Global Burden of Disease Study

Resource Pack

2025

Overview

This resource pack on the Global Burden of Disease (GBD) study contains the most recent main global analyses describing the distribution and causes of a wide array of major diseases, injuries, and health risk factors. It includes articles, data portals, interactives and visualizations, country profiles, and selected briefs.

Led by the Institute for Health Metrics and Evaluation (IHME) at the University of Washington, GBD is a global effort with researchers from over 150 countries and territories. IHME and other partnering organizations have developed numerous resources to disseminate and visualize the findings of the GBD studies, data visualizations and interactives, country profiles, policy reports, research articles, infographics, and the GBD Results Tool, which allows users to search GBD data.

Other useful resources about the GBD include a Global Burden of Disease web portal hosted by *The Lancet* and a running master list of sub-national analyses (focused on a single country or region) and topical global analyses (focused on a single health issue) hosted and maintained by GHELI.

This resource pack includes:

gheli@harvard.edu
617-495-8222

Selected Resources

*indicates resource listed in GHELI's online Repository

AT-A-GLANCE

Web Portal. Global Burden of Disease (GBD)
Global Burden of Disease (GBD). Institute for Health Metrics and Evaluation. https://www.healthdata.org/research-analysis/gbd.

*** Data Publication. Global Burden of Disease 2021: Findings from the GBD 2021 Study**
Global Burden of Disease 2021: Findings from the GBD 2021 Study. Institute for Health Metrics and Evaluation 2024. https://www.healthdata.org/research-analysis/library/global-burden-disease-2021-findings-gbd-2021-study.

Article. Findings From the Global Burden of Disease Study 2021
Murray C. Findings From the Global Burden of Disease Study 2021. The Lancet 2024; 403: 2259–2262. DOI: https://doi.org/10.1016/S0140-6736(24)00769-4

Article. Global Burden of Disease Study 2021 Estimates: Implications for Health Policy and Research
Ward ZJ, Goldie SG. Global Burden of Disease Study 2021 Estimates: Implications for Health Policy and Research. The Lancet 2024. DOI: https://doi.org/10.1016/S0140-6736(24)00812-2.

Article. Global Burden of Disease Study 2021 Estimates: Implications for Health Policy and Research
Ward ZJ, Goldie SG. Global Burden of Disease Study 2021 Estimates: Implications for Health Policy and Research. The Lancet 2024; 403(10440): 1958-1959. DOI: https://doi.org/10.1016/S0140-6736(24)00812-2.

ABOUT THE GLOBAL BURDEN OF DISEASE (GBD) STUDY

Web Portal. About the GBD Study
About GBD. Institute for Health Metrics and Evaluation.https://www.healthdata.org/research-analysis/about-gbd.

*** Article. The Global Burden of Disease Study at 30 Years**
Murray CJL. The Global Burden of Disease Study at 30 Years. Nature Medicine 2022; 28: 2019-2026. DOI: https://doi.org/10.1038/s41591-022-01990-1.

Article. The Genesis of the Global Burden of Disease Study
Keating C. The Genesis of the Global Burden of Disease Study. The Lancet 2018; 391(10137): 2316–2317. DOI: https://doi.org/10.1016/S0140-6736(18)31261-3.

*** Glossary. GBD Glossary: Terms Defined**
Terms Defined. Institute for Health Metrics and Evaluation. https://www.healthdata.org/terms-defined.

GLOBAL BURDEN OF DISEASE (GBD) STUDY 2021 RESULTS

*** Article. Global Age-Sex-Specific Mortality, Life Expectancy, and Population Estimates in 204 Countries and Territories and 811 Subnational Locations, 1950–2021, and the Impact of the COVID-19 Pandemic: A Comprehensive Demographic Analysis for the Global Burden of Disease Study 2021**
GBD 2021 Demographic Collaborators. Global Age-Sex-Specific Mortality, Life Expectancy, and Population Estimates in 204 Countries and Territories and 811 Subnational Locations, 1950–2021, and the Impact of the COVID-19 Pandemic: A Comprehensive Demographic Analysis for the Global Burden of Disease Study 2021. The Lancet 2024; 403(10440): 1989-2056. DOI: https://doi.org/10.1016/S0140-6736(24)00476-8.

*** Article. Global Fertility in 204 Countries and Territories, 1950–2021, With Forecasts to 2100**
GBD 2021 Fertility and Forecasting Collaborators. Global Fertility in 204 Countries and Territories, 1950–2021, With Forecasts to 2100: A Comprehensive Demographic Analysis for the Global Burden of Disease Study 2021. The Lancet 2024; 403(10440): 2057-2099. DOI: https://doi.org/10.1016/S0140-6736(24)00550-6.

*** Article. Global Burden of 288 Causes of Death and Life Expectancy Decomposition in 204 Countries and Territories and 811 Subnational Locations, 1990–2021: A Systematic Analysis for the Global Burden of Disease Study 2021**
GBD 2021 Causes of Death Collaborators. Global Burden of 288 Causes of Death and Life Expectancy Decomposition in 204 Countries and Territories and 811 Subnational Locations, 1990–2021: A Systematic Analysis for the Global Burden of Disease Study 2021. The Lancet 2024; 403(10440): 2100-2132. DOI: https://doi.org/10.1016/S0140-6736(24)00367-2.

*** Article. Global Incidence, Prevalence, Years Lived With Disability (YLDs), Disability-Adjusted Life-Years (DALYs), and Healthy Life Expectancy (HALE) for 371 Diseases and Injuries in 204 Countries and Territories and 811 Subnational Locations, 1990–2021**
GBD 2021 Diseases and Injuries Collaborators. Global Incidence, Prevalence, Years Lived With Disability (YLDs), Disability-Adjusted Life-Years (DALYs), and Healthy Life Expectancy (HALE) for 371 Diseases and Injuries in 204 Countries and Territories and 811 Subnational Locations, 1990–2021: A Systematic Analysis for the Global Burden of Disease Study 2021. The Lancet 2024. DOI: https://doi.org/10.1016/S0140-6736(24)00757-8.

*** Article. Global Burden and Strength of Evidence for 88 Risk Factors in 204 Countries and 811 Subnational Locations, 1990–2021**
GBD 2021 Risk Factors Collaborators. Global Burden and Strength of Evidence for 88 Risk Factors in 204 Countries and 811 Subnational Locations, 1990–2021. The Lancet 2024; 403(10440): 2162-2203. DOI: https://doi.org/10.1016/S0140-6736(24)00933-4.

*** Article. Burden of Disease Scenarios for 204 Countries and Territories, 2022–2050: A Forecasting Analysis for the Global Burden of Disease Study 2021**
GBD 2021 Forecasting Collaborators. Burden of Disease Scenarios for 204 Countries and Territories, 2022–2050: a Forecasting Analysis for the Global Burden of Disease Study 2021. The Lancet 2024; 403(10440): 2204-2256. DOI: https://doi.org/10.1016/S0140-6736(24)00685-8.

*** Web Portal. GBD 2021: Country and Subnational-Level Profiles**
Country Profiles. Institute for Health Metrics and Evaluation 2024. https://www.healthdata.org/research-analysis/health-by-location/profiles.

*** Web Portal. GBD 2021: Disease, Injury, and Risk Fact Sheets**
Global Burden of Disease 2021: Disease, Injury, and Risk Factsheets. Institute for Health Metrics and Evaluation. https://www.healthdata.org/research-analysis/diseases-injuries-risks/factsheets.

GLOBAL BURDEN OF DISEASE (GBD) DATA AND INTERACTIVES

Web Portal. GBD Results Tool
GBD Results Tool. Institute for Health Metrics and Evaluation. http://ghdx.healthdata.org/gbd-results-tool.

*** Data Portal. GBD 2021: Data Resources Portal**
Global Burden of Disease Study 2021 (GBD 2021) Data Resources. Institute for Health Metrics and Evaluation. https://ghdx.healthdata.org/gbd-2021.

*** Data Portal. GBD Compare**
GBD Compare. Institute for Health Metrics and Evaluation 2024. https://vizhub.healthdata.org/gbd-compare.

*** Data Portal. GBD Cancer Compare**
GBD Cancer Compare. Institute for Health Metrics and Evaluation 2024. http://vizhub.healthdata.org/gbd-compare/cancer.

*** Data Portal. GBD Foresight**
GBD Foresight. Institute for Health Metrics and Evaluation 2024. https://vizhub.healthdata.org/gbd-foresight.

gheli@harvard.edu
617-495-8222

*** Data Portal. GBD 2021: Causes of Death (COD)**
Causes of Death (COD) Visualization. Institute for Health Metrics and Evaluation 2024. https://vizhub.healthdata.org/cod.

*** Data Portal. GBD 2021: Mortality**
Mortality Visualization. Institute for Health Metrics and Evaluation 2024. https://vizhub.healthdata.org/mortality.

*** Data Portal. GBD 2021: Epidemiology**
Epi Visualization. Data Visualization. Institute for Health Metrics and Evaluation 2024. https://vizhub.healthdata.org/epi.

Web Portal. GBD Data Visualizations
GBD Data Visualizations. Institute for Health Metrics and Evaluation. https://www.healthdata.org/gbd/data-visualizations.

GLOBAL BURDEN OF DISEASE (GBD) STUDY 2019 RESULTS

*** Article. Measuring Universal Health Coverage Based on an Index of Effective Coverage of Health Services in 204 Countries and Territories, 1990-2019**
GBD 2019 Universal Health Coverage Collaborators. Measuring Universal Health Coverage Based on an Index of Effective Coverage of Health Services in 204 Countries and Territories, 1990-2019: A Systematic Analysis for the Global Burden of Disease Study 2019. The Lancet 2020; 1-35. DOI: https://doi.org/10.1016/S0140-6736(20)30750-9.

*** Article. Global Burden of 369 Diseases and Injuries in 204 Countries and Territories, 1990-2019**
GBD 2019 Diseases and Injuries Collaborators. Global Burden of 369 Diseases and Injuries in 204 Countries and Territories, 1990-2019: A Systematic Analysis for the Global Burden of Disease Study 2019. The Lancet 2020; 396(10258): 1204-1222. DOI: https://doi.org/10.1016/S0140-6736(20)30925-9.

*** Article. Global Age-Sex-Specific Fertility, Mortality, Healthy Life Expectancy (HALE), and Population Estimates in 204 Countries and Territories, 1950-2019**
GBD 2019 Demographics Collaborators. Global Age-Sex-Specific Fertility, Mortality, Healthy Life Expectancy (HALE), and Population Estimates in 204 Countries and Territories, 1950-2019: A Comprehensive Demographic Analysis for the Global Burden of Disease Study 2019. The Lancet 2020; 369(10258): 1160-1203. DOI: https://doi.org/10.1016/S0140-6736(20)30977-6.

*** Article. Fertility, Mortality, Migration, and Population Scenarios for 195 Countries and Territories From 2017 to 2100**
Vollset S et al. Fertility, Mortality, Migration, and Population Scenarios for 195 Countries and Territories From 2017 to 2100: A Forecasting Analysis for the Global Burden of Disease Study. The Lancet 2020; 1-22.
DOI: https://doi.org/10.1016/S0140-6736(20)30677-2.

*** Article. Progress in Adolescent Health and Well-being: Tracking 12 Headline Indicators for 195 Countries and Territories, 1990-2016**
Azzopardi PS et al. Progress in Adolescent Health and Well-being: Tracking 12 Headline Indicators for 195 Countries and Territories, 1990-2016. The Lancet 2019; 393(10176): 1101-1118. DOI: https://doi.org/10.1016/S0140-6736(18)32427-9.

*** Web Portal. GBD: Policy Reports**
Policy Reports. Institute for Health Metrics and Evaluation.
https://www.healthdata.org/search?f%5B0%5D=content_type%3Areport.

OTHER RESOURCES ABOUT THE GLOBAL BURDEN OF DISEASE (GBD) STUDY

*** Organization. Institute for Health Metrics and Evaluation**
Institute for Health Metrics and Evaluation. https://www.healthdata.org.

Web Portal. GBD Publications
GBD Publications. Institute for Health Metrics and Evaluation. https://www.healthdata.org/gbd/publications.

gheli@harvard.edu
617-495-8222

Web Portal. GBD 2021: Country and Subnational-Level Profiles
Country Profiles. Institute for Health Metrics and Evaluation 2024. https://www.healthdata.org/research-analysis/health-by-location/profiles.

Web Portal. GBD Data Interactives and Infographics
Data Interactives and Infographics. Institute for Health Metrics and Evaluation. https://www.healthdata.org/research-analysis/gbd-research-library.

Guide. GBD Data and Tools Guide
GBD Data and Tools Guide. Institute for Health Metrics and Evaluation. https://www.healthdata.org/research-analysis/about-gbd/gbd-data-and-tools-guide.

Course. Learn How to Use GBD Compare Tool
Learn How to Use GBD Compare Tool. Institute for Health Metrics and Evaluation. https://rise.articulate.com/share/Yykiricid7Es3w1HJ44Yl00Y-ePOASID#.

Web Portal. Global Burden of Disease
Global Burden of Disease. The Lancet. https://www.thelancet.com/gbd.

RELATED RESOURCE COLLECTIONS

*** Article. Global Burden of Disease Study: Regional and Subnational Analyses**
Global Burden of Disease Study: Regional and Subnational Analyses. Global Health Education and Learning Incubator at Harvard University 2025. https://repository.gheli.harvard.edu/repository/13400.

*** Article. Global Burden of Disease Study: Global Analyses on Topics**
Global Burden of Disease Studies: Global Analyses on Topics. Global Health Education and Learning Incubator at Harvard University 2025. https://repository.gheli.harvard.edu/repository/12878.

gheli@harvard.edu
617-495-8222

Annotated Bibliography

AT-A-GLANCE

Web Portal. Global Burden of Disease (GBD)
Global Burden of Disease (GBD). Institute for Health Metrics and Evaluation. https://www.healthdata.org/research-analysis/gbd.
This web portal from the Institute for Health Metrics and Evaluation provides the major resources associated with the Global Burden of Disease (GBD) studies. The Global Burden of Disease studies form the largest-ever systematic effort to quantify, measure, and analyze the distribution and causes of a wide array of major diseases, injuries, and health risk factors by examining national and sub-national data across populations worldwide from 1990 to the present. Led by the Institute for Health Metrics and Evaluation (IHME) at the University of Washington, GBD is a global effort with more than 5,000 researchers from 154 countries, with a special focus on participation from low- and middle-income countries in recent studies. The web portal links to the capstone research articles, downloadable datasets, the GBD Results Tool, numerous data visualizations, the GBD Country Profiles, and study highlights.

Data Publication. Global Burden of Disease 2021: Findings from the GBD 2021 Study
Global Burden of Disease 2021: Findings from the GBD 2021 Study. Institute for Health Metrics and Evaluation 2024. https://www.healthdata.org/research-analysis/library/global-burden-disease-2021-findings-gbd-2021-study.
GHELI link: https://repository.gheli.harvard.edu/repository/14229
These findings, published by the Institute for Health Metrics and Evaluation (IHME), offer an overview of the results of the Global Burden of Diseases, Injuries, and Risk Factors Study (GBD) 2021. Using data from 328,938 sources, GBD 2021 includes findings on the global disease burden for 371 diseases and injuries between 1990 and 2021 and represents the first data estimates published since the onset of the COVID-19 pandemic. GBD 2021 provides a comprehensive assessment of the burden of emerging diseases at the global, regional, and country levels, and explores data on mortality, life expectancy, and demographic trends, such as fertility and population levels.

Article. Findings From the Global Burden of Disease Study 2021
Murray C. Findings From the Global Burden of Disease Study 2021. The Lancet 2024; 403: 2259–2262.
DOI: https://doi.org/10.1016/S0140-6736(24)00769-4
This viewpoint article from *The Lancet* introduces the Global Burden of Diseases, Injuries, and Risk Factors Study (GBD) 2021, providing an overview of the GBD 2021 findings published in a series of six articles. The articles include comprehensive summaries of data trends and analyze disparities across age, sex, location, and sociodemographic index worldwide. GBD 2021 presents data estimates on the global disease burden for 371 diseases and injuries between 1990 and 2021, utilizing more than 328,938 primary data sources. This newest iteration of the GBD specifically analyzes the impact of the COVID-19 pandemic, representing the first global data estimates published since the onset of the pandemic in 2020. It also explores and forecasts disease trends based on several factors, such as climate change, the obesity epidemic, and the rise of substance-use disorders.

Article. Global Burden of Disease Study 2021 Estimates: Implications for Health Policy and Research
Ward ZJ, Goldie SG. Global Burden of Disease Study 2021 Estimates: Implications for Health Policy and Research. The Lancet 2024; 403(10440): 1958-1959. DOI: https://doi.org/10.1016/S0140-6736(24)00812-2.
GHELI repository link: https://repository.gheli.harvard.edu/repository/14215
This editorial article, published by *The Lancet*, outlines the health policy and research implications of the newest iteration of the Global Burden of Diseases, Injuries, and Risk Factors Study (GBD), GBD 2021. Published in 2024, GBD 2021 estimates include data on the global disease burden for 371 diseases and injuries between 1990 and 2021 and represent the first estimates published since the onset of the COVID-19 pandemic. GBD 2021 provides a comprehensive assessment of the burden of emerging diseases at the global, regional, and country levels and explores how data varies by location and over time.

gheli@harvard.edu
617-495-8222

ABOUT THE GLOBAL BURDEN OF DISEASE (GBD) STUDY

Web Portal. About the GBD Study
About GBD. Institute for Health Metrics and Evaluation. https://www.healthdata.org/gbd/about.
The Global Burden of Disease (GBD) studies form the largest-ever systematic effort to quantify, measure, and analyze the distribution and causes of a wide array of major diseases, injuries, and health risk factors by examining national and sub-national data across populations worldwide from 1990 to the present. Led by the Institute for Health Metrics and Evaluation (IHME) at the University of Washington, GBD is a global effort with more than 5,000 researchers from 154 countries and territories, with a special focus on participation from low- and middle-income countries in recent studies. Estimates from the GBD study may differ from national statistics due to differences in data sources and methodology. The IHME also maintains a resource portal for the GBD studies including summary reports, additional visualizations, and data sets quantifying health loss from hundreds of diseases, injuries, and risk factors, so that health systems can be improved and disparities eliminated.

Article. The Global Burden of Disease Study at 30 Years
Murray CJL. The Global Burden of Disease Study at 30 Years. Nature Medicine 2022; 28: 2019-2026.
DOI: https://doi.org/10.1038/s41591-022-01990-1.
GHELI repository link: https://repository.gheli.harvard.edu/repository/14252
This perspective article published by *Nature Medicine* presents the history of the Global Burden of Disease (GBD) Study. The article discusses the initial goals of the GBD Study, which first began in 1991, and describes the study's efforts to assess outcomes for diseases, injuries, and risk factors in more than 200 countries, and its present collaboration of more than 8,000 scientists and analysts from over 150 countries worldwide. The article describes the core principles of the GBD, including best estimates, comprehensive accounting, comparability of measurement, morbidity and disability, and commitment to evaluating face validity. It also includes information concerning GBD data evaluation and processing, data sources, statistical methods, and future directions.

Article. The Genesis of the Global Burden of Disease Study
Keating C. The Genesis of the Global Burden of Disease Study. The Lancet 2018; 391(10137): 2316–2317.
DOI: https://doi.org/10.1016/S0140-6736(18)31261-3.
This article from *The Lancet* describes how the Global Burden of Disease (GBD) study began, chronicling a series of events in the 1990s that gave rise to the GBD in its present day form. The story begins with the precursor to GBD, a World Bank project in 1993 led by Dean Jamison. The rest of the article describes the pioneering work of Christopher Murray and Alan Lopez that led to a series of papers in The Lancet in 1997. The author explains the motivation of Murray and Lopez to create a source of information that allowed for worldwide policymaking and control of disease. To accomplish this, Murray and Lopez had to laboriously piece together data from a number of sources to create a statistical picture of global health. These accomplishments were revolutionary and set the stage for more advances in the new millennium.

Glossary. GBD Glossary: Terms Defined
Terms Defined. Institute for Health Metrics and Evaluation. https://www.healthdata.org/terms-defined.
GHELI repository link: https://repository.gheli.harvard.edu/repository/12355
This glossary from the Institute for Health Metrics and Evaluation (IHME) defines key terms used in the Global Burden of Disease (GBD) study, a systematic effort to measure the mortality and morbidity from major diseases, injuries, and health risk factors by examining national and sub-national data across populations worldwide from 1990 to the present.

gheli@harvard.edu
617-495-8222

GLOBAL BURDEN OF DISEASE (GBD) STUDY 2021 RESULTS

Article. Global Burden of 288 Causes of Death and Life Expectancy Decomposition in 204 Countries and Territories and 811 Subnational Locations, 1990–2021: A Systematic Analysis for the Global Burden of Disease Study 2021
GBD 2021 Causes of Death Collaborators. Global Burden of 288 Causes of Death and Life Expectancy Decomposition in 204 Countries and Territories and 811 Subnational Locations, 1990–2021: A Systematic Analysis for the Global Burden of Disease Study 2021. The Lancet 2024; 403(10440): 2100-2132. DOI: https://doi.org/10.1016/S0140-6736(24)00367-2.
GHELI repository link: https://repository.gheli.harvard.edu/repository/14249
This article from *The Lancet* presents global age-sex-specific mortality, life expectancy, and population estimates in 204 countries and 811 subnational locations from 1990 to 2021. The article includes a specific focus on changes in mortality and life expectancy due to the onset of the global COVID-19 pandemic, finding that age standardized mortality rates increased during the COVID-19 period between 2020 and 2021. Between 1950 and 2021, the authors find that global life expectancy at birth increased by 22.7 years; however, this historic trend reversed due to the onset of the COVID-19 pandemic, with global life expectancy declining between 2019 and 2021.

Article. Global Fertility in 204 Countries and Territories, 1950–2021, With Forecasts to 2100
GBD 2021 Fertility and Forecasting Collaborators. Global Fertility in 204 Countries and Territories, 1950–2021, With Forecasts to 2100: A Comprehensive Demographic Analysis for the Global Burden of Disease Study 2021. The Lancet 2024; 403(10440): 2057-2099. DOI: https://doi.org/10.1016/S0140-6736(24)00550-6.
GHELI repository link: https://repository.gheli.harvard.edu/repository/14231
This article from *The Lancet* analyzes global fertility rates and indicators in 204 countries and territories from 1950 to 2021, using data from the Global Burden of Disease, Injuries, and Risk Factors Study (GBD) 2021. The study also provides fertility projections at the global, national, and regional levels up to 2100. The authors find that fertility is declining globally, as fertility rates have declined in all countries since 1950. The data forecasts that fertility will continue to decline worldwide, and a larger proportion of livebirths will occur in lower-income countries.

Article. Global Burden of 288 Causes of Death and Life Expectancy Decomposition in 204 Countries and Territories and 811 Subnational Locations, 1990–2021: A Systematic Analysis for the Global Burden of Disease Study 2021
GBD 2021 Causes of Death Collaborators. Global Burden of 288 Causes of Death and Life Expectancy Decomposition in 204 Countries and Territories and 811 Subnational Locations, 1990–2021: A Systematic Analysis for the Global Burden of Disease Study 2021. The Lancet 2024; 403(10440): 2100-2132. DOI: https://doi.org/10.1016/S0140-6736(24)00367-2.
GHELI repository link: https://repository.gheli.harvard.edu/repository/14248
This article from *The Lancet* examines the mortality and estimated years of life lost (YLLs) from 288 causes of death in 204 countries and territories from 1990 to 2021. The article analyzes the leading causes of age-standardized deaths globally and the impact of the COVID-19 pandemic on mortality rates and life expectancy, finding that the data varied by region. The authors examine cause-specific mortality at global, regional, and national levels over time and consider the interruptions to gains in life expectancy and global burden of disease.

Article. Global Incidence, Prevalence, Years Lived With Disability (YLDs), Disability-Adjusted Life-Years (DALYs), and Healthy Life Expectancy (HALE) for 371 Diseases and Injuries in 204 Countries and Territories and 811 Subnational Locations, 1990–2021
GBD 2021 Diseases and Injuries Collaborators. Global Incidence, Prevalence, Years Lived With Disability (YLDs), Disability-Adjusted Life-Years (DALYs), and Healthy Life Expectancy (HALE) for 371 Diseases and Injuries in 204 Countries and Territories and 811 Subnational Locations, 1990–2021: A Systematic Analysis for the Global Burden of Disease Study 2021. The Lancet 2024. DOI: https://doi.org/10.1016/S0140-6736(24)00757-8.
GHELI repository link: https://repository.gheli.harvard.edu/repository/14217
This article from *The Lancet* examines the incidence, prevalence, years lived with disability (YLDs), disability-adjusted life-years (DALYs), and healthy life expectancy (HALE) for 371 diseases and injuries in 204 countries and territories and 811 subnational locations using data from the Global Burden of Disease, Injuries, and Risk Factors Study (GBD) 2021. The article examines data from 1990 to 2021 and finds that global DALYs increased from 2.63 billion in 2010 to 2.99 billion in 2021 for all causes, citing this increase due to global population growth and aging. In 2021, the leading cause of DALYs

globally was COVID-19, followed by ischemic heart disease, neonatal disorders, and stroke; however, the article finds significant health gains among other leading communicable, maternal, neonatal, and nutritional (CMNN) diseases. While HALE improved globally between 2010 and 2021, life expectancy declined between 2019 and 2021. The article explores key health data and disparities for CMNN and non-communicable diseases, highlighting disease trends and patterns from 1990 to 2021, and specifically examines the impact of the first two years of the COVID-19 pandemic worldwide.

Article. Global Burden and Strength of Evidence for 88 Risk Factors in 204 Countries and 811 Subnational Locations, 1990–2021

GBD 2021 Risk Factors Collaborators. Global Burden and Strength of Evidence for 88 Risk Factors in 204 Countries and 811 Subnational Locations, 1990–2021. The Lancet 2024; 403(10440): 2162-2203. DOI: https://doi.org/10.1016/S0140-6736(24)00933-4.

GHELI repository link: https://repository.gheli.harvard.edu/repository/14232

This article published by *The Lancet* provides estimates of the burden of disease for 88 risk factors in 204 countries and territories, using data from the Global Burden of Disease, Injuries, and Risk Factors Study (GBD) 2021. The article examines risks factors from 1990 to 2021, and it aims to provide an overview of the exposures and health outcomes associated with key risk factors. The authors find that particulate matter air pollution was the leading contributor to global disease burden in 2021, followed by high systolic blood pressure, low birthweight, and high fasting plasma glucose. For younger populations, low birthweight and unsafe water and sanitation (WASH) remain leading risks, while metabolic risks had a greater impact on older populations. The authors analyze the risk attributable burden of disease at the global, regional, and national levels and explore findings over time and between age groups and geographic regions.

Article. Burden of Disease Scenarios for 204 Countries and Territories, 2022–2050: A Forecasting Analysis for the Global Burden of Disease Study 2021

GBD 2021 Forecasting Collaborators. Burden of Disease Scenarios for 204 Countries and Territories, 2022–2050: a Forecasting Analysis for the Global Burden of Disease Study 2021. The Lancet 2024; 403(10440): 2204-2256. DOI: https://doi.org/10.1016/S0140-6736(24)00685-8.

GHELI link: https://repository.gheli.harvard.edu/repository/14230

This article from *The Lancet* seeks to analyze future trends in disease burden and drivers of health, providing cause-specific forecasts of mortality, years of life lost (YLL), years lived with disability (YLDs) and disability-adjusted life-years (DALYs) from 2022 to 2050 for 204 countries and territories, using data from the Global Burden of Disease, Injuries, and Risk Factors Study (GBD) 2021. Globally, life expectancy and the disease burden were predicted to improve between 2022 and 2050, with life expectancy increasing the most in regions with low life expectancies. The study highlights a forecasted reduction of the burden of communicable, maternal, neonatal, and nutritional (CMNN) diseases toward noncommunicable diseases (NCDs), with NCDs such as diabetes and chronic obstructive pulmonary disease (COPD), predicted to make up a more significant cause of DALYs worldwide.

Web Portal. GBD 2021: Country and Subnational-Level Profiles

Country Profiles. Institute for Health Metrics and Evaluation 2024. https://www.healthdata.org/research-analysis/health-by-location/profiles.

GHELI link: https://repository.gheli.harvard.edu/repository/11219

This web portal, offered by the Institute for Health Metrics and Evaluation (IHME), provides online country and subnational-level profiles that summarize the findings from the latest 2021 Global Burden of Disease Study (GBD) using color-coded graphics and charts. Each printable profile depicts 2021 population data, fertility rates and trends, and population forecasts, offering an overview of the health landscape in individual countries. Data on health spending, health coverage, under-5 mortality rate, the top 10 causes of premature death, and other indicators are included. A few indicators still use data from the 2017 and 2019 GBD Study. The country profiles show country-specific changes between 1990 and 2021 for life expectancy, fertility trends, child mortality, and other population demographics. Data is also available for some subnational locations worldwide, such as individual U.S. states and various country regions.

gheli@harvard.edu
617-495-8222

Web Portal. GBD 2021: Disease, Injury, and Risk Fact Sheets
Global Burden of Disease 2021: Disease, Injury, and Risk Factsheets. Institute for Health Metrics and Evaluation. https://www.healthdata.org/research-analysis/diseases-injuries-risks/factsheets.
GHELI link: https://repository.gheli.harvard.edu/repository/14237
These fact sheets from the Institute for Health Metrics and Evaluation (IHME) accompany the Global Burden of Disease (GBD) 2021 Study. Each fact sheet includes a two-page summary that offers an overview of the causes, impairments, and risk factors modeled in the GBD, and associated health loss. The fact sheets include a summary of results, a definition of the specific disease, injury, impairment, or risk, and include tables and figures that display metrics for each topic. Metrics include prevalence, incidence, deaths, years of life lost (YLLs), years lived with disability (YLDs), and more. Users can access the full set of published factsheets and filter by category: disease & injuries, impairments, or risk factors.

GLOBAL BURDEN OF DISEASE (GBD) DATA AND INTERACTIVES

Web Portal. GBD Results Tool
GBD Results Tool. Institute for Health Metrics and Evaluation. http://ghdx.healthdata.org/gbd-results-tool.
GHELI repository link: https://repository.gheli.harvard.edu/repository/14253
This data tool, presented by the Institute for Health Metrics and Evaluation (IHME), allows users to view, explore, and download data estimates from the Global Burden of Disease (GBD) Study 2021, which includes 288 causes of death, 371 diseases and injuries, and 88 risk factors in 204 countries and territories worldwide, from 1990 to 2021. Users can examine trends by age, sex, and region, and explore measures such as mortality, population, fertility, deaths, maternal mortality ratio, life expectancy, prevalence, disability-adjusted life years (DALYs), and more.

Data Portal. GBD 2021: Data Resources Portal
Global Burden of Disease Study 2021 (GBD 2021) Data Resources. Institute for Health Metrics and Evaluation. https://ghdx.healthdata.org/gbd-2021.
GHELI repository link: https://repository.gheli.harvard.edu/repository/11444
This portal, from the Institute for Health Metrics and Evaluation (IHME), contains data and resources from the Global Burden of Disease Study (GBD) 2019. It provides links to country profiles and data visualizations, as well as the GBD Results Tool, the Global Health Data Exchange (GHDx) Records, and the Data Input Sources Tool. In addition, a number of supplementary references can be accessed, along with the GBD 2021 *Lancet* articles and the code used to generate the study's results. A guide to GBD's suite of web-based tools provides an overview of what data is available in each tool.

Data Portal. GBD Compare
GBD Compare. Institute for Health Metrics and Evaluation 2024. https://vizhub.healthdata.org/gbd-compare.
GHELI repository link: https://repository.gheli.harvard.edu/repository/11446
This data interactive, presented by the Institute for Health Metrics and Evaluation (IHME), allows users to explore trends and patterns in the data from the Global Burden of Disease Study (GBD) 2021. Using color treemaps, world maps, arrow diagrams, plots, and other charts, each of the visualizations is fully customizable to give users the ability to refine or expand their selection of data across a variety of causes, risk factors, geographic locations, and other specifics of the GBD 2021 data.

Data Portal. GBD Cancer Compare
GBD Cancer Compare. Institute for Health Metrics and Evaluation 2024. http://vizhub.healthdata.org/gbd-compare/cancer.
GHELI repository link: https://repository.gheli.harvard.edu/repository/14251
This data interactive, presented by the Institute for Health Metrics and Evaluation (IHME), allows users to visualize and analyze global estimates of 52 cancers from 1990 to 2021, using data from the Global Burden of Disease (GBD) Study 2021. Users can compare causes of cancer and risks within a country, compare countries and regions, and explore

gheli@harvard.edu
617-495-8222

patterns by country, age and sex. Using maps, diagrams, and charts, this interactive also allows users to view subnational data and visualize how cancer patterns have shifted over time.

Data Portal. GBD Foresight
GBD Foresight. Institute for Health Metrics and Evaluation 2024. https://vizhub.healthdata.org/gbd-foresight.
GHELI repository link: https://repository.gheli.harvard.edu/repository/14251
This data interactive, presented by the Institute for Health Metrics and Evaluation (IHME), allows users to analyze forecasts and alternative future scenarios for death, life expectancy, years of life lost (YLLs), years lived with disability (YLDs), and disability-adjusted life years (DALYs) from 2022 to 2050, using data from the Global Burden of Disease (GBD) Study 2021. Users can compare data across countries and global regions using a treemap, charts, and maps, and explore patterns and trends by country, age, and sex.

Data Portal. GBD 2021: Causes of Death (COD) Data Interactive
Causes of Death (COD) Visualization. Institute for Health Metrics and Evaluation 2024.
https://vizhub.healthdata.org/cod.
GHELI repository link: https://repository.gheli.harvard.edu/repository/11448
This data interactive, presented by the Institute for Health Metrics and Evaluation (IHME), allows users to explore causes of death through a series of graphs and tables. Providing data for the world as a whole, along with individual countries, regions, and World Health Organization Income Classifications, the interactive graphs the estimates developed by the Global Burden of Disease Study (GBD) 2021. By selecting options in the left panel, users can view a series of age-specific charts displaying data specific to selected causes of death. The interactive provides results from 1980 through 2021, and can be viewed as a time-series, an age-pattern, or a comparative map.

Data Portal. GBD 2021: Mortality Data Interactive
Mortality Visualization. Institute for Health Metrics and Evaluation 2024. https://vizhub.healthdata.org/mortality.
GHELI repository link: https://repository.gheli.harvard.edu/repository/11447
This data interactive, presented by the Institute for Health Metrics and Evaluation (IHME), allows users to visualize and compare global mortality estimation data from the Global Burden of Disease Study (GBD) 2021. Users can select between child and adult mortality as well as sources and comparison values, and view trends on color line graphs and a time-animated world map. The process of estimation is described in detail and the tool contains data starting as early as 1950.

Data Portal. GBD 2021: Epidemiology
Epi Visualization. Data Visualization. Institute for Health Metrics and Evaluation 2024. https://vizhub.healthdata.org/epi.
GHELI repository link: https://repository.gheli.harvard.edu/repository/12871
This data interactive, presented by the Institute for Health Metrics and Evaluation (IHME), allows users to access visualizations and charts for a huge variety of health conditions from the years 1990, 1995, 2000, 2005, 2010, 2015, 2017, 2019, and 2021. Available health conditions span infectious diseases, chronic diseases, injuries, and accidents. Data can also be displayed at the aggregated global level or broken down by region or country. This interactive uses data from the Global Burden of Disease studies.

Web Portal. GBD Data Visualizations
GBD Data Visualizations. Institute for Health Metrics and Evaluation. https://www.healthdata.org/gbd/data-visualizations.
This web portal from the Institute for Health Metrics and Evaluation (IHME) provides data visualizations about global health challenges, and the national and global responses to these, including searchable data and visualization options from the Global Burden of Disease Study using the GBD Results Tool.

gheli@harvard.edu
617-495-8222

GLOBAL BURDEN OF DISEASE (GBD) STUDY 2019 RESULTS

Article. Measuring Universal Health Coverage Based on an Index of Effective Coverage of Health Services in 204 Countries and Territories, 1990-2019

GBD 2019 Universal Health Coverage Collaborators. Measuring Universal Health Coverage Based on an Index of Effective Coverage of Health Services in 204 Countries and Territories, 1990-2019: A Systematic Analysis for the Global Burden of Disease Study 2019. The Lancet 2020; 1-35. DOI: https://doi.org/10.1016/S0140-6736(20)30750-9.

GHELI repository link: https://repository.gheli.harvard.edu/repository/13466

This article from *The Lancet* assesses Universal Health Coverage (UHC) effective coverage for 204 countries and territories using data from the Global Burden of Disease (GBD) study 2019. Making progress toward providing UHC for all—where individuals can access high quality health care without experiencing financial strain—is engrained in both national and global institutions, and in the Sustainable Development Goals (SDGs). The authors sought to measure effective coverage through the adaptation of the World Health Organization's GPW13 consultation and created 23 indicators representing health service types—such as promotion, prevention, and treatment—as well as five age groups from reproductive age through adults over 65.

The authors found that the UHC effective coverage index improved from 45.8 in 1990 to 60.3 in 2019—however scores varied drastically between countries. Japan, for example, had an index rating of 95 whereas Somalia and the Central African Republic scored 25 on the index. UHC effective coverage in Sub-Saharan Africa has rapidly improved since 2010 with an average index increase of 2.6% per year. Other GBD super regions, however, have seen slower rates of gain between 2010 and 2019. Measuring effective coverage at the health system level ensures that health services are aligned with countries' health profiles and are of sufficient quality to improve health in populations of all ages.

Article. Global Burden of 369 Diseases and Injuries in 204 Countries and Territories, 1990-2019

GBD 2019 Diseases and Injuries Collaborators. Global Burden of 369 Diseases and Injuries in 204 Countries and Territories, 1990-2019: A Systematic Analysis for the Global Burden of Disease Study 2019. The Lancet 2020; 396(10258): 1204-1222. DOI: https://doi.org/10.1016/S0140-6736(20)30925-9.

GHELI repository link: https://repository.gheli.harvard.edu/repository/13474

This article from *The Lancet* examines the prevalence, incidence, and years lived with disability (YLDs) for 369 diseases and injuries in 204 countries and territories using data from the Global Burden of Diseases, Injuries, and Risk Factors Study (GBD) 2019. The authors note that global health has steadily improved over the last three decades, as measured by age-standardized Disability Adjusted Life Year (DALY) rates. The greatest decline in DALYs occurred among the zero to nine age group. The largest drivers of increased DALYs between 1990 and 2019 included six causes primarily affecting older adults and four common from youth through old age. Those that largely affect adults include ischemic heart disease, diabetes, stroke, chronic kidney disease, lung cancer, and age-related hearing loss. Those increasing DALYs beginning in youth include HIV/AIDS, musculoskeletal disorders, low back pain, and depressive disorders. The study further breaks down the top causes of DALYs by age group: zero to nine years, 10 to 24 years, 25 to 49 years, 50 to 74 years, and 74 years and older. Years lived with disability due to noncommunicable diseases and injuries have been a considerable portion of disease burden since 1990, indicating a shift away from the burden caused by infectious diseases. The authors highlight that as disability becomes a larger component of disease burden and health expenditure, investment is needed to identify new and more effective interventions.

Article. Global Age-Sex-Specific Fertility, Mortality, Healthy Life Expectancy (HALE), and Population Estimates in 204 Countries and Territories, 1950-2019

GBD 2019 Demographics Collaborators. Global Age-Sex-Specific Fertility, Mortality, Healthy Life Expectancy (HALE), and Population Estimates in 204 Countries and Territories, 1950-2019: A Comprehensive Demographic Analysis for the Global Burden of Disease Study 2019. The Lancet 2020; 369(10258): 1160-1203. DOI: https://doi.org/10.1016/S0140-6736(20)30977-6.

GHELI repository link: https://repository.gheli.harvard.edu/repository/13476

This article from *The Lancet* summarizes the updated and comprehensive demographic assessments of the key indicators related to fertility, mortality, migration, and population for 204 countries and territories and selected

subnational locations from 1950 to 2019. The global population increased by more than 25% between 2000 and 2019, from 6.2 billion to 7.7 billion. In recent decades, the world has experienced a declining fertility rate and an increasing life expectancy. The authors found that the global total fertility rate (TFR) decreased from 2.72 in 2000 to 2.31 in 2019. Of the 204 countries followed in the study, in 2019, 102 had a TFR lower than 2.1—the approximation of replacement fertility. Global life expectancy increased from 67.2 years in 2000 to 73.5 years in 2019. While the total number of global deaths increased from 50.7 million in 2000 to 56.5 million in 2019, under-5 deaths drastically declined over the same period. Healthy life expectancy (HALE), which takes into account mortality and nonfatal outcomes, increased between 2000 and 2019 in 202 of the 204 countries followed. The article notes that tracking demographic changes and the emergence of new patterns is critical for global health monitoring.

Article. Fertility, Mortality, Migration, and Population Scenarios for 195 Countries and Territories From 2017 to 2100
Vollset S et al. Fertility, Mortality, Migration, and Population Scenarios for 195 Countries and Territories From 2017 to 2100: A Forecasting Analysis for the Global Burden of Disease Study. The Lancet 2020; 1-22.
DOI: https://doi.org/10.1016/S0140-6736(20)30677-2.
GHELI repository link: https://repository.gheli.harvard.edu/repository/13471
This article from *The Lancet* seeks to understand patterns in future population levels to plan for changes in population age structure, anticipate resource needs in health care settings, and to examine the potential impacts on the environment and economy using data from the Global Burden of Disease (GBD) study 2017. The future population estimates were modeled using fertility, migration, and mortality rates. The global total fertility rate is forecasted to be 1.66 in 2100, with the global population estimated to peak at 9.72 billion in 2064 and subsequently decline to 8.79 billion in 2100. An estimated 151 countries will have fertility levels less than total replacement fertility by 2050, with the number rising to 183 countries by 2100. The top five largest countries in 2100 will be India, Nigeria, China, the USA, and Pakistan. The forecast also indicated that there will be a significant shift in global age structure, where 2.37 billion people will be 65 or older and 1.70 billion people will be younger than 20. The authors anticipate that a sustained total fertility rate lower than replacement fertility will have economic, social, environmental, and geopolitical consequences.

Article. Progress in Adolescent Health and Well-being: Tracking 12 Headline Indicators for 195 Countries and Territories, 1990-2016
Azzopardi PS et al. Progress in Adolescent Health and Well-being: Tracking 12 Headline Indicators for 195 Countries and Territories, 1990-2016. The Lancet 2019; 393(10176): 1101-1118. DOI: https://doi.org/10.1016/S0140-6736(18)32427-9.
GHELI repository link: https://repository.gheli.harvard.edu/repository/13113
This article from *The Lancet* provides estimates of 12 indicators for adolescent health and wellbeing from 1990 to 2016 on the country level. The study analyzed health outcomes, health risks, and social determinants of health for adolescents. While some countries have experienced a major decrease in disease burden, other countries have experienced population growth contributing to poor adolescent health. In 2016, 250 million more adolescents were living in multi-burden countries than in 1990. Obesity, anemia, child marriage, and not in education, employment, or training (NEET) for women are remaining global challenges. Several individual indicators have improved, but gender inequity such as NEET prevalence in females is a factor contributing to poor health. Males account for almost 75% of DALYs due to injuries, almost half of which are among males in multi-burden countries or territories. Overall, many of the changes in health outcomes, risks, and determinants are related to demographic changes, as most of the countries now have a higher non-communicable disease burden. It is necessary to address social and structural determinants of health such as health, education, and legal systems to continue investing in adolescent health and development.

Web Portal. Policy Reports
Policy Reports. Institute for Health Metrics and Evaluation.
https://www.healthdata.org/search?f%5B0%5D=content_type%3Areport.
GHELI repository link: https://repository.gheli.harvard.edu/repository/12923
This web portal from the Institute for Health Metrics and Evaluation (IHME) shares policy briefs featuring country-level analysis of health service programs, financing, universal health coverage, and assessing facility capacity—among many other topics. These policy briefs are typically country-specific and focus on certain aspects of a country's health system. These policy briefs are updated regularly.

gheli@harvard.edu
617-495-8222

OTHER RESOURCES ABOUT THE GLOBAL BURDEN OF DISEASE (GBD) STUDY

Organization. Institute for Health Metrics and Evaluation
Institute for Health Metrics and Evaluation. https://www.healthdata.org.
GHELI repository link: https://repository.gheli.harvard.edu/repository/12291
The Institute for Health Metrics and Evaluation (IHME) is an independent population health research center at the University of Washington, providing measurement of the world's health problems and evaluating 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 improve population health. Guiding everything that IHME does are five principles: scientific excellence, policy relevance, impartiality, collaboration, and knowledge sharing.

Publicly available resources include data visualizations and interactives, policy reports, research articles, infographics, presentations, and several databases, including the GBD Results Tool, which allows users to search data from the Global Burden of Disease (GBD) study. IHME publishes country profiles that provide an overview of findings from the GBD study, including information about mortality, morbidity, and disability as well as health care access, quality, and spending. Profiles are based on more than 80,000 different data sources used by researchers to produce the most scientifically rigorous estimates possible, and may be freely downloaded and distributed. IHME also provides information on featured health topics and has a news portal for the latest IHME research.

Web Portal. Global Burden of Disease
Global Burden of Disease. The Lancet. https://www.thelancet.com/gbd.
GHELI repository link: https://repository.gheli.harvard.edu/repository/11300
This web collection from *The Lancet* features articles from the ongoing Global Burden of Disease study which address mortality and morbidity from major diseases and injuries, as well as risk factors to health at global, national, and regional levels. The most recent are from the Global Burden of Disease Study 2019, released in October 2020. *The Lancet* portal includes all articles and resources from the 2017, 2016, 2015, and 2010 studies, including video, audio, and interactive visualizations.

RELATED RESOURCE COLLECTIONS

Article. Global Burden of Disease Study: Regional and Subnational Analyses
Global Burden of Disease Study: Regional and Subnational Analyses. Global Health Education and Learning Incubator at Harvard University 2024. https://repository.gheli.harvard.edu/repository/13400.
GHELI repository link: https://repository.gheli.harvard.edu/repository/13400
The Global Burden of Disease (GBD) Study is a systematic effort to quantify, measure, and analyze mortality and morbidity due to major diseases, injuries, and health risk factors across populations worldwide. In addition to global reports that focus on national-level data, analyses are periodically released that focus on regions, or that evaluate subnational data for individual countries. This resource is a running list of GBD regional and subnational analyses and is updated quarterly by GHELI.

Other resources curated and maintained by GHELI include a GBD resource pack (containing articles, data portals, interactives and visualizations, and country profiles), and a running list of GBD analyses focused on a single topic related to health conditions, injuries or risk factors.

Article. Global Burden of Disease Study: Global Analyses on Topics
Global Burden of Disease (GBD) Studies: Global Analyses on Topics. Global Health Education and Learning Incubator at Harvard University 2024. https://repository.gheli.harvard.edu/repository/12878.
GHELI repository link: https://repository.gheli.harvard.edu/repository/12878
The Global Burden of Disease (GBD) Study is a systematic effort to quantify, measure, and analyze mortality and morbidity due to major diseases, injuries, and health risk factors across populations worldwide. In addition to global reports that include all countries and sub-national analyses that focus on a single country, the GBD produces global

gheli@harvard.edu
617-495-8222

analyses that focus on a single issue (e.g., specific disease, risk, or injury). This resource is a running list of GBD disease-specific analyses and is updated quarterly by GHELI.

Other resources curated and maintained by GHELI include a GBD resource pack (containing articles, data portals, interactives and visualizations, and country profiles), and a running list of GBD regional and subnational analyses.

gheli@harvard.edu
617-495-8222