



HEARTS IN THE AMERICAS

Regional Workshop

Punta Cana, Dominican Republic
May 14-17, 2019





HEARTS

IN THE AMERICAS
Regional Workshop

Framework of Health Gaps: measures for CVD outcome indicators

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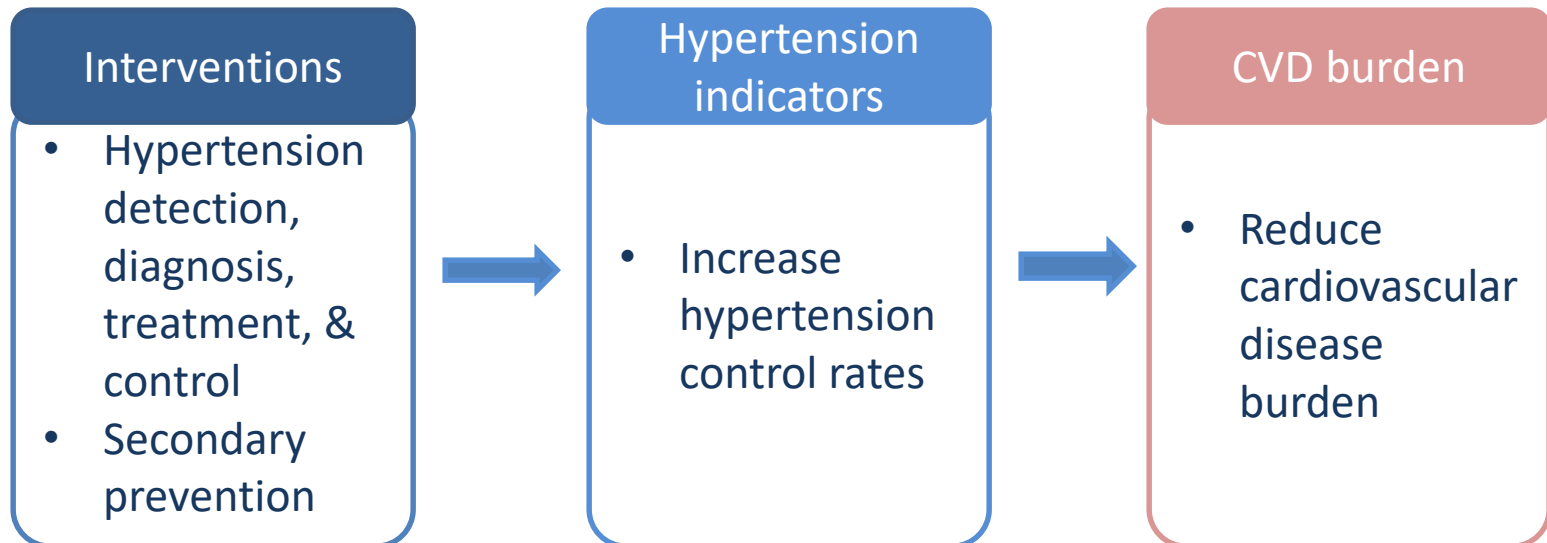


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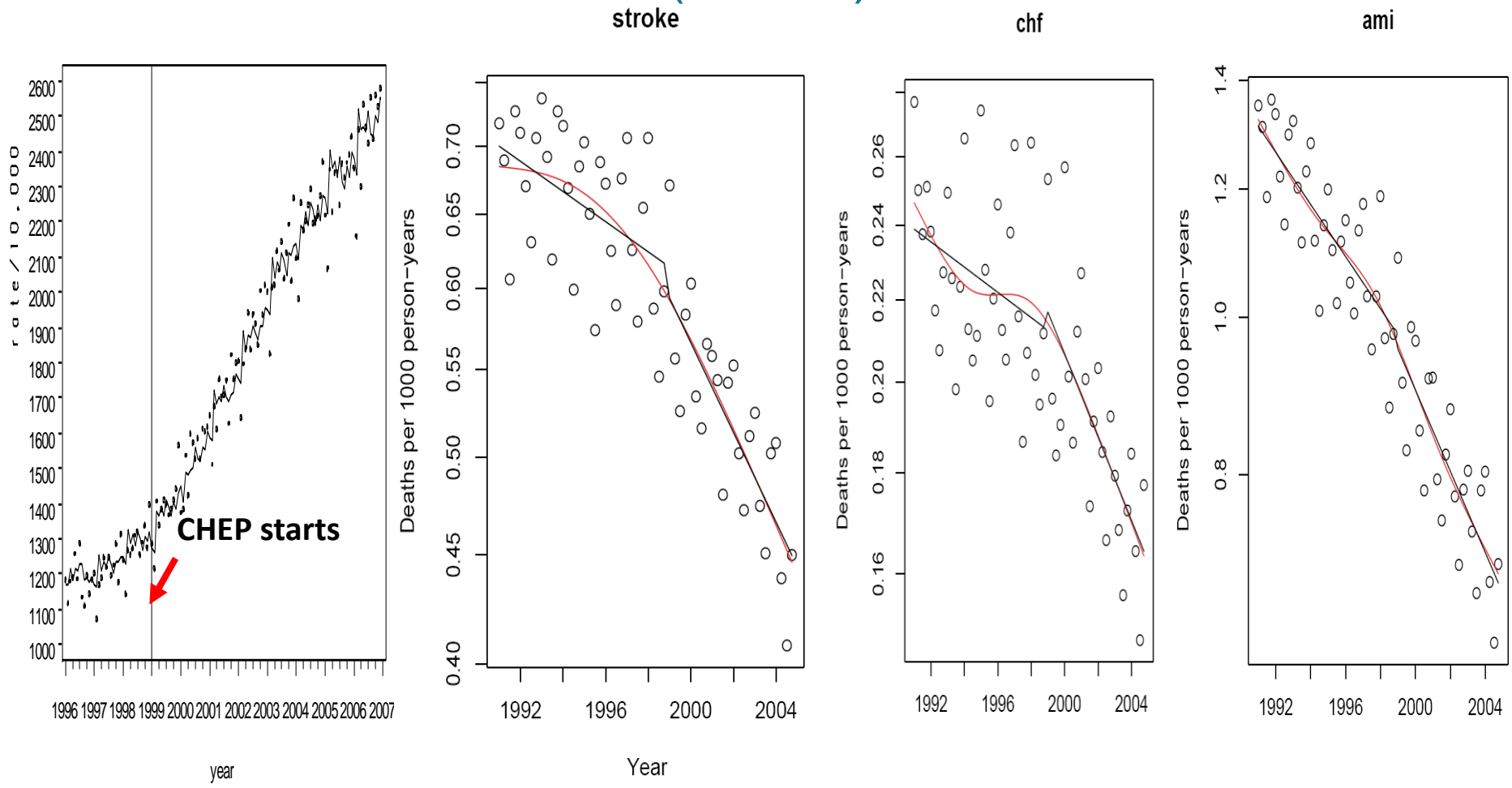
1. Context for monitoring disease outcome indicator on hypertension control program
2. Framework of the population health gaps and measures for CVD outcome indicators
3. Data resources and tools
4. Quantifying the progress of outcome indicators

Premise of HEARTS interventions

The scaling of **a successful and an innovative hypertension control program** should lead to a significant **reduction of the CVD burden** including morbidity, mortality and disabilities

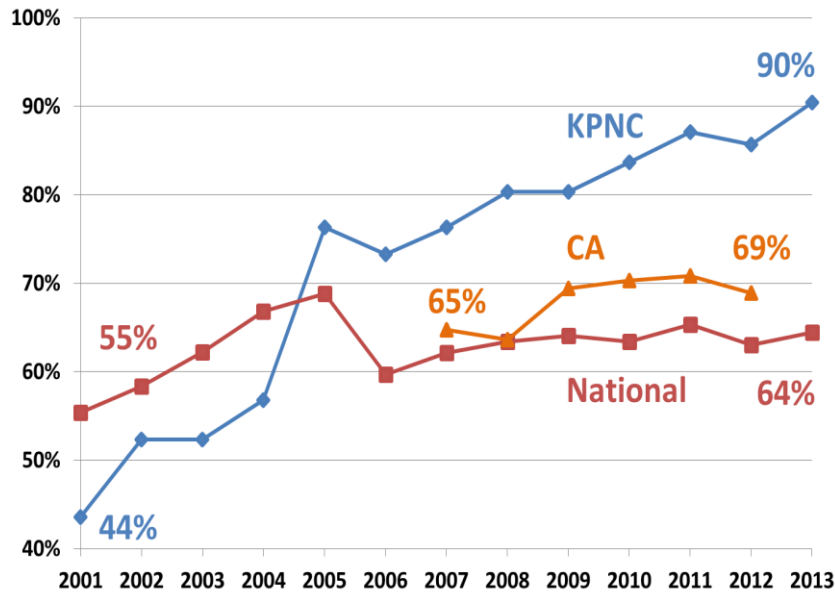


Canadian Hypertension Education Program (CHEP)

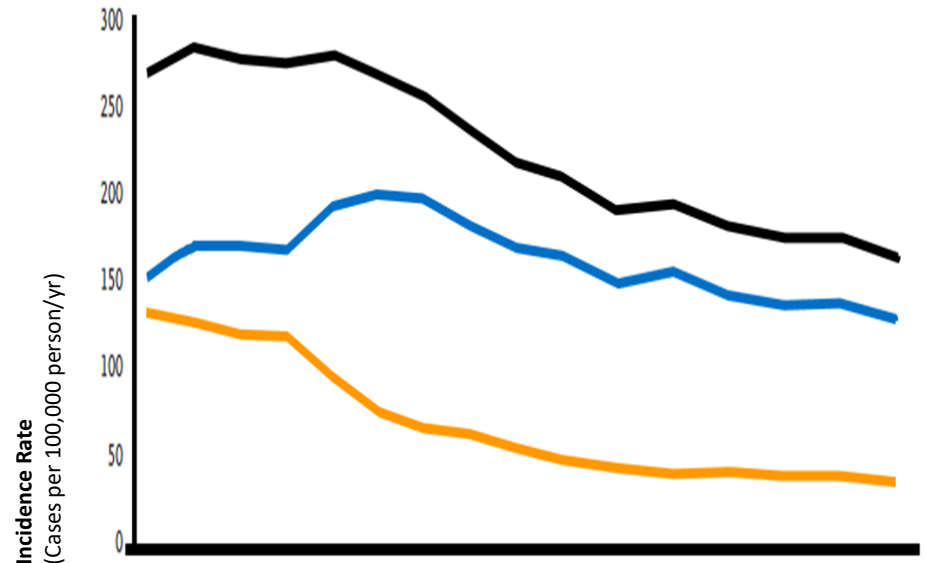


Kaiser Permanente, Northern California (KPNC) Cardiovascular Risk Reduction Program

KPNC vs. National and California HTN Control



Falling heart attack rates 1999-2014 - KPNC



Courtesy of M Jaffe
 Yeh RW. Engl J Med 2010;362:2155-165.
 Solomon MD. J Am Coll Cardiol. 2016;68(6):666-668.

Disease Outcome Indicators

Key elements to be considered for selecting the disease outcome indicator for the hypertension control program

1. The epidemiological **measures**
2. The **disease** associated with elevated blood pressure and that is sensible to changes in the hypertension control

Measures

Frequency Measures

Absolute measures

- Cases
- Deaths

Relative measures

- Incidence, prevalence
- Death rates per population (crude and age-standardized rates)
- Probability of dying (%) before reaching certain age

Measures of Health Gaps

Absolute measures

- DALYs: disability-adjusted life years
- YLDs: years lived with disability
- YLLs: years of life lost

Relative measures

- DALY rates per population
- YLD rates per population (crude and age-standardized rates)
- YLL rates per population

Measures of Health Gaps

- They quantify the gaps between current health status and the ideal health situation (**aspirational measures**)
- unit of measure: **time**, e.g., years

Summary measures

Disability-adjusted life years (DALYs): is a summary measure of burden of disease accounting for **disability** and **mortality**

- **DALYs = YLDs + YLLs**
- **Years lived with disability (YLDs)**
- **Years of life lost due to premature mortality (YLLs)**

Measures of Health Gaps: calculation

$$\text{DALYs} = \text{YLDs} + \text{YLLs}$$

$$\text{YLDs} = P \times \text{WD}$$

$$\text{YLDs} = I \times d \times \text{WD}$$

where:

P = the number of prevalent cases

I = incident cases

d = average duration of the condition until remission or death, in years

WD = the disability weight for the condition

$$\text{YLLs} = D \times \text{SLE}$$

where:

D = number of deaths

SLE = standard life expectancy at age of death

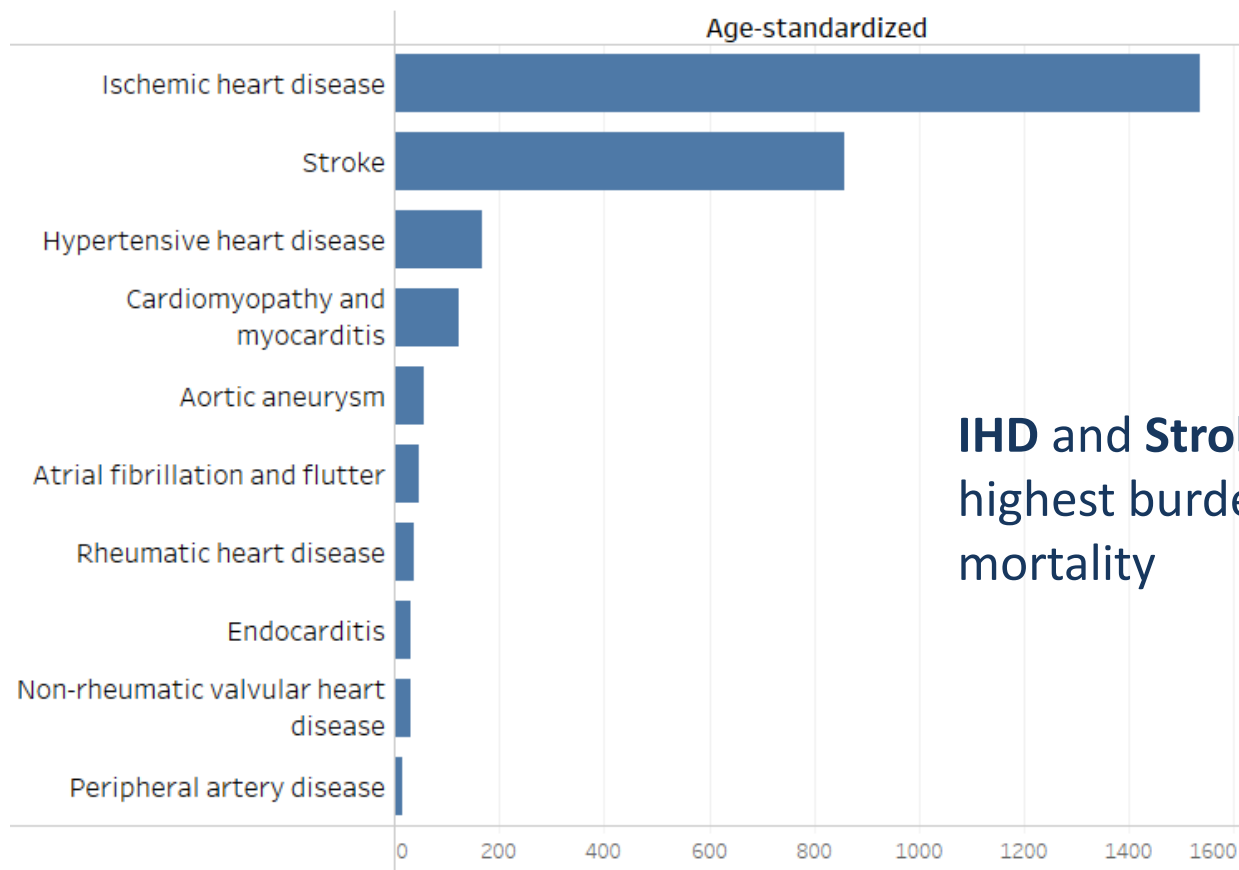
Standard life expectancy (SLE) is defined as the life expectancy by age observed in the population experience the lower death rates

Calculating YLLs, YLL rates (crude & age-standardized)

Age grupos	Number of deaths (a)	SLE (b)	YLL (c) = (a) x (b)	Population (d)	YLL rate (e) = (c)/(d) x 100,000	Standard population weights (f)	ASYR (g)=(e) x (f)
0-4	10,109	89.41	903,870	74,910,767	1,206.6	0.0886	106.9
5-9	4,844	84.52	409,448	75,955,736	539.1	0.0869	46.8
10-14	4,925	79.53	391,663	77,055,947	508.3	0.086	43.7
15-19	8,965	74.54	668,288	78,750,920	848.6	0.0847	71.9
20-24	12,334	69.57	858,048	79,725,807	1,076.2	0.0822	88.5
25-29	17,215	64.6	1,112,097	77,478,740	1,435.4	0.0793	113.8
30-34	26,836	59.63	1,600,214	73,714,765	2,170.8	0.0761	165.2
35-39	39,472	54.67	2,157,925	68,415,366	3,154.2	0.0715	225.5
40-44	64,154	49.73	3,190,381	63,794,631	5,001.0	0.0659	329.6
45-49	105,182	44.81	4,713,227	60,369,057	7,807.4	0.0604	471.6
50-54	181,543	39.92	7,247,186	57,785,174	12,541.6	0.0537	673.5
55-59	266,676	35.07	9,352,322	51,389,071	18,199.0	0.0455	828.1
60-64	342,106	30.25	10,348,705	43,427,629	23,829.8	0.0372	886.5
65-69	414,043	25.49	10,553,962	34,099,240	30,950.7	0.0296	916.1
70-74	464,968	20.77	9,657,395	24,645,889	39,184.6	0.0221	866.0
75-79	497,750	16.43	8,178,032	17,733,596	46,116.0	0.0152	701.0
80-84	527,106	12.51	6,594,092	12,003,732	54,933.7	0.0091	499.9
85+	944,280	7.6	7,176,528	11,519,802	62,297.3	0.0063	392.5
Total	3,932,508		85,113,383	982,775,869	8,660.5		7,426.9

Level of burden of CVD by cause category

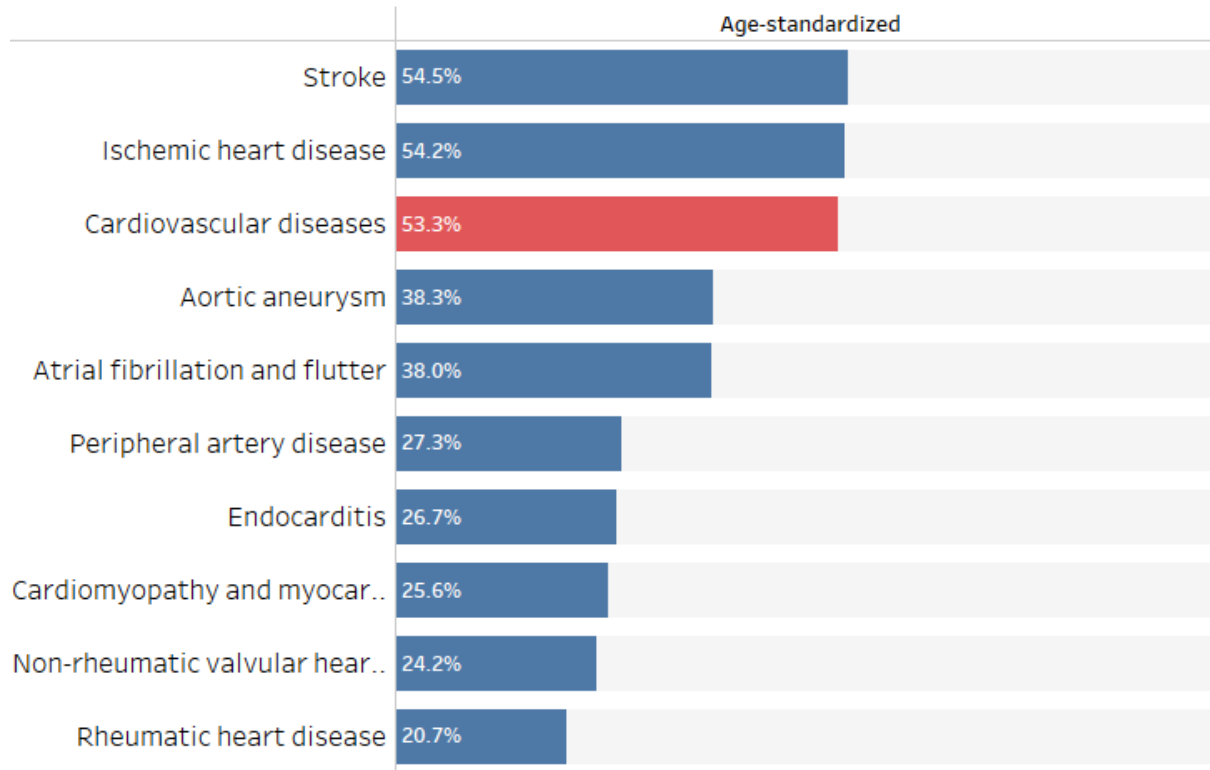
YLLs (Years of Life Lost) rates per 100 000 population by CVD categories and selected age groups



IHD and Stroke have the highest burden of premature mortality

CVD category sensible to hypertension control

Fraction (%) of YLLs (Years of Life Lost) attributable to high blood pressure by cause, age and sex in Latin America and Caribbean, 2017



Stroke is the CVD cause category most sensible to high blood pressure

Resources: Data and Tools

Global Health Estimates (GHE), WHO

WHO GHE produces measures of deaths and burden of diseases for 237 diseases and injuries, 191 Member States (33 from the Americas), 3 of them at subnational level, period 2000 to present. Estimates are produced and updated in an annual basis.

Global Burden of Disease Study (GBD), IHME

GBD Study produces estimates of measures and metrics for 354 fatal and non-fatal diseases and injuries, and 84 risk factors for 195 countries (37 countries and territories of the Americas), regions and subregions for the period 1990 to present. Estimates are produced and updated in an annual basis.

WHO - Global Health Observatory

Global

Regions ▾

عربي

中文

English

Français

Русский

Español



Health Topics ▾

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Global Health Observatory (GHO) data

Monitoring health for the SDGs

Welcome to the Global Health Observatory, WHO's gateway to health-related statistics for more than 1000 indicators for its 194 Member States.

Data are organized to monitor progress towards the Sustainable Development Goals (SDGs), including health status indicators to monitor progress towards for the overall health goal, indicators to track equity in health indicators, and the indicators for the specific health and health-related targets of the SDGs.

Dashboard of SDG health and related-indicators data visualizations

[More about the Global Health Observatory](#)


[More about Sustainable Development Goals](#)

Data and analyses for health and health-related SDGs



Link: <https://www.who.int/gho/en/>

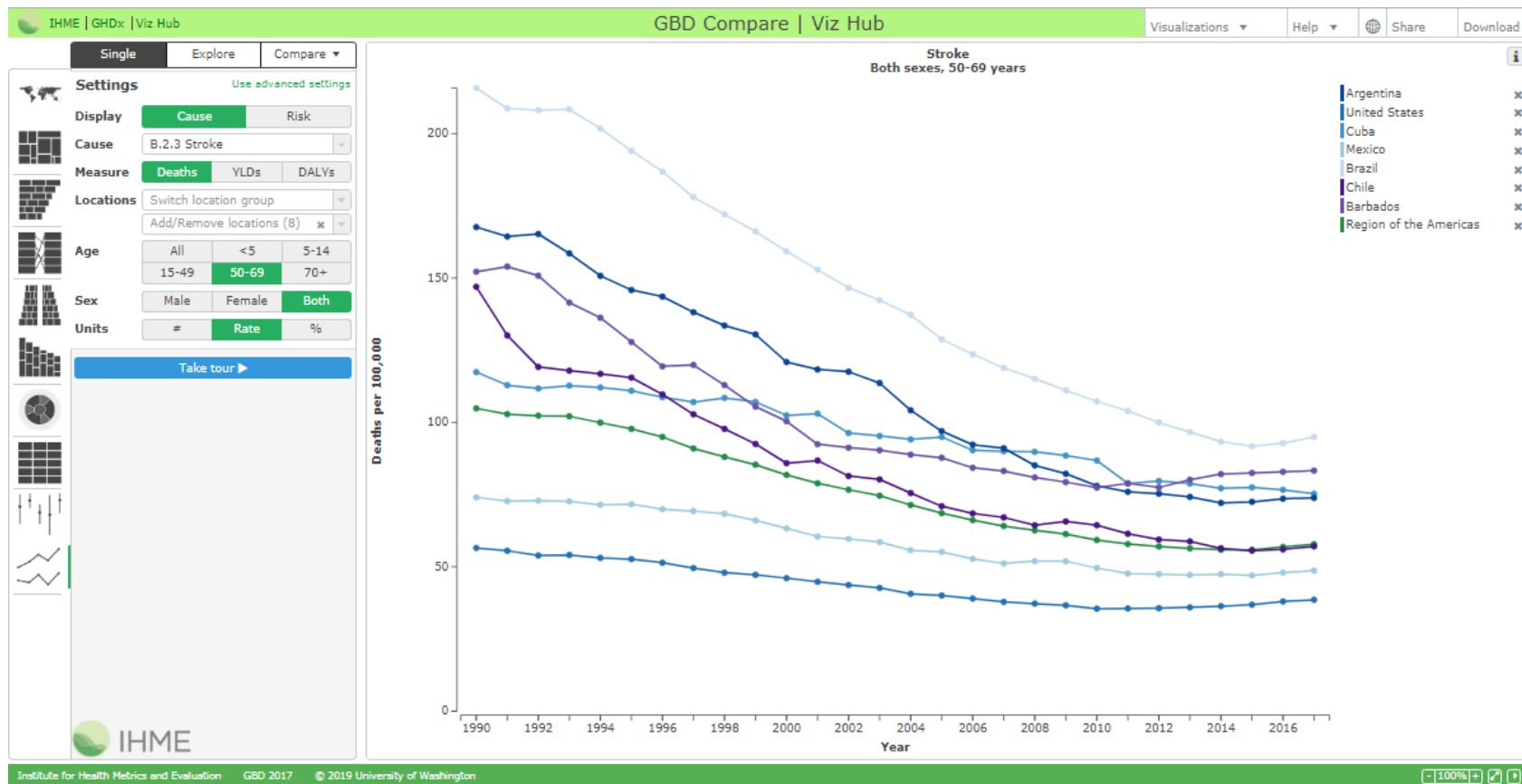
WHO - Global Health Estimates



The screenshot shows the WHO website interface for 'Global Health Estimates'. At the top is a blue navigation bar with a home icon and dropdown menus for 'Health Topics', 'Countries', 'News', 'Emergencies', and 'About Us'. Below this is a sub-header 'Health statistics and information systems'. The main content area is divided into three columns. The left column is a sidebar menu with links: 'Health statistics and information systems', 'Topics', 'Classifications and indicators', 'Data collection tools', 'Data analysis tools', 'Statistics', 'Country monitoring and evaluation', 'Monitoring universal health coverage', and 'Publications'. The middle column is titled 'Disease burden and mortality estimates' and contains a section for 'CAUSE-SPECIFIC MORTALITY, 2000–2016'. It includes a paragraph about the latest estimates, a recommended citation, a summary of data sources, and a 'Related links' section with a link to 'WHO methods and data sources for global causes of death, 2000–2016'. Below this is a section for 'GLOBAL AND BY REGION' with a summary of mortality tables. The right column features social media icons and a list of three documents: '1. CAUSE-SPECIFIC MORTALITY, 2000–2016', '2. DISEASE BURDEN, 2000–2016', and '3. CHILD CAUSES OF DEATH, 2000–2017'. At the bottom of this column is a 'MORE INFORMATION' box with links for 'Definitions of region groupings' and 'Methods'.

Link: https://www.who.int/healthinfo/global_burden_disease/estimates/en/

IHME - GBD Compare



Link: <http://ihmeuw.org/4sk1>

IHME - GBD Results Tool

Online interactive tool for selecting and downloading GBD Study estimates data sets



Global Health Data Exchange
Discover the World's Health Data

- Home
- Countries
- Series and Systems
- Organizations
- Keywords
- IHME Data
- About the GHDx
- Help

Home > IHME Data

GBD Results Tool

Default results are deaths and DALYs for 2017 with trends since 1990. Refer to the [GBD Results Tool User Guide](#) for help with common questions and troubleshooting. [Download additional GBD 2017 results](#) from the GHDx.

[Terms defined](#) | [Codebook](#) | [Tools Overview](#)

Base	<input checked="" type="radio"/> Single <input type="radio"/> Change <input type="radio"/> PoD	Context	<input type="text" value="Cause"/>	Measure	<input type="text" value="Add/Remove... (1)"/>
Location	<input type="text" value="Add/Remove... (1)"/>	Age	<input type="text" value="Add/Remove... (2)"/>	Sex	<input type="text" value="Add/Remove... (1)"/>
Year	<input type="text" value="Add/Remove... (28)"/>	Metric	<input type="text" value="Add/Remove... (1)"/>	Cause	<input type="text" value="Add/Remove... (1)"/>

MEASURE	LOCATION	SEX	AGE	CAUSE	METRIC	YEAR	VAL	UPPER	LOWER
Deaths	Region of t...	Both sexes	All Ages	Stroke	Rate	1990	53.11	53.84	52.50
Deaths	Region of t...	Both sexes	50-69 years	Stroke	Rate	1990	104.87	106.82	103.08
Deaths	Region of t...	Both sexes	All Ages	Stroke	Rate	1991	52.41	53.15	51.89

Link: <http://ghdx.healthdata.org/gbd-results-tool>

Level of the Outcome Indicator Across Countries

Cause Name
 Stroke

Measure Name
 YLLs (Years of Life Los...

Metric Name
 Rate

Age Name
 Age-standardized

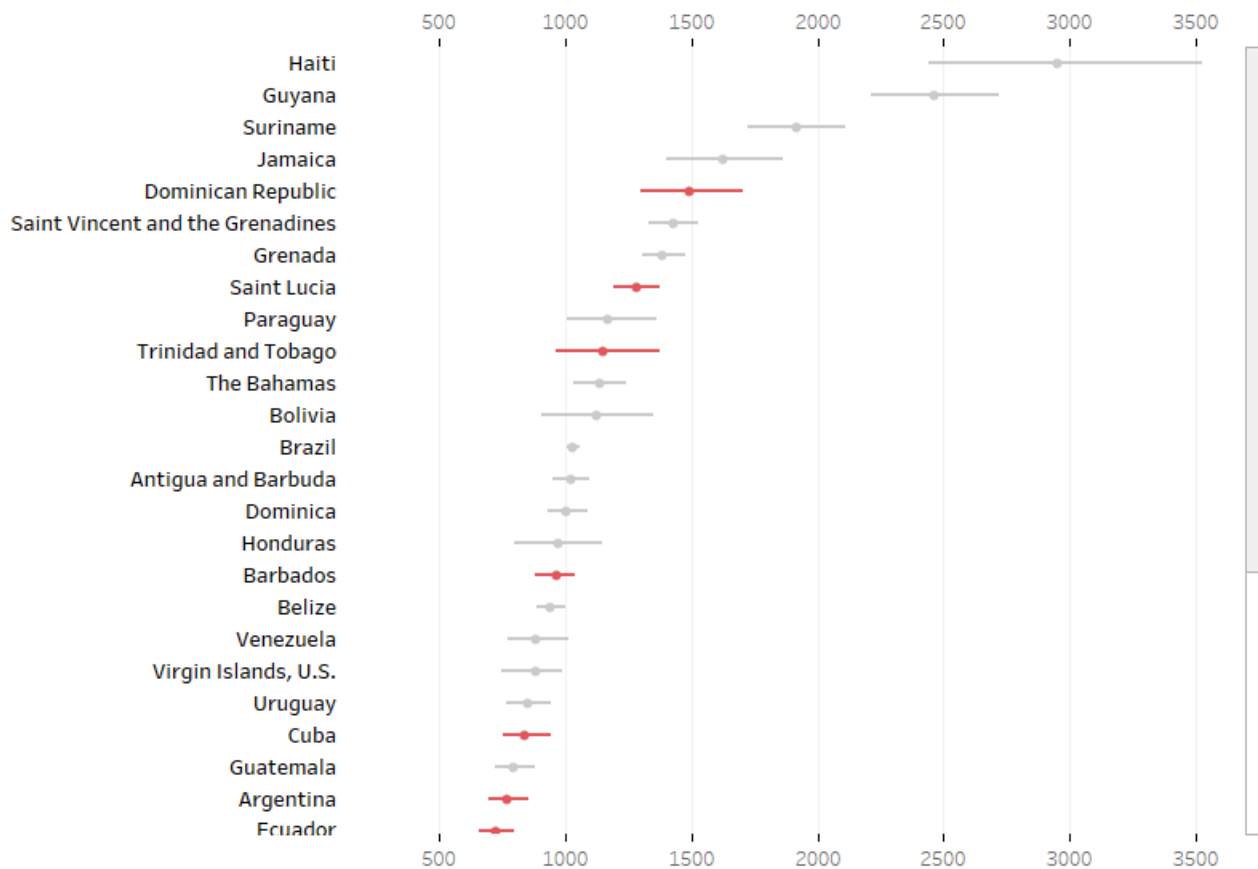
Sex Name
 Both

Year
 2017

Location Name (group)
 HEARTS Countries
 HEARTS Reference...
 Other

Participant Countries
■ HEARTS Countries
■ HEARTS Reference...
■ Other

YLLs (Years of Life Lost) Rate (Age-standardized, Both) per 100 000 population



SOURCE: GBD Collaboration Network. Global Burden of Disease Study 2017. IHME, 2018

Trends of the Outcome Indicator by Cause, Age and Sex in Selected Countries

Location Name
 Multiple values

Measure Name
 YLLs (Years of Life Lost)

Cause Name
 Stroke

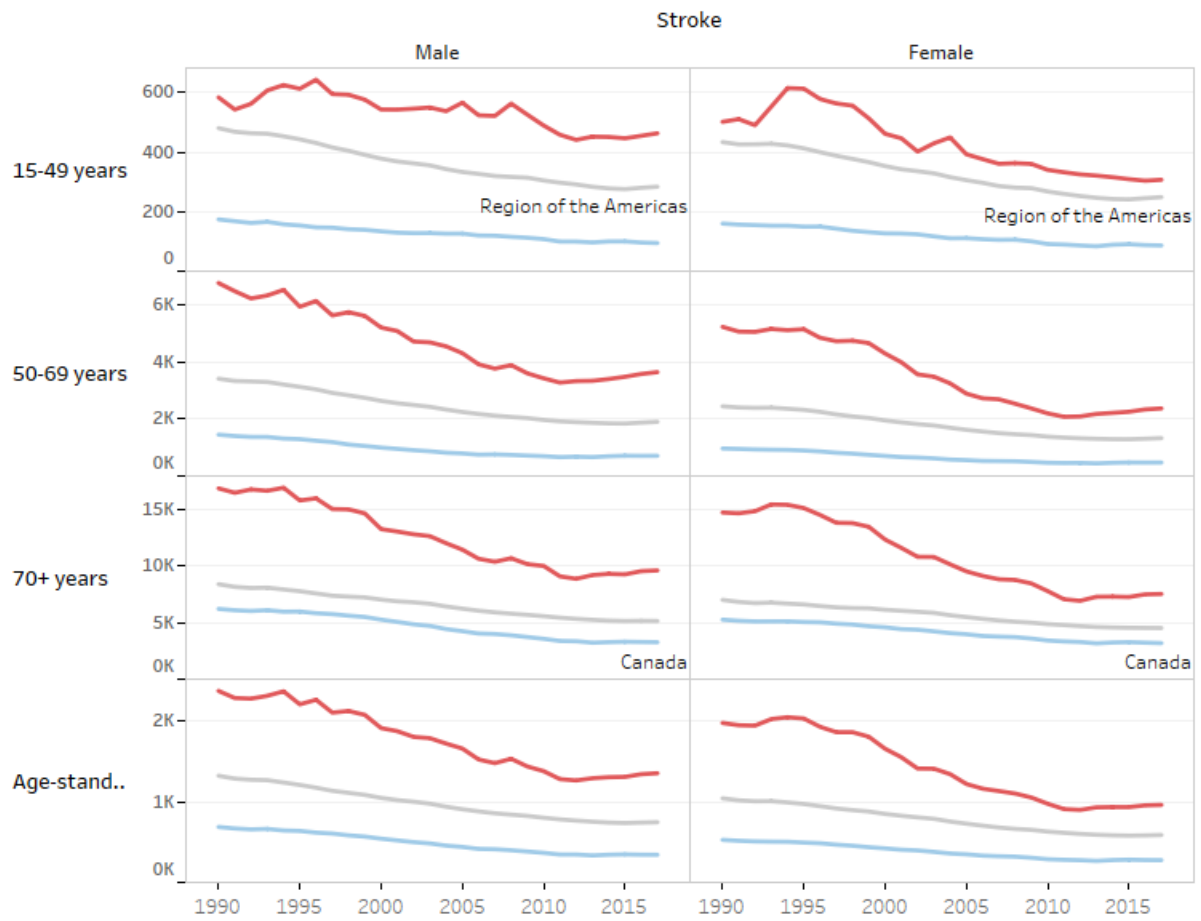
Age Name
 Multiple values

Sex Name
 Multiple values

Location Name (group)
 HEARTS Countries
 HEARTS Reference Countries
 Other

Participant Countries
 HEARTS Countries
 HEARTS Reference Countries
 Other

YLLs (Years of Life Lost) rates per 100 000 population



SOURCE: GBD Collaboration Network. Global Burden of Disease Study 2017. IHME, 2018

Progress-Scorecard

a method and tool for measuring the indicator progress towards its target

MEASURING PROGRESS TOWARDS TARGETS

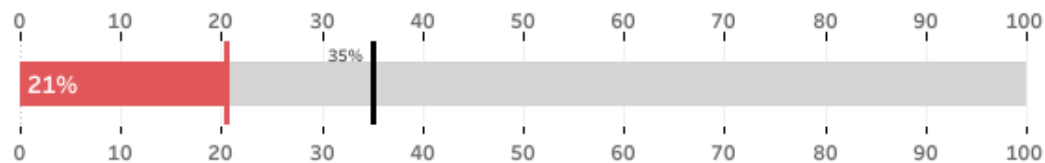
Select the Disease
Stroke

Select the Region, Subregion or Country
Region of the Americas

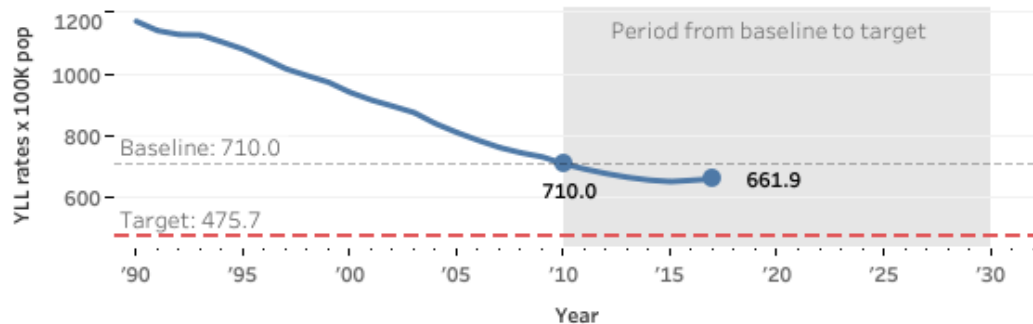
YLLs (Years of Life Lost) Rate (Age-standardized) per 100,000 population due to Stroke, Region of the Americas

710.0 baseline 2010	661.9 current 2017	-6.8% % change 2010-2017	475.7 target 2030	-33% target 2030
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Indicator versus time progress towards the target | indicator progress | time progress



Current indicator trends, baseline, current and target values



MONITORING & ASSESSING TRENDS: premature mortality from NCDs

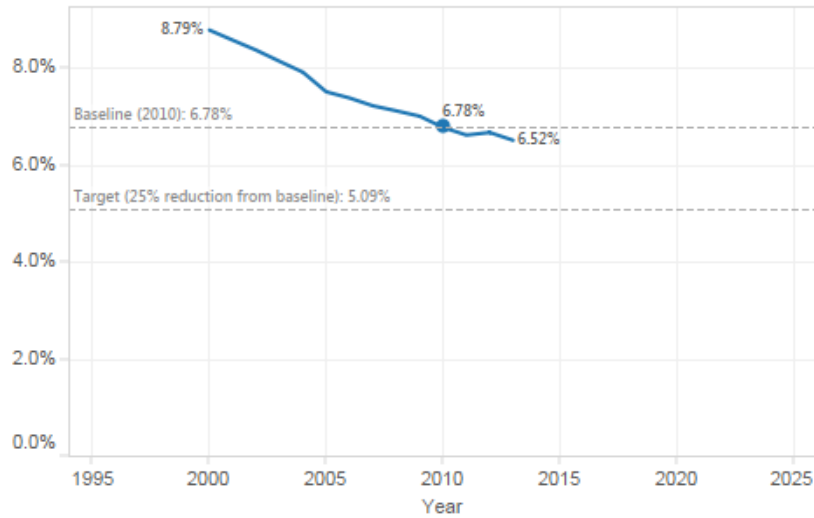
Indicator: Unconditional probability of dying at exact ages between 30 and 70 years from selected NCD cause of death

Select Cause of Death
Cardiovascular diseases

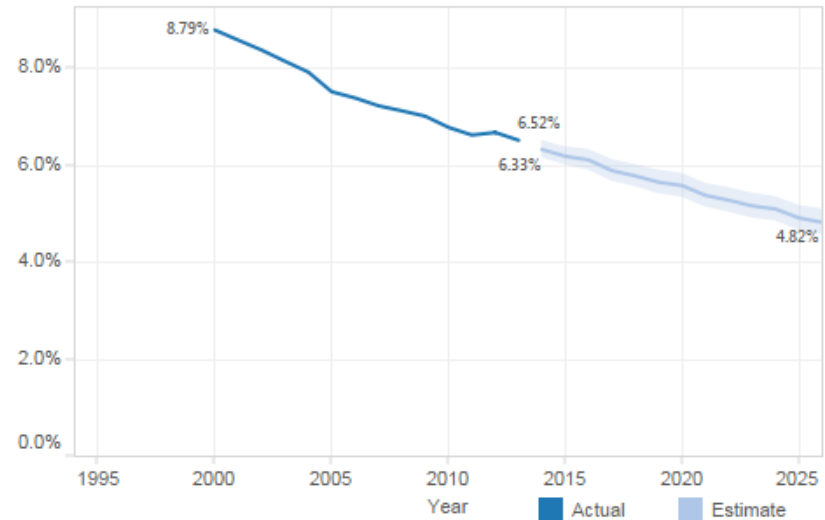
Select Country
Americas

Select Sex
Both sexes

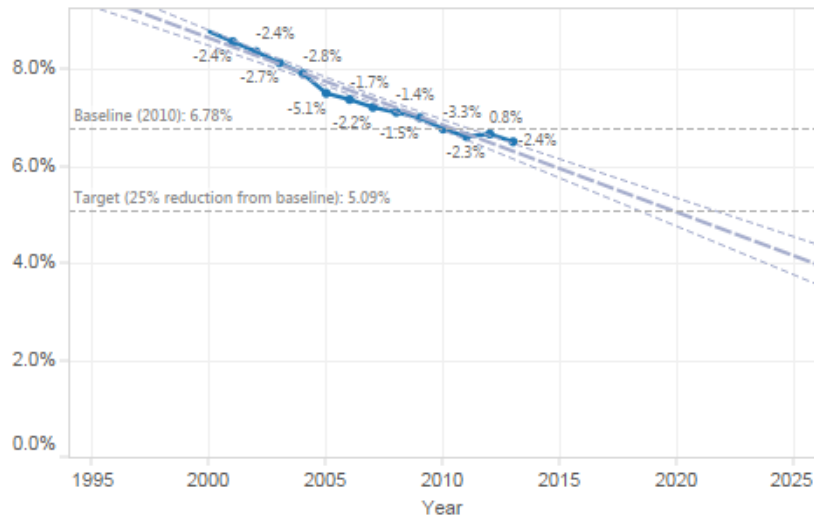
Panel 1. Time series, baseline (2010), and target (2025)



Panel 2. Actual series and forecast with 95% Confidence Interval (95% CI)



Panel 3. Time series, annual % change and linear regression with 95% CI



Panel 4. Trends Analysis Summary Metrics

Average annual percent change & 95% CI: -2.35% [-2.55, -2.15]
Overall % change 2010-2025: -35.29%

The **Average Annual Percent Change (AAPC)** is significantly different from zero when its 95% CI does not contain zero.

An AAPC of at least **-1.7%** is required to reach the target of **25% relative reduction on year 2025** from baseline on year 2010.

Select the period for trends analysis
2000 to 2013

Conclusion

- 1. Monitoring the outcome indicator** are useful for assessing the impact of the hypertension control program
- 2. Stroke** is the most sensible CVD subcategory to changes in hypertension control
- 3. Age-standardized years of life lost (YLL) rates per 100 000 population due to Stroke** is a comprehensive and robust disease outcome indicator for the Hypertension Control Program



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