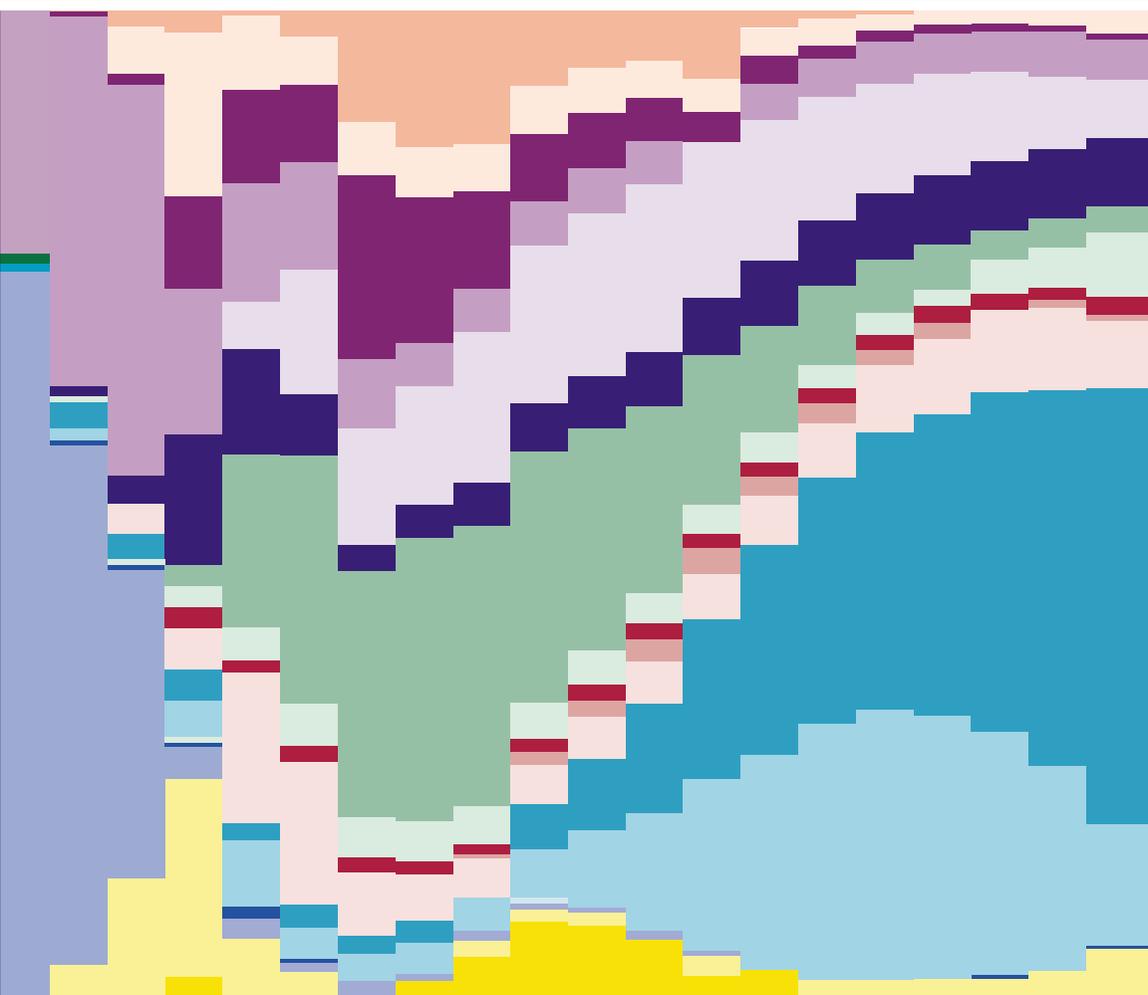


THE GLOBAL BURDEN OF DISEASE: GENERATING EVIDENCE, GUIDING POLICY

LATIN AMERICA & CARIBBEAN REGIONAL EDITION

INSTITUTE FOR HEALTH METRICS AND EVALUATION
UNIVERSITY OF WASHINGTON

HUMAN DEVELOPMENT NETWORK
THE WORLD BANK

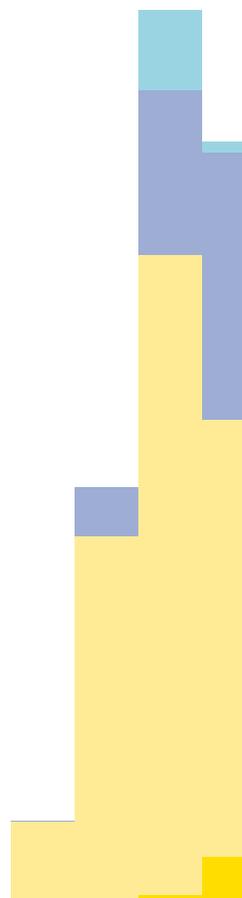


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This report was prepared by the Institute for Health Metrics and Evaluation (IHME) at the University of Washington and the Human Development Network at the World Bank based on seven papers for the Global Burden of Disease Study 2010 (GBD 2010) published in *The Lancet* (2012 Dec 13; 380). GBD 2010 had 488 co-authors from 303 institutions in 50 countries. The work was made possible through core funding from the Bill & Melinda Gates Foundation. The views expressed are those of the authors.

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GBD

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ABOUT IHME

The Institute for Health Metrics and Evaluation (IHME) is an independent global health research center at the University of Washington that provides rigorous and comparable measurement of the world's most important health problems and evaluates the strategies used to address them. IHME makes this information freely available so that policymakers have the evidence they need to make informed decisions about how to allocate resources to best improve population health.

To express interest in collaborating, participating in GBD training workshops, or receiving updates of GBD or copies of this publication, please contact IHME at:

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ABOUT THE HUMAN DEVELOPMENT NETWORK AT THE WORLD BANK GROUP

The World Bank Group is one of the world's largest sources of funding and knowledge for developing countries. It comprises five closely associated institutions: the International Bank for Reconstruction and Development and the International Development Association (IDA), which together form the World Bank; the International Finance Corporation (IFC); the Multilateral Investment Guarantee Agency (MIGA); and the International Centre for Settlement of Investment Disputes (ICSID). Each institution plays a distinct role in the mission to end extreme poverty and build shared prosperity in the developing world.

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For more information, go to www.worldbank.org/health.

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GLOSSARY

Years of life lost (YLLs): Years of life lost due to premature mortality.

Years lived with disability (YLDs): Years of life lived with any short-term or long-term health loss, adjusted for severity.

Disability-adjusted life years (DALYs): The sum of years lost due to premature death (YLLs) and years lived with disability (YLDs). DALYs are also defined as years of healthy life lost.

Healthy life expectancy, or health-adjusted life expectancy (HALE): The number of years that a person at a given age can expect to live in good health, taking into account mortality and disability.

Sequelae: Consequences of diseases and injuries.

Health states: Groupings of sequelae that reflect key differences in symptoms and functioning.

Disability weights: Number on a scale from 0 to 1 that represents the severity of health loss associated with a health state.

Risk factors: Potentially modifiable causes of disease and injury.

Uncertainty intervals: A range of values that is likely to include the correct estimate of health loss for a given cause. Narrow uncertainty intervals indicate that evidence is strong, while wide uncertainty intervals show that evidence is weaker.

INTRODUCTION

The Global Burden of Disease (GBD) approach is a systematic, scientific effort to quantify the comparative magnitude of health loss due to diseases, injuries, and risk factors by age, sex, and geography for specific points in time. Box 1 describes the history of GBD. The latest iteration of that effort, the Global Burden of Diseases, Injuries, and Risk Factors Study 2010 (GBD 2010), was published in *The Lancet* in December 2012. The intent is to create a global public good that will be useful for informing the design of health systems and the creation of public health policy. It estimates premature death and disability due to 291 diseases and injuries, 1,160 sequelae (direct consequences of disease and injury), and 67 risk factors for 20 age groups and both sexes in 1990, 2005, and 2010. GBD 2010 produced estimates for 187 countries and 21 regions. In total, the study generated over 1 billion estimates of health outcomes.

GBD 2010 was a collaborative effort among 488 researchers from 50 countries and 303 institutions. The Institute for Health Metrics and Evaluation (IHME) acted as the coordinating center for the study. The collaboration strengthened both the data-gathering effort and the quantitative analysis by bringing together some of the foremost minds from a wide range of disciplines. Our intention is to build on this collaboration by enlarging the network in the years to come. Similarly, IHME and its collaborators hope to expand the list of diseases, injuries, and risk factors included in GBD and routinely update the GBD estimates. Continual updates will ensure that the international community can have access to high-quality estimates in the timeliest fashion. Through sound measurement, we can provide the foundational evidence that will lead to improved population health.

Over the last two decades, the global health landscape has undergone rapid transformation. People around the world are living longer than ever before, and the population is getting older. The number of people in the world is growing. Many countries have made remarkable progress in preventing child deaths. As a result, disease burden is increasingly defined by disability instead of premature mortality. The leading causes of death and disability have changed from communicable diseases in children to non-communicable diseases in adults. Eating too much has overtaken hunger as a leading risk factor for illness. While there are clear trends at the global level, there is substantial variation across regions and countries. Nowhere is this contrast more striking than in sub-Saharan Africa, where communicable, maternal, nutritional, and newborn diseases continue to dominate.

In the Latin America and Caribbean region, many of the leading causes of health loss were non-communicable diseases. Similar to global trends, communicable, maternal, nutritional, and newborn causes are becoming less important in this region as non-communicable diseases kill more people prematurely and cause increasing disability. However, HIV/AIDS increased in most countries in Latin America and the Caribbean over the past 20 years and was a leading cause of loss of healthy life in

certain countries. Road injuries and violence were also dominant causes of health loss in the region. High blood pressure, dietary risks, alcohol use, and other risk factors contributed to the rise of burden from non-communicable diseases in Latin America and the Caribbean, while risks related to illness in children remained prominent in some countries, including Bolivia and Haiti.

As demographic changes such as population growth and increasing average age have caused burden from non-communicable diseases to increase in Latin America and the Caribbean, GBD found that many countries are making progress in some of these conditions. This progress can be seen when using measurements called age-standardized rates, which remove the effects of demographic changes to isolate health improvements. Age-standardized rates of non-communicable diseases, such as ischemic heart disease and stroke, have declined over time in many countries in Latin America and the Caribbean. At the same time, age-standardized rates of diabetes, musculoskeletal disorders, and drug use disorders are rising in a large number of countries, underscoring the mixed success in combatting different non-communicable diseases in the region.

This publication summarizes the global GBD 2010 findings as well as the regional findings for Latin America and the Caribbean. It also explores intraregional differences in diseases, injuries, and risk factors. The overall findings for the region are summarized in the next section.

MAIN FINDINGS FOR LATIN AMERICA AND THE CARIBBEAN

- Latin America and the Caribbean made dramatic progress in reducing mortality and prolonging life since 1970. In Brazil, Costa Rica, Dominican Republic, Ecuador, El Salvador, Honduras, Mexico, Nicaragua, Peru, and Saint Lucia, the average age of death rose 30 years or more between 1970 and 2010.
- Over the last 20 years, the region has made substantial health progress. Latin America and the Caribbean succeeded in decreasing premature death and disability from most communicable, newborn, nutritional, and maternal causes. Diarrheal disease was the number one cause of disease burden in the region in 1990, but dropped to the 20th leading cause in 2010. HIV/AIDS remains a persistent challenge. It was one of the top five causes of disease burden in nine countries in the region in 2010. However, age-standardized rates of HIV/AIDS began dropping in most countries in the region in 2005.
- Despite improvements, substantial burdens of communicable, newborn, nutritional, and maternal causes persist in low- and lower-middle-income countries in Latin America and the Caribbean, including Bolivia, Guatemala, Guyana, and Haiti.
- Between 1990 and 2010, demographic changes and risk factors contributed to rising disease burden from many non-communicable causes, particularly ischemic heart disease, mental disorders such as depression and anxiety, musculoskeletal disorders including low back pain and neck pain, diabetes, and chronic

Box 1: History of the Global Burden of Disease and innovations in GBD 2010

The first GBD study was published as part of the *World Development Report 1993*. This original study generated estimates for 107 diseases, 483 sequelae (non-fatal health consequences), eight regions, and five age groups.

The authors' inspiration for the study came from the realization that policymakers lacked comprehensive and standardized data on diseases, injuries, and potentially preventable risk factors for decision-making. A second source of inspiration was the fact that disease-specific advocates' estimates of the number of deaths caused by their diseases of interest far exceeded the total number of global deaths in any given year. GBD authors chose to pursue a holistic approach to analyzing disease burden to produce scientifically sound estimates that were independent of the influence of advocates.

The GBD 1990 study had a profound impact on health policy as it exposed the hidden burden of mental illness around the world. It also shed light on neglected health areas such as the premature death and disability caused by road traffic injuries. Work from this study has been cited over 4,000 times since 1993.

The study also sparked substantial controversy. Many disease-specific advocates argued that the original GBD underestimated burden from the causes they cared about most. The use of age weighting and discounting also caused extensive debates. Age weighting assumed that a year of life increased in value until age 22, and then decreased steadily. Discounting counted years of healthy life saved in the present as more valuable than years of life saved in the future. Also controversial was the use of expert judgment to estimate disability weights (estimations of the severity of non-fatal conditions). As a result of this feedback and consultation with a network of philosophers, ethicists, and economists, GBD no longer uses age weighting and discounting. Also, GBD 2010 updated its methods for determining disability weights and used data gathered from thousands of respondents from different countries around the world.

GBD 2010 shares many of the founding principles of the original GBD 1990 study, such as using all available data on diseases, injuries, and risk factors; using comparable metrics to estimate the impact of death and disability on society; and ensuring that the science of disease burden estimation is not influenced by advocacy.

Despite these similarities, GBD 2010 is broader in scope and involved a larger number of collaborators than any previous GBD study. While the original study had the participation of 100 collaborators worldwide, GBD 2010 had 488 co-authors. Thanks to that network, the study includes vast amounts of data on health outcomes and risk factors. Researchers also made substantial improvements to the GBD methodology, summarized in Box 2 and described in detail in the Annex of this report and in the published studies. Among these improvements, highlights include using data collected via population surveys to estimate disability weights for the first time, greatly expanding the list of causes and risk factors analyzed in the study, providing detailed analysis of the effect of different components of diet on health outcomes, and reporting of uncertainty intervals for all metrics. GBD 2010 researchers reported uncertainty intervals to provide full transparency about the weaknesses and strengths of the analysis. Narrow uncertainty intervals indicate that evidence is strong, while wide uncertainty intervals show that evidence is weaker.

kidney disease. Diabetes is a major public health problem in the Caribbean, where it ranked among the top five causes of health loss in many countries. Today, drug and alcohol use disorders are causing more early death and disability in Latin America and the Caribbean than two decades ago.

- Although health systems in Latin America and the Caribbean are grappling with a larger burden from non-communicable diseases than ever before, progress is being made in certain areas. Researchers can remove the impact of demographic changes to isolate what is important for comparisons of health performance. This involves the use of a health performance metric called age-standardized rates. Using this metric reveals that many countries in the Latin American and Caribbean region succeeded in reducing ischemic heart disease and stroke between 1990 and 2010. At the same time, age-standardized rates of diabetes, musculoskeletal disorders, and drug use disorders rose in multiple countries during this period.
- Dietary risks such as low fruit, nut and seed, and whole grain intake and high sodium consumption are a leading risk factor for premature death and disability in the region. High body mass index, high blood pressure, high fasting glucose (blood sugar), and alcohol use are also top contributors to health loss in many countries. Risk factors that primarily cause illness in children, such as household air pollution, iron deficiency, and suboptimal breastfeeding, were important in lower-income countries of the region, including Bolivia and Haiti.
- As countries in Latin America and the Caribbean have become more developed, road injuries have taken a growing toll on human health. Also, many countries in the region suffered from increasing levels of health loss as a result of interpersonal violence. Brazilian men, for example, lost nearly 3 million years of healthy life in 2010 as a result of such violence.
- Disease and injury trends within Latin America and the Caribbean differ dramatically across countries in the region. Ischemic heart disease was the leading cause of health loss in 12 countries in the region, but the top causes in other countries were as diverse as interpersonal violence, lower respiratory infections, diabetes, HIV/AIDS, and road injuries.
- The leading causes of disability in Latin America and the Caribbean, including low back pain, neck pain, and other musculoskeletal disorders, as well as mental disorders such as depression and anxiety, largely mirrored global trends. In contrast to global trends, asthma and drug use disorders were larger causes of disability in the region, and iron-deficiency anemia and chronic obstructive pulmonary disease were less prominent in the region than in the world as a whole.
- When comparing countries' health performance, low- and low-middle-income countries in the region had the highest age-standardized rates of premature death and disability due to communicable, newborn, nutritional, and maternal conditions while upper-middle-income countries had rates that were more comparable to developed countries. Generally, upper-middle-income countries performed better than the regional average for most causes of premature death while low- and lower-middle-income countries did not tend to perform as well, but there were important exceptions to this trend.

Box 2: Global Burden of Disease methodology

GBD uses thousands of data sources from around the world to estimate disease burden. As a first step, GBD researchers estimate child and adult mortality using data sources such as vital and sample registration systems, censuses, and household surveys. Years lost due to premature death from different causes are calculated using data from vital registration with medical certification of causes of death when available, and sources such as verbal autopsies in countries where medical certification of causes of death is lacking. Years lived with disability are estimated using sources such as cancer registries, data from outpatient and inpatient facilities, and direct measurements of hearing, vision, and lung function testing. Once they have estimated years lost due to premature death and years lived with disability, GBD researchers sum the two estimates to obtain disability-adjusted life years. Finally, researchers quantified the amount of premature death and disability attributable to different risk factors using data on exposure to, and the effects of, the different risk factors. For more information about the GBD methods, see the Annex of this report as well as the published papers.