

TECHNICAL NOTE: CARDIOVASCULAR DISEASES COUNTRY PROFILES

HOW THE PROFILES ARE ORGANIZED

Each profile includes the following five sections:

1. Demographic and socioeconomic profile;
2. Premature mortality from all causes for the latest available year with mortality data;
3. Premature mortality from CVD, for the latest available year with mortality data;
4. Trends in standardized premature mortality rates for CVD, ischemic heart disease, cerebrovascular disease and hypertensive disease for the past 10 years with available mortality data;
5. Trends in standardized premature mortality rates for cardiovascular disease for the past 10 years with available mortality data, and targets and projections for 2025.

METHODOLOGY

Variables

- *Life expectancy at birth*: Average number of years that a newborn could expect to live, if he or she were to pass through life exposed to the sex- and age-specific death rates prevailing at the time of his or her birth, for a specific year, in a given country, territory, or geographic area (1).
- *Literacy rate*: Proportion of the adult population aged 15 years old and over that is literate, expressed as a percentage of the corresponding population, total or for a given sex, in a given country, territory, or geographic area, at a specific point in time, usually at mid-year. A person is considered literate if they can, with understanding, both read and write a short, simple statement in his/her everyday life (1).
- *Gross national income (GNI), current \$US*: Gross national income converted to United States dollars using the World Bank Atlas method, divided by the midyear population. GNI is the sum of value added by all resident producers plus any product taxes (less subsidies) not included in the valuation of output, plus net receipts of primary income (compensation of employees and property income) from abroad (1).
- *Gross national income (GNI), international dollars (PPP-adjusted)*: Gross national income (GNI) converted to international dollars using purchasing power parity rates. An international dollar has the same purchasing power over GNI as a U.S. dollar has in the United States. GNI is the sum of value added by all resident producers plus any product taxes (less subsidies) not included in the valuation of output plus net receipts of primary income (compensation of employees and property income) from abroad. Data are in current international dollars (1).
- *Premature mortality (30-69 years)*: Number of deaths caused in men and women from age 30 to 69 years old by: cardiovascular disease (I00-I99), cerebrovascular disease (I60-I69), hypertensive disease (I10-I15), ischemic heart disease (I20-I25), cancer (C00-99), diabetes (E10-14) and chronic respiratory disease (J30-98), coded according to the *Tenth Revision of the International Statistical Classification of Diseases and Related Health Problems (ICD-10)* (2), for the period between 2000 and the latest year with available data.
- *Population*: Estimated midyear population for the period 2000-2011.

- *Standardized premature mortality rate (30-69 years)*: Number of deaths per 100,000 population, by sex and for the 30-69 year-old age group, age-standardized for cardiovascular diseases, cerebrovascular disease, ischemic heart disease, and hypertensive disease.

Sources of information

- The following indicators: *Life expectancy at birth, literacy rate, gross national income (current US\$ and PPP-adjusted)* were obtained from PAHO *Basic Indicators 2013 (3)*.
- *Population*: Midyear population estimates for 5-year age groups were obtained from the United Nations Population Division, 2010 Revision (4).
- *Mortality*: The ICD-10 coded mortality data were obtained from the PAHO Mortality Information System (5). PAHO receives this information from national vital statistics sources through the civil registry systems of the countries of the Americas, and applies an algorithm to correct for underregistration and another algorithm to redistribute deaths due to ill-defined causes, when the proportion of underregistration and/or ill-defined causes is higher than 10% (6). To prepare the profiles, deaths classified under the following ICD-10 codes were used: cardiovascular (I00-I99), cerebrovascular disease (I60-I69), ischemic heart disease (I20-I25), hypertensive disease (I10-I15), chronic respiratory diseases (J30-98), cancer (C00-99), and diabetes (E10-14). Deaths were obtained according to 5-year age groups.

Analysis

Demographic and socioeconomic profile

Six of the PAHO *Basic Indicators* were selected to prepare the demographic and socioeconomic profile, including demographic data, life expectancy at birth, literacy rate, and per capita gross national income. Population pyramids were also constructed, using population data for the latest year with available mortality data for each country. In the case of the regional profile, population pyramids were constructed for the years 1950, 1980, 2010, and 2050, to illustrate demographic trends in the Region.

Premature mortality from all causes

To show premature mortality from all causes in graphic form, pie charts were constructed showing premature mortality for the four principal NCDs (cardiovascular disease, cancer, chronic respiratory disease, and diabetes) and other causes of mortality. Furthermore, the number of premature deaths from all causes and from the four NCDs is shown at the bottom of the chart. Data for men and for women were analyzed.

Premature mortality due to cardiovascular diseases

To show premature mortality due to cardiovascular diseases in graphic form, pie charts were prepared for men and women showing the proportion of cerebrovascular disease, ischemic heart disease, hypertensive disease, cardiac insufficiency, rheumatic disease, and other CVD. In addition, the charts show premature deaths from CVD in absolute numbers by sex.

Trends in standardized premature mortality rates for cardiovascular disease

The standardized premature mortality rates (30-69 years) per 100,000 population were calculated for the region, country, and sex for cardiovascular disease, cerebrovascular disease, ischemic heart disease, and hypertensive disease. Standardized rates were prepared by the direct method using the WHO standard population (17) for every year with information available within the period of the study (approximately 2000-2011, according to countries).

To show the trends in standardized premature mortality rates, trend graphs were constructed showing, by sex, the rates for cardiovascular disease, cerebrovascular disease, ischemic heart disease, and hypertensive disease for the study period (approximately 2000-2011, by country).

Trends in standardized premature mortality rates for cardiovascular disease, and targets and projections for 2025

Premature mortality rate trends for cardiovascular diseases were analyzed using segmented regression models. The results from these models make it possible to describe the magnitude of the observed increase or decrease, estimating the average annual percent change (AAPC) for the last 5 and 10 years.

To estimate these models, standardized premature mortality rates were used, with a Poisson distribution. A maximum of two or three inflection points were set for each regression in relation to the available time series. It was decided to use the simplest model that fit the data using the technique of weighted square minimums. The statistical significance of the models was estimated by means of Monte Carlo permutations (8).

In addition, the trends in standardized premature mortality rates for cardiovascular disease were shown graphically for men and women during the time period with available data up to 2010. The standardized premature mortality rate in 2010 was used as a baseline to estimate the standardized anticipated premature mortality rate in 2025 if the target of a 25% reduction in mortality were met as proposed in the Global Monitoring Framework. Furthermore, the AAPC for the last five years was used, provided that it was statistically significant, in order to project what the standardized expected premature mortality rate would be on the basis of the AAPC, assuming all conditions remained constant. Finally, the difference between the target mortality rate and the projected mortality rate was calculated to highlight the proximity of achieving the proposed target of 25% reduction by 2025.

Countries of the Caribbean

For Caribbean countries that reported fewer than 20 deaths, by sex, mortality data were grouped in order to minimize fluctuations in the causes of death studied (9).

For the descriptive analysis of premature mortality in the latest year with available data, deaths in each country are grouped for the latest three-year period. In calculating the standardized premature mortality rates and analyzing their trends over time, deaths and populations were grouped for all the countries in order to obtain grouped standardized rates for the Caribbean islands.

The countries that required this grouping of mortality data were: Anguilla, Antigua and Barbuda, Aruba, Bahamas, Barbados, Belize, Bermuda, Cayman Islands, Dominica, French Guiana, Grenada, Guadeloupe, Martinique, Montserrat, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Turks and Caicos Islands, Virgin Islands (United Kingdom), and Virgin Islands (United States).

Software used

The statistical packages used to calculate specific mortality rates and the descriptive analysis were Excel (10) and SPSS (11). Segmented regression analyses were done with the computer program *Joinpoint version 4.0.4.*, developed by the *Surveillance Research Program* of the National Cancer Institute of the United States (12).

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