Published in final edited form as:

Lancet. 2012 December 15; 380(9859): 2163–2196. doi:10.1016/S0140-6736(12)61729-2.

Years lived with disability (YLDs) for 1160 sequelae of 289 diseases and injuries 1990-2010: a systematic analysis for the Global Burden of Disease Study 2010

A full list of authors and affiliations appears at the end of the article.

Summary

Background—Non-fatal health outcomes from diseases and injuries are a crucial consideration in the promotion and monitoring of individual and population health. The Global Burden of Disease (GBD) studies done in 1990 and 2000 have been the only studies to quantify non-fatal health outcomes across an exhaustive set of disorders at the global and regional level. Neither effort quantified uncertainty in prevalence or years lived with disability (YLDs).

‡Correspondence to: Prof Christopher J L Murray, Institute for Health Metrics and Evaluation, University of Washington, 2301 Fifth Avenue, Suite 600, Seattle, WA 98121, USA cjlm@uw.edu.

Contributors

CJLM, ADL, and TV prepared the first draft. TV, AF, MN, RL, CM, ME, KS, JS, ADL, and CJLM finalised the draft on the basis of comments from all other authors and reviewer feedback. CJLM and ADL had the idea for the study and provided overall guidance. All other authors developed cause-specific models, reviewed results, provided guidance on the selection of key covariates, and reviewed the paper.

Conflicts of interest

C E Canter has worked as an Optum Health consultant, Blue Cross Blue Shield consultant, and received Berlin Heart Honoraria and travel fees. E R Dorsey has received payments for consulting services from Lundbeck and Medtronic and research support from Lundbeck and Prana Biotechnology. T Driscoll was supported in part by funding from the National Occupational Health and Safety Commission (now Safework Australia). M Ezzati chaired a session and gave a talk at the World Cardiology Congress (WCC), with travel cost reimbursed by the World Heart Federation. At the WCC, he also gave a talk at a session organised by PepsiCo with no financial or other remuneration. F Guillemin did a study on osteoarthritis epidemiology in an institution that received grants from public sources: Assurance-Maladie (CNAMTS) InVS, Inserm, CHU de Nancy, CHU de Nice, Conseil Regional de Lorraine, Societe Francaise de Negma-Lerads, Pfizer, Pierre Fabre Medicaments, Sanofi-Aventis France. H J Hoffman is a US Federal Government employee of the National Institutes of Health (NIH). P J Hotez reports holding several positions: Dean, National School of Tropical Medicine, Baylor College of Medicine; Director, Sabin Vaccine Institute Texas Children's Hospital Center for Vaccine Development; and President, Sabin Vaccine Institute. He also is an inventor on several patents: 5,527,937 "Hookworm Anticoagulant"; 5,753,787 "Nucleic Acids for Ancylostoma Secreted Proteins"; 7,303,752 B2 "Hookworm vaccine"; 12/492,734 "Human Hookworm Vaccine"; 61/077,256 "Multivalent Anthelminthic Vaccine"; and PCT-20100701/0.20.5.18 "Malaria Transmission blocking vaccine". G A Mensah is a former employee of PepsiCo. F Perez-Ruiz was an advisor for Ardea, Menarini, Novartis, Metabolex; was a member of the Speaker's Bureau for Menarini, Novartis; an advisor for educational issues for Savient; led investigation grants for the Spanish Health Ministry, Hospital de Cruces Rheumatology Association; and was principal investigator in clinical trials for Ardea. G V Polanczyk has served as a speaker or consultant to Eli-Lily, Novartis, Janssen-Cilag, and Shire Pharmaceuticals, developed educational material for Janssen-Cilag, and received an independent investigator grant from Novartis and from the National Council for Scientific and Technological Development (CNPq, Brazil). L Rushton received honorarium for board membership of the European Centre for Ecotoxicology and Toxicology of Chemicals and received research grants to Imperial College London (as PI) from the European Chemical Industry Council (CEFIC) and CONCAWE (Conservation of Clean Air and Water Europe). J A Singh has received research grants from Takeda and Savient and consultant fees from Savient, Takeda, Ardea, Regeneron, Allergan, URL pharmaceuticals, and Novartis. J A Singh is a member of the executive of OMERACT, an organisation that develops outcome measures in rheumatology and receives arms-length funding from 36 companies; a member of the American College of Rheumatology's Guidelines Subcommittee of the Quality of Care Committee; and a member of the Veterans Affairs Rheumatology Field Advisory Committee. J A Singh is supported by research grants from the National Institutes of Arthritis, Musculoskeletal and Skin Diseases (NIAMS), National Institute on Aging (NIA), National Cancer Institute (NCI) and the Agency for Health Quality and Research Center for Education and Research on Therapeutics (CERTs) and is also supported by the resources and the use of facilities at the VA Medical Center at Birmingham, Alabama, USA.

*Authors listed alphabetically

†Joint senior authors

Methods—Of the 291 diseases and injuries in the GBD cause list, 289 cause disability. For 1160 sequelae of the 289 diseases and injuries, we undertook a systematic analysis of prevalence, incidence, remission, duration, and excess mortality. Sources included published studies, case notification, population-based cancer registries, other disease registries, antenatal clinic serosurveillance, hospital discharge data, ambulatory care data, household surveys, other surveys, and cohort studies. For most sequelae, we used a Bayesian meta-regression method, DisMod-MR, designed to address key limitations in descriptive epidemiological data, including missing data, inconsistency, and large methodological variation between data sources. For some disorders, we used natural history models, geospatial models, back-calculation models (models calculating incidence from population mortality rates and case fatality), or registration completeness models (models adjusting for incomplete registration with health-system access and other covariates). Disability weights for 220 unique health states were used to capture the severity of health loss. YLDs by cause at age, sex, country, and year levels were adjusted for comorbidity with simulation methods. We included uncertainty estimates at all stages of the analysis.

Findings—Global prevalence for all ages combined in 2010 across the 1160 sequelae ranged from fewer than one case per 1 million people to 350 000 cases per 1 million people. Prevalence and severity of health loss were weakly correlated (correlation coeffi cient –0·37). In 2010, there were 777 million YLDs from all causes, up from 583 million in 1990. The main contributors to global YLDs were mental and behavioural disorders, musculoskeletal disorders, and diabetes or endocrine diseases. The leading specific causes of YLDs were much the same in 2010 as they were in 1990: low back pain, major depressive disorder, iron-deficiency anaemia, neck pain, chronic obstructive pulmonary disease, anxiety disorders, migraine, diabetes, and falls. Age-specific prevalence of YLDs increased with age in all regions and has decreased slightly from 1990 to 2010. Regional patterns of the leading causes of YLDs were more similar compared with years of life lost due to premature mortality. Neglected tropical diseases, HIV/AIDS, tuberculosis, malaria, and anaemia were important causes of YLDs in sub-Saharan Africa.

Interpretation—Rates of YLDs per 100 000 people have remained largely constant over time but rise steadily with age. Population growth and ageing have increased YLD numbers and crude rates over the past two decades. Prevalences of the most common causes of YLDs, such as mental and behavioural disorders and musculoskeletal disorders, have not decreased. Health systems will need to address the needs of the rising numbers of individuals with a range of disorders that largely cause disability but not mortality. Quantifi cation of the burden of non-fatal health outcomes will be crucial to understand how well health systems are responding to these challenges. Effective and affordable strategies to deal with this rising burden are an urgent priority for health systems in most parts of the world.

Funding—Bill & Melinda Gates Foundation.

Introduction

Non-fatal health outcomes from diseases and injuries are a crucial consideration in the promotion and monitoring of individual and population health. In an era in which the Millennium Development Goals (MDGs) have refocused global health attention on prevention of mortality from selected disorders, it is important to emphasise that health is about more than avoiding death. Individuals, households, and health systems devote

enormous resources to the cure, prevention, and amelioration of non-fatal sequelae of diseases and injuries. Some form of periodic accounting about the burden of non-fatal illness in populations, and how it is changing, should therefore be available for policy making and planning. Quantification of the burden of non-fatal health outcomes was one of the main goals in launching the Global Burden of Disease study (GBD) in the 1990s.[1] The study introduced the disability-adjusted life-year (DALY) as a time-based measure of health that enables commensurable measurement of years of life lost due to premature mortality (YLLs) with years of life lived in less than ideal health (years lived with disability [YLDs]). The amalgamation of both components of individual and population health under a comprehensive framework for measuring population health can provide important insights into a broader set of causes of disease burden than can consideration of mortality alone.

To our knowledge, the various revisions of the GBD are the only effort to quantify non-fatal health outcomes across an exhaustive set of disorders at the global and regional level.[2–8] Many national burden of disease studies and subnational studies have analysed local patterns of YLDs as well.[9–16] Publication of the GBD 1990 results raised awareness about a range of disorders that primarily cause ill health and not death, such as unipolar major depression, bipolar disorder, asthma, and osteoarthritis.[17–19] This attention has led to greater policy debate and action on mental health and other non-communicable diseases at WHO,[4,20,21] in non–governmental organisations, and in many countries.[22] The burden of non-fatal illness attributed to some parasitic diseases has also been an important issue highlighted by the GBD findings.[23–26]

Despite the unique role of the GBD in provision of comparative quantification of the burden of non-fatal health outcomes, there have been important limitations. The evidence on MDG-related diseases has been regularly revised and incorporated into updates of the GBD, but many disorders have not been systematically analysed since 1990. *Global Health Statistics,* a companion volume to the original *Global Burden of Disease and Injuries* book, provided estimates of incidence, prevalence, remission, and case fatality for 483 sequelae, by age and sex, for eight regions of the world.[27] The GBD 2000 revisions included 474 sequelae. A substantial number, but not all, of these sequelae were revised since GBD 1990. Those that were not revised were approximated with constant relations between YLLs and YLDs or YLD rates estimated from the GBD 1990. Even when revisions were undertaken, however, many were not based on systematic analyses of published studies and unpublished sources. The epidemiological inputs to YLD estimates such as prevalence have been released for only 40 sequelae. The most important limitation of both the GBD 1990 and 2000 efforts is that YLDs have not been estimated with uncertainty. Uncertainty can come from many sources, including heterogeneity in the empirical data that are available and uncertainty in the indirect estimation models used to make predictions for populations with little or no data. Because the empirical basis for estimating prevalence or incidence is much weaker for some sequelae than it is for others, uncertainty is likely to vary substantially across sequelae and across countries and regions for the same sequelae.[8,28]

The Global Burden of Diseases, Injuries, and Risk Factors Study 2010 (GBD 2010) provided an important opportunity to address the key limitations of past burden of disease assessments, including a more standardised approach to evidence synthesis, epidemiological

estimation with uncertainty, and assessment of comorbidity. In this Article, we describe the approach to undertaking these analyses with the available evidence, and discuss key comparative results. Subsequent disease-specific and injury-specific papers are planned that will provide much more detail on data, methods, and results for various disorders of interest.

Methods

Overview

Details of the GBD 2010 hierarchical cause list, the 21 epidemiological regions (and combinations of these into seven super-regions), the 20 age groups, and the relation between different components of GBD 2010 are published elsewhere.[29] For the GBD 2010, YLDs are computed as the prevalence of a sequela multiplied by the disability weight for that sequela without age weighting or discounting. The YLDs arising from a disease or injury are the sum of the YLDs for each of the sequelae associated with that disease. Across the 291 diseases and injury causes in the study, 289 cause disability—for these causes there were 1160 sequelae that captured the major outcomes of these diseases and injuries.[29,30] The key analytical task for the study was to estimate the prevalence with uncertainty of each of the 1160 sequelae for 20 age groups, both sexes, and 21 regions for 1990, 2005, and 2010. See panel for terminology used in GBD 2010.

For each disease or injury, we identified the key sequelae from that cause. Sequelae could include the disease itself, such as diabetes, or the outcomes associated with that disease such as diabetic foot, neuropathy, or retinopathy. Some clinical disorders were classified as a disease but also can be a consequence of another disease—eg, chronic kidney disease secondary to diabetes is a consequence of diabetes but was classified as a disease. Any given outcome appears in the GBD cause and sequela list only once to avoid double counting of the associated burden. Across the 1160 sequelae, we identified 220 unique health states, representing a parsimonious list providing enough detail to describe the large variations between health states while still a manageable number for which we were able to derive disability weights by survey. In principle, we estimated YLDs at the level of an individual and then assigned individual health loss to all the contributing sequelae present in an individual. The analysis can be divided into seven specific steps (figure 1) which are briefly described below.

Identification and documentation of data sources—The analysis for each sequela began with the identification and documentation of sources of data for incidence, prevalence, remission, duration, and excess mortality. We used nine types of data sources. First, contributors to the GBD have undertaken systematic reviews for disease sequelae. For example, for epilepsy we retrieved: 230 prevalence studies from 83 countries in all 21 world regions, a further 97 studies of incidence, 25 studies of the mortality risk in people with epilepsy, and only one study on remission meeting inclusion criteria. For other disease sequelae, only a small fraction of the existing data appear in the published literature, and other sources predominate such as local surveys of schistosomiasis prevalence or antenatal clinic serosurveillance for HIV/AIDS. Second, reports to governments of cases have been used for African trypanosomiasis, measles, pertussis, tuberculosis, leprosy, dengue, cholera,

and yellow fever. Use of these data for burden of disease assessment required explicit modelling of the case detection rate for every disease. Third, we used population-based disease registry data for cancers,[32–40] chronic kidney diseases, multiple sclerosis,[41] Parkinson's disease,[42,43] and congenital anomalies.[44] Cancer registries have been established in many developed countries and are being rapidly established in developing countries. For example, by the end of 2010, cancer registries had expanded in China to 149 registries covering 31 provinces;[45] India now has 23 registries.[46] Fourth, many countries, in collaboration with UNAIDS and WHO, have established networks of antenatal clinics that test women presenting for antenatal care for HIV, syphilis, and other disorders. Fifth, for 43 countries, we obtained hospital discharge data coded to ICD9 or ICD10. Use of these data required an explicit model of selection bias to take into account variations in access to care. Additionally, for chronic diseases, we had to estimate the average number of admissions to hospital per person per year with a disease to interpret the results. We analysed datasets with unique identifiers for every patient for seven US states from 2003 to 2007 for cirrhosis and pneumoconiosis. Hospital discharge data were an important source for acute disorders such as stroke, myocardial infarction, appendicitis, or pancreatitis, and for injuries. Sixth, for skin diseases and other mental and behavioural disorders, outpatient data collected in health systems with nearly complete or at least representative samples of ambulatory data[47–55] have also been used after taking into account selection bias. Seventh, we used interview questions, direct measurements (eg, hearing, vision, and lung function testing), serological measurements, and anthropometry from the re-analysis of multiple household surveys. Surveys of selected populations such as school children for intellectual disability,[56] nursing home residents for dementia,[57] or mental health clinic attendees for schizo-phrenia[58] have also been used after taking into consideration selection bias. Eighth, re-analysis of cohort or follow-up studies has been used for some causes such as impairment due to injury. We also used cohort studies to provide information about remission rates, duration, and mortality risks for many chronic disorders. Finally, we used indirect prevalence studies as an input to estimate the total number of drug users.[59] These estimates were produced from a combination of multiplier, capture-recapture, and back- projection methods combining data from treatment centres, police records, court records, and survey data.

Developing prevalence estimates for sequelae—Meta-analysis or meta-regression of descriptive epidemiological studies[60–63] poses many challenges. First, for many regions and for many sequelae data are scarce. Predictions of prevalence need to take advantage of relations with covariates in a meta-regression or default to the average of a region, super-region, or the world. Second, in settings with multiple measurements, study results can be highly heterogeneous because of much non-sampling error. Sources of non-sampling error include selection bias in the population studied, study design, implementation issues in data collection, widely varying case definitions across studies, and the use of different diagnostic technologies or laboratory techniques. Third, available studies have often used diverse age groups like 17–38 years or 15 years and above. Fourth, data for various disorders were collected for many different outcomes such as incidence, prevalence, remission, excess mortality, or cause-specific mortality. The mix of data varies across diseases and across regions for a disease. All of these sources provide some relevant information for the estimation of prevalence. Fifth, within regions or countries, the true prevalence of a sequela

can vary enormously. Sixth, on the basis of biology or clinical series, there might be strong prior views on the age pattern of incidence or prevalence for a disorder that should be reflected in the results. For instance, we would not expect prevalence of Alzheimer's disease before age 40 years and diagnostic rules stipulate that the onset of attention deficit and hyperactivity disorder cannot occur before age 4 years or after age 8 years.[64]

To address these challenges, we have developed a Bayesian meta-regression method, DisMod-MR, which estimates a generalised negative binomial model for all epidemioiogical data. The model includes the following: covariates that predict variation in true rates; covariates that predict variation across studies because of measurement bias; super-region, region, and country random intercepts; and age-specific fixed effects. When appropriate, the rates were assumed to have been constant over time, which allowed data for incidence, prevalence, excess mortality, and cause-specific mortality to inform prevalence estimates. The differential equations governing the relation between the parameters of incidence, remission, mortality, prevalence, and duration are well charac-terised.[65,66] DisMod-MR can use data reported for any age group to inform the maximum likelihood estimate. We used a large set of 179 covariates that have been appropriately imputed so that the data provide a complete time series for all 187 countries in the analysis (see the appendix for details of the estimation equations used for DisMod-MR and the approach to numerical solution, as well as an example of its application).[29]

For cancer incidence and prevalence, we used the approach applied by Forouzanfar and colleagues[67] to breast and cervical cancers. We estimated the mortality- to-incidence ratio for each cancer for all country, age, and sex groups using data from all high-quality registries that reported on both incidence and mortality. We developed separate models for both sexes. Cause of death estimates for each cancer by country, year, age, and sex[68] were divided by the predicted mortality-to-incidence ratio to generate incidence estimates. To estimate the prevalence of each of four sequelae of cancer including: diagnosis or treatment phase, remission, recurrence, and terminal phase, we estimated the natural history of incident cases using a calculated 5 year survival and relative duration of each cancer phase. We also used a variant of this approach to estimate incidence and prevalence for visceral leishmaniasis.

We used four sets of alternative methods for some disorders because of variation in the types of data available and the complexity of their spatial and temporal distributions (see appendix for further details). For HIV/ AIDS, we used the UNAIDS natural history model developed with the Spectrum platform.[69,70] Detailed estimates of prevalence and mortality with uncertainty by age and sex have been provided based on the 2012 revision of HIV/AIDS epidemiology. We developed natural history models for measles and pertussis. For ascariasis, trichuriasis, hookworm, and schistosomiasis, prevalence of the disease has been estimated with geospatial estimation methods.[71–73] For diphtheria, tetanus, and rabies, we have used systematic reviews of data for case-fatality rates with estimates of mortality to estimate incidence—the mortality estimates for these diseases are described elsewhere.[68] For these disorders, DisMod-MR was used as a meta-regression method to estimate the case-fatality rate by age, sex, and region. For tuberculosis and dengue, the key source of information was registered cases. We developed statistical models that simultaneously model

the expected rates as a function of covariates and the undercount of cases as a function of health system access.

Severity distributions—For 41 diseases, the sequelae of the disease have been linked to more than one health state including stroke, anxiety, major depressive disorder, symptomatic heart failure, and chronic obstructive pulmonary disease (COPD). After analysing the prevalence of the overall disorder, we estimated the distribution of these prevalent cases across severity levels. Disability weights were measured in population surveys[30] for individuals without comorbidity. Two estimates are needed to calculate YLDs: the disability weight for individuals with a single sequela and the disability weight for individuals with multiple sequelae, which is a common occurrence. The prevalence of comorbid disorders can be estimated with micro-simulation. However, we needed to estimate the distribution of severity controlling for comorbidity, otherwise the severity distribution would be systematically biased towards more severe symptoms caused by comorbidity. For example, if individuals with depression are also likely to have anxiety and substance-use disorders, the reported distribution of functional health status would be shifted towards the more severe end.

Data for severity distributions are often scarcer and of poorer quality than are data for prevalence of disorders, with some exceptions.[74,75] Approaches to severity classification are inconsistent across disorders.[76] Because of the heterogeneity of the available evidence for disease severity, we supplemented disease specific reviews with an analysis of three data sources: the US Medical Expenditure Panel Survey (MEPS) 2000–09,[77] the US National Epidemiological Survey on Alcohol and Related Conditions (NESARC) 2000–01 and 2004–05,[78] and the Australian National Survey of Mental Health and Wellbeing of Adults (AHS) 1997.[79] These sources allow the assessment of the severity distributions taking into account co morbidity (see appendix for more details of this analysis). For some diseases for which data are available for the distribution of severity by age, sex, and region, we pooled proportions in each health state using DisMod-MR or simple meta-analysis methods.

Impairments—For selected impairments, we have constrained the estimates for sequelae related to that impairment to sum to estimates of the impairment prevalence from independent sources of data. For example, nine dis orders have blindness as a sequela. We have analysed all available blindness survey data and we constrain the prevalence of all blindness sequelae to sum to blindness prevalence. We did this impairment prevalence analysis for anaemia, blindness, low vision, hearing impairment, infertility, heart failure, epilepsy, and intellectual disability (appendix).

Analysis of injury burden—The analysis of YLDs from injuries needed careful consideration because injuries are classified in the cause list according to the external cause such as a road injury, animal bite, or drowning, whereas the functional limitations after injury are determined by the nature of injury such as brain trauma, femur fracture, or spinal cord transection. We did the injuries analysis in five steps, which are briefly outlined here with further details in the appendix. First, we analysed household survey and hospital discharge data using DisMod-MR for each external cause to generate estimates of incidence by age, sex, country, and year. Survey data included recall of injuries warranting admission

to hospital as well as injuries that warranted medical attention but not admission to hospital. The metaregression included a covariate for whether an individual was admitted to hospital or not, which we used to generate predictions both for injury warranting hospital admission and injury warranting outpatient care. Second, we analysed hospital data from 28 countries that had dual coding of discharges by external cause and nature of injury after ICD9 and ICD10, using negative binomial models to estimate the probability of different groups of nature of injury as a function of age, sex, and an indicator variable for developed versus developing countries. Separate models were created for injury warranting hospital admission and injury warranting other health care. Third, for each nature of injury we estimated the probability of individuals developing long-term functional impairment. We re-analysed follow-up data from four studies using data from the Dutch Injury Surveillance system (LIS),[80] the South Carolina Traumatic Brain Injury Follow-up Registry (SCTBIFR),[81] the National Study on Costs and Outcomes of Trauma (NSCOT),[82] and MEPS.[77] Fourth, we used DisMod-MR to estimate the prevalence of individuals in the population who are likely to have functional limitation because of a previous injury. Prevalence was estimated from incidence assuming zero remission and a relative risk of death compared with the general population based on available studies. In the fifth step, the YLDs due to prevalent cases of long-term injury were attributed back to external causes in proportion with the contributions of these causes to every type of injury.

Comorbidity—Comorbidity was taken into account in the calculation of YLDs, which needed three analytical steps (appendix). First, we estimated the co-occurrence of all the sequelae for each age, sex, country, and year. Co-occurrence is a function of the prevalence of each sequela and whether the probabilities of co-occurrence are independent of, or dependent on, each other.[83] We could not identify sufficiently large datasets to estimate these dependent probabilities reliably within age groups. We therefore adopted the simplifying assumption of independence. For each age-sex-country-year, we used a Monte Carlo simulation of 20 000 individuals to estimate the cooccurrence of sequelae. To capture uncertainty in the prevalences of each of the sequelae, for each age-sex- country-year, we ran 1000 different micro-simulations of 20 000 individuals.

Second, we calculated the combined disability weight for the estimated individuals with every combination of disorders. For all combinations of disorders generated in the micro-simulation, the combined disability weight for a simulated individual with two or more disorders is one minus the product of one minus each disability weight. Tests on real data such as MEPS as well as other studies suggest that this multiplicative model was the most appropriate.[84,85] To propagate uncertainty in disability weights into the YLD estimates, each computation was based on a draw from the uncertainty distribution of each disability weight. Third, the combined disability weight from the co-occurrence of sequelae was apportioned to each of the contributing sequelae in proportion to the disability weight of a sequela on its own.

We tested the validity of our assumption of independence within an age-sex-country-year using the MEPS data (described above), which includes both individual-level measurement of functional status using SF−12 and ICD− coded diagnoses. We applied the GBD approach assuming multiplicative disability weights and independent disorder probabilities

to estimate YLDs and we computed directly from the MEPS data taking into account actual comorbid patterns at the individual level. The correlation coefficient for the two approaches was 0.999.

YLDs from residual categories

There are nine causes on the cause list such as other neglected tropical diseases, other neurological disorders, or other congenital anomalies that are groupings of a large number of often rare disorders. We approximate the YLDs for these disorders using the ratio of YLDs to YLLs for similar or related disorders to then estimate YLDs for these residual categories from YLLs that have been directly estimated.[68]

Ranking lists

For the presentation of leading causes of YLDs, the level at which causes are ranked is subject to debate. We have opted to use the level of disaggregation that seems most relevant for public health decision making. For example, we have chosen to include diarrhoeal diseases, lower respiratory infections, maternal disorders, stroke, liver cancer, cirrhosis, drug use, road injury, exposure to mechanical forces, animal contact, interpersonal violence, and congenital anomalies in the ranking list.

Decomposing changes in YLDs into demographic and epidemiological factors

To help understand the drivers of change in the number of YLDs by cause or region, we have estimated the proportion of the change from 1990 to 2010 due to growth in total population, change in population age-structure and sexstructure, and change in age-specifi c and sex-specifi c rates. We computed two counterfactual sets of YLDs. First, a population growth scenario computed as the number of YLDs expected in 2010 if only total population numbers increased to the level of 2010 but the age-sex structure of population stayed the same as in 1990 and age-sex specifi c rates remained at 1990 levels. Second, a popu lation growth and population ageing scenario computed as the number of YLDs expected in 2010, using 1990 age-specifi c and sex-specifi c rates and 2010 age-specifi c and sexspecific population numbers. The diff erence between 1990 numbers and the population growth scenario is the change in YLDs due strictly to the growth in total population. The change from the population growth scenario to the population growth and ageing scenario is the number of YLDs due to ageing of the population. The diff erence between 2010 YLDs and the population growth and ageing scenario is the difference in YLDs due to epidemiological change in age-specific and sex-specific YLDs per person. Each of these three differences is also presented as a percentage change with reference to the 1990 YLD estimate. Further details about the data and methods used for specific causes of YLDs are available on request from the corresponding author.

Role of the funding source

The sponsor of the study had no role in study design, data collection, data analysis, data interpretation, or writing of the report. The corresponding author had full access to all of the data in the study and the final responsibility to submit for publication.

Results

Global prevalence for all ages combined in 2010 across the 1160 sequelae varied from fewer than one case per 1 million people to 350 000 cases per 1 million people. 58 sequelae each affected more than 1% of the global population. Table 1 shows the global prevalence of the 50 most common sequelae in 2010. Of these sequelae, four were oral health disorders (dental caries of permanent teeth, chronic periodontitis, dental caries of baby teeth, and edentulism). Four skin diseases were also very common: fungal skin disease, acne vulgaris, pruritus, and eczema; collectively these disorders affected 2·1 billion individuals (table 1). The number of individuals affected by tension-type headaches or migraine was also very large—these neurological causes respectively ranked as the second and third most common. Low back pain, neck pain, other musculoskeletal, and osteoarthritis of the knee were also very common (table 1). Hearing loss affected 1·3 billion people and vision loss affected 661 million people. Two mental and behavioural disorders, anxiety and major depressive disorder, were in the top 30 most common causes. Two respiratory disorders, COPD and asthma, were also highly prevalent. Although prevalences varied substantially across communities, iron-deficiency anaemia affected 14·9% and infection with schistosomiasis affected 3·5% of the world's population. Five of the top 50 most common sequelae affected only one sex: genital prolapse, uterine fibroids, benign prostatic hyperplasia, premenstrual syndrome, and polycystic ovarian disease. Table 1, however, shows prevalences at the level of only sequelae and not at the level of disease or injuries. Disorders such as chronic kidney diseases (CKD) does not appear in the top 30 causes because, at the sequelae level, we have separate estimates for CKD from hypertension, CKD from diabetes, and CKD from other causes.

We detected a huge range of severity across sequelae with similar prevalence when comparing prevalence rate per 100 000 individuals on a log scale for each sequela compared with the average disability weight (appendix p 36). In general, more severe disorders were less common than less severe disorders, but there were notable exceptions. The variation in prevalence across disorders extended by more than a factor of 100 000. A weak relation exists when the more common sequelae are milder than the less common sequelae (correlation coefficient –0·37). The lack of a strong association between prevalence and severity plus the substantial number of highly prevalent, but mild, disorders draws attention to why consideration of prevalence of disorders alone is insufficient in quantifying burden of disease. To understand which causes contribute the greatest burden, we need to take into account both prevalence and severity of the health states. The disability weights collected from the general public provide the mechanism by which the highly diverse set of sequelae can be compared by adjusting for severity.[30]

In 2010, there were a total of 777 million YLDs globally, implying an average health loss of 0·11 years per person. By sex, the YLD rate was 10 819 per 100 000 male individuals and 11 755 per 100 000 female individuals, with female individuals accounting for 51·6% of all YLDs globally. Disaggregated into three broad cause groups, 15·3% of YLDs in 2010 were due to communicable, maternal, neonatal, and nutritional disorders, 78·6% to non-communicable diseases, and 6·1% to injuries. The heavy preponderance of YLDs from non-

communicable diseases is substantially different from the distribution of years of life lost because of premature mortality (YLLs; 42·8%).[68]

We detected a characteristic pattern of the prevalence of disease adjusted for severity by age and sex at the global level in 2010 (figure 2). This figure provides an analysis using the 21 mutually exclusive and collectively exhaustive cause categories at the second level in the GBD cause list for male and female individuals. In children younger than 5 years, leading causes of YLDs included neonatal disorders, nutritional deficiencies, diarrhoea, lower respiratory infections, other infectious diseases, and neglected tropical diseases and malaria. Beginning at age 10 years and extending to age 65 years, mental and behavioural disorders were a major cause, contributing as much as 36% at age 20–29 years. Nearly as important but with an older age distribution, the other dominant cause was musculoskeletal disorders. The third most important factor in adults was other non-communicable diseases, which includes congenital anomalies, skin diseases, sense organ disorders, and oral disorders (figure 2). Diabetes, urogenital, blood, and endocrine diseases made a progressively larger contribution with age. Neurological disorders (Alzheimer's disease and Parkinson's disease in particular) started to make a major contribution in individuals aged 80 years or older. Chronic respiratory disorders made a substantial contribution in individuals aged 10 years and older, whereas cardiovascular diseases seemed progressively more important at older ages. The long-term cumulative disability from unintentional injuries is also an important factor. This age-sex pattern of the leading causes was very different from the pattern for mortality by cause, which was dominated by causes such as cancers, cardiovascular diseases, HIV and tuberculosis, diarrhoea, pneumonia, and other infectious diseases.[68]

The GBD 2010 includes the assessment of 1160 sequelae, of which 600 are 40 different nature of injury sequelae (such as hip fracture or traumatic brain injury) for each of the 25 external causes of injury (such as falls or road injury). For simplicity of presentation, table 2 shows YLD estimates for all non-fatal health outcomes and some select groupings of sequelae. For example, we estimated YLDs for mild, moderate, and severe anaemia from a variety of causes but the table shows YLDs from all three forms of anaemia. For injuries we show only the YLDs by external cause without giving details for each nature of injury. Furthermore, we show results for both sexes combined for summary age groups (table 2) and the full age and sex detail for 2010 and 1990 (appendix pp 37–270). A substantial number of causes contribute to the overall YLDs at the global level (appendix pp 37–270). The leading causes were low back pain, which contributed 10·7% of total YLDs, and major depressive disorder, which contributed 8·1% of total YLDs. Within the broad category of communicable, maternal, neonatal, and nutritional disorders, the most important causes of YLDs included iron-deficiency anaemia, which accounted for 5·5% of all YLDs. Other causes within this group that caused 4 million or more YLDs included tuberculosis, HIV, diarrhoeal diseases, otitis media, malaria, intestinal nematodes, and neonatal disorders. Several neglected tropical diseases caused between 1 million and 4 million YLDs, including schistosomiasis, lymphatic filariasis, and food-borne trematodiases. Although major contributors to YLLs, the entire list of cancers caused a total of 4·5 million YLDs. Cardiovascular and circulatory diseases accounted for 2. 8% of all YLDs with ischaemic heart disease and stroke accounting for 60% of the total for the cardiovascular category and the rest distributed across a wide range of causes. Chronic respiratory diseases accounted for

6·3% of global YLDs with the largest contributor being COPD (29·4 million YLDs) followed by asthma with 13·8 million YLDs. YLD rates for COPD have risen since 1990 whereas asthma rates have decreased marginally in this period. Neurological disorders accounted for another 42·9 million YLDs—migraine accounted for more than half of these YLDs.

Mental and behavioural disorders accounted for 22·7% of all YLDs. YLDs for the category as a whole have increased by 37% from 1990 to 2010 from 129 million to 177 million and rates have also increased slightly by 5% over the two decades (from 2440 per 100 000 people to 2564 per 100 000 people). Within this category, six disorders or clusters of disorders accounted for more than 10 million YLDs each. The largest category was depressive disorders: major depressive disorder caused 63 million YLDs and dysthymia caused 11 million YLDs—together accounting for 9·6% of all YLDs. Schizophrenia, alcohol use disorders, drug use disorders, and bipolar disorder accounted for 12·9–16·4 million YLDs. Anxiety disorders were also a major global cause, contributing 3·5% of all YLDs. Another important category of diseases causing YLDs was diabetes, urogenital, blood, and endocrine diseases, which accounted for 56·9 million YLDs. Major causes included diabetes mellitus (20·8 million YLDs), benign prostatic hyperplasia (6·8 million YLDs), gynaecological disorders (10·0 million YLDs), and haemoglobinopathies and haemolytic anaemias (10·2 million YLDs). Together, musculoskeletal disorders caused 21·3% of all YLDs. The main contributors were low back pain (83·1 million YLDs), neck pain (33·6 million YLDs), osteoarthritis (17·1 million YLDs), and the other musculoskeletal category (28·2 million YLDs). Osteoarthritis of the knee accounted for 83% of the total osteoarthritis burden. We included the assessment of 13 separate skin diseases. Collectively they caused 33·7 million YLDs, with the largest cause being eczema followed by acne vulgaris. Many of the skin diseases have low disability weights but because of very high prevalences, they still accounted for a substantial number of YLDs. Oral disorders combined caused 15·0 million YLDs, with about equal shares caused by dental caries, periodontal disease, and edentulism. Injuries collectively caused 6·1% of global YLDs. Falls accounted for 41% of the total YLDs caused by injuries. The other major contributors were road injuries, causing 13·5 million YLDs.

Between 1990 and 2010, the total number of YLDs increased by 194 million—a 33·3% increase. We have decomposed this change into three components (table 3): growth in total population, ageing of the global population, and changes in the YLD rates. We have decomposed change both for YLDs from all causes and also for the three broad cause groups. For YLDs from all causes, population growth alone led to a 30·1% increase in YLDs and population ageing led to a further 10·9% increase in YLDs. Reductions in age-sex specific prevalence rates would have reduced YLDs by 7·7%, leading to an overall increase of about a third. Examination of change by the three broad groups shows distinct patterns. Age-specific and sex-specific YLD rates for communicable, maternal, neonatal, and nutritional disorders have decreased, and alone would have led to a 27·9% decrease in YLDs. Overall, YLDs from this cluster of causes increased, slightly, by 4·6% because of population growth, which increased more in the regions with the highest YLDs from these causes. For non-communicable diseases, the overall increase has been 40·3%, but this increase was driven by both population growth and population ageing, with very small

decreases in prevalence rates. For injuries we saw a similar pattern, except that the decrease in age-sex specific rates would have caused a 9·1% decline.

For all causes of YLDs combined, the small decrease expected because of changes in age-specific and sex- specific YLDs per person of 7·7% shown in table 3 can also be seen in figure 3, which shows age-specific YLDs per person in 1990 and 2010 for both sexes. Values in figure 3 can be interpreted as the fraction of health lost to short-term and long-term disabling sequelae in each age group. As expected, the YLDs per person rose with age; YLDs per person aged 5 years were 5·4%, rising to28·6% (28·2% for women; 29·4% for men) for individuals aged 80 years. Female YLDs per person were higher than male YLDs for individuals aged 10–60 years at the global level; the difference is highest for individuals aged 30 years, when YLDs per woman were 1·4 percentage points higher than YLDs per man. The decrease in overall YLDs per person over the 20 year period (between 1990 and 2010) was much smaller than the approximate 20% decrease in mortality.[68]

Faster rates of increase in YLDs for non-communicable diseases led to their share of total YLDs increasing from 74·6% in 1990 to 78·6% in 2010. Causes are ordered by their mean rank across 1000 draws. The order based on the mean rank across draws is not the same as the order based on the mean value of YLDs. The 25 most common causes in 1990 and 2010 are shown in figure 4. Non-communicable diseases were the most common cause of YLDs (figure 4); 21 of the 25 leading causes are from non-communicable diseases, up from 19 of the 25 most common in 1990. The four leading causes in 2010 were also the four leading causes in 1990: low back pain, major depressive disorder, iron-deficiency anaemia, and neck pain. COPD increased from sixth to fifth, and anxiety and migraine retained the same ranking as in 1990 (figure 4). Other notable changes over the time period include the drop in the ranking of asthma, although the number of YLDs it caused increased by 28%. Road injury YLDs also increased but to a lesser extent than the increase in many of the non-communicable diseases, meaning that it also dropped in the rank list. We detected larger decreases in the rank of diarrhoea and tuberculosis than the other 25 most common causes in 1990.

The appendix (pp 280–88) shows YLDs per person by age and sex for the 21 GBD regions in 2010 and 1990. In general, in almost all age groups, the lowest YLDs per person were in the high-income Asia Pacific and east Asia regions. Western Europe and Australasia had the next lowest levels of YLDs per person, with rates of YLDs typically 10·15% lower than in high-income North America for most age groups. We estimate that the highest levels of YLDs per person were in the Caribbean, Oceania, and sub-Saharan Africa, particularly in the age groups affected by HIV in southern sub-Saharan Africa. The ratio of YLDs per person, comparing regions with the highest rates to the lowest rates, ranges from 9·71 in post-neonatal boys to 1·39 in men aged 80 years or older. This range is much smaller than we saw for YLLs across the same region-age-sex groups (the highest being 84·90 in male individuals aged 1–4 years and the lowest being 2·04 in male individuals aged 80 years or older).

Figure 5 shows how the broad composition of the causes of YLDs varied by region in 2010. At the 21 cause-group level, which is level 2 in the GBD cause hierarchy,[29] we detected a

clear association between the demographic and epidemiological transition. Mental and behavioural, musculoskeletal, other non-communicable, and chronic respiratory causes were consistently important in all regions. Some causes played a much more important part in regions that are less advanced in the demographic and epidemiological transition as measured by the mean age of death.[86] HIV/AIDS and tuberculosis, neglected tropical diseases, and nutritional deficiencies stand out as being the most variable. For example, neglected tropical diseases and malaria ranged from 11·4% of total YLDs in western sub-Saharan Africa to less than 0·01% in high- income North America. Injuries have made a greater contribution to overall disability, in percentage terms, in those regions that are more advanced in the demographic and epidemiological transition. The contribution of stroke and diabetes, urogenital, blood, and endocrine diseases also increased with the demographic and epidemiological transition. Cardiovascular diseases did not contribute more than 5% of YLDs. The large fraction in the Caribbean attributable to war and disaster in 2010 is related to the Haiti earthquake.

Figure 6 shows how the leading causes of YLDs varied by region in 2010. Causes were included if they were in the 25 most common globally or in the 25 most common for any region. By contrast with a similar analysis for YLLs,[68] we recorded much consistency in the ranking of causes of YLDs for the 15 most common causes, with the exception of iron-deficiency anaemia, which was the third most common cause globally. Iron-deficiency anaemia ranged from the most common cause in sub-Saharan Africa (western, eastern, and cent ral) to the 88th most common cause in high-income North America. Other causes that were highly variable across regions included malaria, cataracts, hookworm disease, sickle cell anaemia, thalassaemia, lymphatic filariasis, onchocerciasis, and schistosomiasis. The consistency of ranks for most major causes is related to the comparatively small variation in the prevalence of major mental and behavioural disorders and musculoskeletal disorders across different regions of the world.

Injuries accounted for a total of 47·2 million YLDs in 2010, up from 34·1 million in 1990. Table 2 provides the results of YLDs for each external cause of injury (see appendix pp 37–270 for more detailed results by age and sex). In terms of external causes, falls and road injuries combined accounted for more than two-thirds (69·8%) of all YLDs due to injuries. YLDs from injuries stem from the nature of the injury rather than the external cause. Figure 7 shows the global breakdown of the nature of injury by age. In terms of the nature of injury that health services should address, 52·3% of YLDs were accounted for by the following: lacerations, multiple wounds, other dislocations, and eye injuries; fractures of the patella, fibula, tibia, or ankle; and moderate-to-severe traumatic brain injury. The number of YLDs from lacerations, multiple wounds, other dislocations, and eye injuries stemmed from the large numbers of people who had this type of injury and the evidence from follow-up studies that some individuals have long-term decreases in functioning. More severe injuries such as spinal cord injury are much less common according to the hospital and non-hospital data for external cause and nature of injury, even though they have more severe long-term consequences for individuals affected. The age pattern shows a slow rise by age of the fraction of the nature of injury due to fractures of the sternum, face, and pelvis. The percentage due to burns decreased with age as did moderate to severe brain trauma. (figure 7).

An important innovation in GBD 2010 was the assessment of selected impairments overall as well as their attribution by cause. The results of the impairment analysis are not easily discernible in table 2 because the burden is distributed across multiple disease or injury sequelae. Anaemia was perhaps the most important of these disorders in terms of its overall contribution to global YLDs. The burden of anaemia overall was large—68·2 million YLDs or almost a tenth (8·8%) of all YLDs worldwide, showing the high prevalence as well as the moderately severe disability weight especially for severe anaemia. By far the most important contributor to this health loss was iron-deficiency anaemia, which accounted for 62·2% of anaemia YLDs globally. However, our assessment of iron-deficiency anaemia was based on the results of iron supplementation trials which by their nature will capture both iron deficiency anaemia due to inadequate dietary intake but also some anaemia due to blood loss that is iron sensitive. The second leading specific cause of anaemia YLDs was thalassaemia (6·7% of total anaemia YLDs) followed by malaria (4·9%). Hookworm and sickle cell anaemia together account for a further 7·2%. Figure 8 shows the YLD rate per 100 000 individuals across regions; YLD rates varied from nearly 2300 in central sub-Saharan Africa to less than 300 in high-income North America. The cause composition of anaemia YLDs also varied across regions. In sub-Saharan Africa, higher anaemia rates were caused mainly by malaria, hookworm, schistosomiasis, sickle cell anaemia, and higher iron-deficiency anaemia. South Asia had the highest rates after sub-Saharan Africa, with the largest contributor being iron-deficiency anaemia. Although in absolute terms not a major cause of global anaemia, chronic kidney diseases accounted for a substantial proportion of anaemia burden in high-income regions.

Left-side and right-side heart failure was another impairment that was included in the GBD cause-sequelae list in many locations. Worldwide, we recorded an estimated 37·7 million cases of prevalent heart failure in 2010, leading to 4·2 million YLDs. This assessment of heart failure includes only symptomatic heart failure and does not include the large number of individuals with pre-symptomatic disease. For those with symptoms, the average disability weight was 0·12, although severity varies widely between individuals. Heart failure was distributed across 17 causes (figure 9). Slightly more than two-thirds (68·7%) of heart failure globally was due to four causes: ischaemic heart disease, COPD, hypertensive heart disease, and rheumatic heart disease. The pattern varied by region: ischaemic heart disease and COPD caused proportionally more YLDs in developed regions, whereas hypertensive heart disease, rheumatic heart disease, and cardiomyopathy and myocarditis made a larger contribution in some developing regions.

Another important cause of global YLDs is blindness and low vision. Overall, visual impairment accounted for 21·1 million YLDs or 2·7% of the global total. Figure 10 shows the main causes of low vision and blindness. The largest global cause of YLDs from vision impairment globally was other vision loss (mainly from trauma, occupational exposures, and idiopathic disorders), which accounted for 29·5% of the total number of vision-loss YLDs. Uncorrected refractive error was the second most common cause and accounted for 26·5% of vision impairment. Cataracts were the third largest contributor (22·4% of vision-loss YLDs). Glaucoma and macular degeneration together accounted for a further 10·7%, with trachoma and onchocerciasis accounting for 2·1% of YLDs from vision loss in 2010. Most blindness and low vision YLDs were in individuals aged 45 years or older. We recorded a

substantial increase in the absolute number of YLDs from low vision and blindness since 1990, primarily driven by changes in population age structure.The regional pattern shows that in sub-Saharan Africa, uncorrected refractive error, trachoma, onchocerciasis, and vitamin A deficiency play a much greater part than in other regions. As expected in more epidemiologically advanced regions, the composition of causes of blindness and low vision burden was shifted towards macular degeneration, glaucoma, diabetes, and other vision loss.

Hearing impairment accounted for 19·9 million YLDs—2·6% of the total number of YLDs. Adult-onset hearing loss unrelated to a specific disease process accounted for 79·0% of the total YLDs due to hearingimpairment. Other major causes included otitis media, which caused 14·1% of hearing loss YLDs. Smaller causes included congenital hearing loss and meningitis. Of the 19·9 million YLDs due to hearing loss, mild-to-moderate severity accounted for 74·7%, whereas complete hearing loss accounted for only 3·7%. We detected a substantial increase in the number of YLDs due to hearing impairment since 1990, again driven by the ageing of populations.

Intellectual disability and borderline intellectual impairment accounted for 3·1 million YLDs. The prevalence of these disorders were quite low, ranging from 0·5% in high-income Asia Pacific to 2·2% in sub-Saharan Africa and south Asia, with disability weights from 0·003 for mild disorders to 0·149 for profound disorders. Prevalence varied across regions by about two-fold from east sub-Saharan Africa to high-income Asia Pacific. Figure 11 shows YLD rates per 100 000 people across regions by cause. Globally, the main causes of intellectual disability YLDs were idiopathic, Down's syndrome, autism, preterm birth, and other congenital disorders. Some causes, however, were much more important in selected regions, such as meningitis in west and central sub-Saharan Africa and cretinism in south Asia. In terms of YLD rates, the largest variation across regions was from idiopathic causes.

Discussion

We know of no other complete assessment of the prevalence of sequelae from diseases and injuries and their associated YLDs since GBD 1990. Prevalences of the 1160 sequelae ranged by more than a factor of 100 000 from the least to the most common. Taking into account severity, on average, every person in the world had an 11% reduction in their overall health in 2010 because of diseases and injuries. The prevalence of diseases and injuries and YLDs per person increased steadily with age in all regions. We have identified the main causes that contributed to YLDs as mental and behavioural disorders and musculoskeletal disorders. Neurological disorders, chronic respiratory diseases, some neglected tropical diseases, gynaecological disorders, and long-term disability from injuries were also important causes of YLDs. Compared with causes of mortality and years of life lost because of premature mortality, the main drivers of disability were much more consistent across regions. YLDs from non-communicable diseases ranged from 62·0% (central sub-Saharan Africa) to 92·6% (high-income North America) of the total. However, we detected large regional variation when assessing all disorders; the 25 most common disorders in any region included 49 different disorders globally.

There has been much debate in demographic, epidemiological, and gerontological studies about whether the prevalence of morbidity and disability increases or decreases with the epidemiological transition.[87–93] Fries[88] argued that with mortality reduction the onset of disabling chronic illness could be delayed, leading to individuals spending fewer years with morbidity—this hypothesis is known as the compression of morbidity hypothesis. Alternative views have stressed the effect of medical intervention in extending the lifespan of people with disabling disorders,[92] which is commonly referred to as expansion of morbidity. Manton and colleagues[94] argued using self-reported data that the prevalence of disability in elderly people in the USA was decreasing, providing support for the compression hypothesis. Demographic historians have noted the rise in reported morbidity as mortality decreases,[87,89] which could be indicative of a real rise in disease pathology or a changing perception of the importance of lesser morbidities. The results reported here, constructed from multiple sources for nearly all major contributors to functional impairment, suggest that the prevalence of disability in nearly all regions of the world has been stable over the past two decades. In four regions (the Caribbean, western Europe, high-income North America, and southern sub-Saharan Africa), age- standardised YLDs per person increased, whereas in all other regions they decreased, although in all cases the changes were small. The implications of stable age-specific YLDs per person that steadily rise with age are important. As life expectancy increases, people can expect to spend a greater number ofyears living with reduced health because the added years are at older ages with increased rates of disability. If compression is defined as a decreasing number of years of life lived with disability, then our findings are not consistent with this hypothesis. Of course, the evidence for some causes of YLDs over time is scarce, which might mean that we did not identify important secular decreases in disability. However, for the leading causes of YLDs, such as major depressive disorder and most musculoskeletal disorders, much available evidence does not suggest clear trends in age-specific prevalences.

We detected a clear difference between patterns of selfrated health and the YLD rate per person estimated in the GBD 2010, which was constructed from a careful assessment of the evidence for 1160 disabling sequelae across regions. Analysis of the general health question in the World Health Survey,[95] for example, suggests that levels of self-reported health are much lower in North America than they are in Africa. Yet we saw that YLDs per person are higher in Africa than they were in North America. The gap between these self-assessments and the results of the GBD derives from several key factors. First, many studies have been done on variations in the use of categorical responses across cultures;[96–98] attempts to correct for this variation (eg, anchoring vignettes) have been proposed and implemented in various surveys.[99–100] Second, in this study, we assumed the health loss, but not the welfare loss, associated with a sequela would be the same over time or across populations. Responses to general health questions could be confounded by other welfare or wellbeing considerations. In this analysis, however, we saw that self-rated functional health status measured using SF-12 or EQ5D survey instruments in cohort follow-up studies provided useful inputs into the assessment of long-term disability after an event and the distribution of severity within a disorder. Yet the same selfrated health data seem problematic when used to compare overall prevalence of functional impairment across linguistic or cultural groups. Our view of the gap is that substantial research will be needed to enhance the cross-

population comparability of self-rated health instruments to the point at which they can be useful inputs for the assessment of the level of YLDs across populations.

The largest contributor to global YLDs were mental and behavioural disorders. In this study, the number of mental and behavioural disorders that we included increased from eight in GBD 1990 to 22 in GBD 2010. The present analysis used a much more extensive database than was used for GBD 1990, using data from multiple sources and survey programmes. Prevalence estimates for these disorders are based largely on self-reported symptoms with standardised screening instruments. In GBD 1990 and 2000, we included three specific anxiety disorders: post-traumatic stress disorder, panic disorder, and obsessive-compulsive disorder. On the basis of the high degree of comorbidity across anxiety disorders, we chose to assess the burden of all anxiety disorders but not to provide estimates for specific forms of anxiety disorders. Despite some claims to the contrary,[101,102] our systematic analysis and meta-regression have not detected notable trends in the age-specific prevalences of these disorders overall; a notable exception is the rise in some regions in drug use disorders. The overall YLDs per person due to mental and behavioural disorders ranged from 2·0% in western sub-Saharan Africa to 3·3% in high-income North America. This narrow variation in the estimated YLD rates contrasts with some published analyses of variations in prevalence; the differences stem from both the data sources used and the methods applied for meta-regression.[103] The findings of large and increasing YLDs due to mental and behavioural disorders draws attention to the urgent need for identification and implementation of effective and affordable strategies for this set of problems.

The second largest contributor to YLDs globally and in nearly all regions were musculoskeletal (MSK) disorders. Osteoarthritis (OA) of the knees and hips combined was the third most prevalent MSK disorder, and, because we did not include OA in other joints or the spine, is an underestimate of OA, although the burden of OA in other joints or the spine was captured under the categories of low back pain, neck pain, and other MSK. Low back pain stands out as the leading MSK disorder because of a combination of similarly high prevalence and a greater disability weight associated with this health state. Low back pain was one of the four most common disorders in all regions, and was the leading cause of YLDs in all developed countries; neck pain was also a major contributor in many regions. Low back and neck pain accounted for 70% of all YLDs from musculoskeletal disorders, and for every YLD due to neck pain there were 2· 5YLDs related to low back pain. The burden as estimated here is substantially higher than previously assessed in the GBD 1990 and GBD 2000 rounds of estimations. We believe the estimates presented here are more accurate because the empirical basis for prevalence generated through the systematic reviews and the analysis of survey data such as the World Health Survey is much stronger than in the past and a greater body of data was available for analysis. The increase in burden is also attributable to the higher disability weights that emerged from the disability weight surveys of the general population. Across all countries surveyed, respondents consistently recorded high levels of health loss caused by pain. These findings combined with the 33·3% increase in YLDs from 1990 to 2010 driven largely by population growth and ageing have important implications for health systems. Health systems will need to develop effective and affordable strategies to respond to this growing and nearly universal burden.

Intellectual disability (ID) accounted for 3·1 million YLDs, or 0·4% of the global total. This magnitude of ID is small compared with some claims about cognitive impairment in developing countries.[102] There are several explanations for this discrepancy. First, the epidemiological data, especially those from low-income settings, are very scarce and our estimations consequently have large uncertainty intervals. Better data collection for ID would help in future revisions to narrow uncertainty intervals. Second, the disability weights selected by the general public for mild, moderate, severe, and profound intellectual disability ranged from 0·031 to 0·157, which were quite low. Some studies of anaemia and of helminth infections have reported evidence of irreversible cognitive deficits associated with these disorders.[103–109] The reversible component of cognitive deficit associated with anaemia that is related to lethargy is captured in the disability weight for anaemia. The important issue, however, is the irreversible component of ID. In this analysis, this burden is classified as idiopathic intellectual disability. In the allocation of ID to different causes, 1·0 million YLDs were allocated to the idiopathic category in developing countries. If there are irreversible cognitive deficits associated with anaemia and helminth infections that lead to affected individuals being classified as disabled, we would capture this health loss in our estimates of intellectual disability. In sub-Saharan Africa and south Asia, the residual category of intellectual disability is larger than in other regions, which might be an indication of the effect of these other disorders. Nevertheless, the number of YLDs from idiopathic intellectual disability is not large enough to substantially change the ranks of the parasitic diseases or nutritional deficiencies presented here. Also, only IQs below 85 are assigned a disability weight so that if parasitic infections or nutritional deficiencies lowered IQ by two or three points in individuals but did not lower them below the threshold of 85, this effect would not be represented here. The disability weight, even for borderline ID (IQs of 70–84), is very small, suggesting that the general public does not consider small IQ reductions as a health loss; although such changes might have important effects on the general welfare of populations.

Hearing impairments accounted for less than 3% of all YLDs, which was a smaller contribution than that estimated in the GBD 2004 revision (4·5%).[8] The main reason for this lower estimate is that disability weights for severe hearing loss are substantially lower in the current study than in the GBD 1990. As discussed by Salomon and colleagues,[30] the main basis for estimation of disability weights comes from population-based surveys in which respondents make a series of paired comparisons between health states presented as brief lay descriptions. For hearing loss, the lay descriptions focused on the hearing impairment itself, excluding other possible outcomes that might accompany severe levels of hearing loss—eg, depression or learning disabilities. So far as these outcomes are part of the construct being measured in the Global Burden of Disease, their exclusion from the descriptions for hearing outcomes would be expected to lower the overall burden estimated for these causes. Furthermore, findings from some studies suggest that hearing loss can itself be a contributor to depression and other outcomes.[110–112] To the extent that these relations are causal, the YLDs estimated in the present study for hearing loss do not capture these relations. These issues might also apply to the YLDs estimated for blindness or low vision.

A study of this magnitude with so many outcomes estimated for many different age-sex-country-years inevitably has many limitations. In view of the GBD philosophy that it is

better to make estimates based on the best available evidence than not to make estimates, some YLD figures are based on a restricted database. The uncertainty intervals are meant to convey the strength of the evidence. Nevertheless, there are likely sources of uncertainty that have not been captured. In the GBD 2010 causes ofdeath analysis,[68] we used out-of-sample predictive validity to more objectively quantify the validity of uncertainty intervals. We have not been able to apply this approach to the Bayesian meta-regression step in the YLD analysis for two reasons. First, the meta-regression step with DisMod-MR needed too much computing time to allow for repeated out-of-sample predictive validity testing. Future improvements in computational efficiency might allow such analysis, but at present it is not feasible. Second, data for many disorders are more scarce than they are for causes of death. Out-of-sample predictive validity testing is not very stable when data are very scarce. Another important limitation of the study is the disease and sequelae list itself. Although we included 1160 sequelae, there are many smaller sequelae of diseases and less common diseases that are only captured in the residual categories in the cause list. The estimates for these residual categories are, by their nature, very approximate. Compared with GBD 2000, the percentage of YLDs estimated in these residual categories has decreased from 9·0% to less than 2·0%. Future iterations of the GBD could add more disorders and reduce the uncertainty that stems from the residual categories.

Other limitations of this study include the restricted evidence-base for some disorders for crosswalking (adjusting data inputs based on less desirable study characteristics to the expected level of data inputs from optimally conducted studies) different case definitions or item recall periods such as 12-month versus 1-month recall. These crosswalks are estimated on the basis of a comparison of datapoints identified as having the desirable case definition, recall period, or other study quality characteristic with values with the less desirable attributes. This approach assumes that the relation between different study attributes is constant across age, sex, and region. In some cases, when such a relation does not exist, we estimated the crosswalks separately by age and sex using data collected with multiple definitions, such as for different decibel thresholds for hearing loss. The idea of using results of studies done with different definitions or diagnostic approaches in the final systematic analysis has substantially expanded the empirical basis available for assessing prevalence across age, sex, and regions. It does, however, draw attention to the importance of investigators publishing or making available data from existing studies using alternative case definitions or diagnostic approaches.

Another limitation of the study is that long-term follow- up data for injuries were available only from high-income countries. Long-term follow-up in developing countries could be different. Because of higher case-fatality rates in such countries, the average severity in surviving cases might be better than it is in high-income countries, if medical and surgical intervention extends the lifespan of those with more severe disabilities. Alternatively, the probability of long-term disability could be higher because of care that lowers mortality but does not restore function as effectively as does care in developed countries.

For the first time, we have adjusted GBD results for YLDs for comorbidity. The analysis of comorbidity, however, has several major limitations. Very few data are available that have been collected with a sufficiently large sample size and covering enough sequelae to

estimate the correlation matrix for sequelae prevalence by age. National health information systems that capture detailed ICD-coded encounter data could provide a source of data for this type of analysis in the future. In general, if substantial dependent comorbidity (ie, one disease predisposes a person to be more or less likely to have another disease) exists, our estimates of YLDs might be slightly overestimated.[83] The effect, however, is unlikely to be large because of the validation results seen in the 171 354 respondents in MEPS.[77] In the microsimulation step for each country, age, sex, and year, we used 20 000 simulated individuals, then repeated the microsimulation 1000 times to capture uncertainty in the prevalences of all sequelae and disability weights. The effect of the microsimulation, especially for rare disorders, is to increase the estimated uncertainty in YLDs. For most disorders, this increase in uncertainty is small, but it can be quite substantial for rare disorders. The comorbidity process will tend to overestimate uncertainty in uncommon disorders. There are many potential uses of the comorbidity results of the GBD other than correction to YLD calculations. For instance, estimations of the expected number of individuals with multiple disorders might be useful for health planning purposes. We expect that comorbidity will be an important area for future burden research.

Consideration of comorbidity has put more emphasis on understanding the distribution of severity of disease. We directly model combinations of disorders and their effect on individual disability weights; to avoid double-counting, severity distributions for each disorder need to be estimated either controlling for comorbidity or in individuals without comorbidities, although the latter might be intractably affected by selection bias. In either case, the available data are limited. Datasets like the MEPS[77] that collect repeated observations over time on functional health status and collect ICD-coded information on multiple conditions can be extremely useful for future assessments of severity. Other data collection strategies are possible but future burden of disease research needs to foster new data collection that provides direct assessments of severity distributions. Studies of severity need also to take into account that individuals might be asymptomatic for some time, and to quantify this as part of the protocol. In datasets in which clinical diagnoses can be verified, more routine collection of information using a standard self-reported functional health status instrument will enhance their utility.

In view of the fact that there is almost no relation between the prevalence of a sequela and the severity of the sequela as captured in the disability weights, recognition that our results depend on the validity of the disability weights themselves is crucial. Some disability weights have changed substantially compared with GBD 1990 weights, such as for blindness or profound hearing loss. Elsewhere, Salomon and colleagues[30] describe the methods used to measure the GBD 2010 disability weights in multiple populations around the world. The shift to the use of samples of the general population, rather than small panels of health-care professionals as used for the GBD 1990 disability weights, we believe strengthens the findings presented here. Nevertheless, the crucial mechanism by which the general public can assess the level of health for different health states is through brief descriptions in lay language. Salomon and colleagues[30] lay out a future research agenda to better understand how alternative lay descriptions of health states might affect the resulting disability weight.

One important function for health information systems should be to provide national decision makers with timely information about the burden of non-fatal health outcomes. The GBD 2010 analysis of YLDs provides important insights into which types of data can be informative for assessing non-fatal health outcomes. Not surprisingly, there is an important role for household surveys that involve interviews and the collection of blood and other functional tests (eg, hearing, vision, and lung function). Making sure a household survey collects data with a general functional health status instrument and collects information on a broad array of sequelae can make such data collection opportunities even more valuable. Building on the analysis of YLDs and YLLs as well, construction of a household interview and examination survey instrument that can capture the main sources of disease burden would be useful. The detail in the GBD 2010 now makes this approach feasible. Beyond household surveys, however, we have seen that ICD-coded hospital discharge and ambulatory care data, when individual records are available and other sociodemographic data have been collected, can be very valuable, especially if these datasets can be linked. Disease registries for cancer, renal disease, and congenital anomalies have also been an important resource, drawing attention to the importance of tracking individuals with chronic disorders over time who come into contact with health services.

Health priorities have, for much of the past 100 years or more, been largely driven by the imperative of improving the survival of populations, particularly child survival. This was justified, in view of the availability of technologies to treat and prevent childhood illness. However, societies also spend substantial resources on keeping people healthy, not only on keeping them alive into old age, so the availability of strategies to monitor their effectiveness in doing so is important. In this Article, we have shown that quantification of health loss in populations is possible, using comparable metrics that identify the leading causes of non-fatal illness in different regions, at different ages, and at different points in time. The principal findings, namely that mental health, musculoskeletal health, and the rising importance of diabetes need urgent policy responses, are well established. Monitoring progress in reducing the effect of these, and other major contributors to health loss, is as important for improving population health as monitoring progress against the leading causes of death. YLDs provide a convenient framework and metric to do so; ensuring the routine availability of data collection suitable for computation of these measures of health loss should be a key focus of national health information system strategies.

Authors

Prof Theo Vos, PhD,
School of Population Health

Abraham D Flaxman, PhD,
Institute for Health Metrics and Evaluation

Mohsen Naghavi, PhD,
Institute for Health Metrics and Evaluation

Prof Rafael Lozano, MD,
Institute for Health Metrics and Evaluation

Catherine Michaud, MD,
China Medical Board, Boston, MA, USA

Prof Majid Ezzati, PhD,
MRC-HPA Centre for Environment and Healthe, Department of Epidemiology and Biostatistics, School of Public Health

Prof Kenji Shibuya, MD,
Department of Global Health Policy

Prof Joshua A Salomon, PhD,
School of Public Health

Safa Abdalla, MBBS,
Sudanese Public Health Consultancy Group, Sudan

Prof Victor Aboyans, M,
Department of Cardiology, Dupuytren University Hospital, Limoges, France

jerry Abraham, MPH,
University of Texas, San Antonio, TX, USA

Ilana Ackerman, PhD,
University of Melbourne, Melbourne, VIC,Australia

Prof Rakesh Aggarwal, MD,
Sanjay Gandhi Postgraduate Institute of Medical Sciences, Lucknow,India

Stephanie Y Ahn, MPH,
Institute for Health Metrics and Evaluation

Mohammed K Ali, MBChB,
Emory University, Atlanta, GA,USA

Mohammad A AlMazroa, MD,
Ministry of Health, Riyadh, Saudi Arabia

Miriam Alvarado, BA,
Institute for Health Metrics and Evaluation

Prof H Ross Anderson, MD,
St George's University of London, London, UK

Laurie M Anderson, PhD,
Department of Epidemiology, School of Public Health

Kathryn G Andrews, MPH,
Institute for Health Metrics and Evaluation

Charles Atkinson, BS,
Institute for Health Metrics and Evaluation

Prof Larry M Baddour, MD,
Mayo Clinic, Rochester, MN,USA

Adil N Bahalim, MEng,
Independent Consultant, Geneva, Switzerland

Suzanne Barker-Collo, PhD,
University of Auckland, Auckland, New Zealand

Lope H Barrero, ScD,
Department of Industrial Engineering, School of Engineering, Pontifi cia Universidad Javeriana, Bogota,Colombia

David H Bartels, BA,
Harvard Medical School, Harvard University, Boston, MA, USA

Prof Maria-Gloria Basáñez, PhD,
Imperial College London, London, UK

Amanda Baxter, MPH,
Queensland Centre for Mental Health Research

Prof Michelle L Bell, PhD,
Yale University, New Haven, CT, USA

Prof Emelia J Benjamin, MD,
Boston University, Boston, MA, USA

Derrick Bennett, PhD,
Clinical Trial Service Unit and Epidemiological Studies Unit

Eduardo Bernabé, PhD,
Dental Institute

Kavi Bhalla, PhD,
Harvard Medical School, Harvard University, Boston, MA, USA

Bishal Bhandari, MSc,
Queen Mary University of London, London, UK

Boris Bikbov, MD,
Moscow State University of Medicine and Dentistry, Research Institute of Transplantology and Artifi cial Organs, Moscow, Russia

Aref Bin Abdulhak, MD,
King Fahad Medical City, Riyadh, Saudi Arabia

Prof Gretchen Birbeck, MD,
Michigan State University, East Lansing, MI, USA

James A Black, MPhil,
MRC Epidemiology Unit, Cambridge,UK

Hannah Blencowe, MBChB,
London School of Hygiene and Tropical Medicine, London, UK

Jed D Blore, PhD,
School of Population Health

Fiona Blyth, PhD,
University of Sydney, Sydney, NSW, Australia

Ian Bolliger, AB,
Institute for Health Metrics and Evaluation

Audrey Bonaventure, MD,
Inserm, Paris,France

Soufiane Boufous, PhD,
Transport and Road Safety Research

Prof Rupert Bourne, MD,
Vision and Eye Research Unit, Anglia Ruskin University, Cambridge, UK

Michel Boussinesq, MD,
Institut de Recherche pour le Développement, Martinique, France

Tasanee Braithwaite, BMBCh,
Moorfi elds Eye Hospital, London, UK

Prof Carol Brayne, MD,
University of Cambridge, Cambridge, UK

Lisa Bridgett, PhD,
University of Sydney, Sydney, NSW, Australia

Prof Simon Brooker, DPhil,
London School of Hygiene and Tropical Medicine, London, UK

Peter Brooks, MD,
University of Melbourne, Melbourne, VIC,Australia

Prof Traolach S Brugha, MD,
University of Leicester, Leicester, UK

Claire Bryan-Hancock, BPsych,
Flinders University, Adelaide,SA, Australia

Chiara Bucello, BPsyc,
University of New South Wales, Sydney, NSW, Australia

Prof Rachelle Buchbinder,
Institute, Malvern, VIC, Australia

Geoffrey Buckle, MPH,
Bloomberg School of Public Health

Christine M Budke, PhD,
Texas A&M University, College Station, TX, USA

Michael Burch, MD,
Great Ormond Street Hospital, London, UK

Prof Peter Burney, MD,

Imperial College London, London, UK

Roy Burstein, BA,
Institute for Health Metrics and Evaluation

Bianca Calabria,
National Drug and Alcohol Research Centre

Benjamin Campbell, BA,
Institute for Health Metrics and Evaluation

Prof Charles E Canter, MD,
Washington University, St Louis, MO, USA

Prof Hélène Carabin, PhD,
University of Oklahoma Health Sciences Center, Oklahoma City, OK, USA

Prof Jonathan Carapetis, MBBS,
Telethon Institute for Child Health Research, Centre for Child, Health Research

Loreto Carmona, MD,
Universidad Camilo Jose Cela, Villanueva de la Cañada, Spain

Claudia Cella, PharmChemD,
Mario Negri, Institute for Pharmacological, Research, Bergamo, Italy

Fiona Charlson, MPH,
School of Population Health

Honglei Chen, PhD,
National Institute of Environmental Health Sciences, Research, Triangle Park, NC, USA

Prof Andrew Tai-Ann Cheng, MD,
Institute of Biomedical Sciences, Academia Sinica, Taipei, Taiwan

David Chou, BA,
Institute for Health Metrics and Evaluation

Prof Sumeet S Chugh, MD,
Cedars-Sinai Medical Center, Los Angeles, CA, USA

Luc E Coffeng, MD,
Erasmus MC, University Medical Center, Rotterdam, Rotterdam, Netherlands

Prof Steven D Colan, MD,
Boston Children's Hospital

Samantha Colquhoun, MPH,
Menzies School of Health Research, Darwin, NT, Australia

K Ellicott Colson, BA,
Institute for Health Metrics and Evaluation

John Condon, PhD,

Menzies School of Health, Research, Darwin, NT, Australia

Myles D Connor, PhD,
National Health Services, Fife, Edinburgh, Scotland, UK

Prof Leslie T Cooper, MD,
Loyola University Medical School, Chicago, IL, USA

Matthew Corriere, MD,
School of Public Health Sciences, Wake Forest University, Winston-Salem, NC, USA

Monica Cortinovis, BiotechD,
Mario Negri Institute for Pharmacological, Research, Bergamo, Italy

Karen Courville de Vaccaro, MD,
Hospital Dr Gustavo N Collado, Puerto Chitre, Panama

Prof William Couser, MD,
University of Washington, Seattle, WA, USA

Benjamin C Cowie, MBBS,
Victorian Infectious Diseases Reference Laboratory, Melbourne, VIC, Australia

Prof Michael H Criqui, MD,
University of California, San Diego, San Diego, CA, USA

Marita Cross, PhD,
University of Sydney, Sydney, NSW, Australia

Kaustubh C Dabhadkar, MBBS,
Emory University, Atlanta, GA,USA

Manu Dahiya, BDS,
Institute of Dentistry

Nabila Dahodwala, MD,
University of Pennsylvania, Philadelphia, PA, USA

James Damsere-Derry, MPH,
Building and Road Research Institute, Kumasi, Ghana

Goodarz Danaei, MD,
School of Public Health

Prof Adrian Davis, PhD,
MRC Hearing and Communication Group, Manchester, UK

Prof Diego De Leo, DSc,
Griffi th University, Brisbane, QLD, Australia

Prof Louisa Degenhardt, PhD,
National Drug and Alcohol Research Centre

Centre for Health Policy, Programs and Economics

Robert Dellavalle, MD,
Denver VA Medical Center, Denver, CO, USA

Allyne Delossantos, BS,
Institute for Health Metrics and Evaluation

Julie Denenberg, MA,
University of California, San Diego, San Diego, CA, USA

Sarah Derrett, PhD,
University of Otago, Dunedin, New Zealand

Don CDes Jarlais, PhD,
Beth Israel Medical Center, New York, City, NY, USA

Prof Samath D Dharmaratne, MBBS,
Institute for Health Metrics and Evaluation

Mukesh Dherani, PhD,
The University of Liverpool, Liverpool, UK

Cesar Diaz-Torne, MD,
Hospital de la Santa Creu i Sant Pau, Barcelona, Spain

Prof Helen Dolk, DrPH,
University of Ulster, Ulster, UK

E Ray Dorsey, MD,
Johns Hopkins University, Baltimore, MD, USA

Tim Driscoll, PhD,
Sydney School of Public Health

Herbert Duber, MD,
University of Washington, Seattle, WA, USA

Beth Ebel, MD,
University of Washington, Seattle, WA, USA

Karen Edmond, PhD,
London School of Hygiene and Tropical Medicine, London, UK

Alexis Elbaz, MD,
Inserm, Paris,France

Suad Eltahir Ali, Mcs,
Federal Ministry of Health, Khartoum, Sudan

Holly Erskine, BPsySc,
Queensland Centre for Mental Health Research

Patricia J Erwin, MLS,
Mayo Clinic, Rochester, MN,USA

Patricia Espindola, MD,

Hospital Maciel, Montevideo, Uruguay

Stalin E Ewoigbokhan, MPH,
Emerald Public Health Consulting Services Ltd, Abuja, Nigeria

Farshad Farzadfar, MD,
Tehran University of Medical Sciences, Tehran, Iran

Prof Valery Feigin, MD,
National Institute for Stroke and Applied Neurosciences

Prof David T Felson, MD,
School of Medicine

Alize Ferrari, BPsySc,
Queensland Centre for Mental Health Research

Cleusa P Ferri, PhD,
Federal University of São Paulo, São Paulo, Brazil

Eric M Fèvre, PhD,
University of Edinburgh, Edinburgh, Scotland, UK

Mariel M Finucane, PhD,
Department of Biostatistics

Seth Flaxman, BA,
Carnegie Mellon University, Pittsburgh, PA, USA

Louise Flood, MBBS,
Flinders University, Adelaide,SA, Australia

Kyle Foreman, MPH,
Imperial College London, London, UK

Mohammad H Forouzanfar, MD,
Institute for Health Metrics and Evaluation

Prof Francis Gerry R Fowkes, FRCPE,
University of Edinburgh, Edinburgh, Scotland, UK

Richard Franklin, PhD,
Royal Life Saving Society, Sydney, NSW, Australia

Marlene Fransen, PhD,
Faculty of Health Sciences

Michael K Freeman, BA,
Institute for Health Metrics and Evaluation

Belinda J Gabbe, PhD,
Department of Epidemiology and Preventive Medicine

Prof Sherine E Gabriel, MD,
Mayo Clinic, Rochester, MN,USA

Emmanuela Gakidou, PhD,
Institute for Health Metrics and Evaluation

Hammad A Ganatra, MBBS,
Emory University, Atlanta, GA,USA

Bianca Garcia, MPH,
University of Queensland, Brisbane, QLD, Australia

Flavio Gaspari, ChemD,
Mario Negri Institute for Pharmacological, Research, Bergamo, Italy

Prof Richard F Gillum, MD,
Howard University College of Medicine, Washington, DC, USA

Prof Gerhard Gmel, PhD,
Addiction Info Switzerland, Lausanne, Switzerland

Prof Richard Gosselin, MD,
University of California, San Francisco, San Francisco, CA, USA

Rebecca Grainger, PhD,
University of Otago, Dunedin, New Zealand

Justina Groeger, MPH,
College of Medicine, SUNY Downstate Medicle Center, Brooklyn, NY, USA

Prof Francis Guillemin, MD,
Université de Lorraine, Nancy, France

Prof David Gunnell, DSc,
University of Bristol, Bristol, UK

Ramyani Gupta, MSc,
St George's University of London, London, UK

Juanita Haagsma, PhD,
Erasmus MC, University Medical Center, Rotterdam, Rotterdam, Netherlands

Prof Holly Hagan, PhD,
New York University, New York City, NY

Yara A Halasa, DDS,
Brandeis University, Waltham, MA, USA

Prof Wayne Hall, PhD,
University of Queensland, Brisbane, QLD, Australia

Diana Haring, BS,
Institute for Health Metrics and Evaluation

Josep Maria Haro, MD,
Parc Sanitari Sant Joan de Déu, CIBERSAM, Universitat de Barcelona, Sant, Boi de Llobregat, Spain

Prof James E Harrison, MBBS,
Flinders University, Adelaide,SA, Australia

Rasmus Havmoeller, MD,
Heart Institute

Karolinska University Hospital, Stockholm, Sweden

Prof Roderick J Hay, DM,
Hospital NHS Trust

Hideki Higashi, PhD,
School of Population Health

Catherine Hill, MBBS,
The Queen Elizabeth Hospital, Adelaide, SA, Australia

Prof Bruno Hoen, MD,
Université de Franche-Comté, Besançon, France

Howard Hoffman, MA,
National Institute on Deafness and Other Communication Disorders

Prof Peter J Hotez, MD,
National School of Tropical Medicine, Baylor College of Medicine, Houston, TX, USA

Damian Hoy, PhD,
Monash University, Melbourne, VIC, Australia

John J Huang, MD,
Yale University, New Haven, CT, USA

Sydney E Ibeanusi, MBBS,
University of Port Harcourt, Port Harcourt, Nigeria

Kathryn H Jacobsen, PhD,
George Mason University, Fairfax, VA, USA

Spencer L James, MPH,
Institute for Health Metrics and Evaluation

Deborah Jarvis, FFPH,
Imperial College London, London, UK

Rashmi Jasrasaria, BA,
Institute for Health Metrics and Evaluation

Sudha Jayaraman, MD,
Brigham and Women's Hospital

Nicole Johns, BA,
Institute for Health Metrics and Evaluation

Prof Jost B Jonas, MD,

Department of Ophthalmology, Medical Faculty Mannheim, Ruprecht Karls University, Heidelberg, Germany

Ganesan Karthikeyan, MD,
All India Institute of Medical Sciences, New Delhi, India

Nicholas Kassebaum, MD,
Department of Anesthesiology and Pain Medicine

Prof Norito Kawakami, MD,
University of Tokyo, Tokyo,Japan

Prof Andre Keren, MD,
Department of Cardiology, Hebrew University Hadassah Medical School, Jerusalem, Israel

Jon-Paul Khoo, MBBS,
Queensland Centre for Mental Health Research

Prof Charles H King, MD,
Case Western Reserve University, Cleveland, OH, USA

Lisa Marie Knowlton, MD,
Harvard Humanitarian Initiative

Olive Kobusingye, MMed,
School of Public Health, Makerere University, Kampala, Uganda

Adofo Koranteng, MSc,
Kwame Nkrumah University of Science and Technology, Kumasi, Ghana

Rita Krishnamurthi, PhD,
Auckland Technical University, Auckland, New Zealand

Prof Ratilal Lalloo, PhD,
School of Dentistry and Oral Health

Laura L Laslett, MMedSci,
University of Tasmania, Tasmania, Australia

Tim Lathlean, MA,
FlindersUniversity, Adelaide,SA, Australia

Janet L Leasher, OD,
Nova Southeastern University, Fort, Lauderdale, FL, USA

Yong Yi Lee, MHEcon,
School of Population Health

James Leigh, MBBS,
Sydney School of Public Health

Stephen S Lim, PhD,
Institute for Health Metrics and Evaluation

Elizabeth Limb, MSc,
St George's University of London, London, UK

John Kent Lin, AB,
School of Public Health

Michael Lipnick, MD,
University of California, San Francisco, San Francisco, CA, USA

Prof Steven E Lipshultz, MD,
Miller School of Medicine, University of Miami, Miami, FL, USA

Wei Liu, MD,
Department of Epidemiology

Maria Loane, MSc,
University of Ulster, Ulster, UK

Summer Lockett Ohno, BA,
Institute for Health Metrics and Evaluation

Prof Ronan Lyons, MD,
Swansea University, Swansea, UK

Jixiang Ma, PhD,
National Center for Non-Communicable, Disease Control and Prevention, China Centers for Disease Control, Beijing, China

Jacqueline Mabweijano, MMed,
Mulago Hospital, Kampala, Uganda

Michael F MacIntyre, EdM,
Institute for Health Metrics and Evaluation

Prof Reza Malekzadeh, MD,
Digestive Disease Research Center

Leslie Mallinger, MPH,
Institute for Health Metrics and Evaluation

Sivabalan Manivannan, ScM,
Bloomberg School of Public Health

Prof Wagner Marcenes, PhD,
Queen Mary University of London, London, UK

Prof Lyn March, MD,
Institute of Bone and Joint Research

Prof David J Margolis, MD,
University of Pennsylvania, Philadelphia, PA, USA

Prof Guy B Marks, PhD,
University of Sydney, Sydney, NSW, Australia

Prof Robin Marks, MBBS,
University of Melbourne, Melbourne, VIC,Australia

Akira Matsumori, MD,
Asian Pacific Society of Cardiology, Kyoto, Japan

Richard Matzopoulos, MPhil,
Medical Research Council, Tygerberg, South Africa

Prof Bongani M Mayosi, DPhil,
University of Cape Town, Cape Town, South Africa

John H McAnulty, MD,
Legacy Health System, Portland, Oregon

Prof Mary M McDermott, MD,
Northwestern University Feinberg School of Medicine, Evanston, IL, USA

Neil McGill, FRACP,
University of Sydney, Sydney, NSW, Australia

Prof John McGrath, MD,
Queensland Brain Institute

Maria Elena Medina-Mora, PhD,
National Institute on Psychiatry Ramón de la Fuente, Mexico City, Mexico

Michele Meltzer, MD,
Thomas Jefferson University, Philadelphia, PA, USA

Prof Ziad A Memish, MD,
Ministry of Health, Riyadh, Saudi Arabia

Prof George A Mensah, MD,
Department of Medicine

Tony R Merriman, PhD,
University of Otago, Dunedin, New Zealand

Ana-Claire Meyer, MD,
University of California, San Francisco, San Francisco, CA, USA

Valeria Miglioli,
Mario Negri Institute for Pharmacological Research, Bergamo, Italy

Matthew Miller, MD,
School of Public Health

Ted R Miller, PhD,
Pacific Institute for Research and Evaluation, Calverton, MD, USA

Prof Philip B Mitchell, MD,
University of New South Wales, Sydney, NSW, Australia

Prof Ana Olga Mocumbi, MD,

National Institute of Health, Maputo, Mozambique

Prof Terrie E Moffitt, PhD,
Duke University, Durham, NC, USA

Ali A Mokdad, MD,
Institute for Health Metrics and Evaluation

Lorenzo Monasta, DSc,
Institute for Maternal and Child Health, IRCCS Burlo Garofolo, Trieste, Italy

Marcella Montico, Msc,
Institute for Maternal and Child Health, IRCCS Burlo Garofolo, Trieste, Italy

Maziar Moradi-Lakeh, MD,
Tehran University of Medical Sciences, Tehran, Iran

Andrew Moran, MD,
Columbia University, New York City, NY, USA

Prof Lidia Morawska, PhD,
Queensland University of Technology, Brisbane, QLD, Australia

Rintaro Mori, MD,
National Center for Child Health and Development, Tokyo, Japan

Michele E Murdoch, FRCP,
Watford General Hospital, Watford, UK

Michael K Mwaniki, MBChB,
Kemri-Wellcome Trust, Kilifi, Kenya

Prof Kovin Naidoo, PhD,
AVRI, University of KwaZulu-Natal, Durban, South Africa

M Nathan Nair, MD,
Institute for Health Metrics and Evaluation, University of Washington, 2301 Fifth Avenue, Suite 600, Seattle, WA 98121, USA

Luigi Naldi, MD,
Centro Studi GISED, Bergamo, Italy

KM Venkat Narayan, MD,
Emory University, Atlanta, GA,USA

Paul K Nelson, MHSc,
National Drug and Alcohol Research Centre

Robert G Nelson, MD,
National Institute of Diabetes, and Digestive and Kidney Diseases, National Institutes of Health, Bethesda, MD, USA

Michael C Nevitt, PhD,
Department of Epidemiology and Biostatistics

Prof Charles R Newton, MD,
University of Oxford, Oxford, UK

Sandra Nolte, PhD,
Charité-Universitätsmedizin Berlin, Berlin, Germany

Prof Paul Norman, MD,
University of Western Australia, Perth, WA, Australia

Rosana Norman, PhD,
School of Population Health

Martin O'Donnell, PhD,
HRB-Clinical Research Facility, National University of Ireland Galway, Galway, Ireland, UK

Simon O'Hanlon, MSc,
Imperial College London, London, UK

Casey Olives, PhD,
University of Washington, Seattle, WA, USA

Saad B Omer, MBBS,
Schools of Public Health and Medicine

Katrina Ortblad, BA,
Institute for Health Metrics and Evaluation, University of Washington, 2301 Fifth Avenue, Suite 600, Seattle, WA 98121, USA

Prof Richard Osborne, PhD,
Deakin University, Melbourne, VIC, Australia

Doruk Ozgediz, MD,
Global Partners in Anesthesia and Surgery

Andrew Page, PhD,
School of Population Health

Bishnu Pahari, MD,
B P Koirala Institute of Health Sciences, Dharan, Nepal

Jeyaraj Durai Pandian, MD,
Betty Cowan Research and Innovation Center, Ludhiana, India

Andrea Panozo Rivero, MD,
Hospital Juan XXIII, La Paz, Bolivia

Prof Scott B Patten, MD,
University of Calgary, Calgary, AB, Canada

Prof Neil Pearce, PhD,
London School of Hygiene and Tropical Medicine, London, UK

Rogelio Perez Padilla, MD,
Instituto Nacional de Enfermedades Respiratorias, Mexico City, Mexico

Fernando Perez-Ruiz, MD,
Hospital Universitario Cruces, Barakaldo, Spain

Norberto Perico, MD,
Mario Negri Institute for Pharmacological Research, Bergamo, Italy

Prof Konrad Pesudovs, PhD,
Flinders University, Adelaide, SA, Australia

David Phillips, BS,
Institute for Health Metrics and Evaluation

Prof Michael R Phillips, MD,
Shanghai Mental Health Center, School of Medicine

Kelsey Pierce, BA,
Institute for Health Metrics and Evaluation, University of Washington, 2301 Fifth Avenue, Suite 600, Seattle, WA 98121, USA

Sébastien Pion, MD,
Institut de Recherche pour le Développement, Martinique, France

Guilherme V Polanczyk, MD,
Medical School,Chicago, IL, USA

Suzanne Polinder, PhD,
Department of Public Health

Prof C Arden Pope III, PhD,
Brigham Young University, Provo, UT, USA

Svetlana Popova, MD,
Centre for Addiction and Mental Health, Toronto, ON, Canada

Esteban Porrini, MD,
Hospital Universitario de Canarias, Tenerif, Spain

Farshad Pourmalek, MD,
Faculty of Medicine, School of Population and Public Health, University of British Columbia, Vancouver, BC, Canada

Prof Martin Prince, MD,
Psychiatry, King's College London, London, UK

Rachel L Pullan, PhD,
London School of Hygiene and Tropical Medicine, London, UK

Kapa D Ramaiah, PhD,
Vector Control Research Centre, Pondicherry, India

Dharani Ranganathan, BS,
Institute for Health Metrics and Evaluation, University of Washington, 2301 Fifth Avenue, Suite 600, Seattle, WA 98121, USA

Homie Razavi, PhD,

Center for Disease Analysis, Louisville, CO, USA

Mathilda Regan, MPH,
University of California, Berkeley, Berkeley, CA, USA

Prof Jürgen T Rehm, PhD,
Centre for Addiction and Mental Health, Toronto, ON, Canada

David B Rein, PhD,
NORC, University of Chicago, Chicago, IL, USA

Prof Guiseppe Remuzzi, MD,
Mario Negri Institute for Pharmacological Research, Bergamo, Italy

Kathryn Richardson, MSc,
University of Cambridge, Cambridge, UK

Prof Frederick P Rivara, MD,
University of Washington, Seattle, WA, USA

Thomas Roberts, BA,
Institute for Health Metrics and Evaluation

Carolyn Robinson, BS,
University of California, San Francisco, San Francisco, CA, USA

Felipe Rodriguez De Leòn, MD,
Complejo Hospitalario Caja De Seguro Social, Panama City, Panama

Luca Ronfani, PhD,
Institute for Maternal and Child Health, IRCCS Burlo Garofolo, Trieste, Italy

Prof Robin Room, PhD,
School of Population Health

Lisa C Rosenfeld, MPH,
Institute for Health Metrics and Evaluation

Lesley Rushton, PhD,
Imperial College London, London, UK

Prof Ralph L Sacco, MD,
Miller School of Medicine, University of Miami, Miami, FL, USA

Sukanta Saha, PhD,
Queensland Centre for Mental Health Research

Prof Uchechukwu Sampson, MD,
Vanderbilt University, Nashville, TN, USA

Lidia Sanchez-Riera, MD,
Institute of Bone and Joint Research

Ella Sanman, BS,
Institute for Health Metrics and Evaluation

Prof David C Schwebel, PhD,
University of Alabama at Birmingham, Birmingham, AL, USA

James Graham Scott, PhD,
Centre for Clinical Research

Maria Segui-Gomez, MD,
Ministry of Interior, Madrid, Spain

Saeid Shahraz, MD,
Brandeis University, Waltham, MA, USA

Prof Donald S Shepard, PhD,
Brandeis University, Waltham, MA, USA

Hwashin Shin, PhD,
Health Canada, Ottawa, ON, Canada

Rupak Shivakoti, BA,
Johns Hopkins University, Baltimore, MD, USA

Prof Donald Silberberg, MD,
Department of Neurology, University of Pennsylvania School of Medicine, Philadelphia, PA, USA

David Singh, MD,
Queens Medical Center, Honolulu, HI, USA

Gitanjali M Singh, PhD,
School of Public Health

Jasvinder A Singh, MBBS,
University of Alabama at Birmingham, Birmingham, AL, USA

Jessica Singleton, MIPH,
National Drug and Alcohol Research Centre

David A Sleet, PhD,
National Center for Injury Prevention and Control

Prof Karen Sliwa, MD,
Hatter Institute

Emma Smith, PhD,
Department of Rheumatology, Northern Clinical School

Jennifer L Smith, MSc,
London School of Hygiene and Tropical Medicine, London, UK

Nicolas J C Stapelberg, MBBS,
Griffith University, Brisbane, QLD, Australia

Andrew Steer, MBBS,
Centre for International Child Health

Prof Timothy Steiner, PhD,
Norwegian University of Science and Technology, Trondheim, Norway

Wilma A Stolk, PhD,
Erasmus MC, University Medical Center Rotterdam, Rotterdam, Netherlands

Prof Lars Jacob Stovner, PhD,
Department of Neuroscience

Christopher Sudfeld, ScM,
School of Public Health

Sana Syed, MBBS,
Agwa Khan University, Karachi, Pakistan

Giorgio Tamburlini, PhD,
Institute for Maternal and Child Health, IRCCS Burlo Garofolo, Trieste, Italy

Mohammad Tavakkoli, MD,
School of Public Health

Prof Hugh R Taylor, MD,
University of Melbourne, Melbourne, VIC,Australia

Jennifer A Taylor, PhD,
Drexel University School of Public Health, Philadelphia, PA, USA

William J Taylor, PhD,
University of Otago, Dunedin, NewZealand

Bernadette Thomas, MD,
University of Washington, Seattle, WA, USA

Prof W Murray Thomson, PhD,
University of Otago, Dunedin, NewZealand

Prof George D Thurston, ScD,
NewYork University, NewYork City, NY

Imad M Tleyjeh, MD,
King Fahad Medical City, Riyadh, Saudi Arabia

Prof Marcello Tonelli, MD,
Alberta Kidney Disease Network, University of Alberta, Edmonton, AB, Canada

Prof Jeffrey A Towbin, MD,
Cincinnati Children's Hospital, Cincinnati, OH, USA

Thomas Truelsen, MD,
Department of Neurology, Copenhagen University Hospital, Herlev, Denmark

Prof Miltiadis K Tsilimbaris, MD,
University of Crete Medical School, Crete, Greece

Clotilde Ubeda, MD,

Instituto Nacional de Epidemiología, ANLIS, Malbran, Argentina

Eduardo A Undurraga, PhD,
Brandeis University, Waltham, MA, USA

Marieke J van der Werf, PhD,
KNCV Tuberculosis Foundation, The Hague, Netherlands

Prof Jim va nOs, PhD,
Maastricht University Medical Centre, Maastricht, Netherlands

Prof Monica S Vavilala, MD,
University of Washington, Seattle, WA, USA

N Venketasubramanian, FRCP,
National University of Singapore, Singapore

Mengru Wang, MPH,
Institute for Health Metrics and Evaluation

Prof Wenzhi Wang, MD,
Beijing Neurosurgical Institute, Capital Medical University, Beijing, China

Kerrianne Watt, PhD,
James Cook University, Townsville, QLD, Australia

David J Weatherall, MD,
University of Oxford, Oxford, UK

Prof Martin A Weinstock, MD,
Brown University, Providence, RI, USA

Robert Weintraub, MBBS,
Department of Paediatrics

Marc G Weisskopf, PhD,
School of Public Health

Prof Myrna M Weissman, PhD,
Mailman School of Public Health

Richard A White, MA,
School of Public Health

Prof Harvey Whiteford, MBBS,
Queensland Centre for Mental Health Research

Steven T Wiersma, MD,
Centers for Disease Control and Prevention, Atlanta, GA, USA

Prof James D Wilkinson, MD,
Miller School of Medicine, University of Miami, Miami, FL, USA

Prof Hywel C Williams, PhD,
University of Nottingham, Nottingham, UK

Sean R M Williams, MBBS,
University of Western Sydney, Campbelltown, NSW, Australia

Emma Witt, MSc,
Auckland Technical University, Auckland, New Zealand

Frederick Wolfe, MD,
Arthritis Research, Wichita, KS, USA

Prof Anthony D Woolf, MBBS,
Royal Cornwall Hospital, Truro, UK

Sarah Wulf, MPH,
Institute for Health Metrics and Evaluation

Pon-Hsiu Yeh, MS,
London School of Economics, London,UK

Anita K M Zaidi, MBBS,
Agwa Khan University, Karachi, Pakistan

Prof Zhi-Jie Zheng,
School of Public Health, Shanghai Jiao Tong University, Shanghai, China

David Zonies, MD,
Landstuhl Regional Medical Center, Landstuhl, Germany

Prof Alan D Lopez, PhD, and
School of Population Health

Prof Christopher J L Murray, MD
Institute for Health Metrics and Evaluation

Affiliations

School of Population Health

Institute for Health Metrics and Evaluation

Institute for Health Metrics and Evaluation

Institute for Health Metrics and Evaluation

China Medical Board, Boston, MA, USA

MRC-HPA Centre for Environment and Healthe, Department of Epidemiology and Biostatistics, School of Public Health

Department of Global Health Policy

School of Public Health

Sudanese Public Health Consultancy Group, Sudan

Department of Cardiology, Dupuytren University Hospital, Limoges, France

University of Texas, San Antonio, TX, USA

University of Melbourne, Melbourne, VIC,Australia

Sanjay Gandhi Postgraduate Institute of Medical Sciences, Lucknow,India

Institute for Health Metrics and Evaluation

Emory University, Atlanta, GA,USA

Ministry of Health, Riyadh, Saudi Arabia

Institute for Health Metrics and Evaluation

St George's University of London, London, UK

Department of Epidemiology, School of Public Health

Institute for Health Metrics and Evaluation

Institute for Health Metrics and Evaluation

Mayo Clinic, Rochester, MN,USA

Independent Consultant, Geneva, Switzerland

University of Auckland, Auckland, New Zealand

Department of Industrial Engineering, School of Engineering, Pontifi cia Universidad Javeriana, Bogota,Colombia

Harvard Medical School, Harvard University, Boston, MA, USA

Imperial College London, London, UK

Queensland Centre for Mental Health Research

Yale University, New Haven, CT, USA

Boston University, Boston, MA, USA

Clinical Trial Service Unit and Epidemiological Studies Unit

Dental Institute

Harvard Medical School, Harvard University, Boston, MA, USA

Queen Mary University of London, London, UK

Moscow State University of Medicine and Dentistry, Research Institute of Transplantology and Artifi cial Organs, Moscow, Russia

King Fahad Medical City, Riyadh, Saudi Arabia

Michigan State University, East Lansing, MI, USA

MRC Epidemiology Unit, Cambridge,UK

London School of Hygiene and Tropical Medicine, London, UK

School of Population Health

University of Sydney, Sydney, NSW, Australia

Institute for Health Metrics and Evaluation

Inserm, Paris,France

Transport and Road Safety Research

Vision and Eye Research Unit, Anglia Ruskin University, Cambridge, UK

Institut de Recherche pour le Développement, Martinique, France

Moorfi elds Eye Hospital, London, UK

University of Cambridge, Cambridge, UK

University of Sydney, Sydney, NSW, Australia

London School of Hygiene and Tropical Medicine, London, UK

University of Melbourne, Melbourne, VIC,Australia

University of Leicester, Leicester, UK

Flinders University, Adelaide,SA, Australia

University of New South Wales, Sydney, NSW, Australia

Institute, Malvern, VIC, Australia

Bloomberg School of Public Health

Texas A&M University, College Station, TX, USA

Great Ormond Street Hospital, London, UK

Imperial College London, London, UK

Institute for Health Metrics and Evaluation

National Drug and Alcohol Research Centre

Institute for Health Metrics and Evaluation

Washington University, St Louis, MO, USA

University of Oklahoma Health Sciences Center, Oklahoma City, OK, USA

Telethon Institute for Child Health Research, Centre for Child, Health Research

Universidad Camilo Jose Cela, Villanueva de la Cañada, Spain

Mario Negri, Institute for Pharmacological, Research, Bergamo, Italy

School of Population Health

National Institute of Environmental Health Sciences, Research, Triangle Park, NC, USA

Institute of Biomedical Sciences, Academia Sinica, Taipei, Taiwan

Institute for Health Metrics and Evaluation

Cedars-Sinai Medical Center, Los Angeles, CA, USA

Erasmus MC, University Medical Center, Rotterdam, Rotterdam, Netherlands

Boston Children's Hospital

Menzies School of Health Research, Darwin, NT, Australia

Institute for Health Metrics and Evaluation

Menzies School of Health, Research, Darwin, NT, Australia

National Health Services, Fife, Edinburgh, Scotland, UK

Loyola University Medical School, Chicago, IL, USA

School of Public Health Sciences, Wake Forest University, Winston-Salem, NC, USA

Mario Negri Institute for Pharmacological, Research, Bergamo, Italy

Hospital Dr Gustavo N Collado, Puerto Chitre, Panama

University of Washington, Seattle, WA, USA

Victorian Infectious Diseases Reference Laboratory, Melbourne, VIC, Australia

University of California, San Diego, San Diego, CA, USA

University of Sydney, Sydney, NSW, Australia

Emory University, Atlanta, GA,USA

Institute of Dentistry

University of Pennsylvania, Philadelphia, PA, USA

Building and Road Research Institute, Kumasi, Ghana

School of Public Health

MRC Hearing and Communication Group, Manchester, UK

Griffi th University, Brisbane, QLD, Australia

National Drug and Alcohol Research Centre

Centre for Health Policy, Programs and Economics

Denver VA Medical Center, Denver, CO, USA

Institute for Health Metrics and Evaluation

University of California, San Diego, San Diego, CA, USA

University of Otago, Dunedin, New Zealand

Beth Israel Medical Center, New York, City, NY, USA

Institute for Health Metrics and Evaluation

The University of Liverpool, Liverpool, UK

Hospital de la Santa Creu i Sant Pau, Barcelona, Spain

University of Ulster, Ulster, UK

Johns Hopkins University, Baltimore, MD, USA

Sydney School of Public Health

University of Washington, Seattle, WA, USA

University of Washington, Seattle, WA, USA

London School of Hygiene and Tropical Medicine, London, UK

Inserm, Paris,France

Federal Ministry of Health, Khartoum, Sudan

Queensland Centre for Mental Health Research

Mayo Clinic, Rochester, MN,USA

Hospital Maciel, Montevideo, Uruguay

Emerald Public Health Consulting Services Ltd, Abuja, Nigeria

Tehran University of Medical Sciences, Tehran, Iran

National Institute for Stroke and Applied Neurosciences

School of Medicine

Queensland Centre for Mental Health Research

Federal University of São Paulo, São Paulo, Brazil

University of Edinburgh, Edinburgh, Scotland, UK

Department of Biostatistics

Carnegie Mellon University, Pittsburgh, PA, USA

Flinders University, Adelaide,SA, Australia

Imperial College London, London, UK

Institute for Health Metrics and Evaluation

University of Edinburgh, Edinburgh, Scotland, UK

Royal Life Saving Society, Sydney, NSW, Australia

Faculty of Health Sciences

Institute for Health Metrics and Evaluation

Department of Epidemiology and Preventive Medicine

Mayo Clinic, Rochester, MN,USA

Institute for Health Metrics and Evaluation

Emory University, Atlanta, GA,USA

University of Queensland, Brisbane, QLD, Australia

Mario Negri Institute for Pharmacological, Research, Bergamo, Italy

Howard University College of Medicine, Washington, DC, USA

Addiction Info Switzerland, Lausanne, Switzerland

University of California, San Francisco, San Francisco, CA, USA

University of Otago, Dunedin, New Zealand

College of Medicine, SUNY Downstate Medicle Center, Brooklyn, NY, USA

Université de Lorraine, Nancy, France

University of Bristol, Bristol, UK

St George's University of London, London, UK

Erasmus MC, University Medical Center, Rotterdam, Rotterdam, Netherlands

New York University, New York City, NY

Brandeis University, Waltham, MA, USA

University of Queensland, Brisbane, QLD, Australia

Institute for Health Metrics and Evaluation

Parc Sanitari Sant Joan de Déu, CIBERSAM, Universitat de Barcelona, Sant, Boi de Llobregat, Spain

Flinders University, Adelaide,SA, Australia

Heart Institute

Karolinska University Hospital, Stockholm, Sweden

Hospital NHS Trust

School of Population Health

The Queen Elizabeth Hospital, Adelaide, SA, Australia

Université de Franche-Comté, Besançon, France

National Institute on Deafness and Other Communication Disorders

National School of Tropical Medicine, Baylor College of Medicine, Houston, TX, USA

Monash University, Melbourne, VIC, Australia

Yale University, New Haven, CT, USA

University of Port Harcourt, Port Harcourt, Nigeria

George Mason University, Fairfax, VA, USA

Institute for Health Metrics and Evaluation

Imperial College London, London, UK

Institute for Health Metrics and Evaluation

Brigham and Women's Hospital

Institute for Health Metrics and Evaluation

Department of Ophthalmology, Medical Faculty Mannheim, Ruprecht Karls University, Heidelberg, Germany

All India Institute of Medical Sciences, New Delhi, India

Department of Anesthesiology and Pain Medicine

University of Tokyo, Tokyo,Japan

Department of Cardiology, Hebrew University Hadassah Medical School, Jerusalem, Israel

Queensland Centre for Mental Health Research

Case Western Reserve University, Cleveland, OH, USA

Harvard Humanitarian Initiative

School of Public Health, Makerere University, Kampala, Uganda

Kwame Nkrumah University of Science and Technology, Kumasi, Ghana

Auckland Technical University, Auckland, New Zealand

School of Dentistry and Oral Health

University of Tasmania, Tasmania, Australia

FlindersUniversity, Adelaide,SA, Australia

Nova Southeastern University, Fort, Lauderdale, FL, USA

School of Population Health

Sydney School of Public Health

Institute for Health Metrics and Evaluation

St George's University of London, London, UK

School of Public Health

University of California, San Francisco, San Francisco, CA, USA

Miller School of Medicine, University of Miami, Miami, FL, USA

Department of Epidemiology

University of Ulster, Ulster, UK

Institute for Health Metrics and Evaluation

Swansea University, Swansea, UK

National Center for Non-Communicable, Disease Control and Prevention, China Centers for Disease Control, Beijing, China

Mulago Hospital, Kampala, Uganda

Institute for Health Metrics and Evaluation

Digestive Disease Research Center

Institute for Health Metrics and Evaluation

Bloomberg School of Public Health

Queen Mary University of London, London, UK

Institute of Bone and Joint Research

University of Pennsylvania, Philadelphia, PA, USA

University of Sydney, Sydney, NSW, Australia

University of Melbourne, Melbourne, VIC,Australia

Asian Pacific Society of Cardiology, Kyoto, Japan

Medical Research Council, Tygerberg, South Africa

University of Cape Town, Cape Town, South Africa

Legacy Health System, Portland, Oregon

Northwestern University Feinberg School of Medicine, Evanston, IL, USA

University of Sydney, Sydney, NSW, Australia

Queensland Brain Institute

National Institute on Psychiatry Ramón de la Fuente, Mexico City, Mexico

Thomas Jefferson University, Philadelphia, PA, USA

Ministry of Health, Riyadh, Saudi Arabia

Department of Medicine

University of Otago, Dunedin, New Zealand

University of California, San Francisco, San Francisco, CA, USA

Mario Negri Institute for Pharmacological Research, Bergamo, Italy

School of Public Health

Pacific Institute for Research and Evaluation, Calverton, MD, USA

University of New South Wales, Sydney, NSW, Australia

National Institute of Health, Maputo, Mozambique

Duke University, Durham, NC, USA

Institute for Health Metrics and Evaluation

Institute for Maternal and Child Health, IRCCS Burlo Garofolo, Trieste, Italy

Institute for Maternal and Child Health, IRCCS Burlo Garofolo, Trieste, Italy

Tehran University of Medical Sciences, Tehran, Iran

Columbia University, New York City, NY, USA

Queensland University of Technology, Brisbane, QLD, Australia

National Center for Child Health and Development, Tokyo, Japan

Watford General Hospital, Watford, UK

Kemri-Wellcome Trust, Kilifi, Kenya

AVRI, University of KwaZulu-Natal, Durban, South Africa

Institute for Health Metrics and Evaluation, University of Washington, 2301 Fifth Avenue, Suite 600, Seattle, WA 98121, USA

Centro Studi GISED, Bergamo, Italy

Emory University, Atlanta, GA,USA

National Drug and Alcohol Research Centre

National Institute of Diabetes, and Digestive and Kidney Diseases, National Institutes of Health, Bethesda, MD, USA

Department of Epidemiology and Biostatistics

University of Oxford, Oxford, UK

Charité-Universitätsmedizin Berlin, Berlin, Germany

University of Western Australia, Perth, WA, Australia

School of Population Health

HRB-Clinical Research Facility, National University of Ireland Galway, Galway, Ireland, UK

Imperial College London, London, UK

University of Washington, Seattle, WA, USA

Schools of Public Health and Medicine

Institute for Health Metrics and Evaluation, University of Washington, 2301 Fifth Avenue, Suite 600, Seattle, WA 98121, USA

Deakin University, Melbourne, VIC, Australia

Global Partners in Anesthesia and Surgery

School of Population Health

B P Koirala Institute of Health Sciences, Dharan, Nepal

Betty Cowan Research and Innovation Center, Ludhiana, India

Hospital Juan XXIII, La Paz, Bolivia

University of Calgary, Calgary, AB, Canada

London School of Hygiene and Tropical Medicine, London, UK

Instituto Nacional de Enfermedades Respiratorias, Mexico City, Mexico

Hospital Universitario Cruces, Barakaldo, Spain

Mario Negri Institute for Pharmacological Research, Bergamo, Italy

Flinders University, Adelaide, SA, Australia

Institute for Health Metrics and Evaluation

Shanghai Mental Health Center, School of Medicine

Institute for Health Metrics and Evaluation, University of Washington, 2301 Fifth Avenue, Suite 600, Seattle, WA 98121, USA

Institut de Recherche pour le Développement, Martinique, France

Medical School,Chicago, IL, USA

Department of Public Health

Brigham Young University, Provo, UT, USA

Centre for Addiction and Mental Health, Toronto, ON, Canada

Hospital Universitario de Canarias, Tenerif, Spain

Faculty of Medicine, School of Population and Public Health, University of British Columbia, Vancouver, BC, Canada

Psychiatry, King's College London, London, UK

London School of Hygiene and Tropical Medicine, London, UK

Vector Control Research Centre, Pondicherry, India

Institute for Health Metrics and Evaluation, University of Washington, 2301 Fifth Avenue, Suite 600, Seattle, WA 98121, USA

Center for Disease Analysis, Louisville, CO, USA

University of California, Berkeley, Berkeley, CA, USA

Centre for Addiction and Mental Health, Toronto, ON, Canada

NORC, University of Chicago, Chicago, IL, USA

Mario Negri Institute for Pharmacological Research, Bergamo, Italy

University of Cambridge, Cambridge, UK

University of Washington, Seattle, WA, USA

Institute for Health Metrics and Evaluation

University of California, San Francisco, San Francisco, CA, USA

Complejo Hospitalario Caja De Seguro Social, Panama City, Panama

Institute for Maternal and Child Health, IRCCS Burlo Garofolo, Trieste, Italy

School of Population Health

Institute for Health Metrics and Evaluation

Imperial College London, London, UK

Miller School of Medicine, University of Miami, Miami, FL, USA

Queensland Centre for Mental Health Research

Vanderbilt University, Nashville, TN, USA

Institute of Bone and Joint Research

Institute for Health Metrics and Evaluation

University of Alabama at Birmingham, Birmingham, AL, USA

Centre for Clinical Research

Ministry of Interior, Madrid, Spain

Brandeis University, Waltham, MA, USA

Brandeis University, Waltham, MA, USA

Health Canada, Ottawa, ON, Canada

Johns Hopkins University, Baltimore, MD, USA

Department of Neurology, University of Pennsylvania School of Medicine, Philadelphia, PA, USA

Queens Medical Center, Honolulu, HI, USA

School of Public Health

University of Alabama at Birmingham, Birmingham, AL, USA

National Drug and Alcohol Research Centre

National Center for Injury Prevention and Control

Hatter Institute

Department of Rheumatology, Northern Clinical School

London School of Hygiene and Tropical Medicine, London, UK

Griffith University, Brisbane, QLD, Australia

Centre for International Child Health

Norwegian University of Science and Technology, Trondheim, Norway

Erasmus MC, University Medical Center Rotterdam, Rotterdam, Netherlands

Department of Neuroscience

School of Public Health

Agwa Khan University, Karachi, Pakistan

Institute for Maternal and Child Health, IRCCS Burlo Garofolo, Trieste, Italy

School of Public Health

University of Melbourne, Melbourne, VIC,Australia

Drexel University School of Public Health, Philadelphia, PA, USA

University of Otago, Dunedin, NewZealand

University of Washington, Seattle, WA, USA

University of Otago, Dunedin, NewZealand

NewYork University, NewYork City, NY

King Fahad Medical City, Riyadh, Saudi Arabia

Alberta Kidney Disease Network, University of Alberta, Edmonton, AB, Canada

Cincinnati Children's Hospital, Cincinnati, OH, USA

Department of Neurology, Copenhagen University Hospital, Herlev, Denmark

University of Crete Medical School, Crete, Greece

Instituto Nacional de Epidemiología, ANLIS, Malbran, Argentina

Brandeis University, Waltham, MA, USA

KNCV Tuberculosis Foundation, The Hague, Netherlands

Maastricht University Medical Centre, Maastricht, Netherlands

University of Washington, Seattle, WA, USA

National University of Singapore, Singapore

Institute for Health Metrics and Evaluation

Beijing Neurosurgical Institute, Capital Medical University, Beijing, China

James Cook University, Townsville, QLD, Australia

University of Oxford, Oxford, UK

Brown University, Providence, RI, USA

Department of Paediatrics

School of Public Health

Mailman School of Public Health

School of Public Health

Queensland Centre for Mental Health Research

Centers for Disease Control and Prevention, Atlanta, GA, USA

Miller School of Medicine, University of Miami, Miami, FL, USA

University of Nottingham, Nottingham, UK

University of Western Sydney, Campbelltown, NSW, Australia

Auckland Technical University, Auckland, New Zealand

Arthritis Research, Wichita, KS, USA

Royal Cornwall Hospital, Truro, UK

Institute for Health Metrics and Evaluation

London School of Economics, London,UK

Agwa Khan University, Karachi, Pakistan

School of Public Health, Shanghai Jiao Tong University, Shanghai, China

Landstuhl Regional Medical Center, Landstuhl, Germany

School of Population Health

Institute for Health Metrics and Evaluation

Acknowledgments

We would like to thank the countless individuals who have contributed to the Global Burden of Disease Study 2010 in various capacities. We would also like to specifically acknowledge the important contribution to this work from multiple staff members of the World Health Organization. We also wish to express our gratitude to the following organizations that hosted consultations during the final stages of the analytic process, providing valuable feedback about the results and the data to improve the study's findings overall: Pan American Health Organization; Eastern Mediterranean Regional Office of WHO; UNAIDS; Ministry of Health, Brazil; China Centers for Disease Control; and the University of Zambia. We would like to thank Lori M Newman, Jordis Ott, Poul Erik Petersen, Shekhar Saxena, and Gretchen A Stevens for their collaboration and input into the analyses and estimates. Finally, we would like to acknowledge the extensive support from all staff members at the Institute for Health Metrics and Evaluation and specifically thank: James Bullard, Andrew Ernst, and Serkan Yalcin for their tireless support of the computational infrastructure required to produce the results; Linda A Ettinger for her expert administrative support in order to facilitate communication and coordination amongst the authors; Peter Speyer, Abigail McLain, Katherine Leach-Kemon, and Eden Stork for their persistent and valuable work to gain access to and catalog as much data as possible to inform the estimates; Erin C Mullany for her systematic efforts in organizing drafts of papers, formatting correspondence with expert groups, and preparing the final manuscript; Brad Bell for his review, critiques, and insights about the DisMod-MR software which helped to improve its performance and results; and Jiaji Du for his work developing the user interface for the DisMod-MR software so that multiple expert groups could use it and easily assess the results.

The following individuals would like to acknowledge various forms of institutional support. J P Abraham, B Bartels, and P Yeh recognize the support of the World Bank Global Road Safety Facility and Department of Global Health & Population, Harvard School of Public Health, and the World Health Organization Violence and Injury Prevention. B Bikbov acknowledges support from the Moscow State University of Medicine and Dentistry, Moscow, Russia; Academician V.I.Shumakov Federal Research Center of Transplantology and Artificial Organs, Moscow, Russia; International Society of Nephrology. R Bourne acknowledges the Vision & Eye Research Unit, Postgraduate Medical Institute, Anglia Ruskin University, Cambridge, UK. S Brooker is supported by a Wellcome Trust Senior Fellowship in Basic Biomedical Science (098045). T S Brugha received funding from the Department of Health London, for the National Health Service Information Centre, by the University of Leicester. R Buchbinder is partially funded by an Australian National Health and Medical Research Council (NHMRC) Practitioner Fellowship, Monash University and Cabrini Health. P Burney and D Jarvis acknowledge that the Chronic Respiratory Disease Group received support from the BUPA Foundation, who had no role in study design, data collection and analysis, interpretation of data, decision to publish, or preparation of the manuscript. C Cella, M Cortinovis, F Gaspari, V Miglioli, and N Perico on behalf of the entire Genitourinary Expert Group acknowledge the International Society of Nephrology (ISN). H Chen acknowledges that his participation in this study was in part supported by the intramural research program of the NIH, the National Institute of Environmental Health Sciences. L E Coffeng and W A Stolk received financial support from the Africa Programme for Onchocerciasis Control (WHO/APOC) for their work on onchocerciasis. B C Cowie received institutional support from the Victorian Infectious Diseases Reference Laboratory, Melbourne, Australia. M Cross and L March acknowledge the University of Sydney (USYD); Institute of Bone and Joint Research, University of Sydney, Department of Rheumatology, Royal North Shore Hospital, St Leonards NSW 2065 Australia. N Dahodwala was supported by NIH grant K23

AG034236 and the Parkinson Council while working on this project. L Degenhardt is supported by an Australian NHMRC Senior Research Fellowship and funding to support her work for illicit drug dependence was provided by the Australian National Drug and Alcohol Research Centre of the University of New South Wales, Australia. R Dellavalle was supported by the US Department of Veterans Affairs while contributing to this study. S Derrett acknowledges the Health Research Council of New Zealand and the University of Otago for their support. V Feigin and R Krishnamurthi were supported by the National Institute for Stroke and Applied Neurosciences, AUT University. E Fevre acknowledges the Wellcome Trust for grant 085308. W Hall was supported by an NHMRC Australia Fellowship. R Havmoeller was supported by a grant from the Swedish Research Council (#2011–1071). D Hoy was supported by the Bill and Melinda Gates Foundation and the Australian National Health and Medical Research Council. K H Jacobsen was supported by the World Health Organization for her work on hepatitis A. N Kawakami notes that the collection of data ultimately used in this study was supported by the following grants: The World Mental Health Japan (WMH-J) is supported by the Grant for Research on Psychiatric and Neurological Diseases and Mental Health (H13-SHOGAI-023, H14-TOKUBETSU-026, H16-KOKORO-013) from the Japan Ministry of Health, Labour, and Welfare. He would like to thank staffmembers, field coordinators, and interviewers of the WMH Japan 2002–2004 Survey. L L Laslett is supported by an Australian Government Australian Postgraduate Award. She also notes that the TasOAC study, the results of which were used in this research, was supported by the National Health and Medical Research Council of Australia; Arthritis Foundation of Australia; Tasmanian Community Fund; Masonic Centenary Medical Research Foundation, Royal Hobart Hospital Research Foundation, and University of Tasmania Institutional Research Grants Scheme. R Malekzadeh funding from research grant of Tehran University of Medical Sciences to do the related studies. R Matzopoulos acknowledges the two institutions that support his research work: South African Medical Research Council Burden of Disease Research Unit; and the University of Cape Town School of Public Health and Family Medicine. T Merriman acknowledges the Health Research Council of New Zealand. K Naidoo was supported by the Brien Holden Vision Institute. P Nelson was supported by the National Drug and Alcohol Research Centre (UNSW, Australia). R G Nelson acknowledges his research was supported in part by the Intramural Research Program of the National Institute of Diabetes and Digestive and Kidney Diseases. C Olives was funded in part by the Biostatistics, Epidemiologic and Bioinformatic Training in Environmental Health Training Grant (ES015459). D Ozgediz acknowledges the staffand collaborators at the Mulago Hospital and Makerere University in Kampala, Uganda. K Pesudovs received institutional support from Flinders University. R Room's position at the University of Melbourne and Turning Point Alcohol and Drug Centre is funded by the Foundation for Alcohol Research and Education and the Victorian Department of Health. J A Salomon received support from the Burke Global Health Fellowship while working on this study. U Sampson received funding support from the Harold Amos Medical Faculty Development Award of the Robert Wood Johnson Foundation and the Vanderbilt Clinical and Translational Scholars Award. L Sanchez-Riera acknowledges the Spanish Society of Rheumatology (Sociedad Española de Reumatología). M Segui-Gomez's participation was partly supported by funds from the European Center for Injury Prevention, Universidad de Navarra. E Smith acknowledges the Department of Health and Ageing, Commonwealth Government of Australia, Institute of Bone and Joint Research (IBJR), University of Sydney (USYD). G D Thurston was supported in part by Center grant ES00260 from the National Institute of Environmental Health Sciences. D J Weatherall was supported by the Wellcome Trust UK, the Medical Research Council UK and the Anthony Cerami and Ann Dunne Research Trust.

References

1. Murray CJ, Lopez AD. Evidence-based health policy-lessons from the Global Burden of Disease Study. Science 1996; 274: 740–3. [PubMed: 8966556]
2. Murray CJ, Lopez AD. Regional patterns of disability-free life expectancy and disability-adjusted life expectancy: Global Burden of Disease Study. Lancet 1997; 349: 1347–52. [PubMed: 9149696]
3. World Health Organization. The world health report 2000—Health systems: improving performance. 2010 http://www.who.int/whr/2000/en/whr00_en.pdf (accessed July 9, 2012).
4. World Health Organization. The world health report 2001—Mental Health: New Understanding, New Hope. 2001 http://www.who.int/whr/2001/en/whr01_en.pdf (accessed June 25, 2012).
5. World Health Organization. The world health report 2002— Reducing Risks, Promoting Healthy Life. 2002 http://www.who.int/whr/2002/en/whr02_en.pdf (accessed July 9, 2012).
6. World Health Organization. The world health report 2003—Shaping the future. 2003 http://www.who.int/whr/2003/en/index. html (accessed July 9, 2012).
7. World Health Organization. The world health report 2004— Changing history. 2004 http://www.who.int/whr/2002/en/whr02_en.pdf (accessed July 9, 2012).
8. Mathers C, Fat DM, Boerma JT. The Global Burden of Disease: 2004 Update. Geneva: World Health Organization, 2008.

9. Begg SJ, Vos T, Barker B, Stanley L, Lopez AD. Burden of disease and injury in Australia in the new millennium: measuring health loss from diseases, injuries and risk factors. Med J Aust 2008;188:36–40. [PubMed: 18205562]
10. Michaud CM, McKenna MT, Begg S, et al. The burden of disease and injury in the United States 1996. Popul Health Metr 2006; 4: 11. [PubMed: 17049081]
11. Schopper D, Pereira J, Torres A, et al. Estimating the burden of disease in one Swiss canton: what do disability adjusted life years (DALY) tell us? Int J Epidemiol 2000; 29: 871–77 [PubMed: 11034971]
12. Kominski GF, Simon PA, Ho A, Luck J, Lim Y-W, Fielding JE. Assessing the burden of disease and injury in Los Angeles County using disability-adjusted life years. Public Health Rep 2002; 117: 185–91. [PubMed: 12357003]
13. Zhou S-C, Cai L, Wan C-H, Lv Y-L, Fang P-Q. Assessing the disease burden of Yi people by years of life lost in Shilin county of Yunnan province, China. BMC Public Health 2009; 9: 188. [PubMed: 19534776]
14. Friedman C, McKenna MT, Ahmed F, et al. Assessing the burden of disease among an employed population: implications for employer- sponsored prevention programs. J Occup Environ Med 2004; 46: 3–9. [PubMed: 14724472]
15. Hsairi M, Fekih H, Fakhfakh R, Kassis M, Achour N, Dammak J. Années de vie perdues et transition épidémiologique dans le gouvernorat de Sfax (Tunisie). Sante Publique 2003; 15: 25–37 [PubMed: 12806806]
16. Dodhia H, Phillips K. Measuring burden of disease in two inner London boroughs using Disability Adjusted Life Years.J Public Health (Oxf) 2008; 30: 313–21. [PubMed: 18400697]
17. Soriano JB, Kiri VA, Maier WC, Strachan D. Increasing prevalence of asthma in UK primary care during the 1990s.Int J Tuberc Lung Dis 2003; 7: 415–21. [PubMed: 12757040]
18. Goldman LS, Nielsen NH, Champion HC, and the Council on Scientific Affairs AMA. Awareness, diagnosis, and treatment of depression. J Gen Intern Med 1999; 14: 569–80. [PubMed: 10491249]
19. Woolf AD, Akesson K. Understanding the burden of musculoskeletal conditions. The burden is huge and not reflected in national health priorities. BMJ 2001; 322: 1079–80. [PubMed: 11337425]
20. Woolf AD. The bone and joint decade 2000–2010. Ann Rheum Dis 2000; 59: 81–82. [PubMed: 10666159]
21. Cohen A, Kleinman A, Saraceno B. World mental health casebook: Social and Mental Health Programs in Low-Income Countries. Springer, 2002.
22. Brooks PM. Musculoskeletal medicine: the challenge of the Bone and Joint Decade. APLAR J Rheumatol 2004; 7: 272–77
23. King CH, Bertino A-M. Asymmetries of poverty: why global burden of disease valuations underestimate the burden of neglected tropical diseases. PLoS Negl Trop Dis 2008; 2: e209. [PubMed: 18365036]
24. Brooker S Estimating the global distribution and disease burden of intestinal nematode infections: adding up the numbers—a review. Int J Parasitol 2010; 40: 1137–44. [PubMed: 20430032]
25. Mathers CD, Ezzati M, Lopez AD. Measuring the burden of neglected tropical diseases: the global burden of disease framework. PLoS Negl Trop Dis 2007; 1: e114. [PubMed: 18060077]
26. Hotez PJ, Brindley PJ, Bethony JM, King CH, Pearce EJ, Jacobson J. Helminth infections: the great neglected tropical diseases.J Clin Invest 2008; 118: 1311–21. [PubMed: 18382743]
27. Murray CJL, Lopez AD. Global health statistics: a compendium of incidence, prevalence, and mortality estimates for over 200 conditions. Published by the Harvard School of Public Health on behalf of the World Health Organization and the World Bank,1996.
28. Jamison DT, Breman JG, Measham AR, et al., eds. Disease control priorities in developing countries, 2nd edn World Bank Publications, 2006.
29. Murray CJ, Ezzati M, Flaxman A, et al. The Global Burden of Disease Study 2010: design, definitions, and metrics. Lancet 2012; 380: 2063–66. [PubMed: 23245602]
30. Salomon JA, Vos T, Hogan DR, et al. Common values in assessing health outcomes from disease and injury: disability weights measurement study for the Global Burden of Disease Study 2010. Lancet 2012; 380: 2129–3. [PubMed: 23245605]

31. WHO. World report on disability, 2011 http://whqlibdoc.who.int/publications/2011/9789240685215_eng.pdf (accessed Nov 26,2012).
32. Doll R, Payne P, Waterhouse J. Cancer incidence in five continents, Vol. I Geneva: Union Internationale Contre le Cancer, 1966.
33. Doll R, Muir C, Waterhouse J. Cancer incidence in five continents, Vol. II Geneva: Union Internationale Contre le Cancer, 1970.
34. Waterhouse J, Muir C, Correa P, Powell J. Cancer incidence in five continents, Vol. III IARC Scientific Publications No. 15. Lyon: IARC, 1976.
35. Waterhouse J, Muir C, Shanmugaratnam K, Powell J. Cancer incidence in five continents, Vol. IV IARC Scientific Publications No. 42. Lyon: IARC, 1982.
36. Muir C, Waterhouse J, Mack T, Powell J, Whelan S. Cancer Incidence in Five Continents, Vol. V, IARC Scientific Publications No. 88. Lyon: IARC, 1987.
37. Parkin D, Muir C, Whelan S, Gao Y, Ferlay J, Powell J. Cancer incidence in five continents, Vol. VI IARC Scientific Publications No. 120. Lyon: IARC, 1992.
38. Parkin D, Whelan S, Ferlay J, Raymond L, Young J. Cancer incidence in five continents, Vol. VII IARC Scientific Publications No. 143. Lyon: IARC, 1997
39. Parkin D, Whelan S, Ferlay J, Teppo L, Thomas D. Cancer Incidence in Five Continents, Vol. VIII IARC Scientific Publications No. 155. Lyon: IARC, 2002.
40. Curado M, Edwards B, Shin H, et al. Cancer incidence in five continents, Vol. IX IARC Scientific Publications No. 160. Lyon: IARC, 2007.
41. Mayr WT, Pittock SJ, McClelland RL, Jorgensen NW, Noseworthy JH, Rodriguez M. Incidence and prevalence of multiple sclerosis in Olmsted County, Minnesota, 1985–2000. Neurology 2003; 61: 1373–77 [PubMed: 14638958]
42. Strickland D, Bertoni JM. Parkinson's prevalence estimated by a state registry. Mov Disord 2004; 19: 318–23. [PubMed: 15022187]
43. Bhidayasiri R, Wannachai N, Limpabandhu S, et al. A national registry to determine the distribution and prevalence of Parkinson's disease in Thailand: implications of urbanization and pesticides as risk factors for Parkinson's disease. Neuroepidemiology 2011; 37: 222–30. [PubMed: 22133707]
44. European Surveillance of Congenital Anomalies. http://www.eurocat-network.eu/ (accessed July 9, 2011).
45. Chen WQ, Zhao P, Rao KQ. [Strengthening cancer registration system in China]. Zhonghua Yu Fang Yi Xue Za Zhi 2010; 44: 374–75. [PubMed: 20654223]
46. National Cancer Registry Programme. http://www.ncrpindia.org/ (accessed June 20, 2011).
47. Canadian Institute for Health Information. National Ambulatory Care Reporting System 2002–2009. 2011.
48. CDC National Center for Health Statistics. National Hospital Ambulatory Medical Care Survey. 1992.
49. CDC National Center for Health Statistics. National Ambulatory Medical Care Survey. 1993.
50. RCGP Research & Surveillance Centre. Weekly Returns Service Annual Report, 2005 http://www.rcgp.org.uk/pdf/ANNUAL%20REPORT%202005.pdf (accessed March 5, 2012).
51. RCGP Research & Surveillance Centre. Weekly Returns Service Annual Report, 2006 http://www.rcgp.org.uk/pdf/bru_annual%20report%202006%20final.pdf (accessed March 5, 2012).
52. RCGP Research & Surveillance Centre. Weekly Returns Service Annual Report, 2007 http://www.rcgp.org.uk/pdf/ANNUAL%20REPORT%202007%20FINAL%20COMPLETE.pdf (accessed March 5, 2012).
53. RCGP Research & Surveillance Centre. Weekly Returns Service Annual Report, 2008 http://www.rcgp.org.uk/PDF/ANNUAL%20REPORT%202008%202%20FINAL.pdf (accessed March 5, 2012).
54. RCGP Research & Surveillance Centre. Weekly Returns Service Annual Report, 2009 http://www.rcgp.org.uk/pdf/ANNUAL%20REPORT%202009%20FINAL.pdf (accessed March 5, 2012).
55. RCGP Research & Surveillance Centre. Weekly Returns Service Annual Report, 2010 http://www.rcgp.org.uk/pdf/ANNUAL%20REPORT%202010%20FINAL.pdf (accessed March 5, 2012).

56. Leonard H, Petterson B, Bower C, Sanders R. Prevalence of intellectual disability in Western Australia. Paediatr Perinat Epidemiol 2003; 17: 58–67 [PubMed: 12562473]
57. Hofman A, Rocca WA, Brayne C, et al., and the Eurodem Prevalence Research Group. The prevalence of dementia in Europe: a collaborative study of 1980–1990 findings. Int J Epidemiol 1991; 20: 736–48. [PubMed: 1955260]
58. Jablensky A, McGrath J, Herrman H, et al. Psychotic disorders in urban areas: an overview of the Study on Low Prevalence Disorders. Aust N Z J Psychiatry 2000; 34: 221–36. [PubMed: 10789527]
59. Hickman M, Taylor C, Chatterjee A, et al. Estimating the prevalence of problematic drug use: a review of methods and their application. Bull Narc 2002; 54: 15–32.
60. Imdad A, Jabeen A, Bhutta ZA. Role of calcium supplementation during pregnancy in reducing risk of developing gestational hypertensive disorders: a meta-analysis of studies from developing countries. BMC Public Health 2011; 11 (suppl 3): S18. [PubMed: 21501435]
61. Imdad A, Bhutta ZA. Effect of preventive zinc supplementation on linear growth in children under 5 years of age in developing countries: a meta-analysis of studies for input to the lives saved tool. BMC Public Health 2011; 11 (suppl 3): S22. [PubMed: 21501440]
62. Munos MK, Walker CLF, Black RE. The effect of rotavirus vaccine on diarrhoea mortality. Int J Epidemiol 2010; 39 (suppl 1): i56–62. [PubMed: 20348127]
63. Imdad A, Yakoob MY, Sudfeld C, Haider BA, Black RE, Bhutta ZA. Impact of vitamin A supplementation on infant and childhood mortality. BMC Public Health 2011; 11 (suppl 3): S20. [PubMed: 21501438]
64. American Psychiatric Association. Diagnostic and statistical manual of mental disorders (DSM-IV-TR). Washington DC: American Psychiatric Association, 2000.
65. Murray CJL, Lopez AD. The global burden of disease:a comprehensive assessment of mortality and disability from diseases, injuries, and risk factors in 1990 and projected in 2020. http://cdsweb.cern.ch/record/732931 (accessed June 25, 2012).
66. Barendregt JJ, Van Oortmarssen GJ, Vos T, Murray CJ. A generic model for the assessment of disease epidemiology: the computational basis of DisMod II. Popul Health Metr 2003; 1: 4. [PubMed: 12773212]
67. Forouzanfar MH, Foreman KJ, Delossantos AM, et al. Breast and cervical cancer in 187 countries between 1980 and 2010: a systematic analysis. Lancet 2011; 378: 1461–84. [PubMed: 21924486]
68. Lozano R, Naghavi M, Foreman K, et al. Global and regional mortality from 235 causes of death for 20 age groups in 1990 and 2010: a systematic analysis for the Global Burden of Disease Study 2010. Lancet 2012; 380: 2095–128. [PubMed: 23245604]
69. Ghys PD, Brown T, Grassly NC, et al. The UNAIDS Estimation and Projection Package: a software package to estimate and project national HIV epidemics. Sex Transm Infect 2004; 80 (suppl 1): i5–9. [PubMed: 15249692]
70. UNAIDS. Spectrum/EPP 2011 http://www.unaids.org/en/ataanalysis/tools/spectrumepp2011/ (accessed June 19, 2012).
71. Brooker S, Hay SI, Issae W, et al. Predicting the distribution of urinary schistosomiasis in Tanzania using satellite sensor data.Trop Med Int Health 2001; 6: 998–1007 [PubMed: 11737837]
72. Clements ACA, Firth S, Dembele R, et al. Use of Bayesian geostatistical prediction to estimate local variations in Schistosoma haematobium infection in western Africa. Bull World Health Organ 2009; 87: 921–29. [PubMed: 20454483]
73. Schur N, Hurlimann E, Stensgaard A-S, et al. Spatially explicit Schistosoma infection risk in eastern Africa using Bayesian geostatistical modelling. Acta Trop 2011; published online Oct 14. D0I:10.1016/j.actatropica.2011.10.006.
74. New York Heart Association. Diseases of the heart and blood vessels: nomenclature and criteria for diagnosis. Boston: Little, Brown, 1964.
75. Global Initiative for Chronic Obstructive Lung Disease. Global strategy for the diagnosis, management, and prevention of COPD. 2011 http://www.goldcopd.org/ (accessed July 6, 2012).
76. Kessler RC, Berglund P, Demler O, et al., and the National Comorbidity Survey Replication. The epidemiology of major depressive disorder: results from the National Comorbidity Survey Replication (NCS-R). JAMA 2003; 289: 3095–105. [PubMed: 12813115]

77. Agency for Healthcare Research and Quality. United States Medical Expenditure Panel Survey 2000–2009. Rockville, United States, Agency for Healthcare Research and Quality.

78. US National Institutes of Health National Institute on Alcohol Abuse and Alcoholism. National Epidemiologic Survey on Alcohol and Related Conditions Wave 1 and Wave 2. Bethesda, MD: National Institutes of Health.

79. Australian Bureau of Statistics. National Survey of Mental Health and Wellbeing of Adults 1997 Canberra: Australian Bureau of Statistics.

80. Polinder S, van Beeck EF, Essink-Bot ML, et al. Functional outcome at 2.5, 5, 9, and 24 months after injury in the Netherlands. J Trauma 2007; 62: 133–41. [PubMed: 17215744]

81. South Carolina Traumatic Brain Injury Follow-up Registry (SCTBIFR). http://www.musc.edu/sctbifr/ (accessed on July 9, 2012).

82. Mackenzie EJ, Rivara FP, Jurkovich GJ, et al. The National Study on Costs and Outcomes of Trauma. J Trauma 2007; 63: S54–67; [PubMed: 18091213]

83. Mathers CD, Iburg KM, Begg S. Adjusting for dependent comorbidity in the calculation of healthy life expectancy.Popul Health Metr 2006; 4: 4. [PubMed: 16620383]

84. van Baal PHM, Hoeymans N, Hoogenveen RT, de Wit GA,Westert GP. Disability weights for comorbidity and their influence on health-adjusted life expectancy. Popul Health Metr 2006; 4: 1. [PubMed: 16606448]

85. van Baal PHM, Hoogenveen RT, de Wit GA, Boshuizen HC. Estimating health-adjusted life expectancy conditional on risk factors: results for smoking and obesity. Popul Health Metr 2006; 4: 14. [PubMed: 17083719]

86. Wang H, Dwyer-Lindgren L, Lofgren KT, et al. Age-specific and sex-specific mortality in 187 countries, 1970–2010: a systematic analysis for the Global Burden of Disease Study 2010. Lancet 2012; 380: 2071–94. [PubMed: 23245603]

87. Alter G, Riley JC. Frailty, sickness, and death: models of morbidity and mortality in historical populations. Popul Stud (Camb) 1989;43: 25–5. [PubMed: 11622025]

88. Fries JF. Aging, natural death, and the compression of morbidity.N Engl J Med 1980; 303: 130–35. [PubMed: 7383070]

89. Johansson SR. The health transition: the cultural inflation of morbidity during the decline of mortality. Health Transit Rev 1991;1: 39–68. [PubMed: 10148803]

90. Gruenberg EM. The failures of success.Milbank Mem Fund Q Health Soc 1977; 55: 3–24. [PubMed: 141009]

91. Verbrugge LM. Longer life but worsening health? Trends in health and mortality of middle-aged and older persons.Milbank Mem Fund Q Health Soc 1984; 62: 475–519. [PubMed: 6566016]

92. Olshansky SJ, Rudberg MA, Carnes BA, Cassel CK, Brody JA. Trading off longer life for worsening health: the expansion of morbidity hypothesis. J Aging Health 1991; 3: 194–216.

93. Brody JA, Miles TP. Mortality postponed and the unmasking of age-dependent non-fatal conditions. Aging (Milano) 1990; 2: 283–89. [PubMed: 2094367]

94. Manton KG, Gu X, Lowrimore GR. Cohort changes in active life expectancy in the U.S. elderly population: experience from the 1982–2004 National Long-Term Care Survey.J Gerontol B Psychol Sci Soc Sci 2008; 63: s269–81. [PubMed: 18818447]

95. Moussavi S, Chatterji S, Verdes E, Tandon A, Patel V, Ustun B. Depression, chronic diseases, and decrements in health: results from the World Health Surveys. Lancet 2007; 370: 851–58. [PubMed: 17826170]

96. King G, Murray CJL, Salomon JA, Tandon A. Enhancing the validity and cross-cultural comparability of measurement in survey research. Am Polit Sci Rev 2004; 98: 191–207.

97. Salomon JA, Tandon A, Murray CJL. Comparability of self rated health: cross sectional multi-country survey using anchoring vignettes. BMJ 2004; 328: 258. [PubMed: 14742348]

98. Iwata N, Turner RJ, Lloyd DA. Race/ethnicity and depressive symptoms in community-dwelling young adults: a differential item functioning analysis. Psychiatry Res 2002; 110: 281–89. [PubMed: 12127478]

99. Kapteyn A, Smith JP, van Soest A. Vignettes and self-reports of work disability in the United States and the Netherlands.Am Econ Rev 2007; 97: 461–73.

100. Kristensen N, Johansson E. New evidence on cross-country differences in job satisfaction using anchoring vignettes.Labour Econ 2008; 15: 96–1177

101. Kramer M The rising pandemic of mental disorders and associated chronic diseases and disabilities. Acta Psychiatr Scand 1980; 62: 382–97 [PubMed: 7468297]

102. Eaton WW, Kalaydjian A, Scharfstein DO, Mezuk B, Ding Y. Prevalence and incidence of depressive disorder: the Baltimore ECA follow-up, 1981–2004. Acta Psychiatr Scand 2007; 116: 182–88. [PubMed: 17655559]

103. Kessler RC, Angermeyer M, Anthony JC, et al. Lifetime prevalence and age-of-onset distributions of mental disorders in the World Health Organization's World Mental Health Survey Initiative.World Psychiatry 2007; 6: 168–76. [PubMed: 18188442]

104. Eppig C, Fincher CL, Thornhill R. Parasite prevalence and the worldwide distribution of cognitive ability. Proc Biol Sci 2010;277: 3801–08. [PubMed: 20591860]

105. Walter T, De Andraca I, Chadud P, Perales CG. Iron deficiency anemia: adverse effects on infant psychomotor development. Pediatrics 1989; 84: 7–177 [PubMed: 2472596]

106. Lozoff B, Wolf AW, Jimenez E Iron-deficiency anemia and infant development: effects of extended oral iron therapy. J Pediatr 1996; 129: 382–89. [PubMed: 8804327]

107. Watkins WE, Cruz JR, Pollitt E. The effects of deworming on indicators of school performance in Guatemala.Trans R Soc Trop Med Hyg 1996; 90: 156–61. [PubMed: 8761577]

108. Simeon DT, Grantham McGregor SM, Callender JEM, Robinson S, Wong MS. Treatment of mild to moderate trichuris trichiura infections in children: effects on school performance and growth—abstract. West Indian Med J 1995: 277

109. Hotez PJ, Bundy DAP, Beegle K, et al., eds. Helminth infections: soil-transmitted helminth infections and SchistosomiasisIn: Disease control priorities in developing countries, 2nd edn, World Bank Publications, 2006.

110. Wallhagen MI, Strawbridge WJ, Shema SJ. The relationship between hearing impairment and cognitive function: a 5-year longitudinal study. Res Gerontol Nurs 2008; 1: 80–86. [PubMed: 20078020]

111. Gates GA, Beiser A, Rees TS, D'Agostino RB, Wolf PA. Central auditory dysfunction may precede the onset of clinical dementia in people with probable Alzheimer's disease. J Am Geriatr Soc 2002;50: 482–88. [PubMed: 11943044]

112. Sugawara N, Sasaki A, Yasui-Furukori N, et al. Hearing impairment and cognitive function among a community-dwelling population in Japan. Ann Gen Psychiatry 2011; 10: 27 [PubMed: 21961439]

Panel:

Terminology used in the Global Burden of Disease study (GBD)

Disability

Disability refers to any short-term or long-term health loss. Many other definitions of disability are in use such as those in the WHO World Report on Disabilities.[31] These definitions often stress moderate to severe health loss and the role of the environment in the loss of individuals' wellbeing.

Sequelae

In the GBD 2010 cause list there are 291 diseases and injuries, of which 289 cause disability. In total, we have identified 1160 sequelae of these diseases and injuries. For example, diabetic neuropathy is a sequela of diabetes mellitus. To avoid double counting, a sequela can only be counted in the cause list once even if the same outcome might be caused by more than one disease.

Health state

Across the 1160 sequelae, we identified 220 unique health states. For example, both malaria and hookworm have mild anaemia as a sequela. Mild anaemia is a unique health state. The list of unique health states serves two purposes: to allow assessment of the total burden of some health states such as anaemia across various causes, and to simplify the task of measuring disability weights for sequelae.

Disability weights

A quantification of the severity of health loss associated with the 220 unique health states on a scale from 0 to 1, when 0 is commensurate with perfect health and 1 is commensurate with death. In the GBD 2010, disability weights for health states are measured based on survey respondents representing the general public.

Years lived with disability (YLDs)

For the GBD 2010, YLDs per person from a sequela are equal to the prevalence of the sequela multiplied by the disability weight for the health state associated with that sequela. YLDs for a disease or injury are the sum of the YLDs for each sequela associated with the disease or injury.

Impairments

In the GBD 2010 we estimated the prevalence and burden of several unique health states that are sequelae for multiple diseases including anaemia, heart failure, vision loss, seizures, hearing loss, infertility, and intellectual disability. These are referred to as impairments.

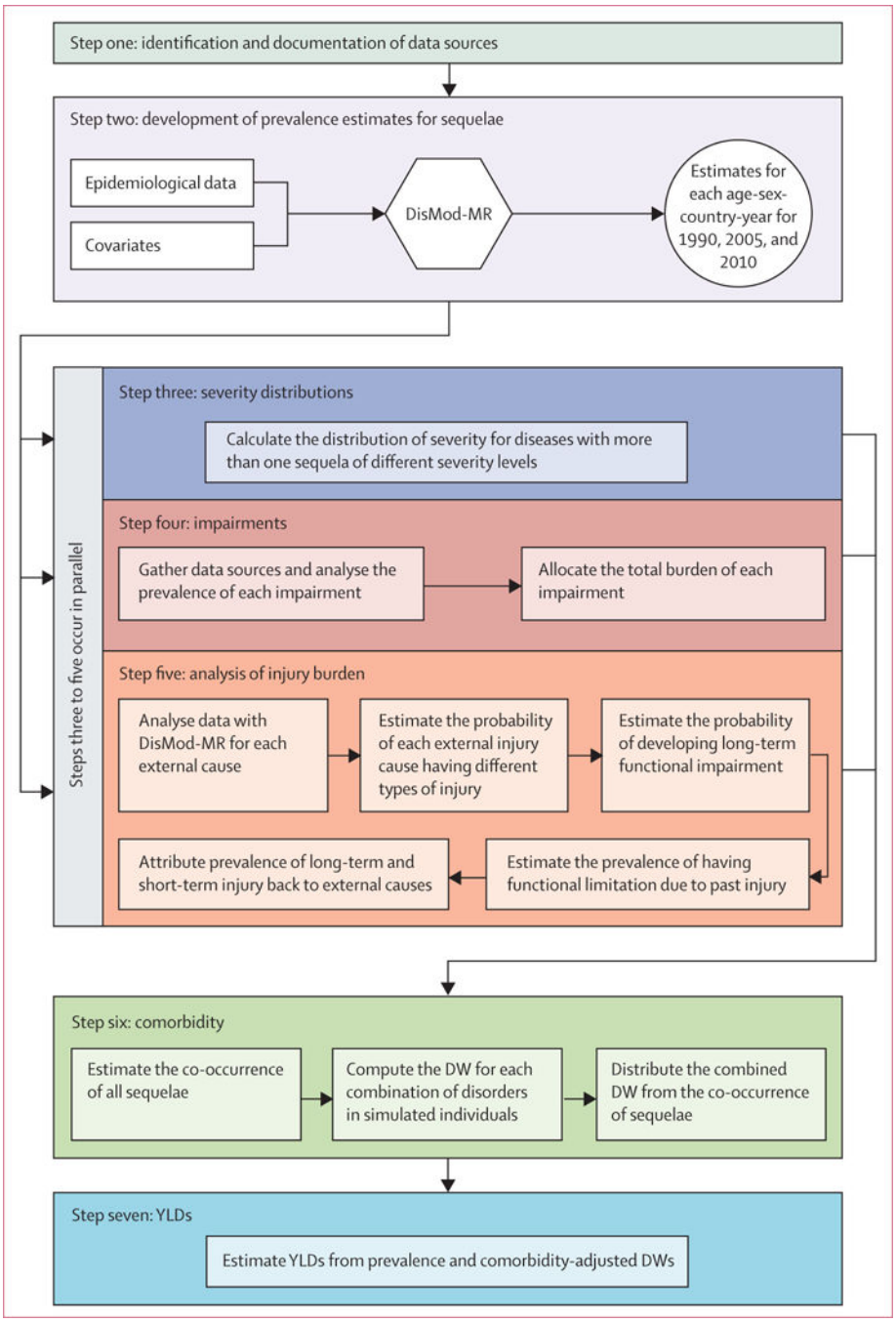


Figure 1:

Overview of the seven steps in the estimation of prevalence and years lived with disability (YLDs) DW=disability weight.

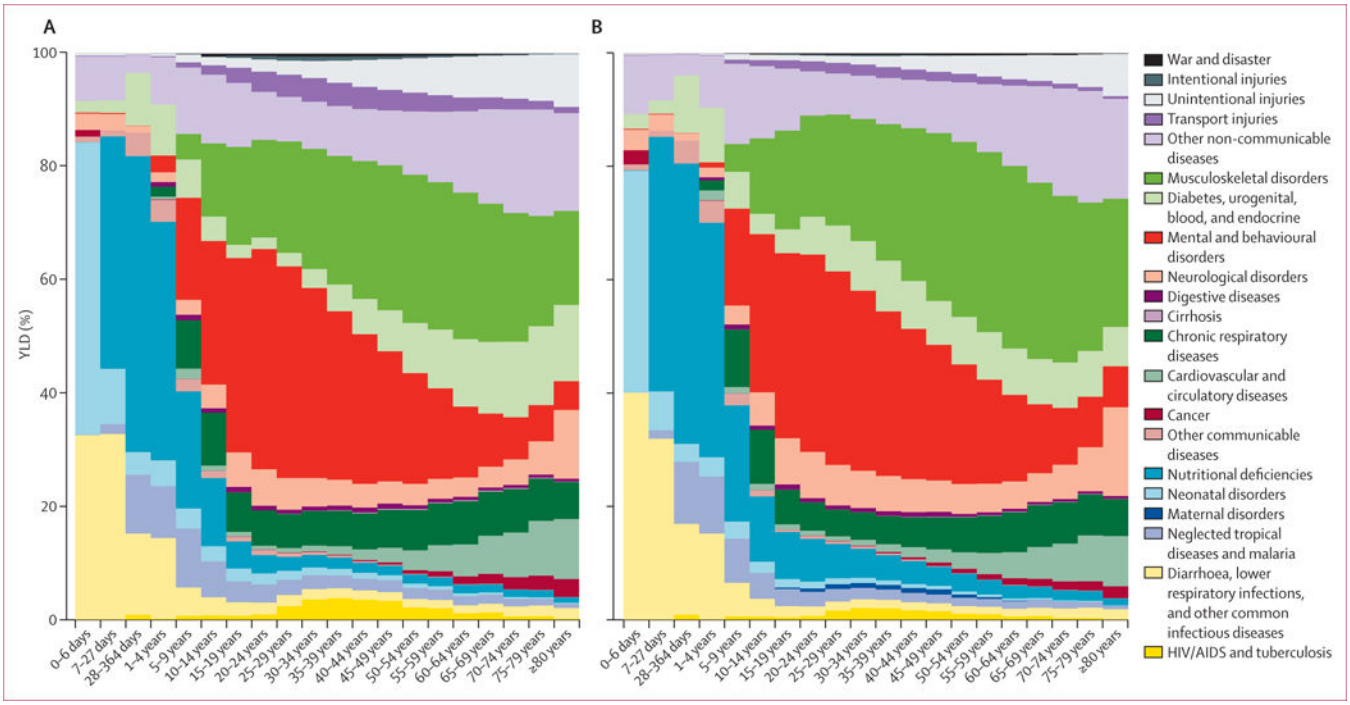


Figure 2:
Percentage of years lived with disability (YLDs) in 2010, by cause and age

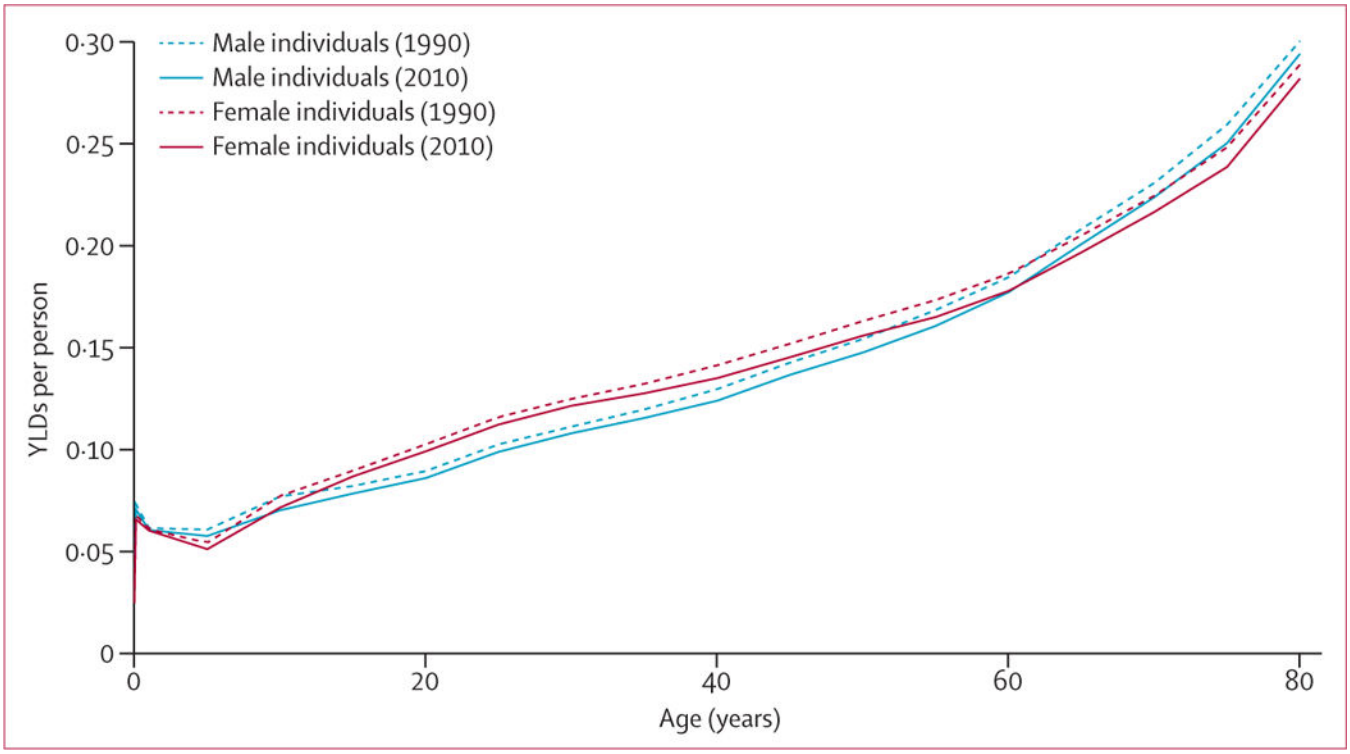


Figure 3:
Global years lived with disability (YLDs) per person in 1990 and 2010 for all ages, by sex

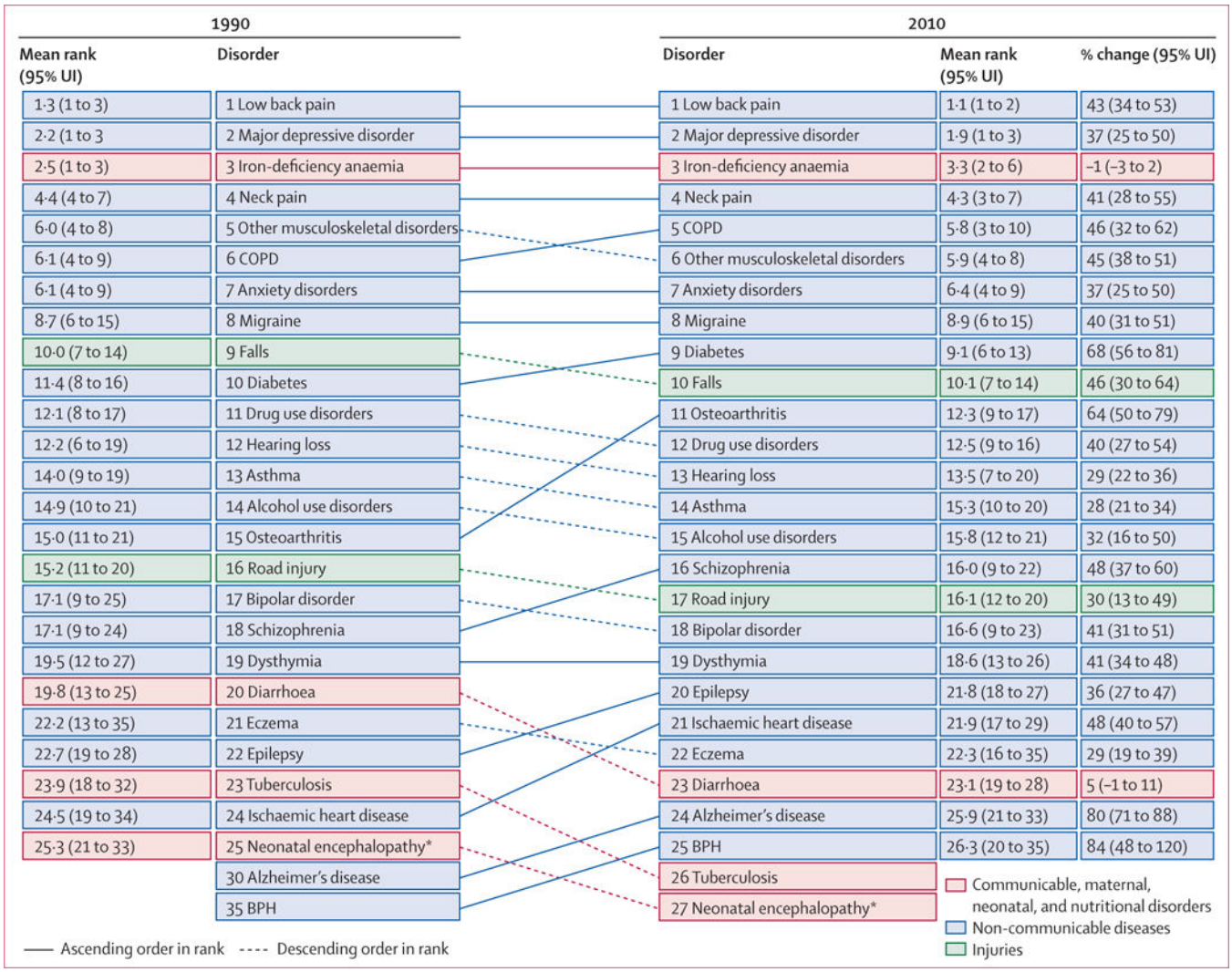


Figure 4:

Global years lived with disability (YLDs) ranks with 95% uncertainty intervals (UI) for the 25 most common causes in 1990 and 2010. COPD=chronic obstructive pulmonary disease. BPH=benign prostatic hyperplasia. *Includes birth asphyxia/trauma. An interactive version of this figure is available online at http://healthmetricsandevaluation.org/gbd/visualizations/regional.

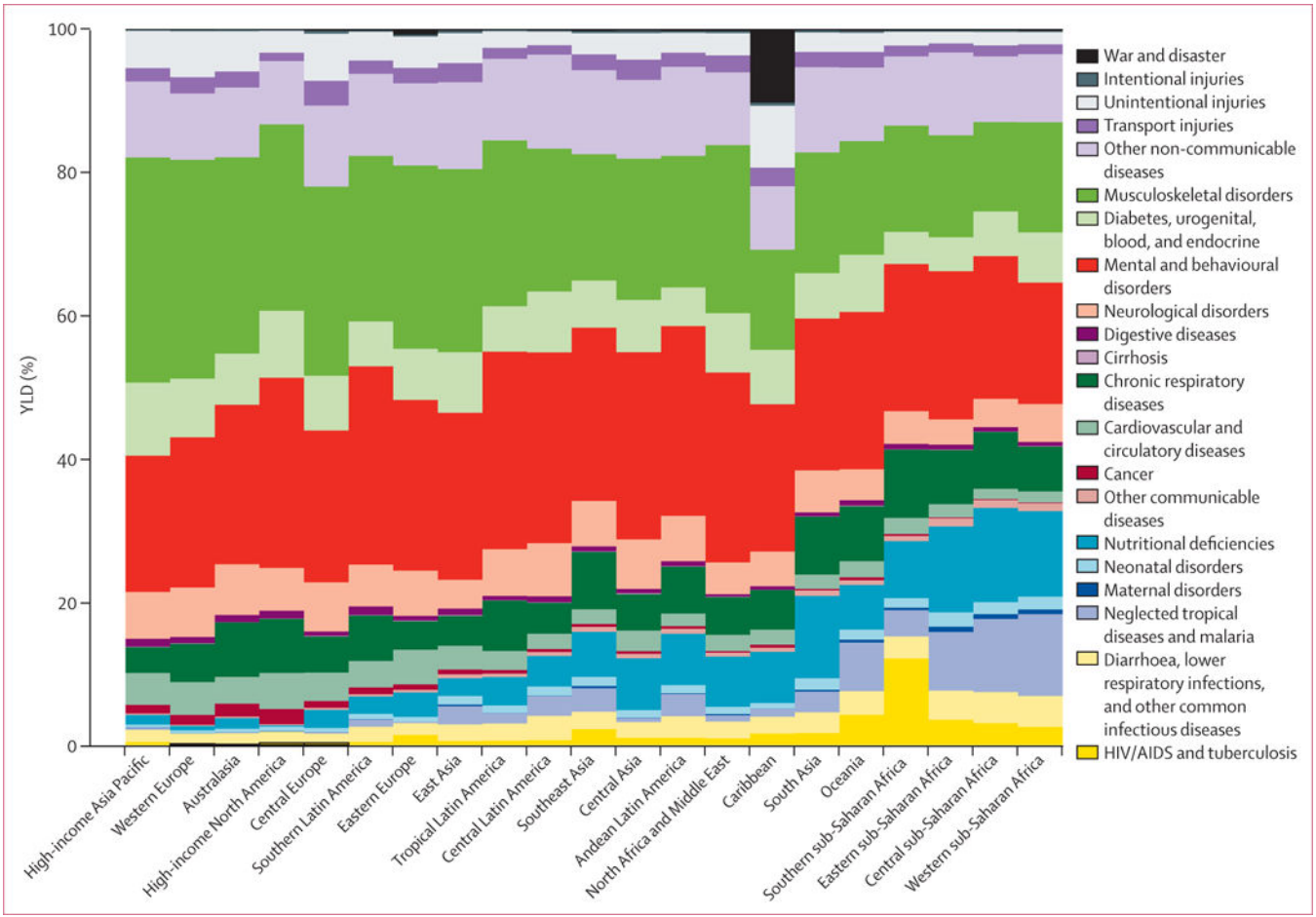
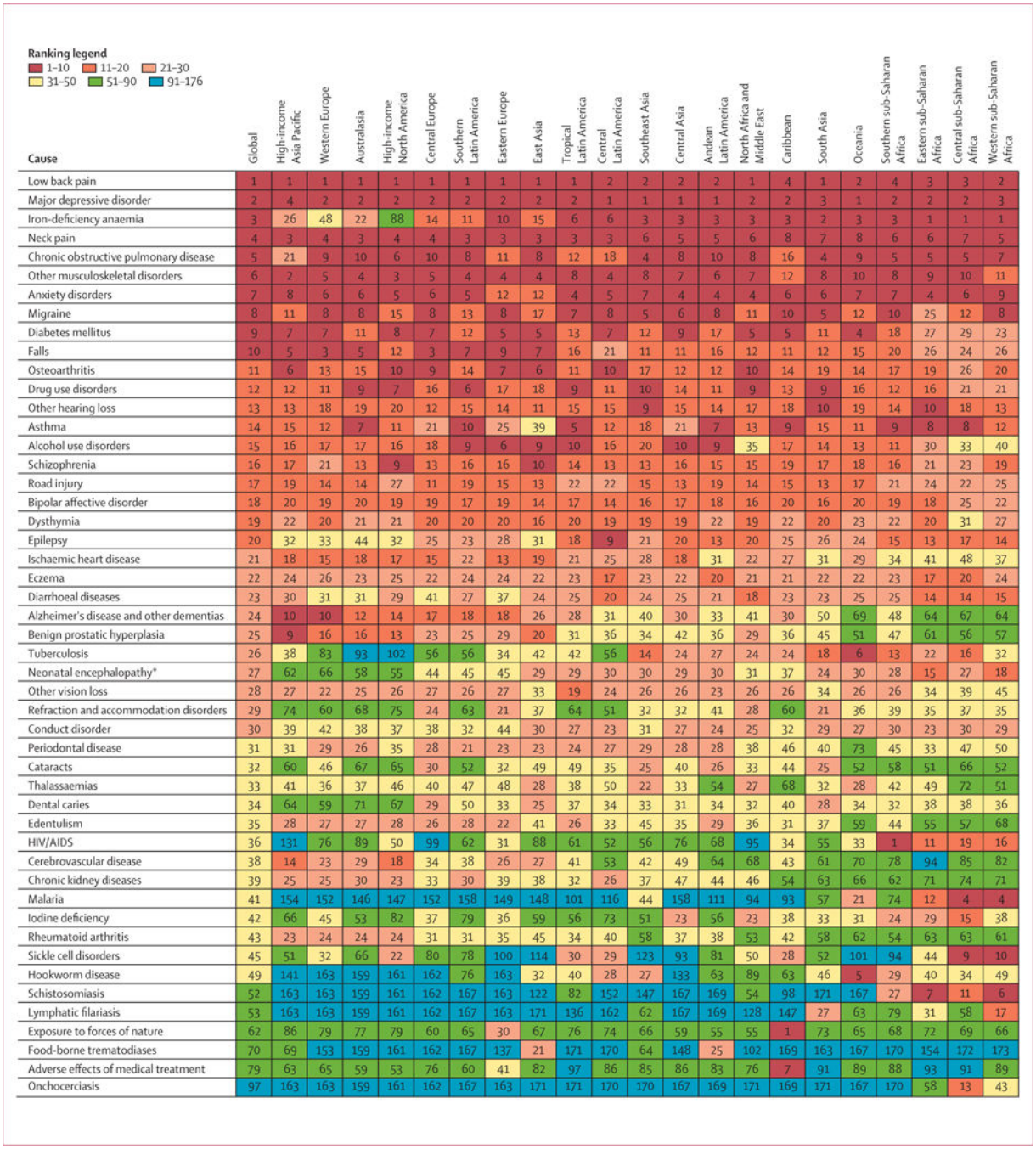


Figure5:

Percentage of years lived with disability (YLDs) by 21 major cause groupings and region for 2010 An interactive version of this figure is available online at http://healthmetricsandevaluation.org/gbd/visualizations/regional.



Cause	Global	High-income Asia Pacific	Western Europe	Australasia	High-income North America	Central Europe	Southern Latin America	Eastern Europe	East Asia	Tropical Latin America	Central Latin America	Southeast Asia	Central Asia	Andean Latin America	North Africa and Middle East	Caribbean	South Asia	Oceania	Southern sub-Saharan Africa	Eastern sub-Saharan Africa	Central sub-Saharan Africa	Western sub-Saharan Africa
Low back pain	1	1	1	1	1	1	1	1	1	1	2	2	2	2	1	4	1	2	4	3	3	2
Major depressive disorder	2	4	2	2	2	2	2	2	2	2	1	1	1	1	2	2	3	1	2	2	2	3
Iron-deficiency anaemia	3	26	48	22	88	14	11	10	15	6	6	3	3	3	3	3	2	3	3	1	1	1
Neck pain	4	3	4	3	4	4	3	3	3	3	3	6	5	5	6	8	7	8	6	6	7	5
Chronic obstructive pulmonary disease	5	21	9	10	6	10	8	11	8	12	18	4	8	10	8	16	4	9	5	5	5	7
Other musculoskeletal disorders	6	2	5	4	3	5	4	4	4	8	4	8	7	6	7	12	8	10	8	9	10	11
Anxiety disorders	7	8	6	6	5	6	5	12	12	4	5	7	4	4	4	6	6	7	7	4	6	9
Migraine	8	11	8	8	15	8	13	8	17	7	8	5	6	8	11	10	5	12	10	25	12	8
Diabetes mellitus	9	7	7	11	8	7	12	5	5	13	7	12	9	17	5	5	11	4	18	27	29	23
Falls	10	5	3	5	12	3	7	9	7	16	21	11	11	16	12	11	12	15	20	26	24	26
Osteoarthritis	11	6	13	15	10	9	14	7	6	11	10	17	12	12	10	14	19	14	17	19	26	20
Drug use disorders	12	12	11	9	7	16	6	17	18	9	11	10	14	11	9	13	9	16	12	16	21	21
Other hearing loss	13	13	18	19	20	12	15	14	11	15	15	9	15	14	17	18	10	19	14	10	18	13
Asthma	14	15	12	7	11	21	10	25	39	5	12	18	21	7	13	9	15	11	9	8	8	12
Alcohol use disorders	15	16	17	17	16	18	9	6	9	10	16	20	10	9	35	17	14	13	11	30	33	40
Schizophrenia	16	17	21	13	9	13	16	16	10	14	13	13	16	15	15	19	17	18	16	21	23	19
Road injury	17	19	14	14	27	11	19	15	13	22	22	15	13	19	14	15	13	17	21	24	22	25
Bipolar affective disorder	18	20	19	20	19	19	17	19	14	17	14	16	17	18	16	20	16	20	19	18	25	22
Dysthymia	19	22	20	21	21	20	20	20	16	20	19	19	19	22	19	22	20	23	22	20	31	27
Epilepsy	20	32	33	44	32	25	23	28	31	18	9	21	20	13	20	25	26	24	15	13	17	14
Ischaemic heart disease	21	18	15	18	17	15	22	13	19	21	25	28	18	31	22	27	31	29	34	41	48	37
Eczema	22	24	26	23	25	22	24	24	22	23	17	23	22	20	21	21	22	22	23	17	20	24
Diarrhoeal diseases	23	30	31	31	29	41	27	37	24	25	20	24	25	21	18	23	23	25	25	14	14	15
Alzheimer's disease and other dementias	24	10	10	12	14	17	18	18	26	28	31	40	30	33	41	30	50	69	48	64	67	64
Benign prostatic hyperplasia	25	9	16	16	13	23	25	29	20	31	36	34	42	36	29	36	45	51	47	61	56	57
Tuberculosis	26	38	83	93	102	56	56	34	42	42	56	14	24	27	24	24	18	6	13	22	16	32
Neonatal encephalopathy*	27	62	66	58	55	44	45	45	29	29	30	30	29	30	31	37	24	30	28	15	27	18
Other vision loss	28	27	22	25	26	27	26	27	33	19	24	26	26	23	26	26	34	26	26	34	39	45
Refraction and accommodation disorders	29	74	60	68	75	24	63	21	37	64	51	32	32	41	28	60	21	36	39	35	37	35
Conduct disorder	30	39	42	38	37	38	32	44	30	27	23	31	27	24	25	32	29	27	30	23	30	29
Periodontal disease	31	31	29	26	35	28	21	23	23	24	27	29	28	28	38	46	40	73	45	33	47	50
Cataracts	32	60	46	67	65	30	52	32	49	49	35	25	40	26	33	44	25	52	58	51	66	52
Thalassaemias	33	41	36	37	46	40	47	48	28	38	50	22	33	54	27	68	32	28	42	49	72	51
Dental caries	34	64	59	71	67	29	50	33	25	37	34	33	31	34	32	40	28	34	32	38	38	36
Edentulism	35	28	27	27	28	26	28	22	41	26	33	45	35	29	36	31	37	59	44	55	57	68
HIV/AIDS	36	131	76	89	50	99	62	31	88	61	52	56	76	68	95	34	55	33	1	11	19	16
Cerebrovascular disease	38	14	23	29	18	34	38	26	27	41	53	42	49	64	68	43	61	70	78	94	85	82
Chronic kidney diseases	39	25	25	30	23	33	30	39	38	32	26	37	47	44	46	54	63	66	62	71	74	71
Malaria	41	154	152	146	147	152	158	149	148	101	116	44	158	111	94	93	57	21	74	12	4	4
Iodine deficiency	42	66	45	53	82	37	79	36	59	56	73	51	23	56	23	38	33	31	24	29	15	38
Rheumatoid arthritis	43	23	24	24	24	31	31	35	45	34	40	58	37	38	53	42	58	62	54	63	63	61
Sickle cell disorders	45	51	32	66	22	80	78	100	114	30	29	123	93	81	50	28	52	101	94	44	9	10
Hookworm disease	49	141	163	159	161	162	76	163	32	40	28	27	133	63	89	63	46	5	29	40	34	49
Schistosomiasis	52	163	163	159	161	162	167	163	122	82	152	147	167	169	54	98	171	167	27	7	11	6
Lymphatic filariasis	53	163	163	159	161	162	167	163	171	136	162	62	167	169	128	147	27	63	79	31	58	17
Exposure to forces of nature	62	86	79	77	79	60	65	30	67	76	74	66	59	55	55	1	73	65	68	72	69	66
Food-borne trematodiases	70	69	153	159	161	162	167	137	21	171	170	64	148	25	102	169	163	167	170	154	172	173
Adverse effects of medical treatment	79	63	65	59	53	76	60	41	82	97	86	85	86	83	76	7	91	89	88	93	91	89
Onchocerciasis	97	163	163	159	161	162	167	163	171	171	170	170	167	169	171	169	171	167	170	58	13	43

Figure 6:

Variation in the leading causes of years lived with disability (YLDs), by region, in 2010

Causes in the figure are ordered according to global ranks for causes. The figure shows all causes that are in the 25 leading causes in at least one region. Ranks are also colour shaded to indicate rank intervals. *Includes birth asphyxia/trauma. An interactive version of this figure is available online at http://healthmetricsandevaluation.org/gbd/visualizations/regional.

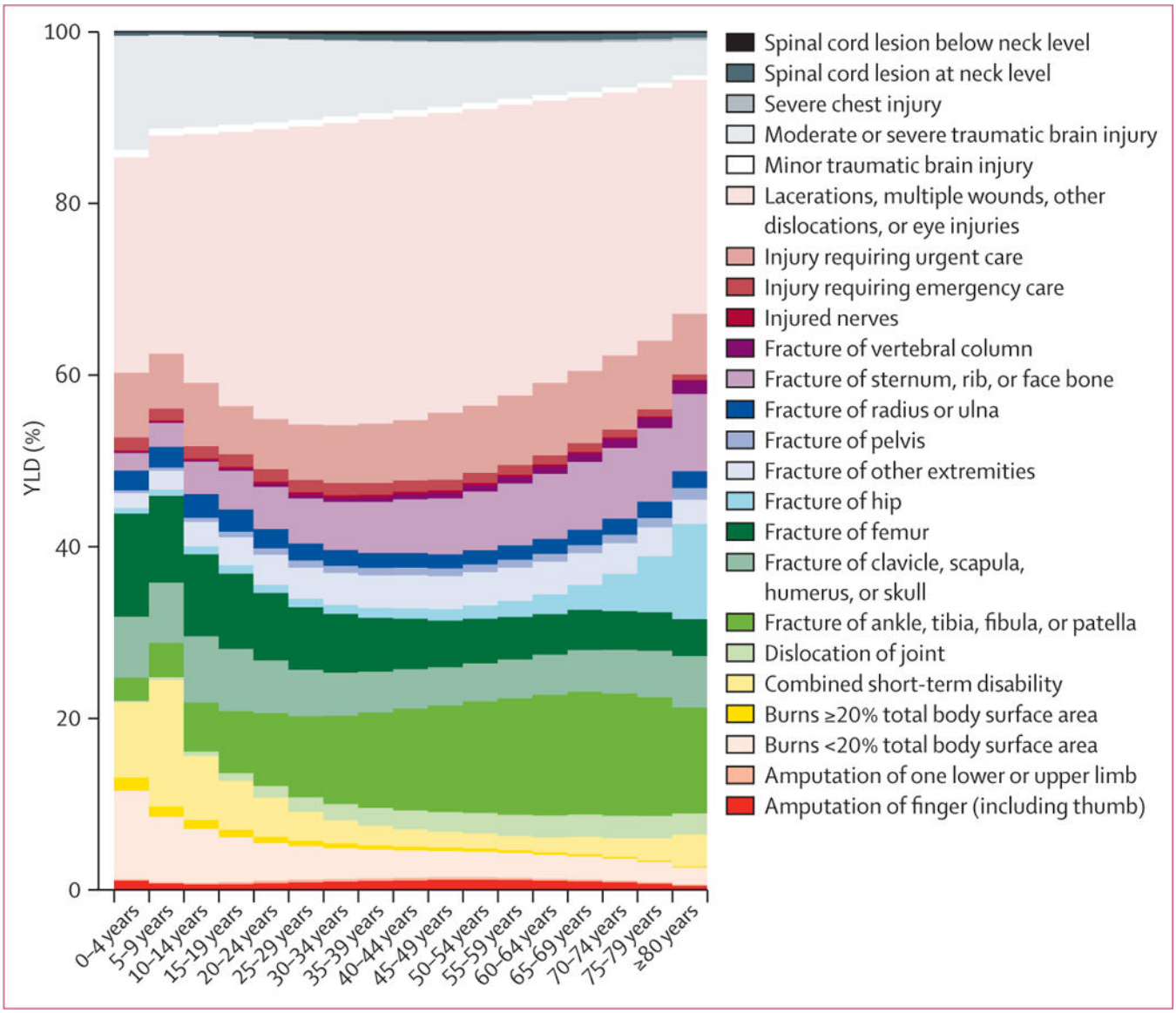


Figure 7:
Global years lived with disability (YLDs) for injury in 2010, by type of injury and age

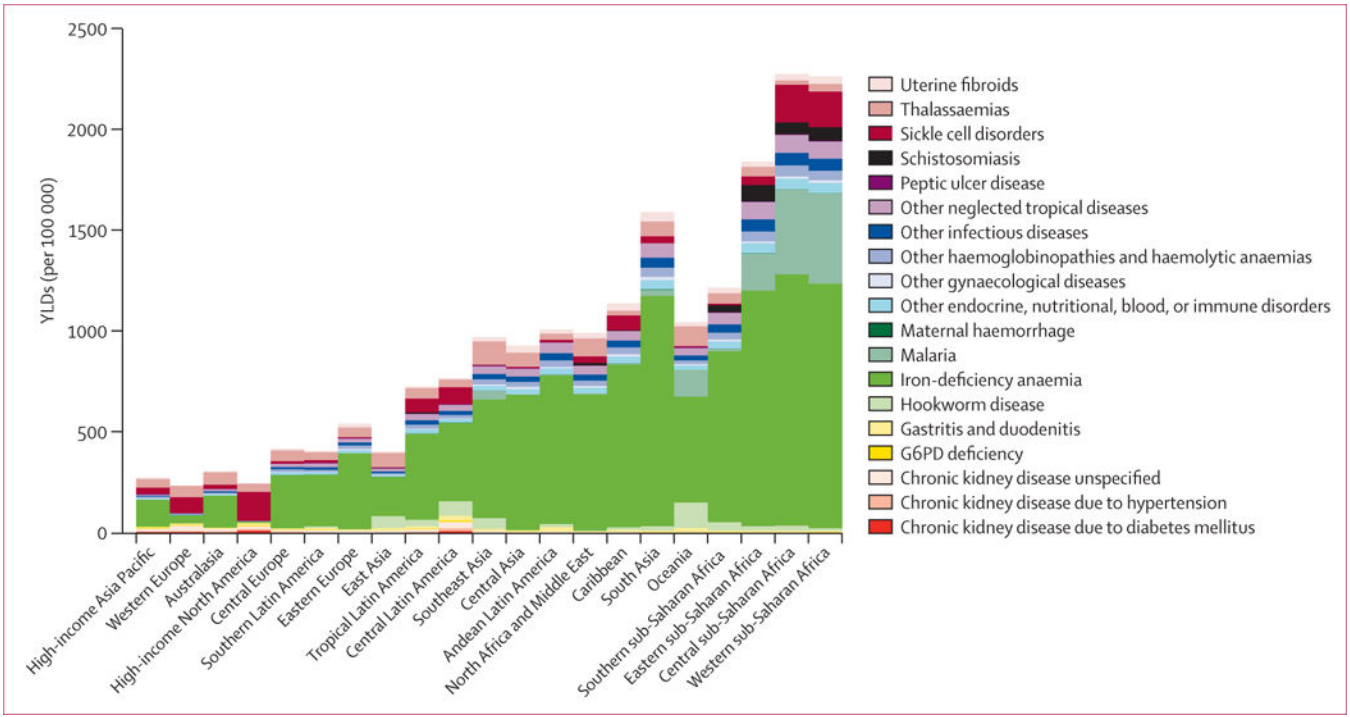


Figure 8:
Years lived with disability (YLD) estimates for anaemia in 2010, by cause and region

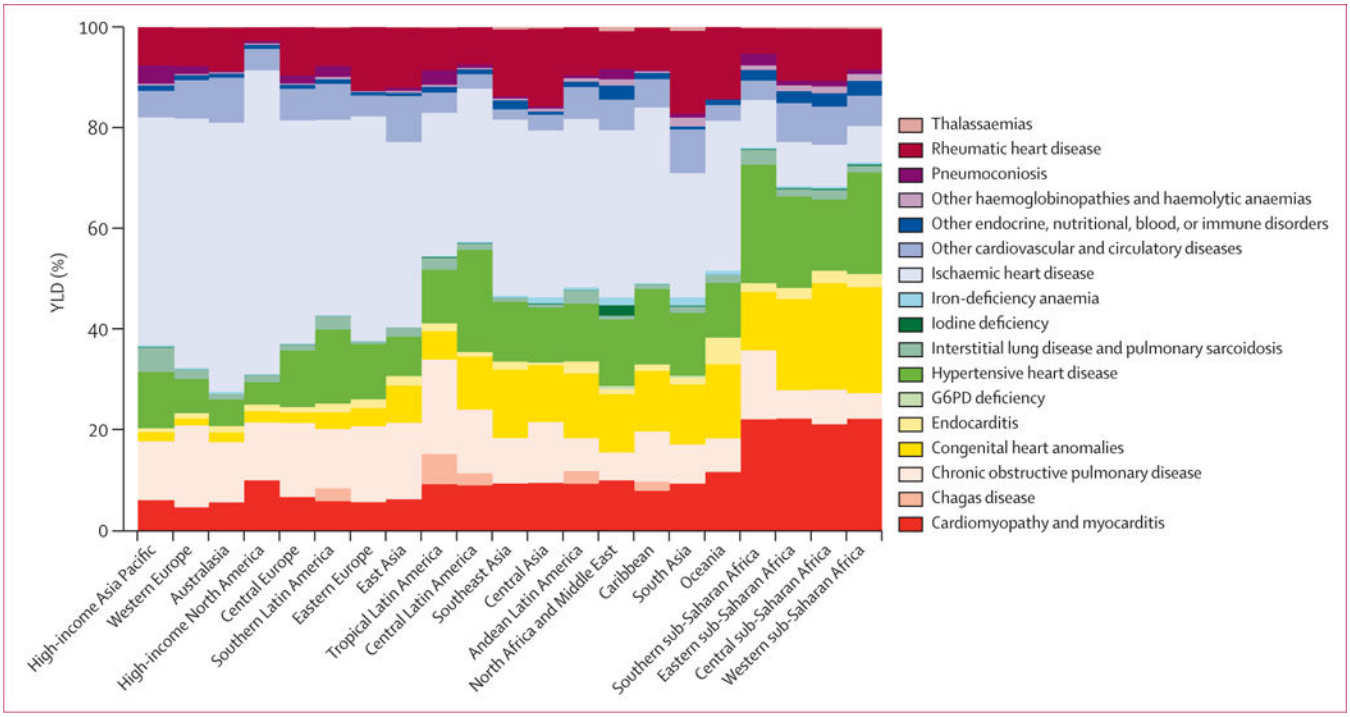


Figure 9:

Years lived with disability (YLD) estimates for heart failure in 2010, by cause and region

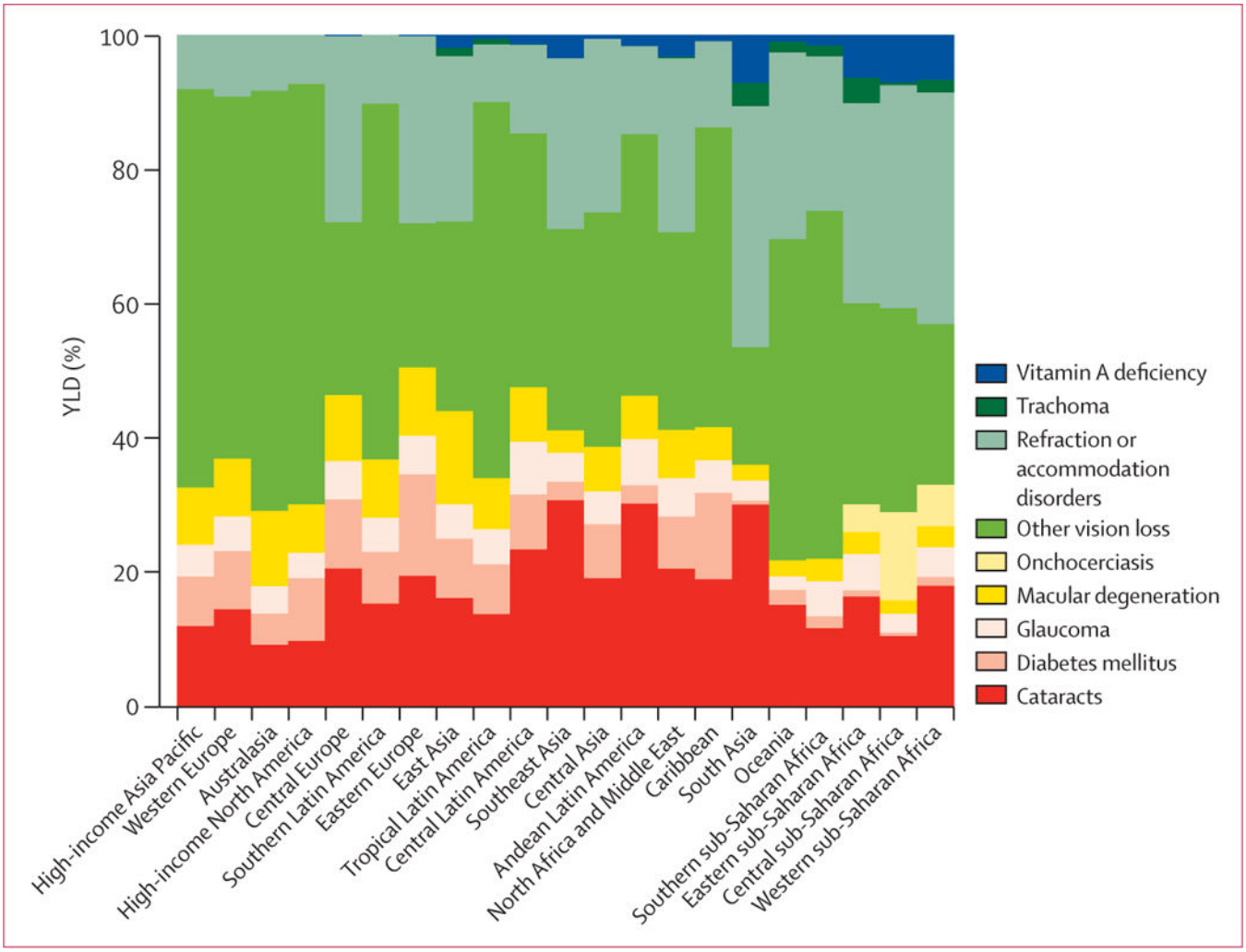


Figure 10:
Years lived with disability (YLD) estimates for vision loss in 2010, by cause and region

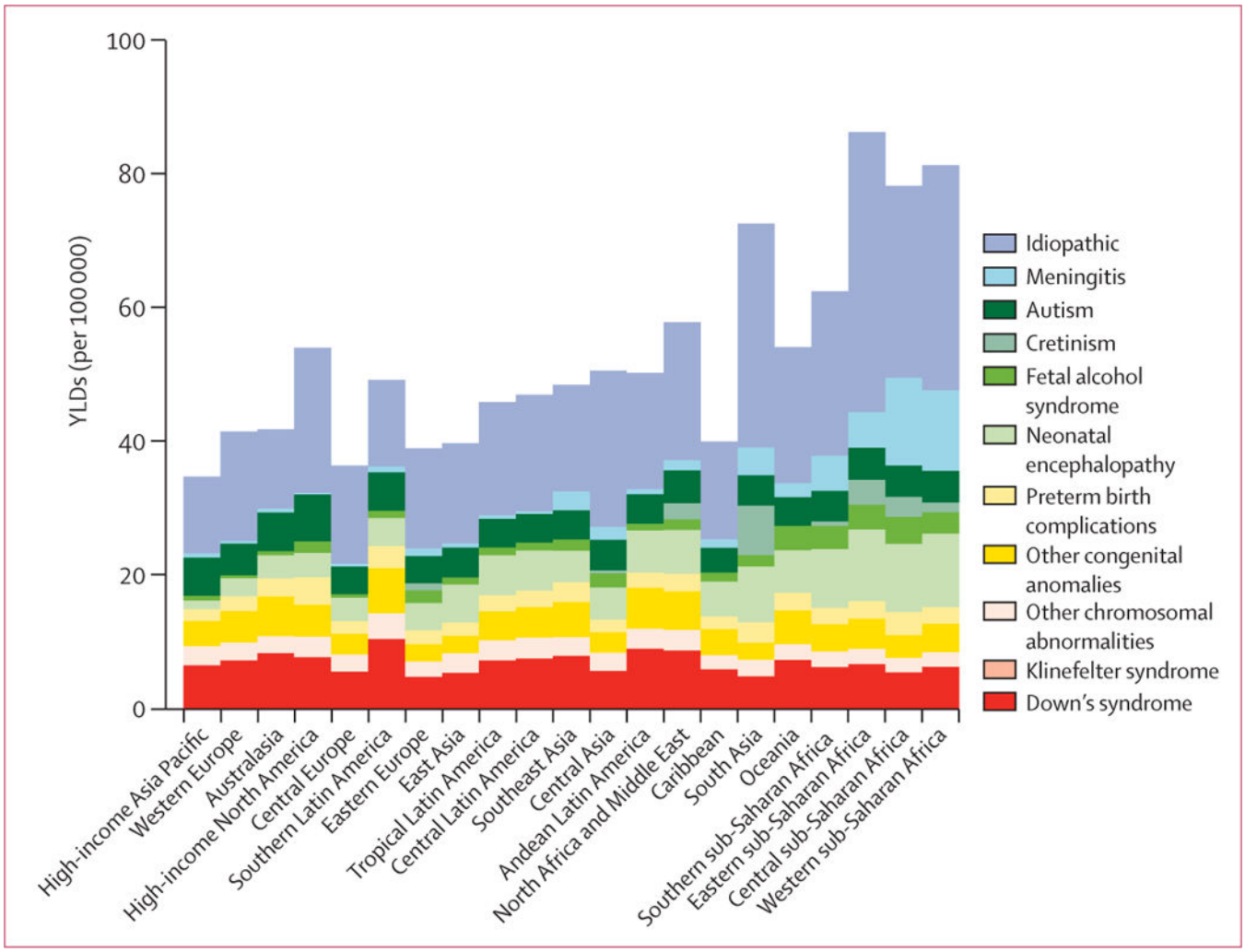


Figure 11:
Years lived with disability (YLDs) estimates for intellectual disability in 2010, by cause and region

Table 1:

Global prevalence of the 50 most common sequelae o

	Prevalence (both sexes)		Male prevalence		Female prevalence	
	Total (thousands)	Proportion of population (%)	Total (thousands)	Proportion of population (%)	Total (thousands)	Proportion of population (%)
Dental caries of permanent teeth	2431636	35. 29%	1 194 051	34.37%	1 237 585	36.23%
Tension-type headache	1431 067	20.77%	655 937	18.88%	775131	22.69%
Migraine	1012944	14.70%	371 072	10.68%	641 873	18.79%
Fungal skin diseases	985 457	14.30%	516 167	14.86%	469 291	13.74%
Other skin and subcutaneous diseases	803597	11.66%	417 129	12.01%	386 468	11.32%
Chronic periodontitis	743 187	1079%	378 407	10.89%	364 780	10.68%
Mild hearing loss with perinatal onset due to other hearing loss	724 689	1.0.52%	386 147	11.11%	338 543	9.91%
Acne vulgaris	646 488	9.38%	311 349	8.96%	335 140	9.81%
Low back pain	632 045	9.17%	334 793	9. 64%	297 252	8.70%
Dental caries of baby teeth	621 507	9.02%	352 085	10.13%	269 421	7.89%
Moderate iron-deficiency anaemia	608 915	8.84%	269 596	7.76%	339 319	9.93%
Other musculoskeletal disorders	560 978	8.14%	262779	7.56%	298 199	8.73%
Near sighted due to other vision loss	459 646	6.67%	235 052	6.77%	224 593	6.58%
Mild iron-deficiency anaemia	375 438	5.45%	152 523	4.39%	222915	6.53%
Asthma	334 247	4.85%	160 346	4.61%	173 901	5.09%
Neck pain	332 049	4.82%	135 134	3. 89%	196 915	5.77%
Chronic obstructive pulmonary disease	328 615	4.77%	168 445	4.85%	160170	4.69%
Genital prolapse	316 897	4.55%	..	..	316 897	9.28%
Major depressive disorder	298 441	4.33%	111 441	3.21%	187 000	5.48%
Pruritus	280 229	4.07%	117758	3.39%	162471	4.76%
Anxiety disorders	272 777	3.96%	95 731	2.76%	177 046	5.18%
Mild anaemia due to hookworm disease	260254	3.78%	149 572	4.30%	110 681	3.24%
Osteoarthritis of the knee	250 785	3.64%	88 885	2.56%	161 900	4.74%
Schistosomiasis	238 366	3.46%	124 289	3.58%	114 077	3.34%
Eczema	229761	3.33%	104 259	3.00%	125 502	3.67%
Uncomplicated diabetes mellitus	227 588	3.30%	114 817	3.30%	112 771	3.30%
Uterine fibroids	225 259	3.23%	..	..	225 259	6.60%
Sexually transmitted chlamydial diseases	215 621	3.13%	85 675	2.47%	129 946	3.80%
Benign prostatic hyperplasia	210 142	3.05%	210 142	6.05%	..	..
Premenstrual syndrome	199 072	2.89%	..	..	199 072	5.83%
Moderate hearing loss with perinatal onset due to other hearing loss	189 919	2.76%	103 629	2.98%	86 290	2.53%
Goitre due to iodine deficiency	187 181	2.72%	69 752	2.01%	117 429	3.44%
Lacerations, multiple wounds, other dislocations, and eye injuries due to falls	185 700	2.70%	110 263	3.17%	75 438	2.21%
Edentulism	158 284	2.30%	67 264	1.94%	91 020	2.66%
Trichomoniasis	152232	2.21%	49731	1.43%	102501	3.00%

	Prevalence (both sexes)		Male prevalence		Female prevalence	
	Total (thousands)	Proportion of population (%)	Total (thousands)	Proportion of population (%)	Total (thousands)	Proportion of population (%)
Chronic urolithiasis	144346	2.10%	90446	2.60%	53901	1.58%
Mild hearing loss due to otitis media	141600	2.06%	79359	2.28%	62241	1.82%
Mild anaemia due to sickle cell disorders	141419	2.05%	64343	1.85%	77075	2.26%
Impetigo	140495	2.04%	67464	1.94%	73031	2.14%
Diabetic neuropathy	131930	1.91%	63509	1.83%	68421	2.00%
Other cardiovascular and circulatory diseases	127990	1.86%	48040	1.38%	79950	2.34%
Molluscum contagiosum	122601	1.78%	65841	1.89%	56760	1.66%
Otitis media (chronic)	117881	1.71%	55891	1.61%	61989	1.81%
Polycystic ovarian syndrome	116730	1.68%	..	..	116730	3.42%
Angina due to ischaemic heart disease	111705	1.62%	59683	1.72%	52022	1.52%
Dysthymia	105520	1.53%	43863	1.26%	61657	1.81%
Scabies	100625	1.46%	51736	1.49%	48889	1.43%
Mild anaemia due to thalassaemias	95731	1.39%	44362	1.28%	51370	1.50%

Table 2:

Global years lived with disability (YLDs) for a comprehensive set of 289 causes and select sequelae in 1990 and 2010, for all ages, both sexes combined, and per 100 000

	All ages YLDs (thousands)			YLDs (per 100 000)		
	1990	**2010**	**%Δ**	**1990**	**2010**	**%Δ**
All causes	583 393 (484 649-694 406)	777 401 (648 158-921 711)	333%	11 004 (9142-13 098)	11 283 (9407-13 378)	2.5%
Communicable, maternal, neonatal, and nutritional disorders	113 925 (85 875-148 463)	119 164 (91 399-152 096)	46%	2149 (1620-2800)	1730 (1327-2207)	−19.5%
HIV/AIDS and tuberculosis	7681 (5222-10 722)	11 117 (7718-15 187)	44.7%	145 (99-202)	161 (112-220)	11.4%
Tuberculosis	6085 (4020-8737)	6774 (4500-9756)	11.3%	115 (76-165)	98 (65-142)	−14.3%
HIV/AIDS	1596 (1132-2125)	4342 (3142-5629)	172.2%	30 (21-40)	63(46-82)	109.4%
HIV disease resulting in mycobacterial infection	220 (143-314)	1224 (793-1746)	456.8%	4(3-6)	18 (12-25)	328.4%
HIV disease resulting in other specified or unspecified diseases	1376 (967-1857)	3119 (2241-4107)	126.7%	26 (18-35)	45 (33-60)	74.4%
HIV pre-AIDS asymptomatic	376 (227-569)	889 (546-1338)	136.8%	7 (4-11)	13(8-19)	82.2%
HIV pre-AIDS symptomatic	289 (193-411)	531 (350-756)	83.6%	5 (4-8)	8 (5-11)	41.3%
AIDS with antiretroviral treatment	0 (0-0)	389 (251-578)	..	0 (0-0)	6 (4-8)	..
AIDS without antiretroviral treatment	711 (483-958)	1309 (913-1758)	84.2%	13 (9-18)	19 (13-26)	41.7%
Diarrhoea, lower respiratory infections, meningitis, and other common infectious diseases	18 579 (13 419-25 301)	19 921 (14 241-27 439)	7.2%	350 (253-477)	289 (207-398)	−17.5%
Diarrhoeal diseases	7654 (5135-10 855)	8045 (5371-11 366)	5.1%	144 (97-205)	117 (78-165)	−19.1%
Cholera	115 (59-188)	80 (42-134)	−30.1%	2 (1-4)	1 (1-2)	−46.2%
Other salmonella infections	263 (150-410)	341 (202-523)	29.8%	5(3-8)	5(3-8)	−0.1%
Shigellosis	703 (391-1111)	744 (440-1147)	5.8%	13 (7-21)	11 (6-17)	−18.6%
Enteropathogenic *E coli* infection	972 (438-1652)	845 (387-1416)	−13.0%	18 (8-31)	12 (6-21)	−33.1%
Enterotoxigenic *E coli* infection	889 (520-1409)	1065 (649-1643)	19.8%	17 (10-27)	15 (9-24)	−7.8%
Campylobacter enteritis	753 (407-1211)	746 (416-1180)	−1.0%	14 (8-23)	11 (6-17)	−23.8%
Campylobacter enteritis	753 (406-1211)	746 (415-1181)	−0.9%	14 (8-23)	11 (6-17)	−23.8%
Guillain-Barre syndrome due to *C enteritis*	1 (0-1)	1 (1-2)	35.7%	<0.5 (0-0.5)	<0.5 (0-0.5)	4.4%
Amoebiasis	142 (84-217)	205 (126-314)	44.1%	3 (2-4)	3(2-5)	10.9%
Cryptosporidiosis	651 (312-1101)	661 (316-1096)	1.6%	12 (6-21)	10 (5-16)	−21.8%
Rotaviral enteritis	1159 (624-1885)	1269 (701-2006)	9.5%	22 (12-36)	18 (10-29)	−15.8%
Other diarrhoeal diseases	2007 (1027-3412)	2089 (1054-3521)	4.1%	38 (19-64)	30 (15-51)	−19.9%
Typhoid and paratyphoid fevers	134 (25-348)	172 (33-435)	27.8%	3 (0-7)	2(0-6)	−1.7%
Typhoid and paratyphoid fevers	124 (16-337)	159 (20-423)	27.8%	2(0-6)	2(0-6)	−1.6%

	All ages YLDs (thousands)			YLDs (per 100 000)		
	1990	2010	%Δ	1990	2010	%Δ
Liver abscess and cysts due to typhoid and paratyphoid fevers	10 (7-15)	13 (8-20)	27.4%	<0.5 (0-0.5)	<0.5 (0-0.5)	−1.9%
Lower respiratory infections	2113 (1444-2941)	2331 (1592-3240)	10.3%	40 (27-55)	34 (23-47)	−15.1%
Influenza	510 (344-714)	583 (393-815)	14.2%	10 (6-13)	8(6-12)	−12.1%
Influenza	510 (343-713)	582 (392-814)	14.2%	10 (6-13)	8(6-12)	−12.1%
Guillain-Barre syndrome due to influenza	1 (1-2)	2(1-3)	34.3%	<0.5 (0-0.5)	<0.5 (0-0.5)	3.3%
Pneumococcal pneumonia	298 (203-414)	367 (248-509)	23.2%	6 (4-8)	5 (4-7)	−5.2%
H influenzae type B pneumonia	216 (145-306)	201 (134-286)	−6.6%	4(3-6)	3 (2-4)	−28.2%
Respiratory syncytial virus pneumonia	52 (31-82)	36 (21-55)	−31.3%	1 (1-2)	1 (0-1)	−47.2%
Other lower respiratory infections	1037 (702-1459)	1144 (779-1589)	10.2%	20 (13-28)	17 (11-23)	−15.2%
Upper respiratory infections	1438 (755-2542)	1728 (911-3050)	20.2%	27 (14-48)	25 (13-44)	−7.5%
Upper respiratory infections	1437 (753-2541)	1727 (910-3048)	20.2%	27 (14-48)	25 (13-44)	−7.5%
Guillain-Barre syndrome due to upper respiratory infections	1 (1-2)	2(1-3)	33.8%	<0.5 (0-0.5)	<0.5 (0-0.5)	3.0%
Otitis media	3794 (2456-5829)	4436 (2887-6668)	16.9%	72 (46-110)	64 (42-97)	−10.0%
Otitis media	1359 (819-2150)	1613 (979-2594)	18.7%	26 (15-41)	23 (14-38)	−8.7%
Hearing loss due to otitis media	2435 (1423-3929)	2824 (1669-4533)	16.0%	46 (27-74)	41 (24-66)	−10.8%
Meningitis	2757 (1973-3732)	2628 (1857-3643)	−4.7%	52 (37-70)	38 (27-53)	−26.7%
Pneumococcal meningitis	920 (624-1298)	886 (595-1254)	−3.7%	17 (12-24)	13(9-18)	−25.9%
Spneumoniae meningitis	9 (5-14)	11 (6-17)	19.6%	<0.5 (0-0.5)	<0.5 (0-0.5)	−8.0%
Long term sequelae due to *S pneumoniae* meningitis	571 (324-899)	488 (261-806)	−14.5%	11 (6-17)	7 (4-12)	−34.2%
Seizures due to *S pneumoniae* meningitis	80 (52-118)	79 (55-113)	−0.4%	2(1-2)	1 (1-2)	−23.4%
Hearing loss due to *Spneumoniae* meningitis	261 (154-420)	308 (185-500)	18.2%	5 (3-8)	4 (3-7)	−9.0%
H influenzae type B meningitis	646 (429-933)	371 (247-524)	−42.6%	12 (8-18)	5 (4-8)	−55.8%
H influenzae type B meningitis	10 (6-17)	7 (4-12)	−32.0%	<0.5 (0-0.5)	<0.5 (0-0.5)	−47.7%
Long term sequelae due to *H influenzae* type B meningitis	448 (253-715)	233 (124-368)	−48.4%	8(5-13)	3(2-5)	−60.0%
Seizures due to *H influenzae* type B meningitis	65 (38-110)	31 (18-51)	−52.2%	1(1-2)	<0.5 (0-1)	−63.3%
Hearing loss due to *H influenzae* type B meningitis	123 (74-198)	100 (60-160)	−18.5%	2 (1-4)	1 (1-2)	−37.3%
Meningococcal infection	424 (302-597)	403 (281-566)	−4.8%	8 (6-11)	6 (4-8)	−26.7%
Meningococcal infection	6 (4-10)	7 (4-12)	13.0%	<0.5 (0-0.5)	<0.5 (0-0.5)	−13.0%
Long term sequelae due to meningococcal infection	195 (115-306)	165 (92-269)	−15.2%	4(2-6)	2 (1-4)	−34.8%
Seizures due to meningococcal infection	35 (23-52)	28 (18-40)	−21.4%	1 (0-1)	<0.5 (0-1)	−39.5%

	All ages YLDs (thousands)			YLDs (per 100 000)		
	1990	2010	%Δ	1990	2010	%Δ
Hearing loss due to meningococcal infection	187 (110-297)	203 (119-325)	8.6%	4 (2-6)	3(2-5)	−16.5%
Other meningitis	733 (509-1036)	930 (647-1361)	27.0%	14 (10-20)	14 (9-20)	−2.3%
Other meningitis	37 (24-53)	49 (31-72)	34.4%	1 (0-1)	1 (0-1)	3.4%
Long term sequelae due to other bacterial meningitis infection	283 (157-446)	289 (149-476)	2.2%	5 (3-8)	4 (2-7)	−21.4%
Seizures due to other bacterial meningitis infection	48 (32-71)	46 (31-66)	−4.0%	1 (1-1)	1 (0-1)	−26.1%
Hearing loss due to other bacterial meningitis infection	365 (221-572)	546 (322-883)	49.6%	7 (4-11)	8 (5-13)	15.1%
Encephalitis	183 (120-260)	205 (133-292)	12.6%	3 (2-5)	3 (2-4)	−13.4%
Encephalitis	5 (3-9)	7 (4-12)	35.7%	<0.5 (0-0.5)	<0.5 (0-0.5)	4.4%
Motor cognitive impairments due to encephalitis	177 (117-253)	198 (128-283)	11.9%	3(2-5)	3 (2-4)	−13.9%
Diphtheria	<0'5 (0-2)	<0.5 (0-1)	−49.1%	<0.5 (0-0.5)	<0.5 (0-0.5)	−60.9%
Whooping cough	181 (103-287)	122 (70-195)	−32.5%	3(2-5)	2(1-3)	−48.0%
Tetanus	78 (35-159)	21(9-43)	−72.3%	1 (1-3)	<0.5 (0-1)	−78.7%
Tetanus	77 (35-158)	21(9-43)	−72.3%	1 (1-3)	<0.5 (0-1)	−78.7%
Long-term sequelae from neonatal tetanus	1 (0-2)	<0.5 (0-1)	−73.2%	<0.5 (0-0.5)	<0.5 (0-0.5)	−79.4%
Measles	106 (58-180)	31 (17-51)	−70.8%	2(1-3)	<0.5 (0-1)	−77.5%
Varicella	142 (87-219)	202 (124-308)	42.0%	3 (2-4)	3 (2-4)	9.3%
Chickenpox	7 (2-16)	7 (2-16)	−0.9%	<0.5 (0-0.5)	<0.5 (0-0.5)	−23.8%
Herpes zoster	135 (84-209)	195 (120-295)	44.3%	3 (2-4)	3 (2-4)	11.0%
Neglected tropical diseases and malaria	23 491 (15 715-36 639)	22 219 (15 693-31 544)	−5.4%	443 (296-691)	322 (228-458)	−27.2%
Malaria	2662 (1257-4481)	4070 (1853-6980)	52.9%	50 (24-85)	59 (27-101)	17.7%
Malaria	433 (194-854)	498 (218-933)	14.8%	8(4-16)	7 (3-14)	−11.6%
Anaemia due to malaria	2127 (833-3972)	3367 (1312-6294)	58.3%	40 (16-75)	49 (19-91)	21.8%
Motor cognitive impairments due to malaria	104 (41-273)	211(81-556)	102.8%	2(1-5)	3 (1-8)	56.0%
Chagas disease	324 (108-594)	303(106-573)	−6.4%	6(2-11)	4(2-8)	−28.0%
Acute Chagas disease	31 (7-62)	28 (7-59)	−8.8%	1(0-1)	<0.5 (0-1)	−29.8%
Chronic heart disease due to Chagas disease	213 (38-429)	195 (36-411)	−8.4%	4(1-8)	3 (1-6)	−29.5%
Chronic digestive disease due to Chagas disease	73 (8-178)	67 (7-157)	−8.5%	1(0-3)	1 (0-2)	−29.6%
Heart failure due to Chagas disease	7 (4-10)	13 (8-19)	92.6%	<0.5 (0-0.5)	<0.5 (0-0.5)	48.2%
Leishmaniasis	113 (53-215)	124 (60-235)	10.2%	2 (1-4)	2(1-3)	−15.2%
Visceral leishmaniasis	8 (2-16)	6(2-13)	−17.2%	<0.5 (0-0.5)	<0.5 (0-0.5)	−36.3%
Cutaneous leishmaniasis	105 (47-206)	118 (56-229)	12.2%	2 (1-4)	2(1-3)	−13.7%
African trypanosomiasis	33 (12-86)	8(2-25)	−75.2%	1(0-2)	<0.5 (0-0.5)	−80.9%
Schistosomiasis	1797 (923-3413)	2986 (1541-5666)	66.2%	34 (17-64)	43 (22-82)	27.9%
Schistosomiasis	696 (229-1579)	1148 (377-2607)	65.0%	13 (4-30)	17 (5-38)	27.0%

	All ages YLDs (thousands)			YLDs (per 100 000)		
	1990	2010	%Δ	1990	2010	%Δ
Mild diarrhoea due to schistosomiasis	1 (0-1)	1 (1-2)	77.2%	<0.5 (0-0.5)	<0.5 (0-0.5)	36.3%
Anaemia due to schistosomiasis	433 (219-766)	687 (344-1217)	58.8%	8 (4-14)	10 (5-18)	22.2%
Hepatomegaly due to schistosomiasis	104 (47-200)	185(84-355)	77.8%	2 (1-4)	3(1-5)	36.8%
Haematemesis due to schistosomiasis	39 (26-55)	69 (46-97)	76.6%	1(0-1)	1 (1-1)	35.9%
Ascites due to schistosomiasis	31 (21-44)	56 (38-77)	78.9%	1 (0-1)	1(1-1)	37.7%
Dysuria due to schistosomiasis	174 (80-334)	298 (135-572)	71.0%	3(2-6)	4(2-8)	31.5%
Bladder pathology due to schistosomiasis	159 (72-304)	268 (122-515)	68.9%	3 (1-6)	4 (2-7)	30.0%
Hydronephrosis due to schistosomiasis	162 (74-310)	277(126-533)	71.5%	3 (1-6)	4(2-8)	32.0%
Cysticercosis	484 (378-600)	457 (357-566)	−5.5%	9(7-11)	7 (5-8)	−27.3%
Echinococcosis	89 (44-187)	110 (55-228)	23.9%	2 (1-4)	2 (1-3)	−4.7%
Chronic respiratory disease due to echinococcosis	2 (1-6)	3 (1-7)	22.8%	<0.5 (0-0.5)	<0.5 (0-0.5)	−5.5%
Epilepsy due to echinococcosis	13 (6-28)	16 (8-32)	24.1%	<0.5 (0-1)	<0.5 (0-0.5)	−4.5%
Abdominopelvic problems due to echinococcosis	73 (36-155)	91 (43-193)	23.9%	1 (1-3)	1 (1-3)	−4.7%
Lymphatic filariasis	2368 (1551-3399)	2775 (1807-4000)	17.2%	45 (29-64)	40 (26-58)	−9.9%
Lymphoedema	955 (585-1454)	1151 (698-1773)	20.5%	18 (11-27)	17 (10-26)	−7.3%
Hydrocele due to lymphatic filariasis	1414 (842-2103)	1624 (981-2450)	14.9%	27 (16-40)	24 (14-36)	−11.6%
Onchocerciasis	512 (361-687)	494 (360-656)	−3.5%	10 (7-13)	7 (5-10)	−25.7%
Skin disease due to onchocerciasis	407 (277-559)	352 (240-486)	−13.3%	8(5-11)	5 (3-7)	−33.3%
Vision loss due to onchocerciasis	105 (79-134)	142 (108-185)	34.5%	2(1-3)	2 (2-3)	3.5%
Trachoma	144 (104-189)	334 (243-438)	132.5%	3 (2-4)	5 (4-6)	78.9%
Dengue	6(2-13)	12 (6-23)	103.9%	<0.5 (0-0.5)	<0.5 (0-0.5)	56.9%
Dengue	5(2-11)	10 (5-20)	105.9%	<0.5 (0-0.5)	<0.5 (0-0.5)	58.5%
Post-dengue chronic fatigue syndrome	1 (0-2)	2 (0-4)	92.6%	<0.5 (0-0.5)	<0.5 (0-0.5)	48.2%
Yellow fever	<0.5 (0-0.5)	<0.5 (0-0.5)	15.1%	<0.5 (0-0.5)	<0.5 (0-0.5)	−11-4%
Rabies	<0.5 (0-1)	<0.5 (0-1)	−56.7%	<0.5 (0-0.5)	<0.5 (0-0.5)	−66.7%
Intestinal nematode infections	8741 (4778-15 094)	4980 (2722-8442)	−43-0%	165 (90-285)	72 (40-123)	−56.2%
Ascariasis	3950(2080-6805)	1111 (618-1864)	−71'9%	75 (39-128)	16 (9-27)	−78.4%
Ascariasis infestation	1995 (1091-3254)	758 (419-1232)	−62.0%	38 (21-61)	11 (6-18)	−70.8%
Severe wasting due to ascariasis	49 (32-72)	43 (28-62)	−12.8%	1 (1-1)	1(0-1)	−32.9%
Mild abdominopelvic problems due to ascariasis	1906 (871-3673)	310 (139-598)	−83.7%	36 (16-69)	4(2-9)	−87.5%
Trichuriasis	857 (465-1420)	638 (349-1061)	−25.5%	16 (9-27)	9 (5-15)	−42.7%
Trichuriasis infestation	677 (367-1104)	504 (277-821)	−25.6%	13 (7-21)	7 (4-12)	−42.8%

	All ages YLDs (thousands)			YLDs (per 100 000)		
	1990	2010	%Δ	1990	2010	%Δ
Severe wasting due to trichuriasis	9(5-13)	9(5-13)	−0.5%	<0.5 (0-0.5)	<0.5 (0-0.5)	−23.4%
Mild abdominopelvic problems due to trichuriasis	171 (77-327)	126 (57-246)	−26.3%	3 (1-6)	2 (1-4)	−43.3%
Hookworm disease	3934(2056-6983)	3231(1695-5732)	−17.9%	74 (39-132)	47 (25-83)	−36.8%
Hookworm infestation	1315 (718-2150)	1011 (556-1655)	−23.1%	25 (14-41)	15(8-24)	−40.9%
Severe wasting due to hookworm disease	34 (21-49)	42 (27-61)	23.4%	1 (0-1)	1(0-1)	−5.0%
Mild abdominopelvic problems due to hookworm disease	241(110-462)	217(98-422)	−10.0%	5(2-9)	3(1-6)	−30.8%
Anaemia due to hookworm disease	2344 (983-4348)	1962 (895-3672)	−16.3%	44 (19-82)	28 (13-53)	−35.6%
Food-borne trematodiases	2394 (635-8501)	1875 (708-4837)	−21.7%	45 (12-160)	27 (10-70)	−39.7%
Heavy clonorchiasis	367 (95-1145)	296 (100-822)	−19.4%	7 (2-22)	4(1-12)	−37.9%
Heavy fascioliasis	32 (18-53)	42 (26-65)	32.5%	1 (0-1)	1(0-1)	2.0%%
Heavy intestinal fluke infection	101 (58-179)	106 (64-170)	4.9%	2(1-3)	2(1-2)	−19.3%
Heavy opisthorchiasis	48 (29-77)	60 (37-92)	27.0%	1 (1-1)	1(1-1)	−2.3%
Cerebral paragonimiasis	57 (7-245)	43 (8-148)	−25.2%	1 (0-5)	1 (0-2)	−42.4%
Heavy paragonimiasis	1789 (233-7696)	1328 (280-4234)	−25.8%	34 (4-145)	19 (4-61)	−42.9%
Other neglected tropical diseases	3825 (2517-6057)	3690 (2556-5303)	−3.5%	72 (47-114)	54 (37-77)	−25.8%
Other neglected tropical disease	1007 (533-2568)	949 (657-1557)	−5.8%	19 (10-48)	14 (10-23)	−27.5%
Anaemia due to other neglected tropical diseases	2873 (1920-4163)	2800 (1857-4054)	−2.5%	54 (36-79)	41 (27-59)	−25.0%
Maternal disorders	1394 (935-2271)	1790 (1138-2936)	28.4%	26 (18-43)	26 (17-43)	−1.2%
Maternal haemorrhage	143 (84-234)	98 (61-151)	−31.7%	3 (2-4)	1 (1-2)	−47.5%
Maternal haemorrhage	29 (18-46)	19 (12-29)	−34.2%	1 (0-1)	<0.5 (0-0.5)	−49.4%
Anaemia due to maternal haemorrhage	114(65-193)	79 (47-124)	−31.1%	2 (1-4)	1 (1-2)	−47.0%
Maternal sepsis	80 (46-128)	42 (25-65)	−48.4%	2(1-2)	1 (0-1)	−60.3%
Hypertensive disorders of pregnancy	69 (41-111)	93 (53-151)	33.2%	1(1-2)	1 (1-2)	2.5%
Pre-eclampsia	60 (33-100)	83 (44-141)	38.9%	1(1-2)	1 (1-2)	6.9%
Eclampsia	4 (1-7)	3 (1-7)	−14.6%	<0.5 (0-0.5)	<0.5 (0-0.5)	−34.3%
Long-term sequelae for hypertensive disorders of pregnancy	6(1-15)	7 (2-15)	6.3%	<0.5 (0-0.5)	<0.5 (0-0.5)	−18.2%
Obstructed labour	809 (458-1493)	1182 (641-2194)	46.0%	15(9-28)	17 (9-32)	12.4%
Obstructed labour	77 (40-140)	34 (19-57)	−56.1%	1(1-3)	<0.5 (0-1)	−66.3%
Fistula	732 (390-1425)	1148 (601-2138)	56.8%	14 (7-27)	17 (9-31)	20.6%
Abortion	27 (15-52)	32 (19-59)	19.8%	1 (0-1)	<0.5 (0-1)	−7.8%
Other maternal disorders	264 (180-420)	343 (225-526)	30.1%	5(3-8)	5(3-8)	0.1%
Neonatal disorders	8422(6368-10706)	9464 (7167-11 937)	12.4%	159 (120-202)	137 (104-173)	−13.5%
Preterm birth complications	2298 (1743-2895)	2982 (2236-3716)	29.7%	43 (33-55)	43 (32-54)	−0.2%

	All ages YLDs (thousands)			YLDs (per 100 000)		
	1990	2010	%Δ	1990	2010	%Δ
Impairment due to preterm birth complications	2041 (1471-2613)	2636 (1882-3359)	29.1%	39 (28-49)	38 (27-49)	−0.7%
Retinopathy of prematurity due to preterm birth complications	257 (154-376)	347 (212-508)	34.9%	5 (3-7)	5 (3-7)	3.8%
Neonatal encephalopathy (birth asphyxia/trauma)	5625 (4116-7298)	6132 (4471-8030)	9.0%	106 (78-138)	89 (65-117)	−16.1%
Sepsis and other infectious disorders of the newborn baby	18 (9-32)	23 (12-40)	24.9%	<0.5 (0-1)	<0.5(0-1)	−3.9%
Other neonatal disorders	481 (357-618)	328 (244-417)	−31.8%	9(7-12)	5 (4-6)	−47.5%
Nutritional deficiencies	49 887 (34 714-70 780)	49 942 (34 705-70 350)	0.1%	941(655-1335)	725 (504-1021)	−23.0%
Protein-energy malnutrition	3200 (2071-4743)	2720(1766-3972)	−15.0%	60 (39-89)	39 (26-58)	−34.6%
Kwashiokor or marasmus due to protein-energy malnutrition	298 (155-520)	197 (103-339)	−33.7%	6 (3-10)	3(1-5)	−49.0%
Severe wasting due to protein-energy malnutrition	2906 (1803-4418)	2530 (1604-3772)	−12.9%	55 (34-83)	37 (23-55)	−33.0%
Iodine deficiency	3181 (2049-4912)	3889(2468-6136)	22.3%	60 (39-93)	56 (36-89)	−5.9%
Goitre due to iodine deficiency	2902 (1823-4617)	3767 (2382-5990)	29.8%	55 (34-87)	55 (35-87)	−0.1%
Idiopathic intellectual disability due to iodine deficiency	271 (181-386)	113 (73-167)	−58.4%	5 (3-7)	2(1-2)	−68.0%
Heart failure due to iodine deficiency	7(5-11)	10 (6-14)	33.3%	<0.5 (0-0.5)	<0.5 (0-0.5)	2.6%
Vitamin A deficiency	740 (565-941)	806 (612-1037)	9.0%	14 (11-18)	12 (9-15)	−16.1%
Iron-deficiency anaemia	42 731 (28 506-61 896)	42 494 (28 170-61 626)	−0.6%	806 (538-1167)	617 (409-894)	−23.5%
Iron-deficiency anaemia	42 728 (28 497-61 897)	42 505 (28 166-61 656)	−0.5%	806 (538-1168)	617(409-895)	−23.5%
Heart failure due to iron-deficiency anaemia	17 (11-24)	24 (16-36)	46.7%	<0.5 (0-0.5)	<0.5(0-1)	12.9%
Other nutritional deficiencies	35 (31-44)	32 (24-36)	−9.2%	1 (1-1)	<0.5(0-1)	−30.1%
Other communicable, maternal, neonatal, and nutritional disorders	4472 (3188-6195)	4711(3352-6562)	5.3%	84 (60-117)	68 (49-95)	−18.9%
Sexually transmitted diseases excluding HIV	1111 (589-2072)	1298 (704-2439)	16.9%	21 (11-39)	19 (10-35)	−10.0%
Syphilis	73 (3-156)	91 (4-200)	25.5%	1(0-3)	1 (0-3)	−3.4%
Sexually transmitted chlamydial diseases	560 (268-1025)	669 (324-1233)	19.6%	11 (5-19)	10 (5-18)	−8.0%
Sexually transmitted chlamydial diseases	507 (233-952)	609 (281-1143)	20.1%	10 (4-18)	9 (4-17)	−7.6%
Salpingitis, inflammatory disease of cervix, and other female pelvic inflammatory diseases due to sexually transmitted chlamydial diseases	27 (16-43)	25 (15-40)	−7.5%	1(0-1)	<0.5(0-1)	−28.8%
Infertility due to sexually transmitted chlamydial diseases	25 (9-53)	35 (14-72)	37.7%	<0.5 (0-1)	1 (0-1)	6.0%

	All ages YLDs (thousands)			YLDs (per 100 000)		
	1990	2010	%Δ	1990	2010	%Δ
Gonococcal infection	184 (94-336)	249 (123-450)	35.1%	3(2-6)	4 (2-7)	4.0%
Gonococcal infection	147 (69-282)	207(96-390)	40.7%	3(1-5)	3 (1-6)	8.3%
Salpingitis, inflammatory disease of cervix, and other female pelvic inflammatory diseases due to gonococcal infection	20 (12-33)	19 (11-31)	−7.7%	<0.5 (0-1)	<0.5 (0-0.5)	−29.0%
Infertility due to gonococcal infection	17(7-35)	23 (9-47)	37.7%	<0.5 (0-1)	<0.5(0-1)	5.9%
Trichomoniasis	182 (0-549)	167 (0-493)	−8.4%	3 (0-10)	2 (0-7)	−29.5%
Other sexually transmitted diseases	112 (68-181)	122 (74-200)	9.3%	2 (1-3)	2 (1-3)	−15.9%
Other sexually transmitted diseases	70 (42-111)	64 (39-105)	−7.8%	1 (1-2)	1(1-2)	−29.0%
Infertility due to other sexually transmitted diseases	42 (17-91)	58 (23-125)	37.7%	1 (0-2)	1 (0-2)	5.9%
Hepatitis	449 (230-810)	542 (280-981)	20.7%	8 (4-15)	8 (4-14)	−7.1%
Acute hepatitis A	172 (85-294)	185 (95-311)	7.6%	3(2-6)	3(1-5)	−17.2%
Acute hepatitis B	194 (24-456)	248 (28-585)	28.1%	4(0-9)	4(0-8)	−1.4%
Acute hepatitis C	24 (4-50)	39 (7-79)	61.2%	<0.5 (0-1)	1 (0-1)	24.1%
Acute hepatitis E	59 (20-121)	69 (24-142)	17.8%	1 (0-2)	1 (0-2)	−9.3%
Leprosy	26 (12-48)	6 (3-11)	−76.6%	<0.5 (0-1)	<0.5 (0-0.5)	−82.0%
Other infectious diseases	2886 (1920-4175)	2864 (1902-4141)	−0.8%	54 (36-79)	42 (28-60)	−23.6%
Other infectious diseases	922 (615-1330)	957 (635-1386)	3.8%	17 (12-25)	14 (9-20)	−20.2%
Anaemia due to other infectious diseases	2000 (1329-2897)	1947 (1292-2812)	−2.7%	38 (25-55)	28 (19-41)	−25.1%
Guillain-Barré syndrome due to other infectious diseases	1 (0-1)	1 (0-1)	35.8%	<0.5 (0-0.5)	<0.5 (0-0.5)	4.5%
Non-communicable diseases	435 400 (365 526-515 063)	611 076 (512 645-721 956)	40.3%	8213(6895-9715)	8869 (7440-10 478)	8.0%
Neoplasms	2540 (1876-3348)	4483 (3324-5861)	76.5%	48 (35-63)	65(48-85)	35.8%
Oesophageal cancer	61(42-86)	75 (49-103)	22.8%	1 (1-2)	1(1-1)	−5.5%
Stomach cancer	204 (137-286)	229 (150-323)	12.3%	4(3-5)	3(2-5)	−13.6%
Liver cancer	77 (53-104)	140 (96-189)	82.7%	1 (1-2)	2(1-3)	40.6%
Liver cancer secondary to hepatitis B	35 (23-49)	64 (43-89)	81.4%	1 (0-1)	1 (1-1)	39.6%
Liver cancer secondary to hepatitis C	19 (13-27)	34 (23-47)	80.5%	<0.5 (0-1)	<0.5 (0-1)	38.9%
Liver cancer secondary to alcohol use	15 (9-21)	29 (19-42)	100.2%	<0.5 (0-0.5)	<0.5 (0-1)	54.1%
Other liver cancer	8(4-12)	12 (7-19)	60.3%	<0.5 (0-0.5)	<0.5 (0-0.5)	23.3%
Larynx cancer	47 (26-77)	63 (34-102)	32.5%	1 (0-1)	1 (0-1)	2.0%
Trachea, bronchus, and lung cancers	227 (154-317)	355 (234-493)	56.5%	4(3-6)	5 (3-7)	20.5%
Breast cancer	504 (351-714)	898 (623-1268)	78.0%	10 (7-13)	13 (9-18)	37.0%
Cervical cancer	99 (59-146)	111 (64-160)	11.8%	2(1-3)	2(1-2)	−14.0%
Uterine cancer	47(25-82)	68 (30-107)	44.5%	1 (0-2)	1 (0-2)	11.2%

	All ages YLDs (thousands)			YLDs (per 100 000)		
	1990	2010	%Δ	1990	2010	%Δ
Prostate cancer	165 (109-249)	464 (298-729)	181.3%	3(2-5)	7 (4-11)	116.4%
Colon and rectum cancers	307 (223-411)	564 (408-759)	83.9%	6 (4-8)	8(6-11)	41.5%
Mouth cancer	63 (44-84)	101 (71-136)	61.6%	1 (1-2)	1 (1-2)	24.3%
Nasopharynx cancer	15 (9-23)	25 (14-39)	64.1%	<0.5 (0-0.5)	<0.5 (0-1)	26.3%
Cancer of other part of pharynx and oropharynx	29 (16-42)	45 (25-67)	53.3%	1 (0-1)	1 (0-1)	18.0%
Gallbladder and biliary tract cancer	19 (12-29)	35 (20-53)	81.2%	<0.5 (0-1)	1 (0-1)	39.5%
Pancreatic cancer	23 (15-33)	37 (23-54)	59.4%	<0.5 (0-1)	1 (0-1)	22.6%
Malignant melanoma of skin	24 (15-40)	45 (25-74)	84.5%	<0.5 (0-1)	1 (0-1)	42.0%
Non-melanoma skin cancer	115 (85-148)	255 (192-326)	122.2%	2(2-3)	4(3-5)	71.0%
Ovarian cancer	41 (27-56)	63 (39-89)	53.8%	1 (1-1)	1 (1-1)	18.3%
Testicular cancer	8(4-12)	12 (7-20)	64.2%	<0.5 (0-0.5)	<0.5 (0-0.5)	26.4%
Kidney and other urinary organ cancers	32 (21-48)	79 (52-118)	143.4%	1 (0-1)	1 (1-2)	87.3%
Bladder cancer	81 (57-110)	125 (85-171)	54.6%	2(1-2)	2(1-2)	18.9%
Brain and nervous system cancers	57 (34-84)	94 (51-134)	63.3%	1 (1-2)	1(1-2)	25.6%
Thyroid cancer	21 (13-32)	48 (28-75)	132.4%	<0.5 (0-1)	1 (0-1)	78.8%
Hodgkin's disease	13 (8-20)	17 (10-27)	25.7%	<0.5 (0-0.5)	<0.5 (0-0.5)	−3.3%
Non-Hodgkin's lymphoma	60 (42-80)	110 (77-147)	83.5%	1 (1-2)	2 (1-2)	41.2%
Multiple myeloma	22 (13-34)	36 (21-53)	64.9%	<0-5 (0-1)	1 (0-1)	26.9%
Leukaemia	79 (53-110)	123 (83-170)	57.2%	1 (1-2)	2(1-2)	20.9%
Other neoplasms	99 (67-139)	266 (174-366)	168.2%	2(1-3)	4(3-5)	106.4%
Cardiovascular and circulatory diseases	14 373 (11 094-18 134)	21 985 (16 947-27 516)	53.0%	271(209-342)	319 (246-399)	17.7%
Rheumatic heart disease	1150 (765-1709)	1430 (944-2067)	24.3%	22 (14-32)	21 (14-30)	−4.4%
Valvular disease due to rheumatic heart disease	861 (477-1429)	1009 (557-1646)	17.3%	16 (9-27)	15 (8-24)	−9.8%
Heart failure due to rheumatic heart disease	290 (191-412)	420 (278-592)	45.1%	5 (4-8)	6 (4-9)	11.6%
Ischaemic heart disease	5952 (3679-8768)	8795 (5447-12 806)	47.8%	112 (69-165)	128 (79-186)	13.7%
Myocardial infarction due to ischaemic heart disease	29 (15-45)	42 (22-67)	45.5%	1 (0-1)	1 (0-1)	11.9%
Angina due to ischaemic heart disease	5030 (2942-7567)	7234 (4232-10 986)	43.8%	95 (55-143)	105 (61-159)	10.7%
Heart failure due to ischaemic heart disease	894 (609-1236)	1518 (1038-2128)	69.9%	17 (11-23)	22 (15-31)	30.8%
Cerebrovascular disease	2328 (1864-2837)	4346 (3476-5298)	86.7%	44 (35-54)	63 (50-77)	43.6%
Ischaemic stroke	1857 (1489-2263)	3384 (2705-4121)	82.2%	35 (28-43)	49 (39-60)	40.2%
Ischaemic stroke (acute)	77 (52-107)	133 (90-183)	72.8%	1(1-2)	2 (1-3)	32.9%
Ischaemic stroke (chronic)	1780 (1416-2187)	3251 (2583-3999)	82.6%	34 (27-41)	47 (37-58)	40.5%
Haemorrhagic and other non-ischaemic stroke	471(373-585)	961 (769-1178)	104.1%	9 (7-11)	14 (11-17)	57.0%
Haemorrhagic non-ischaemic stroke (acute)	28 (18-38)	56 (37-78)	104.1%	1 (0-1)	1 (1-1)	57.1%

	All ages YLDs (thousands)			YLDs (per 100 000)		
	1990	2010	%Δ	1990	2010	%Δ
Haemorrhagic non-ischaemic stroke (chronic)	444 (345-558)	905 (717-1121)	104.1%	8 (7-11)	13 (10-16)	57.0%
Hypertensive heart disease	292 (202-412)	460 (315-639)	57.4%	6 (4-8)	7 (5-9)	21.1%
Cardiomyopathy and myocarditis	272 (183-378)	394 (269-551)	44.8%	5 (3-7)	6 (4-8)	11.4%
Acute myocarditis	1 (0-1)	1 (0-1)	30.9%	<0.5 (0-0.5)	<0.5 (0-0.5)	0.7%
Heart failure due to cardiomyopathy and myocarditis	271 (182-378)	393 (268-551)	44.8%	5 (3-7)	6 (4-8)	11.4%
Atrial fibrillation and flutter	1433 (970-1987)	2425 (1631-3382)	69.2%	27 (18-37)	35 (24-49)	30.2%
Peripheral vascular disease	256 (132-453)	419 (218-744)	63.7%	5 (2-9)	6 (3-11)	26.0%
Endocarditis	42 (28-60)	62 (42-87)	46.1%	1 (1-1)	1 (1-1)	12.4%
Endocarditis	<0.5 (0-1)	1 (0-1)	87.7%	<0.5 (0-0.5)	<0.5 (0-0.5)	44.4%
Heart failure due to endocarditis	42 (28-59)	61 (42-87)	45.8%	1 (1-1)	1 (1-1)	12.2%
Other cardiovascular and circulatory diseases	2646 (1448-4148)	3655(2053-5581)	38.1%	50 (27-78)	53 (30-81)	6.3%
Heart failure due to other circulatory diseases	183 (123-259)	268 (180-372)	46.3%	3 (2-5)	4 (3-5)	12.6%
Other cardiovascular and circulatory diseases	2463 (1271-3992)	3388 (1783-5346)	37.5%	46 (24-75)	49 (26-78)	5.8%
Chronic respiratory diseases	34 976 (24 536-47 579)	49 303 (33 874-67 087)	41.0%	660 (463-897)	716 (492-974)	8.5%
Chronic obstructive pulmonary disease	20 097 (13 793-28 248)	29 373 (19 850-41 822)	46.2%	379 (260-533)	426 (288-607)	12.5%
Chronic obstructive pulmonary disease	19 805 (13 571-27 835)	28 893 (19 455-41 183)	45.9%	374 (256-525)	419 (282-598)	12.3%
Heart failure due to chronic obstructive pulmonary disease	292 (195-410)	480 (316-678)	64.1%	6 (4-8)	7 (5-10)	26.3%
Pneumoconiosis	212 (104-477)	445 (193-1377)	109.9%	4(2-9)	6(3-20)	61.5%
Silicosis	76 (22-199)	136 (38-408)	79.8%	1 (0-4)	2 (1-6)	38.3%
Asbestosis	44 (4-253)	130(8-974)	192.4%	1(0-5)	2 (0-14)	125.0%
Coal workers' pneumoconiosis	24 (10-43)	33 (13-64)	41.1%	<0.5 (0-1)	<0.5 (0-1)	8.6%
Other pneumoconiosis	43 (12-108)	101 (26-261)	135.2%	1(0-2)	1 (0-4)	80.9%
Heart failure due to pneumoconiosis	25 (17-36)	45 (31-63)	77.1%	<0.5 (0-1)	1 (0-1)	36.3%
Asthma	10 835 (7247-15 268)	13 835 (9286-19 487)	27.7%	204 (137-288)	201 (135-283)	−1.7%
Interstitial lung disease and pulmonary sarcoidosis	111 (68-182)	162 (99-268)	45.8%	2(1-3)	2 (1-4)	12.2%
Interstitial lung disease and pulmonary sarcoidosis	69 (37-134)	99 (52-191)	44.6%	1(1-3)	1 (1-3)	11.3%
Heart failure due to interstitial lung disease and pulmonary sarcoidosis	42 (28-60)	62 (42-90)	47.9%	1 (1-1)	1 (1-1)	13.8%
Other chronic respiratory diseases	3722 (2529-5177)	5488 (3773-7675)	47.5%	70 (48-98)	80 (55-111)	13.5%
Cirrhosis of the liver	455 (309-630)	613 (415-862)	34.8%	9 (6-12)	9(6-13)	3.7%
Cirrhosis of the liver secondary to hepatitis B	156 (93-235)	198 (120-298)	26.7%	3 (2-4)	3 (2-4)	−2.5%

	All ages YLDs (thousands)			YLDs (per 100 000)		
	1990	2010	%Δ	1990	2010	%Δ
Cirrhosis of the liver secondary to hepatitis C	113 (67-170)	155(93-235)	37.5%	2 (1-3)	2(1-3)	5.8%
Cirrhosis of the liver secondary to alcohol use	109 (65-163)	160 (94-241)	46.6%	2 (1-3)	2(1-3)	12.8%
Other cirrhosis of the liver	77(46-118)	101 (61-150)	30.2%	1(1-2)	1 (1-2)	0.2%
Digestive diseases (except cirrhosis)	4467 (3265-5979)	5473 (3916-7380)	22.5%	84 (62-113)	79 (57-107)	−5.7%
Peptic ulcer disease	355 (224-570)	311 (196-485)	−12.3%	7 (4-11)	5 (3-7)	−32.5%
Peptic ulcer disease	190 (111-328)	154 (93-254)	−18.8%	4(2-6)	2 (1-4)	−37.5%
Anaemia due to peptic ulcer disease	165(89-325)	157 (87-273)	−4.8%	3(2-6)	2 (1-4)	−26.7%
Gastritis and duodenitis	820 (498-1253)	855 (525-1386)	4.2%	15 (9-24)	12 (8-20)	−19.8%
Gastritis and duodenitis	178 (120-259)	182 (121-264)	2.3%	3(2-5)	3 (2-4)	−21.3%
Anaemia due to gastritis and duodenitis	642 (368-1046)	673 (389-1174)	4.7%	12 (7-20)	10(6-17)	−19.4%
Appendicitis	154 (99-226)	176 (112-257)	14.3%	3 (2-4)	3 (2-4)	−12.0%
Paralytic ileus and intestinal obstruction without hernia	10 (4-24)	12 (6-27)	24.4%	<0.5 (0-0.5)	<0.5 (0-0.5)	−4.2%
Inguinal or femoral hernia	333 (144-689)	441 (189-861)	32.5%	6(3-13)	6(3-12)	1.9%
Non-infective inflammatory bowel disease	1582 (1130-2151)	1795 (1272-2460)	13.5%	30 (21-41)	26 (18-36)	−12.7%
Non-infective inflammatory bowel disease due to ulcerative colitis	932 (583-1492)	1169 (734-1801)	25.4%	18 (11-28)	17 (11-26)	−3.5%
Non-infective inflammatory bowel disease due to Crohn's disease	541 (356-775)	513 (334-733)	−5.2%	10 (7-15)	7 (5-11)	−27.0%
Non-infective inflammatory bowel disease severe episodes due to ulcerative colitis	54 (32-89)	64 (39-102)	18.6%	1 (1-2)	1(1-1)	−8.7%
Non-infective inflammatory bowel disease severe episodes due to Crohn's disease	54 (31-91)	50 (30-81)	−8.5%	1 (1-2)	1 (0-1)	−29.6%
Vascular disorders of intestine	6 (4-10)	14 (8-20)	121.6%	<0.5 (0-0.5)	<0.5 (0-0.5)	70.5%
Gallbladder and bile duct disease	314 (215-440)	453 (310-635)	44.6%	6 (4-8)	7 (4-9)	11.2%
Pancreatitis	133 (85-198)	206 (131-303)	54.9%	3 (2-4)	3 (2-4)	19.2%
Other digestive diseases	761 (553-1025)	1209 (852-1638)	58.9%	14 (10-19)	18 (12-24)	22.3%
Neurological disorders	29 389 (23 635-35 837)	42 943 (34 605-52 115)	46.1%	554(446-676)	623(502-756)	12.4%
Alzheimer's disease and other dementias	3785 (2720-5007)	6801 (4898-9043)	79.7%	71 (51-94)	99 (71-131)	38.3%
Parkinson's disease	356 (231-560)	606 (396-964)	70.5%	7 (4-11)	9(6-14)	31.2%
Epilepsy	6415 (4993-7799)	8740 (6762-10 594)	36.2%	121 (94-147)	127 (98-154)	4.8%
Multiple sclerosis	373 (276-473)	524 (379-660)	40.8%	7 (5-9)	8 (5-10)	8.3%
Migraine	15 927 (10 394-22 023)	22 362 (14 395-31 121)	40.4%	300 (196-415)	325(209-452)	8.0%
Tension-type headache	1266 (754-2016)	1779 (1056-2822)	40.5%	24 (14-38)	26 (15-41)	8.1%
Other neurological disorders	1267 (958-1616)	2129 (1619-2723)	68.0%	24 (18-30)	31(23-40)	29.3%

	All ages YLDs (thousands)			YLDs (per 100 000)		
	1990	2010	%Δ	1990	2010	%Δ
Other neurological disorders	1399 (1056-1789)	2353 (1785-3011)	68.2%	26 (20-34)	34 (26-44)	29.4%
Guillain-Barre syndrome due to other neurological disorders	2 (1-3)	3 (2-4)	35.6%	<0.5 (0-0.5)	<0.5 (0-0.5)	4.4%
Mental and behavioural disorders	129 377 (106 771-154 032)	176 626 (145 613-209 122)	36.5%	2440 (2014-2905)	2564 (2113-3035)	5.0%
Schizophrenia	9760 (6186-13 369)	14 400 (9160-19 752)	47.5%	184 (117-252)	209 (133-287)	13.5%
Alcohol use disorders	10 470 (7173-14 644)	13 826 (9248-19 212)	32.1%	197 (135-276)	201 (134-279)	1.6%
Alcohol dependence	10 385 (7086-14 556)	13 735 (9164-19 108)	32.3%	196 (134-275)	199 (133-277)	1.8%
Fetal alcohol syndrome	85 (49-133)	91 (55-138)	6.9%	2(1-3)	1 (1-2)	−17.7%
Drug use disorders	11 764 (8388-15 468)	16 412 (11 836-21 583)	39.5%	222 (158-292)	238 (172-313)	7.3%
Opioid use disorders	4812 (3350-6281)	7170 (5143-9257)	49.0%	91 (63-118)	104 (75-134)	14.6%
Cocaine use disorders	800 (475-1214)	1085 (633-1639)	35.7%	15 (9-23)	16 (9-24)	4.4%
Amphetamine use disorders	1894 (1067-2955)	2596 (1460-3957)	37.1%	36 (20-56)	38 (21-57)	5.5%
Cannabis use disorders	1693 (1105-2418)	2057 (1348-2929)	21.5%	32 (21-46)	30 (20-43)	−6.5%
Other drug use disorders	2565 (1583-3817)	3503 (2108-5170)	36.6%	48 (30-72)	51 (31-75)	5.1%
Unipolar depressive disorders	54 010 (40 381-68 450)	74 264 (55 670-94 240)	37.5%	1019 (762-1291)	1078 (808-1368)	5.8%
Major depressive disorder	46 139 (34 517-58 427)	63 179 (47 779-80 891)	36.9%	870 (651-1102)	917 (693-1174)	5.4%
Dysthymia	7871 (5266-10 858)	11 084 (7297-15 447)	40.8%	148 (99-205)	161 (106-224)	8.4%
Bipolar affective disorder	9129 (5757-13 169)	12 867 (8084-18 654)	40.9%	172 (109-248)	187 (117-271)	8.5%
Anxiety disorders	19 664 (13 868-26 820)	26 826 (18 779-36 795)	36.4%	371(262-506)	389 (273-534)	5.0%
Eating disorders	1120 (749-1554)	1956 (1316-2742)	74.6%	21 (14-29)	28 (19-40)	34.3%
Anorexia nervosa	95 (65-136)	188 (125-265)	97.1%	2(1-3)	3 (2-4)	51.7%
Bulimia nervosa	1025 (687-1417)	1768 (1183-2480)	72.5%	19 (13-27)	26 (17-36)	32.7%
Pervasive development disorders	5918 (4133-8130)	7666 (5355-10 565)	29.5%	112 (78-153)	111 (78-153)	−0.3%
Autism	3088 (2119-4260)	4007 (2752-5563)	29.8%	58 (40-80)	58 (40-81)	−0.2%
Asperger's syndrome	2830 (1917-4016)	3659 (2463-5150)	29.3%	53 (36-76)	53 (36-75)	−0.5%
Childhood behavioural disorders	5472 (3277-8359)	6245 (3785-9347)	14.1%	103 (62-158)	91 (55-136)	−12.2%
Attention-deficit hyperactivity disorder	424 (244-667)	491(280-775)	15.8%	8 (5-13)	7 (4-11)	−10.9%
Conduct disorder	5047 (2960-7840)	5753 (3428-8748)	14.0%	95 (56-148)	84 (50-127)	−12.3%
Idiopathic intellectual disability	1247 (746-1924)	1043 (572-1687)	−16.4%	24 (14-36)	15 (8-24)	−35.7%
Other mental and behavioural disorders	822 (485-1307)	1121 (661-1774)	36.4%	16 (9-25)	16 (10-26)	5.0%
Diabetes, urogenital, blood, and endocrine diseases	38 626 (28 236-51 159)	56 924 (42 172-75 399)	47.4%	729 (533-965)	826 (612-1094)	13.4%
Diabetes mellitus	12 412 (8403-17 524)	20 758 (14 415-28 762)	67.2%	234 (158-331)	301 (209-417)	28.7%
Uncomplicated diabetes mellitus	4260 (2420-6828)	6569 (3684-10 380)	54.2%	80 (46-129)	95 (53-151)	18.7%
Diabetic foot	209 (108-356)	308 (160-518)	47.1%	4 (2-7)	4(2-8)	13.2%

	All ages YLDs (thousands)			YLDs (per 100 000)		
	1990	2010	%Δ	1990	2010	%Δ
Diabetic neuropathy	7325 (4967-10 520)	11 914 (7977-17 035)	62.6%	138 (94-198)	173 (116-247)	25.2%
Amputation due to diabetes mellitus	392 (192-669)	905 (481-1427)	130.9%	7 (4-13)	13 (7-21)	77.6%
Vision loss due to diabetes mellitus	227 (166-307)	1062 (795-1395)	368.6%	4 (3-6)	15 (12-20)	260.6%
Acute glomerulonephritis	1 (0-2)	1 (0-2)	1.6%	<0.5 (0-0.5)	<0.5 (0-0.5)	−21.8%
Chronic kidney diseases	2558 (1900-3288)	4018 (2972-5204)	57.1%	48 (36-62)	58 (43-76)	20.9%
Chronic kidney disease due to diabetes mellitus	621 (453-796)	1003 (740-1317)	61.5%	12 (9-15)	15 (11-19)	24.2%
Stage IV chronic kidney disease due to diabetes mellitus	88 (58-126)	141 (94-205)	60.5%	2(1-2)	2(1-3)	23.5%
End-stage renal disease due to diabetes mellitus	388 (270-506)	626 (436-817)	61.5%	7 (5-10)	9(6-12)	24.2%
Anaemia due to chronic kidney disease stage III from diabetes mellitus	145 (79-237)	235 (126-378)	62.0%	3 (1-4)	3(2-5)	24.7%
Chronic kidney disease due to hypertension	550 (411-711)	872 (645-1123)	58.4%	10 (8-13)	13 (9-16)	21.9%
Stage IV chronic kidney disease due to hypertension	88 (59-128)	138 (93-198)	56.7%	2(1-2)	2(1-3)	20.6%
End-stage renal disease due to hypertension	326 (225-422)	515(359-670)	58.0%	6 (4-8)	7(5-10)	21.6%
Anaemia due to chronic kidney disease stage III from hypertension	136 (77-222)	219 (124-354)	60.6%	3 (1-4)	3(2-5)	23.6%
Chronic kidney disease unspecified	1386 (1032-1800)	2143(1585-2779)	54.6%	26 (19-34)	31(23-40)	19.0%
Stage IV unspecified or other chronic kidney disease	229 (154-335)	352 (233-506)	53.9%	4(3-6)	5 (3-7)	18.4%
End-stage renal disease from unspecified or other chronic kidney disease	799 (555-1042)	1242 (872-1607)	55.5%	15 (10-20)	18 (13-23)	19.6%
Anaemia due to unspecified or other chronic kidney disease stage III	359 (208-579)	549 (314-889)	53.1%	7 (4-11)	8(5-13)	17.8%
Urinary diseases and male infertility	4651 (3057-7025)	8188 (5398-11 978)	76.0%	88 (58-133)	119 (78-174)	35.5%
Tubulointerstitial nephritis, pyelonephritis, and urinary tract infections	156 (84-269)	207 (109-360)	33.2%	3 (2-5)	3(2-5)	2.5%
Urolithiasis	480 (306-842)	716 (447-1425)	49.1%	9 (6-16)	10 (6-21)	14.7%
Urolithiasis episodes	204 (107-526)	225 (104-918)	10.5%	4 (2-10)	3(2-13)	−15.0%
Chronic urolithiasis	277 (156-443)	491(276-785)	77.5%	5 (3-8)	7 (4-11)	36.6%
Benign prostatic hyperplasia	3726 (2392-5645)	6834 (4377-10 179)	83.4%	70 (45-106)	99 (64-148)	41.1%
Male infertility	126 (50-270)	173 (70-365)	36.9%	2 (1-5)	3(1-5)	5.3%
Other urinary diseases	162 (103-267)	258 (167-415)	58.8%	3 (2-5)	4(2-6)	22.2%
Gynaecological diseases	7671(4880-11715)	10 042(6226-15619)	30.9%	145 (92-221)	146 (90-227)	0.7%
Uterine fibroids	2341 (1568-3340)	3037 (1967-4551)	29.7%	44 (30-63)	44 (29-66)	−0.2%

	All ages YLDs (thousands)			YLDs (per 100 000)		
	1990	2010	%Δ	1990	2010	%Δ
Uterine fibroids	934 (401-1852)	1527(664-3059)	63.5%	18 (8-35)	22 (10-44)	25.8%
Anaemia due to uterine fibroids	1407 (943-2023)	1509 (1000-2199)	7.3%	27 (18-38)	22 (15-32)	−17.4%
Polycystic ovarian syndrome	2027 (971-3786)	2756 (1312-5212)	35.9%	38 (18-71)	40 (19-76)	4.6%
Polycystic ovarian syndrome	1982 (931-3747)	2694 (1245-5171)	35.9%	37 (18-71)	39 (18-75)	4.6%
Infertility due to polycystic ovarian syndrome	45 (18-95)	62 (25-128)	37.5%	1(0-2)	1 (0-2)	5.8%
Female infertility	91 (36-189)	125 (50-259)	37.6%	2 (1-4)	2 (1-4)	5.9%
Endometriosis	404 (142-738)	544 (188-1007)	34.6%	8 (3-14)	8(3-15)	3.5%
Endometriosis	388 (129-715)	522 (166-974)	34.4%	7 (2-13)	8(2-14)	3.4%
Infertility due to endometriosis	16(6-35)	22 (9-46)	37.8%	<0.5 (0-1)	<0.5 (0-1)	6.0%
Genital prolapse	1339 (544-2686)	1811 (741-3649)	35.2%	25 (10-51)	26 (11-53)	4.1%
Premenstrual syndrome	983 (49-2592)	1249 (63-3337)	27.0%	19 (1-49)	18 (1-48)	−2.3%
Other gynaecological diseases	485 (330-703)	520 (345-759)	7.3%	9(6-13)	8 (5-11)	−17.4%
Haemoglobinopathies and haemolytic anaemias	8271 (5746-11276)	10 197 (7166-13 843)	23.3%	156 (108-213)	148 (104-201)	−5.1%
Thalassaemias	3725 (2499-5279)	4636 (3098-6621)	24.4%	70 (47-100)	67(45-96)	−4.2%
β-thalassaemia major	31 (17-56)	33 (19-59)	7.9%	1 (0-1)	<0.5 (0-1)	−16.9%
Haemoglobin E/β-thalassaemia	22 (14-34)	24 (15-37)	8.8%	<0.5 (0-1)	<0.5 (0-1)	−16.3%
Haemoglobin H/β-thalassaemia	10 (6-16)	10 (6-16)	3.7%	<0.5 (0-0.5)	<0.5 (0-0.5)	−20.2%
Anaemia due to thalassaemias	3653 (2427-5219)	4557(3024-6530)	24.7%	69 (46-98)	66 (44-95)	−4.0%
Heart failure due to thalassaemias	10 (6-14)	13 (8-19)	34.1%	<0.5 (0-0.5)	<0.5 (0-0.5)	3.2%
Sickle cell disorders	2647 (1829-3615)	3665 (2612-4949)	38.5%	50 (34-68)	53 (38-72)	6.5%
Homozygous sickle cell and severe sickle cell/β-thalassaemia	334 (238-441)	546 (389-736)	63.8%	6 (4-8)	8(6-11)	26.1%
Haemoglobin sickle cell disorders	78 (54-107)	130 (88-182)	65.5%	1 (1-2)	2(1-3)	27.3%
Mild sickle cell/β-thalassaemia	26 (18-37)	38 (27-53)	43.8%	<0.5 (0-1)	1 (0-1)	10.6%
Anaemia due to sickle cell disorders	2211 (1439-3181)	2954 (1957-4240)	33.6%	42 (27-60)	43 (28-62)	2.8%
G6PD deficiency	120 (81-174)	146 (97-210)	22.1%	2(2-3)	2(1-3)	−6.1%
Anaemia due to G6PD deficiency	116 (77-171)	141(93-205)	21.5%	2(1-3)	2(1-3)	−6.5%
Heart failure due to G6PD deficiency	4 (2-6)	5(3-8)	40.2%	<0.5 (0-0.5)	<0.5 (0-0.5)	7.8%
Other haemoglobinopathies and haemolytic anaemias	1779 (1193-2565)	1750 (1171-2503)	−1.6%	34 (23-48)	25 (17-36)	−24.3%
Anaemia due to other haemoglobinopathies and haemolytic anaemias	1757 (1173-2545)	1720 (1138-2483)	−2.1%	33 (22-48)	25 (17-36)	−24.7%
Heart failure due to other haemoglobinopathies and haemolytic anaemias	22 (14-32)	31(20-45)	39.5%	<0.5 (0-1)	<0.5 (0-1)	7.4%
Other endocrine, nutritional, blood, and immune disorders	3063 (2256-4177)	3721 (2713-5114)	21.5%	58 (43-79)	54 (39-74)	−6.5%

	All ages YLDs (thousands)			YLDs (per 100 000)		
	1990	2010	%Δ	1990	2010	%Δ
Other endocrine, nutritional, blood, and immune disorders	1254 (739-1952)	1919 (1133-2991)	53.0%	24 (14-37)	28 (16-43)	17.7%
Anaemia due to other endocrine, nutritional, blood, and immune disorders	1777 (1187-2562)	1756 (1166-2542)	−1.2%	34 (22-48)	25 (17-37)	−23.9%
Heart failure due to other endocrine, nutritional, blood, and immune disorders	33 (22-47)	48 (33-69)	46.1%	1 (0-1)	1 (0-1)	12.4%
Musculoskeletal disorders	114 719 (87 053-145 247)	165 955 (126 364-208 779)	44.7%	2164 (1642-2740)	2409 (1834-3030)	11.3%
Rheumatoid arthritis	2566 (1831-3381)	3776 (2672-4954)	47.1%	48 (35-64)	55(39-72)	13.2%
Osteoarthritis	10 449 (7100-14 788)	17 135 (11 884-24 256)	64.0%	197 (134-279)	249 (172-352)	26.2%
Osteoarthritis of the hip	1821 (1200-2616)	2917 (1945-4389)	60.2%	34 (23-49)	42 (28-64)	23.2%
Osteoarthritis of the knee	8627 (5929-12 276)	14 218 (9809-19 968)	64.8%	163 (112-232)	206 (142-290)	26.8%
Low back and neck pain	82 111 (56 962-110 433)	116 704 (80 615-156 527)	42.1%	1549 (1074-2083)	1694 (1170-2272)	9.4%
Low back pain	58 245 (39 934-78 139)	83 063 (56 632-111 880)	42.6%	1099 (753-1474)	1206 (822-1624)	9.7%
Neck pain	23 866 (16 535-33 105)	33 640 (23 469-46 476)	41.0%	450 (312-624)	488 (341-675)	8.5%
Gout	76 (48-112)	114 (72-167)	49.3%	1 (1-2)	2(1-2)	14.9%
Other musculoskeletal disorders	19 517 (16 148-22 127)	28 226 (23 201-31 884)	44.6%	368 (305-417)	410 (337-463)	11.3%
Other non-communicable diseases	66 478 (45 586-97 937)	86 771 (59 561-128 605)	30.5%	1254 (860-1847)	1259 (864-1867)	0.4%
Congenital anomalies	2620(2088-3333)	3279 (2594-4167)	25.2%	49 (39-63)	48 (38-60)	−3.7%
Neural tube defects	569 (330-901)	754 (439-1142)	32.6%	11 (6-17)	11 (6-17)	2.0%
Congenital heart anomalies	498 (350-711)	563 (388-804)	13.0%	9 (7-13)	8(6-12)	−13.0%
Congenital heart anomalies	189 (86-354)	226 (103-425)	19.1%	4 (2-7)	3 (1-6)	−8.3%
Heart failure due to congenital heart anomalies	308 (203-442)	337 (221-486)	9.3%	6 (4-8)	5 (3-7)	−15.9%
Ccenter lip and ccenter palate	259 (180-362)	254 (181-346)	−1.7%	5 (3-7)	4(3-5)	−24.4%
Down's syndrome	462 (306-664)	627 (425-888)	35.7%	9(6-13)	9(6-13)	4.4%
Other chromosomal abnormalities	191 (127-274)	276 (182-392)	44.1%	4(2-5)	4(3-6)	10.8%
Turner syndrome	3 (1-6)	4(2-8)	35.6%	<0.5 (0-0.5)	<0.5 (0-0.5)	4.3%
Klinefelter syndrome	5 (2-10)	6 (3-14)	38.7%	<0.5 (0-0.5)	<0.5 (0-0.5)	6.8%
Chromosomal unbalanced rearrangements	184 (123-261)	265 (176-377)	44.3%	3(2-5)	4 (3-5)	11.1%
Other congenital anomalies	642 (464-868)	806 (596-1053)	25.6%	12 (9-16)	12 (9-15)	−3.3%
Other congenital anomalies	437 (325-580)	595 (446-775)	36.4%	8 (6-11)	9 (6-11)	4.9%
Hearing loss due to other congenital anomalies	225 (142-336)	240 (152-363)	6.6%	4 (3-6)	3 (2-5)	−17.9%
Skin and subcutaneous diseases	26 273 (16 798-40 932)	33 744 (21 503-52 280)	28.4%	496 (317-772)	490 (312-759)	−1.2%
Eczema	6890 (3508-10 872)	8897 (4518-14 049)	29.1%	130 (66-205)	129 (66-204)	−0.6%
Psoriasis	742 (371-1179)	1059 (528-1690)	42.8%	14 (7-22)	15 (8-25)	9.8%

	All ages YLDs (thousands)			YLDs (per 100 000)		
	1990	2010	%Δ	1990	2010	%Δ
Cellulitis	302 (126-648)	376 (163-831)	24.5%	6 (2-12)	5(2-12)	−4.2%
Abscess, impetigo, and other bacterial skin diseases	1038 (473-2016)	1322 (599-2511)	27.4%	20(9-38)	19 (9-36)	−1.9%
Impetigo	871 (417-1624)	1088 (514-2048)	24.9%	16 (8-31)	16 (7-30)	−3.9%
Abscess and other bacterial skin diseases cases	167 (54-386)	235 (78-539)	40.8%	3 (1-7)	3(1-8)	8.3%
Scabies	1881 (956-3384)	1580 (807-2792)	−16.0%	35 (18-64)	23 (12-41)	−35.4%
Fungal skin diseases	1618 (532-3754)	2303 (740-5435)	42.3%	31 (10-71)	33 (11-79)	9.5%
Viral skin diseases	2354(1058-4369)	2731(1203-4941)	16.0%	44 (20-82)	40 (17-72)	−10.7%
Molluscum contagiosum	289 (88-702)	270(85-645)	−6.6%	5(2-13)	4 (1-9)	−28.1%
Viral warts	2065 (816-3960)	2461 (984-4720)	19.2%	39 (15-75)	36 (14-69)	−8.3%
Acne vulgaris	3281 (1545-6205)	4002 (1869-7575)	22.0%	62 (29-117)	58 (27-110)	−6.2%
Alopecia areata	1002 (313-1906)	1352 (424-2567)	35.0%	19 (6-36)	20 (6-37)	3.9%
Pruritus	1433 (682-2676)	2086 (1004-3951)	45.6%	27 (13-50)	30 (15-57)	12.1%
Urticaria	1968 (757-3431)	2600 (980-4441)	32.1%	37 (14-65)	38 (14-64)	1.6%
Decubitus ulcer	320 (165-524)	476 (237-779)	48.8%	6 (3-10)	7 (3-11)	14.5%
Other skin and subcutaneous diseases	3445 (1638-6437)	4961 (2324-9239)	44.0%	65 (31-121)	72 (34-134)	10.8%
Sense organ diseases	25 169 (18 140-35 220)	34 733 (25 167-47 663)	38.0%	475 (342-664)	504 (365-692)	6.2%
Glaucoma	443 (338-561)	943 (725-1178)	112.7%	8(6-11)	14 (11-17)	63.7%
Cataracts	4225 (3283-5364)	4732 (3647-6010)	12.0%	80 (62-101)	69 (53-87)	−13.8%
Macular degeneration	513 (388-647)	1329 (1026-1668)	158.9%	10 (7-12)	19 (15-24)	99.2%
Refraction and accommodation disorders	3608 (2688-4762)	5593 (4117-7468)	55.0%	68 (51-90)	81 (60-108)	19.3%
Other hearing loss	12 211 (7258-19 495)	15 761 (9455-25 210)	29.1%	230 (137-368)	229 (137-366)	−0.7%
Other vision loss	4069 (2171-7180)	6240(3260-11208)	53.4%	77 (41-135)	91(47-163)	18.0%
Other sense organ diseases	100 (34-231)	136 (46-309)	35.4%	2 (1-4)	2 (1-4)	4.2%
Oral disorders	12 417 (6824-20 984)	15 015 (7795-26 482)	20.9%	234 (129-396)	218 (113-384)	−7.0%
Dental caries	3704 (1523-7150)	4984(2086-9356)	34.5%	70 (29-135)	72 (30-136)	3.5%
Dental caries of baby teeth	403 (164-774)	425 (172-818)	5.7%	8 (3-15)	6(3-12)	−18.7%
Dental caries of permanent teeth	3302 (1347-6455)	4559 (1907-8554)	38.1%	62 (25-122)	66 (28-124)	6.2%
Periodontal disease	3440 (1310-7305)	5410 (2051-11 286)	57.3%	65 (25-138)	79 (30-164)	21.0%
Edentulism	5273 (3100-8127)	4621 (2678-7296)	−12.4%	99 (58-153)	67 (39-106)	−32.6%
Injuries	34 068 (24 209-47 034)	47162 (32 958-66 050)	38.4%	643 (457-887)	685 (478-959)	6.5%
Transport injuries	12062 (8524-16826)	16 268 (11 304-22 717)	34.9%	228 (161-317)	236 (164-330)	3.8%
Road injury	10 363 (7315-14 487)	13 485 (9362-18 950)	30.1%	195 (138-273)	196 (136-275)	0.1%
Pedestrian injury by road vehicle	3106 (2183-4360)	4520 (3139-6367)	45.6%	59 (41-82)	66(46-92)	12.0%
Pedal cycle vehicle	755 (536-1056)	1025 (714-1436)	35.7%	14 (10-20)	15 (10-21)	4.4%

	All ages YLDs (thousands)			YLDs (per 100 000)		
	1990	2010	%Δ	1990	2010	%Δ
Motorised vehicle with two wheels	1750 (1234-2435)	2224 (1529-3133)	27.1%	33 (23-46)	32 (22-45)	−2.2%
Motorised vehicle with three or more wheels	4138 (2901-5793)	5792 (4041-8114)	40.0%	78 (55-109)	84 (59-118)	7.7%
Road injury other	1440 (1 013-2 020)	1196 (824-1673)	−16.9%	27 (19-38)	17 (12-24)	−36.1%
Other transport injury	1699 (1184-2386)	2783 (1902-3872)	63.8%	32(22-45)	40(28-56)	26.0%
Unintentional injuries other than transport injuries	19 036 (13 233-26 794)	26 620 (18 472-37 641)	39.8%	359 (250-505)	386 (268-546)	7.6%
Falls	13 324 (9110-18 725)	19 459 (13 559-27 481)	46.0%	251(172-353)	282 (197-399)	12.4%
Drowning	233 (161-326)	281 (191-391)	20.9%	4 (3-6)	4(3-6)	−7.0%
Fire, heat, and hot substances	1010 (637-1575)	1398 (857-2232)	38.4%	19 (12-30)	20 (12-32)	6.5%
Poisonings	323(210-470)	417(276-621)	29.3%	6 (4-9)	6(4-9)	−0.5%
Exposure to mechanical forces	922 (599-1387)	1021 (662-1490)	10.8%	17 (11-26)	15 (10-22)	−14.7%
Mechanical forces (firearm)	526 (346-784)	467 (305-676)	−11.2%	10 (7-15)	7(4-10)	−31.7%
Mechanical forces (other)	710 (460-1074)	910 (588-1336)	28.2%	13 (9-20)	13(9-19)	−1.3%
Adverse effects of medical treatment	585 (401-824)	1088 (727-1537)	85.9%	11 (8-16)	16 (11-22)	43.1%
Animal contact	437 (293-634)	234 (154-329)	−46.4%	8 (6-12)	3(2-5)	−58.7%
Animal contact (venomous)	355 (233-526)	168 (110-242)	−52.5%	7 (4-10)	2 (2-4)	−63.4%
Animal contact (non-venomous)	82 (55-119)	66 (44-93)	−20.0%	2(1-2)	1 (1-1)	−38.4%
Unintentional injuries not classified elsewhere	2202 (1484-3108)	2720 (1866-3827)	23.5%	42 (28-59)	39 (27-56)	−4.9%
Self-harm and interpersonal violence	1571(1066-2188)	1985 (1366-2726)	26.4%	30 (20-41)	29 (20-40)	−2.8%
Self-harm	308 (209-428)	407 (278-577)	32.3%	6 (4-8)	6 (4-8)	1.8%
Interpersonal violence	1263 (840-1775)	1578 (1085-2180)	24.9%	24 (16-33)	23(16-32)	−3.9%
Assault by firearm	504 (336-714)	587(404-808)	16.5%	10 (6-13)	9(6-12)	−10.4%
Assault by sharp object	368 (245-516)	540 (369-743)	46.8%	7(5-10)	8 (5-11)	12.9%
Assault by other means	543(362-758)	678 (464-940)	25.0%	10 (7-14)	10 (7-14)	−3.9%
Forces of nature, war, and legal intervention	1399 (903-2080)	2289 (1550-3341)	63.6%	26 (17-39)	33 (22-48)	25.9%
Exposure to forces of nature	173 (110-269)	2187 (1480-3210)	1164.7%	3(2-5)	32 (21-47)	873.1%
Collective violence and legal intervention	1226 (779-1854)	102 (66-153)	−91.7%	23 (15-35)	1 (1-2)	−93.6%

Data are YLDs (95% uncertainty interval) or percentage change (%A). G6PD=glucose-6-phosphate dehydrogenase deficiency. *Ecoli=Escherichia coli. H influenzae=Haemophilus influenzae.* S *pneumoniae=Streptococcus pneumoniae.*

Table 3:

Decomposition analysis of the change of global years lived with disability (thousands) by level 1 causes from 1990 to 2010 into total population growth, population ageing, and changes in age-specifi c, sex-specifi c, and cause-specifi c years lived with disability rates

	All causes	Communicable, maternal, neonatal, and nutritional disorders	Non-communicable diseases	Injuries
1990 YLDs (thousands)	583393	113925	435400	34068
YLDs expected with 2010 population, 1990 population age structure, and 1990 YLD rates (thousands)	759024	158213	557726	43084
YLDs expected with 2010 population, 2010 population age structure, and 1990 YLD rates (thousands)	822452	150982	621220	50250
2010 YLDs (thousands)	777401	119164	611076	47162
Percentage change from 1990 due to population growth	30.1%	38.9%	28.1%	26.5%
Percentage change from 1990 due to population ageing	10.9%	−6.3%	14.6%	21.0%
Percentage change from 1990 due to change in YLD rates	−7.7%	−27.9%	−2.3%	−9.1%
Percentage change from 1990 to 2010	33.3%	4.6%	40.3%	38.4%

YLD=years lived with disability.