

THE GLOBAL BURDEN OF DISEASE: GENERATING EVIDENCE, GUIDING POLICY

SUB-SAHARAN AFRICA REGIONAL EDITION

INSTITUTE FOR HEALTH METRICS AND EVALUATION
UNIVERSITY OF WASHINGTON

HUMAN DEVELOPMENT NETWORK
THE WORLD BANK

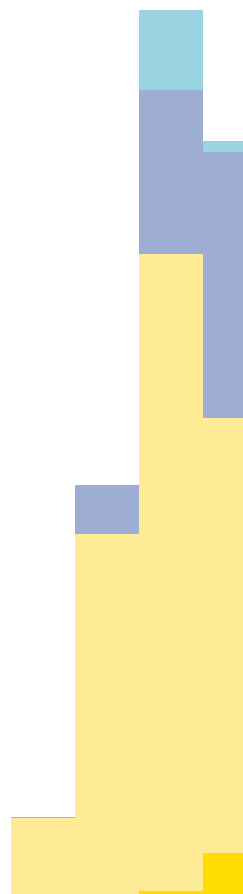


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This report was prepared by the Institute for Health Metrics and Evaluation (IHME) and the Human Development Network at the World Bank based on seven papers for the Global Burden of Disease Study 2010 (GBD 2010) published in *The Lancet* (2012 Dec 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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Glossary	6
Introduction	7
The GBD approach to tracking health progress and challenges	12
Rapid health transitions: GBD 2010 results	16
Tremendous progress in sub-Saharan Africa, but major challenges remain for Millennium Development Goals 4, 5, and 6	45
Using GBD to assess countries' health progress	50
Conclusion	56
Annex	59

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.

The World Bank's Human Development Network (HDN) invests in creating equal opportunities for people to live healthy and productive lives, secure meaningful jobs, and protect themselves from crises. HDN takes a lifecycle and systems approach to help developing countries deliver equitable and effective education; health, nutrition, and population; and social protection and labor services. HDN works across all development sectors and with ministries of finance to demonstrate how these investments in people promote inclusive development; long, healthy, and productive lives; economic growth; and country competitiveness. HDN focuses on results through building strong, integrated systems and country capacity; promoting evidence-based policy and program decision-making; and leveraging partnerships with donors and development agencies, civil society, the private sector, and communities

to deliver country-tailored solutions. HDN's work helps support the most effective policies, tools, and instruments to make a real difference toward the broader goal of ending extreme poverty and building shared prosperity.

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

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The Global Burden of Disease Study 2010 (GBD 2010) was implemented as a collaboration between seven institutions: the Institute for Health Metrics and Evaluation (IHME) as the coordinating center, the University of Queensland School of Population Health, Harvard School of Public Health, the Johns Hopkins Bloomberg School of Public Health, the University of Tokyo, Imperial College London, and the World Health Organization. This summary draws on seven GBD 2010 papers published in *The Lancet* (2012 Dec 13; 380). GBD 2010 had 488 co-authors from 303 institutions in 50 countries.

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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.

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. Limited data create substantial uncertainty.

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 this region, dramatic progress has been made in reducing the loss of life from many types of communicable diseases and conditions of early childhood, especially diarrheal diseases and lower respiratory infections. These diseases still account for the most health loss in the region, but their relative burdens are much lower today than 20 years ago. Deaths from measles and tetanus have also plummeted in sub-Saharan Africa since 1990. Malaria and HIV/AIDS accounted for more health loss in

2010 than in 1990, but the peak occurred for most countries between 2000 and 2005. Child mortality rates have declined for most countries, but several countries with high rates of HIV/AIDS experienced increases in childhood deaths. Mortality rates among adults in the region are more variable, with some age groups experiencing rising mortality, such as younger women of reproductive age and adult males between 25 and 39 years of age. Risk factors like childhood underweight account for far less health loss in sub-Saharan Africa today than in 1990; reductions in these risks have helped improve childhood survival throughout the region. Non-communicable diseases like stroke and diabetes are on the rise. Stroke and ischemic heart disease account for many deaths in Cape Verde, for example, while malaria and HIV/AIDS still drive much of the premature health loss in Nigeria. Nonetheless, relative to 1990, nearly every country in sub-Saharan Africa has seen improvements in their overall health outcomes, especially among children.

This publication summarizes the global GBD 2010 findings and highlights the regional findings for sub-Saharan Africa. 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 SUB-SAHARAN AFRICA

- The sub-Saharan Africa region has made overall progress in reducing mortality and prolonging life since 1970; however, some countries showed elevated rates of death within certain age groups and for sexes, between 1990 and 2010. Mozambique, for example, has seen rising mortality rates among women aged 25 to 29.
- Over the last 20 years, the region has succeeded in decreasing premature death and disability from some communicable, newborn, nutritional, and maternal causes, especially from diarrheal diseases and lower respiratory infections. Throughout the region, deaths from measles and tetanus have substantially declined since 1990. Malaria and HIV/AIDS accounted for more health loss in 2010 than in 1990, but both diseases peaked between 2000 and 2005 in most countries.
- Although their relative burdens have declined, communicable, newborn, nutritional, and maternal causes such as diarrheal diseases, lower respiratory infections, and protein-energy malnutrition remained the top drivers of health loss in most sub-Saharan Africa countries, especially in lower-income countries like Niger and Sierra Leone.
- Between 1990 and 2010, disease burden from many non-communicable causes increased, particularly stroke, depression, diabetes, and ischemic heart disease among upper-middle-income countries in the region.
- As many countries in sub-Saharan Africa have become more developed, road injuries have taken a growing toll on human health. Many countries experienced increased levels of interpersonal violence, especially in the Democratic Republic

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, detailed analysis of the effect of different components of diet on health outcomes, and reporting 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.

of the Congo and Lesotho. In Somalia and Sudan, past and ongoing conflicts have resulted in higher levels of health loss due to war.

- In most of sub-Saharan Africa, a larger percentage of healthy years were lost due to disability in 2010 compared to 1990. The leading causes of disability in the region, such as depression and low back pain, were largely consistent with the leading causes at the global level; however, communicable diseases like HIV/AIDS and malaria accounted for a larger proportion of disability in sub-Saharan Africa than the world as a whole. In 2010, nutritional deficiencies, especially iron-deficiency anemia, accounted for nearly twice the health loss in sub-Saharan Africa than they did globally; this trend was primarily driven by lower-income countries and was not seen in upper-middle-income countries in the region, such as Mauritius and the Seychelles.
- Undernutrition and household air pollution were among the leading risk factors for premature death and disability in sub-Saharan Africa. In most countries, substantial progress has been made in reducing risks like childhood underweight, suboptimal breastfeeding, and vitamin deficiencies, such that their burdens have declined between 30% and 50% in the last 20 years. Nonetheless, these risk factors remain among the top three contributors to health loss throughout the region, especially among lower-income countries.
- Alcohol use, high blood pressure, and smoking were also top contributors to health loss in many countries in sub-Saharan Africa. Among upper-middle-income countries in the region, such as Gabon and South Africa, high fasting plasma glucose and high body mass index accounted for more health loss. In lower-income countries, such as the Central African Republic, childhood underweight was the primary risk factor that drove larger health burdens.

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 quantify 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.