower respiratory infections	6.5 (4-9)	-81% (-85 to -63)
8.1 (5-13)	7 Malaria	7 Diabetes	7.3 (6-9)	86% (55 to 124)
9.0 (5-16)	8 Neonatal encephalopathy	8 Neonatal encephalopathy	7.9 (5-11)	8% (-36 to 120)
11.3 (9-14)	9 Ischemic heart disease	9 Preterm birth complications	8.8 (6-11)	-15% (-41 to 26)
11.4 (5-20)	10 Meningitis	10 Cirrhosis	10.1 (9-11)	96% (59 to 142)
11.9 (6-18)	11 Protein-energy malnutrition	11 Chronic kidney disease	12.4 (11-15)	94% (52 to 142)
12.2 (4-25)	12 Measles	12 Typhoid fevers	14.1 (6-45)	32% (6 to 66)
12.7 (5-25)	13 Neonatal sepsis	13 Neonatal sepsis	14.6 (9-22)	-16% (-78 to 55)
13.3 (8-19)	14 Congenital anomalies	14 Lung cancer	15.6 (12-22)	105% (68 to 149)
14.5 (11-18)	15 Diabetes	15 Other cardio & circulatory	15.9 (13-20)	22% (-10 to 54)
15.2 (12-18)	16 Maternal disorders	16 Hypertensive heart disease	16.1 (12-20)	68% (38 to 100)
16.5 (8-26)	17 Tetanus	17 COPD	16.4 (12-20)	40% (-1 to 65)
18.5 (16-21)	18 Cirrhosis	18 Congenital anomalies	17.8 (13-21)	-42% (-63 to 1)
18.5 (8-46)	19 Typhoid fevers	19 Maternal disorders	18.1 (13-22)	-34% (-51 to -12)
20.6 (17-25)	20 Other cardio & circulatory	20 Malaria	18.9 (12-29)	-66% (-86 to -30)
22.5 (19-26)	22 COPD	31 Meningitis	32.4 (25-38)	-81% (-90 to -45)
23.5 (20-28)	24 Chronic kidney disease	34 Measles	33.1 (17-53)	-79% (-87 to -65)
25.3 (21-29)	25 Hypertensive heart disease	40 Protein-energy malnutrition	41.9 (34-49)	-86% (-93 to -75)
27.7 (24-32)	28 Lung cancer	57 Tetanus	56.0 (43-69)	-91% (-96 to -79)

Indonesia | Top 20 | Causes | Risks

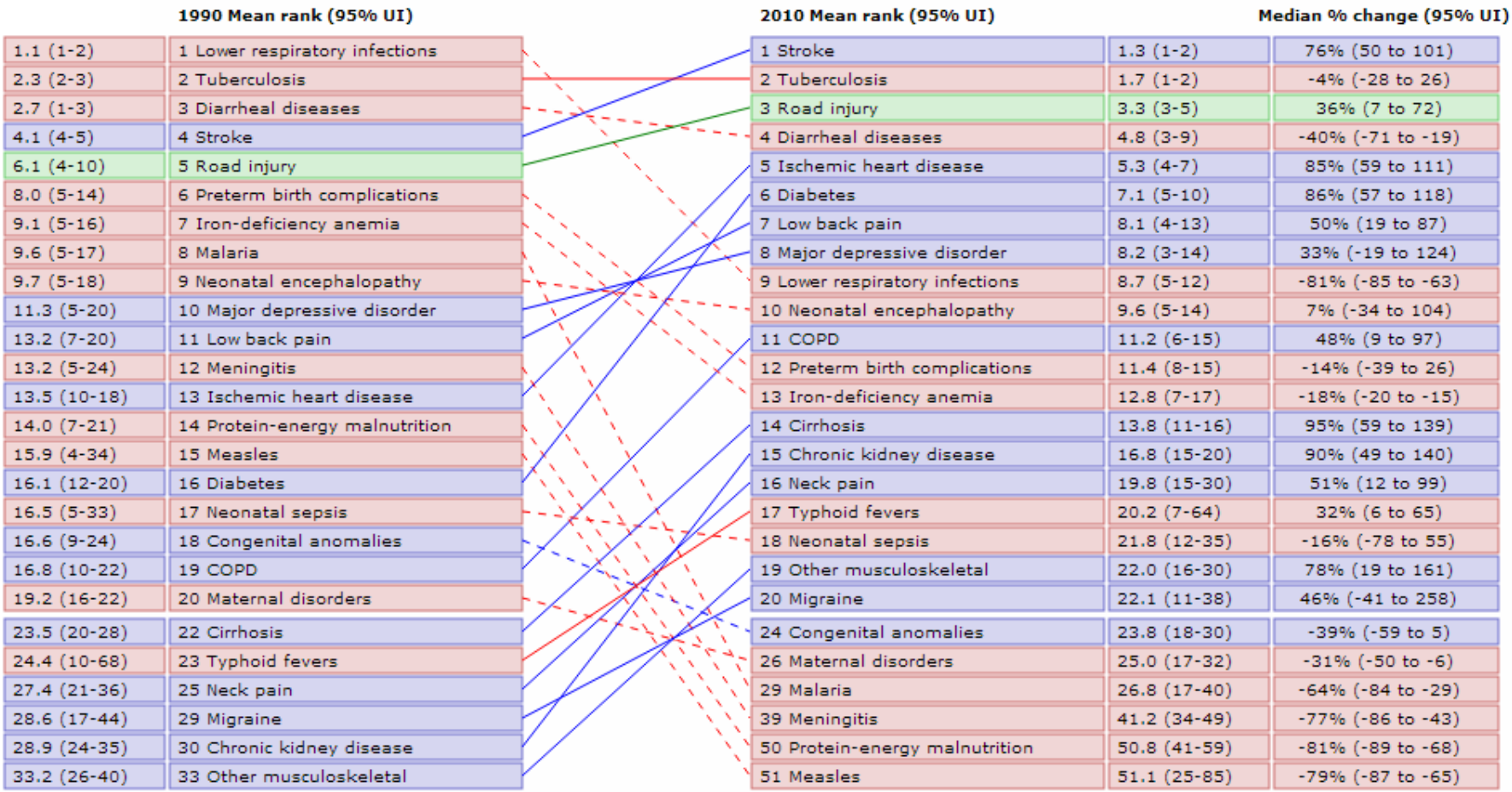
Both | Male | Female | YLD (Years Lost due to Disability) | All ages



1990 Mean rank (95% UI)		2010 Mean rank (95% UI)		Median % change (95% UI)
1.5 (1-3)	1 Iron-deficiency anemia	1 Low back pain	1.6 (1-3)	50% (19 to 87)
2.0 (1-4)	2 Major depressive disorder	2 Major depressive disorder	1.7 (1-4)	33% (-19 to 124)
2.5 (1-4)	3 Low back pain	3 Iron-deficiency anemia	3.0 (1-5)	-18% (-20 to -16)
5.5 (4-10)	4 COPD	4 COPD	5.1 (3-10)	55% (1 to 144)
5.8 (4-8)	5 Neck pain	5 Neck pain	5.7 (4-8)	51% (12 to 99)
6.5 (4-13)	6 Migraine	6 Migraine	6.6 (3-15)	46% (-41 to 258)
6.5 (3-14)	7 Anxiety disorders	7 Other musculoskeletal	7.4 (5-12)	63% (6 to 147)
8.1 (5-12)	8 Other musculoskeletal	8 Anxiety disorders	7.8 (3-18)	26% (-63 to 311)
10.3 (6-18)	9 Other hearing loss	9 Drug use disorders	11.1 (6-18)	53% (-4 to 145)
11.1 (6-19)	10 Drug use disorders	10 Falls	11.3 (8-16)	60% (33 to 96)
12.2 (8-17)	11 Falls	11 Other hearing loss	11.8 (6-19)	36% (13 to 61)
12.4 (8-18)	12 Road injury	12 Road injury	13.6 (9-18)	46% (16 to 84)
14.1 (8-24)	13 Bipolar disorder	13 Bipolar disorder	13.7 (7-21)	55% (16 to 102)
16.4 (9-27)	14 Dysthymia	14 Diabetes	14.3 (9-20)	83% (40 to 153)
16.4 (7-33)	15 Epilepsy	15 Osteoarthritis	14.8 (8-20)	84% (12 to 182)
17.4 (9-29)	16 Schizophrenia	16 Schizophrenia	15.0 (8-22)	73% (16 to 153)
17.8 (12-26)	17 Diabetes	17 Dysthymia	16.3 (10-23)	49% (17 to 89)
18.2 (11-26)	18 Diarrheal diseases	18 Epilepsy	17.3 (8-29)	34% (-49 to 251)
18.4 (11-28)	19 Osteoarthritis	19 Tuberculosis	17.6 (12-24)	53% (39 to 69)
18.4 (12-28)	20 Tuberculosis	20 Periodontal disease	23.1 (11-40)	74% (40 to 117)
29.7 (12-53)	26 Periodontal disease	21 Diarrheal diseases	23.8 (19-30)	-2% (-19 to 16)

Indonesia | Top 20 | Causes | Risks

Both | Male | Female | DALY (Disability-Adjusted Life Ye... | All ages



1990 Mean rank (95% UI)		2010 Mean rank (95% UI)		Median % change (95% UI)
1.1 (1-2)	1 Lower respiratory infections	1 Stroke	1.3 (1-2)	76% (50 to 101)
2.3 (2-3)	2 Tuberculosis	2 Tuberculosis	1.7 (1-2)	-4% (-28 to 26)
2.7 (1-3)	3 Diarrheal diseases	3 Road injury	3.3 (3-5)	36% (7 to 72)
4.1 (4-5)	4 Stroke	4 Diarrheal diseases	4.8 (3-9)	-40% (-71 to -19)
6.1 (4-10)	5 Road injury	5 Ischemic heart disease	5.3 (4-7)	85% (59 to 111)
8.0 (5-14)	6 Preterm birth complications	6 Diabetes	7.1 (5-10)	86% (57 to 118)
9.1 (5-16)	7 Iron-deficiency anemia	7 Low back pain	8.1 (4-13)	50% (19 to 87)
9.6 (5-17)	8 Malaria	8 Major depressive disorder	8.2 (3-14)	33% (-19 to 124)
9.7 (5-18)	9 Neonatal encephalopathy	9 Lower respiratory infections	8.7 (5-12)	-81% (-85 to -63)
11.3 (5-20)	10 Major depressive disorder	10 Neonatal encephalopathy	9.6 (5-14)	7% (-34 to 104)
13.2 (7-20)	11 Low back pain	11 COPD	11.2 (6-15)	48% (9 to 97)
13.2 (5-24)	12 Meningitis	12 Preterm birth complications	11.4 (8-15)	-14% (-39 to 26)
13.5 (10-18)	13 Ischemic heart disease	13 Iron-deficiency anemia	12.8 (7-17)	-18% (-20 to -15)
14.0 (7-21)	14 Protein-energy malnutrition	14 Cirrhosis	13.8 (11-16)	95% (59 to 139)
15.9 (4-34)	15 Measles	15 Chronic kidney disease	16.8 (15-20)	90% (49 to 140)
16.1 (12-20)	16 Diabetes	16 Neck pain	19.8 (15-30)	51% (12 to 99)
16.5 (5-33)	17 Neonatal sepsis	17 Typhoid fevers	20.2 (7-64)	32% (6 to 65)
16.6 (9-24)	18 Congenital anomalies	18 Neonatal sepsis	21.8 (12-35)	-16% (-78 to 55)
16.8 (10-22)	19 COPD	19 Other musculoskeletal	22.0 (16-30)	78% (19 to 161)
19.2 (16-22)	20 Maternal disorders	20 Migraine	22.1 (11-38)	46% (-41 to 258)
23.5 (20-28)	22 Cirrhosis	24 Congenital anomalies	23.8 (18-30)	-39% (-59 to 5)
24.4 (10-68)	23 Typhoid fevers	26 Maternal disorders	25.0 (17-32)	-31% (-50 to -6)
27.4 (21-36)	25 Neck pain	29 Malaria	26.8 (17-40)	-64% (-84 to -29)
28.6 (17-44)	29 Migraine	39 Meningitis	41.2 (34-49)	-77% (-86 to -43)
28.9 (24-35)	30 Chronic kidney disease	50 Protein-energy malnutrition	50.8 (41-59)	-81% (-89 to -68)
33.2 (26-40)	33 Other musculoskeletal	51 Measles	51.1 (25-85)	-79% (-87 to -65)

Top Chart: Stacked Bar Ch...

Risk Factor Category: Overview

Metric: DALYs (Disabilit...

Place: Indonesia

Year: 2010

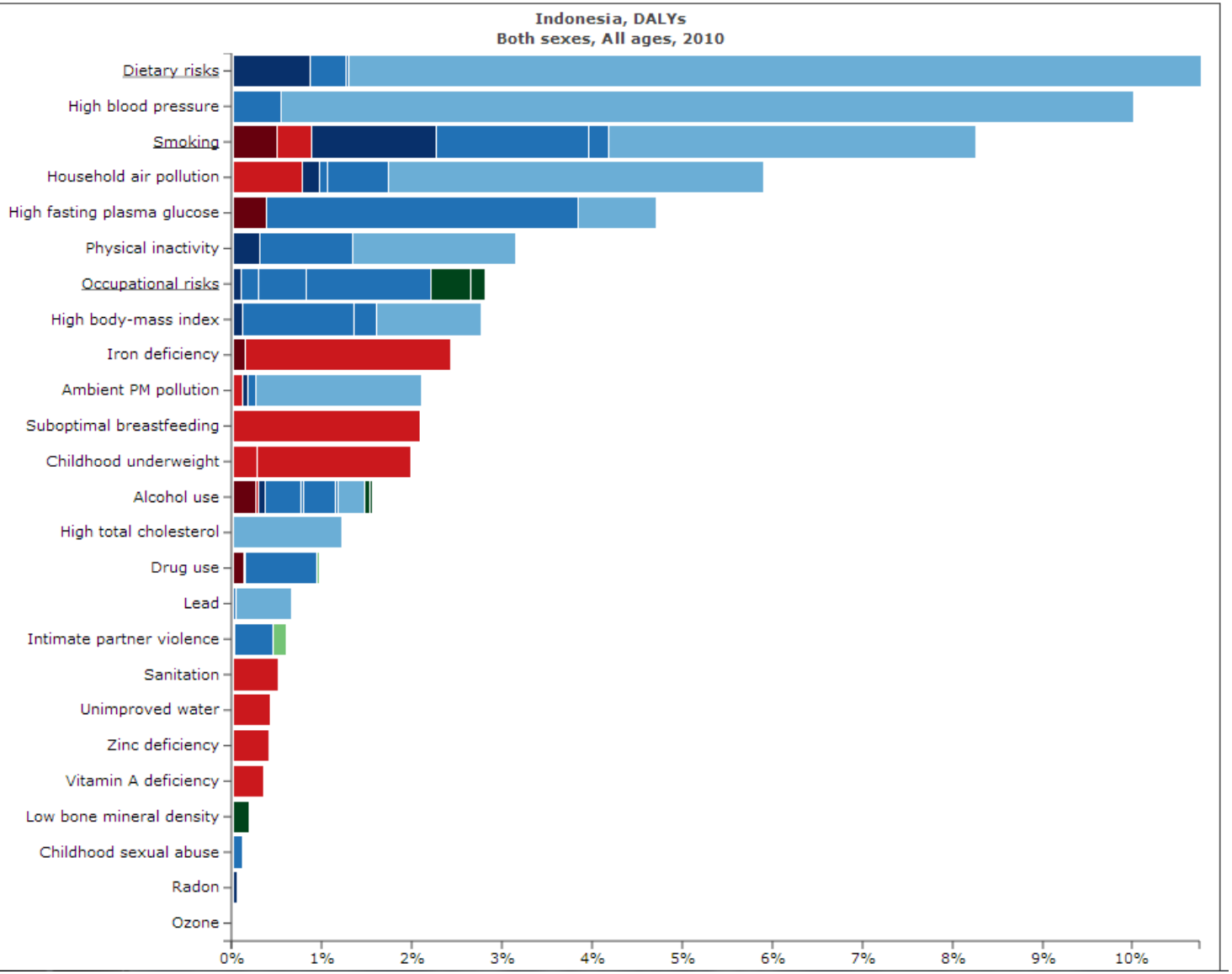
Age: All ages

Sex: Both | Male | Female

Units: # | Rate | %

Bar Order: Rank | Alphabetical

Bottom Chart: None selected



IHME | GHDx Share

GBD Compare

Top Chart Stacked Bar Ch...

Risk Factor Category
Dietary risks

Metric DALYs (Disabilit...

Place Indonesia

Year 2010

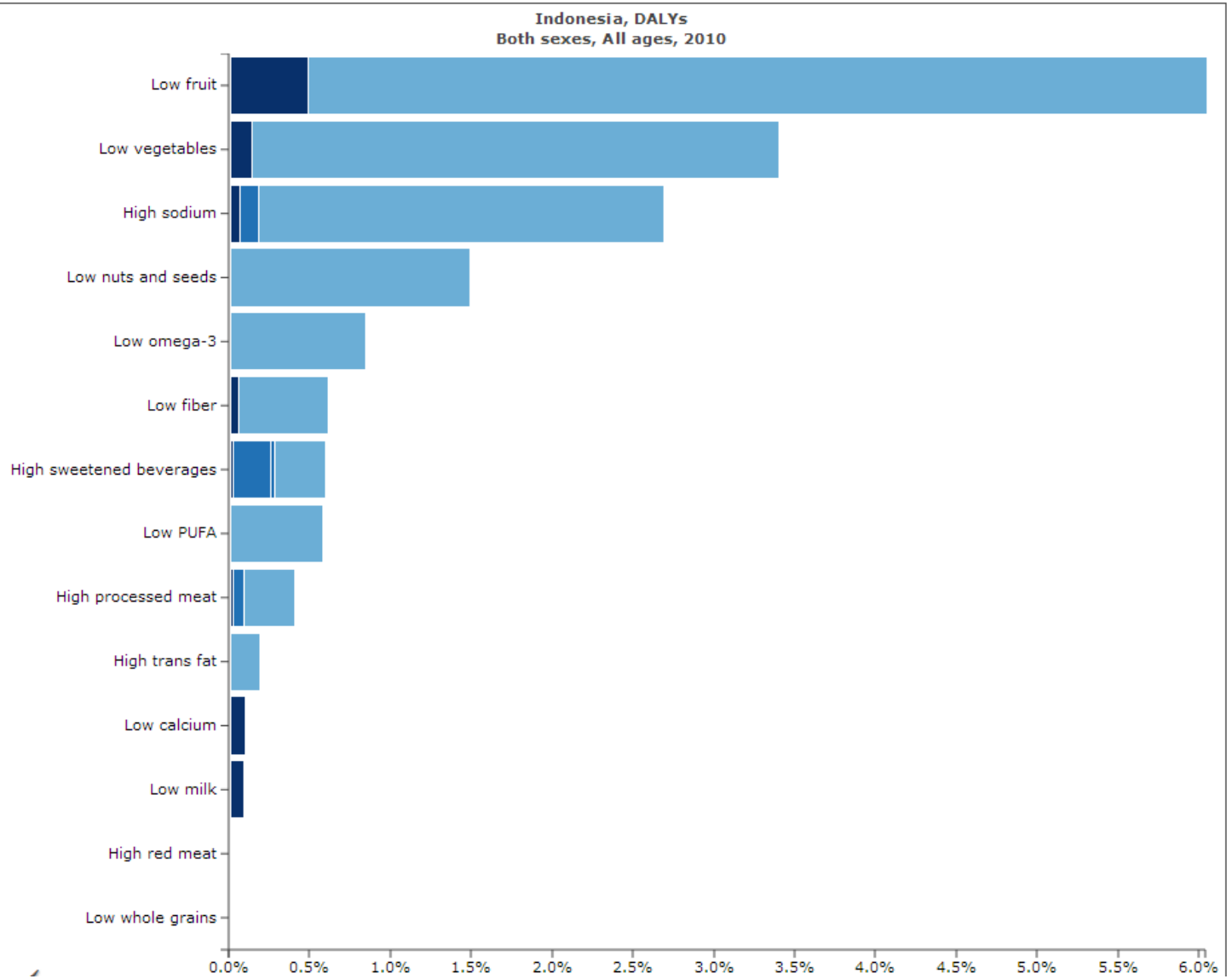
Age All ages

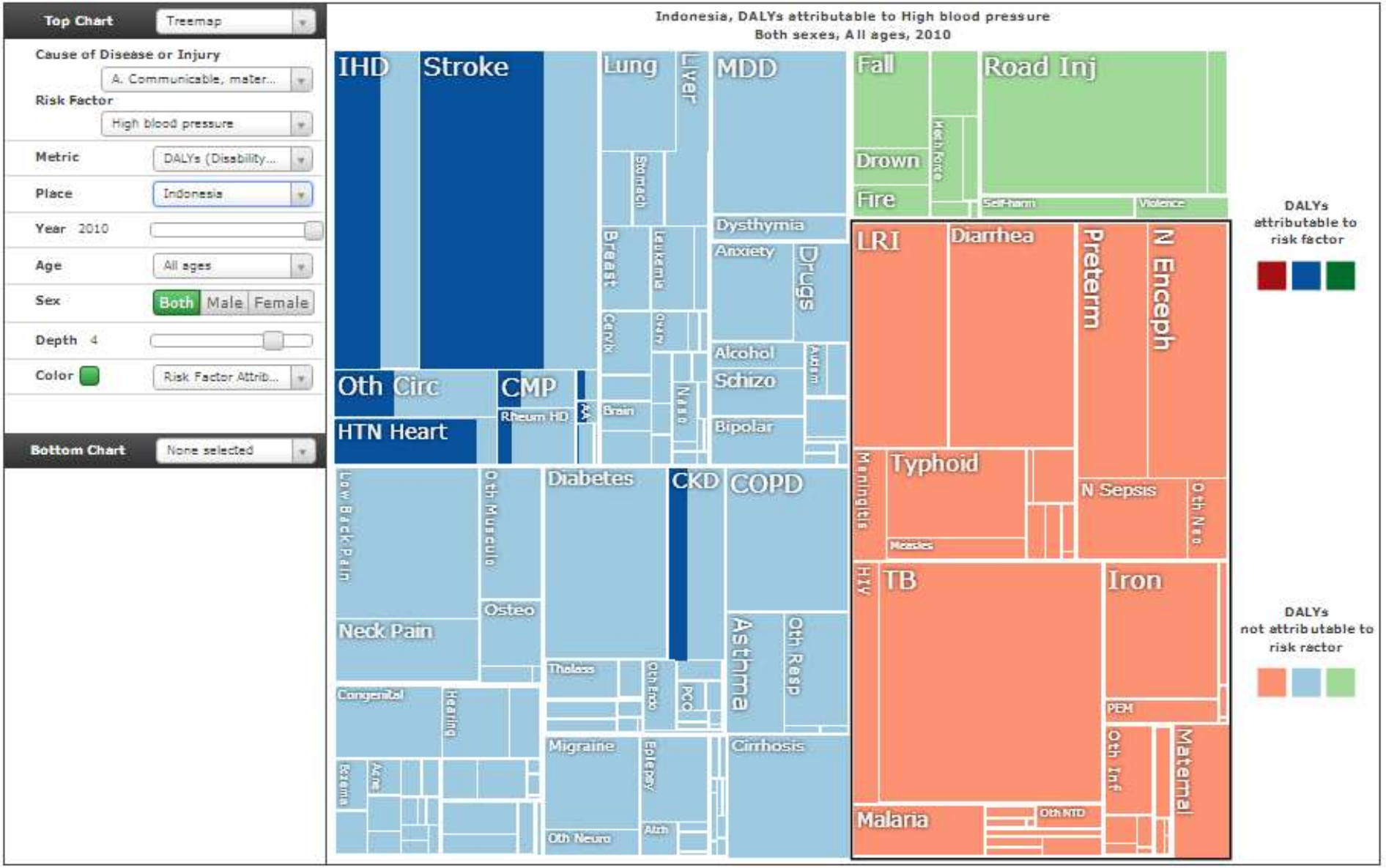
Sex Both | Male | Female

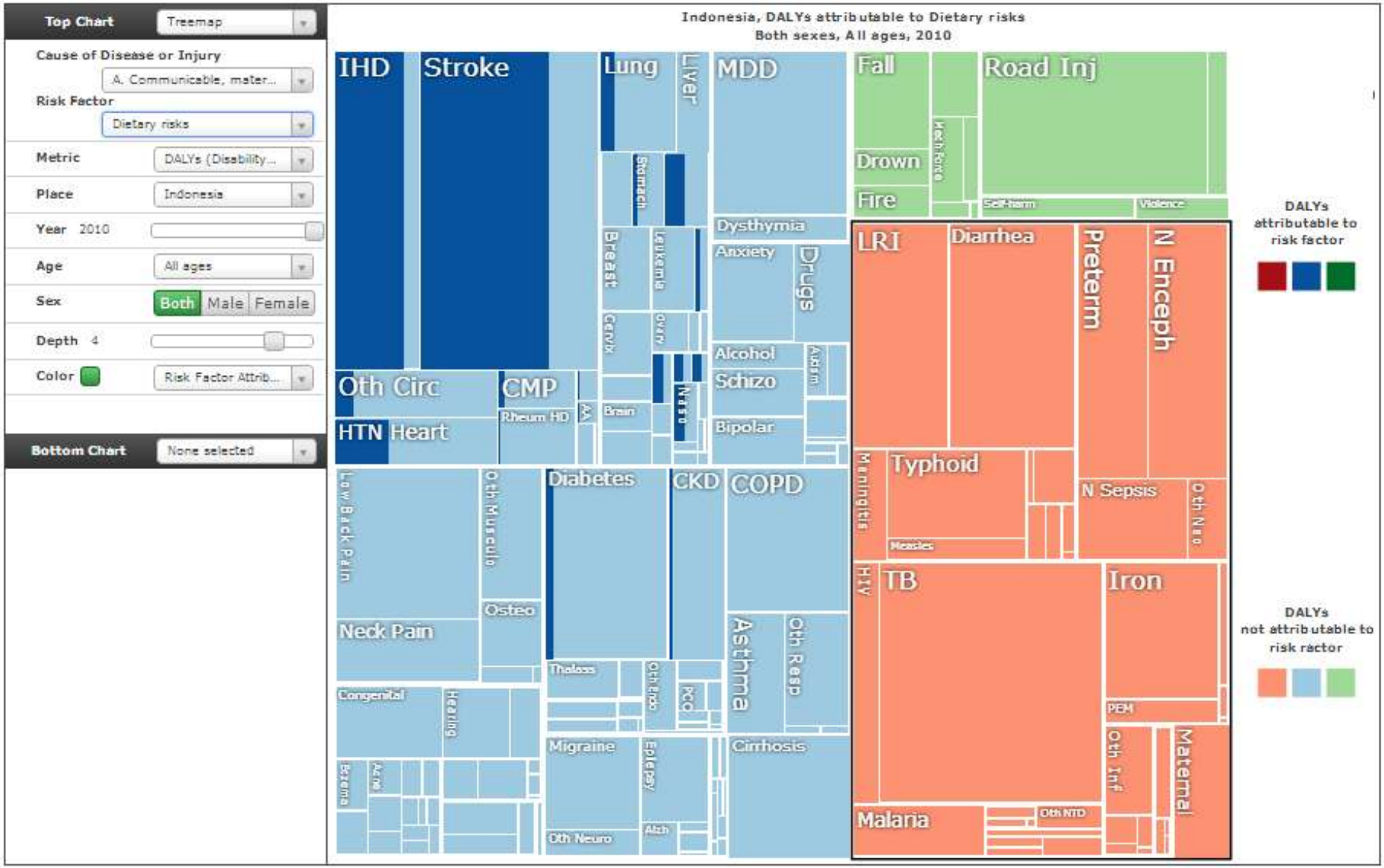
Units # | Rate | %

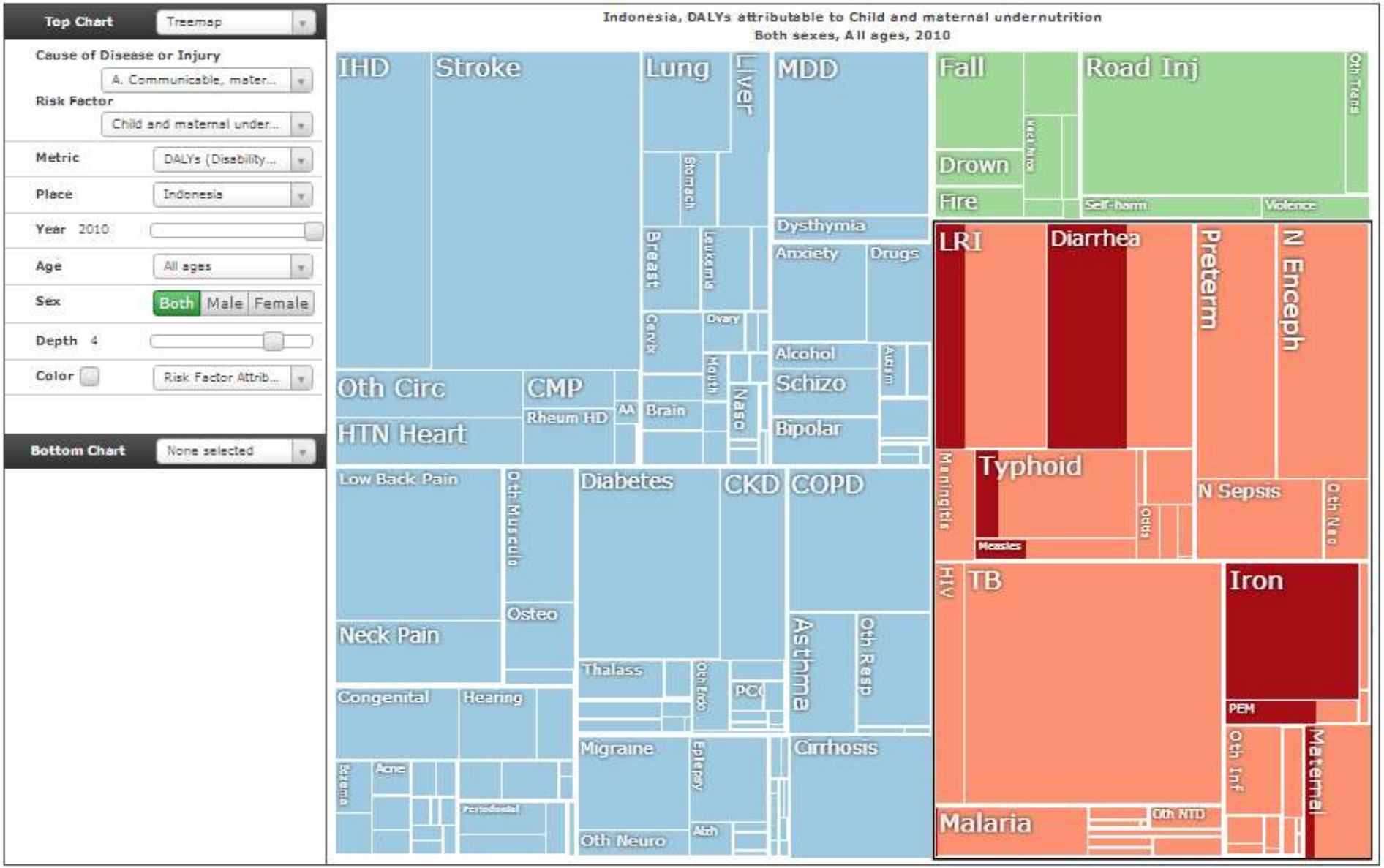
Bar Order Rank | Alphabetical

Bottom Chart None selected




Top Chart
Treemap
Cause of Disease or Injury
A. Communicable, mater...
Risk Factor
High blood pressure
Metric
DALYs (Disability...
Place
Indonesia
Year 2010
Age
All ages
Sex
Both
Male
Female
Depth 4
Color
Risk Factor Attrib...
Bottom Chart
None selected
Indonesia, DALYs attributable to High blood pressure
Both sexes, All ages, 2010
IHD
Stroke
Lung
Liver
Stomach
Breast
Leukemia
Cervix
Ovary
Brain
Naso
MDD
Dysthymia
Anxiety
Drugs
Alcohol
Schizo
Bipolar
Oth Circ
CMP
Rheum HD
HTN Heart
Low Back Pain
Oth Muscu
Neck Pain
Osteo
Diabetes
CKD
COPD
Asthma
Oth Resp
Thalass
Oth Endo
PCO
Congenital
Hearing
Eczema
Acne
Migraine
Epilepsy
Alzh
Oth Neuro
Cirrhosis
Fall
Drown
Fire
Mech Force
Road Inj
Self-harm
Violence
LRI
Diarrhea
Preterm
N Enceph
Meningitis
Typhoid
Measles
N Sepsis
Oth Neo
HIV
TB
Iron
PEM
Oth Inf
Maternal
Malaria
Oth NTD
DALYs attributable to risk factor
DALYs not attributable to risk factor


Top Chart
Treemap
Cause of Disease or Injury
A. Communicable, mater...
Risk Factor
Dietary risks
Metric
DALYs (Disability...
Place
Indonesia
Year 2010
Age
All ages
Sex
Both
Male
Female
Depth 4
Color
Risk Factor Attrib...
Bottom Chart
None selected
Indonesia, DALYs attributable to Dietary risks
Both sexes, All ages, 2010
IHD
Stroke
Lung
Liver
Stomach
MDD
Dysthymia
Anxiety
Drugs
Alcohol
Schizo
Bipolar
Autism
Breast
Leukemia
Cervix
Ovary
Brain
Naso
Oth Circ
CMP
Rheum HD
AA
HTN
Heart
Fall
Drown
Fire
Mech Force
Road Inj
Self-harm
Violence
LRI
Diarrhea
Preterm
N Enceph
Typhoid
Meningitis
Measles
N Sepsis
Oth Neo
HIV
TB
Iron
PEM
Oth Inf
Maternal
Malaria
Oth NTD
Low Back Pain
Oth Musculo
Neck Pain
Osteo
Diabetes
CKD
COPD
Asthma
Oth Resp
Thalass
Oth Endo
PCO
Congenital
Hearing
Eczema
Acne
Migraine
Epilepsy
Alzh
Oth Neuro
Cirrhosis
DALYs attributable to risk factor
DALYs not attributable to risk factor


Top Chart
Treemap
Cause of Disease or Injury
A. Communicable, mater...
Risk Factor
Child and maternal under...
Metric
DALYs (Disability...
Place
Indonesia
Year 2010
Age
All ages
Sex
Both
Male
Female
Depth 4
Color
Risk Factor Attrib...
Bottom Chart
None selected
Indonesia, DALYs attributable to Child and maternal undernutrition
Both sexes, All ages, 2010
IHD
Stroke
Lung
Liver
Stomach
MDD
Dysthymia
Anxiety
Drugs
Breast
Leukemia
Cervix
Ovary
Mouth
Alcohol
Schizo
Bipolar
Brain
Naso
Oth Circ
CMP
Rheum HD
AA
HTN Heart
Low Back Pain
Oth Musculo
Osteo
Neck Pain
Diabetes
CKD
COPD
Asthma
Oth Resp
Thalass
Oth Endo
PCO
Congenital
Hearing
Migraine
Epilepsy
Cirrhosis
Oth Neuro
Fall
Drown
Fire
Road Inj
Oth Trans
Self-harm
Violence
LRI
Diarrhea
Preterm
N Enceph
Meningitis
Typhoid
Measles
N Sepsis
Oth Neo
HIV
TB
Iron
PEM
Oth Inf
Maternal
Malaria
Oth NTD

Outline

What is the GBD 2010?

Some Key Global Results

Indonesia Results

Benchmarking Indonesia

Continuous Updating

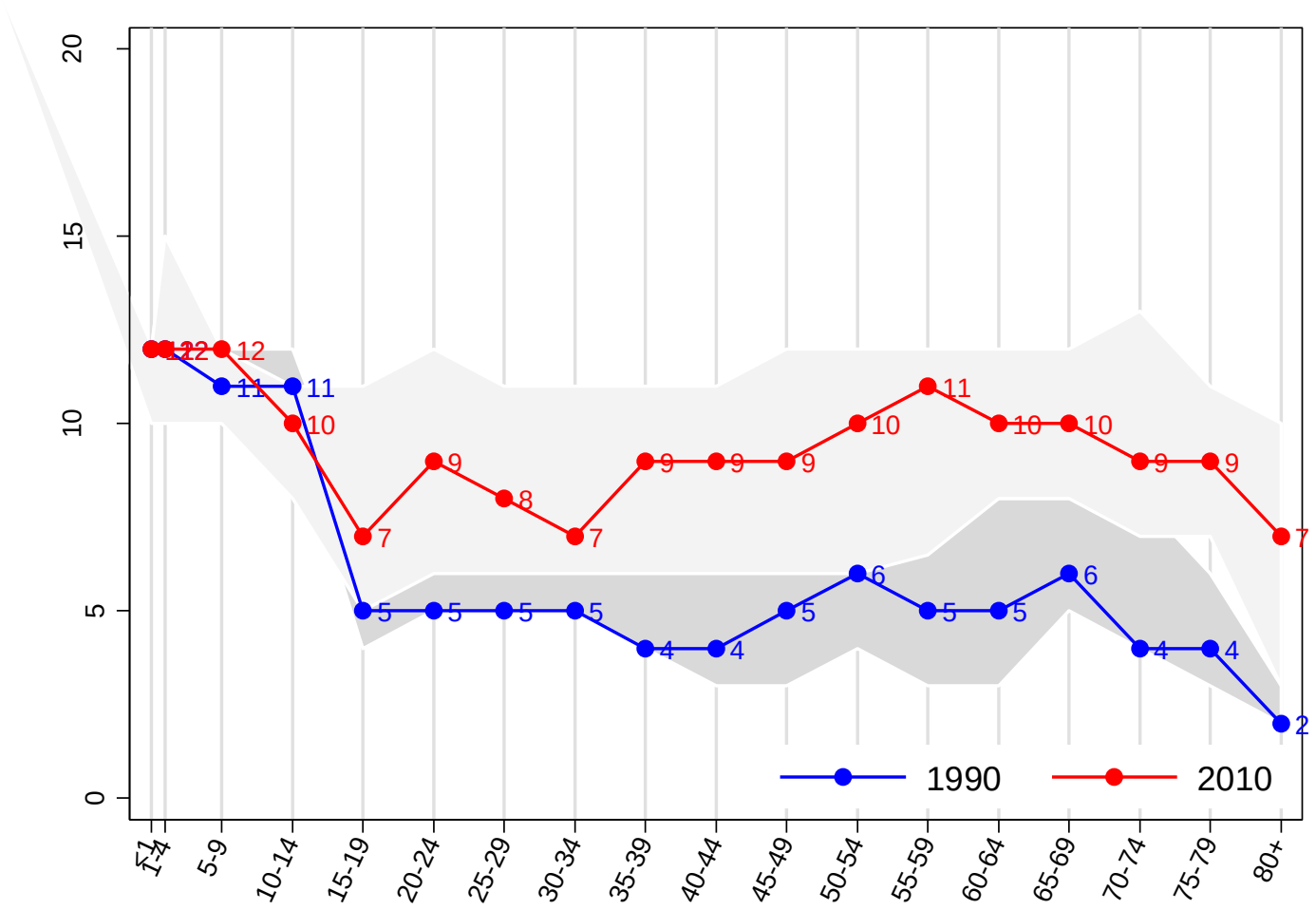
Indonesia Outcomes Compared to Other Countries of Interest

- South Korea
- Chile
- Vietnam
- Mexico
- China
- Turkey
- Thailand
- Brazil
- Malaysia
- Bangladesh
- Philippines
- Russia
- Cambodia
- Laos
- India

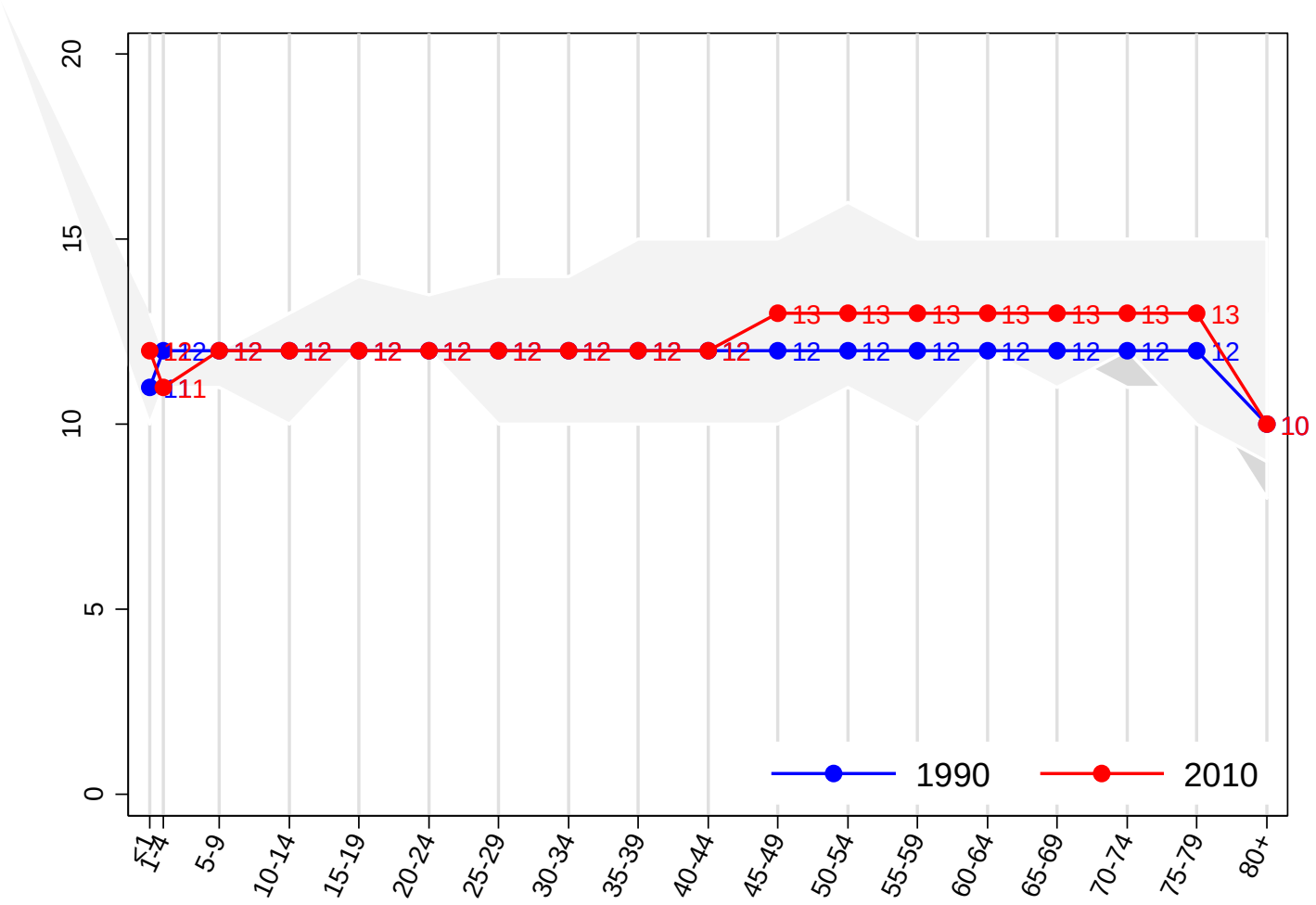
Indonesia Outcomes Compared to Other Countries of Interest

	Age-standardized death rate (per 100,000)				Age-standardized YLL rate (per 100,000)				Age-standardized YLD rate (per 100,000)				Life expectancy at birth				Health-adjusted life expectancy at birth			
	1990		2010		1990		2010		1990		2010		1990		2010		1990		2010	
Country	Rate	Rank	Rate	Rank	Rate	Rank	Rate	Rank	Rate	Rank	Rate	Rank	LE	Rank	LE	Rank	HALE	Rank	HALE	Rank
Bangladesh	1,295	13	864	11	49,258	14	26,361	13	14,743	16	13,206	16	58.9	14	69.0	12	49.5	15	58.6	13
Brazil	854	6	670	8	26,370	9	17,580	9	12,016	8	11,637	10	69.1	7	74.1	7	59.6	8	64.0	9
Cambodia	1,355	14	957	14	47,844	13	28,770	14	14,501	15	12,603	15	59.2	13	67.5	14	50.0	13	58.0	14
Chile	760	3	490	2	18,210	1	11,136	2	11,185	5	10,407	5	72.9	1	78.5	2	63.4	2	68.6	2
China	896	8	607	5	24,989	6	14,024	3	9,639	1	8,782	1	69.3	6	75.7	3	61.7	6	67.8	3
India	1,447	15	1,097	16	50,084	15	33,366	15	13,727	14	12,494	14	58.3	15	65.2	16	49.8	14	56.2	16
Indonesia	1,033	12	867	10	34,584	12	24,178	11	12,101	9	11,107	7	65.0	12	69.7	11	56.2	12	60.9	10
Laos	1,532	16	1,094	15	56,031	16	34,746	16	13,297	12	12,323	12	56.4	16	64.8	15	48.4	16	56.0	15
Malaysia	825	5	726	9	19,850	3	16,000	6	11,926	7	11,186	8	71.6	4	73.7	9	62.0	5	64.4	7
Mexico	740	2	604	4	22,775	5	15,658	5	10,092	3	9,364	2	71.5	5	75.5	5	62.9	4	66.9	4
Philippines	909	9	868	12	28,515	10	23,262	10	13,334	13	12,483	13	67.8	10	70.1	10	57.7	11	60.2	11
Russia	953	11	952	13	25,715	7	25,387	12	11,536	6	11,444	9	68.7	9	68.9	13	59.8	7	60.0	12
South Korea	813	4	447	1	18,830	2	8,941	1	10,074	2	9,575	3	72.1	3	79.7	1	63.8	1	70.3	1
Thailand	712	1	663	7	20,676	4	17,227	8	11,069	4	10,369	4	72.4	2	74.1	8	63.1	3	65.2	6
Turkey	942	10	628	6	30,025	11	16,760	7	12,442	11	11,885	11	67.1	11	74.4	6	57.7	10	64.0	8
Vietnam	876	7	595	3	26,230	8	15,123	4	12,188	10	10,909	6	68.9	8	75.6	4	59.4	9	65.8	5

Indonesia rank in male age-specific mortality when compared with 15 countries



Indonesia rank in female age-specific mortality when compared with 15 countries

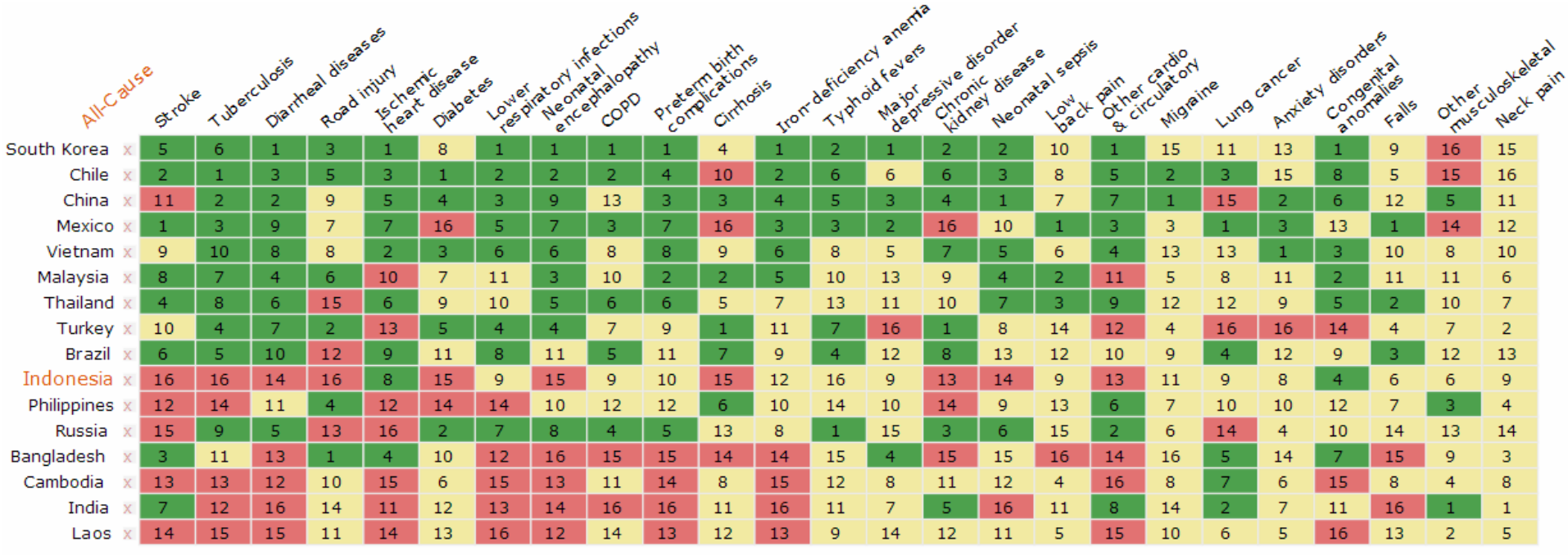


Benchmarking Age-Standardized YLLs 2010

	All-Cause	Stroke	Tuberculosis	Diarrheal diseases	Road injury	Diabetes	Ischemic heart disease	Lower respiratory infections	Neonatal encephalopathy	Preterm birth complications	Cirrhosis	Typhoid fevers	Chronic kidney disease	Neonatal sepsis	Other cardio & circulatory	Hypertensive heart disease	COPD	Malaria	Maternal disorders	Asthma	Lung cancer	HIV AIDS	Rheumatic heart disease	Congenital anomalies	Breast cancer	Leukemia
South Korea	x	5	5	1	4	6	1	1	1	1	4	2	2	2	1	1	1	3	1	5	11	4	1	1	2	3
Chile	x	2	2	2	5	3	3	2	2	4	10	6	5	3	3	2	2		2	1	3	6	3	8	8	6
China	x	11	3	3	10	2	5	3	8	3	3	5	4	1	6	8	14	6	3	2	15	5	7	6	3	14
Vietnam	x	9	9	8	7	5	2	6	6	8	8	8	6	5	7	3	4	11	5	7	13	12	6	4	1	2
Mexico	x	1	6	9	8	16	7	5	7	7	16	3	16	10	5	7	3	5	10	4	1	8	2	12	7	11
Malaysia	x	8	7	4	6	7	10	11	3	2	2	10	8	4	12	6	10	8	8	9	8	14	4	2	10	5
Turkey	x	10	1	5	2	4	13	4	4	9	1	7	1	8	11	10	11	4	7	10	16	2	15	14	13	15
Thailand	x	4	8	7	15	8	6	10	5	6	5	13	10	7	9	5	5	10	4	8	12	15	12	5	4	7
Brazil	x	6	4	10	13	9	9	8	11	11	7	4	9	13	10	11	8	7	9	3	4	10	5	9	12	4
Philippines	x	12	13	11	3	14	12	14	10	12	6	14	14	9	8	16	7	9	11	14	10	3	10	13	15	13
Indonesia	x	16	16	14	16	15	8	9	15	10	15	16	13	14	14	13	9	14	14	12	9	9	11	3	14	12
Russia	x	15	10	6	12	1	16	7	9	5	13	1	3	6	2	4	6		6	6	14	16	8	11	16	8
Bangladesh	x	3	11	13	1	12	4	12	16	15	14	15	15	15	13	12	15	12	13	11	5	1	9	7	5	16
Cambodia	x	13	12	12	9	11	15	15	13	14	9	12	11	12	16	15	12	16	12	15	7	11	14	15	11	10
India	x	7	14	16	14	10	11	13	14	16	11	11	7	16	4	9	16	13	15	13	2	13	13	10	6	1
Laos	x	14	15	15	11	13	14	16	12	13	12	9	12	11	15	14	13	15	16	16	6	7	16	16	9	9

Columns ordered by largest difference between Indonesia and best country for each disease

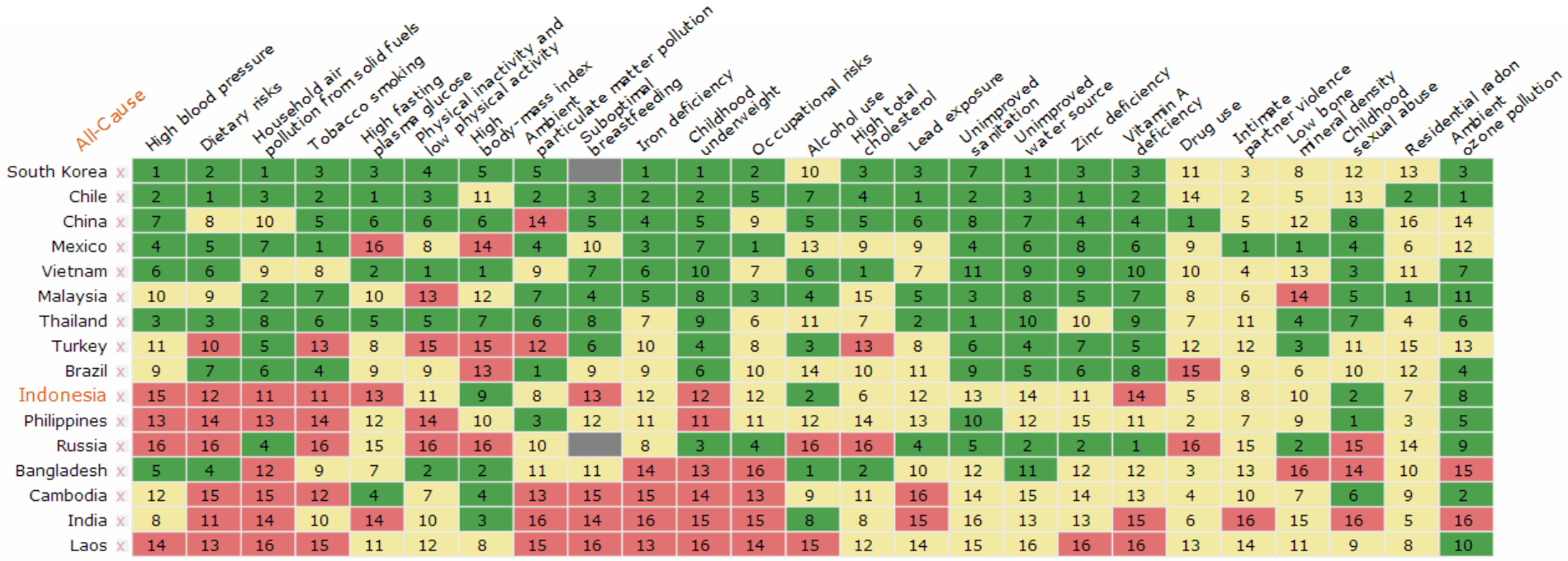
Benchmarking Age-Standardized DALYs 2010



All-Cause	Stroke	Tuberculosis	Diarrheal diseases	Road injury	Ischemic heart disease	Diabetes	Lower respiratory infections	Neonatal encephalopathy	COPD	Preterm birth complications	Cirrhosis	Iron-deficiency anemia	Typhoid fevers	Major depressive disorder	Chronic kidney disease	Neonatal sepsis	Low back pain	Other cardio & circulatory	Migraine	Lung cancer	Anxiety disorders	Congenital anomalies	Falls	Other musculoskeletal	Neck pain
South Korea x	5	6	1	3	1	8	1	1	1	1	4	1	2	1	2	2	10	1	15	11	13	1	9	16	15
Chile x	2	1	3	5	3	1	2	2	2	4	10	2	6	6	6	3	8	5	2	3	15	8	5	15	16
China x	11	2	2	9	5	4	3	9	13	3	3	4	5	3	4	1	7	7	1	15	2	6	12	5	11
Mexico x	1	3	9	7	7	16	5	7	3	7	16	3	3	2	16	10	1	3	3	1	3	13	1	14	12
Vietnam x	9	10	8	8	2	3	6	6	8	8	9	6	8	5	7	5	6	4	13	13	1	3	10	8	10
Malaysia x	8	7	4	6	10	7	11	3	10	2	2	5	10	13	9	4	2	11	5	8	11	2	11	11	6
Thailand x	4	8	6	15	6	9	10	5	6	6	5	7	13	11	10	7	3	9	12	12	9	5	2	10	7
Turkey x	10	4	7	2	13	5	4	4	7	9	1	11	7	16	1	8	14	12	4	16	16	14	4	7	2
Brazil x	6	5	10	12	9	11	8	11	5	11	7	9	4	12	8	13	12	10	9	4	12	9	3	12	13
Indonesia x	16	16	14	16	8	15	9	15	9	10	15	12	16	9	13	14	9	13	11	9	8	4	6	6	9
Philippines x	12	14	11	4	12	14	14	10	12	12	6	10	14	10	14	9	13	6	7	10	10	12	7	3	4
Russia x	15	9	5	13	16	2	7	8	4	5	13	8	1	15	3	6	15	2	6	14	4	10	14	13	14
Bangladesh x	3	11	13	1	4	10	12	16	15	15	14	14	15	4	15	15	16	14	16	5	14	7	15	9	3
Cambodia x	13	13	12	10	15	6	15	13	11	14	8	15	12	8	11	12	4	16	8	7	6	15	8	4	8
India x	7	12	16	14	11	12	13	14	16	16	11	16	11	7	5	16	11	8	14	2	7	11	16	1	1
Laos x	14	15	15	11	14	13	16	12	14	13	12	13	9	14	12	11	5	15	10	6	5	16	13	2	5

Columns ordered by largest difference between Indonesia and best country for each disease

Benchmarking Age-Standardized DALYs Attributable to Risk Factors



	All-Cause	High blood pressure	Dietary risks	Household air pollution from solid fuels	Tobacco smoking	High fasting plasma glucose	Physical inactivity and low physical activity	High body-mass index	Ambient particulate matter pollution	Suboptimal breastfeeding	Iron deficiency	Childhood underweight	Occupational risks	Alcohol use	High total cholesterol	Lead exposure	Unimproved sanitation	Unimproved water source	Zinc deficiency	Vitamin A deficiency	Drug use	Intimate partner violence	Low bone mineral density	Childhood sexual abuse	Residential radon	Ambient ozone pollution
South Korea	x	1	2	1	3	3	4	5	5		1	1	2	10	3	3	7	1	3	3	11	3	8	12	13	3
Chile	x	2	1	3	2	1	3	11	2	3	2	2	5	7	4	1	2	3	1	2	14	2	5	13	2	1
China	x	7	8	10	5	6	6	6	14	5	4	5	9	5	5	6	8	7	4	4	1	5	12	8	16	14
Mexico	x	4	5	7	1	16	8	14	4	10	3	7	1	13	9	9	4	6	8	6	9	1	1	4	6	12
Vietnam	x	6	6	9	8	2	1	1	9	7	6	10	7	6	1	7	11	9	9	10	10	4	13	3	11	7
Malaysia	x	10	9	2	7	10	13	12	7	4	5	8	3	4	15	5	3	8	5	7	8	6	14	5	1	11
Thailand	x	3	3	8	6	5	5	7	6	8	7	9	6	11	7	2	1	10	10	9	7	11	4	7	4	6
Turkey	x	11	10	5	13	8	15	15	12	6	10	4	8	3	13	8	6	4	7	5	12	12	3	11	15	13
Brazil	x	9	7	6	4	9	9	13	1	9	9	6	10	14	10	11	9	5	6	8	15	9	6	10	12	4
Indonesia	x	15	12	11	11	13	11	9	8	13	12	12	12	2	6	12	13	14	11	14	5	8	10	2	7	8
Philippines	x	13	14	13	14	12	14	10	3	12	11	11	11	12	14	13	10	12	15	11	2	7	9	1	3	5
Russia	x	16	16	4	16	15	16	16	10		8	3	4	16	16	4	5	2	2	1	16	15	2	15	14	9
Bangladesh	x	5	4	12	9	7	2	2	11	11	14	13	16	1	2	10	12	11	12	12	3	13	16	14	10	15
Cambodia	x	12	15	15	12	4	7	4	13	15	15	14	13	9	11	16	14	15	14	13	4	10	7	6	9	2
India	x	8	11	14	10	14	10	3	16	14	16	15	15	8	8	15	16	13	13	15	6	16	15	16	5	16
Laos	x	14	13	16	15	11	12	8	15	16	13	16	14	15	12	14	15	16	16	16	13	14	11	9	8	10

Columns ordered by largest difference between Indonesia and best country for each risk factor

Outline

What is the GBD 2010?

Some Key Global Results

Indonesia Results

Benchmarking Indonesia

Understanding Local Health Risks

Continuous Updating

GBD 2.0: a Global Public Good

1) Vision: provide the world access to continuously updated country level assessments of the burden of disease over time for all major diseases, injuries and risk factors using the latest available evidence.
2) As new evidence on descriptive epidemiology is published, collected through surveillance systems or released in reports, this evidence will be rapidly incorporated in the GBD country, regional and global estimates and made widely available.
3) Methodological innovations or studies that provide new insights into etiology or causation should also be adopted when the evidence is compelling.

Building the Network of Collaborators

1) GBD 2010 collaboration organized around diseases, injuries and risk factors. GBD 2.0 will expand this collaboration.
2) GBD 2.0 will add collaborators organized by country whose role will be:
    a. Assess the face validity of country results
    b. Identify missing datasets or inadequate or incorrect interpretation of available data.
    c. Interpret findings and facilitate country policy translation
    d. Where feasible, undertake sub-national assessments

Expanding the Scope of the GBD

1) Forecasts for disease burden (mortality, causes of death, prevalence, YLDs, YLLs, DALYs) by country for the next 15-25 years.
2) Track health expenditure at the national level by disease and injury categories.
3) Eventually link size of problem to what can be addressed through affordable and effective policies. Bringing cost-effectiveness evidence and descriptive epidemiology together in a coherent framework.

POLICY IMPLICATIONS

- Indonesia needs to improve the efforts to improve the population health status.
- Since there are big variation among regions and provinces/districts/cities, we need to apply similar GBD Approach to region and provinces/districts/cities
- To accelerate reduction of the Burden of Disease and Injuries, special efforts should be prioritized, planned and implemented; among others:
  - Control of major risk factors of Non-Communicable Diseases: unhealthy diet including reduction of salt consumption and avoiding high total cholesterol food, controlling high blood pressure and smoking behavior
  - Special preventive effort by the health sector and other related sectors should be carried out for reducing road traffic injuries

POLICY IMPLICATIONS

- Beside controlling major risk factors for Non-Communicable Diseases, controlling Communicable Diseases with big "burden" also need to be prioritized; this include among others: Tuberculosis, Diarrheal Diseases, Pneumonia, Typhoid Fever, Malaria and HIV/AIDS
- Further research should be conducted to investigate etiologies and determinants of high incidence of blood hypertension, Cerebrovascular Disease/Stroke, Ischaemic Heart Disease, Diabetes Mellitus, Liver Cirrhosis, Chronic Kidney Disease and Road Injury

Unfinished Agenda for Child and Maternal Mortality

1. Despite sustained and rapid reductions in child mortality, a substantial fraction of the burden of disease is due to premature mortality in children. Neonatal causes, diarrhea and pneumonia are the major causes. Progress on diarrhea has been notably less than pneumonia since 1990.
2. Progress on maternal mortality has occurred but levels are high compared to other countries at a similar level of development.
3. In a decentralized system, improving the quality of maternity care will require concerted action.

Tackling Stroke

1. Stroke is not only the #1 cause of burden, it is also the disease with the biggest gap between Indonesia and comparator countries.
2. Key factors include high levels of hypertension, tobacco consumption, and diet especially high sodium consumption and low fruit consumption.
3. Two key strategies to tackle high stroke rates.
   First, risk factor reduction through public health campaigns, taxation and legislation.
   Second, blood pressure management through effective diagnosis, treatment and follow up in primary care.

Accelerating Progress on Tuberculosis

1. Despite 37% reduction in age-standardized tuberculosis death rates 1990 to 2010, TB is the #2 cause of burden.
2. Case detection rates need to be increased through better diagnostic capabilities in the peripheral health system facilities.
3. Given the unusually high burden of tuberculosis in Indonesia present for decades, other strategies such as mass preventive therapy should be considered to accelerate progress.

Road Injuries

1. Road injuries are the #3 cause of burden and increasing steadily. It is also has the fourth highest potential for burden reduction.
2. Indonesia has the highest rates among the comparator nations.
3. Successful multi-sectoral approaches to reducing road traffic injuries are needed including road engineering, traffic calming, separation of pedestrians from traffic, helmet law enforcement, and vehicle safety standards.

Massive Rise of Diabetes and Chronic Kidney Diseases

1. Diabetes and Chronic Kidney Diseases have risen by 86% and 90% respectively since 1990.
2. Disease burden and cost on these conditions will steadily grow. In most countries, cost per case is very high
3. Prevention strategies such as encouraging physical activity and weight reduction are important but given experience in other countries, Indonesia needs to aggressively manage complications such as retinopathy, nephropathy, neuropathy and cardiovascular complications through improved primary care.

Tobacco Control

1. Tobacco consumption is still high in Indonesia (67.4 % among males). Rising burden in men means that tobacco's toll in Indonesia is nearly equal to the United States in 1990.
2. Burden will continue to rise for decades on current patterns of consumption.
3. Future cost in terms of cardiovascular diseases, cancers and other outcomes will be very large.
4. Aggressive tobacco control efforts following the MPOWER WHO Policy package and FCTC are urgently needed.

Household Air Pollution

1. Declining since 1990 but still fourth leading risk factor and third leading contributor to potential burden reduction.
2. Poverty related agenda as burden is concentrated in poor households using solid fuels for cooking.
3. Important contributor to child and adult female mortality, because of increased exposure in both groups.
4. Changes in cooking technology or shifts to clean fuels can accelerate reduction in this risk factor.

Transforming the Health Sector

1. Pace of epidemiological change is very rapid. The rise of non-communicable diseases and behavioural risks requires a different type of health personnel training and skill set than tackling communicable diseases.
2. Often difficult for the health sector to transform their staff and structure to cope with the new challenges.
3. This transformation will continue and likely accelerate with continued development in Indonesia.
   The Ministry of Health should consider ways to ensure it has sufficient work force it needs to tackle these problems.

Implications for National Health Insurance (JAMKESNAS)

1. Results of the burden of disease in terms of incidence and prevalence of diseases along with information on likely costs per case treated, should be used to forecast the financial burdens that should be expected due to the epidemiological transition.
2. Instituting disease expenditure tracking and linkage to ongoing updates of the burden of disease should be undertaken to aid in anticipating high cost areas of health care delivery.

Undertake Subnational Burden of Disease Tracking

1. Epidemiological patterns in Indonesia are highly heterogeneous as a function of income and socio-economic status.
2. National results are useful but effective planning will require subnational assessments.
3. Many Indonesian data sources provide sufficient information to undertake a subnational assessment.
4. The capacity for an ongoing subnational assessment should be built and linked to the ongoing global tracking of the burden of disease.

Visualizations

1. Search GBD Compare
2. http://www.healthmetricsandevaluation.org/gbd/visualizations/country

GBD Technical Training Workshop

When: May 7-17, 2013

Where: Greece

Learn more about:

- Data, methods and key findings from the GBD
- Metric calculations: YLLs, YLDs, DALYs, HALE, disability weights
- Data visualization tools and how to use them to communicate key findings to policy makers
- Using GBD as a performance benchmarking tool

- Email training@healthmetricsandevaluation.org to express interest in attending
- Find out more www.healthmetricsandevaluation.org/gbd/training