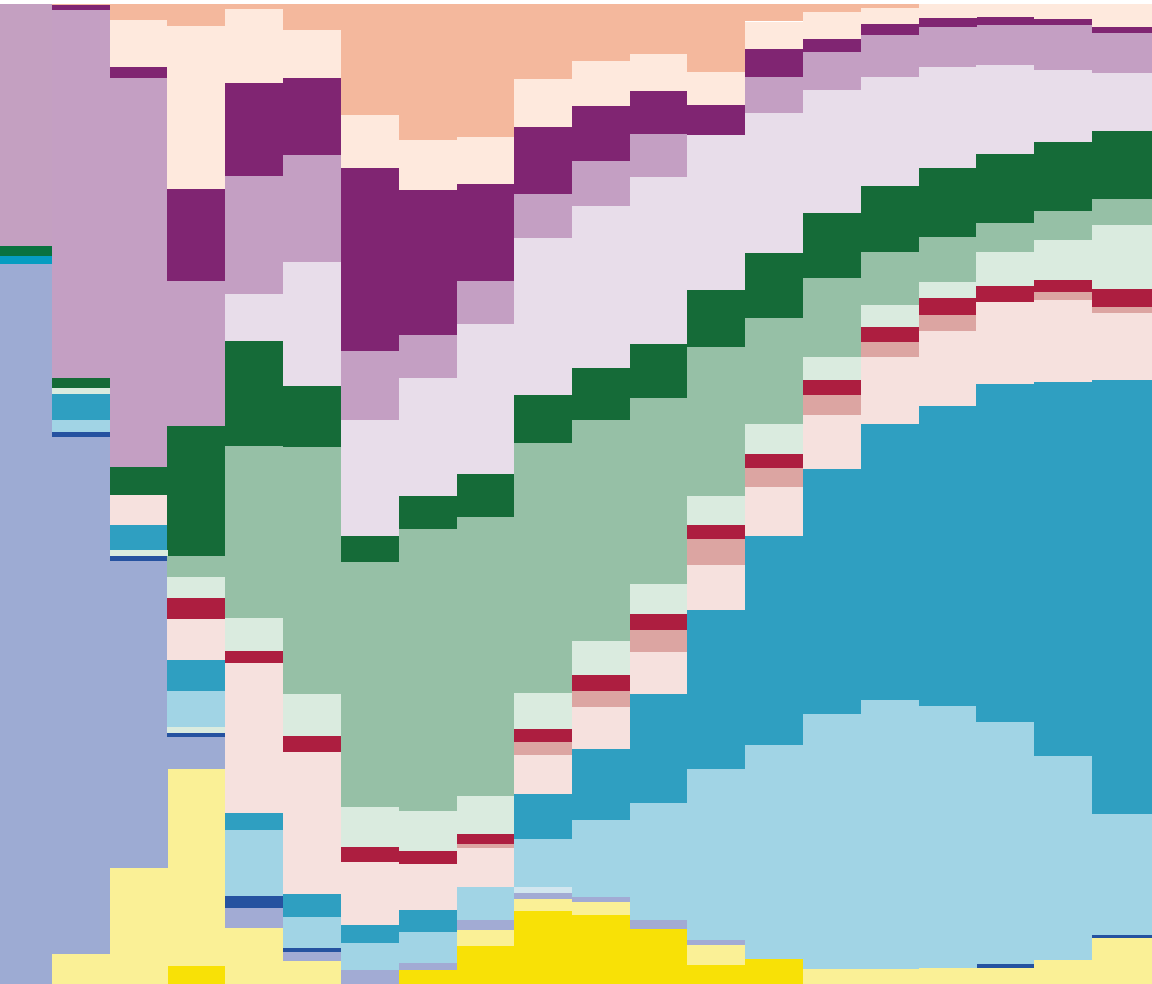
THE GLOBAL BURDEN OF DISEASE: GENERATING EVIDENCE, GUIDING POLICY

SOUTH ASIA 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.

Citation: Institute for Health Metrics and Evaluation, Human Development Network, The World Bank. *The Global Burden of Disease: Generating Evidence, Guiding Policy – South Asia Regional Edition.* Seattle, WA: IHME, 2013.

Institute for Health Metrics and Evaluation
2301 Fifth Ave., Suite 600
Seattle, WA 98121
USA
www.healthmetricsandevaluation.org

Contact:
Katherine Leach-Kemon
Policy Translation Specialist
katielk@uw.edu

Human Development Network
The World Bank
1818 H St., NW
Washington, DC 20433
USA
www.worldbank.org

Contact:
Anne-Maryse Pierre-Louis
Public Health Cluster Leader
apierrelouis@worldbank.org

THE WORLD BANK

Printed in the United States of America

ISBN 978-0-9894752-1-1

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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:

Institute for Health Metrics and Evaluation
2301 Fifth Ave., Suite 600
Seattle, WA 98121
USA

Telephone: +1-206-897-2800
Fax: +1-206-897-2899
E-mail: comms@healthmetricsandevaluation.org
www.healthmetricsandevaluation.org

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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.

ACKNOWLEDGMENTS

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.

IHME and the World Bank oversaw the production of this publication. In particular, we thank IHME's Board for their continued leadership. We are grateful to the report's writer, Nancy Fullman; to Christopher Murray, Michael MacIntyre, Theo Vos, Rafael Lozano, Rouselle Lavado, Rhonda Stewart, and William Heisel at IHME, Anne-Maryse Pierre-Louis of the Human Development Network at the World Bank, and Julie McLaughlin and team at the World Bank for content guidance; to Ryan Barber and Daniel Dicker for data analysis; to Brittany Wurtz and Summer Ohno for program coordination; to Patricia Kiyono for production oversight; to Katherine Leach-Kemon for writing support and production management; to Pamela Bruton for editing; to Rica Asuncion-Reed for editorial support; and to Miriam Alvarado, Ian Bolliger, Roy Burstein, Emily Carnahan, Greg Freedman, Nicole Johns, Katherine Lofgren, and Richard Luning for fact checking. This report would not have been possible without the ongoing contributions of Global Burden of Disease collaborators around the world.

Finally, we would like to extend our gratitude to the Human Development Network at the World Bank for co-financing this report, and to the Bill & Melinda Gates Foundation for generously funding IHME and for its consistent support of the Global Burden of Disease research.

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 of the GBD approach 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 one 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 South Asia, dramatic progress has been made in reducing the loss of life from many types of communicable diseases and conditions of early childhood, especially in lower-middle-income countries like Bhutan. These diseases still account for the

most health loss in these countries, but their relative burdens are much lower today than 20 years ago. Child mortality rates have plummeted, and death rates among women have generally improved as well. Mortality rates among adult males are more variable, with some age groups showing a reverse pattern of heightened risk for death (e.g., men aged 35 to 39 in Pakistan). Risk factors like childhood underweight and vitamin deficiencies account for far less health loss in South Asia today than in 1990; reductions in these conditions have undoubtedly helped improve overall childhood survival throughout the region. Non-communicable diseases like ischemic heart disease and diabetes are on the rise, especially in some of the lower-middle- and upper-middle-income countries. In the Maldives, the only country in South Asia with a World Bank classification of upper-middle income, non-communicable conditions like ischemic heart disease and stroke now kill more people than maternal, nutritional, and newborn causes of death; these trends mirror those at the global level. The region's lower-middle-income countries show more heterogeneous health trends, with ischemic heart disease accounting for the most deaths in Sri Lanka, while newborn conditions like preterm birth complications still drive the most premature health loss in India. Nonetheless, relative to 1990 – or even just 10 years ago – nearly every country in South Asia has seen improvements in their health outcomes, especially with respect to some of the most lethal diseases of childhood.

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

MAIN FINDINGS FOR SOUTH ASIA

- The South Asia 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 sex between 1990 and 2010 (e.g., heightened mortality rates among girls aged 10 to 14 in Sri Lanka).
- Over the last 20 years, most countries in the region have succeeded in decreasing premature death and disability from most communicable, newborn, nutritional, and maternal causes, with the exception of HIV/AIDS. In Afghanistan, however, many of these conditions have increased, such as preterm birth complications, meningitis, tuberculosis, and maternal disorders.
- Although their relative burdens have substantially declined, communicable, newborn, nutritional, and maternal causes remained the top drivers of health loss in most South Asian countries, such as in low-income Bangladesh and Nepal and even in lower-middle-income India and Pakistan.
- Between 1990 and 2010, disease burden from many non-communicable causes increased, especially ischemic heart disease, stroke, diabetes, musculoskeletal disorders (including low back pain and neck pain), and major depressive disorders. In Bangladesh and Pakistan, ischemic heart disease increased more than 100% between 1990 and 2010. Although diabetes was not always ranked

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 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.

in the top five causes of healthy years lost across countries in South Asia, most countries have documented diabetes as their fastest-growing health burden in the last 20 years.

- Many South Asian countries have suffered from increasing levels of health loss as a result of self-harm, especially India and Pakistan. However, in Sri Lanka, premature death and disability from self-harm have declined in the last 20 years, even though it remained the second highest cause of mortality. Poisonings were the fourth highest cause of disease burden in Bhutan. As the lower-income countries in South Asia have become more developed, road injuries have taken a growing toll on human health. In Afghanistan, past and ongoing conflict has driven substantial health loss due to interpersonal violence and war.
- In South Asia, the leading causes of disability were similar to global trends. In 2010, however, chronic respiratory diseases accounted for a greater percentage of health loss in South Asia than globally; this trend was largely driven by India's disease profile and was not experienced by all South Asian countries.
- Dietary risks such as low consumption of fruit, nuts, and seeds and high sodium intake were leading risk factors for premature death and disability in South Asia. In most countries of the region, substantial progress has been made in reducing risks like childhood underweight, suboptimal breastfeeding, and vitamin deficiencies, such that their burdens have been at least halved in the last 20 years. Household air pollution, smoking, and high blood pressure were also top contributors to health loss in many South Asian countries. Among wealthier countries in South Asia, high fasting plasma glucose (high blood sugar) and high body mass index accounted for more health loss. In low-income countries, such as Afghanistan, childhood underweight was a 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.