

# Global, regional, and national incidence, prevalence, and years lived with disability for 354 diseases and injuries for 195 countries and territories, 1990–2017: a systematic analysis for the Global Burden of Disease Study 2017



GBD 2017 Disease and Injury Incidence and Prevalence Collaborators\*



## Summary

**Background** The Global Burden of Diseases, Injuries, and Risk Factors Study 2017 (GBD 2017) includes a comprehensive assessment of incidence, prevalence, and years lived with disability (YLDs) for 354 causes in 195 countries and territories from 1990 to 2017. Previous GBD studies have shown how the decline of mortality rates from 1990 to 2016 has led to an increase in life expectancy, an ageing global population, and an expansion of the non-fatal burden of disease and injury. These studies have also shown how a substantial portion of the world's population experiences non-fatal health loss with considerable heterogeneity among different causes, locations, ages, and sexes. Ongoing objectives of the GBD study include increasing the level of estimation detail, improving analytical strategies, and increasing the amount of high-quality data.

**Methods** We estimated incidence and prevalence for 354 diseases and injuries and 3484 sequelae. We used an updated and extensive body of literature studies, survey data, surveillance data, inpatient admission records, outpatient visit records, and health insurance claims, and additionally used results from cause of death models to inform estimates using a total of 68 781 data sources. Newly available clinical data from India, Iran, Japan, Jordan, Nepal, China, Brazil, Norway, and Italy were incorporated, as well as updated claims data from the USA and new claims data from Taiwan (province of China) and Singapore. We used DisMod-MR 2.1, a Bayesian meta-regression tool, as the main method of estimation, ensuring consistency between rates of incidence, prevalence, remission, and cause of death for each condition. YLDs were estimated as the product of a prevalence estimate and a disability weight for health states of each mutually exclusive sequela, adjusted for comorbidity. We updated the Socio-demographic Index (SDI), a summary development indicator of income per capita, years of schooling, and total fertility rate. Additionally, we calculated differences between male and female YLDs to identify divergent trends across sexes. GBD 2017 complies with the Guidelines for Accurate and Transparent Health Estimates Reporting.

**Findings** Globally, for females, the causes with the greatest age-standardised prevalence were oral disorders, headache disorders, and haemoglobinopathies and haemolytic anaemias in both 1990 and 2017. For males, the causes with the greatest age-standardised prevalence were oral disorders, headache disorders, and tuberculosis including latent tuberculosis infection in both 1990 and 2017. In terms of YLDs, low back pain, headache disorders, and dietary iron deficiency were the leading Level 3 causes of YLD counts in 1990, whereas low back pain, headache disorders, and depressive disorders were the leading causes in 2017 for both sexes combined. All-cause age-standardised YLD rates decreased by 3.9% (95% uncertainty interval [UI] 3.1–4.6) from 1990 to 2017; however, the all-age YLD rate increased by 7.2% (6.0–8.4) while the total sum of global YLDs increased from 562 million (421–723) to 853 million (642–1100). The increases for males and females were similar, with increases in all-age YLD rates of 7.9% (6.6–9.2) for males and 6.5% (5.4–7.7) for females. We found significant differences between males and females in terms of age-standardised prevalence estimates for multiple causes. The causes with the greatest relative differences between sexes in 2017 included substance use disorders (3018 cases [95% UI 2782–3252] per 100 000 in males vs 1400 [1279–1524] per 100 000 in females), transport injuries (3322 [3082–3583] vs 2336 [2154–2535]), and self-harm and interpersonal violence (3265 [2943–3630] vs 5643 [5057–6302]).

**Interpretation** Global all-cause age-standardised YLD rates have improved only slightly over a period spanning nearly three decades. However, the magnitude of the non-fatal disease burden has expanded globally, with increasing numbers of people who have a wide spectrum of conditions. A subset of conditions has remained globally pervasive since 1990, whereas other conditions have displayed more dynamic trends, with different ages, sexes, and geographies across the globe experiencing varying burdens and trends of health loss. This study emphasises how global improvements in premature mortality for select conditions have led to older populations with complex and potentially expensive diseases, yet also highlights global achievements in certain domains of disease and injury.

**Funding** Bill & Melinda Gates Foundation.

*Lancet* 2018; 392: 1789–858

\*Collaborators listed at the end of the paper

Correspondence to:  
Prof Christopher J L Murray,  
Institute for Health Metrics  
Evaluation, University of  
Washington, Seattle,  
WA 98121, USA  
cjl@uw.edu

Copyright © 2018 The Author(s). Published by Elsevier Ltd. This is an Open Access article under the CC BY 4.0 license.

## Introduction

Measuring non-fatal health loss is one of the most complex endeavours in population health research. The evolution of modern health-care systems has led to an increasing number of diseases and injuries being diagnosed and treated in individual patients, and developments such as antihypertensive and statin medications, percutaneous coronary intervention, and antiretroviral therapies have led to averted deaths and longer lives. In parallel with the increasing complexity of clinical medicine in the past century, measuring non-fatal health loss has necessitated continuous refinement as diagnostic classification systems expand, new diseases emerge, and metrics of disability improve. Across the global landscape, increased non-fatal health loss paradoxically reflects both success in terms of diminishing

rates of premature death but also failure in terms of maintaining health care for diseased and injured individuals. It is increasingly evident that differential access to care, economic inequality, and imbalanced risk factor profiles can and do challenge the ability of health systems to achieve equitable health outcomes in the face of complex and resource-draining diseases and injuries. Addressing such lapses in health equity can pose a burden to under-resourced health care systems and economies.

Global progress in improving the burden of non-fatal health outcomes has been limited, in part by a predominant focus on mortality rates as a common metric of tracking global health progress.<sup>1-3</sup> In the latter part of the 20th century, the global community focused on communicable diseases such as tuberculosis, HIV,

### Research in context

#### Evidence before this study

The Global Burden of Diseases, Injuries, and Risk Factors (GBD) study is a comprehensive study of health loss designed to capture complex patterns of disease and injury burden; for non-fatal health outcomes, these are measured in terms of incidence, prevalence, and years lived with disability (YLDs). Previous versions of the study have increased the estimation detail for conditions, locations, ages, and years. This study is a reassessment of the incidence, prevalence, and YLDs of diseases and injuries from 1990 to 2017 and updates results from previous GBD studies. There are no alternative measurements of non-fatal health loss that include the level of detail provided in the GBD study.

#### Added value of this study

This study adds new knowledge on non-fatal burden globally and improves upon previous iterations of the GBD study in the following ways. We expanded our database of non-fatal health outcomes by adding 2842 collaborator-provided data sources and incorporating new clinical data representing an additional 149 million admissions and 3.7 billion outpatient visits for use in GBD modelling. This resulted in a total of 68 781 sources being used in the estimation process for GBD 2017. We improved estimation methods including updating the calculation of the Socio-demographic Index (SDI), adding the ability to report the statistical differences in non-fatal health outcomes for males and females, using internally consistent GBD estimates of population and fertility, and adopting several cause-specific modelling improvements. Cause-specific improvements included the following; for diarrhoea, we added additional literature informing aetiological attribution; for HIV/AIDS, we updated absolute neutrophil count bias adjustments, antiretroviral therapy coverage data, and sex-specific survey estimates. For hepatitis, we added case fatality rates and hepatitis B vaccine coverage to viral hepatitis incidence models. For maternal, neonatal, and child health causes, we added in-facility delivery

rates to the inpatient admission per-capita estimates to more accurately measure the denominator for incident cases and expanded the age range affected by protein-energy malnutrition. For cancer, we applied mortality-incidence ratios directly to cause-specific mortality rates to estimate incidence, and then calculated prevalence on the basis of incidence and survival estimates. For mental and substance abuse disorders, we adopted new covariates for opioid use and updated autism spectrum disorder designations to be consistent with the most recent Diagnostic and Statistical Manual of Mental Disorders. We also added 19 new causes to our cause hierarchy, including type 1 and type 2 diabetes, chronic kidney disease due to type 1 diabetes, and chronic kidney disease due to type 2 diabetes; cirrhosis due to non-alcoholic steatohepatitis (NASH); liver cancer due to NASH; invasive non-typhoidal salmonella; myelodysplastic, myeloproliferative, and other haemopoietic neoplasms; subarachnoid haemorrhage; non-rheumatic valvular heart disease including calcific aortic and degenerative mitral subtypes; aggregates of vision disorders and hearing loss; poisoning by carbon monoxide; poisoning by other means; and estimates for natures of injury (eg, fractures).

#### Implications of all the available evidence

Global non-fatal burden is continuing to increase despite minor improvements in age-standardised rates. Three causes (low back pain, headache disorders, and depressive disorders) have prevailed as leading causes of non-fatal health loss for nearly three decades, while diabetes has emerged as the fourth leading cause of disability globally. The increase in YLDs reflects an ageing global population commensurate with declines in premature mortality across the development spectrum. Globally, patterns of non-fatal health loss vary dynamically by sex, age, location, SDI, and cause. The increasing burden of non-fatal diseases, injuries, and impairments could pose considerable challenges to health systems and economies not equipped to care for complex and expensive conditions.

malaria, and other conditions that cause premature mortality. In the past decade, it has become evident that measuring non-fatal health loss is important for tracking progress as the disease burden, in terms of disability-adjusted life-years (DALYs), evolves toward being dominated by years lived with disability (YLDs). Transitions in ageing populations and reduced mortality in many areas of the world have created dynamic temporal patterns, particularly within the past decade, and measuring such time patterns is important because advances such as developing a cure for hepatitis C, discovering new therapies for cancer, and improving treatments for HIV can rapidly transform the burden in populations with access to these developments, and as conditions such as diabetes and non-alcoholic fatty liver disease become increasingly prevalent in lower-income countries.<sup>4</sup>

Estimates reported in recent iterations of the Global Burden of Diseases, Injuries, and Risk Factors Study (GBD) have also illustrated differential health outcomes in males and females in certain locations and conditions. This topic has received attention in terms of mortality rates for sex-specific conditions such as maternal causes,<sup>5–9</sup> gynaecological and breast malignancies,<sup>10–13</sup> and long-term complications of obstructed labour, such as obstetric fistula.<sup>14–18</sup> GBD 2016 also highlighted how global, age-standardised, all-cause YLD rates are approximately 10% higher in females than males, emphasising how there may be sex-specific characteristics of the non-fatal burden that have not been explored in detail, particularly with respect to the differences in sex-specific health outcomes.<sup>2</sup> It is increasingly of interest to measure differences in male and female non-fatal health loss.

This year's GBD study represents the continued effort of quantifying non-fatal health outcomes in terms of incidence, prevalence, and YLDs for a list of 354 GBD causes for the years 1990–2017. Because the study is remeasured and published on an annual basis, new estimates are provided not only for new estimation years but also for all previous estimation years and supersede any previous results. This year's study on non-fatal burden incorporates improvements in study design, estimation strategy, and data availability, and focuses on areas of non-fatal burden that are emerging as topical issues in measuring and improving health outcomes. We also explore the patterns of non-fatal health loss over time and estimate the statistical differences in non-fatal health loss for males and females.

## Methods

### Overview

The GBD study provides a standardised approach for estimating incidence, prevalence, and YLDs by cause, age, sex, year, and location. The study aims to use all accessible information on disease occurrence, natural history, and severity that passes a set of inclusion criteria. Our objective is to maximise the comparability of data,

despite different collection methods or case definitions; to find a consistent set of estimates between data on prevalence, incidence, and causes of death; and to predict estimates for locations and causes with sparse or absent data by borrowing information from other locations and covariates.

The study conducts annual updates to incorporate new causes and data (including published literature, surveillance data, survey data, hospital and clinical data, and other types of data) and to improve demographic and statistical methods. In this study, we apply different methods to utilise available data and to measure specific epidemiological patterns of each cause of non-fatal burden. Our standard approach uses the Bayesian meta-regression tool DisMod-MR 2.1. Subsequently, we use data for severity and the occurrence of particular consequences of diseases, or sequelae, to establish the proportion of prevalent cases experiencing each sequela. There are several classes of alternative approaches for estimating non-fatal health outcomes, including for injuries, cancers, HIV/AIDS, other infectious diseases, and neonatal disorders. Presented below is a high-level description of our study methods; the supplementary methods (appendix 1 section 4) provide further detail on inputs, analytical processes, and outputs and methods specific to each cause in GBD 2017.

Analyses were completed using Python version 2.7, Stata version 13.1, or R version 3.3. Statistical code used for GBD estimation is publicly available online. All rates are expressed as age-standardised based on the GBD reference population<sup>19</sup> unless otherwise specified. This study complies with the Guidelines for Accurate and Transparent Health Estimates Reporting (GATHER)<sup>20</sup> recommendations (appendix 1).

### Geographical units, time periods, and demographics

GBD 2017 is based on a geographical hierarchy that includes 195 countries and territories grouped into 21 regions and seven GBD super-regions (appendix 1). Each year, GBD includes subnational analyses for a few new countries and continues to provide subnational estimates for countries that were added in previous cycles. Subnational estimation in GBD 2017 includes five new countries (Ethiopia, Iran, New Zealand, Norway, Russia) and countries previously estimated at subnational levels (GBD 2013: China, Mexico, and the UK [regional level]; GBD 2015: Brazil, India, Japan, Kenya, South Africa, Sweden, and the USA; GBD 2016: Indonesia and the UK [local government authority level]). All analyses are at the first level of administrative organisation within each country except for New Zealand (by Māori ethnicity), Sweden (by Stockholm and non-Stockholm), and the UK (by local government authorities). All subnational estimates for these countries were incorporated into model development and evaluation as part of GBD 2017. To meet data use requirements, in this publication we present all subnational estimates excluding those pending

See Online for appendix 1

For the statistical code see <https://github.com/ihmeuw/ihme-modeling>

See Online for appendix 2

For the Global Health Data Exchange see <http://ghdx.healthdata.org>

publication (Brazil, India, Japan, Kenya, Mexico, Sweden, the UK, and the USA); given space constraints these results are presented in appendix tables and figures instead of in the main text (appendix 2). Subnational estimates for countries with populations larger than 200 million people (measured using our most recent year of published estimates) that have not yet been published elsewhere are presented wherever estimates are illustrated with maps but are not included in data tables. Cause-specific results for non-fatal estimates for GBD 2017 cover the years 1990–2017. A subset of areas in this analysis focuses on 1990, 2007, and 2017 to show changes over time to better inform policy assessments.

GBD 2017 is the first time that estimation of fertility and population has been done within the GBD framework. Previously, the GBD study used external sources<sup>21,22</sup> for fertility and population estimates, which affect estimates throughout the GBD study, particularly estimates expressed in terms of population rates. The purpose of using internally derived demographic estimates is to ensure internal consistency across all GBD estimates. That is, mortality rates and fertility rates have to match population rate change such that there should be no births, deaths, or migrations that are not accounted for in our population estimates.

#### GBD cause list

In GBD 2017, we further refined the existing cause list, and added 19 new causes, increasing the number of estimated causes in GBD to 359 with 282 causes of death estimated and 354 causes of non-fatal health loss estimated. In the GBD study, causes and their sequelae are organised into hierarchical levels. Level 1 contains three broad cause groups: communicable, maternal, neonatal, and nutritional diseases (CMNN); non-communicable diseases (NCDs); and injuries. For non-fatal health estimates, there are 22 Level 2 causes, 167 Level 3 causes, and 288 Level 4 causes. We also report estimates for 3484 sequelae, nine impairments, and seven nature of injury aggregates.

#### New for GBD 2017

In GBD 2017, we report on 381 Level 5 sequelae. We have opted to include aggregate sequelae for GBD 2017 to foster more nuanced interpretations of groups of health outcomes that are relevant to policy makers and clinical users of the GBD. In addition, this reporting list allows for more detailed evaluation of aetiologies and outcomes from GBD causes.

For the first time in the GBD study, we present the burden of injuries in terms of nature of injury as well as external cause of injury. Previously, we reported the incidence, prevalence, and YLDs of injuries expressed only in terms of what caused the injury—eg, those caused by falls. However, the burden that results from falls is experienced in terms of the bodily harm that the fall itself causes—eg, spinal injury or skeletal fracture.

We have grouped the 47 nature of injury sequelae into seven combined categories that represent 1410 sequelae. The supplementary methods (appendix 1) includes the full GBD 2017 non-fatal reporting hierarchy from Level 1 to Level 6.

#### Data sources

The process for non-fatal estimation begins with the compilation of data sources from a diverse set of possible sources, which include 21 possible Global Health Data Exchange (GHDx) data types ranging from scientific literature to survey data to epidemiological surveillance data. Our collaborator network provided 2842 data sources for GBD 2017. We analysed 21100 sources of epidemiological surveillance data (country-years of disease reporting) for GBD 2017 and 4734 sources of disease registry data. For non-fatal estimation, we did systematic data and literature searches for 82 non-fatal causes and one impairment, which were updated to Feb 11, 2018. Search terms used for cause-specific systematic reviews, inclusion and exclusion criteria, preferred and alternative case definitions, and study methods detailed by cause are available in the supplementary methods (appendix 1 section 4). This search process contributed to the use of 15449 scientific literature sources and 3126 survey sources used in non-fatal estimation, reflecting our updated counting criteria for GBD 2017. Household survey data archived in the GHDx were systematically screened together with sources suggested by country-level experts, surveys located in multinational survey data catalogues, and Ministry of Health and Central Statistical Office websites. Primary data sources containing disease prevalence, incidence, mortality risk, duration, remission, or severity were then combined in the estimation process. The supplementary methods section provides further details on gold standard data sources, adjustments, correction factors, and standardisations employed when incorporating these different types of non-fatal data (appendix 1 section 4).

In addition to data sources based on primary literature, surveys, and surveillance, the GBD study has used an increasing number of hospital discharge records, outpatient visit records, and health insurance claims to inform various steps of the non-fatal modelling process. This year, we received hospital discharge records for an additional 30 country-years, specifically discharge records from India (3 country-years), Iran (10), Japan (6), Jordan (1), Nepal (1), Brazil (2), China (1), and Italy (6); inpatient and outpatient claims from Taiwan (province of China); additional years of inpatient and outpatient claims from the USA; and inpatient claims from Singapore, representing an additional 148 842 107 hospital admissions globally and bringing the total number of admissions that inform GBD estimation to more than 2.6 billion. Additionally, we received 10 years of outpatient visit records from Norway, representing a total of

153 351 282 outpatient visits over a 10-year period. Overall, the study now uses hospital data from 335 country-years, outpatient visit data from 45 country-years, and health insurance claims data from 33 country-years between the USA, Taiwan (province of China), and Singapore. These data inform multiple cause models in various ways, mainly by providing incidence and prevalence estimates adjusted for readmission, non-primary diagnosis, outpatient utilisation, or a combination of the above, but also by estimating parameters such as case fatality rates, remission rates, procedure rates, and distribution of disease subtypes. The supplementary methods provide a more detailed description of how the clinical data adjustments are calculated and how admission and outpatient visit data are processed and utilised (appendix 1 section 2).

In the supplementary methods (appendix 1), we show the geographical coverage of non-fatal data, both incidence and prevalence, for GBD 2017. In addition, we illustrate the non-fatal data density and availability for GBD 2017 from 1990 to 2017 by GBD region and year for each of the three Level 1 GBD cause groups. The GHDx provides the metadata for all sources used for non-fatal estimation.

**Non-fatal disease models**

For GBD 2017, we modelled non-fatal disease burden using DisMod-MR 2.1, a meta-analysis tool that uses a compartmental model structure with a series of differential equations that synthesise sparse and heterogeneous epidemiological data for non-fatal disease and

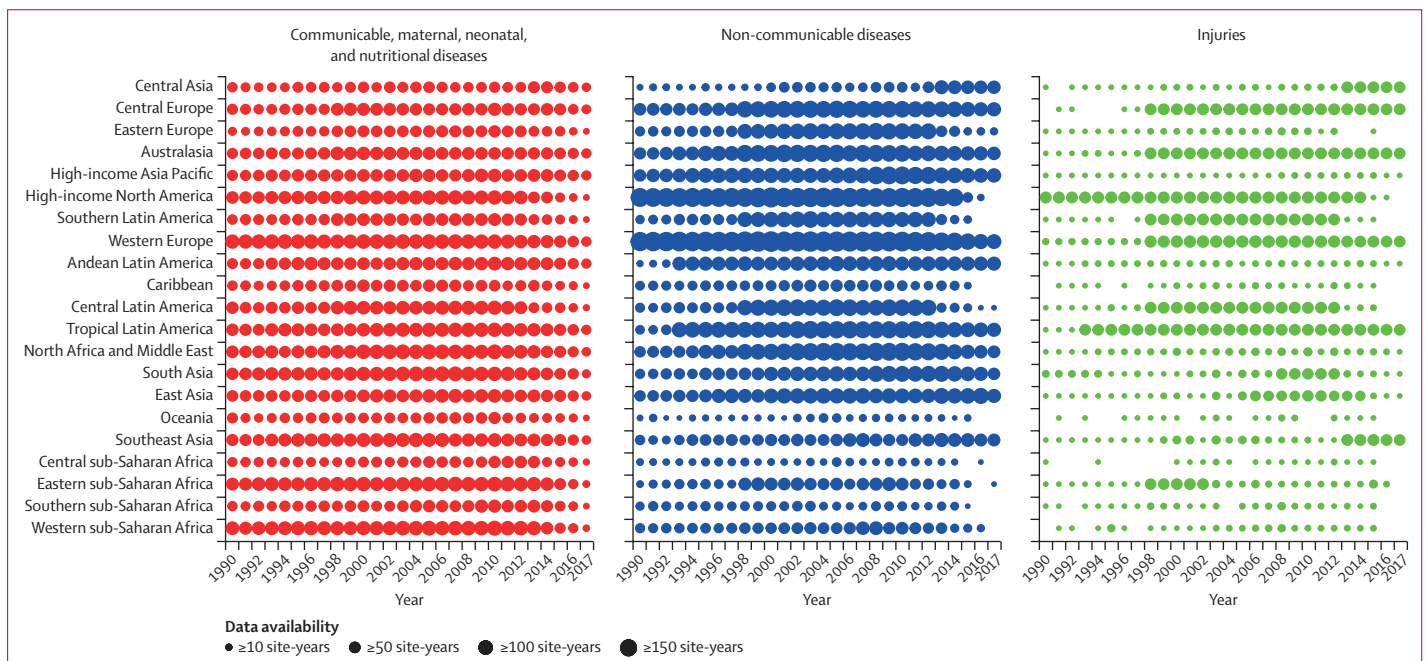
injury outcomes. Estimation occurred at the five levels of the GBD location hierarchy—global, super-regional, regional, national, and subnational—with results of each higher level providing guidance for the analysis at the lower geographical level. Important modelling strategy changes from GBD 2016 to GBD 2017 for specific causes, as well as further details on these causes and their respective models, can be found in the supplementary methods (appendix 1 section 4).

Custom models were created if DisMod-MR 2.1 did not capture the complexity of the disease or if incidence and prevalence needed to be calculated from other data, or both. Further details of these custom models can be found in the cause-specific methods sections of the supplementary methods (appendix 1 section 4).

Prevalence was estimated for nine impairments, defined as sequelae of multiple causes for which better data were available to estimate the overall occurrence than for each underlying cause: anaemia, intellectual disability, epilepsy, hearing loss, vision loss, heart failure, infertility, pelvic inflammatory disease, and Guillain-Barré syndrome. Different methodological approaches were used for each impairment estimation process; these details are described in the supplementary methods (appendix 1 section 4).

**Severity distributions and disability weights**

Severity splits apply a set of proportions that represent the distribution of cases of a given non-fatal cause by its underlying severities. Severity splits are typically categorised as asymptomatic, mild, moderate, and severe. This



**Figure 1: Non-fatal data availability in terms of site-years by GBD region and year for Level 1 causes of burden, 1990–2017**

This figure represents non-fatal data from 1990 to 2017, showing the number of site-years for each location-year combination for each Level 1 cause of burden by GBD region.



distinction is important for conditions such as asthma that have a broad spectrum of symptomatic severities. Severity splits for most conditions use the Medical Expenditure Panel Survey (MEPS) data or literature sources identified through systematic reviews. Further detail on the severity splits for each cause, including changes from GBD 2016, are available in the cause-specific modelling write-ups in the supplementary methods (appendix 1 section 4).

Disability weight estimation is described in more detail elsewhere in the literature,<sup>23</sup> but in summary, these represent the severity of health loss associated with a single given health state. The supplementary methods (appendix 1) provide a complete listing of the lay descriptions of all 234 health states used in the estimation of non-fatal results for GBD 2017.

### Comorbidity

A combined disability weight is required to account for individuals with more than one condition. To calculate a combined disability weight, the health loss associated with two disability weights are multiplied together and then a weighted average of each constituent disability weight is calculated. The adjusted disability weight is proportional to the magnitude of the original disability weight. A simulation of 40 000 distinct individuals is done that calculates the distribution of comorbid conditions on the basis of the expected distribution of each condition's sequelae in the population. Then, the resulting distributions of comorbidity-adjusted disability weights are used to calculate YLDs. This process did not change from GBD 2016.

### YLD computation

YLDs were estimated as the product of prevalence estimate and a disability weight for health states of each mutually exclusive sequela, adjusted for comorbidity as described above. The GBD cause hierarchy also includes 35 residual disease categories to capture YLDs from conditions that lack specific estimation models.

### Uncertainty analysis

We apply the same technique for propagating uncertainty as used elsewhere in the GBD study design.<sup>19,24,25</sup> The distribution of every step in the computation process is stored in 1000 draws that are used for every other step in the process. The distributions are determined from the sampling error of data inputs, the uncertainty of the model coefficients, and the uncertainty of severity distributions and disability weights. Final estimates are computed using the mean estimate across 1000 draws, and the 95% uncertainty intervals (UIs) are determined on the basis of the 25th and 975th ranked values across all 1000 draws.

### The Socio-demographic Index

The Socio-demographic Index (SDI) is a summary measure that estimates a location's position on a spectrum

of development.<sup>26</sup> The SDI was originally constructed for GBD 2015 using the Human Development Index (HDI) methodology, wherein a 0–1 index value was determined for each of the original three covariate inputs (total fertility rate in women aged 15–49 years, educational attainment over the age of 15 years, and lag-distributed income per capita) using the observed minima and maxima over the estimation period to set the scales. In response to feedback from collaborators, we have refined the indicator with each GBD cycle. For GBD 2017, we replaced the total fertility rate with the total fertility rate in women under the age of 25 years. The GBD 2017 Population and Fertility<sup>24</sup> analysis of age-specific fertility rates revealed that through the process of development, many countries exhibited a decline in age-specific fertility rates over the age of 30 years and then increased, creating a U-shaped pattern; however, age-specific fertility rates in ages 10–14 years, 15–19 years, 20–24 years, and total fertility under 25 years did not exhibit this pattern. Total fertility under 25 years remains highly correlated with mortality measures including under-5 mortality rates (Pearson's correlation coefficient  $r=0.873$ ), and results from this revised method for computing SDI and results from GBD 2016 are also correlated ( $r=0.992$ ).<sup>24</sup> We computed the composite SDI as the geometric mean of the three indices for each location-year. The cutoff values used to determine quintiles for analysis were then computed using country-level estimates of SDI for 2017, excluding countries with populations of less than 1 million. These quintiles are used to categorise and present GBD 2017 results on the basis of sociodemographic status. The SDI values ranged from a low of 0.191 in Niger to a high of 0.918 in Denmark in 2017. Additional details on and results from the SDI calculation are available in the supplementary methods (appendix 1 section 2).

### Role of the funding source

The funder of the study had no role in study design, data collection, data analysis, data interpretation, or writing the report. All authors had full access to the data in the study and had final responsibility for the decision to submit for publication.

## Results

### Global prevalence, incidence, and YLDs

Non-fatal estimates by cause for 354 causes and nine impairments for the years 1990, 2007, and 2017 are available by age and sex through the online results tool. Results and findings mentioned in the discussion can also be viewed interactively through an online data visualisation tool.

Figure 1 shows the data density in terms of site-years by GBD region, cause group, and year. The figure shows how data density generally improves over time and how certain regions, particularly higher income regions, are more data dense than others. Additionally, the figure

For the online results tool see <https://collab2017.healthdata.org/gbd-search>

For the online data visualisation tool see <https://vizhub.healthdata.org/gbd-compare>

highlights how injuries data are generally less available than for the other two cause groups.

Table 1 reports cause-specific global estimates of prevalence, incidence, and YLDs for causes at Levels 1–5 of the GBD hierarchy for 2017, as well as the percentage change in YLDs and age-standardised YLD rates between 1990, 2007, and 2017. Unless otherwise specified, all rates reported in this analysis are age standardised.

### Prevalence

For all ages and both sexes combined, globally, in 2017, the three most common causes at Level 3 of the GBD cause hierarchy in terms of all-age prevalent cases were oral disorders (3.47 billion, 95% UI 3.27–3.68), headache disorders (3.07 billion, 2.90–3.27), and tuberculosis including latent tuberculosis infection (1.93 billion, 1.71–2.20; table 1).

Global age-standardised prevalence rankings remained unchanged for the top two Level 3 causes in the GBD hierarchy from 1990 to 2017, with oral disorders and headache disorders remaining the two most common causes. Tuberculosis including latent tuberculosis infection was the third leading cause in 1990 and became the fourth leading cause in 2017, whereas haemoglobinopathies were the fourth leading cause in 1990 and became the third leading cause in 2017. Between 1990 and 2017, the age-standardised prevalence decreased for oral disorders by 5.5% (95% UI 4.9 to 6.0) but increased for headache disorders by 0.3% (–0.2 to 0.9) and for haemoglobinopathies by 4.7% (4.3 to 5.1).

### Incidence

Globally, in 2017, for all ages and both sexes combined, the three leading Level 3 causes in terms of incident cases were upper respiratory infections (17.1 billion, 95% UI 15.3 to 19.2), diarrhoeal diseases (6.29 billion, 5.81 to 6.82), and oral disorders (3.60 billion, 3.23 to 3.99; table 1). These case rankings remained unchanged for the top three causes between 1990 and 2017 despite a decrease in age-standardised incidence rates of upper respiratory infections of 2.6% (95% UI 2.0 to 3.1), from 232 815 new cases (95% UI 207 461 to 260 397) to 226 802 new cases (201 716 to 253 367) per 100 000, and in age-standardised incident rates of oral disorders of 0.3% (–1.1 to 0.6), from 48 423 new cases (43 233 to 53 971) to 48 276 new cases (43 109 to 53 919) per 100 000, and an increase in the number of new cases per 100 000 of diarrhoeal diseases of 11.7% (8.8 to 14.6), from 75 087 new cases (69 475 to 81 367) to 83 846 new cases (77 402 to 90 965) per 100 000.

### YLDs

The global number of YLDs increased from 562 million (95% UI 421–723) to 853 million (642–1097) between 1990 and 2017, representing a 51.8% (50.2–53.5) increase and a 7.2% (6.0–8.4) increase in the all-age YLD rate, while age-standardised YLD rates decreased from 11 310 YLDs (8485–14 506) to 10 871 YLDs (8171–13 980) per

100 000, representing a 3.9% (3.1–4.6) decrease. CMNN causes accounted for 13.8% (12.5–15.1) of total YLDs in 2017, while NCDs accounted for 79.5% (77.8–81.1) and injuries for 6.7% (6.2–7.3), with a total of 118 million (86.7–154) YLDs for CMNN causes, 678 million (510–876) for NCDs, and 57.2 million (42.1–75.4) for injuries. The number of YLDs from CMNN causes increased from 1990 to 2017 by 13.6% (9.15–19.2), and the YLD rates from CMNN causes decreased by 14.8% (10.7–18.0) from 1846 YLDs (1343–2472) to 1573 YLDs (1159–2067) per 100 000 during the same period. The number of YLDs from NCD causes increased between 1990 and 2017 by 61.1% (60.0–62.4), and the YLD rate from these causes decreased by 1.2% (0.66–1.8) from 8684 YLDs (6540–11 223) to 8579 YLDs (6454–11 084) per 100 000. The number of YLDs from injuries increased between 1990 and 2017 by 52.7% (49.3–56.4), and the YLD rate from injuries decreased by 7.8% (6.27–9.28) from 779 (577–1023) YLDs to 719 YLDs (529–948) per 100 000. In 2017, the YLD rate for all causes ranged from 9120 YLDs (6877–11 622) per 100 000 in Columbia to 14 824 YLDs (11 080–19 203) per 100 000 in Yemen.

Globally, in 1990, for all ages and both sexes, the leading Level 3 causes of YLDs were low back pain (42.5 million YLDs, 95% UI 30.2 to 57.2), headache disorders (35.1 million, 22.8 to 49.7), and dietary iron deficiency (31.7 million, 21.6 to 45.5). Between 1990 and 2007, the number of all-age YLDs attributed to low back pain increased by 30.0% (27.9 to 31.9) and those attributed to headache disorders increased by 34.0% (33.0 to 35.1), while the number of all-age YLDs for dietary iron deficiency decreased by 0.2% (–2.8 to 2.2). Between 1990 and 2007, the number of all-age YLDs attributed to depressive disorders increased by 33.4% (31.0 to 35.8), becoming the third leading cause of all-age YLDs in 2007, and shifting dietary iron deficiency to fourth; the rankings for low back pain and headache disorders did not change from 1990 to 2007. From 2007 to 2017, we observed further increases in the number of all-age YLDs attributable to the leading three causes: low back pain (17.5%, 95% UI 16.2–19.0), headache disorders (15.4%, 14.6–16.2), and depressive disorders (14.3%, 13.1–15.6).

Figure 2 illustrates the leading Level 3 causes of YLD rates by GBD country and select subnational locations in 2017 for both sexes combined. The geographical variation in the leading Level 3 causes of YLD rates across countries is shown: low back pain was the leading cause in 126 of the 195 countries and territories whereas diabetes was the leading cause of YLD rates in Mexico, Equatorial Guinea, Congo (Brazzaville), Myanmar, Mauritius, and Gabon, as well as parts of the Caribbean and most of Oceania. Dietary iron deficiency was the leading cause of YLD rates in Yemen, India, Antigua and Barbuda, and in parts of western sub-Saharan Africa. Conflict and terrorism was the leading cause of YLDs in Afghanistan, Eritrea, Rwanda, and Burundi.

	Prevalence (thousands) 2017 counts	Incidence (thousands) 2017 counts	YLDs (thousands)				
			2017 counts	Percentage change in counts, 1990-2007	Percentage change in counts, 2007-17	Percentage change in age-standardised rates, 1990-2007	Percentage change in age-standardised rates, 2007-17
<b>All causes</b>	7 369 526.2 (7 344 769.0 to 7 392 430.8)	3 848 025.2 (3 646 939.0 to 4 056 796.0)	853 042.6 (642 084.6 to 1 097 347.2)	29.8% (28.8 to 30.8)*	17.0% (16.4 to 17.6)*	-3.0% (-3.5 to -2.5)*	-0.9% (-1.4 to -0.4)*
<b>Communicable, maternal, neonatal, and nutritional diseases</b>	4 767 056.2 (4 646 620.9 to 4 904 464.9)	2 714 598.3 (2 524 791.1 to 2 915 135.9)	1 175 737.7 (86 670.4 to 1 544 242.2)	10.6% (7.4 to 14.8)*	2.6% (0.5 to 5.5)*	-7.8% (-10.4 to -4.5)*	-7.6% (-9.6 to -5.0)*
<b>HIV/AIDS and sexually transmitted infections</b>	1 238 129.2 (1 129 539.6 to 1 359 466.0)	769 111.2 (694 471.1 to 850 896.0)	5369.7 (3783.6 to 7272.2)	204.0% (136.7 to 302.7)*	-6.0% (-20.6 to 8.3)	130.4% (79.8 to 202.8)*	-17.6% (-30.5 to -4.7)*
HIV/AIDS	36 822.2 (34 794.9 to 39 199.8)	1942.1 (1632.1 to 2287.5)†	3949.0 (2746.5 to 5419.1)	372.9% (299.6 to 489.2)*	-11.5% (-26.2 to 5.4)	257.8% (204.6 to 343.0)*	-22.6% (-35.7 to -7.8)*
HIV/AIDS and drug-susceptible tuberculosis co-infection	1049.5 (956.6 to 1149.6)	1321.6 (1203.1 to 1454.8)	404.7 (272.3 to 546.5)	329.9% (316.0 to 345.1)*	-19.6% (-21.8 to -17.3)*	229.1% (219.0 to 240.1)*	-29.2% (-31.1 to -27.2)*
HIV/AIDS and multidrug-resistant tuberculosis without extensive drug resistance co-infection	37.6 (25.2 to 54.5)	52.0 (37.5 to 71.2)	15.3 (9.0 to 24.4)	3509.4% (1734.6 to 6384.8)*	-23.4% (-47.9 to 12.8)	2591.5% (1256.0 to 4788.1)*	-32.9% (-54.5 to -11.1)*
HIV/AIDS and extensively drug-resistant tuberculosis co-infection	1.4 (0.9 to 2.3)	1.7 (1.2 to 2.3)	0.6 (0.3 to 1.0)	..	37.1% (-12.3 to 116.5)	..	19.5% (-23.8 to 88.6)
HIV/AIDS resulting in other diseases	35733.7 (33 669.3 to 38 076.0)	1942.1 (1632.1 to 2287.5)	3528.5 (2439.7 to 4941.4)	376.9% (292.0 to 510.8)*	-10.4% (-26.9 to 9.3)	260.2% (199.6 to 357.9)*	-21.7% (-36.3 to -4.5)*
HIV/AIDS not on antiretroviral treatment without tuberculosis	14763.0 (13 278.6 to 16 643.9)	1942.1 (1632.1 to 2287.5)	1911.1 (1240.9 to 2928.7)	343.8% (257.7 to 481.8)*	-47.8% (-52.9 to -42.9)*	235.0% (172.5 to 332.7)*	-53.9% (-58.4 to -49.5)*
HIV/AIDS on antiretroviral treatment without tuberculosis	20970.7 (19 876.1 to 22 058.6)	..	1617.4 (1079.5 to 2267.1)	2265 649.4% (1200 289.1 to 5966 377.3)*	491.3% (420.4 to 581.8)*	1847 617.4% (1009 483.5 to 4566 992.3)*	404.7% (343.7 to 482.1)*
Sexually transmitted infections excluding HIV	1216 425.2 (1107 618.8 to 1337 882.9)	767 169.1 (692 748.8 to 849 178.3)	1420.7 (764.5 to 2552.2)	33.8% (32.1 to 35.3)*	13.4% (12.1 to 14.8)*	0.8% (-0.2 to 1.5)	0.8% (-0.3 to 1.8)
Syphilis	36 388.6 (31 030.7 to 42 960.2)	10 263.8 (8574.2 to 11 991.1)	72.9 (50.9 to 98.3)	28.7% (25.1 to 33.0)*	18.5% (15.7 to 21.5)*	-10.8% (-13.8 to -7.4)*	-3.5% (-5.8 to -1.2)*
Early syphilis	36 018.0 (30 662.1 to 42 602.0)	10 263.8 (8574.2 to 11 991.1)	8.6 (2.6 to 21.9)	36.6% (32.5 to 40.8)*	13.7% (10.1 to 17.1)*	5.0% (2.2 to 7.8)*	2.2% (-1.0 to 5.3)
Tertiary syphilis	370.6 (319.8 to 420.3)	..	64.3 (43.9 to 88.2)	27.7% (23.9 to 32.2)*	19.2% (16.1 to 22.5)*	-12.5% (-15.3 to -9.4)*	-4.2% (-6.5 to -1.8)*
Chlamydial infection	109 822.0 (93 827.4 to 128 829.4)	297 131.3 (247 050.0 to 358 150.1)	314.6 (179.4 to 565.4)	30.9% (28.5 to 33.7)*	10.1% (7.7 to 12.7)*	0.3% (-1.0 to 2.0)	-0.7% (-2.7 to 1.6)
Chlamydia episode	104 561.0 (88 447.0 to 123 536.5)	297 131.3 (247 050.0 to 358 150.1)	175.0 (68.4 to 379.5)	29.0% (26.4 to 31.4)*	9.0% (7.7 to 10.3)*	-1.0% (-1.7 to -0.3)*	-1.7% (-2.4 to -1.0)*
Chlamydial infection complications	5261.1 (4960.3 to 5607.8)	..	139.6 (92.2 to 195.6)	33.5% (28.8 to 38.4)*	11.6% (6.5 to 16.6)*	2.1% (-1.0 to 5.2)	0.7% (-3.8 to 5.2)
Gonococcal infection	47 269.2 (36 099.9 to 61 106.1)	137 221.5 (105 854.1 to 173 538.4)	190.3 (102.2 to 356.6)	27.0% (24.1 to 30.5)*	10.2% (6.8 to 14.4)*	1.3% (-0.5 to 3.3)	1.9% (-1.3 to 5.6)
Gonococcal infection complications	1705.4 (1596.2 to 1824.5)	..	68.9 (45.3 to 97.9)	31.9% (26.9 to 36.9)*	16.9% (9.7 to 24.5)*	2.6% (-1.1 to 6.4)	6.6% (0.1 to 13.5)*
Gonorrhoea episode	45 563.8 (34 373.4 to 59 361.5)	137 221.5 (105 854.1 to 173 538.4)	121.3 (46.5 to 271.5)	24.7% (22.1 to 28.0)*	6.7% (2.9 to 9.9)*	0.7% (-0.9 to 2.6)	-0.5% (-4.2 to 2.7)
Trichomoniasis	142 114.5 (118 989.2 to 170 489.8)	244 855.9 (208 226.8 to 289 024.3)	242.8 (97.6 to 523.8)	37.7% (35.4 to 40.1)*	16.0% (14.2 to 17.7)*	2.9% (1.9 to 3.8)*	2.2% (1.1 to 3.2)*
Genital herpes	95 894.8 (84 327.5 to 108 744.6)	77 696.7 (68 687.0 to 87 707.7)	247.4 (79.8 to 593.7)	41.7% (39.0 to 43.3)*	19.8% (18.1 to 21.0)*	1.9% (1.1 to 2.8)*	1.5% (0.9 to 2.3)*
Other sexually transmitted infections	11 860.5 (11 121.7 to 12 735.7)	..	352.7 (214.9 to 598.5)	33.9% (31.9 to 36.2)*	11.2% (9.6 to 13.1)*	1.8% (0.7 to 3.1)*	0.8% (-0.6 to 2.3)

(Table 1 continues on next page)



	Prevalence (thousands) 2017 counts	Incidence (thousands) 2017 counts	YLDs (thousands)				
			2017 counts	Percentage change in counts, 1990–2007	Percentage change in counts, 2007–17	Percentage change in age-standardised rates, 1990–2007	Percentage change in age-standardised rates, 2007–17
(Continued from previous page)							
Other sexually transmitted diseases residual	..	..	193.3 (105.6 to 361.3)	27.2% (25.3 to 29.5)*	7.8% (5.7 to 10.4)*	-0.0% (-1.2 to 1.4)	-0.6% (-2.6 to 1.7)
Other sexually transmitted diseases	11 860.5 (11 121.7 to 12 735.7)	..	352.7 (214.9 to 598.5)	33.9% (31.9 to 36.2)*	11.2% (9.6 to 13.1)*	1.8% (0.7 to 3.1)*	0.8% (-0.6 to 2.3)
<b>Respiratory infections and tuberculosis</b>	<b>2 187 290.0 (1 979 143.1 to 2 449 760.7)</b>	<b>17 942 622.2 (16 102 037.4 to 20 038 445.4)</b>	<b>11 670.3 (7 845.9 to 16 749.7)</b>	<b>16.2% (14.9 to 17.6)*</b>	<b>9.8% (8.9 to 10.7)*</b>	<b>-6.9% (-8.3 to -5.7)*</b>	<b>-2.6% (-3.6 to -1.7)*</b>
Tuberculosis	1 929 208.6 (1 710 952.7 to 2 199 199.9)	8 965.8 (8 191.8 to 9 820.8)	3 120.4 (2 133.6 to 4 230.6)	16.3% (14.6 to 18.0)*	9.4% (7.8 to 11.2)*	-13.9% (-15.1 to -12.7)*	-7.6% (-8.8 to -6.5)*
Latent tuberculosis infection	1 918 892.1 (1 701 127.1 to 2 187 433.5)	..	..	..	..	..	..
Drug-susceptible tuberculosis	9828.6 (8 860.7 to 10 773.9)	8 508.6 (7 808.6 to 9 371.0)	2 969.7 (2 011.4 to 4 077.3)	11.4% (9.4 to 13.5)*	9.6% (5.2 to 12.7)*	-17.5% (-18.9 to -16.1)*	-7.5% (-11.1 to -5.1)*
Multidrug-resistant tuberculosis without extensive drug resistance	464.1 (229.1 to 863.3)	432.8 (254.6 to 726.9)	142.8 (66.6 to 281.1)	589.4% (189.9 to 1 708.7)*	4.8% (-45.2 to 76.4)	399.5% (110.5 to 1 218.1)*	-11.8% (-53.5 to 48.1)
Extensively drug-resistant tuberculosis	23.7 (13.9 to 44.1)	24.5 (17.7 to 35.0)	7.9 (4.1 to 15.1)	..	44.8% (-11.7 to 157.8)	..	20.9% (-26.3 to 115.5)
Lower respiratory infections	10 638.1 (9 729.1 to 11 559.4)	47 182.5 (42 957.1 to 51 697.9)	6 48.9 (4 32.6 to 9 27.7)	3.2% (0.3 to 6.3)*	15.8% (11.8 to 20.1)*	-11.1% (-13.0 to -9.3)*	4.4% (0.5 to 8.4)*
Guillain-Barré syndrome due to lower respiratory infections	12.3 (6.9 to 19.9)	..	3.6 (1.7 to 6.6)	29.2% (25.3 to 33.5)*	17.9% (15.5 to 20.6)*	2.7% (1.1 to 4.3)*	3.1% (1.9 to 4.2)*
Lower respiratory infection episode	10 625.8 (9 719.1 to 11 547.2)	47 182.5 (42 957.1 to 51 697.9)	6 45.3 (4 29.9 to 9 25.0)	3.1% (0.1 to 6.1)*	15.8% (11.8 to 20.1)*	-11.2% (-13.1 to -9.3)*	4.5% (0.5 to 8.4)*
Upper respiratory infections	236 084.8 (211 064.1 to 264 360.3)	17 144 182.9 (15 334 493.4 to 19 211 715.4)	5 866.0 (3 422.5 to 9 336.4)	19.6% (17.3 to 21.9)*	11.5% (10.3 to 12.8)*	-2.5% (-3.3 to -1.8)*	0.2% (-0.6 to 1.1)
Guillain-Barré syndrome due to upper respiratory infections	33.4 (24.4 to 44.7)	..	9.9 (5.8 to 15.5)	29.2% (25.3 to 33.4)*	17.9% (15.5 to 20.6)*	2.7% (1.1 to 4.3)*	3.1% (1.9 to 4.2)*
Upper respiratory infection episode	236 051.4 (211 015.2 to 264 325.0)	17 144 182.9 (15 334 493.4 to 19 211 715.4)	5 856.2 (3 414.4 to 9 325.9)	19.6% (17.3 to 21.8)*	11.4% (10.3 to 12.8)*	-2.5% (-3.3 to -1.8)*	0.2% (-0.6 to 1.1)
Otitis media	101 690.4 (92 570.7 to 111 633.5)	317 648.0 (254 458.5 to 397 736.6)	2 034.8 (1 230.7 to 3 227.8)	11.6% (8.9 to 14.5)*	4.3% (1.8 to 7.0)*	-5.8% (-8.0 to -3.7)*	-4.6% (-6.9 to -2.2)*
Acute otitis media	18 153.8 (14 592.6 to 22 589.9)	317 625.1 (254 441.2 to 397 715.6)	238.4 (117.1 to 437.1)	10.7% (8.2 to 13.6)*	7.5% (5.2 to 9.7)*	4.6% (2.5 to 7.1)*	0.2% (-2.1 to 2.2)
Chronic otitis media	83 536.6 (75 211.7 to 92 279.1)	22.8 (0.8 to 81.8)	1 796.4 (1 107.7 to 2 821.4)	11.7% (8.7 to 14.9)*	3.9% (1.0 to 7.0)*	-7.1% (-9.4 to -4.6)*	-5.2% (-7.8 to -2.5)*
<b>Enteric infections</b>	<b>93 304.4 (86 780.5 to 99 732.5)</b>	<b>6 307 792.4 (5 822 111.3 to 6 830 241.4)</b>	<b>10 583.7 (7 283.3 to 14 516.1)</b>	<b>16.4% (13.6 to 19.4)*</b>	<b>23.6% (20.6 to 26.9)*</b>	<b>-2.5% (-4.2 to -0.7)*</b>	<b>9.7% (6.8 to 12.7)*</b>
Diarrhoeal diseases	93 472.8 (86 857.2 to 99 961.1)	6 292 936.7 (5 808 374.7 to 6 816 675.4)	10 465.1 (7 203.1 to 14 386.3)	17.6% (14.8 to 20.7)*	24.5% (21.5 to 27.9)*	-1.6% (-3.4 to 0.3)	10.4% (7.6 to 13.4)*
Guillain-Barré syndrome due to diarrhoeal diseases	11.4 (7.8 to 15.7)	..	3.4 (2.0 to 5.4)	29.2% (25.3 to 33.5)*	17.9% (15.5 to 20.6)*	2.7% (1.1 to 4.3)*	3.1% (2.0 to 4.2)*
Diarrhoeal disease episode	93 461.4 (86 846.3 to 99 951.5)	6 292 936.7 (5 808 374.7 to 6 816 675.4)	10 461.7 (7 201.2 to 14 382.7)	17.6% (14.7 to 20.7)*	24.5% (21.5 to 27.9)*	-1.6% (-3.4 to 0.3)	10.4% (7.6 to 13.4)*
Typhoid and paratyphoid	387.5 (312.6 to 467.9)	14 321.1 (12 540.3 to 16 337.4)	114.9 (77.7 to 164.2)	-26.3% (-32.0 to -20.7)*	-24.9% (-30.9 to -18.4)*	-35.2% (-39.8 to -30.4)*	-30.4% (-36.1 to -24.2)*
Typhoid fever	691.5 (582.2 to 808.9)	10 924.3 (9 343.0 to 12 597.1)	105.5 (70.3 to 151.0)	-26.4% (-32.5 to -20.4)*	-25.6% (-32.0 to -18.5)*	-35.2% (-40.2 to -29.8)*	-31.1% (-37.2 to -24.4)*

(Table 1 continues on next page)

	Prevalence (thousands) 2017 counts	Incidence (thousands) 2017 counts	YLDs (thousands)				
			2017 counts	Percentage change in counts, 1990-2007	Percentage change in counts, 2007-17	Percentage change in age-standardised rates, 1990-2007	Percentage change in age-standardised rates, 2007-17
(Continued from previous page)							
Typhoid fever complications	144.0 (120.1 to 173.7)	1880.1 (1605.0 to 2191.0)	45.9 (29.9 to 66.3)	-26.0% (-35.3 to -15.4)*	-25.7% (-35.6 to -14.3)*	-34.9% (-43.0 to -25.5)*	-31.1% (-40.6 to -20.4)*
Typhoid fever episode	547.5 (457.7 to 640.9)	9044.1 (7759.9 to 10 439.8)	59.6 (39.3 to 87.0)	-26.7% (-33.8 to -18.5)*	-25.6% (-33.2 to -16.9)*	-35.4% (-41.6 to -28.5)*	-31.0% (-38.4 to -22.7)*
Paratyphoid fever	149.0 (117.0 to 185.1)	3396.9 (2666.5 to 4184.1)	9.4 (5.9 to 13.9)	-25.8% (-32.5 to -18.1)*	-15.8% (-23.8 to -7.1)*	-35.6% (-41.2 to -29.2)*	-22.0% (-29.5 to -13.6)*
Intestinal perforation due to paratyphoid	6.7 (5.2 to 8.4)	173.9 (135.4 to 215.9)	0.8 (0.5 to 1.1)	-26.4% (-34.5 to -17.6)*	-16.0% (-23.8 to -6.2)*	-36.0% (-42.9 to -28.8)*	-22.1% (-29.7 to -12.6)*
Paratyphoid fever episode	142.3 (111.5 to 176.8)	3222.9 (2537.7 to 3976.5)	8.6 (5.4 to 12.8)	-25.8% (-32.7 to -17.7)*	-15.8% (-24.2 to -6.5)*	-35.6% (-41.4 to -28.7)*	-21.9% (-29.8 to -13.2)*
Invasive non-typhoidal salmonella	20.5 (14.5 to 28.6)	534.6 (409.0 to 705.0)	2.7 (1.6 to 4.3)	97.4% (71.1 to 127.3)*	-20.9% (-30.1 to -9.7)*	75.1% (52.6 to 101.3)*	-26.9% (-36.1 to -16.0)*
Other intestinal infectious diseases	..	..	1.0 (0.6 to 1.4)	-40.9% (-47.2 to -33.9)*	-41.4% (-47.4 to -34.8)*	-45.3% (-50.8 to -39.2)*	-47.0% (-52.6 to -40.9)*
<b>Neglected tropical diseases and malaria</b>	<b>1 278 896.5</b> <b>(1 223 506.1 to 1 343 059.2)</b>	<b>357 652.1</b> <b>(301 519.2 to 431 965.1)</b>	<b>13 622.9</b> <b>(9498.3 to 18 673.3)</b>	<b>2.4%</b> <b>(-1.9 to 7.7)</b>	<b>-10.3%</b> <b>(-15.0 to -5.6)*</b>	<b>-19.2%</b> <b>(-22.5 to -15.4)*</b>	<b>-20.6%</b> <b>(-24.6 to -16.5)*</b>
Malaria	136 085.1 (126 471.7 to 145 009.3)	208 768.2 (170 214.0 to 257 506.0)	1468.0 (1034.0 to 2020.6)	14.1% (4.7 to 24.4)*	-22.6% (-28.0 to -15.7)*	0.3% (-8.0 to 9.1)	-28.4% (-33.4 to -22.0)*
Malaria complications	794.8 (723.8 to 875.7)	..	328.3 (255.8 to 405.9)	43.2% (38.1 to 49.0)*	26.8% (22.2 to 31.8)*	17.3% (13.1 to 21.9)*	17.4% (13.1 to 22.1)*
Malaria episode	12 152.1 (7883.1 to 17 229.6)	208 768.2 (170 214.0 to 257 506.0)	423.2 (217.3 to 710.8)	10.0% (-2.3 to 20.4)	-22.1% (-29.0 to -13.9)*	-0.4% (-11.4 to 9.4)	-27.5% (-34.2 to -19.6)*
Malaria parasitaemia	123 138.2 (112 779.9 to 133 815.6)	..	716.6 (471.7 to 1056.9)	10.9% (0.3 to 23.5)*	-34.5% (-40.4 to -27.0)*	-2.5% (-11.9 to 8.4)	-39.3% (-44.8 to -32.4)*
Chagas disease	6197.0 (5248.5 to 7243.9)	162.5 (139.0 to 189.0)	57.3 (38.3 to 82.5)	10.1% (6.9 to 13.2)*	2.0% (-1.4 to 5.7)	-24.0% (-26.1 to -21.8)*	-17.8% (-20.6 to -15.0)*
Acute Chagas disease	0.9 (0.4 to 1.5)	162.5 (139.0 to 189.0)	0.0 (0.0 to 0.1)	-16.2% (-22.1 to -12.7)*	-11.8% (-14.4 to -8.9)*	-32.1% (-36.3 to -29.6)*	-20.8% (-23.1 to -18.5)*
Asymptomatic Chagas disease	5274.6 (4437.8 to 6166.6)	..	..	..	..	..	..
Symptomatic chronic Chagas infection	921.4 (731.1 to 1128.3)	..	57.2 (38.3 to 82.4)	10.1% (7.0 to 13.3)*	2.0% (-1.4 to 5.7)	-24.0% (-26.1 to -21.8)*	-17.8% (-20.6 to -15.0)*
Leishmaniasis	4130.2 (3515.7 to 4966.8)	669.1 (506.6 to 874.3)	264.4 (172.4 to 389.6)	7.6% (-8.7 to 29.4)	30.1% (20.2 to 42.3)*	-16.2% (-28.2 to 1.1)	14.1% (4.6 to 25.9)*
Visceral leishmaniasis	10.6 (8.2 to 16.5)	42.4 (32.9 to 66.1)	0.8 (0.5 to 1.3)	-96.0% (-97.1 to -94.0)*	-72.4% (-79.4 to -58.3)*	-96.4% (-97.4 to -94.7)*	-74.5% (-81.0 to -61.3)*
Cutaneous and mucocutaneous leishmaniasis	4166.6 (3560.7 to 4992.8)	626.6 (460.0 to 834.2)	263.6 (171.9 to 388.8)	65.8% (35.6 to 126.1)*	31.5% (21.2 to 44.2)*	21.9% (0.0 to 66.3)*	15.3% (5.2 to 27.4)*
African trypanosomiasis	4.9 (1.3 to 19.8)	3.3 (2.0 to 8.1)	1.3 (0.3 to 5.3)	-60.9% (-69.0 to -47.0)*	-79.1% (-94.4 to -11.2)*	-68.9% (-75.4 to -58.4)*	-81.2% (-94.9 to -20.5)*
Trypanosomiasis Gambiense	4.8 (1.3 to 19.6)	3.1 (1.8 to 8.0)	1.3 (0.3 to 5.3)	-60.3% (-69.1 to -44.4)*	-78.4% (-94.6 to -7.0)*	-68.5% (-75.6 to -56.3)*	-80.5% (-95.1 to -16.4)*
Trypanosomiasis Rhodsiense	0.1 (0.0 to 0.3)	0.2 (0.1 to 0.6)	0.0 (0.0 to 0.1)	-67.7% (-81.9 to -46.6)*	-91.7% (-97.3 to -73.1)*	-74.2% (-85.6 to -57.6)*	-92.5% (-97.6 to -75.4)*
Schistosomiasis	142 788.5 (131 656.9 to 155 480.2)	..	1089.1 (535.8 to 2082.0)	48.4% (44.0 to 51.5)*	-20.7% (-22.2 to -19.2)*	10.6% (7.3 to 13.0)*	-30.0% (-31.5 to -28.6)*
Mild schistosomiasis	114 409.2 (106 010.4 to 124 045.9)	..	642.0 (259.2 to 1341.1)	53.2% (51.5 to 54.7)*	-21.8% (-23.3 to -20.4)*	13.1% (11.5 to 14.6)*	-31.5% (-32.9 to -30.1)*
Anaemia due to schistosomiasis	7618.2 (6901.9 to 8321.6)	..	180.6 (119.1 to 268.6)	33.0% (24.1 to 42.6)*	-30.4% (-35.1 to -25.9)*	-1.3% (-7.6 to 5.6)	-38.6% (-42.8 to -34.6)*
Schistosomiasis complications	20 785.2 (18 564.0 to 23 286.9)	..	266.5 (146.7 to 472.7)	50.9% (47.6 to 54.5)*	-9.0% (-11.9 to -4.3)*	15.7% (12.7 to 18.5)*	-17.9% (-20.4 to -14.4)*

(Table 1 continues on next page)

	Prevalence (thousands) 2017 counts	Incidence (thousands) 2017 counts	YLDs (thousands)				
			2017 counts	Percentage change in counts, 1990–2007	Percentage change in counts, 2007–17	Percentage change in age-standardised rates, 1990–2007	Percentage change in age-standardised rates, 2007–17
(Continued from previous page)							
Cysticercosis	5417.9 (4662.0 to 6190.3)	..	1568.5 (1015.3 to 2181.0)	13.5% (8.2 to 18.7)*	8.5% (3.7 to 12.8)*	-17.7% (-21.3 to -14.2)*	-9.1% (-13.1 to -5.6)*
Cystic echinococcosis	589.5 (373.9 to 926.5)	139.6 (90.2 to 213.9)	48.3 (25.4 to 85.0)	33.5% (26.3 to 41.9)*	18.9% (12.4 to 25.5)*	-1.0% (-7.6 to 4.8)	3.4% (-1.1 to 6.9)
Lymphatic filariasis	64 623.4 (59 178.2 to 70 866.1)	..	1364.0 (752.0 to 2157.6)	25.5% (4.6 to 37.4)*	-37.0% (-48.7 to -26.4)*	-6.4% (-22.0 to 2.3)	-44.8% (-54.7 to -35.5)*
Prevalence of detectable microfilaria due to lymphatic filariasis	52 285.4 (48 689.8 to 55 843.9)	..	..	..	..	..	..
Lymphatic filariasis complications	12 338.1 (8403.3 to 17 434.1)	..	1364.0 (752.0 to 2157.6)	25.5% (4.6 to 37.4)*	-37.0% (-48.7 to -26.4)*	-6.4% (-22.0 to 2.3)	-44.8% (-54.7 to -35.5)*
Onchocerciasis	20 938.1 (12 882.3 to 37 227.7)	..	1342.9 (639.1 to 2371.9)	-10.6% (-15.5 to -4.3)*	3.9% (-15.1 to 19.9)	-32.4% (-36.4 to -27.3)*	-8.0% (-25.8 to 6.7)
Asymptomatic onchocerciasis	5131.9 (35.8 to 18 859.4)	..	..	..	..	..	..
Skin disease due to onchocerciasis	14 654.2 (10 690.5 to 19 713.6)	..	1246.9 (552.7 to 2254.6)	-8.6% (-14.3 to -0.6)*	3.7% (-18.4 to 20.3)	-30.0% (-34.7 to -23.6)*	-7.5% (-27.7 to 7.9)
Vision loss due to onchocerciasis	1152.1 (829.0 to 1703.6)	..	96.1 (60.6 to 141.5)	-31.6% (-36.5 to -26.5)*	7.0% (-4.8 to 21.4)	-52.9% (-56.4 to -49.3)*	-15.0% (-24.3 to -3.8)*
Trachoma	3818.9 (2842.6 to 5135.2)	..	302.9 (201.7 to 425.1)	-12.8% (-18.2 to -6.4)*	-5.5% (-13.1 to 2.0)	-41.8% (-45.6 to -37.6)*	-28.2% (-33.8 to -22.5)*
Dengue	6267.4 (3416.1 to 10 611.9)	104 771.9 (63 759.0 to 158 870.0)	1019.8 (447.3 to 1909.6)	178.9% (68.9 to 8404.5)*	61.1% (41.3 to 148.0)*	128.0% (38.1 to 6804.6)*	45.2% (27.4 to 123.4)*
Post-dengue chronic fatigue syndrome	4418.2 (2064.8 to 8078.2)	..	911.1 (380.7 to 1726.5)	179.0% (69.0 to 8459.3)*	61.1% (41.1 to 149.3)*	128.2% (38.2 to 6850.0)*	45.2% (27.3 to 124.6)*
Dengue episode	1849.2 (1117.6 to 2774.7)	104 771.9 (63 759.0 to 158 870.0)	108.7 (56.0 to 189.7)	177.7% (68.1 to 8513.3)*	61.1% (42.2 to 140.9)*	126.7% (37.4 to 6942.1)*	45.0% (28.0 to 116.7)*
Yellow fever	2.6 (0.8 to 7.1)	97.4 (28.0 to 251.7)	0.1 (0.0 to 0.2)	-53.3% (-57.7 to -47.9)*	-15.8% (-25.4 to -4.4)*	-61.1% (-64.7 to -56.7)*	-22.4% (-31.4 to -11.4)*
Asymptomatic yellow fever	1.5 (0.4 to 4.2)	54.4 (14.0 to 152.9)	..	..	..	..	..
Yellow fever episode	1.2 (0.3 to 3.0)	43.0 (12.5 to 115.1)	0.1 (0.0 to 0.2)	-53.3% (-57.7 to -47.9)*	-15.8% (-25.4 to -4.4)*	-61.1% (-64.7 to -56.7)*	-22.4% (-31.4 to -11.4)*
Rabies	0.5 (0.4 to 0.6)	13.4 (10.9 to 16.2)	0.1 (0.0 to 0.1)	-46.8% (-57.6 to -36.0)*	-35.4% (-45.7 to -23.8)*	-56.9% (-66.1 to -48.1)*	-43.3% (-52.3 to -32.9)*
Intestinal nematode infections	894 917.5 (836 669.5 to 961 911.6)	..	1661.4 (960.3 to 2708.6)	-35.8% (-41.3 to -30.1)*	-30.1% (-33.9 to -26.1)*	-47.3% (-51.8 to -42.6)*	-36.3% (-39.8 to -32.7)*
Ascariasis	447 009.0 (394 765.2 to 508 585.1)	..	603.8 (325.2 to 1037.6)	-38.3% (-47.2 to -28.7)*	-34.2% (-41.2 to -26.8)*	-48.3% (-55.9 to -40.2)*	-39.9% (-46.2 to -33.1)*
Asymptomatic ascariasis	414 347.5 (365 611.9 to 472 277.1)	..	..	..	..	..	..
Ascariasis complications	32 661.5 (28 939.0 to 36 737.1)	..	603.8 (325.2 to 1037.6)	-38.3% (-47.2 to -28.7)*	-34.2% (-41.2 to -26.8)*	-48.3% (-55.9 to -40.2)*	-39.9% (-46.2 to -33.1)*
Trichuriasis	289 617.7 (254 640.5 to 330 724.5)	..	212.7 (120.0 to 353.7)	-43.0% (-50.2 to -35.7)*	-23.1% (-29.3 to -15.8)*	-53.4% (-59.4 to -47.5)*	-29.3% (-35.0 to -22.5)*
Asymptomatic trichuriasis	278 887.2 (244 650.6 to 318 878.2)	..	..	..	..	..	..
Trichuriasis complications	10 730.6 (9782.7 to 11 693.0)	..	212.7 (120.0 to 353.7)	-43.0% (-50.2 to -35.7)*	-23.1% (-29.3 to -15.8)*	-53.4% (-59.4 to -47.5)*	-29.3% (-35.0 to -22.5)*
Hookworm disease	229 217.1 (212 538.1 to 246 731.6)	..	845.0 (510.0 to 1340.3)	-31.6% (-39.5 to -23.8)*	-28.5% (-34.0 to -22.7)*	-44.8% (-51.3 to -38.5)*	-35.2% (-40.2 to -30.0)*
Asymptomatic hookworm disease	190 730.4 (176 950.0 to 205 624.5)	..	..	..	..	..	..

(Table 1 continues on next page)

	Prevalence (thousands) 2017 counts	Incidence (thousands) 2017 counts	YLDs (thousands)				
			2017 counts	Percentage change in counts, 1990-2007	Percentage change in counts, 2007-17	Percentage change in age-standardised rates, 1990-2007	Percentage change in age-standardised rates, 2007-17
(Continued from previous page)							
Anaemia due to hookworm disease	9536.1 (8764.4 to 10362.8)	..	245.9 (164.0 to 360.4)	-41.2% (-49.1 to -32.8)*	-35.4% (-41.8 to -28.5)*	-51.7% (-58.1 to -44.7)*	-41.3% (-47.1 to -34.9)*
Hookworm disease complications	28 950.6 (26 952.9 to 31 087.4)	..	599.1 (334.2 to 993.7)	-25.8% (-33.7 to -17.7)*	-25.2% (-30.2 to -19.5)*	-40.8% (-47.2 to -34.4)*	-32.2% (-36.8 to -27.1)*
Food-borne trematodiasis	82 532.4 (74 596.1 to 91 774.9)	40 746.0 (35 650.0 to 46 019.1)	1870.7 (1070.9 to 3149.7)	9.4% (-9.4 to 31.8)	8.5% (4.8 to 12.0)*	-16.6% (-30.0 to -0.8)*	-6.2% (-9.1 to -3.5)*
Asymptomatic food-borne trematodiasis	65 832.6 (56 442.3 to 75 378.7)	30 998.0 (23 711.7 to 37 759.6)	..	..	..	..	..
Food-borne trematodiasis complications	16 699.7 (11 172.6 to 25 636.1)	9748.1 (5025.4 to 16 377.4)	1870.7 (1070.9 to 3149.7)	9.4% (-9.4 to 31.8)	8.5% (4.8 to 12.0)*	-16.6% (-30.0 to -0.8)*	-6.2% (-9.1 to -3.5)*
Leprosy	518.5 (487.7 to 552.5)	48.5 (45.8 to 51.4)	31.5 (21.5 to 44.6)	35.0% (31.7 to 38.2)*	-1.3% (-3.7 to 1.1)	-5.5% (-7.8 to -3.4)*	-20.4% (-22.4 to -18.5)*
Ebola virus disease	..	..	..	..	-96.8% (-97.5 to -94.7)*	..	-97.1% (-97.8 to -95.3)*
Ebola cases	..	..	..	..	-97.8% (-97.9 to -97.7)*	..	-98.1% (-98.1 to -98.0)*
Post-Ebola chronic fatigue syndrome	..	..	..	..	-96.7% (-97.5 to -94.6)*	..	-97.1% (-97.7 to -95.2)*
Zika virus disease	37.6 (28.2 to 52.0)	2232.2 (1659.6 to 3097.6)	1.2 (0.8 to 1.8)	..	..	..	..
Zika virus complications	0.9 (0.7 to 1.5)	0.6 (0.4 to 1.2)	0.5 (0.3 to 0.8)	..	..	..	..
Zika virus episode	36.7 (27.3 to 50.9)	2231.6 (1659.1 to 3097.0)	0.7 (0.4 to 1.1)	..	..	..	..
Guinea worm disease	..	..	..	-99.6% (-99.6 to -99.6)*	-99.5% (-99.6 to -99.3)*	-99.7% (-99.7 to -99.7)*	-99.5% (-99.7 to -99.3)*
Moderate pain and limited mobility due to guinea worm	..	..	..	-99.6% (-99.6 to -99.6)*	-99.5% (-99.6 to -99.3)*	-99.7% (-99.7 to -99.7)*	-99.5% (-99.7 to -99.4)*
Guinea worm disease complications	..	..	..	-99.6% (-99.7 to -99.6)*	-99.5% (-99.6 to -99.2)*	-99.7% (-99.7 to -99.7)*	-99.5% (-99.7 to -99.3)*
Other neglected tropical diseases	52 797.1 (51 667.9 to 54 034.5)	..	1531.2 (1027.0 to 2201.6)	2.2% (-1.2 to 5.5)	-5.7% (-9.7 to -1.5)*	-10.9% (-13.7 to -8.0)*	-13.3% (-17.1 to -9.4)*
Acute infection due to other neglected tropical diseases	..	..	13.3 (6.9 to 23.0)	164.3% (61.7 to 303.2)*	107.6% (83.3 to 199.8)*	135.1% (44.5 to 257.7)*	86.9% (64.7 to 169.5)*
Anaemia due to other neglected tropical diseases	52 797.1 (51 667.9 to 54 034.5)	..	1517.9 (1018.7 to 2185.7)	1.9% (-1.4 to 5.3)	-6.2% (-10.2 to -2.0)*	-11.1% (-14.0 to -8.3)*	-13.7% (-17.6 to -9.8)*
<b>Other infectious diseases</b>	<b>101 451.5</b> <b>(97 425.1 to 105 559.6)</b>	<b>478 720.6</b> <b>(450 498.3 to 511 601.6)</b>	<b>4056.6</b> <b>(2835.5 to 5535.8)</b>	<b>5.0%</b> <b>(2.1 to 7.5)*</b>	<b>-0.5%</b> <b>(-2.9 to 1.6)</b>	<b>-13.3%</b> <b>(-15.3 to -11.5)*</b>	<b>-10.6%</b> <b>(-12.7 to -8.9)*</b>
Meningitis	10 572.9 (8836.7 to 12 552.2)	5045.4 (4435.1 to 5877.8)	933.9 (653.0 to 1255.1)	10.6% (8.4 to 13.2)*	-3.2% (-5.9 to -0.3)*	-10.3% (-12.2 to -8.1)*	-12.4% (-14.7 to -9.7)*
Pneumococcal meningitis	3557.0 (2932.0 to 4337.6)	444.9 (357.8 to 552.1)	325.0 (219.2 to 440.0)	19.9% (16.6 to 23.3)*	-24.8% (-27.4 to -22.1)*	-3.7% (-6.3 to -1.0)*	-32.1% (-34.6 to -29.6)*
Acute pneumococcal meningitis	19.9 (15.8 to 25.0)	444.9 (357.8 to 552.1)	2.6 (1.6 to 3.9)	9.7% (3.6 to 15.9)*	-28.4% (-34.2 to -22.4)*	-0.9% (-6.0 to 4.7)	-34.1% (-39.8 to -28.4)*
Pneumococcal meningitis complications	3537.1 (2915.9 to 4314.0)	..	322.4 (217.6 to 436.2)	20.0% (16.7 to 23.4)*	-24.7% (-27.4 to -22.1)*	-3.7% (-6.4 to -1.0)*	-32.1% (-34.5 to -29.5)*
<i>H influenzae</i> type B meningitis	924.2 (668.2 to 1229.3)	262.3 (195.1 to 351.1)	84.3 (57.6 to 115.4)	-2.7% (-5.7 to 0.5)	-48.1% (-50.4 to -45.8)*	-20.3% (-22.8 to -17.6)*	-52.5% (-54.6 to -50.3)*
Acute <i>H influenzae</i> type B meningitis	11.3 (8.4 to 15.2)	262.3 (195.1 to 351.1)	1.5 (0.9 to 2.4)	-9.6% (-14.9 to -4.3)*	-48.4% (-54.2 to -42.2)*	-16.3% (-21.4 to -11.4)*	-51.7% (-57.2 to -45.6)*

(Table 1 continues on next page)

	Prevalence (thousands) 2017 counts	Incidence (thousands) 2017 counts	YLDs (thousands)				
			2017 counts	Percentage change in counts, 1990–2007	Percentage change in counts, 2007–17	Percentage change in age-standardised rates, 1990–2007	Percentage change in age-standardised rates, 2007–17
(Continued from previous page)							
<i>H influenzae</i> type B meningitis complications	912.9 (657.9 to 1216.9)	..	82.8 (56.6 to 113.3)	-2.6% (-5.6 to 0.7)	-48.1% (-50.4 to -45.8)*	-20.4% (-23.0 to -17.6)*	-52.5% (-54.6 to -50.2)*
Meningococcal infection	1076.7 (764.8 to 1424.7)	402.5 (312.5 to 517.6)	99.0 (67.5 to 135.4)	12.4% (9.4 to 15.4)*	-3.2% (-6.4 to -0.1)*	-9.8% (-12.3 to -7.3)*	-12.9% (-15.9 to -10.0)*
Acute meningococcal meningitis	18.0 (13.9 to 23.1)	402.5 (312.5 to 517.6)	2.4 (1.4 to 3.7)	5.8% (-1.3 to 13.5)	-4.1% (-12.3 to 4.5)	-3.6% (-9.8 to 3.0)	-12.0% (-19.8 to -3.9)*
Meningococcal meningitis complications	1058.6 (749.6 to 1404.6)	..	96.6 (65.7 to 132.1)	12.6% (9.6 to 15.6)*	-3.2% (-6.3 to -0.1)*	-10.0% (-12.5 to -7.4)*	-12.9% (-15.9 to -10.1)*
Other meningitis	5015.1 (3735.5 to 6370.4)	3935.7 (3466.6 to 4569.8)	425.7 (292.3 to 570.1)	5.6% (2.9 to 8.6)*	58.6% (53.4 to 64.1)*	-13.3% (-15.7 to -10.7)*	43.4% (38.7 to 48.4)*
Other acute bacterial meningitis	64.0 (54.6 to 76.8)	1519.8 (1296.4 to 1836.4)	8.5 (5.4 to 12.6)	-1.8% (-6.8 to 4.1)	54.1% (41.2 to 68.0)*	-8.3% (-13.1 to -3.2)*	42.9% (30.7 to 56.3)*
Acute viral meningitis	109.0 (95.5 to 125.5)	2416.0 (2142.8 to 2745.8)	14.5 (9.3 to 20.8)	6.8% (3.0 to 10.6)*	5.8% (0.5 to 11.4)*	-9.2% (-12.4 to -5.9)*	-3.9% (-9.0 to 1.6)
Other bacterial meningitis complications	4842.0 (3574.3 to 6179.3)	..	402.7 (275.3 to 539.5)	5.7% (2.8 to 9.0)*	61.6% (56.3 to 67.5)*	-13.6% (-16.2 to -10.8)*	46.1% (41.1 to 51.4)*
Encephalitis	6724.9 (3731.2 to 10760.4)	2220.5 (2189.1 to 2255.2)	524.1 (365.5 to 691.3)	9.0% (6.6 to 11.2)*	6.7% (4.6 to 8.9)*	-15.8% (-17.5 to -14.1)*	-6.2% (-8.1 to -4.3)*
Acute encephalitis	116.9 (115.1 to 118.8)	2220.5 (2189.1 to 2255.2)	15.5 (10.4 to 22.2)	14.1% (13.3 to 14.8)*	13.9% (13.4 to 14.3)*	-5.2% (-5.8 to -4.7)*	1.2% (0.8 to 1.6)*
Encephalitis complications	6608.0 (3613.0 to 10644.0)	..	508.6 (355.4 to 672.4)	8.8% (6.4 to 11.1)*	6.5% (4.3 to 8.8)*	-16.1% (-17.8 to -14.3)*	-6.5% (-8.4 to -4.5)*
Diphtheria	1.1 (0.7 to 1.7)	14.4 (9.7 to 22.4)	0.1 (0.0 to 0.1)	-76.4% (-81.7 to -69.1)*	-32.3% (-55.3 to 7.2)	-77.6% (-82.6 to -70.7)*	-36.7% (-58.7 to 1.1)
Whooping cough	1974.5 (1525.2 to 2490.2)	14413.5 (11134.0 to 18178.7)	98.1 (58.2 to 154.8)	-26.1% (-27.9 to -24.0)*	-8.2% (-10.3 to -6.3)*	-26.5% (-28.4 to -24.5)*	-12.9% (-14.8 to -11.0)*
Tetanus	59.6 (56.7 to 62.6)	79.2 (53.4 to 105.3)	1.7 (1.1 to 2.5)	-59.8% (-66.6 to -51.9)*	-28.6% (-39.7 to -17.5)*	-64.3% (-70.0 to -57.5)*	-36.2% (-46.2 to -26.1)*
Severe tetanus	4.4 (3.0 to 5.9)	79.2 (53.4 to 105.3)	0.6 (0.3 to 0.9)	-73.0% (-77.3 to -66.9)*	-57.0% (-67.1 to -42.6)*	-75.4% (-79.2 to -70.1)*	-61.3% (-70.2 to -48.0)*
Neonatal tetanus complications	55.2 (52.9 to 57.6)	..	1.1 (0.6 to 1.8)	12.2% (9.5 to 14.1)*	8.6% (6.6 to 10.3)*	-7.3% (-9.0 to -6.1)*	-2.0% (-3.7 to -0.5)*
Measles	572.3 (203.7 to 1267.9)	20888.3 (7433.5 to 46276.7)	51.4 (17.4 to 118.2)	-44.0% (-47.2 to -41.0)*	-46.7% (-51.4 to -41.5)*	-44.6% (-47.8 to -41.6)*	-49.7% (-54.1 to -44.8)*
Varicella and herpes zoster	6836.5 (6151.0 to 7510.6)	95660.6 (91657.3 to 99992.6)	311.4 (187.5 to 471.2)	38.1% (34.9 to 41.5)*	21.7% (19.1 to 24.3)*	1.8% (0.0 to 3.7)*	1.0% (-0.6 to 2.5)
Chickenpox	1236.7 (1200.1 to 1273.0)	64530.2 (62619.2 to 66422.9)	7.1 (2.8 to 15.0)	1.4% (-1.1 to 3.8)	5.8% (3.3 to 8.1)*	-0.9% (-3.1 to 1.4)	0.1% (-2.4 to 2.3)
Herpes zoster	5599.7 (4913.3 to 6277.7)	31130.4 (27271.7 to 35058.2)	304.3 (183.4 to 461.1)	39.5% (36.3 to 42.8)*	22.1% (19.5 to 24.8)*	1.9% (0.1 to 3.8)*	1.0% (-0.6 to 2.6)
Acute hepatitis	31960.4 (29698.0 to 34406.8)	340398.7 (319758.5 to 362492.1)	511.8 (334.5 to 739.0)	32.1% (21.7 to 42.8)*	7.5% (-0.8 to 17.2)	4.9% (-3.5 to 13.5)	-3.8% (-11.0 to 4.7)
Acute hepatitis A	13087.1 (12396.2 to 13831.2)	170132.3 (161150.2 to 179805.9)	211.2 (134.0 to 308.2)	24.2% (15.6 to 33.9)*	6.8% (0.2 to 13.5)*	5.6% (-1.7 to 13.6)	-0.4% (-6.9 to 6.3)
Acute hepatitis B	16793.7 (14752.6 to 19222.1)	145731.0 (128012.1 to 166802.5)	263.5 (169.6 to 398.1)	42.1% (21.9 to 65.7)*	8.4% (-6.2 to 26.7)	5.5% (-9.4 to 22.7)	-6.7% (-18.9 to 8.6)
Acute hepatitis C	587.4 (532.0 to 649.7)	5091.1 (4610.8 to 5631.1)	8.2 (4.0 to 15.8)	5.7% (0.7 to 10.9)*	3.1% (-1.3 to 7.5)	-8.6% (-12.4 to -4.9)*	-7.1% (-11.4 to -3.0)*
Acute hepatitis E	1492.1 (1330.2 to 1674.3)	19444.3 (17332.9 to 21836.3)	28.9 (17.9 to 43.5)	20.6% (10.1 to 32.1)*	6.5% (-1.8 to 15.7)	-0.4% (-8.6 to 8.9)	-1.9% (-9.6 to 6.2)
Other unspecified infectious diseases	53643.7 (52688.5 to 54671.1)	..	1624.1 (1084.1 to 2337.5)	-0.4% (-3.3 to 2.5)	-3.5% (-6.7 to -0.2)*	-16.0% (-18.3 to -13.8)*	-12.1% (-15.1 to -9.0)*

(Table 1 continues on next page)



	Prevalence (thousands) 2017 counts	Incidence (thousands) 2017 counts	YLDs (thousands)				
			2017 counts	Percentage change in counts, 1990-2007	Percentage change in counts, 2007-17	Percentage change in age-standardised rates, 1990-2007	Percentage change in age-standardised rates, 2007-17
(Continued from previous page)							
Guillain-Barré syndrome due to other infectious diseases	7.4 (5.0 to 10.7)	..	2.2 (1.2 to 3.6)	29.2% (25.3 to 33.5)*	18.0% (15.5 to 20.6)*	2.7% (1.1 to 4.3)*	3.1% (2.0 to 4.2)*
Other infectious diseases	..	..	187.2 (114.4 to 291.1)	12.3% (8.1 to 15.9)*	18.0% (15.7 to 20.2)*	-11.2% (-14.3 to -8.6)*	6.0% (4.1 to 7.8)*
Anaemia due to other infectious diseases	53 636.3 (52 678.9 to 54 662.5)	..	1434.7 (967.8 to 2073.7)	-1.6% (-4.7 to 1.4)	-5.7% (-9.1 to -2.2)*	-16.5% (-19.0 to -14.1)*	-13.9% (-17.2 to -10.6)*
<b>Maternal and neonatal disorders</b>	<b>158 835.8</b> <b>(140 427.7 to 179 076.8)</b>	<b>101 962.6</b> <b>(94 726.5 to 109 284.9)</b>	<b>29 894.3</b> <b>(22 429.9 to 38 381.6)</b>	<b>49.5%</b> <b>(44.8 to 54.4)*</b>	<b>22.6%</b> <b>(16.2 to 29.9)*</b>	<b>24.5%</b> <b>(20.8 to 28.3)*</b>	<b>11.3%</b> <b>(5.5 to 18.0)*</b>
Maternal disorders	8532.0 (7424.5 to 9856.9)	79 812.2 (72 665.3 to 87 135.8)	805.6 (570.1 to 1084.3)	0.7% (-8.3 to 10.5)	-3.3% (-12.0 to 7.1)	-21.9% (-28.6 to -14.6)*	-12.5% (-20.6 to -3.3)*
Maternal haemorrhage	1659.9 (1538.9 to 1777.6)	6988.4 (5611.4 to 8568.4)	60.9 (40.9 to 87.1)	-16.6% (-28.5 to -3.5)*	-4.5% (-18.5 to 11.5)	-32.4% (-42.0 to -21.7)*	-12.6% (-25.1 to 2.2)
Maternal haemorrhage complications	1506.9 (1412.6 to 1601.5)	..	35.5 (23.6 to 51.8)	-20.9% (-28.3 to -13.0)*	-6.7% (-14.7 to 1.1)	-35.8% (-41.7 to -29.6)*	-14.6% (-21.7 to -7.5)*
Maternal haemorrhage episode	153.0 (100.5 to 227.6)	6988.4 (5611.4 to 8568.4)	25.5 (15.0 to 40.0)	-9.3% (-35.3 to 30.5)	-1.2% (-32.3 to 41.8)	-26.6% (-47.7 to 5.4)	-9.5% (-37.8 to 30.0)
Maternal sepsis and other pregnancy-related infections	2989.5 (2502.7 to 3623.3)	12 060.9 (9668.8 to 14 890.9)	57.0 (29.3 to 101.3)	-1.7% (-39.7 to 68.6)	5.9% (-34.4 to 65.1)	-21.4% (-51.3 to 33.9)	-3.0% (-40.4 to 51.3)
Infertility due to puerperal sepsis	2073.0 (1839.6 to 2335.1)	113.0 (100.6 to 127.1)	10.4 (3.9 to 21.8)	39.6% (36.9 to 42.7)*	21.8% (19.2 to 24.3)*	-0.3% (-2.2 to 1.7)	6.6% (4.3 to 8.8)*
Maternal sepsis and other maternal infection episode	916.5 (511.3 to 1514.1)	11 947.9 (9553.3 to 14 781.0)	46.6 (22.8 to 85.5)	-6.9% (-46.6 to 75.8)	2.9% (-42.8 to 75.5)	-24.5% (-56.7 to 42.2)	-4.8% (-47.1 to 61.2)
Maternal hypertensive disorders	2849.8 (1890.6 to 3972.4)	15 830.2 (13 530.0 to 18 779.5)	143.1 (80.7 to 231.8)	-6.3% (-35.5 to 40.3)	-0.9% (-34.3 to 41.0)	-24.7% (-48.6 to 12.5)	-9.1% (-39.6 to 29.3)
Maternal hypertensive disorder complications	102.0 (97.7 to 107.0)	1600.2 (1535.3 to 1675.1)	6.7 (4.1 to 10.2)	38.4% (31.0 to 46.7)*	17.9% (10.7 to 24.7)*	9.7% (3.8 to 16.4)*	7.3% (0.7 to 13.4)*
Maternal hypertensive disorder episode	2747.7 (1789.8 to 3869.6)	14 230.0 (11 902.3 to 17 192.4)	136.4 (75.7 to 220.6)	-7.5% (-37.4 to 40.2)	-1.7% (-36.0 to 41.7)	-25.7% (-49.9 to 12.4)	-9.8% (-41.1 to 30.4)
Maternal obstructed labour and uterine rupture	1232.6 (1048.2 to 1449.1)	7915.2 (6032.2 to 10 169.3)	397.6 (260.5 to 551.0)	-0.9% (-6.0 to 5.2)	-10.7% (-15.8 to -5.0)*	-24.9% (-28.6 to -20.6)*	-20.0% (-24.5 to -14.9)*
Obstructed labour, acute event	105.1 (64.7 to 163.8)	7694.5 (5811.6 to 9959.4)	33.0 (16.8 to 55.9)	-9.9% (-42.7 to 51.8)	0.8% (-40.1 to 61.4)	-26.4% (-53.6 to 23.6)	-7.0% (-44.2 to 48.6)
Maternal obstructed labour complications	1127.5 (939.1 to 1338.2)	220.7 (179.2 to 267.7)	364.6 (238.5 to 506.1)	-0.1% (-4.2 to 4.3)	-11.6% (-15.7 to -7.2)*	-24.8% (-27.7 to -21.6)*	-21.1% (-24.7 to -17.3)*
Maternal abortive outcome	164.2 (109.5 to 234.1)	20 052.1 (16 262.0 to 25 281.8)	18.1 (10.2 to 29.7)	2.5% (-32.1 to 54.5)	2.4% (-34.5 to 51.8)	-18.0% (-45.6 to 24.0)	-5.6% (-39.4 to 39.1)
Ectopic pregnancy	138.7 (90.1 to 199.9)	16 965.4 (13 647.7 to 20 936.5)	15.1 (8.3 to 24.0)	35.5% (-10.4 to 115.0)	14.6% (-26.3 to 72.1)	6.5% (-29.1 to 68.3)	5.1% (-32.4 to 58.5)
Other maternal disorders	..	..	113.8 (80.5 to 154.3)	45.4% (32.0 to 60.0)*	20.1% (8.9 to 33.5)*	12.9% (3.0 to 23.8)*	9.0% (-1.0 to 21.2)
Neonatal disorders	150 455.9 (131 734.1 to 170 851.4)	22 150.4 (20 975.1 to 23 700.8)	29 088.7 (21 771.2 to 37 499.1)	52.1% (47.2 to 57.4)*	23.5% (16.8 to 31.2)*	27.0% (22.9 to 31.3)*	12.1% (6.2 to 19.2)*
Neonatal preterm birth	92 585.6 (81 049.6 to 106 597.3)	17 416.9 (17 182.7 to 17 646.4)	13 156.9 (9307.3 to 17 833.1)	46.0% (39.6 to 52.0)*	26.1% (10.6 to 41.4)*	22.2% (17.0 to 27.1)*	14.8% (0.7 to 28.6)*
Preterm birth complications	67 508.3 (56 539.6 to 81 115.5)	..	12 537.7 (8824.7 to 17 161.8)	48.4% (41.1 to 55.5)*	27.3% (10.6 to 43.7)*	24.7% (18.7 to 30.8)*	16.0% (0.8 to 30.8)*
Retinopathy of prematurity	11 361.8 (8979.6 to 13 871.7)	..	619.2 (415.3 to 861.4)	14.4% (10.0 to 18.7)*	6.1% (2.4 to 10.3)*	-8.6% (-12.3 to -5.0)*	-5.9% (-9.5 to -2.0)*
Uncomplicated preterm birth	13 715.6 (12 775.0 to 14 383.3)	17 416.9 (17 182.7 to 17 646.4)	..	..	..	..	..
Neonatal encephalopathy due to birth asphyxia and trauma	53 823.7 (39 817.7 to 70 951.7)	2753.4 (1840.4 to 4017.0)	9703.5 (5872.1 to 15 081.3)	69.8% (57.8 to 84.9)*	23.0% (19.3 to 27.6)*	39.5% (30.0 to 51.5)*	11.1% (7.7 to 14.9)*

(Table 1 continues on next page)

	Prevalence (thousands) 2017 counts	Incidence (thousands) 2017 counts	YLDs (thousands)				
			2017 counts	Percentage change in counts, 1990–2007	Percentage change in counts, 2007–17	Percentage change in age-standardised rates, 1990–2007	Percentage change in age-standardised rates, 2007–17
(Continued from previous page)							
Neonatal sepsis and other neonatal infections	14 268.5 (8908.0 to 21 573.1)	1326.7 (792.7 to 2284.9)	4171.9 (2230.5 to 7009.0)	44.7% (39.1 to 50.6)*	19.5% (15.9 to 22.5)*	17.5% (13.0 to 22.1)*	7.5% (4.3 to 10.1)*
Neonatal sepsis and other neonatal infection complications	13 944.6 (8561.4 to 21 248.8)	996.6 (472.4 to 1951.3)	4171.9 (2230.5 to 7009.0)	44.7% (39.1 to 50.6)*	19.5% (15.9 to 22.5)*	17.5% (13.0 to 22.1)*	7.5% (4.3 to 10.1)*
Neonatal sepsis and other neonatal infection episode	323.9 (254.4 to 405.5)	330.1 (259.0 to 413.2)	..	..	..	..	..
Haemolytic disease and other neonatal jaundice	2355.4 (2032.4 to 2684.1)	653.3 (269.5 to 1211.6)	877.7 (679.2 to 1090.3)	37.1% (33.2 to 40.9)*	20.2% (16.6 to 23.3)*	14.8% (11.4 to 17.9)*	9.3% (6.0 to 12.2)*
Other neonatal disorders	..	..	1178.7 (893.2 to 1519.2)	35.3% (31.1 to 39.6)*	16.0% (9.2 to 23.8)*	35.6% (31.4 to 39.9)*	9.7% (3.3 to 17.2)*
<b>Nutritional deficiencies</b>	<b>1 862 030.8</b> <b>(1 806 258.9 to 1 921 493.5)</b>	<b>1 186 745.8</b> <b>(1 089 728.9 to 1 283 530.0)</b>	<b>42 376.2</b> <b>(28 774.0 to 61 009.9)</b>	<b>-8.3%</b> <b>(-10.4 to -6.2)*</b>	<b>-7.8%</b> <b>(-10.6 to -4.9)*</b>	<b>-20.9%</b> <b>(-22.7 to -19.3)*</b>	<b>-16.1%</b> <b>(-18.5 to -13.4)*</b>
Protein-energy malnutrition	96 454.6 (93 495.9 to 99 611.1)	79 726.7 (76 183.7 to 83 392.8)	1798.0 (1167.7 to 2545.0)	-19.5% (-23.4 to -15.5)*	-3.4% (-6.3 to -0.7)*	-22.0% (-26.0 to -18.1)*	-10.1% (-12.8 to -7.6)*
Iodine deficiency	116 021.9 (104 300.5 to 128 878.3)	3027.9 (2734.2 to 3363.7)	2057.7 (1247.3 to 3255.6)	-33.6% (-38.2 to -27.8)*	-6.9% (-10.1 to -4.3)*	-46.4% (-50.2 to -41.9)*	-17.4% (-20.1 to -14.9)*
Visible goitre without symptoms	113 393.1 (101 868.1 to 126 335.9)	3027.9 (2734.2 to 3363.7)	1208.8 (590.5 to 2248.6)	-41.9% (-45.1 to -38.3)*	-6.1% (-8.2 to -4.4)*	-53.3% (-55.6 to -50.6)*	-17.4% (-19.2 to -15.9)*
Visible goitre with complications	2628.8 (1500.7 to 3684.3)	..	848.9 (445.5 to 1286.3)	-17.0% (-22.5 to -11.1)*	-8.1% (-15.8 to -3.1)*	-32.7% (-37.2 to -27.6)*	-17.3% (-24.2 to -12.8)*
Vitamin A deficiency	818 420.2 (748 849.9 to 892 688.1)	1 103 991.2 (1 007 169.1 to 1 199 987.2)	8313.0 (5398.6 to 12 150.6)	-19.7% (-22.9 to -16.7)*	-17.3% (-20.8 to -13.6)*	-23.0% (-26.0 to -20.2)*	-22.3% (-25.7 to -18.8)*
Asymptomatic vitamin A deficiency	600 048.0 (547 539.5 to 655 650.3)	1 103 991.2 (1 007 169.1 to 1 199 987.2)	..	..	..	..	..
Vitamin A deficiency complications	5403.4 (4329.4 to 6754.9)	..	304.0 (195.6 to 442.0)	23.8% (19.4 to 28.3)*	13.4% (9.9 to 17.1)*	8.8% (5.3 to 12.1)*	3.7% (0.6 to 7.1)*
Vitamin A deficiency with anaemia	212 971.7 (189 376.4 to 240 436.1)	..	8009.0 (5196.4 to 11 716.1)	-20.5% (-23.7 to -17.4)*	-18.1% (-21.8 to -14.3)*	-23.6% (-26.7 to -20.7)*	-23.0% (-26.5 to -19.5)*
Dietary iron deficiency	1136 043.5 (1 117 204.2 to 1 156 043.7)	..	30013.9 (20 323.3 to 43 628.0)	-0.2% (-2.8 to 2.2)	-5.2% (-8.3 to -1.9)*	-17.4% (-19.4 to -15.5)*	-14.3% (-17.2 to -11.4)*
Other nutritional deficiencies	..	..	193.6 (125.3 to 272.6)	-13.7% (-20.8 to -7.2)*	2.2% (-2.6 to 6.2)	-25.8% (-32.2 to -19.9)*	-9.6% (-13.9 to -6.2)*
<b>Non-communicable diseases</b>	<b>7 011 916.8</b> <b>(6 965 421.4 to 7 057 358.0)</b>	<b>10 813 562.6</b> <b>(10 375 088.4 to 11 286 148.0)</b>	<b>678 294.4</b> <b>(510 467.3 to 875 605.3)</b>	<b>35.0%</b> <b>(34.4 to 35.7)*</b>	<b>19.3%</b> <b>(18.8 to 19.9)*</b>	<b>-1.3%</b> <b>(-1.7 to -0.9)*</b>	<b>0.1%</b> <b>(-0.3 to 0.5)</b>
<b>Neoplasms</b>	<b>100 482.9</b> <b>(98 189.8 to 102 850.5)</b>	<b>24 361.6</b> <b>(21 911.3 to 27 310.3)</b>	<b>7775.2</b> <b>(5747.9 to 10 028.9)</b>	<b>59.3%</b> <b>(55.6 to 63.3)*</b>	<b>40.6%</b> <b>(38.3 to 43.2)*</b>	<b>8.5%</b> <b>(6.0 to 11.2)*</b>	<b>9.7%</b> <b>(7.6 to 12.0)*</b>
Lip and oral cavity cancer	1631.9 (1570.3 to 1691.6)	389.8 (374.5 to 404.4)	163.3 (120.3 to 212.3)	49.6% (44.6 to 54.6)*	39.8% (34.0 to 45.1)*	1.1% (-2.3 to 4.4)	9.2% (4.7 to 13.4)*
Diagnosis and primary therapy phase of mouth cancer	95.7 (92.1 to 99.1)	389.8 (374.5 to 404.4)	26.6 (18.0 to 36.6)	50.8% (44.8 to 57.1)*	40.1% (34.2 to 46.3)*	2.2% (-1.8 to 6.4)	9.8% (5.2 to 14.5)*
Controlled phase of mouth cancer	1364.1 (1312.8 to 1414.1)	..	62.4 (40.8 to 89.4)	51.8% (46.5 to 56.9)*	41.0% (35.3 to 46.7)*	3.6% (0.0 to 6.8)*	11.2% (6.7 to 15.6)*
Metastatic phase of mouth cancer	149.4 (143.4 to 154.9)	..	62.1 (42.6 to 81.2)	47.5% (41.0 to 54.6)*	38.5% (31.9 to 45.2)*	-1.0% (-5.3 to 3.6)	7.4% (2.3 to 12.5)*
Terminal phase of mouth cancer	22.7 (21.8 to 23.6)	..	12.2 (8.5 to 15.7)	47.4% (42.5 to 51.7)*	39.5% (33.9 to 44.5)*	-1.4% (-4.4 to 1.4)	7.8% (3.4 to 11.6)*

(Table 1 continues on next page)

	Prevalence (thousands) 2017 counts	Incidence (thousands) 2017 counts	YLDs (thousands)				
			2017 counts	Percentage change in counts, 1990-2007	Percentage change in counts, 2007-17	Percentage change in age-standardised rates, 1990-2007	Percentage change in age-standardised rates, 2007-17
(Continued from previous page)							
Nasopharynx cancer	508.7 (480.9 to 539.0)	109.8 (104.4 to 115.6)	52.3 (37.8 to 69.6)	6.6% (-1.2 to 14.3)	20.3% (13.7 to 28.1)*	-24.7% (-29.8 to -19.7)*	-1.6% (-7.0 to 4.5)
Diagnosis and primary therapy phase of nasopharynx cancer	29.1 (27.5 to 30.9)	109.8 (104.4 to 115.6)	8.3 (5.6 to 11.7)	7.7% (-0.9 to 17.5)	20.3% (12.0 to 29.9)*	-23.4% (-29.4 to -16.9)*	-0.7% (-7.4 to 6.9)
Controlled phase of nasopharynx cancer	427.7 (403.8 to 453.3)	..	20.3 (13.1 to 29.9)	6.7% (-1.8 to 15.3)	19.7% (12.1 to 28.1)*	-23.7% (-29.5 to -18.0)*	-0.7% (-6.9 to 6.0)
Metastatic phase of nasopharynx cancer	46.2 (43.9 to 48.7)	..	20.6 (14.1 to 27.7)	6.5% (-1.3 to 14.9)	20.9% (13.3 to 29.5)*	-25.6% (-30.6 to -19.9)*	-2.6% (-8.6 to 4.2)
Terminal phase of nasopharynx cancer	5.7 (5.4 to 5.9)	..	3.1 (2.1 to 4.0)	3.5% (-3.1 to 9.8)	20.7% (15.4 to 27.1)*	-27.8% (-32.2 to -23.8)*	-3.5% (-7.6 to 1.6)
Other pharynx cancer	440.8 (399.7 to 462.4)	179.3 (160.3 to 188.6)	59.2 (42.3 to 77.6)	61.7% (54.3 to 70.4)*	44.3% (35.0 to 51.2)*	10.1% (5.1 to 15.8)*	11.7% (4.4 to 16.9)*
Diagnosis and primary therapy phase of other pharynx cancer	24.6 (22.3 to 25.7)	179.3 (160.3 to 188.6)	7.0 (4.7 to 9.8)	69.9% (62.7 to 77.5)*	46.7% (38.2 to 53.0)*	15.7% (10.8 to 20.8)*	13.5% (7.0 to 18.4)*
Controlled phase of other pharynx cancer	334.1 (304.3 to 350.1)	..	15.5 (10.0 to 22.9)	72.0% (63.3 to 81.8)*	46.5% (37.3 to 54.0)*	17.5% (11.7 to 24.1)*	13.8% (6.6 to 19.6)*
Metastatic phase of other pharynx cancer	69.6 (62.2 to 73.2)	..	29.9 (20.4 to 39.7)	56.4% (48.1 to 66.2)*	42.7% (32.2 to 51.5)*	6.4% (0.6 to 12.8)*	10.3% (2.3 to 16.9)*
Terminal phase of other pharynx cancer	12.6 (11.2 to 13.3)	..	6.8 (4.7 to 8.7)	56.7% (49.4 to 64.7)*	44.2% (34.9 to 51.0)*	6.6% (1.5 to 11.8)*	11.3% (4.1 to 16.6)*
Oesophageal cancer	806.3 (782.1 to 829.8)	472.5 (459.5 to 485.3)	130.3 (94.5 to 166.4)	34.6% (29.1 to 40.2)*	19.0% (14.5 to 23.9)*	-9.1% (-12.7 to -5.3)*	-9.1% (-12.6 to -5.4)*
Diagnosis and primary therapy phase of oesophageal cancer	67.0 (65.0 to 69.0)	472.5 (459.5 to 485.3)	18.4 (12.4 to 25.4)	45.2% (37.3 to 53.9)*	23.9% (17.5 to 31.3)*	-1.3% (-6.7 to 4.5)	-5.0% (-9.9 to 0.8)
Controlled phase of oesophageal cancer	535.4 (518.8 to 552.0)	..	24.6 (16.0 to 35.8)	52.6% (45.9 to 58.7)*	26.1% (20.9 to 31.5)*	4.7% (0.1 to 8.8)*	-2.8% (-6.8 to 1.2)
Metastatic phase of oesophageal cancer	167.5 (162.9 to 171.9)	..	68.2 (47.0 to 89.1)	28.6% (22.5 to 35.2)*	16.1% (10.5 to 21.8)*	-13.3% (-17.4 to -8.9)*	-11.6% (-15.8 to -7.3)*
Terminal phase of oesophageal cancer	36.4 (35.4 to 37.4)	..	19.0 (13.4 to 24.3)	29.0% (21.9 to 36.6)*	16.7% (10.7 to 23.1)*	-13.1% (-17.9 to -8.2)*	-11.2% (-15.7 to -6.3)*
Stomach cancer	2823.2 (2740.2 to 2914.9)	1220.7 (1189.0 to 1254.6)	348.8 (255.9 to 448.5)	17.6% (14.4 to 20.9)*	32.7% (28.1 to 37.7)*	-20.8% (-23.0 to -18.6)*	1.2% (-2.3 to 5.0)
Diagnosis and primary therapy phase of stomach cancer	268.1 (260.2 to 276.6)	1220.7 (1189.0 to 1254.6)	70.1 (47.9 to 95.2)	22.1% (17.7 to 26.4)*	39.7% (34.3 to 45.6)*	-17.8% (-20.7 to -15.0)*	6.6% (2.5 to 11.1)*
Controlled phase of stomach cancer	2122.2 (2057.1 to 2193.0)	..	96.9 (62.7 to 140.7)	31.4% (28.3 to 34.8)*	54.0% (48.8 to 59.4)*	-11.0% (-13.1 to -8.8)*	18.1% (14.2 to 22.2)*
Metastatic phase of stomach cancer	344.3 (335.7 to 353.8)	..	137.3 (95.8 to 178.7)	11.2% (7.5 to 15.1)*	21.4% (16.9 to 26.2)*	-25.3% (-27.7 to -22.7)*	-7.4% (-10.8 to -3.9)*
Terminal phase of stomach cancer	88.7 (86.5 to 91.2)	..	44.6 (31.3 to 56.9)	11.8% (7.7 to 15.9)*	21.1% (16.3 to 26.8)*	-24.8% (-27.6 to -22.0)*	-7.7% (-11.4 to -3.5)*
Colon and rectum cancer	9352.3 (9143.0 to 9558.6)	1833.5 (1791.9 to 1873.5)	877.6 (650.2 to 1133.2)	70.2% (65.4 to 74.2)*	39.8% (35.9 to 43.6)*	12.3% (9.3 to 15.1)*	6.0% (3.1 to 9.0)*
Diagnosis and primary therapy phase of colon and rectum cancers	401.1 (391.8 to 410.2)	1833.5 (1791.9 to 1873.5)	103.1 (70.4 to 139.0)	78.5% (72.3 to 84.4)*	43.5% (38.3 to 48.8)*	18.7% (14.7 to 22.5)*	9.4% (5.4 to 13.4)*
Controlled phase of colon and rectum cancers	7946.7 (7764.5 to 8129.2)	..	453.5 (304.5 to 637.7)	83.2% (79.5 to 86.7)*	42.8% (38.9 to 47.0)*	22.9% (20.6 to 25.1)*	9.2% (6.3 to 12.3)*
Metastatic phase of colon and rectum cancers	653.8 (639.1 to 667.7)	..	253.1 (176.5 to 327.7)	54.5% (49.5 to 59.3)*	35.5% (31.2 to 40.2)*	0.6% (-2.4 to 3.5)	1.8% (-1.4 to 5.2)
Terminal phase of colon and rectum cancers	92.9 (90.8 to 94.9)	..	45.9 (32.6 to 57.9)	48.8% (42.5 to 54.6)*	33.5% (28.3 to 38.2)*	-2.9% (-6.8 to 0.7)	0.2% (-3.7 to 3.8)

(Table 1 continues on next page)

	Prevalence (thousands) 2017 counts	Incidence (thousands) 2017 counts	YLDs (thousands)				
			2017 counts	Percentage change in counts, 1990–2007	Percentage change in counts, 2007–17	Percentage change in age-standardised rates, 1990–2007	Percentage change in age-standardised rates, 2007–17
(Continued from previous page)							
Stoma from colon and rectum cancers, beyond 10 years	257.8 (249.3 to 266.6)	..	22.1 (15.3 to 30.0)	52.3% (47.4 to 57.0)*	28.3% (25.1 to 31.6)*	-3.5% (-6.5 to -0.6)*	-5.2% (-7.6 to -2.9)*
Liver cancer	803.4 (753.1 to 856.7)	953.1 (916.5 to 997.0)	229.5 (163.9 to 301.7)	52.2% (44.8 to 60.5)*	39.8% (34.2 to 47.3)*	4.4% (-0.6 to 9.9)	8.1% (3.8 to 13.7)*
Liver cancer due to hepatitis B	661.2 (617.3 to 713.0)	404.0 (378.3 to 434.1)	98.1 (69.9 to 129.6)	42.1% (34.2 to 52.6)*	38.1% (30.2 to 48.7)*	-1.5% (-7.0 to 5.6)	8.6% (2.5 to 17.0)*
Diagnosis and primary therapy phase of liver cancer due to hepatitis B	97.9 (91.6 to 105.1)	404.0 (378.3 to 434.1)	26.6 (18.0 to 37.2)	40.5% (29.7 to 53.4)*	35.2% (24.8 to 48.0)*	-2.5% (-9.9 to 6.5)	6.4% (-1.6 to 16.5)
Controlled phase of liver cancer due to hepatitis B	453.6 (422.8 to 490.7)	..	21.3 (13.7 to 31.5)	61.5% (50.8 to 75.1)*	70.3% (58.3 to 84.7)*	12.0% (4.8 to 21.1)*	35.0% (25.4 to 46.4)*
Metastatic phase of liver cancer due to hepatitis B	78.5 (73.5 to 84.4)	..	33.5 (22.9 to 44.7)	37.4% (27.3 to 50.4)*	29.1% (19.7 to 40.9)*	-4.7% (-11.8 to 4.0)	1.5% (-6.0 to 10.7)
Terminal phase of liver cancer due to hepatitis B	31.3 (29.3 to 33.6)	..	16.7 (11.5 to 21.7)	37.9% (31.2 to 47.0)*	29.3% (22.3 to 39.6)*	-4.4% (-9.0 to 1.7)	1.5% (-4.0 to 9.5)
Liver cancer due to hepatitis C	366.5 (341.7 to 391.6)	257.9 (241.3 to 274.5)	60.6 (43.0 to 79.7)	62.2% (54.8 to 68.9)*	38.8% (34.3 to 44.5)*	9.7% (4.6 to 14.2)*	4.9% (1.5 to 9.2)*
Diagnosis and primary therapy phase of liver cancer due to hepatitis C	60.8 (56.9 to 64.7)	257.9 (241.3 to 274.5)	16.8 (11.3 to 23.4)	61.1% (53.2 to 68.2)*	37.3% (31.9 to 43.9)*	8.8% (3.5 to 13.5)*	3.7% (-0.3 to 8.7)
Controlled phase of liver cancer due to hepatitis C	234.4 (217.9 to 250.9)	..	10.9 (6.9 to 15.9)	82.3% (72.8 to 92.3)*	56.4% (48.6 to 65.8)*	25.9% (19.4 to 32.6)*	19.6% (13.6 to 26.7)*
Metastatic phase of liver cancer due to hepatitis C	51.0 (47.7 to 54.3)	..	22.1 (14.9 to 29.5)	57.6% (49.8 to 64.5)*	34.4% (29.1 to 40.1)*	6.2% (1.0 to 10.8)*	1.4% (-2.6 to 5.7)
Terminal phase of liver cancer due to hepatitis C	20.3 (19.0 to 21.6)	..	10.9 (7.6 to 14.1)	58.4% (51.0 to 64.7)*	34.7% (30.9 to 39.7)*	6.7% (1.8 to 10.7)*	1.5% (-1.4 to 5.2)
Liver cancer due to alcohol use	206.3 (180.7 to 239.9)	143.9 (127.2 to 165.0)	34.7 (24.8 to 47.1)	62.6% (52.2 to 70.8)*	39.4% (33.7 to 46.1)*	9.6% (2.7 to 15.0)*	7.2% (2.9 to 12.1)*
Diagnosis and primary therapy phase of liver cancer due to alcohol use	34.0 (30.0 to 39.1)	143.9 (127.2 to 165.0)	9.7 (6.4 to 13.9)	61.1% (50.9 to 69.6)*	38.5% (32.0 to 45.2)*	8.5% (1.7 to 14.1)*	6.4% (1.7 to 11.4)*
Controlled phase of liver cancer due to alcohol use	132.6 (115.1 to 155.3)	..	6.2 (3.8 to 9.2)	88.0% (74.5 to 101.3)*	55.3% (45.5 to 65.6)*	28.8% (19.5 to 37.8)*	20.5% (13.1 to 28.5)*
Metastatic phase of liver cancer due to alcohol use	28.4 (25.2 to 32.6)	..	12.7 (8.6 to 17.4)	57.1% (47.4 to 65.0)*	35.4% (29.9 to 41.7)*	5.7% (-0.7 to 10.8)	3.9% (-0.2 to 8.5)
Terminal phase of liver cancer due to alcohol use	11.3 (10.0 to 13.0)	..	6.1 (4.2 to 8.1)	57.4% (47.4 to 65.1)*	35.3% (30.3 to 41.2)*	5.9% (-0.8 to 10.8)	3.8% (0.2 to 8.2)*
Liver cancer due to NASH	97.4 (86.8 to 108.0)	72.2 (64.6 to 79.9)	17.5 (12.3 to 23.1)	74.4% (63.9 to 83.0)*	52.5% (47.5 to 58.9)*	18.2% (11.2 to 23.6)*	16.1% (12.4 to 20.9)*
Diagnosis and primary therapy phase of liver cancer due to NASH	16.9 (15.1 to 18.6)	72.2 (64.6 to 79.9)	4.8 (3.2 to 6.7)	73.3% (62.6 to 81.8)*	51.4% (46.5 to 57.5)*	17.3% (10.3 to 22.7)*	15.2% (11.6 to 19.8)*
Controlled phase of liver cancer due to NASH	60.5 (53.5 to 67.4)	..	2.9 (1.8 to 4.4)	93.7% (82.0 to 103.9)*	75.6% (66.7 to 85.7)*	34.2% (26.1 to 40.9)*	35.6% (28.9 to 43.7)*
Metastatic phase of liver cancer due to NASH	14.3 (12.8 to 15.9)	..	6.5 (4.4 to 8.7)	70.7% (60.0 to 79.0)*	47.3% (42.7 to 53.3)*	15.3% (8.4 to 20.6)*	11.9% (8.4 to 16.3)*
Terminal phase of liver cancer due to NASH	5.7 (5.1 to 6.3)	..	3.2 (2.2 to 4.2)	70.7% (60.0 to 79.0)*	47.3% (42.6 to 53.3)*	15.3% (8.3 to 20.6)*	11.9% (8.4 to 16.3)*
Liver cancer due to other causes	114.8 (102.2 to 128.7)	75.1 (67.5 to 83.3)	18.6 (13.2 to 25.1)	43.9% (36.4 to 52.0)*	42.3% (36.1 to 50.4)*	-0.3% (-5.4 to 5.0)	11.0% (6.5 to 17.2)*
Diagnosis and primary therapy phase of liver cancer due to other causes	18.0 (16.1 to 20.0)	75.1 (67.5 to 83.3)	5.2 (3.5 to 7.3)	42.7% (35.2 to 50.5)*	40.6% (34.9 to 47.9)*	-1.1% (-6.0 to 4.0)	9.7% (5.4 to 15.3)*
Controlled phase of liver cancer due to other causes	76.3 (67.5 to 85.8)	..	3.7 (2.3 to 5.5)	61.3% (51.7 to 72.7)*	68.1% (56.9 to 81.0)*	12.3% (5.8 to 20.1)*	32.7% (23.7 to 42.5)*

(Table 1 continues on next page)

	Prevalence (thousands) 2017 counts	Incidence (thousands) 2017 counts	YLDs (thousands)				
			2017 counts	Percentage change in counts, 1990-2007	Percentage change in counts, 2007-17	Percentage change in age-standardised rates, 1990-2007	Percentage change in age-standardised rates, 2007-17
(Continued from previous page)							
Metastatic phase of liver cancer due to other causes	14.7 (13.2 to 16.3)	..	6.6 (4.5 to 9.0)	40.0% (32.7 to 47.7)*	35.3% (30.0 to 42.2)*	-3.1% (-7.8 to 2.0)	5.4% (1.4 to 10.6)*
Terminal phase of liver cancer due to other causes	5.8 (5.3 to 6.5)	..	3.2 (2.2 to 4.1)	40.0% (32.7 to 47.7)*	35.3% (30.0 to 42.2)*	-3.1% (-7.8 to 2.0)	5.4% (1.4 to 10.6)*
Gallbladder and biliary tract cancer	235.9 (209.6 to 252.6)	210.9 (186.1 to 225.4)	49.1 (34.4 to 64.3)	33.4% (23.2 to 38.9)*	34.6% (28.1 to 41.4)*	-12.1% (-18.8 to -8.5)*	1.4% (-3.7 to 6.8)
Diagnosis and primary therapy phase of gallbladder and biliary tract cancer	33.7 (29.9 to 35.9)	210.9 (186.1 to 225.4)	9.3 (6.2 to 12.9)	34.1% (24.3 to 39.7)*	35.5% (28.5 to 42.6)*	-11.7% (-18.1 to -7.9)*	2.1% (-3.3 to 7.8)
Controlled phase of gallbladder and biliary tract cancer	126.7 (113.2 to 136.4)	..	5.8 (3.7 to 8.5)	36.9% (28.6 to 44.3)*	53.1% (42.0 to 64.3)*	-8.1% (-13.8 to -3.1)*	17.5% (8.9 to 26.4)*
Metastatic phase of gallbladder and biliary tract cancer	58.6 (51.7 to 62.7)	..	25.0 (16.8 to 33.4)	32.9% (21.7 to 39.8)*	31.7% (25.3 to 38.3)*	-12.6% (-20.0 to -8.0)*	-1.0% (-6.1 to 4.3)
Terminal phase of gallbladder and biliary tract cancer	16.9 (14.9 to 18.1)	..	8.9 (6.2 to 11.6)	32.3% (21.9 to 37.2)*	31.4% (25.4 to 37.6)*	-13.3% (-20.0 to -9.8)*	-1.4% (-6.0 to 3.6)
Pancreatic cancer	380.6 (372.7 to 388.4)	447.7 (438.6 to 456.3)	91.9 (64.7 to 119.3)	65.8% (62.2 to 69.6)*	38.5% (34.8 to 42.2)*	9.8% (7.3 to 12.4)*	4.7% (1.8 to 7.6)*
Diagnosis and primary therapy phase of pancreatic cancer	99.0 (97.0 to 101.0)	447.7 (438.6 to 456.3)	26.5 (18.1 to 36.2)	65.4% (60.1 to 70.8)*	38.7% (33.2 to 43.5)*	9.6% (6.0 to 13.2)*	4.8% (0.6 to 8.4)*
Controlled phase of pancreatic cancer	151.7 (148.4 to 155.0)	..	7.1 (4.6 to 10.3)	102.1% (96.0 to 109.5)*	35.1% (30.2 to 40.4)*	37.5% (33.3 to 42.6)*	5.1% (1.4 to 9.2)*
Metastatic phase of pancreatic cancer	93.2 (91.3 to 95.0)	..	38.9 (26.7 to 51.3)	62.5% (57.6 to 67.8)*	39.1% (34.2 to 44.0)*	7.7% (4.3 to 11.2)*	4.8% (1.0 to 8.6)*
Terminal phase of pancreatic cancer	36.7 (35.9 to 37.4)	..	19.4 (13.6 to 24.8)	62.1% (59.3 to 65.0)*	38.6% (34.9 to 41.9)*	6.6% (4.6 to 8.6)*	4.4% (1.6 to 7.0)*
Larynx cancer	1094.9 (1074.7 to 1118.4)	210.6 (206.4 to 215.5)	109.4 (79.7 to 142.5)	25.1% (21.7 to 28.5)*	34.2% (30.6 to 37.9)*	-14.9% (-17.2 to -12.6)*	2.8% (0.0 to 5.6)*
Diagnosis and primary therapy phase of larynx cancer	65.3 (64.1 to 66.8)	210.6 (206.4 to 215.5)	18.1 (12.3 to 24.9)	27.6% (22.0 to 33.4)*	38.1% (32.8 to 43.5)*	-13.1% (-17.0 to -9.1)*	5.8% (1.7 to 9.9)*
Controlled phase of larynx cancer	882.3 (864.9 to 902.3)	..	48.7 (32.0 to 70.1)	28.2% (24.5 to 31.8)*	36.5% (32.5 to 40.5)*	-12.3% (-14.7 to -9.8)*	4.9% (1.9 to 8.0)*
Metastatic phase of larynx cancer	79.7 (78.1 to 81.6)	..	33.8 (23.2 to 44.7)	19.9% (14.9 to 24.9)*	30.8% (25.3 to 36.1)*	-18.8% (-22.2 to -15.5)*	-0.1% (-4.3 to 4.0)
Terminal phase of larynx cancer	11.3 (11.0 to 11.6)	..	6.1 (4.2 to 7.8)	16.3% (13.9 to 19.0)*	28.2% (25.1 to 31.3)*	-21.3% (-22.9 to -19.6)*	-2.2% (-4.5 to 0.2)
Laryngectomy from larynx cancer, beyond 10 years	56.3 (54.4 to 58.2)	..	2.7 (1.7 to 4.1)	48.5% (43.6 to 53.7)*	25.6% (21.0 to 30.3)*	-0.8% (-4.3 to 2.7)	-4.5% (-8.0 to -0.9)*
Tracheal, bronchus, and lung cancer	3343.1 (3267.9 to 3422.5)	2163.1 (2117.0 to 2212.9)	537.1 (393.6 to 677.2)	51.6% (47.5 to 55.5)*	41.0% (36.8 to 45.4)*	2.9% (0.1 to 5.5)*	7.2% (3.9 to 10.4)*
Diagnosis and primary therapy phase of tracheal, bronchus, and lung cancer	219.5 (214.6 to 224.8)	2163.1 (2117.0 to 2212.9)	57.0 (39.1 to 77.4)	64.3% (58.4 to 69.9)*	51.1% (45.1 to 57.5)*	11.4% (7.3 to 15.2)*	14.9% (10.3 to 19.7)*
Controlled phase of tracheal, bronchus, and lung cancer	2188.1 (2137.3 to 2241.4)	..	99.3 (64.4 to 144.3)	87.5% (83.3 to 91.7)*	65.8% (61.2 to 70.5)*	28.0% (25.1 to 30.7)*	26.4% (22.9 to 30.0)*
Metastatic phase of tracheal, bronchus, and lung cancer	765.7 (749.5 to 783.3)	..	299.0 (208.3 to 387.8)	44.3% (40.1 to 48.2)*	34.5% (30.1 to 38.7)*	-2.0% (-4.8 to 0.5)	2.2% (-1.1 to 5.3)
Terminal phase of tracheal, bronchus, and lung cancer	169.8 (166.2 to 173.7)	..	81.8 (58.1 to 103.2)	44.3% (38.9 to 49.6)*	34.0% (28.8 to 39.6)*	-2.2% (-5.7 to 1.3)	1.8% (-2.1 to 6.0)

(Table 1 continues on next page)



	Prevalence (thousands) 2017 counts	Incidence (thousands) 2017 counts	YLDs (thousands)				
			2017 counts	Percentage change in counts, 1990–2007	Percentage change in counts, 2007–17	Percentage change in age-standardised rates, 1990–2007	Percentage change in age-standardised rates, 2007–17
(Continued from previous page)							
Malignant skin melanoma	2324.4 (1794.8 to 2796.2)	308.7 (237.6 to 365.9)	140.9 (90.8 to 201.6)	104.3% (82.1 to 111.6)*	32.3% (27.0 to 36.9)*	41.3% (24.4 to 46.9)*	4.9% (0.9 to 8.6)*
Diagnosis and primary therapy phase of malignant skin melanoma	64.1 (49.0 to 76.8)	308.7 (237.6 to 365.9)	17.5 (11.0 to 25.2)	110.3% (89.4 to 118.3)*	32.4% (26.1 to 38.8)*	46.4% (30.5 to 52.6)*	5.4% (0.5 to 10.6)*
Controlled phase of malignant skin melanoma	2208.7 (1709.0 to 2662.4)	..	101.2 (59.9 to 154.2)	113.8% (93.9 to 121.4)*	32.9% (27.7 to 37.9)*	50.2% (34.9 to 55.4)*	6.4% (2.3 to 10.7)*
Metastatic phase of malignant skin melanoma	44.3 (32.7 to 49.6)	..	18.4 (11.3 to 25.1)	68.4% (40.0 to 80.0)*	29.5% (22.6 to 35.5)*	12.5% (-7.3 to 20.9)	-1.6% (-6.9 to 3.2)
Terminal phase of malignant skin melanoma	7.3 (5.4 to 8.2)	..	3.9 (2.4 to 5.2)	64.2% (37.2 to 73.7)*	28.7% (21.6 to 33.9)*	9.0% (-9.7 to 15.6)	-2.6% (-7.8 to 1.3)
Non-melanoma skin cancer	2537.1 (1666.4 to 3696.8)	7663.6 (5251.1 to 10570.3)	90.2 (49.5 to 149.0)	211.2% (142.3 to 305.0)*	32.7% (25.3 to 40.0)*	96.8% (46.7 to 162.7)*	-2.0% (-7.7 to 3.9)
Non-melanoma skin cancer (squamous-cell carcinoma)	2158.9 (1294.8 to 3255.8)	1778.8 (1068.8 to 2620.9)	87.7 (46.9 to 146.3)	221.7% (148.5 to 334.5)*	32.8% (25.0 to 40.0)*	102.5% (47.3 to 180.3)*	-2.0% (-7.8 to 4.0)
Non-melanoma skin cancer (basal-cell carcinoma)	596.8 (325.9 to 947.0)	5884.8 (3702.9 to 8742.9)	2.5 (0.9 to 5.2)	44.5% (20.3 to 76.5)*	30.8% (23.1 to 37.0)*	-3.8% (-21.1 to 18.1)	-1.0% (-6.4 to 3.2)
Breast cancer	16 697.3 (16 178.9 to 17 171.7)	1960.7 (1891.4 to 2023.2)	1307.9 (932.0 to 1769.3)	67.7% (60.6 to 72.7)*	33.8% (29.0 to 37.7)*	11.7% (7.1 to 15.0)*	4.5% (0.7 to 7.5)*
Diagnosis and primary therapy phase of breast cancer	416.5 (401.4 to 430.2)	1960.7 (1891.4 to 2023.2)	107.8 (75.1 to 146.7)	71.1% (61.6 to 79.5)*	36.1% (29.4 to 42.2)*	15.1% (9.0 to 20.4)*	7.3% (2.2 to 11.9)*
Controlled phase of breast cancer	13 532.2 (13 027.8 to 13 977.4)	..	843.4 (538.9 to 1218.3)	74.5% (66.8 to 79.7)*	34.4% (29.3 to 38.7)*	17.7% (12.9 to 21.0)*	6.0% (2.1 to 9.3)*
Metastatic phase of breast cancer	676.3 (654.5 to 697.0)	..	263.8 (183.5 to 341.1)	57.5% (49.2 to 64.5)*	33.4% (28.0 to 38.2)*	2.8% (-2.1 to 7.0)	2.3% (-1.8 to 5.8)
Terminal phase of breast cancer	52.0 (50.4 to 54.0)	..	26.9 (18.8 to 34.2)	49.6% (40.4 to 57.4)*	31.4% (25.7 to 36.4)*	-2.1% (-7.7 to 2.8)	0.5% (-3.9 to 4.4)
Mastectomy from breast cancer, beyond 10 years	2020.3 (1957.2 to 2080.1)	..	66.0 (38.5 to 102.5)	38.5% (35.8 to 41.3)*	25.8% (23.9 to 27.7)*	-9.5% (-11.2 to -7.8)*	-6.2% (-7.5 to -4.7)*
Cervical cancer	3657.9 (3364.6 to 3803.1)	601.2 (554.5 to 625.4)	288.1 (205.6 to 381.5)	24.2% (12.3 to 32.3)*	18.9% (12.6 to 23.2)*	-14.2% (-22.3 to -8.7)*	-1.7% (-6.8 to 1.8)
Diagnosis and primary therapy phase of cervical cancer	187.6 (172.7 to 195.1)	601.2 (554.5 to 625.4)	51.4 (34.5 to 70.5)	26.3% (13.6 to 35.9)*	19.2% (12.2 to 25.5)*	-12.2% (-21.1 to -6.0)*	-0.8% (-6.7 to 4.2)
Controlled phase of cervical cancer	3275.4 (3011.5 to 3405.2)	..	151.8 (96.7 to 222.6)	25.7% (13.5 to 34.1)*	19.7% (13.5 to 24.1)*	-12.4% (-20.8 to -6.8)*	0.1% (-5.2 to 3.7)
Metastatic phase of cervical cancer	171.3 (158.6 to 178.3)	..	72.2 (48.9 to 95.3)	20.9% (10.1 to 29.0)*	17.4% (10.9 to 22.9)*	-17.6% (-24.7 to -12.4)*	-5.1% (-10.3 to -0.6)*
Terminal phase of cervical cancer	23.6 (21.9 to 24.6)	..	12.8 (8.8 to 16.4)	17.5% (7.5 to 24.9)*	17.4% (11.7 to 21.6)*	-20.4% (-27.0 to -15.7)*	-6.4% (-10.9 to -3.0)*
Uterine cancer	3084.6 (3005.7 to 3171.3)	406.8 (396.7 to 418.0)	210.9 (151.5 to 279.7)	65.8% (60.6 to 71.6)*	36.5% (32.7 to 41.1)*	11.0% (7.5 to 14.9)*	4.9% (1.9 to 8.2)*
Diagnosis and primary therapy phase of uterine cancer	141.8 (138.2 to 145.8)	406.8 (396.7 to 418.0)	37.5 (25.9 to 51.1)	69.1% (60.6 to 78.2)*	37.4% (30.9 to 44.1)*	13.5% (7.8 to 19.7)*	5.9% (1.0 to 10.9)*
Controlled phase of uterine cancer	2838.0 (2765.2 to 2918.0)	..	129.3 (84.2 to 188.0)	72.5% (67.5 to 78.1)*	38.3% (34.6 to 43.0)*	16.6% (13.3 to 20.2)*	6.9% (4.1 to 10.5)*
Metastatic phase of uterine cancer	94.9 (92.6 to 97.4)	..	38.8 (26.7 to 50.7)	48.4% (40.9 to 56.2)*	31.1% (25.7 to 37.3)*	-2.3% (-7.2 to 2.9)	-1.0% (-5.2 to 3.8)
Terminal phase of uterine cancer	9.9 (9.7 to 10.2)	..	5.3 (3.7 to 6.8)	42.2% (38.7 to 46.5)*	29.0% (25.9 to 33.0)*	-6.6% (-8.8 to -3.9)*	-3.1% (-5.4 to -0.1)*
Ovarian cancer	1353.0 (1313.7 to 1401.1)	286.1 (278.1 to 295.3)	176.1 (127.9 to 224.2)	48.9% (42.2 to 56.6)*	27.7% (22.9 to 32.9)*	1.6% (-2.6 to 6.5)	2.2% (-1.6 to 6.4)

(Table 1 continues on next page)

	Prevalence (thousands) 2017 counts	Incidence (thousands) 2017 counts	YLDs (thousands)				
			2017 counts	Percentage change in counts, 1990-2007	Percentage change in counts, 2007-17	Percentage change in age-standardised rates, 1990-2007	Percentage change in age-standardised rates, 2007-17
(Continued from previous page)							
Diagnosis and primary therapy phase of ovarian cancer	48.1 (46.7 to 49.8)	286.1 (278.1 to 295.3)	13.8 (9.3 to 19.2)	51.7% (45.5 to 58.8)*	28.4% (23.9 to 33.0)*	4.4% (0.5 to 8.9)*	3.7% (0.1 to 7.4)*
Controlled phase of ovarian cancer	1027.2 (997.4 to 1064.3)	..	47.3 (30.3 to 69.3)	52.7% (45.2 to 60.7)*	28.6% (23.2 to 33.9)*	5.8% (0.9 to 11.0)*	4.5% (0.2 to 8.9)*
Metastatic phase of ovarian cancer	261.4 (253.9 to 270.1)	..	106.2 (72.2 to 139.2)	47.4% (40.1 to 55.7)*	27.2% (21.3 to 33.5)*	0.1% (-4.7 to 5.5)	1.2% (-3.5 to 6.3)
Terminal phase of ovarian cancer	16.3 (15.8 to 16.8)	..	8.8 (6.1 to 11.2)	42.6% (37.6 to 48.5)*	29.0% (25.2 to 32.9)*	-4.6% (-7.6 to -1.0)*	-0.1% (-2.9 to 3.1)
Prostate cancer	9901.9 (8810.8 to 12762.0)	1334.3 (1170.9 to 1697.9)	843.2 (614.4 to 1146.4)	97.5% (87.3 to 125.6)*	41.0% (36.3 to 50.9)*	27.7% (20.5 to 46.5)*	5.6% (2.1 to 13.2)*
Diagnosis and primary therapy phase of prostate cancer	342.9 (303.1 to 446.1)	1334.3 (1170.9 to 1697.9)	86.1 (57.9 to 121.6)	115.8% (103.5 to 149.5)*	44.0% (37.3 to 56.3)*	42.5% (34.4 to 65.2)*	8.6% (3.6 to 17.9)*
Controlled phase of prostate cancer	8443.6 (7481.1 to 11011.9)	..	476.0 (309.6 to 698.6)	123.7% (113.6 to 156.9)*	43.3% (38.4 to 54.7)*	49.5% (42.7 to 72.3)*	8.3% (4.5 to 17.1)*
Metastatic phase of prostate cancer	653.8 (568.1 to 817.9)	..	244.6 (168.2 to 321.2)	63.3% (56.2 to 86.0)*	36.4% (31.6 to 44.7)*	2.9% (-1.5 to 17.2)	1.1% (-2.4 to 7.5)
Terminal phase of prostate cancer	39.7 (34.2 to 48.1)	..	18.5 (13.0 to 23.8)	57.9% (47.9 to 75.1)*	35.1% (28.7 to 43.8)*	-0.7% (-6.9 to 10.3)	-0.5% (-5.1 to 6.2)
Impotence and incontinence after 10-year survival from prostate cancer	421.9 (411.4 to 432.6)	..	18.1 (12.6 to 25.0)	61.8% (57.7 to 66.2)*	35.0% (31.2 to 38.9)*	0.5% (-1.9 to 3.1)	-1.6% (-4.2 to 1.1)
Testicular cancer	578.0 (556.4 to 603.6)	71.3 (68.8 to 74.4)	36.2 (24.8 to 49.6)	51.2% (44.3 to 58.7)*	23.8% (18.3 to 29.5)*	14.7% (9.4 to 20.4)*	9.0% (4.1 to 14.1)*
Diagnosis and primary therapy phase of testicular cancer	18.9 (18.2 to 19.7)	71.3 (68.8 to 74.4)	5.4 (3.6 to 7.5)	55.1% (48.5 to 62.3)*	24.9% (19.2 to 30.8)*	18.2% (13.3 to 23.5)*	10.4% (5.4 to 15.6)*
Controlled phase of testicular cancer	549.1 (528.5 to 573.5)	..	26.1 (16.8 to 38.7)	55.3% (47.5 to 64.2)*	25.0% (19.0 to 31.4)*	18.7% (12.7 to 25.4)*	10.7% (5.2 to 16.2)*
Metastatic phase of testicular cancer	9.0 (8.7 to 9.4)	..	4.1 (2.8 to 5.4)	31.0% (26.1 to 35.8)*	16.9% (13.1 to 21.2)*	-3.8% (-7.2 to -0.3)*	-0.3% (-3.5 to 3.4)
Terminal phase of testicular cancer	1.0 (1.0 to 1.1)	..	0.6 (0.4 to 0.7)	22.7% (17.7 to 27.7)*	9.9% (6.2 to 14.3)*	-8.8% (-12.4 to -5.2)*	-5.7% (-8.8 to -1.8)*
Kidney cancer	2184.1 (2081.8 to 2249.0)	393.0 (371.2 to 404.6)	141.0 (101.2 to 190.1)	50.2% (44.0 to 58.6)*	7.2% (18.8 to 28.9)*	-2.2% (3.5 to 12.3)*	-2.2% (-6.3 to 1.6)
Diagnosis and primary therapy phase of kidney cancer	..	393.0 (371.2 to 404.6)	..	..	..	..	..
Controlled phase of kidney cancer	2080.7 (1985.3 to 2143.1)	..	95.6 (62.2 to 139.5)	47.6% (39.9 to 57.7)*	22.6% (16.8 to 27.7)*	8.2% (3.8 to 14.7)*	-2.0% (-6.7 to 2.0)
Metastatic phase of kidney cancer	86.7 (81.4 to 89.3)	..	36.4 (24.6 to 48.3)	55.9% (49.4 to 63.7)*	27.2% (21.8 to 33.1)*	5.1% (0.6 to 10.3)*	-2.6% (-6.7 to 1.9)
Terminal phase of kidney cancer	16.7 (15.7 to 17.2)	..	9.0 (6.3 to 11.6)	57.3% (52.5 to 62.9)*	27.0% (23.3 to 31.5)*	5.8% (2.7 to 9.3)*	-3.0% (-5.8 to 0.4)
Bladder cancer	2632.4 (2566.9 to 2717.2)	473.8 (462.2 to 491.8)	247.0 (179.4 to 322.8)	47.3% (43.4 to 53.6)*	33.0% (29.9 to 36.2)*	-1.9% (-4.6 to 2.2)	0.9% (-1.4 to 3.3)
Diagnosis and primary therapy phase of bladder cancer	141.8 (138.1 to 146.6)	473.8 (462.2 to 491.8)	37.4 (25.4 to 50.8)	47.4% (41.0 to 56.0)*	34.2% (29.3 to 39.3)*	-1.3% (-5.4 to 4.2)	2.2% (-1.5 to 6.0)
Controlled phase of bladder cancer	2269.1 (2209.3 to 2343.1)	..	139.9 (95.0 to 195.4)	50.9% (46.7 to 58.3)*	34.1% (30.8 to 37.6)*	2.0% (-0.8 to 6.6)	2.7% (0.1 to 5.3)*
Metastatic phase of bladder cancer	121.5 (118.5 to 126.6)	..	48.2 (33.4 to 63.1)	37.7% (31.9 to 44.9)*	29.9% (25.5 to 34.6)*	-10.3% (-14.0 to -5.9)*	-3.1% (-6.4 to 0.3)

(Table 1 continues on next page)

	Prevalence (thousands) 2017 counts	Incidence (thousands) 2017 counts	YLDs (thousands)				
			2017 counts	Percentage change in counts, 1990–2007	Percentage change in counts, 2007–17	Percentage change in age-standardised rates, 1990–2007	Percentage change in age-standardised rates, 2007–17
(Continued from previous page)							
Terminal phase of bladder cancer	22.6 (22.0 to 23.5)	..	11.6 (8.1 to 14.8)	38.0% (32.5 to 45.2)*	29.5% (25.2 to 34.1)*	-10.4% (-14.0 to -5.8)*	-3.5% (-6.8 to 0.0)
Incontinence from bladder cancer, beyond 10 years	77.5 (74.8 to 80.5)	..	10.0 (6.8 to 14.1)	63.5% (57.7 to 69.4)*	32.3% (27.9 to 37.3)*	5.2% (1.6 to 9.2)*	-0.8% (-4.1 to 2.9)
Brain and nervous system cancer	1705.7 (1471.0 to 1894.8)	405.2 (351.0 to 442.6)	166.9 (117.5 to 223.0)	56.9% (34.3 to 85.1)*	49.9% (41.3 to 58.9)*	19.1% (2.2 to 37.8)*	24.8% (17.7 to 32.8)*
Diagnosis and primary therapy phase of brain and nervous system cancers	100.0 (86.4 to 110.7)	405.2 (351.0 to 442.6)	28.6 (19.0 to 40.4)	76.5% (51.1 to 107.8)*	61.2% (51.3 to 71.1)*	34.8% (15.7 to 55.6)*	35.4% (27.5 to 44.1)*
Controlled phase of brain and nervous system cancers	1453.1 (1251.8 to 1625.0)	..	68.5 (43.3 to 102.1)	72.1% (45.5 to 109.1)*	61.9% (50.1 to 74.9)*	35.8% (16.1 to 61.4)*	38.0% (28.0 to 49.2)*
Metastatic phase of brain and nervous system cancers	130.1 (112.7 to 139.8)	..	57.7 (38.4 to 78.2)	41.8% (22.1 to 62.1)*	36.5% (30.0 to 42.0)*	4.9% (-9.4 to 17.6)	10.9% (5.6 to 15.2)*
Terminal phase of brain and nervous system cancers	22.6 (19.6 to 24.3)	..	12.2 (8.4 to 15.9)	38.7% (18.9 to 59.0)*	34.3% (27.8 to 39.3)*	3.0% (-10.8 to 15.6)	8.8% (3.7 to 12.9)*
Thyroid cancer	2144.9 (2059.5 to 2287.8)	255.5 (245.7 to 272.5)	132.0 (91.7 to 180.8)	95.1% (87.1 to 104.5)*	37.7% (32.4 to 44.0)*	33.4% (27.9 to 39.2)*	11.4% (7.1 to 16.5)*
Diagnosis and primary therapy phase of thyroid cancer	57.8 (55.5 to 61.6)	255.5 (245.7 to 272.5)	16.6 (11.1 to 23.1)	99.5% (91.6 to 109.7)*	38.5% (32.3 to 45.3)*	37.5% (32.6 to 43.9)*	12.7% (7.6 to 18.1)*
Controlled phase of thyroid cancer	2040.7 (1958.4 to 2176.9)	..	94.5 (61.6 to 138.2)	101.9% (93.0 to 113.0)*	38.1% (32.4 to 45.2)*	40.1% (34.3 to 46.8)*	12.9% (8.2 to 18.7)*
Metastatic phase of thyroid cancer	42.9 (41.6 to 45.4)	..	19.0 (12.9 to 25.3)	67.5% (60.9 to 73.2)*	35.7% (31.4 to 40.1)*	9.9% (5.2 to 13.3)*	4.3% (1.1 to 7.7)*
Terminal phase of thyroid cancer	3.5 (3.4 to 3.8)	..	1.9 (1.3 to 2.5)	63.9% (57.0 to 70.0)*	34.7% (30.4 to 39.1)*	8.6% (4.2 to 12.1)*	3.9% (0.6 to 7.3)*
Mesothelioma	78.6 (76.1 to 81.1)	34.6 (33.5 to 35.7)	14.9 (10.6 to 19.7)	33.7% (17.7 to 56.9)*	23.9% (16.2 to 30.9)*	-10.0% (-20.4 to 5.2)	-4.6% (-10.3 to 0.7)
Diagnosis and primary therapy phase of mesothelioma	9.1 (8.8 to 9.4)	34.6 (33.5 to 35.7)	2.6 (1.7 to 3.6)	35.5% (20.0 to 58.2)*	24.6% (17.0 to 31.2)*	-8.7% (-19.0 to 6.2)	-4.1% (-9.8 to 1.0)
Controlled phase of mesothelioma	46.8 (45.3 to 48.3)	..	2.2 (1.4 to 3.2)	34.9% (18.0 to 58.3)*	23.6% (14.8 to 32.4)*	-8.6% (-19.8 to 7.0)	-4.3% (-11.0 to 2.3)
Metastatic phase of mesothelioma	20.0 (19.3 to 20.6)	..	8.7 (5.9 to 11.6)	33.3% (17.0 to 56.9)*	23.7% (15.3 to 32.1)*	-10.4% (-20.9 to 4.9)	-4.8% (-11.1 to 1.4)
Terminal phase of mesothelioma	2.8 (2.7 to 2.9)	..	1.5 (1.0 to 1.9)	31.6% (16.2 to 53.5)*	24.1% (17.1 to 30.2)*	-11.7% (-21.7 to 2.5)	-4.6% (-9.8 to -0.2)*
Hodgkin lymphoma	657.1 (568.9 to 780.8)	101.1 (88.0 to 118.7)	50.5 (35.1 to 69.3)	31.2% (18.9 to 59.3)*	19.1% (13.8 to 23.7)*	-1.0% (-10.3 to 19.8)	2.5% (-2.2 to 6.5)
Diagnosis and primary therapy phase of Hodgkin lymphoma	21.7 (18.8 to 25.9)	101.1 (88.0 to 118.7)	6.2 (4.1 to 9.0)	44.2% (30.3 to 77.5)*	22.8% (17.3 to 27.3)*	10.8% (0.9 to 35.5)*	6.6% (2.0 to 10.6)*
Controlled phase of Hodgkin lymphoma	601.2 (520.5 to 716.2)	..	28.6 (17.5 to 43.0)	43.8% (29.2 to 77.6)*	22.4% (16.1 to 27.8)*	11.1% (0.4 to 36.7)*	6.7% (1.4 to 11.3)*
Metastatic phase of Hodgkin lymphoma	31.0 (26.7 to 36.1)	..	14.0 (9.1 to 19.0)	13.5% (4.6 to 33.3)*	13.3% (8.3 to 17.3)*	-16.9% (-23.0 to -3.0)*	-5.0% (-9.1 to -1.6)*
Terminal phase of Hodgkin lymphoma	3.2 (2.7 to 3.7)	..	1.7 (1.1 to 2.2)	-2.7% (-10.9 to 13.0)	4.6% (0.8 to 8.2)*	-28.0% (-33.5 to -17.1)*	-12.1% (-15.3 to -9.1)*
Non-Hodgkin lymphoma	2371.9 (2325.0 to 2418.1)	488.0 (478.9 to 496.9)	193.1 (140.2 to 254.2)	77.8% (70.5 to 84.3)*	41.4% (37.7 to 45.0)*	26.1% (21.4 to 30.3)*	11.3% (8.2 to 14.2)*
Diagnosis and primary therapy phase of non-Hodgkin lymphoma	87.8 (86.0 to 89.4)	488.0 (478.9 to 496.9)	24.2 (16.4 to 33.1)	90.1% (82.5 to 97.4)*	45.3% (40.5 to 49.9)*	35.2% (30.7 to 39.7)*	14.7% (10.8 to 18.3)*
Controlled phase of non-Hodgkin lymphoma	2119.9 (2077.3 to 2161.3)	..	97.3 (62.9 to 140.5)	91.9% (83.9 to 99.1)*	45.4% (41.4 to 49.4)*	38.6% (33.9 to 42.8)*	15.6% (12.3 to 18.9)*

(Table 1 continues on next page)

	Prevalence (thousands) 2017 counts	Incidence (thousands) 2017 counts	YLDs (thousands)				
			2017 counts	Percentage change in counts, 1990-2007	Percentage change in counts, 2007-17	Percentage change in age-standardised rates, 1990-2007	Percentage change in age-standardised rates, 2007-17
(Continued from previous page)							
Metastatic phase of non-Hodgkin lymphoma	140.1 (137.6 to 142.6)	..	58.8 (40.5 to 77.5)	60.4% (53.7 to 66.4)*	35.4% (31.3 to 39.6)*	12.0% (7.9 to 15.8)*	5.1% (1.9 to 8.4)*
Terminal phase of non-Hodgkin lymphoma	24.1 (23.7 to 24.6)	..	12.9 (9.0 to 16.5)	57.3% (51.5 to 62.0)*	34.0% (30.5 to 37.2)*	9.4% (6.2 to 11.9)*	3.8% (1.2 to 6.2)*
Multiple myeloma	449.3 (414.6 to 520.9)	152.7 (140.6 to 172.7)	90.8 (64.2 to 118.4)	93.4% (85.2 to 102.7)*	44.3% (38.6 to 50.3)*	29.7% (24.3 to 35.4)*	10.3% (5.9 to 14.7)*
Diagnosis and primary therapy phase of multiple myeloma	28.1 (26.0 to 32.7)	152.7 (140.6 to 172.7)	8.0 (5.3 to 11.2)	116.1% (110.1 to 130.1)*	48.6% (43.2 to 54.8)*	47.0% (43.2 to 55.9)*	14.4% (10.2 to 19.0)*
Controlled phase of multiple myeloma	252.3 (233.7 to 294.6)	..	11.7 (7.5 to 17.3)	118.2% (107.1 to 135.2)*	48.9% (42.0 to 56.3)*	48.8% (41.5 to 60.1)*	15.0% (9.7 to 20.7)*
Metastatic phase of multiple myeloma	157.9 (145.3 to 181.5)	..	65.1 (44.2 to 85.7)	90.5% (80.8 to 100.4)*	43.8% (37.3 to 50.4)*	27.7% (21.3 to 34.0)*	9.8% (4.8 to 14.8)*
Terminal phase of multiple myeloma	10.9 (10.1 to 12.3)	..	5.9 (4.1 to 7.6)	63.8% (53.4 to 68.1)*	35.8% (31.5 to 39.8)*	8.5% (0.7 to 11.3)*	2.4% (-0.9 to 5.5)
Leukaemia	2432.4 (2190.3 to 2591.6)	518.5 (472.2 to 548.0)	263.3 (191.2 to 342.0)	27.8% (13.5 to 38.0)*	25.1% (19.7 to 29.5)*	-3.6% (-12.7 to 2.1)	2.3% (-2.3 to 6.5)
Acute lymphoid leukaemia	521.1 (433.1 to 579.5)	64.2 (56.4 to 70.4)	43.0 (30.6 to 58.6)	29.9% (3.6 to 46.7)*	31.6% (11.9 to 47.7)*	11.1% (-9.4 to 24.0)	18.6% (0.3 to 33.7)*
Diagnosis and primary therapy phase of acute lymphoid leukaemia	32.0 (28.1 to 35.1)	64.2 (56.4 to 70.4)	9.2 (6.1 to 13.0)	18.6% (-6.0 to 33.6)	11.8% (-3.0 to 21.9)	0.6% (-18.0 to 11.8)	-1.0% (-14.5 to 8.0)
Controlled phase of acute lymphoid leukaemia	465.2 (383.8 to 521.0)	..	22.6 (14.0 to 34.1)	39.6% (10.2 to 59.8)*	48.4% (20.2 to 69.2)*	24.4% (-0.3 to 41.3)	36.8% (10.2 to 56.6)*
Metastatic phase of acute lymphoid leukaemia	20.1 (17.3 to 21.7)	..	9.1 (6.0 to 12.4)	26.3% (3.9 to 42.1)*	21.6% (10.0 to 31.5)*	2.4% (-13.6 to 13.8)	5.8% (-4.5 to 14.3)
Terminal phase of acute lymphoid leukaemia	3.7 (3.2 to 4.0)	..	2.0 (1.4 to 2.6)	25.4% (2.9 to 41.5)*	20.8% (9.0 to 30.9)*	2.0% (-14.1 to 13.7)	5.2% (-5.2 to 13.9)
Chronic lymphoid leukaemia	567.7 (534.1 to 600.4)	90.6 (85.6 to 95.6)	74.6 (54.8 to 96.5)	72.3% (65.5 to 80.3)*	42.7% (36.5 to 49.1)*	12.5% (7.8 to 17.7)*	7.3% (2.5 to 12.3)*
Diagnosis and primary therapy phase of chronic lymphoid leukaemia	30.4 (28.6 to 32.1)	90.6 (85.6 to 95.6)	8.6 (5.8 to 11.9)	78.0% (71.6 to 84.8)*	45.4% (39.0 to 52.0)*	18.1% (13.6 to 22.7)*	10.6% (5.5 to 15.7)*
Controlled phase of chronic lymphoid leukaemia	424.3 (399.1 to 449.4)	..	19.5 (12.7 to 28.2)	83.4% (75.4 to 91.3)*	46.6% (39.4 to 54.0)*	23.1% (18.0 to 28.5)*	12.2% (6.9 to 17.9)*
Metastatic phase of chronic lymphoid leukaemia	108.9 (103.0 to 114.8)	..	44.4 (31.2 to 58.5)	67.8% (59.1 to 77.9)*	40.8% (33.9 to 48.3)*	8.5% (2.8 to 14.8)*	5.1% (0.0 to 10.7)*
Terminal phase of chronic lymphoid leukaemia	4.0 (3.8 to 4.2)	..	2.2 (1.5 to 2.8)	58.4% (52.4 to 64.5)*	35.9% (30.4 to 41.8)*	1.6% (-2.4 to 5.5)	0.5% (-3.6 to 5.0)
Acute myeloid leukaemia	150.9 (137.0 to 160.0)	119.6 (108.4 to 125.9)	28.8 (20.2 to 37.7)	52.6% (24.2 to 72.6)*	22.9% (12.9 to 30.0)*	13.5% (-4.6 to 25.4)	1.0% (-7.1 to 6.7)
Diagnosis and primary therapy phase of acute myeloid leukaemia	..	119.6 (108.4 to 125.9)	..	..	..	..	..
Controlled phase of acute myeloid leukaemia	99.2 (90.5 to 105.8)	..	4.8 (3.0 to 7.2)	63.3% (25.1 to 91.8)*	18.7% (7.4 to 27.0)*	26.4% (1.9 to 44.0)*	0.0% (-9.5 to 7.1)
Metastatic phase of acute myeloid leukaemia	42.5 (38.5 to 44.7)	..	19.0 (12.5 to 25.5)	50.4% (23.7 to 69.1)*	23.8% (14.0 to 30.8)*	11.1% (-6.0 to 22.1)	1.1% (-6.4 to 6.8)
Terminal phase of acute myeloid leukaemia	9.2 (8.4 to 9.7)	..	5.0 (3.4 to 6.5)	51.0% (24.2 to 69.8)*	24.0% (14.2 to 30.8)*	11.6% (-5.6 to 22.6)	1.2% (-6.2 to 6.8)
Chronic myeloid leukaemia	95.8 (88.3 to 103.2)	34.2 (31.5 to 36.7)	11.7 (8.4 to 15.4)	6.5% (1.3 to 11.2)*	6.6% (3.0 to 10.0)*	-28.1% (-31.5 to -24.8)*	-15.0% (-17.9 to -12.1)*

(Table 1 continues on next page)

	Prevalence (thousands) 2017 counts	Incidence (thousands) 2017 counts	YLDs (thousands)				
			2017 counts	Percentage change in counts, 1990–2007	Percentage change in counts, 2007–17	Percentage change in age-standardised rates, 1990–2007	Percentage change in age-standardised rates, 2007–17
(Continued from previous page)							
Diagnosis and primary therapy phase of chronic myeloid leukaemia	6.9 (6.4 to 7.4)	34.2 (31.5 to 36.7)	2.0 (1.3 to 2.8)	13.6% (8.5 to 18.5)*	7.5% (3.9 to 11.0)*	-23.4% (-26.6 to -20.3)*	-13.7% (-16.6 to -10.8)*
Controlled phase of chronic myeloid leukaemia	76.1 (70.1 to 82.0)	..	3.7 (2.4 to 5.6)	17.9% (12.1 to 23.7)*	7.8% (3.9 to 11.5)*	-19.3% (-23.2 to -15.2)*	-12.6% (-15.8 to -9.5)*
Metastatic phase of chronic myeloid leukaemia	10.6 (9.7 to 11.3)	..	4.8 (3.2 to 6.4)	-1.3% (-6.1 to 2.9)	5.5% (2.0 to 9.1)*	-33.5% (-36.6 to -30.5)*	-16.7% (-19.7 to -13.8)*
Terminal phase of chronic myeloid leukaemia	2.3 (2.1 to 2.5)	..	1.2 (0.9 to 1.6)	-1.7% (-6.3 to 2.6)	5.5% (1.9 to 9.1)*	-33.9% (-36.7 to -31.1)*	-16.8% (-19.6 to -13.9)*
Other leukaemia	1096.8 (930.7 to 1204.2)	209.9 (180.8 to 227.5)	105.3 (74.7 to 137.1)	9.1% (-6.7 to 25.2)	15.4% (8.5 to 22.4)*	-14.8% (-25.1 to -5.3)*	-4.0% (-9.7 to 1.9)
Diagnosis and primary therapy phase of other leukaemia	..	209.9 (180.8 to 227.5)	..	..	..	..	..
Controlled phase of other leukaemia	957.9 (808.7 to 1058.8)	..	45.4 (28.5 to 67.6)	7.6% (-13.7 to 33.7)	13.1% (1.7 to 25.4)*	-8.8% (-24.9 to 9.7)	-1.1% (-11.7 to 10.0)
Metastatic phase of other leukaemia	130.2 (114.4 to 139.3)	..	55.1 (37.6 to 72.8)	10.8% (-0.2 to 20.4)	17.4% (13.1 to 23.7)*	-18.7% (-25.8 to -13.5)*	-6.0% (-9.4 to -1.3)*
Terminal phase of other leukaemia	8.8 (7.7 to 9.4)	..	4.7 (3.3 to 6.1)	6.4% (-4.0 to 17.1)	15.2% (11.1 to 20.7)*	-20.7% (-27.2 to -15.4)*	-7.6% (-10.9 to -3.4)*
Other malignant cancers	9176.2 (8080.3 to 10 439.8)	715.5 (656.3 to 740.0)	678.1 (481.1 to 910.4)	99.7% (84.8 to 118.8)*	149.2% (122.1 to 179.0)*	46.4% (35.6 to 60.0)*	107.7% (84.2 to 133.3)*
Diagnosis and primary therapy phase of other malignant neoplasms	205.1 (181.3 to 231.1)	715.5 (656.3 to 740.0)	56.6 (38.0 to 80.5)	126.8% (107.3 to 150.6)*	177.7% (146.5 to 210.3)*	67.9% (55.4 to 83.7)*	133.3% (107.0 to 161.9)*
Controlled phase of other malignant neoplasms	8451.7 (7437.1 to 9683.5)	..	397.1 (252.9 to 592.8)	140.6% (114.5 to 174.5)*	204.9% (166.8 to 245.8)*	86.8% (68.6 to 109.9)*	161.4% (127.6 to 198.8)*
Metastatic phase of other malignant neoplasms	460.4 (413.4 to 501.3)	..	188.6 (128.3 to 248.2)	67.0% (58.2 to 80.1)*	86.3% (71.8 to 101.9)*	18.3% (12.2 to 27.4)*	49.1% (37.2 to 61.1)*
Terminal phase of other malignant neoplasms	68.0 (61.1 to 73.8)	..	35.8 (24.8 to 46.0)	62.1% (54.1 to 73.7)*	77.1% (65.3 to 90.1)*	14.2% (8.8 to 22.0)*	40.7% (31.0 to 51.3)*
Other neoplasms	25 223.0 (24 682.1 to 25 725.3)	11 159.5 (10 928.2 to 11 416.2)	55.1 (35.2 to 80.9)	47.4% (42.6 to 52.3)*	34.5% (31.6 to 37.3)*	4.7% (1.8 to 7.7)*	6.0% (4.0 to 7.9)*
Myelodysplastic, myeloproliferative, and other haemopoietic neoplasms	1212.2 (1098.1 to 1332.1)	134.3 (118.4 to 148.9)	55.1 (35.2 to 80.9)	47.4% (42.6 to 52.3)*	34.5% (31.6 to 37.3)*	4.7% (1.8 to 7.7)*	6.0% (4.0 to 7.9)*
Benign and in-situ intestinal neoplasms	3966.3 (3840.7 to 4110.3)	1010.9 (980.1 to 1049.4)	..	..	..	..	..
Benign and in-situ cervical and uterine neoplasms	1180.0 (1138.1 to 1223.0)	299.4 (287.6 to 312.8)	..	..	..	..	..
Other benign and in-situ neoplasms	19 417.1 (18 926.5 to 19 882.6)	9715.0 (9488.7 to 9966.6)	..	..	..	..	..
<b>Cardiovascular diseases</b>	<b>485 620.9</b> <b>(468 031.7 to 504 964.4)</b>	<b>72 721.2</b> <b>(70 388.1 to 75 264.1)</b>	<b>35 697.3</b> <b>(26 428.2 to 45 510.3)</b>	<b>39.8%</b> <b>(38.8 to 40.8)*</b>	<b>34.3%</b> <b>(32.0 to 37.0)*</b>	<b>-5.5%</b> <b>(-6.2 to -4.8)*</b>	<b>4.5%</b> <b>(2.9 to 6.4)*</b>
Rheumatic heart disease	39 345.4 (37 960.8 to 40 828.7)	1311.3 (1269.4 to 1354.9)	1901.0 (1232.8 to 2766.0)	40.9% (40.0 to 41.8)*	16.0% (15.3 to 16.7)*	7.3% (6.7 to 7.9)*	2.4% (1.9 to 3.1)*
Rheumatic heart disease without heart failure	38 145.4 (36 705.9 to 39 639.2)	1311.3 (1269.4 to 1354.9)	1797.9 (1160.7 to 2619.0)	40.0% (39.2 to 40.9)*	15.4% (14.8 to 16.1)*	7.3% (6.7 to 7.9)*	2.6% (2.0 to 3.2)*
Heart failure due to rheumatic heart disease	1199.9 (1006.1 to 1403.8)	..	103.1 (69.7 to 145.1)	58.9% (54.7 to 62.6)*	27.2% (24.4 to 30.2)*	7.9% (5.3 to 10.3)*	-0.1% (-2.2 to 1.9)
Ischaemic heart disease	126 451.5 (118 587.5 to 134 706.5)	10 636.5 (9573.2 to 11 794.5)	5291.9 (3657.3 to 7238.9)	35.8% (34.5 to 37.0)*	23.5% (22.9 to 24.2)*	-10.9% (-11.9 to -10.0)*	-5.2% (-5.7 to -4.7)*

(Table 1 continues on next page)



	Prevalence (thousands) 2017 counts	Incidence (thousands) 2017 counts	YLDs (thousands)				
			2017 counts	Percentage change in counts, 1990-2007	Percentage change in counts, 2007-17	Percentage change in age-standardised rates, 1990-2007	Percentage change in age-standardised rates, 2007-17
(Continued from previous page)							
Asymptomatic ischaemic heart disease following myocardial infarction	37 908.6 (31 907.4 to 44 225.6)	..	..	..	..	..	..
Angina due to ischaemic heart disease	70 969.3 (66 224.1 to 75 830.1)	..	3850.4 (2615.6 to 5381.2)	35.1% (34.3 to 35.9)*	22.9% (22.2 to 23.5)*	-10.0% (-10.4 to -9.5)*	-4.6% (-5.0 to -4.2)*
Heart failure due to ischaemic heart disease	17 007.2 (14 512.0 to 19 849.5)	..	1388.9 (951.7 to 1947.2)	37.2% (33.2 to 41.7)*	25.9% (24.3 to 27.5)*	-13.5% (-16.2 to -10.7)*	-6.4% (-7.6 to -5.1)*
Myocardial infarction due to ischaemic heart disease	566.4 (505.5 to 634.4)	10 636.5 (9573.2 to 11 794.5)	52.7 (36.6 to 72.9)	48.9% (46.1 to 51.7)*	13.6% (10.5 to 16.6)*	-4.2% (-5.9 to -2.5)*	-14.6% (-17.0 to -12.3)*
Stroke	104 178.7 (98 454.0 to 110 125.0)	11 931.1 (11 118.4 to 12 825.8)‡	18 695.4 (13 574.3 to 23 686.9)	40.0% (38.4 to 41.4)*	43.6% (39.6 to 47.8)*	-4.7% (-5.8 to -3.7)*	11.2% (8.1 to 14.3)*
Ischaemic stroke	82 417.3 (76 967.8 to 88 516.9)	7737.5 (6951.1 to 8677.6)‡	14 304.4 (10 297.5 to 18 176.0)	42.8% (40.6 to 44.9)*	54.3% (49.1 to 59.4)*	-4.1% (-5.5 to -2.7)*	18.1% (14.1 to 22.0)*
Acute ischaemic stroke	587.5 (529.1 to 655.7)	7737.5 (6951.1 to 8677.6)‡	144.3 (100.1 to 188.1)	40.1% (37.4 to 42.9)*	43.0% (37.0 to 49.4)*	-6.9% (-8.5 to -5.2)*	8.8% (4.3 to 13.6)*
Chronic ischaemic stroke	81 829.7 (76 384.9 to 87 926.6)	..	14 160.1 (10 204.3 to 17 970.9)	42.8% (40.6 to 45.0)*	54.4% (49.2 to 59.6)*	-4.1% (-5.4 to -2.7)*	18.2% (14.1 to 22.2)*
Intracerebral haemorrhage	17 914.9 (16 190.6 to 19 666.6)	3128.6 (2874.6 to 3418.0)‡	2946.9 (2121.6 to 3794.1)	32.1% (29.9 to 34.3)*	13.9% (8.0 to 20.3)*	-6.8% (-8.2 to -5.4)*	-9.5% (-14.2 to -4.8)*
Acute intracerebral haemorrhage	168.7 (154.2 to 184.6)	3128.6 (2874.6 to 3418.0)‡	44.3 (31.0 to 57.8)	39.4% (36.8 to 42.4)*	-1.9% (-6.8 to 3.2)	-5.5% (-7.3 to -3.7)*	-24.4% (-28.1 to -20.6)*
Chronic intracerebral haemorrhage	17 746.2 (16 029.3 to 19 493.5)	..	2902.6 (2090.3 to 3738.5)	32.0% (29.8 to 34.1)*	14.2% (8.1 to 20.6)*	-6.8% (-8.3 to -5.4)*	-9.3% (-14.0 to -4.4)*
Subarachnoid haemorrhage	9321.9 (8523.7 to 10 242.4)	1064.9 (953.3 to 1182.6)‡	1444.2 (1031.6 to 1845.4)	36.8% (34.7 to 38.9)*	25.0% (21.3 to 28.6)*	-5.7% (-7.1 to -4.3)*	-1.6% (-4.4 to 1.2)
Acute subarachnoid haemorrhage	80.5 (71.7 to 89.5)	1064.9 (953.3 to 1182.6)‡	21.1 (14.5 to 28.0)	40.2% (31.1 to 43.9)*	25.2% (19.8 to 27.2)*	-4.6% (-10.2 to -2.5)*	-1.6% (-5.5 to -0.2)*
Chronic subarachnoid haemorrhage	9241.4 (8444.1 to 10 171.4)	..	1423.1 (1016.6 to 1817.9)	36.7% (34.6 to 38.8)*	25.0% (21.2 to 28.6)*	-5.7% (-7.1 to -4.3)*	-1.6% (-4.4 to 1.2)
Hypertensive heart disease	17 067.7 (14 426.9 to 19 874.3)	..	1408.0 (966.6 to 1982.4)	63.8% (60.5 to 67.2)*	34.9% (33.2 to 36.6)*	6.0% (3.8 to 8.2)*	1.9% (0.7 to 2.9)*
Non-rheumatic valvular heart disease	29 729.1 (28 505.4 to 31 022.5)	30 691.2 (29 436.4 to 32 002.2)	360.8 (207.1 to 559.6)	54.9% (49.0 to 61.0)*	35.8% (30.9 to 40.7)*	-4.5% (-7.7 to -1.7)*	-1.0% (-4.3 to 2.1)
Non-rheumatic calcific aortic valve disease	12 570.2 (11 411.8 to 13 841.1)	12 570.2 (11 411.8 to 13 841.1)	168.0 (96.6 to 259.9)	64.8% (56.5 to 73.5)*	38.9% (30.9 to 46.2)*	-0.2% (-5.1 to 4.3)	0.2% (-5.9 to 5.3)
Heart failure due to calcific aortic valve disease	1386.0 (896.6 to 2029.9)	..	111.0 (63.7 to 173.8)	42.3% (30.1 to 56.6)*	30.6% (13.2 to 47.6)*	-14.1% (-21.4 to -6.0)*	-6.0% (-19.0 to 6.2)
Non-rheumatic calcific aortic valve disease	11 184.2 (9987.3 to 12 425.7)	12 570.2 (11 411.8 to 13 841.1)	56.9 (30.4 to 93.2)	163.9% (124.2 to 209.0)*	58.7% (36.3 to 84.3)*	62.6% (37.1 to 93.2)*	15.0% (-1.6 to 34.3)
Non-rheumatic degenerative mitral valve disease	18 121.0 (17 682.3 to 18 586.4)	18 121.0 (17 682.3 to 18 586.4)	190.3 (109.2 to 295.3)	47.4% (41.5 to 52.7)*	33.2% (28.1 to 38.0)*	-8.1% (-11.5 to -5.4)*	-2.0% (-5.6 to 1.2)
Heart failure due to degenerative mitral valve disease	1723.6 (1111.4 to 2494.0)	..	139.9 (81.5 to 217.1)	33.3% (25.0 to 43.1)*	26.7% (15.5 to 38.6)*	-17.1% (-22.2 to -11.4)*	-6.8% (-15.0 to 2.0)
Non-rheumatic degenerative mitral valve disease	16 397.4 (15 574.9 to 17 179.2)	18 121.0 (17 682.3 to 18 586.4)	50.5 (26.7 to 84.0)	129.8% (95.6 to 171.4)*	55.2% (33.1 to 78.0)*	44.9% (22.1 to 72.2)*	14.0% (-2.5 to 30.9)
Other non-rheumatic valve diseases	26.9 (22.1 to 32.2)	..	2.5 (1.6 to 3.6)	63.1% (58.9 to 67.2)*	37.7% (34.1 to 41.1)*	7.4% (5.1 to 9.4)*	6.1% (4.1 to 8.1)*
Mild heart failure due to other non-rheumatic valve disease	5.0 (3.5 to 6.8)	..	0.2 (0.1 to 0.3)	63.6% (59.2 to 68.1)*	38.0% (34.5 to 41.4)*	7.7% (5.4 to 9.9)*	6.2% (4.2 to 8.1)*

(Table 1 continues on next page)

	Prevalence (thousands) 2017 counts	Incidence (thousands) 2017 counts	YLDs (thousands)				
			2017 counts	Percentage change in counts, 1990–2007	Percentage change in counts, 2007–17	Percentage change in age-standardised rates, 1990–2007	Percentage change in age-standardised rates, 2007–17
(Continued from previous page)							
Moderate heart failure due to other non- rheumatic valve disease	3.3 (2.2 to 4.4)	..	0.2 (0.1 to 0.4)	63.6% (59.0 to 68.0)*	38.0% (34.5 to 41.6)*	7.7% (5.3 to 10.0)*	6.2% (4.0 to 8.2)*
Severe heart failure due to other non-rheumatic valve disease	8.8 (6.9 to 10.9)	..	1.5 (1.0 to 2.3)	63.0% (58.7 to 67.4)*	37.7% (33.6 to 41.6)*	7.3% (4.8 to 9.8)*	6.1% (3.7 to 8.8)*
Controlled, medically managed heart failure due to other non-rheumatic valve disease	9.9 (8.0 to 12.1)	..	0.5 (0.3 to 0.7)	63.2% (58.8 to 67.6)*	37.6% (33.5 to 41.6)*	7.4% (5.0 to 10.0)*	6.1% (3.3 to 8.7)*
Cardiomyopathy and myocarditis	5429.9 (4694.4 to 6257.1)	3071.0 (2745.0 to 3451.2)	623.8 (424.7 to 859.3)	27.4% (24.5 to 30.9)*	21.2% (19.2 to 23.0)*	-12.6% (-14.9 to -10.3)*	-3.9% (-5.0 to -2.9)*
Myocarditis	1804.6 (1635.3 to 1983.8)	3071.0 (2745.0 to 3451.2)	131.4 (90.1 to 183.0)	26.6% (23.9 to 29.6)*	15.9% (13.9 to 18.0)*	-5.4% (-6.8 to -4.1)*	-1.9% (-3.0 to -0.9)*
Acute myocarditis	740.8 (656.3 to 830.8)	3071.0 (2745.0 to 3451.2)	35.7 (22.5 to 52.6)	33.3% (30.5 to 36.2)*	19.1% (16.7 to 21.6)*	-2.4% (-4.0 to -0.6)*	-1.3% (-2.9 to 0.2)
Heart failure due to myocarditis	1063.7 (914.1 to 1215.2)	..	95.7 (63.9 to 133.5)	24.4% (21.0 to 28.2)*	14.8% (12.3 to 17.3)*	-6.5% (-8.1 to -4.9)*	-2.1% (-3.4 to -0.8)*
Alcoholic cardiomyopathy	1621.8 (1370.5 to 1902.4)	..	139.1 (95.1 to 196.1)	20.7% (16.8 to 25.1)*	15.5% (12.9 to 18.1)*	-17.9% (-20.5 to -15.2)*	-9.5% (-11.2 to -7.7)*
Other cardiomyopathy	4212.7 (3634.6 to 4869.9)	..	353.3 (237.9 to 493.9)	30.8% (27.2 to 34.9)*	25.7% (23.4 to 27.9)*	-12.8% (-15.6 to -9.9)*	-2.5% (-3.9 to -1.0)*
Atrial fibrillation and flutter	37574.2 (32548.8 to 42588.4)	3046.0 (2605.8 to 3507.2)	2921.5 (1992.6 to 4034.2)	49.0% (46.7 to 51.7)*	31.4% (30.3 to 32.5)*	-3.7% (-5.1 to -1.9)*	-1.2% (-1.9 to -0.6)*
Asymptomatic atrial fibrillation and flutter	22545.7 (19530.0 to 25680.2)	3046.0 (2605.8 to 3507.2)	..	..	..	..	..
Symptomatic atrial fibrillation and flutter	15028.5 (13016.1 to 17142.8)	..	2921.5 (1992.6 to 4034.2)	49.0% (46.7 to 51.7)*	31.4% (30.3 to 32.5)*	-3.7% (-5.1 to -1.9)*	-1.2% (-1.9 to -0.6)*
Peripheral vascular disease	118123.6 (102706.9 to 134350.4)	10811.7 (9282.1 to 12503.4)	515.6 (237.6 to 938.4)	40.0% (37.6 to 42.8)*	27.8% (26.6 to 29.3)*	-8.5% (-9.6 to -7.0)*	-4.7% (-5.5 to -3.6)*
Asymptomatic peripheral arterial disease	78631.6 (66970.1 to 91233.4)	10811.7 (9282.1 to 12503.4)	..	..	..	..	..
Symptomatic claudication due to peripheral arterial disease	39492.0 (31074.7 to 50227.2)	..	515.6 (237.6 to 938.4)	40.0% (37.6 to 42.8)*	27.8% (26.6 to 29.3)*	-8.5% (-9.6 to -7.0)*	-4.7% (-5.5 to -3.6)*
Endocarditis	654.1 (567.5 to 743.8)	1222.5 (1097.6 to 1334.0)	53.8 (36.6 to 75.3)	31.1% (27.3 to 35.6)*	24.6% (22.1 to 27.3)*	-10.7% (-14.3 to -7.2)*	-2.5% (-4.4 to -0.8)*
Acute endocarditis	87.9 (78.3 to 96.3)	1222.5 (1097.6 to 1334.0)	4.9 (3.2 to 7.3)	34.3% (31.7 to 36.9)*	26.2% (23.2 to 29.2)*	2.1% (1.4 to 2.9)*	4.3% (2.3 to 6.4)*
Heart failure due to endocarditis	566.2 (480.9 to 655.8)	..	48.9 (33.3 to 68.7)	30.8% (26.5 to 35.7)*	24.5% (21.8 to 27.4)*	-11.7% (-15.5 to -8.1)*	-3.2% (-5.1 to -1.3)*
Other cardiovascular and circulatory diseases	75599.8 (64068.9 to 88170.3)	..	3925.4 (2650.1 to 5544.1)	32.5% (30.0 to 35.5)*	24.4% (22.5 to 26.2)*	-9.1% (-10.9 to -6.9)*	-0.5% (-1.4 to 0.4)
Heart failure due to other cardiovascular diseases	1562.0 (1279.4 to 1882.1)	..	129.6 (86.6 to 185.3)	32.6% (28.4 to 37.1)*	30.0% (27.5 to 32.6)*	-15.0% (-18.0 to -12.0)*	-2.0% (-3.8 to -0.2)*
Other cardiovascular and circulatory disease episodes	74037.8 (62741.1 to 86283.3)	..	3795.9 (2564.1 to 5373.7)	32.4% (30.0 to 35.5)*	24.2% (22.3 to 26.0)*	-8.8% (-10.7 to -6.7)*	-0.4% (-1.3 to 0.5)
<b>Chronic respiratory diseases</b>	<b>544899.2</b> <b>(506937.5 to 584858.4)</b>	<b>62161.4</b> <b>(55134.8 to 69320.7)</b>	<b>44311.8</b> <b>(36751.6 to 51407.1)</b>	<b>21.9%</b> <b>(19.7 to 24.3)*</b>	<b>22.8%</b> <b>(19.0 to 26.5)*</b>	<b>-12.5%</b> <b>(-13.7 to -11.3)*</b>	<b>-0.4%</b> <b>(-3.3 to 2.5)</b>
Chronic obstructive pulmonary disease	299398.2 (269025.2 to 330073.8)	18475.7 (16736.0 to 20255.6)	30611.5 (26034.9 to 34813.0)	24.9% (22.7 to 27.2)*	23.8% (18.6 to 28.6)*	-14.1% (-15.5 to -12.6)*	-2.8% (-6.9 to 0.9)
Chronic obstructive pulmonary disease with heart failure	14890.7 (12183.6 to 17715.3)	..	5673.6 (4163.8 to 7049.6)	66.5% (61.8 to 71.3)*	36.1% (32.1 to 39.1)*	5.4% (2.6 to 8.1)*	1.3% (-1.1 to 3.4)

(Table 1 continues on next page)

	Prevalence (thousands) 2017 counts	Incidence (thousands) 2017 counts	YLDs (thousands)				
			2017 counts	Percentage change in counts, 1990-2007	Percentage change in counts, 2007-17	Percentage change in age-standardised rates, 1990-2007	Percentage change in age-standardised rates, 2007-17
(Continued from previous page)							
Chronic obstructive pulmonary disease without heart failure	284 507.4 (254 368.4 to 315 515.1)	18 475.7 (16 736.0 to 20 255.6)	24 937.9 (21 040.1 to 28 738.5)	18.9% (16.3 to 21.5)*	21.3% (15.4 to 26.8)*	-17.6% (-19.3 to -15.8)*	-3.7% (-8.4 to 0.6)
Pneumoconiosis	527.5 (470.0 to 593.2)	60.1 (53.1 to 67.0)	80.5 (54.5 to 111.5)	41.3% (36.5 to 46.3)*	27.0% (22.8 to 31.2)*	-3.8% (-6.9 to -0.7)*	-2.0% (-5.2 to 1.1)
Silicosis	162.4 (127.5 to 202.6)	23.7 (19.1 to 29.0)	24.9 (16.0 to 36.0)	45.4% (36.4 to 54.7)*	29.1% (21.3 to 37.1)*	-0.0% (-5.9 to 6.1)	0.2% (-5.8 to 6.4)
Heart failure due to silicosis	11.0 (9.1 to 13.1)	..	5.0 (3.4 to 6.9)	64.3% (58.4 to 70.9)*	31.0% (26.8 to 35.3)*	8.7% (5.1 to 13.1)*	-1.6% (-4.8 to 1.9)
Silicosis without heart failure	151.4 (117.1 to 190.0)	23.7 (19.1 to 29.0)	19.8 (12.2 to 29.4)	41.3% (30.6 to 52.9)*	28.6% (19.0 to 38.5)*	-2.1% (-9.3 to 5.9)	0.6% (-6.9 to 8.3)
Asbestosis	92.1 (73.1 to 118.3)	9.4 (7.7 to 11.6)	14.4 (9.2 to 21.6)	42.6% (32.3 to 53.9)*	35.0% (29.6 to 41.3)*	-2.1% (-9.1 to 5.2)	4.4% (0.6 to 8.6)*
Asbestosis without heart failure	86.6 (67.7 to 112.7)	9.4 (7.7 to 11.6)	11.9 (7.4 to 18.2)	38.3% (27.2 to 50.6)*	36.6% (30.1 to 44.7)*	-3.9% (-11.9 to 4.7)	7.1% (2.4 to 12.5)*
Heart failure due to asbestosis	5.6 (4.7 to 6.5)	..	2.5 (1.7 to 3.5)	65.2% (54.7 to 77.6)*	27.6% (23.8 to 31.8)*	5.5% (-1.3 to 13.3)	-6.0% (-8.9 to -3.0)*
Coal worker pneumoconiosis	147.9 (117.5 to 190.1)	15.1 (12.0 to 19.8)	21.9 (14.2 to 31.8)	39.1% (28.8 to 50.1)*	23.1% (13.8 to 32.3)*	-6.0% (-12.4 to 1.1)	-5.6% (-12.7 to 1.2)
Coal worker pneumoconiosis without heart failure	140.9 (110.7 to 182.6)	15.1 (12.0 to 19.8)	18.7 (12.0 to 27.8)	36.5% (24.8 to 48.9)*	22.4% (11.6 to 33.0)*	-7.3% (-14.7 to 0.9)	-6.0% (-14.1 to 1.7)
Heart failure due to coal worker pneumoconiosis	7.0 (5.9 to 8.2)	..	3.2 (2.2 to 4.3)	57.8% (51.8 to 64.5)*	27.5% (23.0 to 32.1)*	2.7% (-1.6 to 7.1)	-3.1% (-6.6 to 0.4)
Other pneumoconiosis	125.1 (105.0 to 149.3)	11.9 (9.9 to 14.3)	19.3 (12.6 to 28.5)	38.2% (31.9 to 45.3)*	23.3% (18.5 to 27.9)*	-6.9% (-10.9 to -2.7)*	-5.0% (-8.4 to -1.6)*
Heart failure due to other pneumoconiosis	4.1 (3.4 to 4.7)	..	1.9 (1.3 to 2.6)	80.7% (75.2 to 86.3)*	27.8% (23.5 to 31.9)*	15.2% (12.3 to 18.2)*	-4.5% (-7.5 to -1.9)*
Other pneumoconiosis without heart failure	121.0 (100.9 to 145.2)	11.9 (9.9 to 14.3)	17.5 (11.2 to 26.0)	34.9% (28.3 to 42.1)*	22.8% (17.7 to 27.8)*	-8.8% (-12.9 to -4.5)*	-5.0% (-8.8 to -1.2)*
Asthma	272 677.5 (242 295.9 to 304 699.6)	43 123.4 (36 191.5 to 50 226.4)	10 622.9 (7 057.0 to 15 056.4)	8.0% (5.2 to 10.9)*	19.3% (15.3 to 23.1)*	-13.5% (-14.9 to -11.9)*	4.9% (1.0 to 8.4)*
Asymptomatic asthma	99 070.1 (84 654.0 to 114 607.7)	15 631.4 (12 827.3 to 18 539.7)	..	..	..	..	..
Symptomatic asthma	173 607.4 (151 655.5 to 198 619.2)	27 492.0 (22 746.9 to 32 507.6)	10 622.9 (7 057.0 to 15 056.4)	8.0% (5.2 to 10.9)*	19.3% (15.3 to 23.1)*	-13.5% (-14.9 to -11.9)*	4.9% (1.0 to 8.4)*
Interstitial lung disease and pulmonary sarcoidosis	6234.2 (5661.0 to 6848.2)	502.2 (458.8 to 550.0)	648.2 (440.3 to 923.2)	44.3% (41.7 to 47.3)*	29.1% (26.5 to 31.8)*	-2.3% (-3.9 to -0.5)*	0.1% (-1.8 to 2.0)
Heart failure due to interstitial lung disease and pulmonary sarcoidosis	416.8 (322.3 to 505.6)	..	169.8 (114.4 to 236.1)	60.8% (56.2 to 65.6)*	31.4% (28.6 to 34.2)*	5.5% (2.8 to 8.4)*	-1.2% (-3.3 to 0.9)
Interstitial lung disease and pulmonary sarcoidosis without heart failure	5817.3 (5242.6 to 6431.9)	502.2 (458.8 to 550.0)	478.5 (320.7 to 690.8)	39.3% (36.3 to 42.8)*	28.2% (25.3 to 31.5)*	-4.9% (-6.9 to -2.7)*	0.5% (-1.7 to 2.8)
Other chronic respiratory diseases	..	..	2348.7 (1930.8 to 2739.6)	62.5% (58.1 to 67.0)*	23.8% (19.2 to 28.5)*	21.4% (17.8 to 25.1)*	9.2% (5.0 to 13.3)*
<b>Digestive diseases</b>	<b>2 049 831.2</b> <b>(1 983 314.3 to 2 122 941.6)</b>	<b>465 978.6</b> <b>(429 600.4 to 500 015.1)</b>	<b>19 939.7</b> <b>(13 858.2 to 27 973.1)</b>	<b>31.1%</b> <b>(29.3 to 32.7)*</b>	<b>20.5%</b> <b>(19.5 to 21.6)*</b>	<b>-3.4%</b> <b>(-4.1 to -2.7)*</b>	<b>1.3%</b> <b>(0.6 to 2.0)*</b>
Cirrhosis and other chronic liver diseases	1 500 585.1 (1 448 741.6 to 1 556 007.5)	5154.9 (4935.4 to 5366.5)	1745.6 (1221.5 to 2387.3)	50.7% (49.4 to 52.1)*	34.8% (33.0 to 36.3)*	8.4% (7.6 to 9.3)*	10.4% (9.0 to 11.6)*
Cirrhosis and other chronic liver diseases due to hepatitis B	431 116.3 (395 729.0 to 468 718.9)	1531.5 (1419.0 to 1643.9)	488.4 (337.9 to 665.7)	53.7% (50.9 to 56.5)*	33.2% (30.7 to 35.6)*	8.7% (6.9 to 10.5)*	9.0% (7.1 to 10.9)*

(Table 1 continues on next page)

	Prevalence (thousands) 2017 counts	Incidence (thousands) 2017 counts	YLDs (thousands)				
			2017 counts	Percentage change in counts, 1990–2007	Percentage change in counts, 2007–17	Percentage change in age-standardised rates, 1990–2007	Percentage change in age-standardised rates, 2007–17
(Continued from previous page)							
Cirrhosis and other chronic liver diseases due to hepatitis B, decompensated	2974.2 (2810.2 to 3124.4)	539.5 (509.2 to 570.8)	488.4 (337.9 to 665.7)	53.7% (50.9 to 56.5)*	33.2% (30.7 to 35.6)*	8.7% (6.9 to 10.5)*	9.0% (7.1 to 10.9)*
Chronic hepatitis B without cirrhosis	391 475.2 (356 323.1 to 429 032.9)	..	..	..	..	..	..
Cirrhosis and other chronic liver diseases due to hepatitis B, compensated	36 666.9 (34 057.4 to 39 502.9)	992.1 (890.6 to 1095.8)	..	..	..	..	..
Cirrhosis and other chronic liver diseases due to hepatitis C	134 493.9 (118 558.2 to 153 823.8)	1178.2 (1086.0 to 1272.2)	431.3 (300.3 to 596.4)	56.1% (53.5 to 58.4)*	36.5% (33.9 to 38.9)*	8.4% (6.7 to 9.9)*	10.2% (8.2 to 11.9)*
Cirrhosis and other chronic liver diseases due to hepatitis C, decompensated	2641.5 (2487.0 to 2806.1)	467.3 (438.1 to 496.2)	431.3 (300.3 to 596.4)	56.1% (53.5 to 58.4)*	36.5% (33.9 to 38.9)*	8.4% (6.7 to 9.9)*	10.2% (8.2 to 11.9)*
Chronic hepatitis C without cirrhosis	104 133.4 (88 178.6 to 123 899.7)	..	..	..	..	..	..
Cirrhosis and other chronic liver diseases due to hepatitis C, compensated	27 719.0 (25 515.4 to 29 987.7)	710.9 (628.8 to 800.8)	..	..	..	..	..
Cirrhosis and other chronic liver diseases due to alcohol use	26 041.9 (24 252.8 to 28 011.2)	903.7 (839.9 to 973.5)	400.1 (280.3 to 551.5)	58.1% (55.4 to 61.0)*	37.7% (35.1 to 40.5)*	8.1% (6.3 to 9.9)*	9.8% (7.8 to 11.9)*
Cirrhosis and other chronic liver diseases due to alcohol, decompensated	2457.4 (2313.9 to 2610.3)	433.1 (407.6 to 458.5)	400.1 (280.3 to 551.5)	58.1% (55.4 to 61.0)*	37.7% (35.1 to 40.5)*	8.1% (6.3 to 9.9)*	9.8% (7.8 to 11.9)*
Cirrhosis and other chronic liver diseases due to alcohol, compensated	23 584.5 (21 876.0 to 25 478.8)	470.6 (417.4 to 525.3)	..	..	..	..	..
Cirrhosis due to NASH	892 322.8 (858 624.9 to 927 954.4)	367.8 (334.5 to 403.7)	148.6 (102.8 to 205.0)	83.2% (78.8 to 87.5)*	54.6% (51.0 to 58.3)*	25.6% (22.8 to 28.5)*	23.5% (20.7 to 26.4)*
Non-alcoholic fatty liver disease/NASH	882 058.3 (847 914.0 to 917 435.7)	..	..	..	..	..	..
Cirrhosis and other chronic liver diseases due to NASH	10 264.5 (9358.1 to 11 216.7)	367.8 (334.5 to 403.7)	148.6 (102.8 to 205.0)	83.2% (78.8 to 87.5)*	54.6% (51.0 to 58.3)*	25.6% (22.8 to 28.5)*	23.5% (20.7 to 26.4)*
Cirrhosis and other chronic liver diseases due to other causes	16 616.0 (15 165.6 to 17 954.6)	1173.7 (1084.6 to 1260.7)	277.1 (192.1 to 386.4)	24.0% (20.6 to 27.3)*	22.7% (20.0 to 25.7)*	2.6% (-0.0 to 5.0)	8.1% (5.8 to 10.6)*
Cirrhosis and other chronic liver diseases due to other cause, decompensated	1653.0 (1550.5 to 1755.9)	248.4 (231.4 to 265.9)	277.1 (192.1 to 386.4)	24.0% (20.6 to 27.3)*	22.7% (20.0 to 25.7)*	2.6% (-0.0 to 5.0)	8.1% (5.8 to 10.6)*
Cirrhosis and other chronic liver diseases due to other cause, compensated	14 963.1 (13 571.8 to 16 245.0)	925.4 (840.5 to 1008.8)	..	..	..	..	..
Upper digestive system diseases	807 369.3 (728 919.0 to 888 668.9)	384 665.9 (348 550.3 to 419 766.4)	13 042.1 (8272.3 to 19 986.6)	32.0% (29.9 to 33.8)*	19.3% (18.1 to 20.6)*	-3.6% (-4.5 to -2.7)*	0.6% (-0.2 to 1.4)
Peptic ulcer disease	17 161.2 (15 032.4 to 19 357.3)	6719.1 (6078.7 to 7434.1)	832.8 (555.4 to 1184.1)	22.2% (20.1 to 24.6)*	18.9% (16.5 to 21.1)*	-14.2% (-15.6 to -12.6)*	-1.6% (-3.5 to -0.1)*
Acute peptic ulcer disease	7.8 (6.8 to 8.9)	..	2.5 (1.7 to 3.6)	32.0% (25.8 to 39.1)*	12.6% (10.9 to 14.4)*	-10.3% (-14.4 to -5.4)*	-12.2% (-13.1 to -11.3)*

(Table 1 continues on next page)

	Prevalence (thousands) 2017 counts	Incidence (thousands) 2017 counts	YLDs (thousands)				
			2017 counts	Percentage change in counts, 1990-2007	Percentage change in counts, 2007-17	Percentage change in age-standardised rates, 1990-2007	Percentage change in age-standardised rates, 2007-17
(Continued from previous page)							
Chronic peptic ulcer disease	17153.4 (15 023.5 to 19 349.4)	6719.1 (6078.7 to 7434.1)	830.2 (553.1 to 1180.9)	22.2% (20.1 to 24.5)*	18.9% (16.5 to 21.2)*	-14.2% (-15.6 to -12.6)*	-1.6% (-3.5 to -0.0)*
Gastritis and duodenitis	140 449.0 (120 336.3 to 161 832.9)	96 720.4 (85 853.2 to 108 445.4)	6196.0 (3976.7 to 8960.7)	27.7% (25.0 to 30.3)*	18.2% (16.1 to 20.4)*	-4.5% (-5.8 to -3.3)*	0.3% (-1.2 to 1.7)
Acute gastritis and duodenitis	40.1 (34.5 to 46.3)	..	13.1 (8.6 to 18.7)	27.8% (25.2 to 30.5)*	15.4% (13.9 to 16.9)*	-10.2% (-11.4 to -8.9)*	-6.1% (-7.0 to -5.3)*
Chronic gastritis and duodenitis	140 408.8 (120 292.9 to 161 787.1)	96 720.4 (85 853.2 to 108 445.4)	6182.8 (3967.9 to 8944.1)	27.7% (25.0 to 30.3)*	18.2% (16.1 to 20.4)*	-4.5% (-5.8 to -3.3)*	0.3% (-1.2 to 1.7)
Gastro-oesophageal reflux disease	709 264.3 (625 708.7 to 794 604.2)	281 226.3 (246 633.4 to 315 761.3)	6013.4 (3215.9 to 10 192.9)	38.5% (36.3 to 40.4)*	20.7% (19.1 to 22.3)*	-0.7% (-1.5 to -0.0)*	1.3% (0.6 to 2.0)*
Appendicitis	722.7 (673.2 to 775.6)	19 016.1 (17 716.4 to 20 344.0)	223.6 (149.1 to 306.5)	27.7% (23.9 to 31.9)*	10.3% (6.6 to 14.0)*	2.3% (-0.7 to 5.5)	0.2% (-3.1 to 3.7)
Paralytic ileus and intestinal obstruction	140.2 (128.1 to 152.3)	3855.4 (3520.1 to 4187.5)	44.2 (30.0 to 60.4)	36.0% (32.4 to 39.3)*	25.5% (22.8 to 28.4)*	2.9% (1.2 to 4.5)*	4.2% (2.1 to 6.4)*
Inguinal, femoral, and abdominal hernia	26 490.8 (24 196.8 to 28 760.4)	41 182.8 (36 372.8 to 46 265.0)	2567.0 (1713.5 to 3550.5)	21.2% (17.9 to 24.8)*	14.5% (12.3 to 17.0)*	-7.1% (-8.9 to -5.3)*	-2.9% (-4.4 to -1.2)*
Inflammatory bowel disease	6848.9 (6421.4 to 7304.4)	4048.8 (3776.1 to 4377.4)	1019.4 (705.4 to 1381.8)	48.5% (44.4 to 52.7)*	21.7% (18.0 to 25.1)*	4.7% (1.9 to 7.6)*	-0.2% (-3.1 to 2.3)
Ulcerative colitis	4701.0 (4318.4 to 5113.6)	2690.9 (2440.5 to 2994.3)	684.0 (468.6 to 935.0)	54.8% (50.4 to 59.5)*	29.5% (24.9 to 33.9)*	7.7% (4.8 to 10.9)*	4.6% (1.2 to 7.8)*
Crohn's disease	2147.9 (2007.7 to 2301.8)	1357.8 (1240.2 to 1484.4)	335.4 (227.1 to 460.4)	38.8% (34.0 to 43.8)*	8.6% (5.0 to 11.8)*	-0.1% (-3.5 to 3.4)	-8.7% (-11.5 to -6.2)*
Vascular intestinal disorders	89.8 (80.0 to 100.8)	619.8 (555.7 to 686.7)	27.1 (18.5 to 36.7)	56.5% (50.4 to 63.2)*	25.2% (20.2 to 30.8)*	12.4% (8.9 to 16.2)*	-1.3% (-5.1 to 2.8)
Gallbladder and biliary diseases	30 575.9 (27 503.2 to 34 125.0)	5790.7 (5195.0 to 6386.5)	26.4 (18.0 to 37.5)	29.3% (26.7 to 32.1)*	27.5% (24.1 to 31.3)*	-9.6% (-11.0 to -8.1)*	3.9% (1.7 to 6.3)*
Pancreatitis	6115.8 (5533.9 to 6704.1)	1644.2 (1525.6 to 1769.5)	364.4 (186.3 to 612.8)	52.0% (48.7 to 54.8)*	26.6% (23.3 to 29.7)*	6.5% (4.1 to 8.3)*	2.5% (0.0 to 4.9)*
Acute pancreatitis	118.6 (107.5 to 130.0)	1300.9 (1181.4 to 1426.0)	47.7 (34.2 to 63.9)	33.9% (30.5 to 37.3)*	17.5% (15.7 to 19.4)*	-6.6% (-8.6 to -4.2)*	-4.4% (-5.6 to -3.2)*
Chronic pancreatitis	5997.3 (5412.4 to 6583.8)	343.3 (311.5 to 375.0)	316.7 (145.2 to 556.1)	55.5% (52.7 to 58.8)*	28.1% (24.5 to 31.8)*	9.0% (7.2 to 11.1)*	3.7% (0.9 to 6.5)*
Other digestive diseases	..	..	879.9 (605.6 to 1191.4)	0.9% (-2.8 to 5.0)	30.6% (28.9 to 32.1)*	-19.4% (-21.5 to -17.3)*	9.5% (8.2 to 10.6)*
<b>Neurological disorders</b>	<b>3 121 435.3</b> <b>(2 951 124.5 to 3 316 268.0)</b>	<b>1 006 294.5</b> <b>(907 590.7 to 1 098 468.9)</b>	<b>73 161.8</b> <b>(50 721.9 to 100 409.9)</b>	<b>35.1%</b> <b>(31.9 to 38.1)*</b>	<b>17.8%</b> <b>(15.8 to 20.2)*</b>	<b>0.5%</b> <b>(-1.6 to 2.4)</b>	<b>1.4%</b> <b>(-0.3 to 3.4)</b>
Alzheimer's disease and other dementias	44 988.8 (39 716.2 to 50 377.8)	7300.6 (6515.7 to 8133.4)	6570.4 (4678.1 to 8588.5)	62.7% (60.6 to 64.9)*	36.9% (35.2 to 38.8)*	-2.3% (-3.3 to -1.2)*	-1.7% (-2.3 to -1.1)*
Parkinson's disease	8525.4 (7037.3 to 10 185.6)	1025.9 (854.1 to 1229.9)	1219.0 (823.7 to 1662.2)	69.2% (66.5 to 72.6)*	34.3% (32.5 to 36.2)*	8.9% (7.1 to 11.0)*	1.0% (-0.1 to 2.1)
Epilepsy	27 288.3 (21 576.0 to 33 443.8)	2470.8 (1905.5 to 3062.9)	8561.9 (5380.6 to 12 551.5)	24.1% (8.0 to 42.9)*	15.9% (3.5 to 31.2)*	0.1% (-12.3 to 14.9)	3.4% (-7.8 to 16.8)
Multiple sclerosis	1761.1 (1598.2 to 1947.9)	54.9 (50.1 to 60.8)	456.6 (327.7 to 595.0)	41.6% (38.2 to 45.2)*	18.3% (16.1 to 20.5)*	-0.9% (-3.2 to 1.4)	-2.4% (-4.2 to -0.4)*
Motor neuron disease	237.1 (211.2 to 264.1)	67.3 (60.7 to 74.3)	50.4 (35.7 to 67.5)	39.6% (36.3 to 43.2)*	25.9% (23.1 to 28.9)*	4.6% (3.5 to 5.9)*	4.5% (3.0 to 6.1)*
Headache disorders	3 072 812.1 (2 904 886.2 to 3 266 065.0)	995 374.9 (896 864.3 to 1 087 335.4)	54 341.8 (35 570.5 to 76 780.4)	34.0% (33.0 to 35.1)*	15.4% (14.6 to 16.2)*	0.4% (-0.2 to 1.0)	1.0% (0.5 to 1.5)*
Migraine	1 331 364.6 (1 237 219.6 to 1 433 357.2)	112 933.5 (102 829.9 to 122 899.8)	47 245.4 (29 986.7 to 68 669.3)	34.2% (33.1 to 35.4)*	15.3% (14.5 to 16.2)*	0.6% (-0.0 to 1.2)	1.1% (0.6 to 1.7)*

(Table 1 continues on next page)

	Prevalence (thousands) 2017 counts	Incidence (thousands) 2017 counts	YLDs (thousands)				
			2017 counts	Percentage change in counts, 1990–2007	Percentage change in counts, 2007–17	Percentage change in age-standardised rates, 1990–2007	Percentage change in age-standardised rates, 2007–17
(Continued from previous page)							
Medication overuse headache due to migraine	83 755.8 (70 723.8 to 97 287.8)	..	9166.1 (5759.6 to 13 329.2)	35.5% (33.6 to 37.3)*	17.5% (16.2 to 18.7)*	–1.4% (–2.5 to –0.5)*	0.1% (–0.3 to 0.6)
Migraine	1 247 608.8 (1 154 817.3 to 1 347 980.9)	112 933.5 (102 829.9 to 122 899.8)	38 079.3 (23 576.3 to 57 421.4)	33.9% (32.6 to 35.3)*	14.8% (13.8 to 15.8)*	1.1% (0.4 to 1.9)*	1.3% (0.7 to 2.0)*
Tension-type headache	2 331 334.7 (2 110 373.3 to 2 575 461.4)	882 441.4 (783 241.2 to 975 064.3)	7096.4 (4044.6 to 11 213.5)	32.7% (31.0 to 34.6)*	15.6% (14.5 to 16.9)*	–0.9% (–1.7 to –0.3)*	0.3% (–0.1 to 0.6)
Medication overuse headache due to tension-type headache	31 134.3 (21 220.1 to 41 990.3)	..	3382.8 (1753.7 to 5875.5)	35.5% (33.5 to 37.5)*	17.5% (16.0 to 18.8)*	–1.4% (–2.5 to –0.4)*	0.1% (–0.6 to 0.8)
Tension-type headache	2 300 200.4 (2 079 425.9 to 2 547 509.0)	882 441.4 (783 241.2 to 975 064.3)	3713.6 (1525.8 to 6887.1)	30.3% (28.5 to 32.4)*	14.0% (12.9 to 15.3)*	–0.5% (–1.4 to 0.4)	0.4% (0.0 to 0.7)*
Other neurological disorders	38.9 (25.6 to 53.2)	..	1961.8 (1276.3 to 2823.8)	35.7% (19.8 to 54.5)*	31.9% (18.8 to 47.1)*	11.8% (–0.5 to 26.1)	19.5% (7.2 to 33.4)*
Other neurological disorders	..	..	1950.3 (1267.2 to 2813.5)	35.8% (19.7 to 54.7)*	32.0% (18.8 to 47.3)*	11.9% (–0.5 to 26.4)	19.6% (7.2 to 33.6)*
Guillain-Barré syndrome due to other neurological disorders	38.9 (25.6 to 53.2)	..	11.5 (6.4 to 18.1)	29.7% (25.8 to 34.1)*	18.2% (15.8 to 20.8)*	2.7% (1.0 to 4.3)*	3.1% (2.0 to 4.3)*
<b>Mental disorders</b>	<b>970 812.4 (923 455.4 to 1 020 930.6)</b>	<b>336 996.3 (315 596.6 to 362 049.6)</b>	<b>122 746.3 (91 620.8 to 157 883.6)</b>	<b>31.6% (30.5 to 32.7)*</b>	<b>13.5% (12.9 to 14.1)*</b>	<b>–0.6% (–1.2 to –0.0)*</b>	<b>–1.1% (–1.5 to –0.7)*</b>
Schizophrenia	19 776.9 (17 578.3 to 22 210.7)	1130.5 (1004.6 to 1281.9)	12 657.9 (9481.9 to 15 563.7)	38.6% (37.1 to 40.2)*	17.2% (16.1 to 18.3)*	–0.0% (–0.8 to 0.7)	–0.3% (–1.1 to 0.4)
Depressive disorders	264 455.6 (246 380.1 to 286 312.0)	258 164.5 (238 280.7 to 281 665.5)	43 099.9 (30 536.4 to 58 895.6)	33.4% (31.0 to 35.8)*	14.3% (13.1 to 15.6)*	–1.9% (–3.2 to –0.4)*	–2.6% (–3.5 to –1.8)*
Major depressive disorder	163 044.1 (149 530.9 to 178 929.1)	241 893.3 (222 032.7 to 265 574.7)	32 846.7 (23 081.1 to 44 291.2)	32.1% (29.2 to 35.0)*	12.6% (11.3 to 14.0)*	–2.4% (–4.0 to –0.6)*	–3.6% (–4.6 to –2.7)*
Dysthymia	106 904.4 (93 445.9 to 122 812.3)	16 271.1 (14 236.4 to 18 420.1)	10 253.2 (6878.0 to 14 982.1)	38.3% (35.5 to 41.0)*	20.4% (18.2 to 22.6)*	–0.3% (–1.8 to 1.3)	0.8% (–0.8 to 2.3)
Bipolar disorder	45 549.4 (39 864.5 to 52 852.8)	4525.2 (3944.7 to 5237.5)	9293.8 (5868.2 to 13 748.5)	34.0% (32.6 to 35.4)*	15.2% (14.0 to 16.6)*	0.4% (–0.3 to 1.1)	1.2% (0.6 to 1.8)*
Anxiety disorders	284 360.1 (265 607.5 to 304 531.7)	42 340.0 (39 597.5 to 45 199.5)	27 121.4 (19 248.3 to 36 106.3)	32.3% (30.6 to 34.0)*	12.8% (11.7 to 14.0)*	0.4% (–0.5 to 1.3)	–1.2% (–2.0 to –0.4)*
Eating disorders	15 801.7 (12 596.2 to 19 488.6)	9589.7 (6950.1 to 13 126.9)	3351.9 (2149.3 to 4871.6)	37.7% (35.4 to 40.0)*	18.9% (17.3 to 20.5)*	7.9% (6.8 to 8.9)*	9.4% (8.2 to 10.5)*
Anorexia nervosa	3360.3 (2533.8 to 4321.5)	1027.8 (777.5 to 1329.1)	715.8 (440.9 to 1066.2)	30.9% (28.0 to 33.9)*	13.5% (11.0 to 15.7)*	5.4% (3.3 to 7.2)*	6.2% (4.1 to 8.1)*
Bulimia nervosa	12 509.7 (9480.4 to 15 976.5)	8561.9 (5957.9 to 12 142.7)	2636.2 (1660.3 to 3937.1)	39.7% (36.9 to 42.7)*	20.5% (18.6 to 22.2)*	8.6% (7.5 to 9.8)*	10.3% (9.0 to 11.6)*
Autism spectrum disorders	31 179.7 (28 000.9 to 34 413.8)	670.7 (602.2 to 739.1)	4731.3 (3238.8 to 6518.6)	22.8% (22.1 to 23.5)*	11.4% (10.8 to 12.1)*	–0.7% (–1.2 to –0.2)*	–0.3% (–0.8 to 0.3)
Attention-deficit/ hyperactivity disorder	73 317.5 (62 267.0 to 85 889.6)	3302.7 (2683.9 to 4031.4)	888.8 (543.2 to 1411.8)	20.1% (17.5 to 22.6)*	6.9% (5.2 to 8.5)*	–0.2% (–2.1 to 1.7)	–0.6% (–2.1 to 0.8)
Conduct disorder	53 228.4 (41 976.6 to 65 750.3)	17 273.1 (13 809.1 to 20 989.8)	6445.2 (3869.6 to 10 299.8)	16.1% (14.4 to 17.8)*	4.8% (3.1 to 6.5)*	1.5% (0.1 to 2.9)*	2.4% (0.9 to 3.8)*
Idiopathic developmental intellectual disability	100 572.2 (58 404.5 to 143 878.6)	..	4046.4 (1940.2 to 6859.5)	13.0% (9.1 to 15.9)*	0.0% (–2.8 to 1.5)	–5.8% (–9.0 to –3.1)*	–8.7% (–11.1 to –7.5)*

(Table 1 continues on next page)



	Prevalence (thousands) 2017 counts	Incidence (thousands) 2017 counts	YLDs (thousands)				
			2017 counts	Percentage change in counts, 1990-2007	Percentage change in counts, 2007-17	Percentage change in age-standardised rates, 1990-2007	Percentage change in age-standardised rates, 2007-17
(Continued from previous page)							
Other mental disorders	149 478.6 (130 882.3 to 170 462.4)	..	11 109.6 (7355.5 to 15324.6)	37.7% (36.9 to 38.6)*	17.6% (17.0 to 18.3)*	0.0% (-0.5 to 0.4)	0.0% (-0.4 to 0.5)
<b>Substance use disorders</b>	<b>175 588.8</b> <b>(161 747.6 to 189 304.3)</b>	<b>60 099.6</b> <b>(53 685.6 to 67 048.7)</b>	<b>31 052.9</b> <b>(22 217.1 to 40 499.7)</b>	<b>34.3%</b> <b>(32.2 to 36.2)*</b>	<b>16.7%</b> <b>(14.4 to 19.2)*</b>	<b>2.2%</b> <b>(1.1 to 3.4)*</b>	<b>2.9%</b> <b>(0.8 to 5.1)*</b>
Alcohol use disorders	107 420.2 (95 908.0 to 119 660.2)	52 406.2 (45 976.6 to 59 250.1)	10 712.5 (7368.0 to 14 760.1)	35.9% (33.8 to 38.3)*	10.1% (8.5 to 11.7)*	0.9% (-0.1 to 1.9)	-4.3% (-5.4 to -3.1)*
Alcohol dependence	107 118.2 (95 586.5 to 119 383.0)	52 397.0 (45 967.6 to 59 241.9)	10 701.5 (7361.4 to 14 747.1)	36.0% (33.8 to 38.4)*	10.1% (8.5 to 11.7)*	0.9% (-0.1 to 2.0)	-4.3% (-5.4 to -3.1)*
Fetal alcohol syndrome	302.0 (240.9 to 370.5)	9.1 (7.5 to 11.1)	11.1 (6.6 to 17.0)	2.5% (-3.2 to 7.2)	-4.7% (-10.1 to -0.2)*	-17.6% (-22.1 to -13.9)*	-14.7% (-19.4 to -10.6)*
Drug use disorders	71 244.4 (63 963.8 to 79 771.6)	7 693.4 (6880.2 to 8628.5)	20 340.3 (14 276.7 to 26 665.5)	33.3% (30.3 to 36.3)*	20.4% (17.4 to 23.6)*	3.1% (1.3 to 4.8)*	7.1% (4.3 to 9.9)*
Opioid use disorders	40 484.6 (34 271.4 to 47 941.6)	4 085.2 (3463.6 to 4794.2)	16 844.7 (11 549.8 to 22 534.5)	38.4% (35.4 to 41.9)*	23.7% (20.2 to 27.2)*	6.2% (4.5 to 8.2)*	9.3% (6.0 to 12.5)*
Cocaine use disorders	5 017.2 (4 521.0 to 5 610.4)	260.3 (227.9 to 301.6)	680.0 (446.1 to 974.8)	24.7% (21.2 to 28.6)*	12.6% (11.0 to 14.4)*	-4.7% (-6.9 to -2.1)*	0.3% (-1.2 to 2.0)
Amphetamine use disorders	7 382.6 (5 376.5 to 9 821.8)	887.2 (666.2 to 1 170.2)	977.5 (560.1 to 1 537.4)	5.8% (1.9 to 10.9)*	2.7% (-0.4 to 5.7)	-13.8% (-16.6 to -10.4)*	-4.0% (-6.8 to -1.5)*
Cannabis use disorders	17 857.3 (14 597.9 to 21 953.6)	2 460.7 (2 061.0 to 3 022.0)	517.7 (329.1 to 765.6)	23.8% (19.7 to 28.5)*	4.4% (2.2 to 6.6)*	-2.2% (-4.7 to 0.6)	-3.7% (-5.7 to -1.7)*
Other drug use disorders	2 237.7 (1 984.3 to 2 509.6)	..	1 320.5 (888.2 to 1 854.3)	16.8% (12.0 to 22.4)*	8.2% (5.2 to 11.2)*	-8.3% (-11.3 to -4.9)*	-1.9% (-4.3 to 0.6)
<b>Diabetes and kidney diseases</b>	<b>1 011 116.6</b> <b>(962 767.9 to 1 065 061.5)</b>	<b>43 444.6</b> <b>(40 700.3 to 46 375.6)</b>	<b>45 884.4</b> <b>(32 018.9 to 62 235.3)</b>	<b>68.4%</b> <b>(66.5 to 70.4)*</b>	<b>29.1%</b> <b>(24.8 to 34.0)*</b>	<b>15.4%</b> <b>(14.2 to 16.7)*</b>	<b>3.2%</b> <b>(-0.4 to 6.9)</b>
Diabetes mellitus	475 995.8 (436 590.5 to 522 782.8)	22 935.6 (21 082.9 to 25 040.9)	38 575.4 (26 083.6 to 53 398.2)	75.9% (73.5 to 78.3)*	30.1% (25.0 to 35.8)*	20.3% (18.8 to 21.9)*	3.9% (-0.1 to 8.3)
Type 1 diabetes mellitus	13 019.0 (11 698.8 to 14 614.6)	400.3 (362.3 to 441.7)	964.3 (659.9 to 1 356.0)	40.6% (38.2 to 43.1)*	15.1% (13.8 to 16.7)*	3.5% (2.0 to 4.9)*	-1.2% (-2.3 to -0.1)*
Uncomplicated type 1 diabetes mellitus	8 762.6 (7 743.9 to 9 877.9)	400.3 (362.3 to 441.7)	412.4 (256.1 to 601.4)	34.7% (32.1 to 37.3)*	11.9% (10.1 to 13.6)*	3.5% (1.8 to 5.1)*	-1.2% (-2.7 to 0.1)
Vision loss due to type 1 diabetes mellitus retinopathy	82.5 (65.3 to 102.7)	..	6.9 (4.5 to 10.1)	61.4% (56.5 to 66.9)*	4.0% (-0.9 to 9.0)	10.4% (7.4 to 14.1)*	-15.1% (-19.2 to -11.1)*
Diabetic neuropathy due to type 1 diabetes mellitus	4 173.9 (3 612.2 to 4 837.5)	..	545.0 (365.7 to 762.7)	45.4% (42.2 to 48.6)*	17.9% (15.2 to 20.7)*	3.3% (1.4 to 5.3)*	-1.0% (-3.3 to 1.2)
Type 2 diabetes mellitus	462 976.9 (423 591.9 to 509 485.3)	22 535.3 (20 693.8 to 24 626.7)	37 611.1 (25 451.4 to 52 049.5)	77.2% (74.7 to 79.8)*	30.5% (25.3 to 36.4)*	20.9% (19.3 to 22.5)*	4.0% (-0.1 to 8.6)
Uncomplicated type 2 diabetes mellitus	263 762.9 (232 967.8 to 297 029.0)	22 535.3 (20 693.8 to 24 626.7)	12 152.7 (7 658.0 to 17 914.1)	74.0% (70.9 to 77.3)*	28.5% (22.8 to 34.5)*	20.6% (18.5 to 22.8)*	4.0% (-0.7 to 8.9)
Vision loss due to type 2 diabetes mellitus retinopathy	4 509.0 (3 835.7 to 5 282.0)	..	362.5 (252.6 to 500.2)	97.1% (90.5 to 104.5)*	21.1% (18.2 to 23.6)*	31.3% (27.0 to 36.3)*	-5.7% (-7.7 to -3.8)*
Diabetic neuropathy due to type 2 diabetes mellitus	194 704.9 (169 971.1 to 224 314.8)	..	25 095.9 (16 801.1 to 34 866.6)	78.5% (75.0 to 82.2)*	31.6% (25.7 to 38.1)*	20.9% (18.6 to 23.3)*	4.2% (-0.4 to 9.2)
Chronic kidney disease	697 509.5 (649 209.4 to 752 050.7)	19 735.6 (17 726.6 to 21 982.7)	7 306.3 (5 434.9 to 9 214.6)	38.8% (35.2 to 42.7)*	24.4% (19.7 to 29.5)*	-4.1% (-6.9 to -1.3)*	-0.2% (-3.8 to 3.8)
Chronic kidney disease due to type 1 diabetes mellitus	3 246.5 (2 916.0 to 3 615.5)	118.3 (100.5 to 141.5)	264.7 (187.5 to 353.0)	58.2% (52.8 to 63.9)*	21.7% (17.4 to 26.3)*	10.3% (6.8 to 14.0)*	0.3% (-3.0 to 3.7)

(Table 1 continues on next page)

	Prevalence (thousands) 2017 counts	Incidence (thousands) 2017 counts	YLDs (thousands)				
			2017 counts	Percentage change in counts, 1990–2007	Percentage change in counts, 2007–17	Percentage change in age-standardised rates, 1990–2007	Percentage change in age-standardised rates, 2007–17
(Continued from previous page)							
Albuminuria with preserved GFR due to type 1 diabetes mellitus	1406.8 (1223.8 to 1605.5)	..	..	..	..	..	..
End-stage chronic kidney disease due to type 1 diabetes mellitus	412.3 (326.6 to 512.2)	..	168.0 (110.5 to 233.7)	67.5% (60.5 to 75.9)*	22.1% (16.5 to 27.4)*	13.8% (8.8 to 19.2)*	-0.2% (-4.4 to 3.9)
Stage III chronic kidney disease due to type 1 diabetes mellitus	1186.3 (1002.9 to 1413.2)	118.3 (100.5 to 141.5)	22.8 (15.1 to 33.1)	12.2% (5.2 to 23.4)*	14.8% (5.8 to 24.0)*	-13.6% (-18.6 to -5.9)*	0.4% (-7.6 to 8.5)
Stage IV chronic kidney disease due to type 1 diabetes mellitus	149.4 (118.7 to 187.7)	..	20.5 (12.8 to 29.7)	54.8% (47.9 to 62.3)*	25.6% (16.0 to 34.9)*	7.4% (2.8 to 12.3)*	1.6% (-6.2 to 9.2)
Stage V chronic kidney disease due to type 1 diabetes mellitus	91.7 (74.9 to 111.7)	..	53.5 (36.6 to 73.1)	61.3% (54.0 to 69.3)*	22.1% (15.2 to 29.4)*	14.7% (10.1 to 19.9)*	1.5% (-4.2 to 7.5)
Chronic kidney disease due to type 2 diabetes mellitus	125 811.6 (116 308.7 to 135 941.1)	2352.5 (2063.9 to 2680.9)	1450.3 (1080.6 to 1875.1)	49.9% (41.4 to 55.6)*	29.6% (23.0 to 35.6)*	0.7% (-3.5 to 4.3)	-0.5% (-5.2 to 4.0)
Albuminuria with preserved GFR due to type 2 diabetes mellitus	85 416.5 (76 825.4 to 94 433.7)	..	..	..	..	..	..
End-stage chronic kidney disease due to type 2 diabetes mellitus	1046.2 (889.3 to 1236.3)	..	432.3 (296.9 to 564.4)	94.0% (85.7 to 104.3)*	32.2% (27.7 to 36.7)*	31.7% (26.2 to 38.3)*	0.8% (-2.5 to 4.0)
Stage III chronic kidney disease due to type 2 diabetes mellitus	35 357.3 (31 403.1 to 39 849.1)	2352.5 (2063.9 to 2680.9)	156.1 (102.1 to 234.4)	10.9% (5.6 to 17.2)*	19.0% (10.9 to 27.0)*	-26.2% (-29.6 to -22.1)*	-8.1% (-14.2 to -1.9)*
Stage IV chronic kidney disease due to type 2 diabetes mellitus	2906.1 (2314.3 to 3621.8)	..	308.5 (198.6 to 443.0)	37.1% (31.0 to 41.1)*	30.5% (21.2 to 40.3)*	-9.4% (-11.7 to -7.4)*	-0.8% (-7.6 to 6.7)
Stage V chronic kidney disease due to type 2 diabetes mellitus	1085.5 (915.0 to 1281.7)	..	553.5 (383.2 to 745.7)	47.7% (30.4 to 55.4)*	30.4% (19.5 to 39.2)*	0.2% (-7.0 to 4.8)	1.2% (-6.6 to 7.8)
Chronic kidney disease due to hypertension	23 605.4 (21 734.7 to 25 994.1)	911.2 (810.0 to 1033.5)	1390.7 (1036.0 to 1772.1)	47.7% (44.0 to 52.1)*	28.0% (23.0 to 33.1)*	0.8% (-1.7 to 3.7)	1.4% (-2.4 to 5.4)
Albuminuria with preserved GFR due to hypertension	4310.3 (3891.2 to 4793.2)	..	..	..	..	..	..
End-stage chronic kidney disease due to hypertension	825.3 (700.2 to 968.4)	..	341.2 (232.8 to 450.8)	78.0% (70.5 to 86.4)*	33.5% (28.9 to 37.6)*	20.2% (15.4 to 25.5)*	2.6% (-0.7 to 5.4)
Stage III chronic kidney disease due to hypertension	14 545.5 (13 086.5 to 16 401.2)	911.2 (810.0 to 1033.5)	123.0 (81.8 to 181.1)	16.0% (10.7 to 22.4)*	16.6% (9.1 to 23.6)*	-22.9% (-26.2 to -18.7)*	-9.3% (-14.9 to -3.8)*
Stage IV chronic kidney disease due to hypertension	2743.0 (2268.8 to 3328.2)	..	299.7 (200.7 to 418.4)	39.4% (36.2 to 42.9)*	29.0% (20.5 to 37.3)*	-7.1% (-8.7 to -5.1)*	0.4% (-5.9 to 6.7)
Stage V chronic kidney disease due to hypertension	1181.3 (1017.6 to 1370.2)	..	626.7 (432.1 to 829.9)	47.3% (43.9 to 52.4)*	27.2% (20.9 to 33.9)*	3.3% (1.3 to 6.5)*	3.6% (-1.2 to 9.0)
Chronic kidney disease due to glomerulonephritis	28 809.4 (26 470.2 to 31 575.8)	1509.5 (1345.4 to 1699.8)	1047.9 (753.5 to 1372.2)	38.1% (34.5 to 43.1)*	20.4% (15.5 to 25.6)*	0.8% (-1.4 to 3.8)	2.2% (-1.8 to 6.8)
Albuminuria with preserved GFR due to glomerulonephritis	5008.3 (4410.3 to 5616.9)	..	..	..	..	..	..
End-stage chronic kidney disease due to glomerulonephritis	691.9 (594.2 to 812.8)	..	270.4 (188.0 to 360.3)	57.3% (52.0 to 63.4)*	22.7% (18.4 to 27.2)*	10.2% (6.6 to 14.3)*	-0.4% (-3.6 to 2.8)

(Table 1 continues on next page)

	Prevalence (thousands) 2017 counts	Incidence (thousands) 2017 counts	YLDs (thousands)				
			2017 counts	Percentage change in counts, 1990-2007	Percentage change in counts, 2007-17	Percentage change in age-standardised rates, 1990-2007	Percentage change in age-standardised rates, 2007-17
(Continued from previous page)							
Stage III chronic kidney disease due to glomerulonephritis	20 751.9 (18 673.1 to 23 071.0)	1509.5 (1345.4 to 1699.8)	85.8 (55.6 to 125.3)	7.4% (1.1 to 17.8)*	8.3% (0.1 to 16.9)*	-17.2% (-21.6 to -10.0)*	-4.7% (-12.1 to 2.5)
Stage IV chronic kidney disease due to glomerulonephritis	1435.8 (1169.9 to 1762.1)	..	172.4 (110.5 to 246.3)	30.8% (27.3 to 35.6)*	21.3% (13.0 to 29.7)*	-6.1% (-8.3 to -3.2)*	2.2% (-5.4 to 9.3)
Stage V chronic kidney disease due to glomerulonephritis	921.6 (765.1 to 1104.5)	..	519.3 (351.4 to 713.8)	39.4% (35.4 to 44.9)*	21.2% (14.8 to 28.3)*	2.8% (0.7 to 6.2)*	4.9% (-0.7 to 10.7)
Chronic kidney disease due to other and unspecified causes	516 036.7 (480 273.8 to 555 659.4)	14 844.1 (13 340.7 to 16 532.6)	3152.6 (2327.5 to 4005.4)	30.2% (27.0 to 34.6)*	22.2% (17.2 to 27.6)*	-10.3% (-13.0 to -7.3)*	-1.5% (-5.5 to 2.8)
Albuminuria with preserved GFR due to other and unspecified causes	285 109.9 (256 788.7 to 314 368.4)	..	..	..	..	..	..
End-stage chronic kidney disease due to other and unspecified causes	955.4 (822.5 to 1111.7)	..	380.7 (257.9 to 504.2)	59.9% (54.4 to 66.0)*	23.9% (19.3 to 28.3)*	13.4% (9.5 to 17.3)*	0.2% (-3.1 to 3.2)
Stage III chronic kidney disease due to other and unspecified causes	222 956.2 (200 778.0 to 247 902.5)	14 844.1 (13 340.7 to 16 532.6)	1105.1 (727.3 to 1640.7)	11.4% (7.2 to 15.7)*	15.6% (9.4 to 22.0)*	-24.8% (-27.6 to -22.1)*	-8.4% (-13.4 to -3.2)*
Stage IV chronic kidney disease due to other and unspecified causes	4825.1 (4024.2 to 5754.4)	..	520.5 (346.0 to 725.0)	37.3% (34.0 to 40.9)*	27.9% (20.0 to 36.0)*	-7.8% (-9.3 to -5.9)*	0.3% (-5.5 to 6.5)
Stage V chronic kidney disease due to other and unspecified causes	2190.0 (1894.3 to 2551.5)	..	1146.3 (788.6 to 1517.9)	43.4% (39.4 to 49.2)*	25.9% (19.9 to 32.2)*	2.9% (0.8 to 6.3)*	4.5% (-0.4 to 9.7)
Acute glomerulonephritis	52.4 (45.5 to 60.7)	773.4 (672.8 to 877.3)	2.6 (1.6 to 4.0)	-1.3% (-13.9 to 2.3)	1.0% (-2.1 to 3.5)	-24.3% (-34.2 to -21.4)*	-12.6% (-15.3 to -10.1)*
<b>Skin and subcutaneous diseases</b>	<b>1 974 238.4</b> <b>(1 916 671.8 to 2 034 645.7)</b>	<b>4 185 971.3</b> <b>(3 971 760.5 to 4 391 218.2)</b>	<b>41 621.9</b> <b>(27 371.7 to 61 859.5)</b>	<b>24.0%</b> <b>(22.9 to 25.3)*</b>	<b>13.0%</b> <b>(12.5 to 13.6)*</b>	<b>0.9%</b> <b>(0.4 to 1.4)*</b>	<b>0.6%</b> <b>(0.1 to 1.1)*</b>
Dermatitis	291 689.4 (276 520.7 to 308 059.0)	274 034.1 (246 120.0 to 302 497.5)	11 128.1 (6484.1 to 17 733.4)	19.3% (18.2 to 20.7)*	12.1% (11.3 to 12.8)*	-0.1% (-0.7 to 0.5)	1.1% (0.4 to 1.8)*
Atopic dermatitis	205 517.2 (193 701.2 to 218 582.4)	27 134.4 (25 282.9 to 29 055.0)	9003.4 (4887.0 to 14 981.0)	17.0% (16.1 to 17.9)*	11.6% (10.8 to 12.5)*	0.4% (-0.4 to 1.1)	1.7% (0.9 to 2.6)*
Contact dermatitis	79 666.7 (70 425.7 to 89 554.9)	221 252.8 (193 775.3 to 249 726.6)	1989.2 (1304.4 to 2950.5)	31.0% (28.8 to 33.2)*	14.4% (12.6 to 16.2)*	-1.6% (-2.3 to -1.0)*	-1.1% (-1.7 to -0.5)*
Seborrhoeic dermatitis	10 035.9 (9450.2 to 10 668.4)	25 646.9 (23 981.6 to 27 315.9)	135.6 (78.1 to 215.0)	20.8% (18.5 to 23.3)*	8.4% (6.6 to 10.3)*	-7.7% (-9.0 to -6.4)*	-7.1% (-8.3 to -5.8)*
Psoriasis	64 609.6 (62 454.3 to 66 767.5)	7846.6 (7564.9 to 8162.8)	5569.5 (3956.1 to 7354.3)	43.1% (42.0 to 44.2)*	21.1% (20.3 to 21.9)*	5.1% (4.3 to 5.8)*	2.3% (1.6 to 2.9)*
Bacterial skin diseases	11 397.9 (11 061.4 to 11 741.7)	266 779.7 (260 229.3 to 273 665.3)	177.9 (112.3 to 274.1)	29.2% (27.2 to 31.0)*	15.5% (14.0 to 17.1)*	2.0% (-0.5 to 4.4)	0.8% (-1.1 to 2.9)
Cellulitis	2071.5 (1952.2 to 2186.2)	42 958.6 (40 535.7 to 45 172.9)	118.2 (78.7 to 167.8)	26.7% (24.9 to 28.6)*	12.9% (11.7 to 14.2)*	-2.6% (-3.8 to -1.3)*	-2.9% (-3.8 to -2.0)*
Pyoderma	10 557.2 (10 245.5 to 10 853.2)	223 821.2 (217 649.0 to 230 259.5)	59.6 (23.9 to 123.5)	35.0% (33.7 to 36.4)*	20.9% (19.8 to 22.2)*	13.0% (11.9 to 14.2)*	8.8% (7.8 to 9.9)*
Impetigo	4620.7 (4358.2 to 4870.5)	84 007.5 (79 485.3 to 88 529.9)	26.4 (10.4 to 55.8)	35.7% (33.6 to 37.8)*	20.7% (18.7 to 22.7)*	24.1% (22.2 to 26.0)*	13.4% (11.5 to 15.2)*
Abscess and other bacterial skin diseases	5936.4 (5770.4 to 6098.7)	139 813.6 (135 314.1 to 143 965.8)	33.2 (13.4 to 69.5)	34.5% (32.8 to 36.3)*	21.1% (19.7 to 22.6)*	5.5% (4.2 to 6.8)*	5.1% (3.8 to 6.4)*
Scabies	175 406.7 (154 517.9 to 198 404.1)	527 476.5 (462 050.9 to 598 087.9)	4528.7 (2506.4 to 7414.6)	16.1% (13.8 to 18.5)*	6.6% (5.3 to 8.0)*	-4.3% (-5.0 to -3.6)*	-3.1% (-3.6 to -2.6)*

(Table 1 continues on next page)

	Prevalence (thousands) 2017 counts	Incidence (thousands) 2017 counts	YLDs (thousands)				
			2017 counts	Percentage change in counts, 1990–2007	Percentage change in counts, 2007–17	Percentage change in age-standardised rates, 1990–2007	Percentage change in age-standardised rates, 2007–17
(Continued from previous page)							
Fungal skin diseases	743 458.4 (681 568.4 to 808 149.7)	2 126 927.9 (1 917 361.6 to 2 317 274.7)	4154.5 (1651.4 to 8633.2)	21.5% (19.0 to 24.0)*	10.9% (9.2 to 12.5)*	-3.1% (-3.8 to -2.4)*	-4.4% (-5.4 to -3.4)*
Tinea capitis	160 239.3 (133 390.6 to 194 439.3)	303 016.6 (245 340.4 to 369 760.2)	916.5 (357.3 to 1965.4)	-5.8% (-7.3 to -4.3)*	-13.0% (-14.5 to -11.3)*	-13.8% (-15.0 to -12.7)*	-19.0% (-20.4 to -17.3)*
Other fungal skin diseases	583 219.1 (526 500.8 to 645 363.9)	1 823 911.3 (1 638 297.9 to 2 009 788.9)	3238.0 (1305.4 to 6694.4)	37.1% (35.2 to 39.3)*	20.2% (19.0 to 21.6)*	1.8% (1.5 to 2.1)*	1.3% (1.1 to 1.5)*
Viral skin diseases	130 639.2 (125 604.0 to 136 047.9)	116 329.8 (111 012.4 to 121 710.1)	4033.0 (2595.4 to 5995.6)	10.4% (9.8 to 11.1)*	6.4% (6.0 to 6.9)*	-2.8% (-3.2 to -2.3)*	-1.8% (-2.2 to -1.4)*
Viral warts	54 309.6 (52 104.2 to 56 403.2)	30 140.5 (29 078.5 to 31 211.0)	1662.2 (1066.0 to 2439.8)	13.7% (12.8 to 14.6)*	5.6% (4.8 to 6.3)*	-6.8% (-7.3 to -6.3)*	-4.8% (-5.4 to -4.3)*
Molluscum contagiosum	76 329.6 (71 596.6 to 81 134.1)	86 189.3 (80 984.6 to 91 427.2)	2370.7 (1511.7 to 3525.9)	8.2% (7.5 to 8.9)*	7.1% (6.5 to 7.6)*	0.2% (-0.3 to 0.8)	0.3% (-0.3 to 0.8)
Acne vulgaris	119 082.3 (107 127.9 to 133 651.4)	60 118.8 (53 260.2 to 68 180.7)	2547.6 (1518.8 to 4056.6)	46.1% (44.6 to 47.6)*	16.2% (15.2 to 17.2)*	19.8% (18.6 to 20.9)*	11.4% (10.3 to 12.5)*
Alopecia areata	15 981.0 (15 477.3 to 16 515.9)	28 185.2 (27 302.2 to 29 126.3)	523.1 (334.9 to 774.8)	28.8% (27.6 to 30.1)*	12.7% (11.8 to 13.8)*	-2.3% (-3.1 to -1.4)*	-1.5% (-2.3 to -0.6)*
Pruritus	71 224.3 (63 948.2 to 80 034.2)	55 643.1 (49 208.3 to 62 689.4)	755.6 (356.1 to 1433.2)	36.4% (34.1 to 38.8)*	18.9% (17.5 to 20.4)*	2.9% (2.5 to 3.4)*	1.6% (1.2 to 2.0)*
Urticaria	83 610.0 (73 335.4 to 95 162.9)	147 198.5 (129 941.2 to 166 345.6)	5014.8 (3321.0 to 7046.4)	19.3% (17.4 to 21.5)*	10.8% (9.8 to 11.9)*	0.7% (0.2 to 1.2)*	0.3% (-0.2 to 0.8)
Decubitus ulcer	1143.7 (1022.6 to 1288.5)	4199.3 (3752.4 to 4741.3)	181.2 (125.8 to 244.3)	45.2% (42.7 to 47.7)*	28.9% (26.3 to 31.9)*	-3.3% (-4.9 to -1.8)*	-0.4% (-2.2 to 1.5)
Other skin and subcutaneous diseases	550 810.3 (538 490.7 to 563 961.3)	571 231.9 (558 726.3 to 584 649.5)	3008.1 (1446.7 to 5557.4)	45.1% (44.6 to 45.6)*	25.6% (25.2 to 26.0)*	6.6% (6.4 to 6.8)*	4.3% (4.1 to 4.5)*
<b>Sense organ diseases</b>	<b>2 035 737.0</b> <b>(1 994 115.8 to</b> <b>2 079 908.6)</b>	<b>..</b>	<b>66 576.1</b> <b>(44 700.8 to</b> <b>95 675.1)</b>	<b>42.0%</b> <b>(41.1 to 42.8)*</b>	<b>24.1%</b> <b>(23.4 to 24.8)*</b>	<b>-1.0%</b> <b>(-1.6 to -0.5)*</b>	<b>-0.9%</b> <b>(-1.5 to -0.3)*</b>
Blindness and vision impairment	1193 642.8 (1154 777.0 to 1237 118.0)	..	29 895.2 (20 277.7 to 44 036.0)	39.3% (37.8 to 40.5)*	23.1% (22.0 to 24.0)*	-2.7% (-3.5 to -1.9)*	-1.8% (-2.7 to -0.9)*
Glaucoma	5993.5 (5157.5 to 6984.8)	..	686.1 (462.9 to 948.8)	41.5% (39.1 to 44.2)*	27.9% (26.4 to 29.4)*	-6.0% (-7.4 to -4.2)*	-4.7% (-5.8 to -3.6)*
Cataract	107 987.7 (95 775.3 to 122 319.3)	..	8005.8 (5579.2 to 10 820.9)	49.4% (46.9 to 52.0)*	29.6% (27.4 to 31.7)*	-2.8% (-4.2 to -1.2)*	-2.0% (-3.6 to -0.5)*
Age-related macular degeneration	6758.8 (5612.6 to 8183.0)	..	530.7 (363.6 to 728.6)	59.3% (54.5 to 63.9)*	30.7% (28.6 to 32.9)*	2.8% (-0.7 to 6.1)	-3.7% (-5.3 to -2.1)*
Refraction disorders	185 392.8 (165 673.9 to 208 575.2)	..	7984.3 (5353.0 to 11 487.0)	24.6% (21.7 to 27.7)*	15.3% (13.6 to 17.0)*	-6.1% (-7.8 to -4.3)*	-3.1% (-4.2 to -1.9)*
Near vision loss	969 669.5 (932 613.8 to 1 009 067.7)	..	9802.9 (4669.6 to 17 922.5)	46.4% (45.6 to 47.1)*	24.6% (24.0 to 25.2)*	1.2% (0.8 to 1.7)*	0.5% (0.1 to 0.9)*
Other vision loss	34 607.5 (30 956.5 to 38 397.4)	..	2885.3 (2013.7 to 3884.0)	36.7% (34.6 to 38.8)*	21.0% (19.4 to 22.6)*	-4.6% (-5.8 to -3.3)*	-3.7% (-4.8 to -2.6)*
Age-related and other hearing loss	1 317 431.7 (1 276 962.6 to 1 356 229.1)	..	34 229.6 (23 176.8 to 48 684.1)	44.4% (43.0 to 45.7)*	24.9% (23.9 to 26.0)*	0.4% (-0.4 to 1.1)	-0.2% (-1.0 to 0.5)
Other sense organ diseases	103 750.5 (100 613.2 to 107 050.4)	..	2451.3 (1519.6 to 3573.5)	42.1% (41.1 to 43.1)*	25.0% (24.2 to 25.8)*	1.8% (1.3 to 2.3)*	0.9% (0.4 to 1.4)*
Chronic other sense organ diseases	87 788.5 (84 748.6 to 91 039.5)	..	2232.4 (1381.5 to 3246.2)	44.3% (43.4 to 45.3)*	26.1% (25.4 to 26.9)*	1.8% (1.3 to 2.3)*	0.9% (0.4 to 1.4)*
Acute other sense organ diseases	15 962.1 (15 501.3 to 16 458.6)	..	218.9 (133.2 to 332.7)	24.3% (22.6 to 25.9)*	14.6% (13.2 to 16.2)*	1.7% (0.5 to 2.9)*	1.0% (-0.3 to 2.4)

(Table 1 continues on next page)

	Prevalence (thousands) 2017 counts	Incidence (thousands) 2017 counts	YLDs (thousands)				
			2017 counts	Percentage change in counts, 1990-2007	Percentage change in counts, 2007-17	Percentage change in age-standardised rates, 1990-2007	Percentage change in age-standardised rates, 2007-17
(Continued from previous page)							
<b>Musculoskeletal disorders</b>	<b>1 312 131.3</b> (1 248 058.7 to 1 383 422.6)	<b>334 744.9</b> (309 934.0 to 363 175.8)	<b>135 881.3</b> (99 022.6 to 179 645.0)	<b>38.4%</b> (36.4 to 40.2)*	<b>19.9%</b> (18.8 to 21.2)*	<b>-2.3%</b> (-3.3 to -1.2)*	<b>-1.1%</b> (-1.7 to -0.5)*
Rheumatoid arthritis	19 965.1 (17 990.5 to 21 955.7)	1204.6 (1071.1 to 1331.7)	2626.0 (1783.4 to 3529.9)	45.8% (44.1 to 47.5)*	33.5% (30.6 to 36.4)*	0.9% (-0.1 to 1.9)	6.7% (4.7 to 8.8)*
Osteoarthritis	303 096.5 (273 279.8 to 338 632.0)	14 933.5 (13 386.3 to 16 739.6)	9604.0 (4808.6 to 19 139.0)	63.1% (61.5 to 64.9)*	31.4% (30.7 to 32.1)*	8.5% (7.5 to 9.6)*	1.0% (0.5 to 1.6)*
Osteoarthritis of the hip	40 010.0 (37 473.8 to 42 725.7)	2045.1 (1913.7 to 2195.9)	1265.4 (648.2 to 2609.3)	59.1% (57.9 to 60.4)*	35.3% (34.5 to 36.2)*	5.7% (4.9 to 6.4)*	3.8% (3.2 to 4.4)*
Osteoarthritis of the knee	263 086.5 (232 661.9 to 298 640.0)	12 888.4 (11 375.0 to 14 656.0)	8338.6 (4152.3 to 16 431.9)	63.7% (61.8 to 65.8)*	30.8% (30.1 to 31.6)*	9.0% (7.7 to 10.3)*	0.6% (0.1 to 1.2)*
Low back pain	576 980.9 (518 940.4 to 637 177.9)	245 858.9 (221 816.5 to 272 419.6)	64 946.7 (46 512.3 to 87 417.1)	30.0% (27.9 to 31.9)*	17.5% (16.2 to 19.0)*	-7.2% (-8.4 to -6.0)*	-2.1% (-2.6 to -1.6)*
Low back pain with leg pain	187 103.9 (167 946.8 to 209 695.8)	78 640.7 (69 782.0 to 87 714.4)	26 843.2 (19 173.1 to 36 078.7)	31.2% (29.0 to 33.4)*	19.0% (17.6 to 20.6)*	-7.8% (-8.9 to -6.5)*	-2.2% (-2.7 to -1.6)*
Low back pain without leg pain	389 877.0 (350 624.1 to 429 901.0)	167 218.2 (150 726.4 to 185 159.5)	38 103.5 (27 216.0 to 51 524.8)	29.1% (27.1 to 31.1)*	16.5% (15.1 to 18.0)*	-6.9% (-8.1 to -5.7)*	-2.0% (-2.5 to -1.6)*
Neck pain	288 718.6 (254 715.3 to 323 483.0)	65 310.3 (57 678.2 to 73 917.2)	28 631.1 (19 951.8 to 40 202.3)	44.4% (41.9 to 47.0)*	21.4% (19.5 to 23.6)*	-0.0% (-1.2 to 1.2)	-0.7% (-1.6 to 0.5)
Gout	41 217.7 (36 699.8 to 46 101.3)	7437.7 (6573.8 to 8457.4)	1285.0 (867.4 to 1768.9)	54.7% (52.5 to 56.9)*	30.9% (29.2 to 32.6)*	4.4% (3.1 to 5.8)*	2.7% (1.6 to 3.7)*
Other musculoskeletal disorders	336 467.8 (285 415.0 to 383 783.9)	..	28 788.6 (19 498.0 to 39 995.7)	46.1% (43.6 to 48.6)*	19.0% (15.5 to 22.4)*	4.3% (3.3 to 5.4)*	-0.8% (-3.3 to 1.4)
<b>Other non-communicable diseases</b>	<b>4 916 184.8</b> (4 793 498.0 to 5 046 526.7)	<b>4 209 631.0</b> (3 838 652.6 to 4 611 876.0)	<b>53 645.9</b> (36 899.7 to 74 479.3)	<b>25.7%</b> (24.2 to 27.5)*	<b>12.9%</b> (11.8 to 14.2)*	<b>-5.3%</b> (-6.0 to -4.6)*	<b>-3.2%</b> (-3.9 to -2.4)*
Congenital anomalies	100 366.3 (95 153.7 to 106 524.9)	5445.3 (5088.8 to 5844.4)	12 056.9 (8552.1 to 16 062.8)	23.1% (22.0 to 24.2)*	12.7% (11.7 to 13.7)*	-0.1% (-0.9 to 0.8)	0.8% (-0.2 to 1.6)
Neural tube defects	2874.4 (2566.3 to 3205.2)	163.9 (145.4 to 185.1)	854.7 (600.1 to 1133.9)	25.1% (22.7 to 27.5)*	17.0% (13.8 to 20.3)*	2.1% (0.2 to 4.1)*	5.1% (2.2 to 8.0)*
Severe motor and cognitive impairment due to anencephaly	0.1 (0.1 to 0.1)	12.8 (10.2 to 16.3)	0.0 (0.0 to 0.1)	-5.3% (-7.2 to -3.3)*	-6.5% (-8.6 to -4.5)*	-4.5% (-6.4 to -2.4)*	-8.9% (-11.0 to -7.0)*
Encephalocele due to neural tube defects	300.6 (246.9 to 354.9)	28.8 (22.3 to 37.4)	51.8 (34.6 to 72.3)	17.0% (14.3 to 20.0)*	12.8% (9.8 to 15.6)*	-6.3% (-8.1 to -4.4)*	-0.7% (-3.4 to 1.9)
Spina bifida due to neural tube defects	2573.8 (2296.6 to 2874.9)	122.3 (106.0 to 141.4)	802.9 (557.1 to 1069.3)	25.7% (23.1 to 28.3)*	17.3% (14.1 to 20.6)*	2.8% (0.7 to 4.8)*	5.5% (2.6 to 8.5)*
Congenital heart anomalies	11 998.3 (10 958.7 to 13 123.9)	2481.7 (2203.2 to 2775.4)	589.5 (287.2 to 973.4)	12.2% (9.7 to 13.9)*	7.6% (5.7 to 9.1)*	1.9% (0.4 to 3.2)*	0.2% (-1.5 to 1.5)
Critical malformations of great vessels, congenital valvular heart disease, and patent ductus arteriosus	2075.2 (1788.4 to 2407.9)	519.5 (406.2 to 650.6)	124.7 (62.7 to 201.6)	10.0% (7.1 to 12.6)*	6.9% (4.3 to 9.1)*	0.9% (-1.5 to 2.9)	-0.1% (-2.3 to 2.1)
Other congenital heart anomalies	2540.8 (2333.1 to 2769.7)	398.3 (353.7 to 445.6)	142.9 (62.3 to 243.7)	14.2% (11.1 to 16.6)*	8.9% (6.5 to 11.1)*	1.5% (-0.6 to 3.5)	0.4% (-1.8 to 2.4)
Severe congenital heart anomalies excluding single ventricle heart defects	2899.7 (2567.0 to 3266.8)	565.8 (453.1 to 699.6)	170.9 (86.1 to 282.1)	20.6% (17.0 to 23.4)*	9.2% (6.5 to 11.6)*	6.5% (4.1 to 8.7)*	0.7% (-1.7 to 3.0)

(Table 1 continues on next page)

	Prevalence (thousands) 2017 counts	Incidence (thousands) 2017 counts	YLDs (thousands)				
			2017 counts	Percentage change in counts, 1990–2007	Percentage change in counts, 2007–17	Percentage change in age-standardised rates, 1990–2007	Percentage change in age-standardised rates, 2007–17
(Continued from previous page)							
Single ventricle and single ventricle pathway congenital heart anomalies	344.0 (285.0 to 413.7)	263.5 (186.1 to 356.8)	21.1 (11.3 to 33.7)	13.0% (9.0 to 17.2)*	7.2% (3.2 to 11.1)*	5.5% (1.8 to 9.4)*	0.8% (-3.1 to 4.6)
Ventricular septal defect and atrial septal defect	4138.6 (3401.3 to 4864.5)	734.5 (588.6 to 908.7)	129.8 (62.0 to 225.5)	2.9% (-0.0 to 5.7)	5.1% (2.5 to 7.5)*	-2.4% (-4.7 to -0.0)*	-0.7% (-3.3 to 1.6)
Orofacial clefts	10 816.4 (9945.7 to 11 654.1)	195.5 (152.0 to 249.3)	320.8 (211.9 to 468.2)	8.7% (3.4 to 14.7)*	13.5% (7.5 to 20.0)*	-11.2% (-15.5 to -6.4)*	1.5% (-4.0 to 7.3)
Down syndrome	3535.7 (3092.1 to 4015.5)	110.5 (95.2 to 130.6)	326.4 (222.7 to 452.6)	22.5% (21.3 to 23.8)*	11.8% (9.1 to 14.7)*	-1.5% (-2.6 to -0.5)*	-0.2% (-2.6 to 2.4)
Turner syndrome	572.3 (502.0 to 652.8)	19.6 (17.0 to 22.9)	10.1 (5.0 to 16.5)	21.6% (19.5 to 24.1)*	9.1% (7.3 to 10.9)*	1.1% (-0.6 to 2.7)	0.9% (-0.7 to 2.5)
Klinefelter syndrome	866.8 (747.4 to 994.2)	28.3 (24.2 to 32.8)	5.2 (2.4 to 9.7)	28.6% (24.5 to 33.0)*	7.4% (4.3 to 10.7)*	4.4% (1.4 to 7.6)*	-1.7% (-4.5 to 1.1)
Other chromosomal abnormalities	6379.1 (5052.5 to 7827.4)	301.3 (236.2 to 371.0)	593.1 (389.9 to 833.1)	24.2% (22.1 to 26.3)*	19.6% (16.9 to 22.4)*	2.3% (0.7 to 4.1)*	7.1% (4.7 to 9.5)*
Congenital musculoskeletal and limb anomalies	31 506.6 (28 137.2 to 36 022.4)	1537.0 (1327.4 to 1777.0)	4622.5 (3030.7 to 6345.8)	24.8% (23.9 to 25.8)*	13.4% (12.5 to 14.2)*	-0.6% (-1.4 to 0.1)	0.4% (-0.4 to 1.1)
Polydactyly and syndactyly	432.6 (342.4 to 538.9)	218.7 (158.9 to 295.2)	4.7 (2.1 to 9.1)	0.3% (-3.9 to 5.2)	7.1% (3.1 to 10.9)*	-4.4% (-8.1 to -0.2)*	0.9% (-3.2 to 4.7)
Congenital limb deficiency	14 811.3 (13 154.2 to 17 016.1)	389.3 (343.2 to 449.2)	2217.3 (1452.1 to 3057.6)	22.4% (21.2 to 23.6)*	11.8% (10.8 to 12.9)*	-0.1% (-1.1 to 0.8)	0.5% (-0.4 to 1.5)
Other congenital musculoskeletal anomalies	16 262.8 (14 519.3 to 18 611.7)	929.0 (801.7 to 1074.0)	2400.4 (1574.9 to 3296.1)	27.3% (26.1 to 28.5)*	14.8% (13.8 to 15.8)*	-1.1% (-2.1 to -0.2)*	0.2% (-0.7 to 1.0)
Urogenital congenital anomalies	5725.5 (4984.9 to 6504.8)	249.7 (216.9 to 285.3)	141.0 (82.3 to 233.3)	13.0% (11.5 to 14.6)*	4.2% (2.2 to 6.3)*	-4.7% (-5.8 to -3.6)*	-4.1% (-6.0 to -2.3)*
Digestive congenital anomalies	17 662.5 (15 899.6 to 19 748.8)	357.9 (323.3 to 398.8)	794.3 (528.2 to 1134.1)	16.3% (15.0 to 17.5)*	8.7% (4.3 to 13.2)*	-8.5% (-9.5 to -7.5)*	-4.3% (-8.3 to -0.4)*
Congenital diaphragmatic hernia	315.6 (276.8 to 357.7)	15.5 (12.9 to 17.9)	6.2 (3.6 to 10.1)	13.9% (12.9 to 14.9)*	6.5% (5.6 to 7.3)*	-1.3% (-2.0 to -0.5)*	-1.8% (-2.6 to -1.0)*
Congenital atresia or stenosis of the digestive tract	111.9 (83.4 to 142.7)	137.3 (96.5 to 174.1)	8.9 (5.4 to 13.7)	-5.9% (-8.5 to -3.4)*	6.1% (3.2 to 9.1)*	-7.8% (-10.3 to -5.4)*	0.7% (-2.1 to 3.6)
Congenital malformations of the abdominal wall after treatment	1258.9 (1109.6 to 1431.5)	84.7 (71.3 to 99.3)	54.0 (34.5 to 79.4)	15.2% (14.3 to 16.2)*	7.4% (6.6 to 8.2)*	0.1% (-0.6 to 0.8)	-0.8% (-1.6 to -0.1)*
Other congenital malformations of the digestive tract	15 976.1 (14 219.3 to 18 092.5)	120.3 (88.9 to 169.7)	725.2 (480.5 to 1035.6)	16.7% (15.2 to 18.2)*	8.8% (4.0 to 13.7)*	-9.2% (-10.3 to -8.1)*	-4.7% (-9.0 to -0.4)*
Other congenital anomalies	25 911.9 (22 431.7 to 30 006.9)	..	3799.4 (2595.5 to 5226.3)	25.9% (23.0 to 28.7)*	12.1% (9.6 to 14.5)*	2.9% (0.5 to 5.3)*	0.8% (-1.4 to 3.0)
Other congenital birth defects	..	..	446.4 (309.1 to 601.8)	34.8% (32.6 to 37.3)*	19.3% (17.3 to 22.0)*	19.0% (17.6 to 20.5)*	9.8% (8.0 to 11.9)*
Hearing loss due to other congenital anomalies	25 911.9 (22 431.7 to 30 006.9)	..	3353.0 (2227.2 to 4697.0)	24.8% (21.6 to 28.0)*	11.2% (8.4 to 13.9)*	1.1% (-1.4 to 3.6)	-0.4% (-2.8 to 2.1)
Urinary diseases and male infertility	110 267.4 (99 363.2 to 120 483.9)	366 721.5 (337 838.9 to 396 838.4)	3135.6 (2053.6 to 4529.0)	33.7% (31.9 to 35.6)*	26.9% (25.5 to 28.4)*	-7.6% (-9.0 to -6.2)*	-0.8% (-1.7 to 0.1)
Urinary tract infections	5250.9 (4741.8 to 5801.2)	274 626.5 (247 558.6 to 303 427.3)	173.0 (106.4 to 256.5)	29.8% (27.1 to 32.4)*	16.6% (14.0 to 19.3)*	0.3% (-1.2 to 1.9)	1.9% (0.1 to 3.7)*
Urolithiasis	3147.5 (2808.1 to 3483.6)	83 173.6 (74 603.1 to 91 918.7)	230.9 (159.6 to 317.0)	31.2% (28.7 to 34.1)*	18.6% (16.2 to 20.9)*	-7.5% (-9.3 to -5.7)*	-2.0% (-3.5 to -0.3)*
Benign prostatic hyperplasia	74 541.9 (65 358.9 to 84 081.8)	8921.5 (7859.8 to 10 046.2)	2427.3 (1562.8 to 3460.0)	36.7% (34.1 to 39.5)*	32.0% (30.7 to 33.3)*	-8.0% (-9.5 to -6.2)*	-0.2% (-1.1 to 0.8)
Male infertility	30 432.7 (24 686.0 to 36 812.7)	..	180.9 (74.8 to 373.9)	33.1% (29.7 to 36.8)*	17.0% (13.7 to 20.1)*	1.3% (-0.5 to 3.3)	6.9% (4.1 to 9.7)*

(Table 1 continues on next page)



	Prevalence (thousands) 2017 counts	Incidence (thousands) 2017 counts	YLDs (thousands)				
			2017 counts	Percentage change in counts, 1990-2007	Percentage change in counts, 2007-17	Percentage change in age-standardised rates, 1990-2007	Percentage change in age-standardised rates, 2007-17
(Continued from previous page)							
Other urinary diseases	..	..	123.5 (84.7 to 170.6)	8.4% (6.5 to 10.3)*	-7.1% (-8.6 to -5.7)*	-18.0% (-19.3 to -16.7)*	-20.3% (-21.5 to -19.2)*
Gynaecological diseases	815 073.8 (787 646.5 to 843 595.7)	195 631.4 (189 141.1 to 202 275.1)	11 619.6 (7966.6 to 16 279.1)	33.9% (31.3 to 36.5)*	10.2% (9.0 to 11.6)*	-1.9% (-3.4 to -0.5)*	-2.4% (-3.3 to -1.4)*
Uterine fibroids	159 444.4 (139 576.9 to 182 588.5)	8445.5 (7062.0 to 10 077.7)	1473.4 (866.6 to 2386.3)	44.3% (39.5 to 48.4)*	8.1% (3.9 to 11.7)*	-2.5% (-5.7 to 0.4)	-8.0% (-11.5 to -5.1)*
Polycystic ovarian syndrome	52 159.9 (41 652.7 to 66 540.8)	2129.0 (1727.3 to 2716.3)	459.4 (203.7 to 886.2)	33.2% (31.8 to 34.6)*	13.1% (12.1 to 14.1)*	0.6% (-0.3 to 1.4)	1.8% (1.0 to 2.7)*
Female infertility	61 238.4 (43 321.2 to 82 668.2)	..	342.6 (129.5 to 723.4)	32.1% (26.8 to 37.5)*	27.5% (22.2 to 32.7)*	-0.0% (-2.6 to 2.7)	16.5% (12.0 to 20.8)*
Endometriosis	44 656.0 (37 289.1 to 52 852.4)	6291.6 (5083.7 to 7555.2)	4121.5 (2752.3 to 5940.5)	31.2% (26.0 to 37.5)*	9.2% (7.9 to 10.5)*	-3.1% (-6.3 to 0.5)	-3.0% (-3.9 to -2.0)*
Genital prolapse	108 559.4 (96 272.0 to 121 882.8)	12 319.0 (10 947.3 to 13 860.3)	337.3 (161.9 to 634.2)	26.0% (25.0 to 27.2)*	19.9% (18.5 to 21.3)*	-13.7% (-14.4 to -12.9)*	-3.6% (-4.4 to -2.8)*
Premenstrual syndrome	472 189.7 (451 411.0 to 493 266.2)	127 157.4 (121 707.4 to 132 919.3)	3930.0 (2533.7 to 5900.3)	32.3% (30.9 to 33.7)*	8.8% (7.2 to 10.1)*	0.6% (-1.4 to 0.3)	-2.2% (-3.6 to -1.0)*
Other gynaecological diseases	50 421.8 (48 042.0 to 52 824.5)	39 288.9 (37 076.3 to 41 538.6)	955.4 (643.6 to 1384.7)	42.2% (36.5 to 47.7)*	14.5% (11.6 to 17.4)*	3.0% (-0.6 to 6.7)	1.3% (-1.5 to 3.9)
Other gynaecological diseases	45 859.4 (43 492.6 to 48 226.9)	39 288.9 (37 076.3 to 41 538.6)	855.8 (576.7 to 1238.9)	41.5% (35.6 to 47.2)*	15.5% (12.2 to 18.6)*	2.5% (-1.2 to 6.4)	1.9% (-1.1 to 5.0)
Other gynaecological diseases with anaemia	4562.4 (4423.1 to 4703.7)	..	99.6 (66.3 to 146.8)	47.3% (39.9 to 55.6)*	6.6% (1.1 to 11.8)*	6.4% (0.9 to 12.5)*	-4.2% (-8.9 to 0.6)
Haemoglobinopathies and haemolytic anaemias	1922 603.3 (1878 676.9 to 1967 411.4)	42 237.7 (40 961.6 to 43 660.7)	5313.7 (3608.1 to 7683.0)	1.1% (-2.0 to 4.1)	-5.3% (-8.4 to -2.3)*	-17.8% (-20.2 to -15.5)*	-15.2% (-17.9 to -12.5)*
Thalassaemias	411.4 (384.1 to 441.7)	106.3 (99.7 to 113.5)	17.2 (11.4 to 25.3)	-38.9% (-42.9 to -34.6)*	-20.0% (-25.4 to -15.4)*	-41.0% (-44.8 to -36.6)*	-24.4% (-29.6 to -20.0)*
Thalassaemias trait	298 566.6 (287 549.2 to 309 863.6)	4868.2 (4697.5 to 5051.2)	1908.8 (1282.8 to 2781.8)	-8.2% (-12.8 to -3.6)*	-12.1% (-16.1 to -7.7)*	-25.7% (-29.1 to -22.1)*	-21.6% (-25.1 to -18.0)*
Sickle cell disorders	3131.7 (2845.5 to 3434.9)	613.1 (514.6 to 732.0)	252.7 (173.0 to 354.4)	42.0% (34.4 to 50.4)*	15.1% (8.0 to 21.2)*	28.0% (21.0 to 35.3)*	8.4% (1.8 to 14.2)*
Sickle cell trait	460 730.8 (416 642.3 to 511 272.8)	10 822.4 (9887.9 to 11 861.3)	1203.4 (812.3 to 1731.4)	20.5% (16.4 to 24.3)*	-1.3% (-5.1 to 2.9)	1.2% (-1.9 to 4.2)	-10.3% (-13.9 to -6.4)*
G6PD deficiency	359 180.8 (344 591.4 to 374 393.5)	7844.9 (7507.8 to 8199.3)	24.7 (17.1 to 34.4)	13.8% (8.1 to 21.1)*	2.3% (-4.6 to 8.7)	-6.9% (-11.5 to -1.1)*	-8.8% (-15.2 to -3.1)*
G6PD trait	940 308.4 (924 830.5 to 955 818.2)	17 982.7 (17 673.9 to 18 299.5)	0.4 (0.3 to 0.6)	28.3% (22.4 to 34.0)*	3.0% (-1.7 to 7.8)	1.3% (-3.2 to 5.7)	-8.1% (-12.2 to -3.9)*
Other haemoglobinopathies and haemolytic anaemias	79 442.9 (77 864.8 to 81 099.0)	..	1906.4 (1289.0 to 2768.5)	-0.4% (-3.3 to 2.5)	-2.5% (-5.8 to 1.0)	-20.8% (-23.0 to -18.7)*	-13.8% (-16.8 to -10.6)*
Endocrine, metabolic, blood, and immune disorders	109 922.2 (106 937.4 to 113 100.4)	..	3215.7 (2232.5 to 4501.4)	6.1% (4.1 to 8.2)*	3.2% (1.0 to 5.4)*	-16.0% (-17.4 to -14.5)*	-9.5% (-11.4 to -7.4)*
Anaemia due to endocrine, metabolic, blood, and immune disorders	81 387.3 (80 146.9 to 82 729.4)	..	2177.1 (1481.4 to 3130.1)	0.0% (-2.5 to 2.6)	-4.9% (-8.1 to -1.5)*	-19.4% (-21.4 to -17.4)*	-14.3% (-17.2 to -11.3)*
Endocrine, metabolic, blood, and immune disorders	28 144.8 (25 572.5 to 30 946.4)	..	1005.7 (684.2 to 1398.9)	27.2% (24.6 to 30.0)*	25.4% (22.2 to 28.7)*	-5.4% (-6.6 to -4.0)*	3.3% (1.0 to 5.5)*
Heart failure due to endocrine, metabolic, blood, and immune disorders	390.1 (322.2 to 465.9)	..	32.9 (21.8 to 46.4)	34.0% (27.5 to 40.8)*	28.1% (24.7 to 31.5)*	-13.9% (-18.2 to -9.7)*	-4.6% (-6.9 to -2.1)*
Oral disorders	3 466 894.0 (3 271 733.1 to 3 676 485.6)	3 599 595.0 (3 233 032.9 to 3 992 824.0)	18 304.4 (10 992.8 to 28 338.1)	38.4% (36.9 to 39.8)*	21.4% (20.5 to 22.3)*	-2.7% (-3.8 to -1.8)*	-1.3% (-2.0 to -0.6)*
Caries of deciduous teeth	531 801.7 (443 844.0 to 622 463.7)	1 057 534.3 (756 100.5 to 1 400 908.8)	138.9 (59.4 to 278.1)	-4.5% (-6.2 to -2.9)*	4.9% (3.1 to 6.3)*	-7.0% (-8.6 to -5.6)*	-2.1% (-3.7 to -0.8)*

(Table 1 continues on next page)

	Prevalence (thousands) 2017 counts	Incidence (thousands) 2017 counts	YLDs (thousands)				
			2017 counts	Percentage change in counts, 1990–2007	Percentage change in counts, 2007–17	Percentage change in age-standardised rates, 1990–2007	Percentage change in age-standardised rates, 2007–17
(Continued from previous page)							
Caries of permanent teeth	2 301 999.2 (2 104 931.2 to 2 525 509.0)	2 452 124.9 (2 233 639.1 to 2 665 441.2)	1618.9 (697.9 to 3087.7)	20.6% (18.9 to 22.5)*	9.4% (8.6 to 10.3)*	-8.2% (-9.3 to -7.0)*	-4.0% (-4.8 to -3.3)*
Periodontal disease	796 122.9 (670 981.0 to 930 283.0)	71 483.7 (61 593.0 to 81 227.2)	5185.6 (2039.3 to 10 653.7)	50.2% (48.8 to 51.6)*	26.6% (25.1 to 27.9)*	3.2% (2.6 to 3.7)*	2.8% (2.3 to 3.2)*
Edentulism and severe tooth loss	267 457.5 (235 214.4 to 300 011.3)	18 452.1 (16 192.9 to 20 997.1)	7345.9 (4894.2 to 10 408.2)	40.8% (39.4 to 42.1)*	24.6% (23.7 to 25.5)*	-6.3% (-7.1 to -5.5)*	-4.1% (-4.7 to -3.4)*
Other oral disorders	139 086.3 (133 117.0 to 145 643.0)	..	4015.1 (2507.7 to 5900.3)	32.7% (31.9 to 33.6)*	15.7% (15.0 to 16.3)*	0.0% (-0.3 to 0.4)	0.2% (-0.1 to 0.5)
<b>Injuries</b>	<b>1 507 481.4</b> <b>(1 439 758.0 to</b> <b>1 587 209.4)</b>	<b>520 710.3</b> <b>(493 430.2 to</b> <b>547 988.6)</b>	<b>57 174.5</b> <b>(42 073.9 to</b> <b>75 427.0)</b>	<b>23.7%</b> <b>(22.1 to 25.3)*</b>	<b>23.4%</b> <b>(22.0 to 24.8)*</b>	<b>-10.4%</b> <b>(-11.2 to -9.5)*</b>	<b>2.9%</b> <b>(2.1 to 3.7)*</b>
<b>Transport injuries</b>	<b>226 305.6</b> <b>(209 529.5 to 244 291.1)</b>	<b>63 920.6</b> <b>(56 848.5 to 71 592.2)</b>	<b>13 394.4</b> <b>(9586.9 to</b> <b>17 861.0)</b>	<b>32.9%</b> <b>(30.5 to 35.3)*</b>	<b>21.6%</b> <b>(20.4 to 22.9)*</b>	<b>-4.0%</b> <b>(-5.4 to -2.7)*</b>	<b>1.2%</b> <b>(0.4 to 2.0)*</b>
Road injuries	174 209.6 (162 042.0 to 187 472.1)	54 192.3 (47 381.6 to 61 645.9)	10 159.7 (7272.0 to 13 618.8)	42.8% (41.0 to 44.8)*	21.7% (20.5 to 22.9)*	1.7% (0.6 to 2.8)*	0.5% (-0.3 to 1.3)
Pedestrian road injuries	46 000.9 (39 776.2 to 54 538.8)	11 038.9 (9097.7 to 13 168.8)	2710.1 (1912.5 to 3722.5)	35.6% (32.3 to 38.5)*	18.1% (16.2 to 19.8)*	-3.1% (-4.8 to -1.5)*	-2.4% (-3.6 to -1.3)*
Cyclist road injuries	30 602.6 (25 887.6 to 35 843.6)	11 912.9 (9669.7 to 14 669.8)	1701.1 (1203.1 to 2311.2)	49.1% (45.4 to 52.5)*	27.8% (25.6 to 29.8)*	6.6% (4.5 to 8.4)*	5.1% (3.9 to 6.4)*
Motorcyclist road injuries	43 911.6 (37 802.2 to 50 950.2)	10 099.8 (8264.3 to 12 257.1)	2563.7 (1759.1 to 3510.3)	61.6% (58.6 to 64.8)*	22.5% (20.7 to 24.4)*	15.6% (14.0 to 17.3)*	2.0% (0.6 to 3.4)*
Motor vehicle road injuries	42 004.6 (36 541.9 to 49 398.3)	16 209.2 (13 485.6 to 19 383.3)	2568.1 (1842.3 to 3439.8)	30.8% (29.3 to 32.4)*	16.3% (14.8 to 17.7)*	-7.7% (-8.5 to -6.9)*	-4.5% (-5.6 to -3.5)*
Other road injuries	11 689.9 (9728.7 to 14 348.1)	4931.4 (3777.3 to 6241.2)	616.6 (438.2 to 853.2)	52.6% (49.6 to 55.3)*	45.4% (42.4 to 47.9)*	9.0% (7.4 to 10.5)*	20.3% (18.6 to 21.8)*
Other transport injuries	52 096.1 (43 127.5 to 61 355.1)	9728.3 (8120.6 to 11 627.0)	3234.7 (2315.7 to 4345.0)	9.0% (6.9 to 11.4)*	21.4% (19.8 to 23.3)*	-18.5% (-19.8 to -17.2)*	3.5% (2.0 to 5.0)*
<b>Unintentional injuries</b>	<b>935 298.2</b> <b>(876 022.5 to</b> <b>1 008 077.1)</b>	<b>415 410.3</b> <b>(390 092.6 to</b> <b>441 943.0)</b>	<b>36 509.7</b> <b>(26 384.7 to</b> <b>49 052.5)</b>	<b>19.8%</b> <b>(18.0 to 21.6)*</b>	<b>26.5%</b> <b>(25.2 to 27.7)*</b>	<b>-13.8%</b> <b>(-14.7 to -12.8)*</b>	<b>4.5%</b> <b>(3.7 to 5.3)*</b>
Falls	411 712.0 (366 391.0 to 465 355.0)	171 691.2 (152 472.7 to 194 061.9)	19252.7 (13725.4 to 26 140.4)	23.1% (21.3 to 24.9)*	27.7% (26.5 to 29.0)*	-12.7% (-13.6 to -11.8)*	3.9% (3.0 to 4.6)*
Drowning	2207.3 (1940.6 to 2531.3)	357.5 (311.4 to 411.9)	131.6 (94.3 to 175.8)	-11.2% (-14.0 to -8.2)*	14.2% (10.4 to 17.9)*	-33.1% (-34.9 to -31.2)*	-3.8% (-6.6 to -1.3)*
Fire, heat, and hot substances	99 746.8 (85 298.5 to 115 988.1)	8991.5 (7481.2 to 10 740.9)	3177.0 (2210.4 to 4396.7)	0.8% (-4.4 to 6.2)	17.8% (13.9 to 21.7)*	-25.3% (-28.5 to -22.0)*	1.1% (-1.6 to 3.7)
Poisonings	4556.0 (3808.4 to 5352.3)	4079.6 (3287.6 to 4973.7)	467.4 (308.0 to 663.8)	8.6% (7.2 to 10.0)*	29.9% (28.3 to 31.8)*	-18.1% (-19.0 to -17.1)*	12.2% (10.8 to 13.9)*
Poisoning by carbon monoxide	854.2 (717.2 to 1034.9)	1043.5 (770.9 to 1392.2)	75.5 (50.4 to 109.9)	16.0% (14.1 to 18.0)*	33.4% (30.2 to 36.5)*	-13.1% (-14.4 to -11.9)*	14.7% (12.0 to 17.5)*
Poisoning by other means	3701.8 (2951.6 to 4490.9)	3036.0 (2379.5 to 3782.1)	391.9 (252.7 to 576.0)	7.3% (5.8 to 8.8)*	29.3% (27.2 to 31.4)*	-19.0% (-19.9 to -18.0)*	11.8% (9.9 to 13.7)*
Exposure to mechanical forces	194 479.9 (169 045.7 to 225 589.9)	72 503.4 (62 042.8 to 84 320.6)	4959.6 (3445.4 to 6978.5)	16.5% (14.3 to 18.6)*	29.0% (27.6 to 30.5)*	-16.0% (-17.2 to -14.9)*	7.4% (6.5 to 8.4)*
Unintentional firearm injuries	8469.2 (6941.4 to 9838.8)	1911.8 (1390.6 to 2544.6)	320.1 (224.6 to 436.7)	13.7% (12.2 to 15.2)*	28.0% (26.5 to 29.5)*	-16.5% (-17.4 to -15.7)*	8.6% (7.7 to 9.6)*
Other exposure to mechanical forces	186 010.7 (159 749.5 to 216 401.4)	70 591.6 (60 734.7 to 82 371.3)	4639.5 (3204.1 to 6560.6)	16.7% (14.4 to 18.9)*	29.1% (27.7 to 30.6)*	-16.0% (-17.2 to -14.8)*	7.3% (6.3 to 8.4)*
Adverse effects of medical treatment	2673.1 (2059.9 to 3308.5)	34 975.0 (29 997.9 to 40 308.2)	356.5 (223.9 to 533.8)	60.5% (55.4 to 65.6)*	48.0% (41.2 to 54.5)*	18.5% (16.0 to 21.0)*	19.6% (15.3 to 24.0)*

(Table 1 continues on next page)

	Prevalence (thousands) 2017 counts	Incidence (thousands) 2017 counts	YLDs (thousands)				
			2017 counts	Percentage change in counts, 1990-2007	Percentage change in counts, 2007-17	Percentage change in age-standardised rates, 1990-2007	Percentage change in age-standardised rates, 2007-17
(Continued from previous page)							
Animal contact	38 403.6 (34 169.0 to 43 179.8)	43 844.6 (37 631.9 to 51 149.2)	1075.6 (732.1 to 1484.0)	11.3% (9.7 to 12.9)*	17.9% (16.1 to 19.6)*	-17.0% (-17.9 to -16.2)*	1.1% (-0.2 to 2.3)
Venomous animal contact	15 812.1 (13 211.3 to 18 557.7)	21 097.9 (17 255.4 to 25 592.6)	717.2 (487.1 to 1004.2)	14.7% (12.7 to 17.1)*	18.2% (16.2 to 20.3)*	-13.6% (-14.8 to -12.2)*	2.7% (1.1 to 4.3)*
Non-venomous animal contact	22 591.5 (19 045.6 to 26 729.8)	22 746.6 (18 607.8 to 27 654.5)	358.4 (224.3 to 555.6)	5.0% (2.4 to 7.6)*	17.2% (14.8 to 19.1)*	-22.9% (-24.3 to -21.8)*	-1.8% (-3.5 to -0.5)*
Foreign body	19 350.9 (16 787.2 to 22 108.8)	23 101.7 (19 925.9 to 26 454.1)	949.3 (683.3 to 1285.0)	16.3% (13.6 to 19.1)*	21.5% (20.3 to 22.9)*	-13.0% (-15.0 to -11.0)*	3.4% (2.4 to 4.5)*
Pulmonary aspiration and foreign body in airway	3008.1 (2442.0 to 3662.4)	1346.3 (1115.6 to 1607.1)	150.4 (103.1 to 204.4)	12.2% (6.2 to 19.3)*	23.8% (20.7 to 26.9)*	-14.1% (-17.9 to -9.5)*	5.8% (3.6 to 8.2)*
Foreign body in eyes	3190.4 (1644.6 to 4857.3)	17 672.8 (14 633.0 to 20 947.8)	201.6 (104.6 to 334.5)	20.3% (17.7 to 23.1)*	20.3% (18.8 to 22.1)*	-9.4% (-12.1 to -7.4)*	2.7% (1.3 to 3.6)*
Foreign body in other body part	13 152.5 (10 991.9 to 15 298.2)	4082.5 (3342.2 to 5009.6)	597.3 (427.3 to 783.4)	16.0% (13.3 to 19.2)*	21.4% (20.0 to 22.9)*	-13.9% (-15.6 to -11.9)*	3.1% (1.8 to 4.3)*
Environmental heat and cold exposure	34 896.7 (29 946.9 to 40 886.4)	8769.0 (7357.0 to 10 370.5)	1509.5 (1072.5 to 2023.8)	13.6% (11.0 to 16.4)*	24.5% (22.3 to 26.6)*	-16.7% (-18.2 to -15.1)*	4.9% (3.4 to 6.4)*
Exposure to forces of nature	15 757.0 (11 656.5 to 20 853.3)	689.2 (587.4 to 817.5)	725.5 (524.9 to 975.9)	220.3% (200.7 to 238.8)*	22.6% (19.0 to 26.1)*	156.4% (140.2 to 171.7)*	7.8% (5.0 to 10.4)*
Other unintentional injuries	115 519.2 (98 844.3 to 134 764.7)	46 407.6 (39 513.5 to 53 786.8)	3904.9 (2715.6 to 5485.4)	20.4% (18.4 to 22.2)*	28.4% (27.0 to 29.7)*	-13.9% (-14.9 to -13.0)*	5.7% (4.9 to 6.6)*
<b>Self-harm and interpersonal violence</b>	<b>351 859.6</b> <b>(316 749.7 to 390 321.7)</b>	<b>41 379.4</b> <b>(37 344.5 to 45 834.4)</b>	<b>7270.4</b> <b>(5637.2 to 9008.3)</b>	<b>27.2%</b> <b>(24.7 to 30.0)*</b>	<b>13.0%</b> <b>(10.8 to 15.0)*</b>	<b>-3.5%</b> <b>(-5.4 to -1.3)*</b>	<b>-2.0%</b> <b>(-3.7 to -0.5)*</b>
Self-harm	8502.0 (7072.4 to 10 011.6)	3939.8 (3338.1 to 4603.3)	435.3 (306.0 to 574.8)	18.5% (15.2 to 21.9)*	6.3% (4.8 to 7.9)*	-16.0% (-18.2 to -13.9)*	-12.1% (-13.1 to -11.1)*
Self-harm by firearm	114.4 (100.5 to 130.9)	41.6 (26.1 to 63.2)	4.8 (3.4 to 6.5)	13.5% (11.6 to 15.7)*	7.6% (5.3 to 9.9)*	-21.3% (-22.7 to -19.9)*	-12.9% (-14.7 to -11.1)*
Self-harm by other specified means	8387.6 (6963.0 to 9894.9)	3898.2 (3299.6 to 4570.6)	430.5 (301.7 to 568.8)	18.6% (15.2 to 22.0)*	6.3% (4.8 to 7.9)*	-16.0% (-18.1 to -13.9)*	-12.1% (-13.1 to -11.1)*
Interpersonal violence	297 781.5 (268 378.9 to 330 722.3)	22 919.4 (19 569.3 to 26 696.3)	4561.8 (3522.0 to 5756.8)	24.0% (21.7 to 26.3)*	14.6% (13.1 to 15.9)*	-7.4% (-8.7 to -5.9)*	-0.8% (-1.6 to -0.0)*
Assault by firearm	2599.6 (2158.5 to 3151.0)	551.9 (421.7 to 725.6)	116.9 (83.8 to 159.3)	41.0% (38.7 to 43.5)*	20.2% (18.3 to 22.0)*	1.1% (-0.3 to 2.4)	0.5% (-0.9 to 1.9)
Assault by sharp object	14 754.5 (12 033.6 to 20 359.8)	4233.0 (3265.4 to 5366.7)	475.1 (333.8 to 659.8)	21.0% (18.2 to 23.7)*	13.8% (12.1 to 15.7)*	-12.0% (-13.5 to -10.5)*	-3.4% (-4.9 to -1.9)*
Sexual violence	238 200.3 (209 368.6 to 270 335.5)	..	2142.0 (1447.1 to 3106.7)	26.1% (22.5 to 30.1)*	12.4% (10.2 to 14.3)*	-1.9% (-3.5 to -0.1)*	0.6% (-0.6 to 1.6)
Assault by other means	42 227.1 (35 479.3 to 50 750.5)	18 134.5 (15 426.3 to 21 180.0)	1827.8 (1295.0 to 2446.7)	21.3% (18.4 to 24.5)*	17.1% (15.7 to 18.6)*	-12.4% (-14.1 to -10.6)*	-1.9% (-3.0 to -0.7)*
Conflict and terrorism	41 912.3 (28 964.3 to 59 365.8)	12 492.6 (10 797.4 to 15 087.4)	2134.0 (1438.2 to 3191.0)	35.1% (30.0 to 40.8)*	10.1% (4.9 to 15.5)*	8.2% (4.0 to 12.7)*	-3.2% (-7.6 to 1.4)
Executions and police conflict	3680.5 (2459.9 to 5304.1)	2027.6 (1683.1 to 2486.1)	139.3 (99.1 to 197.0)	59.4% (45.9 to 74.0)*	32.9% (27.9 to 51.1)*	22.3% (11.9 to 33.5)*	14.6% (9.9 to 31.1)*
<b>Nature of injury aggregates</b>							
Amputations	371 422.5 (343 523.2 to 407 748.4)	9847.8 (8414.6 to 11 519.6)	6409.0 (4283.7 to 9318.6)	17.4% (12.9 to 21.9)*	19.6% (15.7 to 23.2)*	-15.5% (-18.6 to -12.2)*	-0.4% (-3.5 to 2.4)
Burns	208 679.9 (192 327.8 to 227 204.0)	14 307.6 (12 437.8 to 16 359.2)	6720.1 (4841.1 to 9083.9)	5.8% (0.9 to 11.2)*	14.3% (10.1 to 18.6)*	-21.0% (-24.2 to -17.8)*	-1.5% (-4.3 to 1.2)
Fractures	360 136.5 (338 070.9 to 385 693.0)	139 646.3 (128 305.0 to 152 504.8)	19 793.8 (13 702.1 to 27 655.9)	30.3% (29.1 to 31.5)*	27.3% (26.1 to 28.3)*	-8.6% (-9.3 to -7.8)*	3.0% (2.1 to 3.7)*
Head injuries	46 873.2 (44 984.0 to 48 892.5)	21 652.5 (19 206.0 to 24 416.0)	6898.0 (4883.9 to 9277.6)	35.6% (34.5 to 36.8)*	27.9% (27.1 to 28.7)*	-2.5% (-3.2 to -1.8)*	6.2% (5.6 to 6.9)*
Spinal injuries	22 489.5 (20 671.6 to 25 115.6)	775.8 (643.3 to 957.7)	6633.4 (4708.0 to 8639.5)	26.1% (23.4 to 28.9)*	25.0% (22.9 to 26.6)*	-6.6% (-8.7 to -4.1)*	6.3% (5.0 to 7.3)*

(Table 1 continues on next page)

	Prevalence (thousands) 2017 counts	Incidence (thousands) 2017 counts	YLDs (thousands)				
			2017 counts	Percentage change in counts, 1990–2007	Percentage change in counts, 2007–17	Percentage change in age-standardised rates, 1990–2007	Percentage change in age-standardised rates, 2007–17
(Continued from previous page)							
Minor injuries	198 921.3 (187 143.0 to 213 281.5)	181 177.5 (167 026.3 to 195 833.2)	1752.5 (831.1 to 3319.5)	25.5% (24.1 to 27.1)*	27.5% (26.8 to 28.4)*	-10.2% (-11.1 to -9.2)*	5.1% (4.6 to 5.8)*
Other injuries	71 339.1 (67 479.1 to 75 358.0)	153 302.9 (143 603.2 to 162 955.6)	6825.7 (4830.6 to 9168.5)	20.4% (18.7 to 22.4)*	23.1% (21.0 to 24.8)*	-10.7% (-11.8 to -9.4)*	4.1% (2.6 to 5.4)*
<b>Impairments</b>							
Anaemia	1 950 345.6 (1 909 153.0 to 1 990 086.8)	..	58 197.1 (39 535.4 to 83 046.0)	-0.9% (-3.3 to 1.5)	-6.7% (-9.5 to -3.8)*	-17.1% (-18.9 to -15.2)*	-16.2% (-18.8 to -13.5)*
Epilepsy	63 783.6 (55 496.5 to 73 199.5)	..	25 957.3 (20 369.4 to 32 900.4)	34.1% (25.9 to 42.1)*	16.3% (10.6 to 22.1)*	8.8% (1.9 to 15.2)*	4.5% (-0.7 to 9.8)
Guillain-Barré syndrome	103.7 (82.7 to 127.2)	..	30.7 (19.3 to 44.4)	29.4% (25.5 to 33.8)*	18.3% (15.9 to 21.0)*	2.7% (1.0 to 4.3)*	3.4% (2.2 to 4.5)*
Hearing loss	1 428 450.1 (1 388 276.9 to 1 465 389.9)	..	39 454.3 (27 100.6 to 55 310.2)	40.0% (38.7 to 41.0)*	22.4% (21.4 to 23.3)*	0.0% (-0.7 to 0.6)	-0.5% (-1.2 to 0.1)
Heart failure	64 343.9 (57 187.0 to 71 648.3)	..	9906.9 (7261.9 to 12 443.6)	55.4% (51.7 to 59.1)*	32.6% (30.3 to 34.6)*	-0.4% (-2.6 to 1.9)	-0.5% (-2.0 to 0.7)
Infertility	123 084.9 (99 543.3 to 150 556.1)	..	956.9 (487.4 to 1791.9)	31.7% (28.0 to 34.8)*	17.3% (13.6 to 20.5)*	-0.7% (-3.0 to 1.0)	6.8% (3.5 to 9.8)*
Developmental intellectual disability	188 585.1 (145 641.8 to 230 402.8)	..	25 301.2 (19 706.5 to 31 400.2)	30.2% (25.9 to 35.0)*	12.9% (10.0 to 16.1)*	7.1% (3.7 to 11.0)*	2.1% (-0.5 to 5.1)
Pelvic inflammatory disease	1064.1 (906.7 to 1249.0)	..	141.0 (94.8 to 197.2)	42.3% (39.0 to 45.9)*	16.0% (13.6 to 18.7)*	4.5% (2.5 to 6.7)*	2.5% (0.4 to 4.7)*
Vision loss	1 339 970.3 (1 291 077.0 to 1 393 811.0)	..	34 125.4 (23 206.6 to 48 924.6)	38.3% (36.9 to 39.6)*	22.2% (21.2 to 23.3)*	-2.4% (-3.2 to -1.6)*	-1.5% (-2.3 to -0.7)*

Data in parentheses are 95% uncertainty intervals. We did not calculate incidence for the nine impairments and certain neglected tropical diseases. Blank cells mean that no estimate is available or that the estimate has a magnitude less than 50. G6PD=glucose-6-phosphate dehydrogenase. GFR=glomerular filtration rate. *H influenzae*=*Haemophilus influenzae*. NASH=non-alcoholic steatohepatitis. YLDs=years lived with disability. \*Percentage changes that are statistically significant. †Incidence of HIV/AIDS represents new infections of HIV only and does not include new infections of tuberculosis in HIV positive cases. ‡Incidence estimates for stroke represent first-ever stroke only.

**Table 1: Global prevalence, incidence, and YLDs for 2017; percentage change of YLD counts; and percentage change of age-standardised YLD rates for 1990–2007 and 2007–17 for both sexes combined for all Level 5 causes, nature of injury aggregates, and nine impairments**

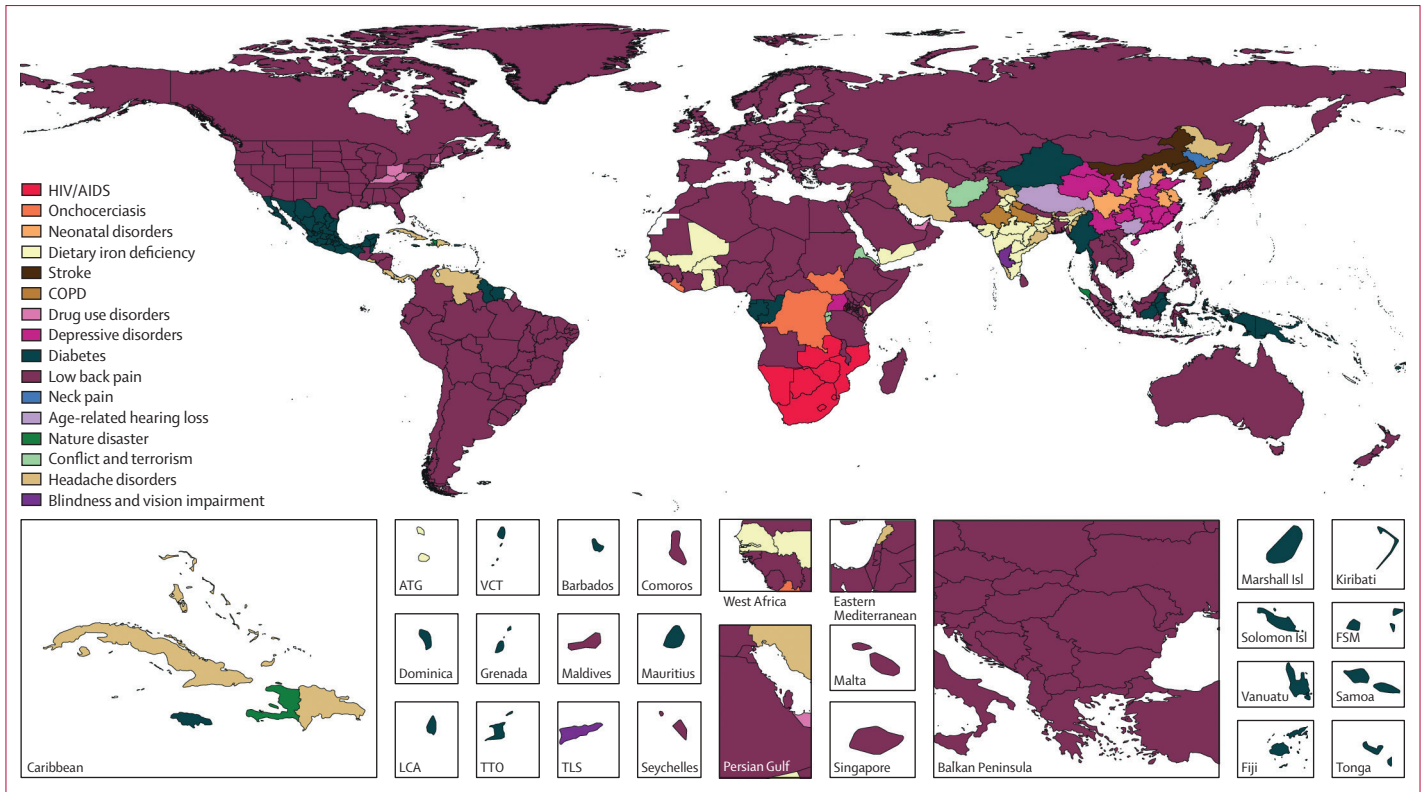
The most common Level 3 causes of YLD rates by country and subnational locations by sex are shown in appendix 2. In both females and males, low back pain was the leading Level 3 cause by country. In females, the second most commonly leading Level 3 cause was headache disorders, which was the leading cause in 57 countries, followed by diabetes, which was the leading cause in 20 countries. In males, the second most commonly leading Level 3 cause was diabetes, highest in 39 countries, followed by drug use disorders and conflict and terror, each leading in five countries.

#### Temporal YLD trends in causes and impairments by geographical regions and SDI quintiles

Figure 3 shows rankings and trends of the top causes of YLDs by SDI quintile and by sex. SDI-based patterns varied by sex: the top cause of YLD rates between 1990 and 2017 in the lowest SDI quintile was dietary iron deficiency for females and low back pain for males,

whereas in the highest SDI quintile it was low back pain for both females and males. In the lowest SDI quintile, for both sexes combined, the top three causes of YLD rates were low back pain, dietary iron deficiency, and headache disorders, while in the highest SDI quintile the top three causes were low back pain, headache disorders, and depressive disorders (appendix 2). The supplementary results show these results for the leading six impairments estimated in GBD: anaemia, heart failure, vision loss, hearing loss, epilepsy, and infertility (appendix 2). The immense burden of anaemia is shown, particularly for females in low-SDI regions. The differences in the burden of impairments by sex are also provided (appendix 2).

Figure 4 shows the all-age and age-standardised YLD rates by SDI and GBD region between 1990 and 2017 for males and females combined for all causes and then separately for Level 1 causes. In general, many regions experienced decreases in all-cause age-standardised



**Figure 2: Leading Level 3 causes of age-standardised YLD rates by location for both sexes combined, 2017**  
 ATG=Antigua and Barbuda. COPD=chronic obstructive pulmonary disease. FSM=Federated States of Micronesia. Isl=Islands. LCA=Saint Lucia. TLS=Timor-Leste. TTO=Trinidad and Tobago. VCT=Saint Vincent and the Grenadines. YLD=years lived with disability.

YLD rates as SDI increased (figure 4). However, there were important exceptions to this finding. First, some regions did not follow this trend consistently. Southern sub-Saharan Africa showed an increase in YLD rates for more than a decade before beginning a more precipitous decline coinciding with the apex of the HIV epidemic, whereas regions with a higher baseline SDI have generally experienced minimal changes or increases in age-standardised YLD rates over the past decade despite advances in SDI. We found that trends also varied over time depending on cause. As SDI increased, age-standardised and all-age YLDs improved for CMNN causes in most regions, but this relation was less reliable for NCDs. The NCD pattern also differed markedly between all-age and age-standardised rates for NCDs, with all-age rates increasing as SDI improved with relatively little change over time observed in age-standardised rates. For injuries, some regions initially experienced a declining burden as SDI increased, followed by an increasing burden as SDI continued to increase over time, as seen in Central Europe, for example.

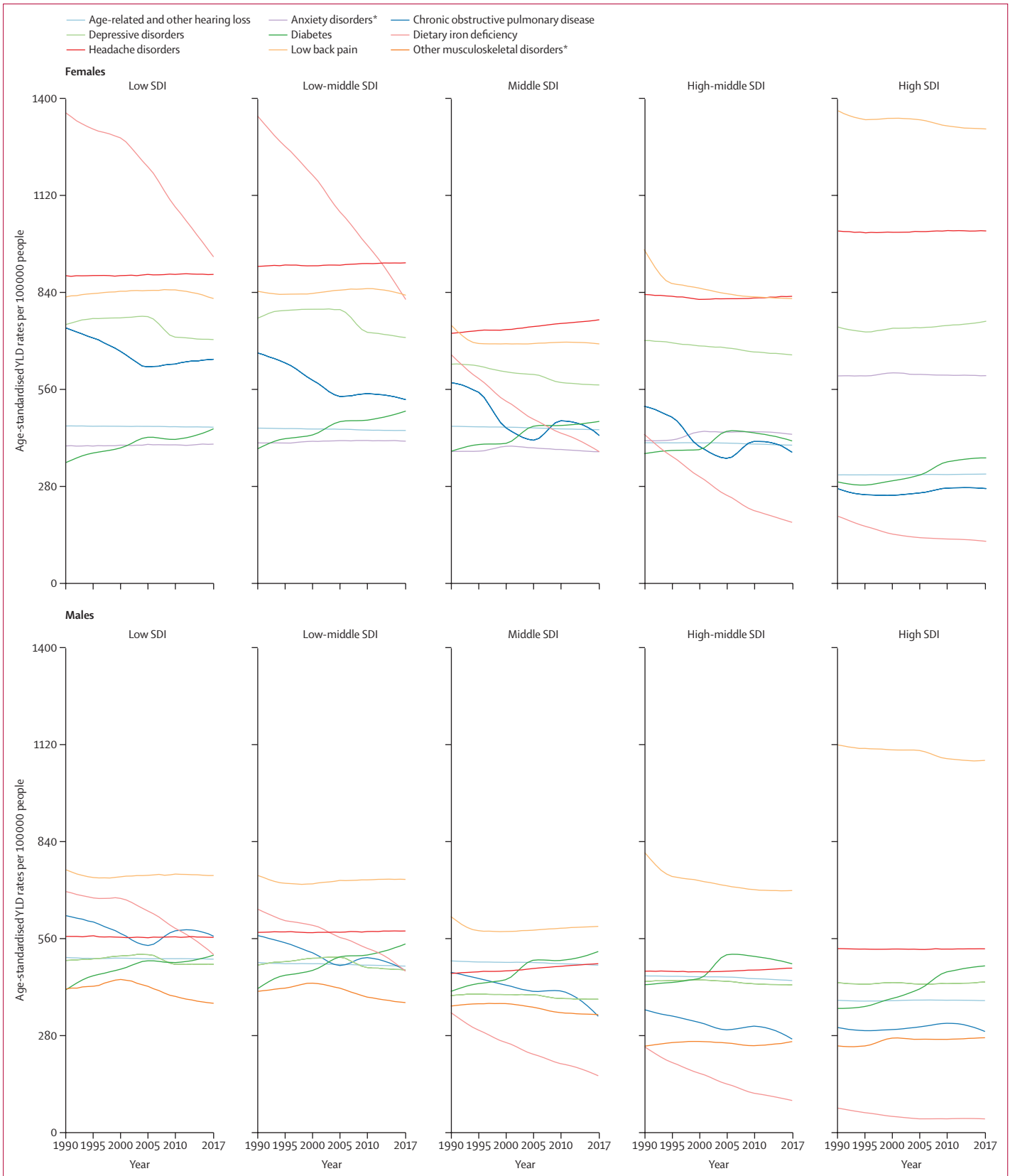
**Age-specific and sex-specific patterns in prevalence and YLDs**

Table 2 shows global age-standardised prevalence for females and males for all Level 2 GBD causes as well as

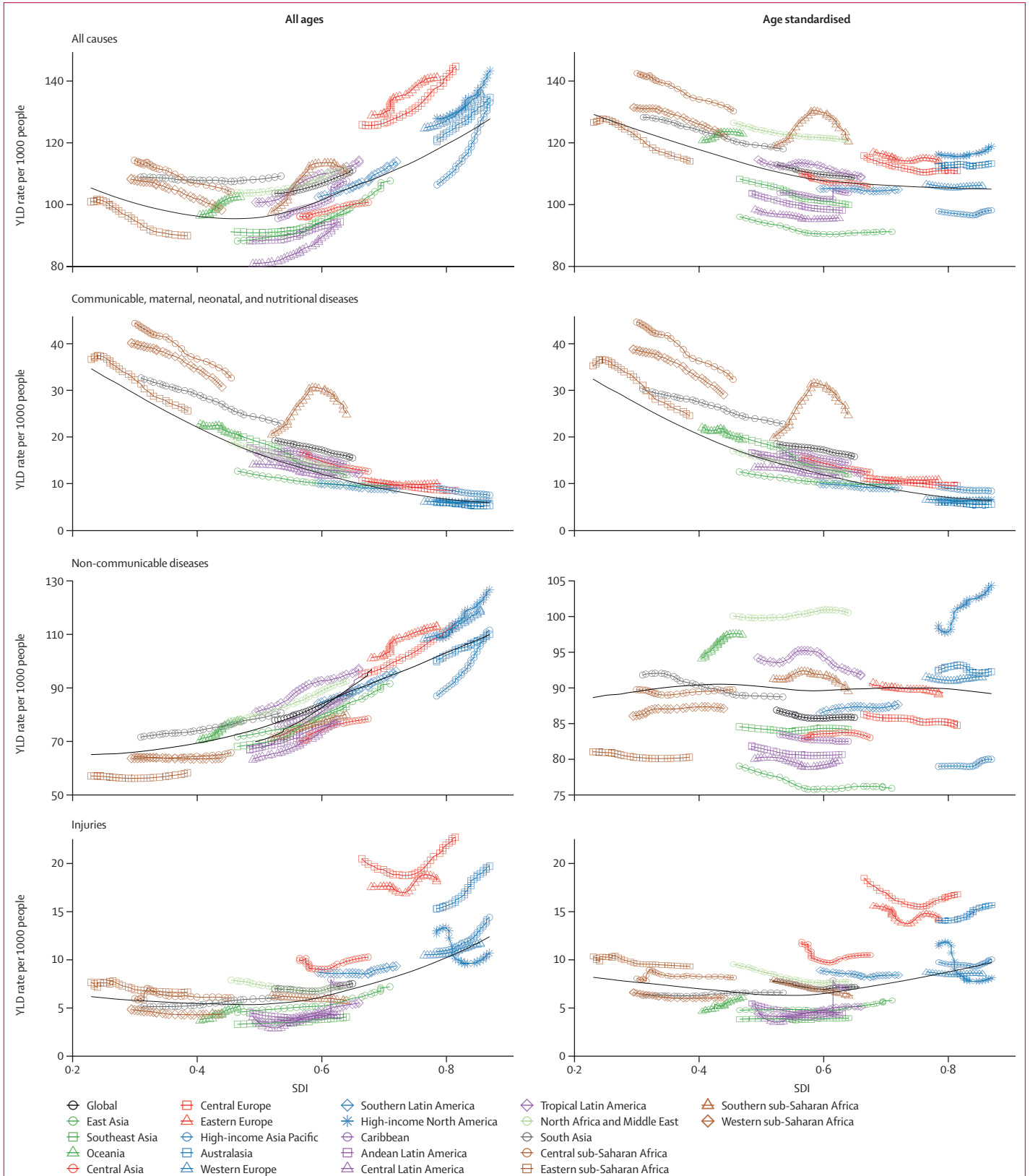
the relative difference between the sexes in 1990 and 2017. In both 1990 and 2017, the cause with the greatest relative difference between sexes was substance use disorders, which had a relative difference of 1.09 (95% UI 1.03–1.15) in 1990, which increased to 1.16 (1.09–1.23) in 2017. In 1990, 302 million (226–388) YLDs were in females and 260 million (195–336) were in males. The all-age YLD rate for females was 11273.6 (8455.6–14492.5) per 100 000 and the all-age YLD for males was 9571.4 (7160.9–12356.1) per 100 000 in 1990. Among the global sum of YLDs, 53.6% (53.3–53.9) or 457 million (344–587) YLDs were in females and 46.4% (46.1–46.7) or 396 million (297–510) YLDs were in males. In the subset of causes that occur in both males and females, there were 761 million (565–987) total YLDs, with 53.0% (52.8–53.2) or 444 million (334–571) YLDs in females and 47.0% (46.8–47.2) or 395 million (296–510) YLDs in males. Between 1990 and 2017, all-age YLD rates increased for females and males,

**Figure 3: Trends of age-standardised YLD rates per 100 000 for the top eight Level 3 causes of non-fatal burden in 2017 for each sex by SDI quintile, 1990–2017**

Mean estimates are shown. SDI=Socio-demographic Index. YLDs=years lived with disability. \*One legend is shown for females and males. Anxiety disorders are a top cause of non-fatal burden for females and other musculoskeletal disorders are a top cause of non-fatal burden for males.







by 6.5% (5.4–7.7) to 12007.7 (9036.7–15352.0) YLDs per 100 000 females and by 7.9% (6.6–9.2) to 10 328.1 (7744.1–13 306.9) YLDs per 100 000 males.

Figure 5A illustrates the differences in global prevalence for females and males for 2017 by age group for the 22 Level 2 GBD causes of non-fatal health loss, calculated as the female-specific estimate subtracted from the male-specific estimate such that causes on the left side of the chart are more prevalent in females while causes on the right side of the chart are more prevalent in males in a given age group. Females experience overall higher prevalence in every age group and the highest age-specific global prevalence differences for female-predominant causes occur between the ages of 20 years and 49 years. From birth to 4 years of age, females have higher prevalence of other NCDs, which continues through all age groups, and of neoplasms than males, whereas neurological disorders are female predominant in all ages, becoming notably evident from age 5–9 years and continuing throughout all subsequent age groups. Similarly, HIV/AIDS and sexually transmitted infections are female predominant in all ages, a trend that becomes evident from age 10–14 years. Although nutritional deficiencies are more prevalent in males in the earliest age groups up to age 9 years, they are more prevalent in females in subsequent age groups up to age 74 years, at which point they once again become more prevalent in males up to the oldest age group. Females also have higher prevalence of self-harm and interpersonal violence starting from age 1–4 years and continuing until age 84 years, after which they become more prevalent in males. Digestive diseases are more prevalent in males in all age groups, whereas unintentional injuries emerge as a male-predominant cause from 5 years of age and remain as such until age 89 years, after which they become female predominant. Transport injuries are male predominant in all age groups starting from age 1–4 years. Respiratory infections and tuberculosis are male predominant in all ages. Cardiovascular diseases are male predominant starting from age 50–54 years, whereas chronic respiratory diseases emerge as a male-predominant cause from age 65–69 years.

Figure 5B shows the sex differences in the global burden of YLDs for 2017 by age group for the 22 Level 2 GBD causes of non-fatal health loss. Before age 10–14 years, males have greater YLD rates than females, driven largely by higher rates of nutritional

deficiencies. From age 10–14 years and older, females have greater overall YLD rates in every age group. Under the age of 1 year, females experience higher YLD rates due to neoplasms and maternal and neonatal disorders, whereas male infants experience higher YLD rates due to nutritional deficiencies and other NCDs. Starting at age 10 years, females experience a higher YLD rate due to other NCDs (until age 50–54 years), musculoskeletal disorders, mental disorders, neurological disorders, and chronic respiratory diseases. Males experience higher YLD rates due to unintentional injuries, transport injuries, and substance use disorders for most of life, although females older than 80 years of age experience a higher rate of unintentional injuries than do males. For self-harm and interpersonal violence, females experience higher rates than males until age 30–34 years, at which point males experience higher YLD rates. Males also experience higher YLD rates from neoplasms, cardiovascular diseases, and other NCDs starting in older age groups ( $\geq 60$  years), and from digestive diseases from age 25–29 years.

Figure 6 shows the extent to which males and females in region–cause combinations have diverged in terms of achieving equal change over time between 1990 and 2017. Each region–cause combination shows which sex has performed better over time either by decreasing more or by increasing less in terms of age-standardised YLD rates. Among the 462 region–cause combinations (excluding any “Global” or “All causes” combinations), females had more favourable outcomes over time for 260 combinations (56.3%), and males had more favourable outcomes for 202 combinations (43.7%). The Z score, that is, the number of SDs from equality, was 0.433 for the mean deviation of female-favourable causes and 0.313 for the mean deviation of male-favourable causes.

Figure 7 shows the leading 20 causes of prevalence and YLDs for females and males separately for 1990, 2007, and 2017, with percentage change. In 1990, the most common causes for females were oral disorders, headache disorders, and haemoglobinopathies and haemolytic anaemias, whereas for males, the most common causes were oral disorders, headache disorders, and tuberculosis including latent tuberculosis. The number of prevalent cases in the top three leading causes for females increased by 23.1% (95% UI 21.8 to 24.5) for oral disorders, 31.5% (30.2 to 32.8) for headache disorders, and 29.9% (29.6 to 30.1) for haemoglobinopathies and haemolytic anaemias between 1990 and 2007. Between 2007 and 2017, the number of cases increased further by 13.5% (12.9 to 14.1), 14.5% (13.8 to 15.3), and 13.4% (13.2 to 13.6), respectively (figure 7A). Between 1990 and 2007, for males, the number of prevalent cases of oral disorders increased by 21.6% (20.1 to 23.1), the number of headache disorders increased by 31.3% (29.9 to 32.8), and the number of prevalent cases of tuberculosis including latent tuberculosis infection increased by 26.2% (21.7 to 30.3). Between 2007 and

**Figure 4:** Co-evolution of all-age and age-standardised YLD rates with SDI globally and for GBD regions for Level 1 causes for both sexes combined, 1990–2017

Coloured lines are global and region values for YLDs. Each point in a line represents 1 year, starting from 1990 and ending in 2017. In all regions, SDI has increased over time so progress in SDI is associated with points further to the right and later years for a given region, with a downwards gradient indicating a reduction in YLD rate. The black lines indicate the trajectories for each geography expected on the basis of SDI alone. SDI=Socio-demographic Index. YLDs=years lived with disability.

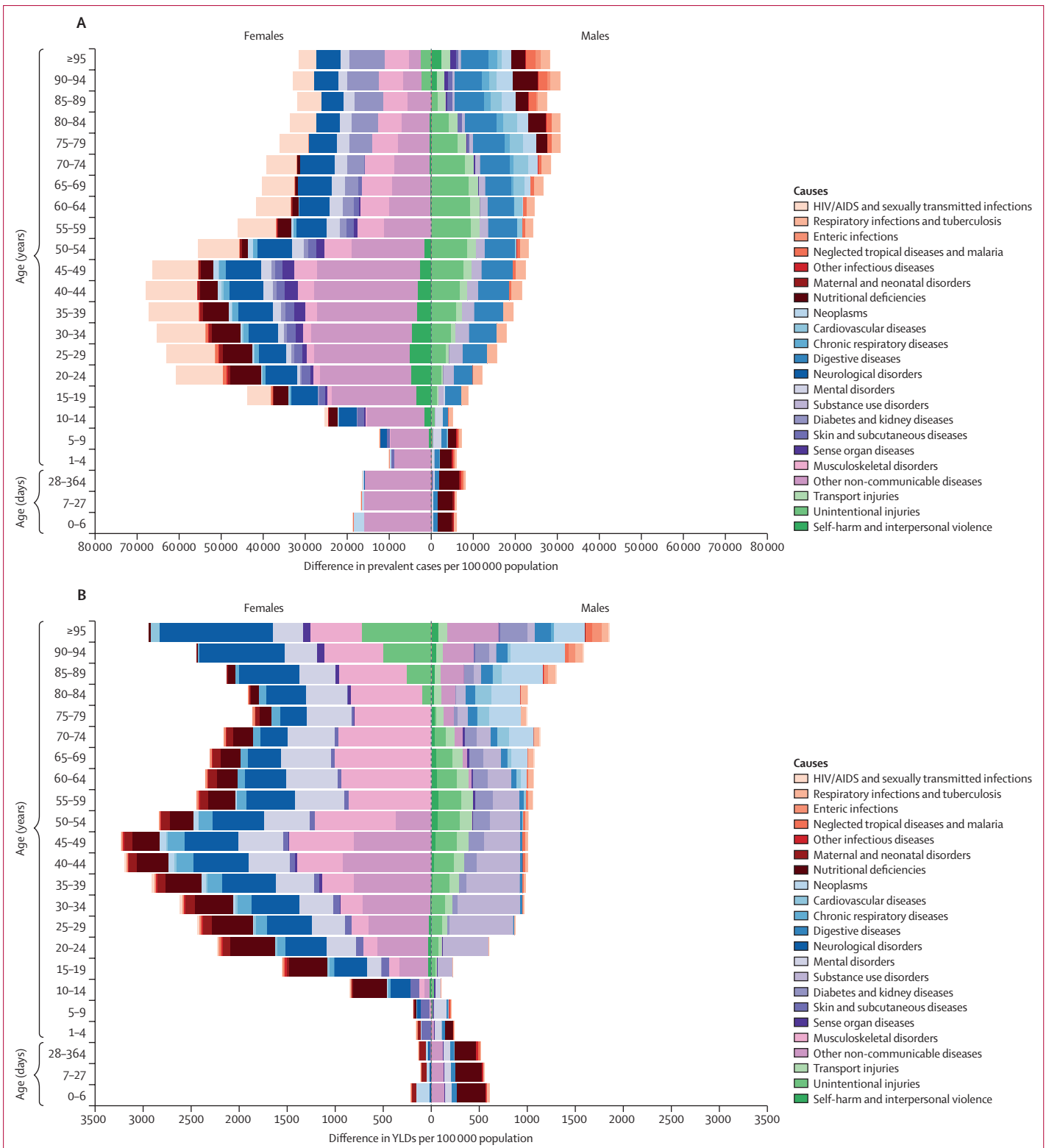
	Prevalence in thousands, 1990			Prevalence in thousands, 2017			Percentage change, 1990–2017	
	Males	Females	Sex difference	Males	Females	Sex difference	Males	Females
Substance use disorders	3008 (2773 to 3237)	1439 (1319 to 1557)	1.09 (1.03 to 1.15)	3018 (2782 to 3252)	1400 (1279 to 1524)	1.16 (1.09 to 1.23)	0.3% (-1.2 to 2.0)	-2.7% (-4.1 to -1.2)
Unintentional injuries	14 678 (13 770 to 15 758)	10 230 (9 589 to 10 981)	0.43 (0.40 to 0.47)	13 773 (12 888 to 14 884)	9 747 (9 148 to 10 484)	0.41 (0.38 to 0.45)	-6.2% (-6.8 to -5.4)	-4.7% (-5.6 to -3.8)
Self-harm and interpersonal violence	3193 (2893 to 3529)	5637 (5058 to 6278)	0.43 (0.39 to 0.48)	3265 (2943 to 3630)	5643 (5057 to 6302)	0.42 (0.37 to 0.47)	2.3% (-0.1 to 4.9)	0.1% (-1.5 to 1.7)
HIV/AIDS and sexually transmitted infections	11 433 (10 355 to 12 703)	18 320 (16 789 to 19 998)	0.38 (0.36 to 0.39)	11 902 (10 826 to 13 196)	18 936 (17 366 to 20 631)	0.37 (0.36 to 0.39)	4.1% (3.3 to 4.9)	3.4% (2.6 to 4.1)
Transport injuries	3150 (2924 to 3384)	2367 (2189 to 2576)	0.33 (0.30 to 0.37)	3322 (3082 to 3582)	2336 (2154 to 2535)	0.42 (0.39 to 0.47)	5.4% (4.1 to 7.2)	-1.3% (-2.6 to 0.0)
Neoplasms	917 (871 to 938)	1191 (1167 to 1219)	0.23 (0.21 to 0.27)	1188 (1146 to 1244)	1355 (1318 to 1391)	0.12 (0.07 to 0.16)	29.6% (26.4 to 34.9)	13.8% (9.4 to 17.7)
Other non-communicable diseases	57 424 (55 351 to 59 629)	73 370 (72 026 to 74 850)	0.22 (0.20 to 0.23)	55 565 (53 542 to 57 701)	72 470 (71 183 to 73 891)	0.23 (0.22 to 0.25)	-3.2% (-3.7 to -2.8)	-1.2% (-1.5 to -1.0)
Maternal and neonatal disorders	1435 (1264 to 1629)	1820 (1643 to 2018)	0.21 (0.18 to 0.25)	1953 (1712 to 2208)	2288 (2027 to 2586)	0.15 (0.11 to 0.18)	36.1% (29.3 to 43.0)	25.7% (18.9 to 32.2)
Digestive diseases	26 590 (25 678 to 27 503)	22 435 (21 585 to 23 377)	0.19 (0.17 to 0.20)	28 165 (27 283 to 29 064)	23 417 (22 581 to 24 342)	0.20 (0.19 to 0.21)	5.9% (5.1 to 6.8)	4.4% (3.7 to 5.1)
Neurological disorders	36 664 (34 401 to 39 294)	42 703 (40 642 to 45 164)	0.14 (0.13 to 0.16)	36 952 (34 695 to 39 469)	42 718 (40 688 to 45 034)	0.14 (0.12 to 0.15)	0.8% (-0.1 to 1.6)	0.0% (-0.6 to 0.7)
Musculoskeletal disorders	15 247 (14 414 to 16 131)	17 770 (16 882 to 18 766)	0.14 (0.13 to 0.15)	14 918 (14 143 to 15 761)	17 581 (16 745 to 18 503)	0.15 (0.14 to 0.16)	-2.2% (-3.0 to -1.4)	-1.1% (-2.0 to -0.2)
Nutritional deficiencies	28 066 (27 246 to 28 935)	31 354 (30 605 to 32 153)	0.11 (0.09 to 0.12)	23 473 (22 648 to 24 309)	26 059 (25 332 to 26 864)	0.10 (0.08 to 0.11)	-16.4% (-18.0 to -14.6)	-16.9% (-18.0 to -15.8)
Diabetes and kidney diseases	10 920 (10 428 to 11 489)	12 120 (11 558 to 12 743)	0.10 (0.09 to 0.11)	12 036 (11 453 to 12 688)	13 044 (12 444 to 13 733)	0.08 (0.07 to 0.09)	10.2% (8.1 to 12.5)	7.6% (5.6 to 9.6)
Enteric infections	1115 (1043 to 1189)	1216 (1141 to 1292)	0.08 (0.07 to 0.09)	1180 (1096 to 1261)	1313 (1221 to 1405)	0.10 (0.09 to 0.11)	5.8% (2.8 to 9.1)	8.0% (5.0 to 11.3)
Respiratory infections and tuberculosis	33 220 (29 889 to 37 160)	31 051 (27 950 to 34 713)	0.07 (0.06 to 0.08)	29 021 (26 238 to 32 454)	27 301 (24 756 to 30 428)	0.06 (0.06 to 0.07)	-12.6% (-14.2 to -11.0)	-12.1% (-13.5 to -10.7)
Mental disorders	12 264 (11 533 to 13 003)	13 237 (12 584 to 13 938)	0.07 (0.05 to 0.10)	12 010 (11 338 to 12 694)	12 834 (12 214 to 13 494)	0.06 (0.04 to 0.09)	-2.1% (-2.7 to -1.4)	-3.0% (-3.6 to -2.5)
Cardiovascular diseases	6496 (6261 to 6744)	6149 (5904 to 6414)	0.06 (0.05 to 0.07)	6253 (6031 to 6482)	5939 (5716 to 6177)	0.05 (0.04 to 0.06)	-3.8% (-4.4 to -3.1)	-3.4% (-4.1 to -2.7)
Chronic respiratory diseases	7926 (7441 to 8420)	8411 (7890 to 8935)	0.06 (0.05 to 0.07)	6731 (6248 to 7268)	7267 (6742 to 7825)	0.07 (0.06 to 0.09)	-15.1% (-17.7 to -12.5)	-13.6% (-16.0 to -11.3)
Skin and subcutaneous diseases	25 139 (24 328 to 26 021)	26 565 (25 776 to 27 407)	0.05 (0.05 to 0.06)	25 221 (24 454 to 26 042)	26 592 (25 832 to 27 377)	0.05 (0.05 to 0.06)	0.3% (-0.4 to 1.0)	0.1% (-0.5 to 0.6)
Other infectious diseases	1574 (1497 to 1661)	1633 (1563 to 1709)	0.04 (0.01 to 0.07)	1336 (1273 to 1404)	1381 (1330 to 1437)	0.03 (0.00 to 0.07)	-15.1% (-18.8 to -11.3)	-15.4% (-18.1 to -12.7)
Neglected tropical diseases and malaria	29 748 (28 431 to 31 138)	28 954 (27 613 to 30 320)	0.03 (0.02 to 0.03)	17 001 (16 259 to 17 864)	16 834 (16 104 to 17 681)	0.01 (0.00 to 0.02)	-42.8% (-46.3 to -38.7)	-41.9% (-45.5 to -37.6)
Sense organ diseases	25 031 (24 477 to 25 581)	25 473 (24 949 to 26 007)	0.02 (0.01 to 0.02)	24 868 (24 325 to 25 411)	25 892 (25 375 to 26 438)	0.04 (0.03 to 0.04)	-0.7% (-0.8 to -0.5)	1.6% (1.4 to 1.9)

Data in parentheses are 95% uncertainty intervals. The relative difference for each of the 22 Level 2 causes between sexes were calculated using the values for females as the denominator. The causes are ranked by the value of the sex difference in 1990. All changes are significant.

Table 2: Global age-standardised prevalence rates per 100 000 for males and females for Level 2 GBD causes with the relative difference between the sexes for 1990 and 2017

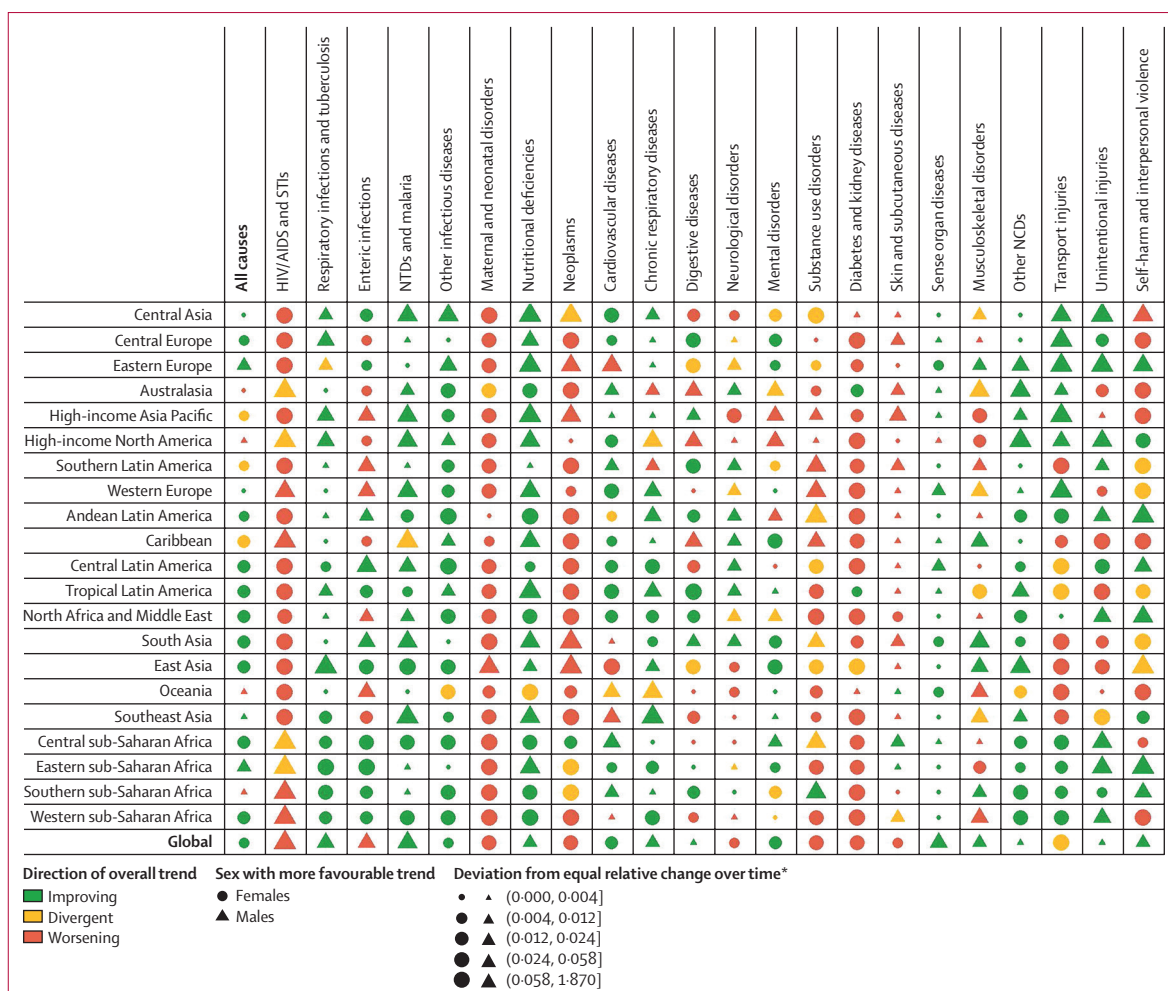
2017, the number of prevalent cases for these three causes increased by 12.5% (11.9 to 13.1), 14.3% (13.6 to 15.2), and 1.1% (-0.67 to 3.01), respectively (figure 7B). The age-standardised prevalence of the top cause for females, oral disorders, decreased by 3.8% (3.3 to 4.3) between 1990 and 2007, and decreased by 1.3% (1.0 to 1.7) between 2007 and 2017. For the second and third top causes for females, the age-standardised prevalence decreased by 0.4% (-1.0 to 0.3) for headache disorders

and increased by 4.2% (4.0 to 4.4) for haemoglobinopathies and haemolytic anaemias between 1990 and 2007 and increased by 0.3% (0.1 to 0.6) and 0.8% (0.6 to 1.0), respectively, between 2007 and 2017. In 2017, oral disorders, headache disorders, and haemoglobinopathies and haemolytic anaemias remained the top three leading Level 3 causes of global age-standardised prevalence for females. Between 1990 and 2007, the age-standardised prevalence for the top three leading causes



**Figure 5: Sex differences in global prevalence and YLD rates per 100 000 for 22 Level 2 causes by age, 2017**

The figure represents the difference in prevalence (A) and YLD rates (B) between males and females as well as the cause composition of those differences for each GBD age group for the Level 2 causes of non-fatal burden. GBD=Global Burden of Diseases, Injuries, and Risk Factors Study. YLDs=years lived with disability.



**Figure 6: Absolute difference in non-fatal trend equality for males and females in terms of age-standardised YLD rates, 1990–2017**  
 This figure shows whether females or males experienced more favourable trends between 1990 and 2017 in terms of age-standardised YLDs by GBD region and Level 2 cause. Circles indicate females experienced more favourable trends and triangles indicate males experienced more favourable trends, where more favourable refers to either decreasing more or increasing less. Green indicates that the overall trend is improving (ie, decreasing age-standardised YLDs) and red indicates that the overall trend is worsening (ie, increasing age-standardised YLDs). Yellow indicates cause-regions where one sex is increasing and the other sex is decreasing. For example, in Andean Latin America for substance use, the large yellow triangle means that males have experienced decreasing age-standardised YLDs whereas the trend for females is the opposite (ie, increasing age-standardised YLDs). Different sizes refer to greater deviations from equal trends between 1990 and 2017. For example, for chronic respiratory conditions, males have experienced more favourable trends in both Andean Latin America and the Caribbean, with both regions having decreasing trends over time for both sexes, but the Caribbean is closer to having equal trends for males and females between 1990 and 2017. GBD=Global Burden of Diseases, Injuries, and Risk Factors Study. STIs=sexually transmitted infections. NCDs=non-communicable diseases. NTDs=neglected tropical diseases. YLDs=years lived with disability. \*Round brackets indicate excluded endpoints whereas square brackets indicate included endpoints.

for males decreased by 4.3% (3.8 to 4.9) for oral disorders, increased by less than 0.1% (–0.85 to 0.85) for headache disorders, and decreased by 3.1% (0.8 to 5.4) for tuberculosis including latent tuberculosis infection. Between 2007 and 2017, the age-standardised prevalence for males for oral disorders and tuberculosis further decreased by 1.6% (1.2 to 2.0) and 11.5% (10.1 to 12.8), respectively, whereas the age-standardised prevalence for headache disorders increased by 0.7% (0.4 to 0.9). In 2017, oral disorders, headache disorders, and tuberculosis including latent tuberculosis remained the three Level 3 causes with greatest global age-standardised prevalence for males.

In terms of numbers of YLDs, in 1990, the leading causes for both females and males were low back pain, headache disorders, and dietary iron deficiency (figure 8).

**Figure 7: Leading 20 Level 3 causes of global prevalence for 1990, 2007, and 2017, with percentage change in number of cases and all-age and age-standardised rates for each sex**  
 Causes are connected by lines between time periods; solid lines are increases and dashed lines are decreases. For the time periods 1990–2007 and 2007–17, three measures of change are shown: percentage change in the number of cases, percentage change in the all-age prevalence rate, and percentage change in the age-standardised prevalence rate. Communicable, maternal, neonatal, and nutritional diseases are shown in red; non-communicable causes in blue; and injuries in green. Statistically significant changes are shown in bold. COPD=chronic obstructive pulmonary disease. STIs=sexually transmitted infections.



Females

Leading causes 1990

Leading causes 2007

Mean percentage change in number of prevalent cases, 1990-2007  
 Mean percentage change in all-age prevalence rate, 1990-2007  
 Mean percentage change in age-standardised prevalence rate, 1990-2007

Leading causes 2017

Mean percentage change in number of prevalent cases, 2007-17  
 Mean percentage change in all-age prevalence rate, 2007-17  
 Mean percentage change in age-standardised prevalence rate, 2007-17

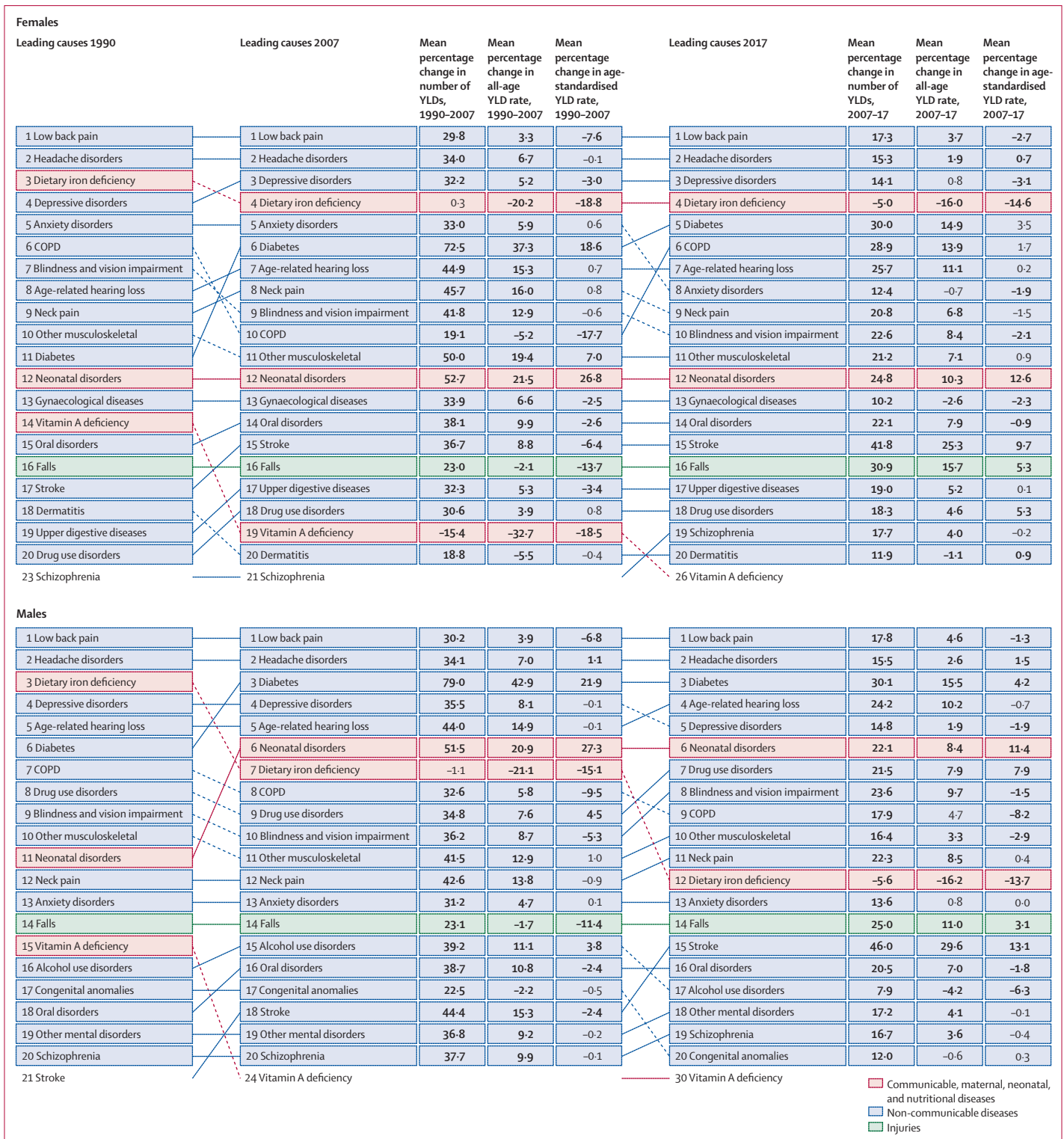
Leading causes 1990	Leading causes 2007	Mean percentage change in number of prevalent cases, 1990-2007	Mean percentage change in all-age prevalence rate, 1990-2007	Mean percentage change in age-standardised prevalence rate, 1990-2007	Leading causes 2017	Mean percentage change in number of prevalent cases, 2007-17	Mean percentage change in all-age prevalence rate, 2007-17	Mean percentage change in age-standardised prevalence rate, 2007-17
1 Oral disorders	1 Oral disorders	23.1	-2.0	-3.8	1 Oral disorders	13.5	0.3	-1.3
2 Headache disorders	2 Headache disorders	31.5	4.7	-0.4	2 Headache disorders	14.5	1.2	0.3
3 Haemoglobinopathies	3 Haemoglobinopathies	29.9	3.3	4.2	3 Haemoglobinopathies	13.4	0.2	0.8
4 Tuberculosis	4 Tuberculosis	27.7	1.6	-2.2	4 Tuberculosis	1.2	-10.6	-11.7
5 Intestinal nematode	5 Gynaecological diseases	34.0	6.6	-2.3	5 Gynaecological diseases	13.3	0.1	-0.5
6 Dietary iron deficiency	6 STIs	40.2	11.6	1.7	6 STIs	17.7	4.0	0.7
7 Gynaecological diseases	7 Dietary iron deficiency	7.2	-14.7	-14.5	7 Blindness and vision impairment	24.1	9.7	0.7
8 STIs	8 Blindness and vision impairment	43.4	14.1	0.9	8 Age-related hearing loss	26.1	11.4	0.9
9 Blindness and vision impairment	9 Intestinal nematode	-20.7	-36.9	-34.9	9 Dietary iron deficiency	6.4	-6.0	-4.9
10 Cirrhosis	10 Age-related hearing loss	45.4	15.7	1.2	10 Cirrhosis	23.5	9.2	4.6
11 Age-related hearing loss	11 Cirrhosis	40.8	12.0	5.0	11 Intestinal nematode	-15.7	-25.5	-23.4
12 Vitamin A deficiency	12 Vitamin A deficiency	11.4	-11.3	-5.2	12 Upper digestive diseases	21.1	7.0	1.5
13 Fungal skin diseases	13 Upper digestive diseases	37.1	9.1	-1.2	13 Chronic kidney disease	28.2	13.3	3.0
14 Upper digestive diseases	14 Fungal skin diseases	23.0	-2.1	-3.0	14 Vitamin A deficiency	5.9	-6.4	-4.0
15 Chronic kidney disease	15 Chronic kidney disease	43.2	14.0	-1.3	15 Fungal skin diseases	12.5	-0.6	-4.0
16 Low back pain	16 Low back pain	29.6	3.2	-7.7	16 Low back pain	17.4	3.8	-2.7
17 Other skin diseases	17 Other skin diseases	44.2	14.8	5.7	17 Other skin diseases	25.4	10.8	3.9
18 Interpersonal violence	18 Diabetes	70.2	35.4	17.6	18 Diabetes	29.8	14.7	3.8
19 Iodine deficiency	19 Interpersonal violence	28.1	1.9	-2.3	19 Interpersonal violence	14.7	1.4	1.1
20 Anxiety disorders	20 Anxiety disorders	33.1	5.9	0.3	20 Other musculoskeletal	21.6	7.5	0.9
26 Diabetes	21 Other musculoskeletal				23 Anxiety disorders			
27 Other musculoskeletal	33 Iodine deficiency				35 Iodine deficiency			

Males

Leading causes 1990	Leading causes 2007	Mean percentage change in number of prevalent cases, 1990-2007	Mean percentage change in all-age prevalence rate, 1990-2007	Mean percentage change in age-standardised prevalence rate, 1990-2007	Leading causes 2017	Mean percentage change in number of prevalent cases, 2007-17	Mean percentage change in all-age prevalence rate, 2007-17	Mean percentage change in age-standardised prevalence rate, 2007-17
1 Oral disorders	1 Oral disorders	21.6	-2.9	-4.3	1 Oral disorders	12.5	-0.2	-1.6
2 Headache disorders	2 Headache disorders	31.3	4.8	0.0	2 Headache disorders	14.3	1.5	0.7
3 Tuberculosis	3 Tuberculosis	26.2	0.7	-3.1	3 Tuberculosis	1.1	-10.2	-11.5
4 Intestinal nematode	4 Cirrhosis	42.5	13.8	6.5	4 Cirrhosis	22.8	9.0	4.6
5 Cirrhosis	5 Haemoglobinopathies	29.0	3.0	3.6	5 Age-related hearing loss	24.3	10.3	0.0
6 Dietary iron deficiency	6 Intestinal nematode	-21.4	-37.3	-35.7	6 Haemoglobinopathies	12.7	0.1	0.7
7 Haemoglobinopathies	7 Age-related hearing loss	44.6	15.4	0.4	7 Blindness and vision impairment	23.1	9.3	-0.4
8 Age-related hearing loss	8 Dietary iron deficiency	6.0	-15.4	-14.3	8 Dietary iron deficiency	5.8	-6.1	-5.2
9 Vitamin A deficiency	9 Blindness and vision impairment	39.5	11.3	-2.2	9 STIs	19.7	6.3	1.9
10 Blindness and vision impairment	10 Vitamin A deficiency	9.7	-12.4	-7.1	10 Intestinal nematode	-16.7	-26.0	-24.2
11 Fungal skin diseases	11 STIs	38.9	10.9	0.7	11 Vitamin A deficiency	5.6	-6.3	-4.0
12 STIs	12 Fungal skin diseases	20.8	-3.5	-3.5	12 Upper digestive diseases	20.3	6.8	1.3
13 Upper digestive diseases	13 Upper digestive diseases	36.5	9.0	-1.3	13 Fungal skin diseases	10.2	-2.2	-4.6
14 Low back pain	14 Chronic kidney disease	45.6	16.2	-0.1	14 Chronic kidney disease	25.4	11.4	1.1
15 Chronic kidney disease	15 Low back pain	30.3	4.0	-6.8	15 Other skin diseases	26.4	12.2	4.7
16 Other skin diseases	16 Other skin diseases	46.5	16.9	7.1	16 Low back pain	18.0	4.7	-1.3
17 Falls	17 Diabetes	77.6	41.8	21.5	17 Diabetes	29.3	14.8	4.0
18 Diabetes	18 Falls	26.4	0.9	-9.8	18 Falls	26.8	12.6	4.1
19 Asthma	19 Other musculoskeletal	41.6	13.0	0.8	19 Other musculoskeletal	16.7	3.6	-2.9
20 Dermatitis	20 COPD	31.5	4.9	-10.6	20 COPD	15.6	2.6	-10.1
21 COPD	21 Dermatitis				22 Dermatitis			
22 Other musculoskeletal	22 Asthma				23 Asthma			

Communicable, maternal, neonatal, and nutritional diseases  
 Non-communicable diseases  
 Injuries





**Figure 8: Leading 20 Level 3 causes of global YLDs for 1990, 2007, and 2017, with percentage change in number of YLDs and all age and age-standardised rates for each sex**  
 Causes are connected by lines between time periods; solid lines are increases and dashed lines are decreases. For the time periods 1990-2007 and 2007-17, three measures of change are shown: percentage change in the number of YLDs, percentage change in the all-age YLD rate, and percentage change in the age-standardised YLD rate. Communicable, maternal, neonatal, and nutritional diseases are shown in red; non-communicable causes in blue; and injuries in green. Statistically significant changes are shown in bold. COPD=chronic obstructive pulmonary disease. YLDs=years lived with disability.

For both males and females, the top two leading causes of global YLDs remained consistent between both time periods, during which the total number of YLDs for each of these causes increased. The third top cause in 2017 was depressive disorders for females and diabetes for males. From 1990 to 2007, for females, the number of YLDs attributable to low back pain increased by 29.8% (95% UI 27.7–31.8) and headache disorders increased by 34.0% (32.8–35.3). From 1990 to 2007, for females, the number of YLDs attributable to depressive disorders increased by 32.2% (29.8–34.4), causing depressive disorders to become the third leading cause in 2007. The number of YLDs for the three leading causes for females continued to increase from 2007 to 2017, by 17.3% (15.8–18.8) for low back pain, 15.3% (14.4–16.2) for headache disorders, and 14.1% (12.8–15.5) for depressive disorders. From 1990 to 2007, for males, the number of YLDs attributable to the top two leading causes increased by 30.2% (28.1–32.2) for low back pain and 34.1% (32.7–35.4) for headache disorders. From 1990 to 2007, for males, the number of YLDs attributable to diabetes increased by 79.0% (75.8–82.2), causing diabetes to become the third leading cause. The number of YLDs for the three leading causes continued to climb from 2007 to 2017, increasing by 17.8% (16.5–19.3) for low back pain, 15.5% (14.5–16.5) for headache disorders, and 30.1% (24.8–36.1) for diabetes.

Between 1990 and 2007, age-standardised YLD rates for females decreased for the three leading causes: low back pain (by 7.6%, 95% UI 6.2 to 8.9), headache disorders (by 0.1%, –0.80 to 0.69), and dietary iron deficiency (by 18.8%, 17.0 to 20.7). Between 1990 and 2007, the YLD rate for depressive disorders decreased by 3.0% (1.6 to 4.5) and became the third leading cause of YLDs in females in 2007 due to the simultaneous large decrease in dietary iron deficiency (figure 8A). Between 1990 and 2017, YLD rates for females decreased for low back pain (by 10.1%, 95% UI 8.8 to 11.3), depressive disorders (by 6.0%, 5.0 to 7.1), and dietary iron deficiency (by 30.7%, 27.4 to 33.7), while headache disorders increased by 0.6% (–0.19 to 1.42). Between 1990 and 2007, the YLD rates for males decreased for low back pain (6.8%, 5.6 to 7.8) and dietary iron deficiency (15.1%, 10.9 to 18.9), and increased for headache disorders (1.1%, 0.15 to 1.9). Between 1990 and 2007, the YLD rate for diabetes increased by 21.9% (20.0 to 24.0) and became the third leading cause of YLDs in males in 2007. From 2007 to 2017, the YLD rate for headache disorders increased by 1.5% (0.8 to 2.3) and that for diabetes increased by 4.2% (0.0 to 8.7), whereas the YLD rate for low back pain decreased by 1.3% (0.7 to 1.9). Between 1990 and 2017, the YLD rate for low back pain decreased by 8.0% (6.9 to 9.1) and that for dietary iron deficiency decreased by 26.7% (20.6 to 32.5), whereas the rates for headache disorders and diabetes increased by 2.6% (1.6–3.6) and 27.0% (22.2–32.4), respectively.

## Discussion

### Main findings

While age-standardised all-cause global YLD rates decreased by less than 4% over the nearly three-decade period from 1990 to 2017, the number of total YLDs has increased by more than 50% during this time. This pattern is concerning given the lack of substantial improvement in age-standardised rates over time as well as the increased magnitude of total health loss. These patterns are probably related to population growth and ageing as well as increasing numbers of YLDs from conditions such as type 2 diabetes and opioid use disorders, which were less common in 1990. YLD increases, even when age-standardised rates are slightly improving, might pose a burden to economies and health-care systems that have not expanded proportionally to population growth or in populations where economic improvements have not been equitably distributed.

Globally, over the 28-year period studied, three chronic NCDs (low back pain, headache disorders, and depressive disorders) have prevailed as three of the top four leading causes of YLDs, collectively causing 162 million (95% UI 118–216) YLDs in 2017 and representing nearly one in five YLDs globally. This substantial portion of global YLDs might be amenable to treatment and care access, because headache disorders and depressive disorders can be treated with low-cost therapeutics. The persistence of depressive disorders and low back pain is also concerning given the former's relation with self-harm and the latter's relation with potential loss of functional status in the work force.

### Emerging trends

For the first time in the GBD study, we estimated the burdens of type 1 and type 2 diabetes separately. Our estimates illustrate the emergence of diabetes as a leading cause of disability globally, ranking as the fourth leading cause of age-standardised YLDs in 2017. This increased burden was observed across all levels of development. Age-standardised YLDs increased for both females and males across all SDI quintiles between 1990 and 2017 (figure 3). Diabetes poses complicated care challenges even in areas with reliable access to medical services. Preventive measures such as prediabetes screening, lifestyle modification, and treatment with low-cost medications such as metformin could avert worsening incidence rates, but as prevalence increases, health-care systems will also need to provide access to services such as wound care, surgical resources, medications including insulin, care for diabetic retinopathy, and increased focus on heightened cardiovascular disease risk.

This is also the first year of GBD estimation for non-alcoholic fatty liver disease (NAFLD) and cirrhosis and liver cancer caused by non-alcoholic steatohepatitis (NASH). For cirrhosis and liver cancer caused by NASH, we estimated 892 million (95% UI 859–928) global cases for cirrhosis due to NASH and 97400 cases

(86 800–108 000) for liver cancer due to NASH, and an age-standardised prevalence of 11 061 cases (10 651–11 493) per 100 000 for cirrhosis due to NASH and 1·20 cases (1·07–1·33) per 100 000 for liver cancer due to NASH in 2017 (appendix 2), identifying NASH as an increasingly important cause of liver disease. We observed that these cases were distributed across all GBD regions, although more commonly in North Africa and the Middle East and in Oceania in terms of age-standardised rates. This expansion of NAFLD and liver disease due to NASH reflects the worsening burden of metabolic conditions globally. Given the complexity of chronic liver disease and the difficulty of effectively treating obesity, efforts to prevent obesity and to develop therapeutics for NAFLD will be increasingly important.

After initial steep reductions in HIV incidence between 1998 and 2005, the global rate of decline in new HIV infections continues, although it has slowed in recent years and global prevalence has increased slightly since 2010, a trend which is probably driven by rapid expansion of antiretroviral therapy in high-prevalence countries and extended life expectancy of people living with HIV. These longer lifespans call for increased resources for treatment and continued prevention and treatment interventions to maintain declines in incidence.<sup>27</sup> For tuberculosis, it is a notable success that drug-susceptible tuberculosis has declined in terms of age-standardised incidence since 1990. The burden of malaria has also declined since the mid-2000s in terms of age-standardised incidence rates. High age-standardised incidence rates of acute viral hepatitis have persisted, however, with age-standardised incidence rates of hepatitis A and B combined exceeding malaria incidence in 2017 despite availability of vaccines. The age-standardised incidence rate of acute hepatitis did not significantly change from 1990 to 2007, from 2007 to 2017, or from 1990 to 2017, suggesting that more proactive global initiatives are important, particularly with respect to vaccine coverage<sup>28</sup> and cost-effective access to hepatitis C curative treatments.<sup>29–31</sup>

Incidence rates of lower respiratory infections (LRIs) declined among children younger than 5 years by 32·4% (95% UI 27·2–37·5) since 1990 and caused 83·0 million (66·4–101) episodes in children younger than 5 years in 2017, while the age-standardised incidence rate decreased by 5·8% (1·5–10·0) between 1990 and 2017 (appendix 1). Among all ages, pneumococcal pneumonia has prevailed as the leading aetiological subtype of LRI, accounting for more than five times more YLDs than the second leading cause (influenza). Diarrhoeal episodes have persisted as the second most common incident cause of health loss after upper respiratory infection among all ages, with 6·29 billion (5·81–6·82) total episodes in 2017, with rotavirus prevailing as the leading aetiology. The age-standardised incidence of diarrhoea varied nine-fold across GBD regions, with the lowest rates in Australasia and the highest rates in Oceania (appendix 2). The burdens

of pneumococcal pneumonia and rotavirus diarrhoea are notable given the availability of vaccines for these pathogens, highlighting the need for continued expansion of vaccine coverage and delivery systems.

While the burden of musculoskeletal disorders, vision loss, and hearing loss in older ages has been a consistent theme in past GBD studies due to their substantial contribution to non-fatal health loss, the burden of medically complex, high-resource conditions has also become increasingly concerning. Cardiovascular disease, chronic respiratory conditions, and neurological disorders sum to form more than 15% of age-standardised YLDs in every GBD region except two (southern Latin America and eastern sub-Saharan Africa; appendix 2). GBD risk factor estimates show that the drivers for atherosclerotic cardiovascular diseases—high systolic blood pressure,<sup>32–34</sup> high cholesterol, poor diet,<sup>35</sup> high fasting plasma glucose,<sup>35</sup> and low physical activity<sup>36</sup>—prevail in many geographies, indicating that this burden can be expected to persist and possibly expand as populations age. While the efforts of primary prevention approaches such as statin therapy and smoking cessation are evident in the gradual declines in age-standardised prevalence in high-income countries over the past 28 years, the prevalence of cardiovascular disease in these populations still remains high, which might also reflect improved survival from acute events due to improved response systems and interventions such as percutaneous coronary intervention, coronary artery bypass grafting, and rapid stroke treatment guidelines,<sup>37–40</sup> as well as secondary prevention with statins, anti-hypertensives, and smoking cessation.<sup>41–46</sup> As developing economies increasingly experience cardiovascular disease burden, investing in health system infrastructure to ensure access to these interventions as well as to primary prevention therapeutics could help to mitigate disability and improve survival into older ages.<sup>40,47,48</sup> Chronic respiratory conditions also inflict considerable health loss in older people, contributing to more than 5% of YLDs starting in the 50–54 year age group, globally, who were exposed to risk factors such as smoking and indoor air pollution and similarly pose challenges to health systems with ageing populations, given the importance of oxygen therapy,<sup>49–52</sup> access to medical care,<sup>53–55</sup> and the risk of respiratory infections among these patient populations.<sup>56,57</sup> Neurological conditions continue to show large numbers of prevalent cases and YLDs, with consistent increases in recent years. We anticipate that this burden will also expand as populations age, creating challenges for health-care systems given the lack of modifiable risk factors for some neurological conditions and effective treatments for conditions such as Alzheimer's disease. Given the extensive care requirements these conditions—in isolation or as comorbidities—demand from both health systems and social and familial supports, their morbidity can reflect not only diminished health for an individual and population but also lost capital in an economy and among caretakers.<sup>58–63</sup>

Opioid use disorders including opioid dependence have become an era-defining epidemic in the USA with more than 4 million prevalent cases in 2017. Outside the USA, opioid dependence was estimated to cause more than 1% of age-standardised YLDs in 135 countries in 2017, whereas in 12 out of 21 GBD regions, more than 5% of YLDs in the 15–49 year age group were caused by substance use disorders overall (appendix 2). Cumulatively, these results show pervasive health loss from substance use, which might also cause lost human capital given the concentration of the burden in working ages. The burden of mental disorders is present in both sexes and across all age groups after emerging in childhood with idiopathic intellectual disability and autism spectrum disorders and continuing into older ages with depressive disorders, anxiety disorders, and schizophrenia. Mental disorders have consistently formed more than 14% of age-standardised YLDs for nearly three decades, and have greater than 10% prevalence in all 21 GBD regions. These findings substantiate a global need for increased mental health and substance abuse treatment resources, improved judiciousness of opioid prescribing patterns particularly for chronic pain, and expanded harm-reduction strategies such as opioid substitution therapy and needle programmes.

### Cross-cutting themes

Among the 22 causes in the Level 2 GBD cause hierarchy, 14 causes had a relative difference between males and females greater than or equal to 10% in terms of prevalent cases in 2017, while 12 causes had a relative difference greater than 10% in terms of age-standardised prevalence. Notably, females had significantly higher prevalence of HIV/AIDS and sexually transmitted infections (driven primarily by higher burden from sexually transmitted infections) and self-harm and interpersonal violence, among other causes, whereas males had significantly higher prevalence of substance use disorders and transport injuries, among other causes. Figure 6 illustrates how divergent trends were nearly evenly distributed between males and females, despite the overall higher numbers of YLDs experienced by females. As indicated by the higher Z score in female-favourable causes, the cause-regions where females did better over time tended to have greater improvements in age-standardised YLD rates than did the cause-regions where males did better over time. There were important exceptions, however: for example, with HIV/AIDS and sexually transmitted infections in central sub-Saharan Africa, the age-standardised YLD rates for females increased by 30·0% (95% UI 6·8–68·1), while rates for males decreased by 43·0% (23·2–58·5) between 1990 and 2017. This particular trend reveals a striking lapse in health equity given the extensive knowledge of treatment and prevention methods for HIV/AIDS and many sexually transmitted infections.

These observations imply that health systems might have achieved improvements in non-fatal burden that have not been shared across sexes. The underlying reasons for these imbalances are likely to be complex. For causes that are inherently more common in males or females, improvements in one sex over the other might reflect these causes differing in susceptibility to prevention, intervention, and treatment. For example, autoimmune conditions such as rheumatoid arthritis can affect both males and females but are ordinarily more common in females.<sup>64,65</sup> However, such a cause still leads to increased disability that might also have ramifications not captured in a health study, such as income loss due either to disability at young ages or to the cost of modern immunotherapies. Similarly, females of childbearing age experience risk of pregnancy-related and maternal conditions, risks that could be pronounced in lower-resource settings without sufficient access to modern obstetric facilities and follow-up care.<sup>66,67</sup> Other causes have firmly established causal risk factors such as smoking and chronic obstructive pulmonary disease (COPD), where the higher COPD rates in males are probably due to historically higher rates of smoking compared with females. Additionally, some causes may be susceptible to systematic misdiagnosis due to conventional clinical heuristics based on flawed or non-existent evidence. For example, in some areas, females presenting with acute coronary syndrome are more commonly misdiagnosed,<sup>68</sup> whereas other causes, such as autism spectrum disorders, might be systematically underdiagnosed in females compared with males.<sup>69–71</sup> These biases in sex-specific misdiagnosis emphasise the need for continued refinement in sex-specific burden estimation.

While YLD rates are highest in older ages, globally, YLD counts are heavily concentrated in working-age males and females (ie, from 20–54 years), a pattern which is particularly evident among causes such as mental disorders, neurological disorders, and musculoskeletal disorders, which sum to more than 45% of all YLDs in these age groups. This finding is notable for two main reasons. First, these age groups have a considerable number of years to live that would otherwise be in full health, emphasising how conditions at these ages, even if having lower disability weights, can still contribute substantially to the non-fatal burden. Second, a disabling condition that occurs during this period of life could represent lost human capital. This loss will be increasingly important to characterise with human capital emerging as an important area of focus at the World Bank.<sup>72,73</sup>

In GBD 2017, anaemia is classified as an impairment, with aetiologies ranging from rare genetic haemoglobinopathies to iron deficiency. Because these aetiologies alone could cause a relatively small proportion of all anaemia cases, the magnitude of anaemia's burden would be obscured by the granularity of these aetiologies



if it was not also estimated in aggregate. In 2017, the sum of YLDs across all causes of anaemia was 58.2 million (95% UI 39.5–83.0), with a global age-standardised rate of 783.9 YLDs (531.3–1117.8) per 100 000 for both sexes, with sex-specific rates of 1012.8 YLDs (689.4–1436.5) per 100 000 females, and 555.9 YLDs (370.4–801.8) per 100 000 males. Globally, in terms of YLD rates in 2017, anaemia is the leading impairment for females, males, and both sexes combined. If anaemia were treated as a cause, it would rank as the fourth leading Level 2 cause and as the first leading Level 3 cause in terms of age-standardised YLD rates globally for females in 2017. The third leading impairment for males, females, and both sexes combined was blindness and vision impairment (1.34 billion [1.29–1.39] cases in 2017), which is notable given the economic consequences of vision loss,<sup>74,75</sup> the relative treatability of many vision loss conditions, and the increased risk of injury that stems from visual impairment.<sup>76,77</sup> Summed together, the impairments included in the GBD cause hierarchy comprise a total of more than 5 billion prevalent cases worldwide in 2017, making it evident that health-care systems and policy makers should evaluate non-fatal burden not only for diseases and injuries but also for impairments and their aetiologies.

### Important changes in GBD 2017 compared with GBD 2016

#### Overview

Overall, the most important systemic change to this year's study is the estimation of population and fertility in the GBD framework. In addition, we made changes to the GBD cause hierarchy (for example adding an aggregate Level 3 headache disorders cause), which limits certain cause-specific comparisons with past GBD cycles; this is discussed in more detail in the Limitations section below. Other notable cause-specific considerations, comparisons, and limitations that are new as of GBD 2017 are as follows. More details for each cause can be found in the supplementary methods (appendix 1 section 4).

#### Cause-specific considerations, comparisons, and limitations

In GBD 2017, we added the Malnutrition and Enteric Disease (MAL-ED) study to our existing use of the Global Enteric Multicenter Study (GEMS)<sup>78–80</sup> to measure diarrhoeal aetiologies, which affected our aetiological distributions with increased norovirus and rotavirus attributions. Our overall diarrhoea incidence estimates were not affected. The Walker and colleagues' study<sup>81</sup> estimated 1.7 billion episodes of diarrhoea among children younger than 5 years in 2010, a value that is greater than the GBD 2017 estimate in the same year (1.16 billion, 95% UI 1.00–1.34). For pneumonia, a study by Rudan and colleagues<sup>82</sup> estimated a global pneumonia incidence of 0.22 episodes (IQR 0.11–0.51) per child-year among children younger than 5 years in 2010, accounting for 122.6 million episodes, a value that is

greater than the GBD 2017 estimate of 94.5 million (79.5–112). These two studies are part of the Maternal and Child Epidemiology Estimation (MCEE). The MCEE methodology for diarrhoea and pneumonia incidence differs from GBD in that MCEE uses only community-based studies. By contrast, the GBD uses a greater volume of data including Demographic and Health Surveys, Multiple Indicator Cluster Surveys, and clinical data records. We also used diarrhoea-specific and LRI-specific summary exposure values as covariates in our models, which include location-specific and year-specific estimates of risk factors associated with diarrhoea or LRI. We observed that these covariates had significant relationships with diarrhoea and LRI incidence rates and therefore strengthened our estimates, particularly in data-sparse areas. Further modelling details are described in the supplementary methods (appendix 1 section 4).

For HIV/AIDS, we used new methods to adjust for representativeness bias in ANC surveillance data,<sup>83</sup> which led to our models predicting a lower peak and flatter trend of the epidemic in southern sub-Saharan Africa compared with GBD 2016. We updated our inputs of antiretroviral therapy coverage distribution informed by data from the International Epidemiology Databases to Evaluate AIDS and CD4+ progression parameters for children.<sup>84,85</sup> We also improved our sex-specific modelling strategy in Spectrum by sex-splitting incidence based on a model fit to the sex ratio of prevalence observed in countries with representative surveys. Our estimated global prevalence results are similar to UNAIDS 2017 values, with some variation at the national level. Estimates in recent years are expected to be less stable due to improvements in HIV treatment coverage and prevention. Further modelling details are described in the supplementary methods (appendix 1 section 4).

The hepatitis estimation process has changed to improve internal consistency between mortality and non-fatal estimates for GBD 2017. First, we included case-fatality rates from clinical data in our mortality models to improve the distribution of hepatitis deaths by virus. Second, we developed a time series of hepatitis B virus vaccine coverage in infants to use as a covariate. Third, the aggregate cause-specific mortality rate of acute hepatitis, cirrhosis, and liver cancer due to hepatitis B and hepatitis C was combined with virus-specific seroprevalence data to ensure internal consistency among incidence, prevalence, remission, and excess mortality rates. Fourth, the prevalence of chronic hepatitis B and C are now captured in the cirrhosis and other chronic liver diseases cause group rather than in the prevalence estimates for acute hepatitis B and acute hepatitis C. Overall, this caused prevalent cases of hepatitis B and C to be shifted from the acute hepatitis B and C causes to the cirrhosis and other chronic liver diseases cause. Specifically, in terms of global age-standardised prevalence rates for both sexes in 2016, acute hepatitis B decreased from 6295 cases (95% UI 5349–7436) per 100 000 in GBD

2016 to 219 cases (193–248) per 100 000 in GBD 2017, while its corresponding chronic cause, cirrhosis and other chronic liver diseases due to hepatitis B, increased from 170 cases (159–184) to 5625 cases (5159–6118) per 100 000. Similarly, acute hepatitis C decreased from 2152 cases (1927–2382) per 100 000 in GBD 2016 to 8·11 cases (7·37–8·98) per 100 000, while its corresponding chronic cause, cirrhosis and other chronic liver diseases due to hepatitis C, increased from 149 cases (136–164) to 1723 cases (1517–1969) per 100 000 (appendix 2).

#### *Maternal, neonatal, and child health*

Several changes were adopted for GBD 2017. Adding clinical and claims records from outside the USA to our models affected congenital birth defects, haemoglobinopathies, and maternal disorders. Updating our inpatient admission per-capita estimates to include in-facility deliveries as a newborn admission affected neonatal disorders and congenital birth defects. Adopting in-facility delivery estimates for processing clinical data for maternal disorders led to lower estimates of pregnancy complications, especially in high-utilisation settings. We refined our method for estimating age-specific preterm birth and its complications to be consistent with GBD risk factor analysis, which resulted in preterm birth prevalence being higher than in previous GBD estimates. We enforced internal consistency among our estimates such that, for example, the sum of all specific types of congenital heart disease must equal the total number of cases of congenital heart disease. These methodological changes have lowered global estimates for many of the specific causes of birth defects, enforced the internal consistency of mortality and non-fatal estimates, narrowed the unexplained geographical variation in disease incidence, and strengthened the empirical relationship with known environmental, nutritional, and behavioural determinants of these conditions. For nutritional deficiencies, we extended our analysis of protein-energy malnutrition past age 5 years, incorporated cause-specific mortality rates, and included the prevalent cases of moderate wasting without oedema. Although the net result might seem to be an increase in the number of protein-energy malnutrition cases, it instead reflects a more comprehensive assessment of acute malnutrition than was estimated previously.

#### *Diabetes*

Diabetes has been estimated in previous GBD studies, but this is the first year that type 1 and type 2 diabetes were estimated and reported separately. The estimation strategy for diabetes is provided in more detail in the supplementary methods (appendix 1 section 4), but in summary, we measured overall diabetes and type 1 diabetes. We subtracted estimates of type 1 from overall diabetes to produce estimates for type 2 diabetes. One of the main limitations to measuring type 2 diabetes is that surveys of diabetes in adults do not make a distinction between cases of type 1 and type 2 diabetes.

#### *NASH and NAFLD*

In GBD 2017, for the first time we estimated NASH as a cause of liver cancer and cirrhosis and NAFLD as an asymptomatic health state. Our global age-standardised prevalence estimate of NAFLD and NASH that leads to cirrhosis or liver cancer was 10 935 cases (95% UI 10 522–11 365) per 100 000 in 2017, which was lower than a study by Younossi and colleagues,<sup>86</sup> which estimated a global prevalence of 24%. This difference is due to how we adjust for alcohol use in the population, which helps to distinguish these conditions from alcohol-driven liver disease. Our study shows a similar geographical pattern to the Younossi study, with higher rates in North America and the Middle East, corresponding to higher rates of obesity.

#### *Cardiovascular diseases*

We split haemorrhagic stroke into subarachnoid haemorrhage and intracerebral haemorrhage as subtypes of stroke and added non-rheumatic valve disease as an additional cause and aetiology of heart failure. The overarching limitation in cardiovascular estimation is that low-income and middle-income locations are less likely to have diagnostic tests such as treadmill tests, ankle-brachial index measurement, and other modern diagnostics. This also limits the identification of preclinical atherosclerotic disease for individuals who have not had clinical events but who might have ischaemic changes with provocative cardiac testing. For stroke, there were few sources of incidence data in many low-income and middle-income countries, and many clinical records used the ICD code for “acute, unspecified stroke”, which does not differentiate between ischaemic stroke, intracerebral haemorrhage, and subarachnoid haemorrhage. Future incorporation of more clinical record data might help to address these limitations by providing more diagnostic detail for cause subtypes.

#### *Chronic respiratory diseases*

We added several data sources that had lower estimates than the International Study of Asthma and Allergies in Childhood studies, which were the main source of asthma prevalence previously. Additionally, the adjustment factor for studies reporting on physician-diagnosed asthma without an additional question on wheezing changed between GBD 2016 and GBD 2017 after new data sources were added.

#### *Neurological conditions*

For dementia, we added covariates for whether studies had common features present in their diagnostic protocol, such as a review of clinical records or a diagnosis by a clinician to try to correct for some of the heterogeneity between studies, because only a very small fraction of studies used the same methods. We do not have reliable covariates for prevalence or incidence of dementia and



other neurological disorders, although in future studies, estimates of neurological disorders will benefit from the increased use of clinical and claims records.

#### *Cancer*

For GBD 2017, we added the new cause “myelodysplastic, myeloproliferative, and other haemopoietic neoplasms”, which were previously estimated as part of the “other neoplasms” group. In addition, we added new causes for three categories of benign and in-situ neoplasms: intestinal, cervical and uterine, and other.

#### *Mental and substance use disorders*

We estimated burden for a combined group of autism spectrum disorders consistent with the Diagnostic and Statistical Manual of Mental Disorders 5 designations in GBD 2017 as opposed to separately estimating autism and Asperger’s syndrome and other autism disorders.<sup>87</sup> Modelling improvements were made for opioid use disorders by incorporating new country-level covariates, including a measure of opioid analgesic consumption by country and the prevalence of injection drug use. Enhancements in the fatal modelling of opioid use disorders also contributed to these improved estimates. Improvements were also made in terms of data additions, particularly for cocaine and amphetamine dependence, where new data showed greater subnational variation in Mexico and Brazil.

#### *Injuries*

For GBD 2017, improvements were made to the computational framework required for injuries non-fatal measurement. These updates included incorporating GBD 2017 age groups and updating the differential equation solver for converting incidence to prevalence. Poisoning was divided into the two subclasses of poisoning by carbon monoxide and poisoning by other agents. Our estimate of 172 million (95% UI 152–194) falls per year resulting in any short-term or long-term disability was higher than those of WHO, which estimated 37 million falls<sup>88</sup> that required medical attention per year—a difference that might be explained by GBD’s inclusion of a wide spectrum of injury severities including minor injuries that result from falls. The WHO and GBD estimates on road injuries were more similar, with WHO estimating 20–50 million people experiencing non-fatal road injuries per year<sup>89</sup> and GBD 2017 estimating 54.2 million (47.4–61.6) road injuries in 2017. For fires, WHO and GBD 2017 had similar estimates when comparisons were available—for example, in the USA, WHO reported 410 000 burn injuries<sup>90</sup> in 2008 and GBD 2017 reported 360 000 (313 000–380 000) fire, heat, and hot substance injuries.

#### **Limitations**

As is evidenced in figure 1 and the supplementary methods, there is considerable heterogeneity in terms of

data density for each Level 1 location-cause combination in the GBD study. Data availability does not consistently correlate with burden—that is, high-burden causes and locations can have relatively sparse data for non-fatal outcomes. This will also be increasingly problematic as more countries start to experience greater burden from NCDs.

Currently, we inform most of the severity distributions that affect YLD calculation using the Medical Expenditure Panel Survey from the USA. This poses a limitation as the severities experienced in this population probably do not reflect global severity distributions or reflect that severity distributions are likely to vary over time, location, age, and by treatment access. As such, YLDs estimated might not reflect improvements in disability over time as SDI increases. Even for the limited diseases such as COPD, epilepsy, and stroke for which data from epidemiological studies allow us to differentiate severity by age, time, and location, the underlying data sources are still extremely limited in coverage by age, time, and location. Relying on published data on severity is unlikely to provide improved estimates in the near future. We also plan to access linked data between administrative records with diagnostic information and health surveys using health status measures to quantify severity of disease and how this changes over time and by age and sex.

Comorbidity adjustment in GBD 2017 assumes independent distributions of comorbid conditions. This is a limitation because comorbidity distributions are known to vary by cause, age, sex, location, and time. For example, diabetes and cardiovascular disease are more likely to be comorbid than asthma and gynaecological disorders but currently our comorbidity adjustment does not capture these correlations.

Clinical data records have known selection bias for subsets of the population that have access to health care. Some GBD causes rely heavily on clinical data given the lack of other sources, with efforts made to correct for this bias by using representative studies as a reference group. In recent years, the GBD study has used USA claims records to inform hospital data adjustments and various other elements of GBD estimation. Relying on data from a privately insured cohort in a high-income country poses limitations to the generalisability of these adjustments. This year, we also used tabulated claims records from Taiwan (province of China) for the first time in the GBD study, and in future publications we plan to continue incorporating claims data from additional countries to address this limitation. Acquiring further health insurance claims data will not only inform estimates in terms of incidence and prevalence measures but will also help to develop more accurate parameters that affect GBD estimates in other modelling steps.

With regard to age-time patterns, in DisMod-MR 2.1, we start by estimating a global model that uses all the available data and covariates with hierarchical random effects for geographies to estimate a prior distribution

that is passed down the geographical cascade. Time trends in our estimates result from where the covariates are changing over time, when year is included as a covariate or when data in different time periods lead to variation in the posterior estimates. This framework, however, does not capture true cohort effects. For example, we do not directly take into consideration prevalence in 30-year-olds in 1990 when estimating prevalence in 50-year-olds in 2010. This is a limitation for some diseases with known cohort effects such as the high incidence of hepatitis C in the USA in younger adults in the 1970s. We are continuing to develop a version of DisMod that explicitly incorporates a full age-time-period model in a Bayesian framework that will help to address this issue.

While our cause list currently specifies 354 diseases and injuries, there is great interest in incorporating a greater level of detail. Going forward, we intend to become more granular in our cause list, but every new disease requires a substantial amount of new reviews and model building. In consultation with our Scientific Council, we will need to balance our available resources with this growing list of priorities for new additions.

Similar to the cause reporting list, the hierarchy of the cause list and the method by which conditions are classified and grouped is a complex component of the GBD framework that has undergone nearly continuous improvement and refinement in years past. Grouping GBD causes into broad cause groups is a necessary part of the study's estimation and reporting process, but it can also cause limitations and challenges in the absence of broad consensus on objective frameworks for organising cause hierarchies. Other studies that measure burden of disease exemplify how disease groupings can affect a study's implications and interpretation. A recent study<sup>91</sup> cited medical errors as the third leading cause of death in the USA but grouped all heart disease and all cancer as the first and second leading causes, respectively. A different aggregation or level of detail in terms of the disease grouping in such a study could change these rankings, which become important in the realm of health policy and resource allocation as well as popular and political perception of what causes death and disability in a population. In the GBD study, we have strived to retain as much detail as is methodologically possible given available data, and additionally we have incorporated input from the GBD collaborator network in terms of refining our cause hierarchy to represent a heterogeneous mix of medical specialties, research expertise, and location-specific knowledge. In addition, our framework allows us to revise the cause hierarchy for specific specialties such as the burden of neurological disorders.<sup>92</sup>

#### Future directions

The methods and data that inform YLD estimation in the GBD study will continue to evolve. Several specific

improvements have been suggested by the GBD collaborator network and the global research community, and the following future directions are planned to be incorporated in the coming cycles.

Because the GBD cycle continues to be published on an annual basis, it will be important to incorporate updated data sources for older estimation years but also to add sources for the most recent estimation year. This necessitates data inclusion immediately after the end of the calendar year in order to be incorporated for the following year's estimation. This is challenging because some surveys, surveillance systems, and literature studies have a lag period between data collection and publication. One solution to this challenge would be adding, updating, and incorporating clinical data records from inpatient and outpatient visits from hospitals and clinics from more locations. Clinical data provide a level of detail, demographic information, and diagnostic accuracy that enhances the GBD study's ability to produce accurate estimates in the more recent estimation years. Relying more heavily on clinical data will require improved methods for adjusting for known representativeness biases. In the future, we plan to link medical records to representative survey results, which is possible with certain claims databases such as the Medicare Current Beneficiary Survey in the USA.<sup>93</sup>

In the next iteration of the GBD study, we plan to incorporate improved age-time estimation using a new tool, DisMod-AT, that simultaneously quantifies the relationships over time, by age, and by age cohorts. DisMod-AT will address the age-time measurement limitation described above.

We plan to continue updating and refining our cause and location hierarchies including the causes described above. This is the first year that estimates for a non-geographical subnational grouping (ie, Māori and non-Māori populations in New Zealand) were modelled, and in future GBD studies it would be compelling to similarly estimate disease burden in groups within a location not strictly determined by geographies—for example, race groups within the USA or refugee populations in host countries.

#### Conclusion

The global burden of non-fatal health loss in 2017 represents a complex culmination of nearly three decades of evolving disease patterns and risk factor profiles, improving health care, and dynamic populations. This study provides comprehensive updates from prior GBD studies and identifies topical themes that can be used to guide future research and discussion in the arena of non-fatal health loss. Continuing a trend from throughout the history of the GBD study, we show how YLDs continue to increase as countries improve along the development spectrum and emphasise how economies should anticipate difficulties in caring for older populations suffering from complex conditions such as

diabetes, respiratory and cardiovascular diseases, and neurological conditions. Additionally, we report heterogeneity in outcomes experienced across different sexes, geographies, and income levels, and identify regions and causes where sexes have had divergent health trends over time. These findings should help to focus prevention and treatment efforts on groups and areas that have experienced inequitable health outcomes. Continuing the theme of health equity, we highlight the extensive amount of health loss experienced globally for conditions that are treatable or preventable such as viral hepatitis, emphasising the profound impact that health-care systems can produce with increasing investment in and access to health-care resources. Finally, we emphasise the burden of non-fatal health loss in younger and middle ages, where it is speculated that non-fatal health loss could ultimately lead to loss in human capital.

#### GBD 2017 Disease and Injury Incidence and Prevalence Collaborators

Spencer L James, Degu Abate, Kalkidan Hassen Abate, Solomon M Abay, Cristiana Abbafati, Nooshin Abbasi, Hedayat Abbastabar, Foad Abd-Allah, Jemal Abdela, Ahmed Abdelalim, Ibrahim Abdollahpour, Rizwan Suliankatchi Abdulkader, Zegeye Abebe, Semaw F Abera, Olifan Zewdie Abil, Haftom Niguse Abraha, Laith Jamal Abu-Raddad, Niveen M E Abu-Rmeileh, Manfred Mario Kokou Accrombessi, Dilaram Acharya, Pawan Acharya, Ilana N Ackerman, Abdu A Adamu, Oladimeji M Adebayo, Victor Adekanmbi, Olatunji O Adetokunboh, Mina G Adib, Jose C Adsuar, Kossivi Agbelenko Afanvi, Mohsen Afarideh, Ashkan Afshin, Gina Agarwal, Kareha M Agesa, Rakesh Aggarwal, Sargis Aghasi Aghayan, Sutapa Agrawal, Alireza Ahmadi, Mehdi Ahmadi, Hamid Ahmadi, Muktar Beshir Ahmed, Amani Nidhal Aichour, Ibtihel Aichour, Miloud Taki Eddine Aichour, Tomi Akinyemiju, Nadia Akseer, Ziyad Al-Aly, Ayman Al-Eyadhy, Hesham M Al-Mekhlafi, Rajaa M Al-Raddadi, Fares Alahdab, Khurshid Alam, Tahiya Alam, Alaa Alashi, Seyed Moayed Alavian, Kefyalew Addis Alene, Mehran Alijanzadeh, Reza Alizadeh-Navaei, Syed Mohamed Aljunid, Ala'a Alkerwi, François Alla, Peter Allebeck, Mohamed M L Alouani, Khalid Altirkawi, Nelson Alvis-Guzman, Azmeraw T Amare, Leopold N Aminde, Walid Ammar, Yaw Ampem Amoako, Nahla Hamed Anber, Catalina Liliana Andrei, Sofia Androudi, Megbaru Debalkie Animut, Mina Anjomshoa, Mustafa Geleto Ansha, Carl Abelardo T Antonio, Palwasha Anwari, Jalal Arabloo, Antonio Arauz, Olatunde Aremu, Filippo Ariani, Bahram Armoon, Johan Årnlöv, Amit Arora, Al Artaman, Krishna K Aryal, Hamid Asayesh, Rana Jawad Asghar, Zerihun Ataro, Sachin R Atre, Marcel Ausloos, Leticia Avila-Burgos, Euripide F G A Avokpaho, Ashish Awasthi, Beatriz Paulina Ayala Quintanilla, Rakesh Ayer, Peter S Azzopardi, Arefeh Babazadeh, Hamid Badali, Alaa Badawi, Ayele Geleto Bali, Katherine E Ballesteros, Shoshana H Ballew, Maciej Banach, Joseph Adel Mattar Banoub, Amrit Banstola, Aleksandra Barac, Miguel A Barboza, Suzanne Lyn Barker-Collo, Till Winfried Bärnighausen, Lope H Barrero, Bernhard T Baune, Shahrzad Bazargan-Hejazi, Neeraj Bedi, Ettore Beghi, Masoud Behzadifar, Meysam Behzadifar, Yannick Béjot, Abate Bekele Belachew, Yihalem Abebe Belay, Michelle L Bell, Aminu K Bello, Isabela M Bensenor, Eduardo Bernabe, Robert S Bernstein, Mircea Beuran, Tina Beyranvand, Neeraj Bhala, Suraj Bhattarai, Soumyadeep Bhaumik, Zulfiqar A Bhutta, Belete Biadgo, Ali Bijani, Boris Bikbov, Ver Bilano, Nigus Bilillign, Muhammad Shahdaat Bin Sayeed, Donal Bisanzio, Brigitte F Blacker, Fiona M Blyth, Ibrahim R Bou-Orm, Soufiane Boufous, Rupert Bourne, Oliver J Brady, Michael Brainin, Luisa C Brant, Alexandra Brazinova, Nicholas J K Breitborde, Hermann Brenner, Paul Svitil Briant, Andrew M Briggs, Andrey Nikolaevich Briko, Gabrielle Britton, Traolach Brugh, Rachelle Buchbinder, Reinhard Busse, Zahid A Butt, Lucero Cahuana-Hurtado, Jorge Cano, Rosario Cárdenas, Juan J Carrero,

Austin Carter, Félix Carvalho, Carlos A Castañeda-Orjuela, Jacqueline Castillo Rivas, Franz Castro, Ferrán Catalá-López, Kelly M Cercy, Ester Cerin, Yazan Chaiah, Alex R Chang, Hsing-Yi Chang, Jung-Chen Chang, Fiona J Charlson, Aparajita Chattopadhyay, Vijay Kumar Chattu, Pankaj Chaturvedi, Peggy Pei-Chia Chiang, Ken Lee Chin, Abdulaal Chittheer, Jee-Young J Choi, Rajiv Chowdhury, Hanne Christensen, Devasahayam J Christopher, Flavia M Cicuttini, Liliana G Ciobanu, Massimo Cirillo, Rafael M Claro, Daniel Collado-Mateo, Cyrus Cooper, Josef Coresh, Paolo Angelo Cortesi, Monica Cortinovich, Megan Costa, Ewerton Cousin, Michael H Criqui, Elizabeth A Cromwell, Marita Cross, John A Crump, Abel Fekadu Dadi, Lalit Dandona, Rakhi Dandona, Paul I Dargan, Ahmad Daryani, Rajat Das Gupta, José Das Neves, Tamirat Tesfaye Dasa, Gail Davey, Adrian C Davis, Dragos Virgil Davitoiu, Barbora De Courten, Fernando Pio De La Hoz, Diego De Leo, Jan-Walter De Neve, Meaza Girma Degefa, Louisa Degenhardt, Selina Deiparine, Robert P Dellavalle, Gebre Teklemariam Demoz, Kebede Deribe, Nikolaos Dervenis, Don C Des Jarlais, Getenet Ayalew Dessie, Subhojit Dey, Samath Dhamminda Dharmaratne, Mesfin Tadese Dinberu, M Ashworth Dirac, Shirin Djalalinia, Linh Doan, Klara Dokova, David Teye Doku, E Ray Dorsey, Kerrie E Doyle, Tim Robert Driscoll, Manisha Dubey, Eleonora Dubljanin, Eyasu Ejeta Duken, Bruce B Duncan, Andre R Duraes, Hedyeh Ebrahimi, Soheil Ebrahimipour, Michelle Marie Echno, David Edvardsson, Aendem Effiong, Joshua R Ehrlich, Charbel El Bcheraoui, Maysaa El Sayed Zaki, Ziad El-Khatib, Hajer Elkout, Iqbal R F Elyazar, Ahmadali Enayati, Aman Yesuf Endries, Benjamin Er, Holly E Erskine, Babak Eshrati, Sharareh Eskandarieh, Alireza Esteghamati, Sadaf Esteghamati, Hamed Fakhim, Wahid Fallah Omrani, Mahbobeh Faramarzi, Mohammad Fareed, Farzaneh Farhadi, Talha A Farid, Carla Sofia E sá Farinha, Andrea Farioli, Andre Faro, Maryam S Farvid, Farshad Farzadfar, Valery L Feigin, Netsanet Fentahun, Seyed-Mohammad Fereshtehnejad, Eduarda Fernandes, Joao C Fernandes, Alize J Ferrari, Garumma Tolu Feyissa, Irina Filip, Florian Fischer, Christina Fitzmaurice, Nataliya A Foigt, Kyle J Foreman, Jack Fox, Tahvi D Frank, Takeshi Fukumoto, Nancy Fullman, Thomas Fürst, João M Furtado, Neal D Futran, Seana Gall, Morsaleh Ganji, Fortune Gbetoho Gankpe, Alberto L Garcia-Basteiro, William M Gardner, Abadi Kahu Gebre, Amanuel Tesfay Gebremedhin, Teklu Gebrehiwo Gebremichael, Tilayie Feto Gelano, Johanna M Geleijnse, Ricard Genova-Maleras, Yilma Chisha Dea Geramo, Peter W Gething, Kebede Embaye Gezae, Keyghobad Ghadiri, Khalil Ghasemi Falavarjani, Maryam Ghasemi-Kasman, Mamata Ghimire, Rakesh Ghosh, Alope Gopal Ghoshal, Simona Giampaoli, Paramjit Singh Gill, Tiffany K Gill, Ibrahim Abdelmageed Ginawi, Giorgia Giussani, Elena V Gnedovskaya, Ellen M Goldberg, Srinivas Goli, Hector Gómez-Dantés, Philimon N Gona, Sameer Vali Gopalani, Taren M Gorman, Alessandra C Goulart, Bárbara Niegia Garcia Goulart, Ayman Grada, Morgan E Grams, Giuseppe Grosso, Harish Chander Gugnani, Yuming Guo, Prakash C Gupta, Rahul Gupta, Rajeev Gupta, Tanush Gupta, Bishal Gyawali, Juanita A Haagsma, Vladimir Hachinski, Nima Hafezi-Nejad, Hassan Haghparast Bidgoli, Tekleberhan B Hagos, Gessesew Bugssa Hailu, Arvin Haj-Mirzaian, Arya Haj-Mirzaian, Randah R Hamadeh, Samer Hamidi, Alexis J Handal, Graeme J Hankey, Yuantao Hao, Hilda L Harb, Sivadasanpillai Harikrishnan, Josep Maria Haro, Mehedi Hasan, Hadi Hassankhani, Hamid Yimam Hassen, Rasmus Havmoeller, Caitlin N Hawley, Roderick J Hay, Simon I Hay, Akbar Hedayatzadeh-Omran, Behzad Heibati, Delia Hendrie, Anduaem Henok, Claudiu Herteliu, Sousan Heydarpour, Desalegn Tsegaw Hibstu, Huong Thanh Hoang, Hans W Hoek, Howard J Hoffman, Michael K Hole, Enayatollah Homaie Rad, Praveen Hoogar, H Dean Hoggood, Seyed Mostafa Hosseini, Mehdi Hosseinzadeh, Mihaela Hostiuc, Sorin Hostiuc, Peter J Hotez, Damian G Hoy, Mohamed Hsairi, Aung Soe Htet, Guoqing Hu, John J Huang, Chantal K Huynh, Kim Moesgaard Iburg, Chad Thomas Ikeda, Bogdan Ileanu, Olayinka Stephen Ilesanmi, Usman Iqbal, Seyed Sina Naghibi Irvani, Caleb Mackay Salpeter Irvine, Sheikh Mohammed Shariful Islam, Farhad Islami, Kathryn H Jacobsen,

Leila Jahangiry, Nader Jahanmehr, Sudhir Kumar Jain, Mihajlo Jakovljevic, Mehdi Javanbakht, Achala Upendra Jayatilleke, Panniyammakal Jeemon, Ravi Prakash Jha, Vivekanand Jha, John S Ji, Catherine O Johnson, Jost B Jonas, Jacek Jerzy Jozwiak, Suresh Banayya Jungari, Mikko Jürisson, Zubair Kabir, Rajendra Kadel, Amaha Kahsay, Rizwan Kalani, Tanuj Kanchan, Manoochehr Karami, Behzad Karami Matin, André Karch, Corine Karema, Narges Karimi, Seyed M Karimi, Amir Kasaeian, Dessalegn H Kassa, Getachew Mullu Kassa, Tesfaye Dessale Kassa, Nicholas J Kassebaum, Srinivasa Vittal Katikireddi, Norito Kawakami, Ali Kazemi Karyani, Masoud Masoud Keighobadi, Peter Njenga Keiyoro, Laura Kemmer, Grant Rodgers Kemp, Andre Pascal Kengne, Andre Keren, Yousef Saleh Khader, Behzad Khafaei, Morteza Abdullatif Khafaie, Alireza Khajavi, Ibrahim A Khalil, Ejaz Ahmad Khan, Muhammad Shahzeb Khan, Muhammad Ali Khan, Young-Ho Khang, Mohammad Khazaei, Abdullah T Khoja, Ardeshir Khosravi, Mohammad Hossein Khosravi, Aliasghar A Kiadaliri, Daniel N Kiirithio, Cho-Il Kim, Daniel Kim, Pauline Kim, Young-Eun Kim, Yun Jin Kim, Ruth W Kimokoti, Yohannes Kinfu, Adnan Kisa, Katarzyna Kissimova-Skarbek, Milka Kivimäki, Ann Kristin Skrindo Knudsen, Jonathan M Kocarnik, Sonali Kochhar, Yoshihiro Kokubo, Tufa Kolola, Jacek A Kopec, Soewarta Kosen, Georgios A Kotsakis, Parvaiz A Koul, Ai Koyanagi, Michael A Kravchenko, Kewal Krishan, Kristopher J Krohn, Barthelemy Kuate Defo, Burcu Kucuk Bicer, G Anil Kumar, Manasi Kumar, Hmwe Hmwe Kyu, Deepesh P Lad, Sheetal D Lad, Alessandra Lafranconi, Ratilal Laloo, Tea Lallukka, Faris Hasan Lami, Van C Lansingh, Arman Latifi, Kathryn Mei-Ming Lau, Jeffrey V Lazarus, Janet L Leasher, Jorge R Ledesma, Paul H Lee, James Leigh, Janni Leung, Miriam Levi, Sonia Lewycka, Shanshan Li, Yichong Li, Yu Liao, Misgan Legesse Liben, Lee-Ling Lim, Stephen S Lim, Shiwei Liu, Rakesh Lodha, Katharine J Looker, Alan D Lopez, Stefan Lorkowski, Paulo A Lotufo, Nicola Low, Rafael Lozano, Tim C D Lucas, Lydia R Lucchesi, Raimundas Lunevicius, Ronan A Lyons, Stefan Ma, Erlyn Rachelle King Macarayan, Mark T Mackay, Fabiana Madotto, Hassan Magdy Abd El Razek, Muhammed Magdy Abd El Razek, Dhaval P Maghavani, Narayan Bahadur Mahotra, Hue Thi Mai, Marek Majdan, Reza Majdzadeh, Azeem Majeed, Reza Malekzadeh, Deborah Carvalho Malta, Abdullah A Mamun, Ana-Laura Manda, Helena Manguerra, Treh Manhertz, Mohammad Ali Mansournia, Lorenzo Giovanni Mantovani, Chabila Christopher Mapoma, Joemer C Maravilla, Wagner Marcenes, Ashley Marks, Francisco Rogerlândio Martins-Melo, Ira Martopullo, Winfried März, Melvin B Marzan, Tivani Phosa Mashamba-Thompson, Benjamin Ballard Massenburg, Manu Raj Mathur, Kunihiko Matsushita, Pallab K Maulik, Mohsen Mazidi, Colm McAlinden, John J McGrath, Martin McKee, Man Mohan Mehndiratta, Ravi Mehrotra, Kala M Mehta, Varshil Mehta, Fabiola Mejia-Rodriguez, Tesfa Mekonen, Addisu Melese, Mulugeta Melku, Michele Meltzer, Peter T N Memiah, Ziad A Memish, Walter Mendoza, Desalegn Tadese Mengistu, Getnet Mengistu, George A Mensah, Seid Tikku Mereta, Atte Meretoja, Tuomo J Meretoja, Tomislav Mestrovic, Naser Mohammad Gholi Mezerji, Bartosz Miazgowski, Tomasz Miazgowski, Anoushka I Milleard, Ted R Miller, Benjamin Miltz, G K Mini, Mojde Mirarefin, Erkin M Mirrakhimov, Awoke Temesgen Misganaw, Philip B Mitchell, Habtamu Mitiku, Babak Moazen, Bahram Mohajer, Karzan Abdulmuhsin Mohammad, Noushin Mohammadifard, Mousa Mohammadnia-Afrouzi, Mohammed A Mohammed, Shafiu Mohammed, Farnam Mohebi, Modhurima Moitra, Ali H Mokdad, Mariam Molokhia, Lorenzo Monasta, Yoshan Moodley, Mahmood Moosazadeh, Ghabad Moradi, Maziar Moradi-Lakeh, Mehdi Moradinazar, Paula Moraga, Lidia Morawska, Ilais Moreno Velásquez, Joana Morgado-Da-Costa, Shane Douglas Morrison, Marilita M Moschos, Seyyed Meysam Mousavi, Kalayu Brhane Mruts, Achenef Asmamaw Muche, Kindie Fentahun Muchie, Ulrich Otto Mueller, Oumer Sada Muhammed, Satinath Mukhopadhyay, Kate Muller, John Everett Mumford, Manoj Murhekar, Jonah Musa, Kamarul Imran Musa, Ghulam Mustafa, Ashraf F Nabhan, Chie Nagata, Mohsen Naghavi, Aliya Naheed, Azin Nahvijou, Gurudatta Naik, Nitish Naik, Farid Najafi, Luigi Naldi, Hae Sung Nam, Vinay Nangia, Jobert Richie Nansseu, Bruno Ramos Nascimento, Gopalakrishnan Natarajan, Nahid Neamati, Ionut Negoii, Ruxandra Irina Negoii, Subas Neupane, Charles Richard James Newton, Josephine W Ngunjiri, Anh Quynh Nguyen, Ha Thu Nguyen, Huong Lan Thi Nguyen, Huong Thanh Nguyen, Long Hoang Nguyen, Minh Nguyen, Nam Ba Nguyen, Son Hoang Nguyen, Emma Nichols, Dina Nur Anggraini Ningrum, Molly R Nixon, Nomonde Noluthungu, Shuhei Nomura, Ole F Norheim, Mehdi Noroozi, Bo Norrving, Jean Jacques Noubiap, Hamid Reza Nouri, Malihe Nourollahpour Shiadeh, Mohammad Reza Nowroozi, Elaine O Nsoesie, Peter S Nyasulu, Christopher M Odell, Richard Ofori-Asenso, Felix Akpojene Ogbo, In-Hwan Oh, Olanrewaju Oladimeji, Andrew T Olagunju, Tinuke O Olagunju, Pedro R Olivares, Helen Elizabeth Olsen, Bolajoko Olubukunola Olusanya, Kanyin L Ong, Sok King Ong, Eyal Oren, Alberto Ortiz, Erika Ota, Stanislav S Ostavnov, Simon Overland, Mayowa Ojo Owolabi, Mahesh P A, Rosana Pacella, Amir H Pakpour, Adrian Pana, Songhomitra Panda-Jonas, Andrea Parisi, Eun-Ke Park, Charles D H Parry, Shanti Patel, Sanghamitra Pati, Snehal T Patil, Ajay Patle, George C Patton, Vishnupriya Rao Paturi, Katherine R Paulson, Neil Pearce, David M Pereira, Norberto Perico, Konrad Pesudovs, Hai Quang Pham, Michael R Phillips, David M Pigott, Julian David Pillay, Michael A Piradov, Meghdad Pirsaeheb, Farhad Pishgar, Oleguer Plana-Ripoll, Dietrich Plass, Suzanne Polinder, Svetlana Popova, Maarten J Postma, Akram Pourshams, Hossein Poustchi, Dorairaj Prabhakaran, Swayam Prakash, V Prakash, Caroline A Purcell, Manorama B Purwar, Mostafa Qorbani, D Alex Quistberg, Amir Radfar, Anwar Rafay, Alireza Rafiei, Fakher Rahim, Kazem Rahimi, Afarin Rahimi-Movaghar, Vafa Rahimi-Movaghar, Mahfuzar Rahman, Mohammad Hifz ur Rahman, Muhammad Aziz Rahman, Sajjad Ur Rahman, Rajesh Kumar Rai, Fatemeh Rajati, Usha Ram, Prabhat Ranjan, Anna Ranta, Puja C Rao, David Laithe Rawaf, Salman Rawaf, K Srinath Reddy, Robert C Reiner, Nickolas Reinig, Marissa Bettay Reitsma, Giuseppe Remuzzi, Andre M N Renzaho, Serge Resnikoff, Satar Rezaei, Mohammad Sadegh Rezaei, Antonio Luiz P Ribeiro, Stephen R Robinson, Leonardo Roeber, Luca Ronfani, Gholamreza Roshandel, Ali Rostami, Gregory A Roth, Ambuj Roy, Enrico Rubagotti, Perminder S Sachdev, Nafis Sadat, Basema Saddik, Ehsan Sadeghi, Sahar Saedi Moghaddam, Hosein Safari, Yahya Safari, Roya Safari-Faramani, Mahdi Safdarian, Sare Safi, Saeid Safiri, Rajesh Sagar, Amirhossein Sahebkar, Mohammad Ali Sahraian, Haniye Sadat Sajadi, Nasir Salam, Joseph S Salama, Payman Salamati, Komal Saleem, Zikria Saleem, Yahya Salimi, Joshua A Salomon, Sundeep Santosh Salvi, Inbal Salz, Abdallah M Samy, Juan Sanabria, Yingying Sang, Damian Francesco Santomauro, Itamar S Santos, João Vasco Santos, Milena M Santric Milicevic, Bruno Piassi Sao Jose, Mayank Sardana, Abdur Razzaque Sarker, Nizal Sarrafzadegan, Benn Sartorius, Shahabeddin Sarvi, Brijesh Sathian, Maheswar Satpathy, Arundhati R Sawant, Monika Sawhney, Sonia Saxena, Mete Saylan, Elke Schaeffner, Maria Inês Schmidt, Ione J C Schneider, Ben Schöttker, David C Schwebel, Falk Schwendicke, James G Scott, Mario Sekerija, Sadaf G Sepanlou, Edson Serván-Mori, Seyedmojtaba Seyedmousavi, Hosein Shabaninejad, Azadeh Shafieesabet, Mehdi Shahbazi, Amira A Shaheen, Masood Ali Shaikh, Mehran Shams-Beyranvand, Mohammadbagher Shamsi, Morteza Shamsizadeh, Heidar Sharafi, Kiamars Sharafi, Mehdi Sharif, Mahdi Sharif-Alhoseini, Meenakshi Sharma, Rajesh Sharma, Jun She, Aziz Sheikh, Peilin Shi, Kenji Shibuya, Mika Shigematsu, Rahman Shiri, Reza Shirkoohi, Markab Shishani, Ivy Shiue, Farhad Shokraneh, Haitham Shoman, Mark G Shrimme, Si Si, Soraya Siabani, Tariq J Siddiqi, Inga Dora Sigfusdottir, Rannveig Sigurvinsdottir, João Pedro Silva, Dayane Gabriele Alves Silveira, Narayana Sarma Venkata Singam, Javinder A Singh, Narinder Pal Singh, Virendra Singh, Dhirendra Narain Sinha, Eirini Skiadaresi, Erica Leigh N Slepak, Karen Sliwa, David L Smith, Mari Smith, Adauto Martins Soares Filho, Badr Hasan Sobaih, Soheila Sobhani, Eugène Sobngwi, Samir S Soneji, Moslem Soofi, Masoud Soosaraei, Reed J D Sorensen, Joan B Soriano, Ireneus N Soyiri, Luciano A Sposato,



Chandrashekhara T Sreeramareddy, Vinay Srinivasan, Jeffrey D Stanaway, Dan J Stein, Caitlyn Steiner, Timothy J Steiner, Mark A Stokes, Lars Jacob Stovner, Michelle L Subart, Agus Sudaryanto, Mu'awiyah Babale Sufiyan, Bruno F Sunguya, Patrick John Sur, Ipsita Sutradhar, Bryan L Sykes, Dillon O Sylte, Rafael Tabarés-Seisdedos, Santosh Kumar Tadakamadla, Birkneh Tilahun Tadesse, Nikhil Tandon, Segen Gebremeskel Tassew, Mohammad Tavakkoli, Nuno Taveira, Hugh R Taylor, Arash Tehrani-Banihashemi, Tigist Gashaw Tekalign, Shishay Wahdey Tekelemedhin, Merhawi Gebremedhin Tekle, Habtamu Temesgen, Mohamad-Hani Temsah, Omar Temsah, Abdullah Suliemun Terkawi, Mebrahtu Teweldemedhin, Kavumpurathu Raman Thankappan, Nihal Thomas, Binyam Tilahun, Quyen G To, Marcello Tonelli, Roman Topor-Madry, Fotis Topouzis, Anna E Torre, Miguel Tortajada-Girbés, Mathilde Touvier, Marcos Roberto Tovani-Palone, Jeffrey A Towbin, Bach Xuan Tran, Khanh Bao Tran, Christopher E Troeger, Thomas Clement Truelsen, Miltiadis K Tsilimbaris, Derrick Tsoi, Lorraine Tudor Car, E Murat Tuzcu, Kingsley N Ukwaja, Irfan Ullah, Eduardo A Undurraga, Jurgen Unutzer, Rachel L Updike, Muhamad Shariq Usman, Olalekan A Uthman, Muthiah Vaduganathan, Afsane Vaezi, Pascual R Valdez, Santosh Varughese, Tommi Juhani Vasankari, Narayanaswamy Venketasubramanian, Santos Villafaina, Francesco S Violante, Sergey Konstantinovich Vladimirov, Vasily Vlassov, Stein Emil Vollset, Kia Vosoughi, Isidora S Vujcic, Fasil Shiferaw Wagnew, Yasir Waheed, Stephen G Waller, Yafeng Wang, Yuan-Pang Wang, Elisabete Weiderpass, Robert G Weintraub, Daniel J Weiss, Fitsum Weldegebreal, Kidu Gidey Weldegewergs, Andrea Werdecker, T Eoin West, Harvey A Whiteford, Justyna Widecka, Tissa Wijeratne, Lauren B Wilner, Shadrach Wilson, Andrea Sylvia Winkler, Alison B Wiyeh, Charles Shey Wiysonge, Charles D A Wolfe, Anthony D Woolf, Shouling Wu, Yun-Chun Wu, Grant M A Wyper, Denis Xavier, Gelin Xu, Simon Yadgir, Ali Yadollahpour, Seyyed Hossein Yahyazadeh Jabbari, Tomohide Yamada, Lijing L Yan, Yuichiro Yano, Mehdi Yaseri, Yasin Jemal Yasin, Alex Yeshaneh, Ebrahim M Yimer, Paul Yip, Engida Yisma, Naohiro Yonemoto, Seok-Jun Yoon, Marcel Yotebieng, Mustafa Z Younis, Mahmoud Yousefifard, Chuanhua Yu, Vesna Zadnik, Zoubida Zaidi, Sojib Bin Zaman, Mohammad Zamani, Zohreh Zare, Ayalew Jewaw Zeleke, Zerihun Menlkalew Zenebe, Kai Zhang, Zheng Zhao, Maigeng Zhou, Sanjay Zodpey, Inbar Zucker, Theo Vos, and Christopher J L Murray.

#### Affiliations

Institute for Health Metrics and Evaluation (S L James MD, A Afshin MD, K M Agesa BA, T Alam MPH, K E Ballesteros PhD, B F Blacker MPH, P S Briant BS, A Carter MPH, K M Cercy BS, E A Cromwell PhD, Prof L Dandona MD, Prof R Dandona PhD, Prof L Degenhardt PhD, S Deiparine BA, S D Dharmaratne MD, M A Dirac MD, M M Echko BSc, C El Bcheraoui PhD, Prof V L Feigin PhD, C Fitzmaurice MD, K J Foreman PhD, T D Frank BS, N Fullman MPH, W M Gardner AB, E M Goldberg MPH, T M Gorman BS, C N Hawley MSPH, Prof S I Hay FMedSci, C K Huynh BA, C T Ikeda BS, C M S Irvine BS, C O Johnson PhD, N J Kassebaum MD, L Kemmer PhD, G R Kemp BA, I A Khalil MD, P Kim BA, J M Kocarnik PhD, K J Krohn MPH, H H Kyu PhD, K M Lau BS, J R Ledesma BA, Prof S S Lim PhD, Prof A D Lopez PhD, Prof R Lozano MD, L R Lucchesi BA, H Manguer BA, T Manhertz BA, A Marks MA, I Martopullo MPH, A I Millear MPH, B Miltz MS, A T Misganaw PhD, M Moitra MPH, Prof A H Mokdad PhD, K Muller MPH, J E Mumford BA, Prof M Naghavi MD, M Nguyen BS, E Nichols BA, M R Nixon PhD, E O Nsoesie PhD, C M Odell MPP, H E Olsen MA, K L Ong PhD, K R Paulson BS, D M Pigott DPhil, C A Purcell BA, P C Rao MPH, R C Reiner PhD, N Reinig BS, M B Reitsma BS, Prof S E Vollset DrPH, Prof H A Whiteford PhD, Prof D L Smith PhD, M Smith MPA, R J D Sorensen MPH, V Srinivasan BA, J D Stanaway PhD, C Steiner MPH, M L Subart BA, P J Sur MPH, D O Sylte BA, A E Torre BS, C E Troeger MPH, D Tsoi BS, R L Updike BA, Prof S E Vollset DrPH, Prof H A Whiteford PhD, L B Wilner MPH, S Wilson BS, S Yadgir BS, Prof T Vos PhD, Prof C J L Murray DPhil, Department of Health Metrics Sciences (A Afshin MD, E A Cromwell PhD, C El Bcheraoui PhD,

Prof S I Hay FMedSci, I A Khalil MD, H H Kyu PhD, Prof S S Lim PhD, Prof R Lozano MD, A T Misganaw PhD, Prof A H Mokdad PhD, Prof M Naghavi MD, D M Pigott DPhil, R C Reiner PhD, Prof D L Smith PhD, J D Stanaway PhD, Prof S E Vollset DrPH, Prof T Vos PhD, Prof C J L Murray DPhil, Department of Global Health (F J Charlson PhD, S Kochhar MD, R J D Sorensen MPH), Division of Hematology (C Fitzmaurice MD), Department of Otolaryngology-Head and Neck Surgery (N D Futran MD), Department of Neurology (R Kalani MD), Department of Periodontics (G A Kotsakis DDS), Division of Plastic Surgery (B B Massenburg MD), Department of Surgery (S D Morrison MD), Department of Bioinformatics and Medical Education (E O Nsoesie PhD), Division of Cardiology, Department of Medicine (G A Roth MD), Department of Psychiatry and Behavioral Sciences (Prof J Unutzer MD), Department of Medicine (T E West MD), University of Washington, Seattle, WA, USA (Prof E Oren PhD); School of Pharmacy (J Abdela MSc, G Mengistu MSc), Department of Medical Laboratory Science (Z Ataro MSc, F Weldegebreal MPH, H Mitiku MSc), School of Public Health (A G Bali MPH, M G Tekle MPH), School of Nursing and Midwifery (T T Dasa MSc), Haramaya University, Harar, Ethiopia (D Abate MSc, T F Gelano MSc, H Mitiku MSc, T G Tekalign MS); Department of Population and Family Health (K H Abate PhD, A T Gebremedhin MPH), Department of Epidemiology (M B Ahmed MPH), Mycobacteriology Research Center (E Duken MSc), Department of Health Education & Behavioral Sciences (G T Feyissa MPH), Department of Environmental Health Sciences and Technology (S Mereta PhD), Jimma University, Jimma, Ethiopia; Department of Pharmacology and Clinical Pharmacy (S M Abay PhD, O S Muhammed MSc), School of Public Health (Prof G Davey MD, K Deribe PhD, Y J Yasin MPH), School of Allied Health Sciences (E Yisma MPH), Addis Ababa University, Addis Ababa, Ethiopia (G T Demoz MSc); Department of Law Philosophy and Economic Studies, La Sapienza University, Rome, Italy (C Abbafati PhD); Non-Communicable Diseases Research Center (N Abbasi MD, F Farzadfar MD, S N Irvani MD, S Saedi Moghaddam MSc, M Shams-Beyranvand MSc, H Ebrahimi MD, B Mohajer MD, F Mohebi MD, F Pishgar MD), Department of Health (H Abbastabar PhD), Endocrinology and Metabolism Research Center (M Afarideh MD, Prof A Esteghamati MD, M Ganji MD), Department of Health Management and Economics (M Anjomshoa PhD, S Mousavi PhD), Liver and Pancreaticobiliary Disease Research Center (H Ebrahimi MD), Multiple Sclerosis Research Center (S Eskandarieh PhD, B Mohajer MD, Prof M Sahraian MD), Endocrine Research Center (S Esteghamati MD), School of Medicine (N Hafezi-Nejad MD), Department of Pharmacology (A Haj-Mirzaian MD), Department of Epidemiology and Biostatistics (Prof S Hosseini PhD, M Mansournia PhD, M Yaseri PhD), Hematologic Malignancies Research Center (A Kasaeian PhD), Knowledge Utilization Research Center (Prof R Majdzadeh PhD), Digestive Diseases Research Institute (Prof R Malekzadeh MD, Prof A Pourshams MD, H Poustchi PhD, G Roshandel PhD, S G Sepanlou MD), Iran National Institute of Health Research (F Mohebi MD, H S Sajadi PhD), Cancer Research Center (A Nahvijou PhD, R Shirkoohi PhD), Uro-Oncology Research Center (M Nowroozi MD, F Pishgar MD), Iranian National Center for Addiction Studies (Prof A Rahimi-Movaghar MD), Sina Trauma and Surgery Research Center (Prof V Rahimi-Movaghar MD, M Safdarian MD, Prof P Salamaty MD, M Sharif-Alhoseini PhD), Center of Expertise in Microbiology (Prof S Seyedmousavi PhD), Cancer Biology Research Center (R Shirkoohi PhD), Department of Anatomy (S Sobhani MD), Hematology-Oncology and Stem Cell Transplantation Research Center (A Kasaeian PhD), Community-Based Participatory-Research Center (Prof R Majdzadeh PhD), Tehran University of Medical Sciences, Tehran, Iran; Montreal Neuroimaging Center (N Abbasi MD), Montreal Neurological Institute (S Fereshtehnejad PhD), McGill University, Montreal, QC, Canada; Department of Neurology, Cairo University, Cairo, Egypt (Prof F Abd-Allah MD, Prof A Abdelalim MD); Department of Epidemiology, Arak University of Medical Sciences, Arak, Iran (I Abdollahpour PhD); Multiple Sclerosis Research Center, Tehran, Iran (I Abdollahpour PhD); Department of Statistics, Manonmaniam Sundaranar University, Tirunelveli, India (R S Abdulkader MD); Human Nutrition Department (Z Abebe MSc), Institute of Public Health

(K A Alene MPH, A F Dadi MPH, M Melku MSc, A A Muche MPH, K Muchie MSc, B Tilahun PhD), Department of Clinical Chemistry (B Biadgo MSc), Department of Medical Parasitology (A J Zeleke MSc), University of Gondar, Gondar, Ethiopia; School of Public Health (S F Abera MSc, A B Belachew MSc), Clinical Pharmacy Unit (H N Abraha MSc, T D Kassa MSc, K G Weldegewrgs MSc), Department of Nutrition and Dietetics (M G Degefa BSc, A Kahsay MPH), School of Pharmacy (A K Gebre MSc, T G Gebremichael MSc, E M Yimer MSc), Department of Biostatistics (K Gezae MSc), Anatomy Unit (T B Hagos MSc), Biomedical Sciences Division (G B Hailu MSc), School of Medicine (D T Mengistu MSc), Department of Midwifery (Z M Zenebe MSc), Mekelle University, Mekelle, Ethiopia (S G Tassew MSc, S W Tekelemedhin MPH); Institute of Biological Chemistry and Nutrition, University of Hohenheim, Stuttgart, Germany (S F Abera MSc); Department of Medical Laboratory Sciences (O Abil MSc), Department of Health Sciences (E Duken MSc), Wollega University, Nekemte, Ethiopia; School of Public Health, University of Medical Science, Ondo, Ondo, Nigeria (O Abil MSc); Department of Healthcare Policy and Research, Weill Cornell Medical College in Qatar, Doha, Qatar (Prof L J Abu-Raddad PhD); Institute of Community and Public Health, Birzeit University, Birzeit, Palestine (N M E Abu-Rmeileh PhD); Bénin Clinical Research Institute (IRCB), Cotonou, Benin (M M K Accrombessi PhD, E F A Avokpaho MD); Department of Preventive Medicine, Dongguk University, Gyeongju, South Korea (D Acharya MPH); Department of Community Medicine, Kathmandu University, Devdaha, Nepal (D Acharya MPH); Department of Non-Communicable Diseases (B Gyawali MPH), Nepal Development Society, Pokhara, Nepal (P Acharya MPH); School of Public Health and Preventive Medicine (I N Ackerman PhD, Prof F M Cicuttini PhD, Prof Y Guo PhD, S Li PhD, S Si PhD), Department of Epidemiology and Preventive Medicine (Prof R Buchbinder PhD, K L Chin PhD), Monash Centre for Health Research and Implementation (B De Courten PhD), Department of Medicine (S Gall PhD), Centre of Cardiovascular Research and Education in Therapeutics (R Ofori-Asenso MSc), Monash University, Melbourne, VIC, Australia; Department of Global Health (A A Adamu MSc, O O Adetokunboh MD, Prof C S Wiysonge MD), Faculty of Medicine & Health Sciences (Prof P S Nyasulu PhD), Department of Psychiatry (Prof C D H Parry PhD), Stellenbosch University, Cape Town, South Africa; Cochrane South Africa (A A Adamu MSc, O O Adetokunboh MD), South African Medical Research Council, Cape Town, South Africa (Prof D J Stein MD); Department of Medicine, University College Hospital, Ibadan, Ibadan, Nigeria (O M Adebayo MD); School of Medicine, Cardiff University, Cardiff, UK (V Adekanmbi PhD); Emergency Department, Saint Mark Hospital, Alexandria, Egypt (M G Adib MD); Sport Science Department (J C Adsuar PhD, S Villafaina MSc), University of Extremadura, Badajoz, Spain (D Collado-Mateo MSc); Department of Public Health, University of Lomé, Lomé, Togo (K A Afanvi MD); Prefectoral Direction of the Health of the Zio, Ministry of Health and Social Protection, Tsevie, Togo (K A Afanvi MD); Department of Family Medicine (G Agarwal MD), Department of Pathology and Molecular Medicine (T O Olagunju MD), McMaster University, Hamilton, ON, Canada; Department of Gastroenterology (Prof R Aggarwal MD), Department of Nephrology (S Prakash PhD), Sanjay Gandhi Postgraduate Institute of Medical Sciences, Lucknow, India; Department of Zoology, Yerevan State University, Yerevan, Armenia (S A Aghayan PhD); Research Group of Molecular Parasitology, Scientific Center of Zoology and Hydroecology, Yerevan, Armenia (S A Aghayan PhD); Indian Institute of Public Health (Prof S Zodpey PhD), Public Health Foundation of India, Gurugram, India (S Agrawal PhD, A Awasthi PhD, Prof L Dandona MD, Prof R Dandona PhD, G A Kumar PhD, M R Mathur PhD, Prof D Prabhakaran DM, K S Reddy DM); Vital Strategies, Gurugram, India (S Agrawal PhD); Department of Anesthesiology (A Ahmadi PhD), Faculty of Public Health (B Karami Matin PhD, A Kazemi Karyani PhD, R Safari-Faramani PhD), Research Center for Environmental Determinants of Health (M Moradinazar PhD), Department of Epidemiology & Biostatistics (Prof F Najafi PhD, Y Salimi PhD), Department of Health Education & Promotion (F Rajati PhD), Environmental Determinants of Health Research Center (S Rezaei PhD, M Soofi PhD), Department of Food Technology & Quality Control (E Sadeghi PhD), Sports Medicine & Rehabilitation (M Shamsi PhD), Imam Ali Cardiovascular Research Center (S Siabani PhD), Kermanshah University of Medical Sciences, Kermanshah, Iran (K Ghadiri BEP, S Heydarpour PhD, Prof M Pirsaeheb PhD, Y Safari PhD, K Sharafi PhD); Environmental Technologies Research Center (M Ahmadi PhD), Department of Public Health (M A Khafaie PhD), Thalassemia and Hemoglobinopathy Research Center (F Rahim PhD), Department of Neurosurgery (H Safari MD), Medical Physics Department (A Yadollahpour PhD), Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran; Department of Ophthalmology (H Ahmadi MD), Research Institute for Endocrine Sciences (A Haj-Mirzaian MD, S N Irvani MD), Safety Promotion and Injury Prevention Research Center (N Jahanmehr PhD), Department of Biostatistics (A Khajavi MSc), Ophthalmic Research Center (S Safi PhD, M Yaseri PhD, H Ahmadi MD), School of Public Health (N Jahanmehr PhD), Ophthalmic Epidemiology Research Center (S Safi PhD), Shahid Beheshti University of Medical Sciences, Tehran, Iran (V Fallah Omrani PhD); University Ferhat Abbas of Setif, Algeria (A Aichour BMedSc, I Aichour Bpharm); Higher National School of Veterinary Medicine, Algiers, Algeria (M Aichour MA); Department of Epidemiology, University of Kentucky, Lexington, KY, USA (T Akinyemiju PhD); The Hospital for Sick Children (N Akseer PhD), Department of Nutritional Sciences (A Badawi PhD), The Centre for Global Child Health, Hospital for Sick Children (Prof Z A Bhutta PhD), Dalla Lana School of Public Health (S Popova PhD), University of Toronto, Toronto, ON, Canada; Internal Medicine Department, Washington University in St Louis, St Louis, MO, USA (Z Al-Aly MD); Clinical Epidemiology Center, VA St Louis Health Care System, Department of Veterans Affairs, St Louis, MO, USA (Z Al-Aly MD); Pediatric Intensive Care Unit (A Al-Eyadhy MD), Department of Pediatrics (B H Sobaih MD, M Temsah MRCPC), King Saud University, Riyadh, Saudi Arabia (K Altirkawi MD); Medical Research Center (H M Al-Mekhlafi PhD), Jazan University, Jazan, Saudi Arabia (Prof N Bedi MD); Department of Medical Parasitology, Sana'a University, Sana'a, Yemen (H M Al-Mekhlafi PhD); Department of Family and Community Medicine, King Abdulaziz University, Jeddah, Saudi Arabia (Prof R M Al-Raddadi PhD); Evidence Based Practice Center, Mayo Clinic Foundation for Medical Education and Research, Rochester, MN, USA (F Alahdab MD); School of Population and Global Health (K Alam PhD), School of Medicine (Prof G J Hankey MD), University of Western Australia, Perth, WA, Australia; Cardiovascular Medicine (A Alashi MD, Prof E Tuzcu MD), Cleveland Clinic, Cleveland, OH, USA; Baqiyatallah Research Center for Gastroenterology and Liver Diseases (Prof S Alavian MD), Student Research Committee (M Khosravi MD), Baqiyatallah University of Medical Sciences, Tehran, Iran; Research School of Population Health (K A Alene MPH), National Centre for Epidemiology and Population Health (M Bin Sayeed MSPS, A Parisi MD), Australian National University, Canberra, ACT, Australia; Department of Public Health (Prof A H Pakpour PhD), Qazvin University of Medical Sciences, Qazvin, Iran (M Alijanzadeh PhD); Gastrointestinal Cancer Research Center (R Alizadeh-Navaei PhD), Department of Medical Mycology (H Badali PhD), Toxoplasmosis Research Center (Prof A Daryani PhD, S Sarvi PhD), School of Public Health (Prof A Enayati PhD), Department of Neurology (N Karimi MD), Health Sciences Research Center (M Moosazadeh PhD), Molecular and Cell Biology Research Center (Prof A Rafiei PhD), Department of Pediatrics (M Rezai MD), Invasive Fungi Research Center (Prof S Seyedmousavi PhD), Department of Medical Mycology and Parasitology (A Vaezi PhD), Immunogenetics Research Center (N Karimi MD), Pharmaceutical Sciences Research Center (M M Keighobadi PhD), Department of Immunology (Prof A Rafiei PhD), Mazandaran University of Medical Sciences, Sari, Iran (A Hedayatizadeh-Omran PhD, M M Keighobadi PhD, M Nouroollahpour Shiadeh PhD, Z Zare PhD); Department of Health Policy and Management, Kuwait University, Safat, Kuwait (Prof S M Aljunid PhD); International Centre for Casemix and Clinical Coding, National University of Malaysia, Bandar Tun Razak, Malaysia (Prof S M Aljunid PhD); Department of Population Health, Luxembourg Institute of Health, Strassen, Luxembourg (A Alkerwi PhD); University of Bordeaux, Bordeaux, France (Prof F Alla PhD); Department of Public Health Sciences (Prof P Allebeck MD, Z El-Khatib PhD), Department of Neurobiology (Prof J Ärnlöv PhD), Department of Medical Epidemiology



and Biostatistics (J J Carrero PhD, Prof E Weiderpass PhD), Department of Neurobiology, Care Sciences and Society (S Fereshtehnejad PhD), Karolinska Institutet, Stockholm, Sweden; Swedish Research Council for Health, Working Life, and Welfare, Stockholm, Sweden (Prof P Allebeck MD); Department of Medicine, University of Setif Algeria, Sétif, Algeria (Prof M M L Alouani PhD); Research Group on Health Economics, University of Cartagena, Cartagena, Colombia (Prof N Alvis-Guzman PhD); Research Group in Hospital Management and Health Policies, University of the Coast, Barranquilla, Colombia (Prof N Alvis-Guzman PhD); Sansom Institute (A Amare PhD), Wardlapingga Aboriginal Research Unit (P S Azzopardi PhD), South Australian Health and Medical Research Institute, Adelaide, SA, Australia; Department of Public Health Nutrition (N Fentahun PhD), Department of Psychiatry (T Mekonen MSc), Bahir Dar University, Bahir Dar, Ethiopia (A Amare PhD); School of Public Health (L N Aminde MD, F J Charlson PhD, H E Erskine PhD, A J Ferrari PhD, D F Santomauro PhD, J G Scott PhD), School of Dentistry (R Lalloo PhD), Institute for Social Science Research (A A Mamun PhD, J C Maravilla PhD), Queensland Brain Institute (Prof J J McGrath MD), The University of Queensland, Brisbane, QLD, Australia (J Leung PhD, Prof H A Whiteford PhD); Department of the Health Industrial Complex and Innovation in Health (Prof D A Silveira MD), Department of Diseases and Noncommunicable Diseases and Health Promotion (A M Soares Filho DSc), Federal Ministry of Health, Beirut, Lebanon (Prof W Ammar PhD); Faculty of Health Sciences, American University of Beirut, Beirut, Lebanon (Prof W Ammar PhD); Department of Internal Medicine, Komfo Anokye Teaching Hospital, Kumasi, Ghana (Y A Amoako MD); Faculty of Medicine (N H Anber PhD), Department of Clinical Pathology (Prof M El Sayed Zaki PhD), Mansoura University, Mansoura, Egypt (N H Anber PhD); Emergency Hospital of Bucharest (Prof M Beuran PhD, I Negoii PhD), Department of General Surgery (D V Davitoiu PhD, M Hostiuic PhD), Department of Legal Medicine and Bioethics (S Hostiuic PhD), Anatomy and Embryology Department (R I Negoii PhD), Carol Davila University of Medicine and Pharmacy, Bucharest, Romania (C Andrei PhD); Department of Medicine, University of Thessaly, Volos, Greece (S Androudi PhD); Department of Public Health (Y C D Geramo MSc), Arba Minch University, Arba Minch, Ethiopia (M D Animum MPH); Social Determinants of Health Research Center, Rafsanjan University of Medical Sciences, Rafsanjan, Iran (L Jahangiri PhD); Department of Public Health (M G Ansha MPH, T Kolola MPH, K B Mruts MPH), Department of Midwifery (M T Dinberu MA), Debre Berhan University, Debre Berhan, Ethiopia; Department of Health Policy and Administration (C T Antonio MD), Development and Communication Studies (E K Macarayan PhD), University of the Philippines Manila, Manila, Philippines; Department of Applied Social Sciences (C T Antonio MD), School of Nursing (P H Lee PhD), Hong Kong Polytechnic University, Hong Kong, China; Independent Consultant, Kabul, Afghanistan (P Anwari MSc); Health Management and Economics Research Center (J Arabloo PhD, M Behzadifar PhD), Department of Ophthalmology (K Ghasemi Falavarjani MD), Air Pollution Research Center (B Heibati PhD), Preventive Medicine and Public Health Research Center (M Moradi-Lakeh MD, K Vosoughi MD, A Tehrani-Banihashemi PhD), Department of Neuroscience (M Safdarian MD), Department of Health Policy (H Shabaninejad PhD), Department of Community Medicine (A Tehrani-Banihashemi PhD), Physiology Research Center (M Yousefifard PhD), Iran University of Medical Sciences, Tehran, Iran (T Beyranvand PhD, F Farhadi MD, M Hosseinzadeh PhD); Stroke Clinic, National Institute of Neurology and Neurosurgery, Mexico City, Mexico (Prof A Arauz DrPH); School of Health Sciences, Birmingham City University, Birmingham, UK (O Aremu PhD); School of Health and Social Studies, Dalarna University, Falun, Sweden (Prof J Årnlöv PhD); CERIMP, Tuscany Regional Centre for Occupational Injuries and Diseases, Firenze, Italy (F Ariani MSc); Social Determinants of Health Research Center, Saveh University of Medical Sciences, Saveh, Iran (B Armoon PhD); School of Science and Health (A Arora PhD), School of Social Sciences and Psychology (Prof A M N Renzaho PhD), Western Sydney University, Sydney, NSW, Australia (F A Ogo PhD); Oral Health Services, Sydney Local Health District, Sydney, NSW, Australia (A Arora PhD); Department of Community Health Sciences, University of Manitoba, Winnipeg, MB, Canada (A Artaman PhD); Monitoring Evaluation and Operational Research Project, Abt Associates Nepal, Lalitpur, Nepal (K K Aryal PhD); Qom University of Medical Sciences, Qom, Iran (H Asayesh MSc); South Asian Public Health Forum, Lahore, Pakistan (R J Asghar MPH); Center for Clinical Global Health Education (S R Atre PhD), Department of Epidemiology (S H Ballew PhD), Bloomberg School of Public Health (J Coresh PhD), School of Medicine (M E Grams PhD), Division of Cardiovascular and Clinical Epidemiology (M E Grams PhD), Department of Radiology (N Hafezi-Nejad MD, A Haj-Mirzaian MD, Prof K Matsushita MD), Department of Health Policy and Management (A T Khoja MD), Epidemiology (Y Sang MSc), Department of Gastrointestinal and Hepatology (K Vosoughi MD), Johns Hopkins University, Baltimore, MD, USA; Dr D Y Patil Medical College (S R Atre PhD), Dr D Y Patil Vidyapeeth, Pune, India (A R Sawant MD); School of Business (Prof M Ausloos PhD), Department of Health Sciences (Prof T Brugha MD), University of Leicester, Leicester, UK; Center for Health Systems Research (L Avila-Burgos PhD, L Cahuana-Hurtado PhD, H Gómez-Dantés MSc, Prof E Serván-Mori DSc), Centro de Investigación en Nutrición y Salud (F Mejía-Rodríguez MSc), National Institute of Public Health, Cuernavaca, Mexico; Contrôle Des Maladies Infectieuses (F F A Avokpaho MD), Non Communicable Disease Department (F G Gankpe MD), Laboratory of Studies and Research-Action in Health, Porto Novo, Benin; Indian Institute of Public Health, Gandhinagar, India (A Awasthi PhD); The Judith Lumley Centre (B Ayala Quintanilla PhD), School of Nursing and Midwifery (Prof D Edvardsson PhD), Austlin Clinical School of Nursing (M Rahman PhD), Department of Psychology and Counselling (Prof T Wijeratne MD), La Trobe University, Melbourne, VIC, Australia; General Office for Research and Technological Transfer, Peruvian National Institute of Health, Lima, Peru (B Ayala Quintanilla PhD); Department of Community and Global Health (R Ayer MHS), Department of Mental Health (Prof N Kawakami PhD), Department of Global Health Policy (S Nomura MSc, Prof K Shibuya MD), Department of Diabetes and Metabolic Diseases (T Yamada MD), University of Tokyo, Tokyo, Japan; Global Adolescent Health Group, Burnet Institute, Melbourne, VIC, Australia (P S Azzopardi PhD); Center for Infectious Diseases Research, Babol, Iran (A Babazadeh MD, S Ebrahimpour PhD); Public Health Risk Sciences Division, Public Health Agency of Canada, Toronto, ON, Canada (A Badawi PhD); Department of Hypertension, Medical University of Lodz, Lodz, Poland (Prof M Banach PhD); Polish Mothers' Memorial Hospital Research Institute, Lodz, Poland (Prof M Banach PhD); Faculty of Medicine, Alexandria University, Alexandria, Egypt (J A M Banoub MD); Department of Transplant Services, University Hospital Foundation Santa Fe de Bogotá, Bogotá, Colombia (J A M Banoub MD); Department of Research, Public Health Perspective Nepal, Pokhara-Lekhnath Metropolitan City, Nepal (A Banstola MPH); Clinic for Infectious and Tropical Diseases, Clinical Center of Serbia, Belgrade, Serbia (A Barac PhD); Faculty of Medicine (A Barac PhD, E Dubljanin PhD), Centre School of Public Health and Health Management (Prof M M Santric Milicevic PhD), Faculty of Medicine Institute of Epidemiology (I S Vujcic PhD), University of Belgrade, Belgrade, Serbia; Department of Neurosciences (Prof M A Barboza MD), Area de Estadística, Dirección Actuarial (Prof J Castillo Rivas MSc), Costa Rican Department of Social Security, San Jose, Costa Rica; School of Medicine (Prof M A Barboza MD), School of Dentistry (Prof J Castillo Rivas MSc), University of Costa Rica, San Pedro, Costa Rica; School of Psychology (Prof S L Barker-Collo PhD), Molecular Medicine and Pathology (K B Tran MD), University of Auckland, Auckland, New Zealand; Institute of Public Health (Prof T W Bärnighausen MD, B Moazen MSc, S Mohammed PhD), Institute of Global Health (Prof J De Neve MD), Department of Ophthalmology (Prof J B Jonas MD), Medical Clinic V (Prof W März MD), Augenpraxis Jonas (S Panda-Jonas MD), Heidelberg University, Heidelberg, Germany; Department of Global Health and Population (Prof T W Bärnighausen MD, Prof O F Norheim PhD), Department of Nutrition (M S Farvid PhD), T H Chan School of Public Health (P C Gupta DSc), Ariadne Labs (E K Macarayan PhD), Division of General Internal Medicine and Primary Care (Prof A Sheikh MD), Heart and Vascular Center (M Vaduganathan MD), Harvard University, Boston, MA, USA (M G Shrimo MD); Department of Industrial

Engineering, Pontifical Javeriana University, Bogota, Colombia (Prof L H Barrero DSc); Melbourne Medical School, Melbourne, VIC, Australia (Prof B T Baune PhD); Department of Psychiatry, Charles R Drew University of Medicine and Science, Los Angeles, CA, USA (Prof S Bazargan-Hejazi BEP); Department of Psychiatry and Biobehavioral Sciences, University of California Los Angeles, Los Angeles, CA, USA (Prof S Bazargan-Hejazi BEP); Department of Community Medicine, Gandhi Medical College Bhopal, Bhopal, India (Prof N Bedi MD); Department of Neuroscience (E Beghi MD, G Giussani PhD), Department of Renal Medicine (B Bikbov MD, N Perico MD), Department of Oncology (M Cortinovis PhD), Mario Negri Institute for Pharmacological Research, Milan, Italy (Prof G Remuzzi MD); Social Determinants of Health Research Center (M Behzadifar PhD), Lorestan University of Medical Sciences, Khorramabad, Iran (M Behzadifar MS); Department of Neurology, University Hospital of Dijon, Dijon, France (Prof Y Béjot PhD); Dijon Stroke Registry – Ufr Sciences Santé, University of Burgundy, Dijon, France (Prof Y Béjot PhD); Department of Public Health (Y A Belay MPH), Department of Nursing (G A Dessie MSc, D H Kassa MSc, F S Wagnew MSc), College of Health Sciences (G M Kassa MSc), Debre Markos University, Debre Markos, Ethiopia (H Temesgen MPH); School of Forestry and Environmental Studies (Prof M L Bell PhD), Department of Ophthalmology and Visual Science (Prof J J Huang MD), Yale University, New Haven, CT, USA; Department of Medicine, University of Alberta, Edmonton, AB, Canada (A K Bello PhD); Department of Internal Medicine (I M Bensenor PhD, Prof I S Santos PhD), Division of Ophthalmology (J M Furtado MD), University Hospital, Internal Medicine Department (A C Goulart PhD), Department of Medicine (Prof P A Lotufo DrPH), Department of Pathology and Legal Medicine (M R Tovani-Palone MSc), Department of Psychiatry (Y Wang PhD), Center for Clinical and Epidemiological Research (A C Goulart PhD), University of São Paulo, São Paulo, Brazil; Dental Institute (E Bernabe PhD), Faculty of Life Sciences and Medicine (Prof P I Dargan MB, M Molokhia PhD), St John's Institute of Dermatology (Prof R J Hay MD), Division of Patient and Population (Prof W Marceles PhD), School of Population Health & Environmental Studies (Prof C D A Wolfe MD), King's College London, London, UK; Hubert Department of Global Health, Emory University, Atlanta, GA, USA (R S Bernstein MD); Department of Global Health, University of South Florida, Tampa, FL, USA (R S Bernstein MD); Institutes of Applied Health Research and Translational Medicine, Queen Elizabeth Hospital Birmingham, Birmingham, UK (N Bhala DPhil); IAHR/ITM, University of Birmingham, Birmingham, UK (N Bhala DPhil); Department of Infectious Disease Epidemiology (O J Brady PhD), Department of Disease Control (J Cano PhD), Department of Health Services Research and Policy (Prof M McKee DSc), Department of Medical Statistics (Prof N Pearce PhD), Department of Non-Communicable Disease Epidemiology (Prof D Prabhakaran DM), London School of Hygiene & Tropical Medicine, London, UK (S Bhattarai MD); Nepal Academy of Science & Technology, Patan, Nepal (S Bhattarai MD); The George Institute for Global Health, New Delhi, India (S Bhaumik MBBS, Prof V Jha MD, P K Maulik PhD); Center of Excellence in Women and Child Health, Aga Khan University, Karachi, Pakistan (Prof Z A Bhutta PhD); Social Determinants of Health Research Center (A Bijani PhD), Health Research Institute (M Ghasemi-Kasman PhD), Department of Immunology (M Mohammadnia-Afrouzi PhD), Department of Clinical Biochemistry (N Neamati MSc), Cellular and Molecular Biology Research Center (H Nouri PhD), Infectious Diseases and Tropical Medicine Research Center (A Rostami PhD), Department of Microbiology and Immunology (M Shahbazi PhD), Student Research Committee (M Zamani MD), Babol University of Medical Sciences, Babol, Iran (M Faramarzi PhD); Department of Epidemiology and Biostatistics (V Bilano PhD), Department of Surgery and Cancer (Prof A C Davis PhD), Department of Primary Care and Public Health (Prof A Majeed MD, Prof S Rawaf PhD), WHO Collaborating Centre for Public Health Education and Training (D L Rawaf MD, H Shoman MPH), School of Public Health (Prof S Saxena MD), Division of Brain Sciences (Prof T J Steiner PhD), Imperial College London, London, UK; Woldia University, Woldia, Ethiopia (N Bililign BHLthSci); Department of Clinical Pharmacy and Pharmacology, University of Dhaka, Ramna,

Bangladesh (M Bin Sayeed MSPS); Global Health Division, Research Triangle Institute International, Research Triangle Park, NC, USA (D Bisanzio PhD); School of Medicine, University of Nottingham, Nottingham, UK (D Bisanzio PhD, F Shokraneh MS); Institute of Bone and Joint Research (M Cross PhD), Sydney School of Public Health (Prof T R Driscoll PhD), Sydney Medical School (S Islam PhD), Asbestos Diseases Research Institute (J Leigh MD), University of Sydney, Australia (Prof F M Blyth PhD, D G Hoy PhD, M A Mohammed PhD); Department of Vital and Health Statistics (H L Harb MPH), Department of Disease, Epidemics, and Pandemics Control (J Nansseu MD), Ministry of Public Health, Beirut, Lebanon (I R Bou-Orm MD); Transport and Road Safety Research (S Boufous PhD), National Drug and Alcohol Research Centre (Prof L Degenhardt PhD), School of Medicine (P K Maulik PhD), School of Psychiatry (Prof P B Mitchell MD, Prof P S Sachdev MD), University of New South Wales, Sydney, NSW, Australia; Vision & Eye Research Unit, Anglia Ruskin University, Cambridge, UK (Prof R Bourne MD); Department for Clinical Neurosciences and Preventive Medicine, Danube University Krems, Krems, Austria (Prof M Brainin MD); School of Medicine and Clinical Hospital (Prof L C Brant PhD), Nutrition Department (Prof R M Claro PhD), Department of Maternal and Child Nursing and Public Health (Prof D C Malta PhD), Hospital of the Federal University of Minas Gerais (B R Nascimento PhD, Prof A P Ribeiro MD), Post-Graduate Program in Infectious Diseases and Tropical Medicine (B P Sao Jose PhD), Federal University of Minas Gerais, Belo Horizonte, Brazil; Institute of Epidemiology, Comenius University, Bratislava, Slovakia (A Brazinova MD); Department of Psychology (Prof N J K Breitborde PhD), College of Public Health (Prof M Yotebieng PhD), Psychiatry and Behavioral Health Department (Prof N J K Breitborde PhD), Ohio State University, Columbus, OH, USA; Division of Clinical Epidemiology and Aging Research, German Cancer Research Center, Heidelberg, Germany (Prof H Brenner MD, B Schöttker PhD); School of Physiotherapy and Exercise Science (Prof A M Briggs PhD), School of Public Health (A T Gebremedhin MPH, D Hendrie PhD, T R Miller PhD), Curtin University, Bentley, WA, Australia; Ageing and Life Course (Prof A M Briggs PhD), Health Information (H Elkout PhD), World Health Organization (WHO), Geneva, Switzerland; Committee for Comprehensive Assessment of Medical Devices and Information Technology, Health Technology Assessment Association, Moscow, Russia (A N Briko MSc); Neuroscience, Institute for Scientific Research and High Technology Services, City Of Knowledge, Panama (G Britton PhD); Department of Research and Health Technology Assessment (F Castro MD), Gorgas Memorial Institute for Health Studies, Panama, Panama (G Britton PhD, I Moreno Velásquez PhD); Monash Department of Clinical Epidemiology, Cabrini Institute, Melbourne, VIC, Australia (Prof R Buchbinder PhD); Institute of Public Health (Prof R Busse PhD, Prof E Schaeffner MD), Department of Operative and Preventive Dentistry (Prof F Schwendicke MPH), Charité University Medical Center Berlin, Berlin, Germany; School of Population and Public Health (Z A Butt PhD, Prof N Sarrafzadegan MD), University of British Columbia, Vancouver, BC, Canada (J A Kopec PhD); Al Shifa School of Public Health, Al Shifa Trust Eye Hospital, Rawalpindi, Pakistan (Z A Butt PhD); Department of Population and Health, Metropolitan Autonomous University, Mexico City, Mexico (Prof R Cárdenas DSc); Institute of Public Health (Prof F Carvalho PhD), Institute of Biomedical Engineering (J Das Neves PhD), REQUIMTE/LAQUV (Prof E Fernandes PhD, Prof D M Pereira PhD), Department of Community Medicine (J V Santos MD), UCIBIO (J P Silva PhD), Applied Molecular Biosciences Unit (Prof F Carvalho PhD), Institute for Research and Innovation in Health (J Das Neves PhD), University of Porto, Porto, Portugal; Colombian National Health Observatory (C A Castañeda-Orjuela MD), National Institute on Deafness and Other Communication Disorders (H J Hoffman MA), National Institute of Health, Bogota, Colombia; Epidemiology and Public Health Evaluation Group (C A Castañeda-Orjuela MD), Department of Public Health (Prof F P De La Hoz PhD), National University of Colombia, Bogota, Colombia; Department of Health Planning and Economics, Institute of Health Carlos III, Madrid, Spain (F Catalá-López PhD); Mary MacKillop Institute for Health Research, Australian Catholic University, Melbourne, VIC, Australia (Prof E Cerin PhD); School of Public Health

(Prof E Cerin PhD), Centre for Suicide Research and Prevention (Prof P Yip PhD), University of Hong Kong, Hong Kong, China (Prof P Yip PhD); College of Medicine, Alfaisal University, Riyadh, Saudi Arabia (Y Chaiah, Prof Z A Memish MD, M Tamsah MRCPC, O Tamsah); Kidney Health Research Institute, Geisinger Health System, Danville, PA, USA (A R Chang MD); Institute of Population Health Sciences, National Health Research Institutes, Zhunan Township, Taiwan (Prof H Chang DrPH); College of Medicine (J Chang PhD), Institute of Epidemiology and Preventive Medicine (Y Wu MSc), National Taiwan University, Taipei, Taiwan; Department of Development Studies (A Chattopadhyay PhD), Department of Population Studies (A Patle MPH), Department of Public Health & Mortality Studies (M H Rahman MPhil, Prof U Ram PhD), International Institute for Population Sciences, Mumbai, India (S Goli PhD); Faculty of Medical Sciences, University of the West Indies, St Augustine, Trinidad and Tobago (V Chattu MD); Independent Consultant, Athens, Greece (V Chattu MD); Surgical Oncology, Tata Memorial Hospital, Mumbai, India (Prof P Chaturvedi MD); Clinical Governance, Gold Coast Health, Gold Coast, QLD, Australia (P P Chiang PhD); Ministry of Health, Baghdad, Iraq (A Chitheer MD); Biochemistry, Biomedical Science, Seoul National University Hospital, Seoul, South Korea (J J Choi PhD); Department of Public Health and Primary Care, University of Cambridge, Cambridge, UK (R Chowdhury PhD); Institute of Clinical Medicine and Bispebjerg Hospital (Prof H Christensen DMSc), Department of Neurology (T C Truelsen PhD), University of Copenhagen, Copenhagen, Denmark; Department of Pulmonary Medicine (Prof D J Christopher MD), Department of Endocrinology (Prof N Thomas PhD), Christian Medical College and Hospital, Vellore, India (Prof S Varughese MD); Adelaide Medical School (L G Ciobanu PhD, T K Gill PhD), University of Adelaide, Adelaide, SA, Australia (A T Olagunju MD); Scuola Medica Salernitana, University of Salerno, Baronissi, Italy (M Cirillo MD); Faculty of Education (D Collado-Mateo MSc), Institute of Physical Activity and Health (Prof P R Olivares PhD), Autonomous University of Chile, Talca, Chile; NIHR Oxford Biomedical Research Centre (Prof C Cooper MEd), University of Southampton, Southampton, UK (Prof C Cooper MEd); School of Medicine and Surgery, University of Milan Bicocca, Monza, Italy (P A Cortesi PhD, A Lafranconi MD, F Madotto PhD, Prof L G Mantovani DSc); T Denny Sanford School of Social and Family Dynamics, Arizona State University, Tempe, AZ, USA (M Costa PhD); Division of Reproductive Health, Centers for Disease Control and Prevention (CDC), Atlanta, GA, USA (M Costa PhD); Postgraduate Program in Epidemiology, Federal University of Rio Grande do Sul, Porto Alegre, Brazil (E Cousin MS, B B Duncan MD, Prof B N G Goulart DSc, Prof M I Schmidt PhD); Department of Family Medicine and Public Health, University of California San Diego, La Jolla, CA, USA (Prof M H Criqui MD); Centre for International Health (Prof J A Crump MD), Department of Medicine (A Ranta PhD), University of Otago, Dunedin, New Zealand; Division of Infectious Diseases and International Health (Prof J A Crump MD), Duke Global Health Institute (L L Yan PhD), Duke University, Durham, NC, USA; Discipline of Public Health, Flinders University, Adelaide, SA, Australia (A F Dadi MPH); Clinical Toxicology Service (Prof P I Dargan MB), Biomedical Research Council (Prof C D A Wolfe MD), Guy's and St Thomas' NHS Foundation Trust, London, UK; James P Grant School of Public Health (R Das Gupta MPH, M Hasan MPH, I Sutradhar MPH), Research and Evaluation Division (M Rahman PhD), BRAC University, Dhaka, Bangladesh; Department of Global Health and Infection, Brighton and Sussex Medical School, Brighton, UK (Prof G Davey MD, K Deribe PhD); Ear Institute (Prof A C Davis PhD), Institute for Global Health (H Haghparast Bidgoli PhD), Department of Epidemiology and Public Health (Prof M Kivimäki PhD, M R Mathur PhD), Department of Psychology (M Kumar PhD), Division of Medicine (K Saleem MSc), University College London, London, UK; Department of Surgery, Clinical Emergency Hospital Sf Pantelimon, Bucharest, Romania (D V Davitoiu PhD); Department of Diabetes and Vascular Medicine, Monash Health, Melbourne, VIC, Australia (B De Courten PhD); Australian Institute for Suicide Research and Prevention (Prof D De Leo DSc), Menzies Health Institute Queensland (S K Tadakamadla PhD), Griffith University, Mount Gravatt, QLD, Australia; School of Medicine, University of Colorado Denver, Aurora,

CO, USA (Prof R P Dellavalle MD); Dermatology Service, US Department of Veterans Affairs (VA), Denver, CO, USA (Prof R P Dellavalle MD); Department of Clinical Pharmacy (G T Demoz MSc), Department of Medical Laboratory Sciences (M Teweldemedhin MSc), Aksum University, Aksum, Ethiopia; Information Services Division (G M A Wyper MSc), National Health Service Scotland, Edinburgh, UK (N Dervenis MD); Department of Ophthalmology (Prof F Topouzis PhD), Aristotle University of Thessaloniki, Thessaloniki, Greece (N Dervenis MD); Department of Psychiatry, Icahn School of Medicine at Mount Sinai, New York, NY, USA (Prof D C Des Jarlais PhD); Disha Foundation, Gurgaon, India (S Dey PhD); Department of Community Medicine, University of Peradeniya, Peradeniya, Sri Lanka (S D Dharmaratne MD); Swedish Family Medicine – First Hill, Seattle, WA, USA (M A Dirac MD); Deputy of Research and Technology (S Djallalinia PhD), Center of Communicable Disease Control (B Eshрати PhD), Ministry of Health and Medical Education, Tehran, Iran (A Khosravi PhD); Center of Excellence in Health Service Management (L Doan BMedSc), Center for Excellence in Behavioral Health (L H Nguyen PhD), Center of Excellence in Behavioral Medicine (N B Nguyen MD, S H Nguyen BS), Nguyen Tat Thanh University, Ho Chi Minh City, Vietnam; Department of Social Medicine and Health Care Organisation, Medical University of Varna, Varna, Bulgaria (K Dokova PhD); Department of Population and Health, University of Cape Coast, Cape Coast, Ghana (D T Doku PhD); Faculty of Social Sciences (D T Doku PhD, S Neupane PhD), University of Tampere, Tampere, Finland; University of Rochester, Rochester, NY, USA (E Dorsey MD); School of Health and Biomedical Sciences (Prof K E Doyle PhD), Department of Psychology (Prof S R Robinson PhD), Royal Melbourne Institute of Technology University, Bundoora, VIC, Australia; United Nations World Food Programme, New Delhi, India (M Dubej PhD); School of Medicine, Federal University of Bahia, Salvador, Brazil (Prof A R Duraes PhD); Diretoria Médica, Roberto Santos General Hospital, Salvador, Brazil (Prof A R Duraes PhD); Department of Nursing, Umeå University, Umeå, Sweden (Prof D Edvardsson PhD); Clinical Epidemiology and Biostatistics, University of Newcastle, Newcastle, NSW, Australia (A Effiong MB); Institute for Health Care Policy and Innovation (J R Ehrlich MD), Department of Ophthalmology and Visual Sciences (J R Ehrlich MD), University of Michigan, Ann Arbor, MI, USA; Department of Community Medicine, Tripoli University, Libya (H Elkout PhD); Eijkman-Oxford Clinical Research Unit, Eijkman Institute for Molecular Biology, Jakarta, Indonesia (I R F Elyazar PhD); Public Health Department, Saint Paul's Hospital Millennium Medical College, Addis Ababa, Ethiopia (A Y Endries MPH); Epidemiology & Disease Control (S Ma PhD), Ministry of Health, Singapore, Singapore (B Er MSc); Policy and Epidemiology Group (D F Santomauro PhD), Child and Youth Mental Health (J G Scott PhD), Queensland Centre for Mental Health Research, Brisbane, QLD, Australia (H E Erskine PhD, A J Ferrari PhD); Department of Medical Parasitology and Mycology, Urmia University of Medical Science, Urmia, Iran (H Fakhim PhD); College of Medicine (M Fareed PhD), Department of Public Health (A T Khoja MD), Imam Muhammad Ibn Saud Islamic University, Riyadh, Saudi Arabia; Division of Cardiovascular Medicine, University of Louisville, Louisville, KY, USA (T A Farid MD, N V Singam MD); National Statistical Office, Lisbon, Portugal (C S E Farinha MSc); Department of Medical and Surgical Sciences, University of Bologna, Bologna, Italy (A Farioli PhD, Prof F S Violante MPH); Department of Psychology, Federal University of Sergipe, Sao Cristovao, Brazil (Prof A Faro PhD); National Institute for Stroke and Applied Neurosciences, Auckland University of Technology, Auckland, New Zealand (Prof V L Feigin PhD); Center for Biotechnology and Fine Chemistry, Catholic University of Portugal, Porto, Portugal (J C Fernandes PhD); Psychiatry, Kaiser Permanente, Fontana, CA, USA (I Filip MD); Department of Health Sciences (I Filip MD), A T Still University, Mesa, Arizona, USA (A Radfar MD, M Soosaraei PhD); Department of Public Health Medicine, Bielefeld University, Bielefeld, Germany (F Fischer PhD); Institute of Gerontology, National Academy of Medical Sciences of Ukraine, Kyiv, Ukraine (N A Foigt PhD); Gene Expression & Regulation Program, Cancer Institute, Philadelphia, PA, USA (T Fukumoto PhD); Department of Dermatology, Kobe University, Kobe, Japan (T Fukumoto PhD); Epidemiology and Public Health

(T Fürst PhD), Malaria Vaccines (C Karema MPH), Swiss Tropical and Public Health Institute, Basel, Switzerland; University of Basel, Basel, Switzerland (T Fürst PhD); Menzies Institute for Medical Research, University of Tasmania, Hobart, TAS, Australia (S Gall PhD); Faculty of Medicine and Pharmacy of Fez, University Sidi Mohammed Ben Abdellah, Fez, Morocco (F G Gankpe MD); Tuberculosis, Manhica Health Research Center, Manhica, Mozambique (A L Garcia-Basteiro MD); Tuberculosis Department (A L Garcia-Basteiro MD), Barcelona Institute for Global Health, Barcelona, Spain (Prof J V Lazarus PhD); Division of Human Nutrition and Health, Wageningen University & Research, Wageningen, Netherlands (Prof J M Geleijnse PhD); Directorate General for Public Health, Regional Health Council, Madrid, Spain (R Genova-Maleras MSc); Centre for Tropical Medicine and Global Health (S Lewycka PhD), Nuffield Department of Medicine (Prof P W Gething PhD, D J Weiss PhD), The Big Data Institute (T C D Lucas PhD), Department of Psychiatry (Prof C R J Newton MD), Nuffield Department of Women's and Reproductive Health (Prof K Rahimi MD), University of Oxford, Oxford, UK (Prof V Jha MD); Department of Health Care Policy and Management, University of Tsukuba, Tsukuba, Japan (M Ghimire MA); Institute for Global Health Sciences (R Ghosh PhD), Department of Epidemiology and Biostatistics (K M Mehta DSc), University of California San Francisco, San Francisco, CA, USA; Department of Respiratory Medicine, National Allergy, Asthma, and Bronchitis Institute, Kolkata, India (Prof A G Ghoshal MD); Department of Respiratory Medicine, Fortis Hospital, Kolkata, India (Prof A G Ghoshal MD); Department of Cardiovascular, Dysmetabolic, and Ageing-Associated Diseases, National Public Health Institute, Rome, Italy (S Giampaoli MD); Department of Public Health, Texas Tech University, Lubbock, TX, USA (S Giampaoli MD); Unit of Academic Primary Care (Prof P S Gill DM), Division of Health Sciences (O A Uthman PhD), University of Warwick, Coventry, UK; Department of Family and Community Medicine, University of Hail, Hail, Saudi Arabia (Prof I A Ginawi MD); Research Center of Neurology, Moscow, Russia (E V Gnedovskaya PhD, M A Kravchenko PhD, Prof M A Piradov DSc); Center for the Study of Regional Development, Jawahar Lal Nehru University, New Delhi, India (S Goli PhD); Nursing and Health Sciences Department, University of Massachusetts Boston, Boston, MA, USA (P N Gona PhD); Department of Biostatistics and Epidemiology, University of Oklahoma, Oklahoma City, OK, USA (S V Gopalani MPH); Department of Health and Social Affairs, Government of the Federated States of Micronesia, Palikir, Federated States of Micronesia (S V Gopalani MPH); School of Medicine, Boston University, Boston, MA, USA (A Grada MD); Registro Tumori Integrato, Vittorio Emanuele University Hospital Polyclinic, Catania, Italy (G Grosso PhD); Department of Epidemiology (Prof H C Gugnani PhD), Department of Microbiology (Prof H C Gugnani PhD), Saint James School of Medicine, The Valley, Anguilla; Department of Epidemiology, Healis Sekhsaria Institute for Public Health, Mumbai, India (P C Gupta DSc, D N Sinha PhD); Commissioner of Public Health, West Virginia Bureau for Public Health, Charleston, WV, USA (Prof R Gupta MD); Department of Health Policy, Management & Leadership, West Virginia University School of Public Health, Morgantown, WV, USA (Prof R Gupta MD); Academics and Research, Rajasthan University of Health Sciences, Jaipur, India (Prof R Gupta MD); Department of Preventive Cardiology, Eternal Heart Care Centre & Research Institute, Jaipur, India (Prof R Gupta MD); Department of Cardiology, Montefiore Medical Center, Bronx, NY, USA (T Gupta MD); Department of Epidemiology and Population Health (H Hosgood PhD), Albert Einstein College of Medicine, Bronx, NY, USA (T Gupta MD); Department of Public Health (B Gyawali MPH, K M Iburg PhD), National Centre for Register-based Research (Prof J J McGrath MD, O Plana-Ripoll PhD), Aarhus University, Aarhus, Denmark; Department of Public Health, Erasmus University Medical Center, Rotterdam, Netherlands (J A Haagsma PhD, S Kochhar MD, S Polinder MA); Department of Clinical Neurological Sciences (V Hachinski DSc), Clinical Neurological Sciences (L A Sposato MD), The University of Western Ontario, London, ON, Canada; Lawson Health Research Institute, London, ON, Canada (V Hachinski DSc); Department of Family and Community Medicine, Arabian Gulf University, Manama, Bahrain (Prof R R Hamadeh DPhil); School of Health and Environmental Studies, Hamdan Bin Mohammed Smart University, Dubai, United Arab Emirates (Prof S Hamidi DrPH); Population Health Department, University of New Mexico, Albuquerque, NM, USA (A J Handal PhD); Neurology Department, Sir Charles Gairdner Hospital, Perth, WA, Australia (Prof G J Hankey MD); Sun Yat-sen Global Health Institute (Prof Y Hao PhD), Department of Medical Statistics and Epidemiology (Y Liao PhD, Prof Y Hao PhD), Sun Yat-sen University, Guangzhou, China; Cardiology Department (Prof S Harikrishnan MD), Achutha Menon Centre for Health Science Studies (P Jeemon PhD, G Mini PhD, Prof K R Thankappan MD), Sree Chitra Tirunal Institute for Medical Sciences and Technology, Trivandrum, India; Research and Development Unit, San Juan de Dios Sanitary Park, Sant Boi De Llobregat, Spain (Prof J M Haro MD, A Koyanagi MD); Department of Medicine, University of Barcelona, Barcelona, Spain (Prof J M Haro MD); Health Education and Health Promotion Department, School of Public Health (L Jahangiry PhD), Tabriz University of Medical Sciences, Tabriz, Iran (H Hassankhani PhD); Independent Consultant, Tabriz, Iran (H Hassankhani PhD); Public Health Department (H Y Hassen MPH), Mizan-Tepi University, Teppi, Ethiopia (A Henok MPH); Unit of Epidemiology and Social Medicine, University Hospital Antwerp, Wilrijk, Belgium (H Y Hassen MPH); Clinical Sciences, Karolinska University Hospital, Stockholm, Sweden (R Havmoeller PhD); International Foundation for Dermatology, London, UK (Prof R J Hay MD); Department of Statistics and Econometrics (Prof C Herteliu PhD, B Ileanu PhD, A Pana MD), Bucharest University of Economic Studies, Bucharest, Romania; Department of Reproductive Health (D T Hibstu MPH), Department of Pediatrics (B T Tadesse MD), Hawassa University, Hawassa, Ethiopia; Department of Psychiatry, University Medical Center Groningen, Groningen, Netherlands (Prof H W Hoek MD); Department of Epidemiology (Prof H W Hoek MD), Department of Health and Behavior Studies (Prof I D Sigfusdottir PhD), Columbia University, New York, NY, USA; Division of Scientific Programs (H J Hoffman MA), Center for Translation Research and Implementation Science (G A Mensah MD), National Institutes of Health, Bethesda, MD, USA; University of Texas Austin, Austin, TX, USA (M K Hole MD); School of Health (E Homaie Rad PhD), Guilan Road Trauma Research Center (E Homaie Rad PhD), Guilan University of Medical Sciences, Rasht, Iran; Transdisciplinary Centre for Qualitative Methods, Manipal University, Manipal, India (P Hoogar PhD); Department of Computer Science, University of Human Development, Sulaimaniyah, Iraq (M Hosseinzadeh PhD); Department of Internal Medicine, Bucharest Emergency Hospital, Bucharest, Romania (M Hostiuic PhD); Clinical Legal Medicine, National Institute of Legal Medicine Mina Minovic, Bucharest, Romania (S Hostiuic PhD); National School of Tropical Medicine, Baylor College of Medicine, Houston, TX, USA (Prof P J Hotez PhD); Faculty of Medicine Tunis, Medicine School of Tunis, Baab Saadoun, Tunisia (Prof M Hsairi MPH); International Relations Division, Ministry of Health and Sports, Myanmar (A Htet MD); Institute of Health and Society (A Htet MD, A S Winkler PhD), Department of Health Management and Health Economics (Prof A Kisa PhD), University of Oslo, Oslo, Norway; Department of Epidemiology and Health Statistics, Central South University, Changsha, China (Prof G Hu PhD); Health Outcomes (A Pana MD), Center for Health Outcomes & Evaluation, Bucharest, Romania (B Ileanu PhD); Department of Public Health and Community Medicine (O S Ilesanmi PhD), University of Liberia, Monrovia, Liberia; Global Health and Development Department (Prof U Iqbal PhD), Graduate Institute of Biomedical Informatics (D N A Ningrum MPH), Taipei Medical University, Taipei City, Taiwan, Taiwan; Institute for Physical Activity and Nutrition (S Islam PhD), School of Medicine (M Rahman PhD), Department of Psychology (M A Stokes PhD), Deakin University, Burwood, VIC, Australia; Surveillance and Health Services Research, American Cancer Society, Atlanta, GA, USA (F Islami PhD); Department of Global and Community Health, George Mason University, Fairfax, VA, USA (K H Jacobsen PhD); Department of Parasitic Diseases, National Centre for Disease Control Delhi, Delhi, India (S K Jain MD); Medical Sciences Department, University of Kragujevac, Kragujevac, Serbia (Prof M Jakovljevic PhD); Newcastle University, Tyne, UK (M Javanbakht PhD); Faculty of Graduate Studies



(A U Jayatilleke PhD), Institute of Medicine (A U Jayatilleke PhD), University of Colombo, Colombo, Sri Lanka; Department of Community Medicine, Banaras Hindu University, Varanasi, India (R P Jha MSc); Environmental Research Center (J S Ji DSc), Global Health Research Center (L L Yan PhD), Duke Kunshan University, Kunshan, China; Beijing Institute of Ophthalmology, Beijing Tongren Hospital, Beijing, China (Prof J B Jonas MD); Faculty of Medicine and Health Sciences (J J Jozwiak PhD), Department of Family Medicine and Public Health (J J Jozwiak PhD), University of Opole, Opole, Poland; School of Health Sciences, Savitribai Phule Pune University, Pune, India (S B Jungari MA); Institute of Family Medicine and Public Health, University of Tartu, Tartu, Estonia (M Jürisson PhD); School of Public Health, University College Cork, Cork, UK (Z Kabir PhD); Personal Social Services Research Unit, London School of Economics and Political Science, London, UK (R Kadel MPH); Department of Forensic Medicine and Toxicology (T Kanchan MD), Department of Paediatrics (Prof R Lodha MD), Department of Cardiology (Prof N Naik DM, Prof A Roy MD), Department of Psychiatry (Prof R Sagar MD), Department of Endocrinology, Metabolism, & Diabetes (Prof N Tandon PhD), All India Institute of Medical Sciences, Jodhpur, India; Department of Epidemiology (M Karami PhD), Department of Environmental Health Engineering (M Khazaei PhD), Department of Biostatistics (N M G Mezerji MSc), Chronic Diseases (Home Care) Research Center (M Shamsizadeh MSc), Hamadan University of Medical Sciences, Hamadan, Iran; Department for Epidemiology, Helmholtz Centre for Infection Research, Braunschweig, Germany (A Karch MD); Quality and Equity Health Care, Kigali, Rwanda (C Karema MPH); School of Interdisciplinary Arts and Sciences, University of Washington Tacoma, Tacoma, WA, USA (S Karimi PhD); Department of Anesthesiology & Pain Medicine, Seattle Children's Hospital, Seattle, WA, USA (N J Kassebaum MD); MRC/CSO Social and Public Health Sciences Unit, University of Glasgow, Glasgow, UK (S V Katikireddi PhD); ODeL Campus (Prof P N Keiyoro PhD), University of Nairobi, Nairobi, Kenya (M Kumar PhD); Department of Linguistics and Germanic, Slavic, Asian, and African Languages, Michigan State University, East Lansing, MI, USA (G R Kemp BA); Non-Communicable Diseases Research Unit (Prof A P Kengne PhD), Alcohol, Tobacco, & Other Drug Use Research Unit (Prof C D H Parry PhD), Cochrane South Africa (A B Wiyeh MD, Prof C S Wiyongse MD), Medical Research Council South Africa, Cape Town, South Africa; Department of Medicine (Prof A P Kengne PhD, G A Mensah MD, J Noubiap MD, Prof K Sliwa MD), Department of Psychiatry and Mental Health (Prof D J Stein MD), University of Cape Town, Cape Town, South Africa; Institute of Cardiology, Assuta Hospital, Tel Aviv Yaffo, Israel (Prof A Keren MD); Heart Failure and Cardiomyopathies Center, Hadassah Hebrew University Hospital, Jerusalem, Israel (Prof A Keren MD); Department of Public Health and Community Medicine, Jordan University of Science and Technology, Ramtha, Jordan (Prof Y S Khader PhD); Department of Statistics, Azad University, Omidiyeh Branch, Iran (B Khafaei PhD); Epidemiology and Biostatistics Department, Health Services Academy, Islamabad, Pakistan (E A Khan MPH); Department of Internal Medicine, John H Stroger Jr Hospital of Cook County, Chicago, IL, USA (M S Khan MD); Department of Internal Medicine, Dow University of Health Sciences, Karachi, Pakistan (M S Khan MD, T J Siddiqi MB, M S Usman MB); Department of Epidemiology (G Naik MPH, J A Singh MD), Department of Medicine (P Ranjan PhD, J A Singh MD), Department of Psychology (D C Schwebel PhD), University of Alabama at Birmingham, Birmingham, AL, USA (M Khan MD, A R Sawant MD); Department of Pediatrics (Prof A Towbin MD), University of Tennessee, Knoxville, TN, USA (M Khan MD); Institute of Health Policy and Management (Prof Y Khang MD), Department of Health Policy and Management (Prof Y Khang MD), Seoul National University, Seoul, South Korea; International Otorhinolaryngology Research Association, Tehran, Iran (M Khosravi MD); Clinical Epidemiology Unit (A A Kiadali PhD), Department of Clinical Sciences (Prof B Norrving PhD), Lund University, Lund, Sweden; Research Department, Kenya Revenue Authority, Nairobi, Kenya (D N Kiirithio MSc); Research and Data Solutions, Synotech Consultant, Nairobi, Kenya (D N Kiirithio MSc); Korea Health Industry Development Institute, Cheongju-Si, South Korea (C Kim PhD); Department of Health Sciences, Northeastern University, Boston, MA, USA (Prof D Kim DrPH); Department of Preventive Medicine, Korea University, Seoul, South Korea (Y Kim PhD, Prof S Yoon PhD); School of Medicine, Xiamen University Malaysia, Sepang, Malaysia (Y Kim PhD); Department of Nutrition, Simmons College, Boston, MA, USA (R W Kimokoti MD); Faculty of Health, University of Canberra, Canberra, ACT, Australia (Y Kinfu PhD); Department of Global Community Health and Behavioral Sciences, Tulane University, New Orleans, LA, USA (Prof A Kisa PhD); Department of Health Economics and Social Security (K Kissimova-Skarbek PhD), Institute of Public Health (R Topor-Madry PhD), Jagiellonian University Medical College, Krakow, Poland; Department of Public Health (Prof M Kivimäki PhD, T Lallukka PhD), University of Helsinki, Helsinki, Finland (T J Meretoja MD); Centre for Disease Burden (A S Knudsen PhD), Division of Mental and Physical Health (Prof S Øverland PhD), Norwegian Institute of Public Health, Bergen, Norway; Department of Psychosocial Science (A S Knudsen PhD, Prof S Øverland PhD), Department of Global Public Health and Primary Care (Prof O F Norheim PhD), University of Bergen, Bergen, Norway; Public Health Sciences Division, Fred Hutchinson Cancer Research Center, Seattle, WA, USA (J M Kocarnik PhD); Department of Preventive Cardiology, National Cerebral and Cardiovascular Center, Suita, Japan (Prof Y Kokubo PhD); Arthritis Research Canada, Richmond, BC, Canada (J A Kopec PhD); Independent Consultant, Jakarta, Indonesia (S Kosen MD); Department of Internal and Pulmonary Medicine, Sheri Kashmir Institute of Medical Sciences, Srinagar, India (Prof P A Koul MD); Department of Anthropology, Panjab University, Chandigarh, India (K Krishan PhD); Department of Social and Preventive Medicine (Prof B Kuate Defo PhD), Department of Demography (Prof B Kuate Defo PhD), University of Montreal, Montreal, QC, Canada; Department of Public Health, Yuksek Ihtisas University, Ankara, Turkey (B Kucuk Bicer BEP); Department of Public Health, Hacettepe University, Ankara, Turkey (B Kucuk Bicer BEP); Department of Internal Medicine (D P Lad DM), Department of Pediatrics (S D Lad MD), Post Graduate Institute of Medical Education and Research, Chandigarh, India; Population and Work Ability Program (T Lallukka PhD), Finnish Institute of Occupational Health, Helsinki, Finland (R Shiri PhD); Department of Community and Family Medicine, Academy of Medical Science, Baghdad, Iraq (F H Lami PhD); HelpMeSee, New York, NY, USA (Prof V C Lansingh PhD); International Relations, Mexican Institute of Ophthalmology, Queretaro, Mexico (Prof V C Lansingh PhD); Department of Public Health (A Latifi PhD), Managerial Epidemiology Research Center (S Safiri PhD), Maragheh University of Medical Sciences, Maragheh, Iran; College of Optometry, Nova Southeastern University, Fort Lauderdale, FL, USA (J L Leasher OD); Regional Centre for the Analysis of Data on Occupational and Work-Related Injuries and Diseases, Local Health Unit Tuscany Centre, Florence, Italy (M Levi PhD); Department of Health Sciences, University of Florence, Florence, Italy (M Levi PhD); Oxford University Clinical Research Unit, Wellcome Trust Asia Programme, Hanoi, Vietnam (S Lewycka PhD); Department of Clinical Research and Epidemiology, Shenzhen Sun Yat-Sen Cardiovascular Hospital, Shenzhen, China (Y Li PhD); Alliance for Improving Health Outcomes, Inc, Quezon City, Philippines (Y Liao PhD); Department of Public Health, Samara University, Samara, Ethiopia (M L Liben MPH); Department of Medicine, University of Malaya, Kuala Lumpur, Malaysia (L Lim MD); Department of Medicine and Therapeutics, The Chinese University of Hong Kong, Shatin, China (L Lim MD); Centre for Chronic Disease Control, Beijing, China (Prof S Liu PhD); Population Health Sciences, Bristol Medical School, University of Bristol, Bristol, UK (K J Looker PhD); Department of Paediatrics (M T Mackay PhD, Prof G C Patton MD), School of Health Sciences (A Meretoja MD), School of Population and Global Health (Prof H R Taylor MD), Department of Medicine (Prof T Wijeratne MD), University of Melbourne, Melbourne, QLD, Australia (Prof A D Lopez PhD); Institute of Nutrition, Friedrich Schiller University Jena, Jena, Germany (Prof S Lorkowski PhD); Competence Cluster for Nutrition and Cardiovascular Health (NUTRICARD), Jena, Germany (Prof S Lorkowski PhD); Institute of Social and Preventive Medicine, University of Bern, Bern, Switzerland (Prof N Low MD); General Surgery Department, Aintree University Hospital National Health

Service Foundation Trust (NHS), Liverpool, UK (R Lunevicius PhD); Surgery Department, University of Liverpool, Liverpool, UK (R Lunevicius PhD); Health Data Research UK, Swansea University, Swansea, UK (Prof R A Lyons MD); Saw Swee Hock School of Public Health (S Ma PhD), Yong Loo Lin School of Medicine (Prof N Venkatasubramanian MBBS), National University of Singapore, Singapore (Z Zhao MSc); Neurology Department (M T Mackay PhD), Cardiology Department (R G Weintraub MB), Royal Children's Hospital, Melbourne, VIC, Australia; Cardiology, Damiatta University, Damiatta, Egypt (H Magdy Abd El Razek MD); Ophthalmology Department, Aswan Faculty of Medicine, Aswan, Egypt (M Magdy Abd El Razek MB); Department of Internal Medicine, Grant Medical College & Sir J J Group of Hospitals, Mumbai, India (D P Maghavani MBBS); Institute of Medicine, Tribhuvan University, Kathmandu, Nepal (N B Mahotra MD); Institute for Global Health Innovations, Duy Tan University, Hanoi, Vietnam (H T Mai MPH, H L T Nguyen MPH, H Q Pham MD); Department of Public Health, Trnava University, Trnava, Slovakia (M Majdan PhD); Non-Communicable Diseases Research Center, Shiraz University of Medical Sciences, Shiraz, Iran (Prof R Malekzadeh MD, S G Sepanlou MD); Surgery Department, Emergency University Hospital Bucharest, Bucharest, Romania (A Manda MD); Department of Population Studies, University of Zambia, Lusaka, Zambia (C Mapoma PhD); Campus Caucaia, Federal Institute of Education, Science and Technology of Ceará, Caucaia, Brazil (F R Martins-Melo PhD); Clinical Institute of Medical and Chemical Laboratory Diagnostics, Medical University of Graz, Graz, Austria (Prof W März MD); Graduate School, University of the East Ramon Magsaysay Memorial Medical Center, Quezon City, Philippines (M B Marzan MSc); Department of Public Health Medicine, University of Kwazulu-Natal, South Africa (T P Mashamba-Thompson PhD, Y Moodley PhD, Prof B Sartorius PhD); Department of Biology and Biological Engineering, Chalmers University of Technology, Gothenburg, Sweden (M Mazidi PhD); Department of Ophthalmology, Hywel Dda University Health Board, Carmarthen, UK (C McAlinden PhD, E Skiadaresi MD); Neurology Department, Janakpuri Super Specialty Hospital Society, New Delhi, India (Prof M Mehndiratta MD); Preventive Oncology, National Institute of Cancer Prevention and Research, Noida, India (Prof R Mehrotra PhD); Department of Internal Medicine, Sevenhills Hospital, Mumbai, India (V Mehta MD); College of Health Sciences, Debre Tabor University, Debre Tabor, Ethiopia (A Melese MSc); Division of Rheumatology, Thomas Jefferson University, Philadelphia, PA, USA (M Meltzer MD); Department of Public Health, University of West Florida, Pensacola, FL, USA (P T N Memiah DrPH); Research Department Prince Mohammed Bin Abdulaziz Hospital, Ministry of Health, Riyadh, Saudi Arabia (Prof Z A Memish MD); Peru Country Office, United Nations Population Fund (UNFPA), Lima, Peru (W Mendoza MD); Department of Pharmacy, Wollo University, Dessie, Ethiopia (G Mengistu MSc); Neurocenter (A Meretoja MD), Breast Surgery Unit (T J Meretoja MD), Helsinki University Hospital, Helsinki, Finland; Clinical Microbiology and Parasitology Unit, Dr Zora Profzoc Polyclinic, Zagreb, Croatia (T Mestrovic PhD); University Centre Varazdin, University North, Varazdin, Croatia (T Mestrovic PhD); Department of Hypertension (Prof T Miazgowski MD), Zdroje Hospital (J Widecka PhD), Emergency Department (B Miazgowski MD), Pomeranian Medical University, Szczecin, Poland (B Miazgowski MD); Pacific Institute for Research & Evaluation, Calverton, MD, USA (T R Miller PhD); Nevada Division of Public and Behavioral Health, Carson City, NV, USA (M Mirarefin MPH); Faculty of General Medicine, Kyrgyz State Medical Academy, Bishkek, Kyrgyzstan (Prof E M Mirrakhimov MD); Department of Atherosclerosis and Coronary Heart Disease, National Center of Cardiology and Internal Disease, Bishkek, Kyrgyzstan (Prof E M Mirrakhimov MD); Institute of Addiction Research, Frankfurt University of Applied Sciences, Frankfurt, Germany (B Moazen MSc); Department of Biology, Salahaddin University, Erbil, Iraq (K A Mohammad PhD); Isik University, Erbil, Iraq (K A Mohammad PhD); Cardiovascular Research Institute, Isfahan University of Medical Sciences, Isfahan, Iran (N Mohammadifard PhD, Prof N Sarrafzadegan MD); Department of Public Health, Jigjiga University, Jigjiga, Ethiopia (M A Mohammed PhD); Health Systems and Policy Research Unit (S Mohammed PhD), Department of Community Medicine (M B Sufiyan MD), Ahmadu Bello University, Zaria, Nigeria; Clinical Epidemiology and Public Health Research Unit, Burlo Garofolo Institute for Maternal and Child Health, Trieste, Italy (L Monasta DSc, L Ronfani PhD); Department of Epidemiology and Biostatistics (G Moradi PhD), Social Determinants of Health Research Center (G Moradi PhD), Kurdistan University of Medical Sciences, Sanandaj, Iran; Lancaster University, Lancaster, UK (P Moraga PhD); International Laboratory for Air Quality and Health (Prof L Morawska PhD), Australian Centre for Health Services Innovation (R Pacella PhD), School of Exercise and Nutrition Sciences (Q G To PhD), Queensland University of Technology, Brisbane, QLD, Australia; Hospital de Sto António, Hospital Center of Porto, Porto, Portugal (J Morgado-Da-Costa MSc); 1st Department of Ophthalmology, University of Athens, Athens, Greece (M M Moschos PhD); Biomedical Research Foundation, Academy of Athens, Athens, Greece (M M Moschos PhD); Demographic Change and Ageing Research Area (A Werdecker PhD), Federal Institute for Population Research, Wiesbaden, Germany (Prof U O Mueller MD); Center for Population and Health, Wiesbaden, Germany (Prof U O Mueller MD); Department of Endocrinology & Metabolism, Institute of Post Graduate Medical Education & Research, Kolkata, India (Prof S Mukhopadhyay MD); National Institute of Epidemiology, Chennai, India (M Murhekar MD); Department of Obstetrics and Gynecology, University of Jos, Jos, Nigeria (J Musa MD); Center for Global Health (J Musa MD), Department of Preventive Medicine (Y Yano MD), Northwestern University, Chicago, IL, USA; School of Medical Sciences, Science University of Malaysia, Kubang Kerian, Malaysia (K Musa PhD); Pediatrics Department, Nishtar Medical University, Multan, Pakistan (Prof G Mustafa MD); Pediatrics & Pediatric Pulmonology, Institute of Mother & Child Care, Multan, Pakistan (Prof G Mustafa MD); Department of Obstetrics and Gynecology (Prof A F Nabhan PhD), Department of Entomology (A M Samy PhD), Ain Shams University, Cairo, Egypt; National Center for Child Health and Development, Setagaya, Japan (C Nagata PhD); Initiative for Non Communicable Diseases (A Naheed PhD), Health Economics and Financing Research Group (A R Sarker MHE), Maternal and Child Health Division (S Zaman MPH), International Centre for Diarrhoeal Disease Research, Bangladesh, Dhaka, Bangladesh; Department of Dermatology, San Bortolo Hospital, Vicenza, Italy (Prof L Naldi MD); Direction, Gised Study Center, Bergamo, Italy (Prof L Naldi MD); Department of Preventive Medicine and Public Health, Chungnam National University School of Medicine, Daejeon, South Korea (Prof H Nam PhD); Daejeon Regional Cancer Center, Chungnam National University Hospital, Daejeon, South Korea (Prof H Nam PhD); Suraj Eye Institute, Nagpur, India (V Nangia MD); Department of Public Health (J Nansseu MD), Department of Internal Medicine and Specialties (Prof E Sobngwi PhD), University of Yaoundé I, Yaoundé, Cameroon; Department of Nephrology, Madras Medical College, Chennai, India (Prof G Natarajan BEP); Department of Cardiology, Cardio-Aid, Bucharest, Romania (R I Negoii PhD); Department of Neurosciences, Kenya Medical Research Institute/Wellcome Trust Research Programme, Kilifi, Kenya (Prof C R J Newton MD); Department of Biological Sciences, University of Embu, Embu, Kenya (J W Ngunjiri DrPH); Health Economics and Finance (A Q Nguyen PhD), Department of Health Economics (H T Nguyen MSc), Hanoi School of Public Health, Hanoi, Vietnam (H T Hoang MSc, H T Nguyen PhD); Public Health Science Department, State University of Semarang, Kota Semarang, Indonesia (D N A Ningrum MPH); National Department of Health, South African Embassy, Pretoria, South Africa (N Nolutshungu MD); Institute for Global Health Policy Research, National Center for Global Health and Medicine, Shinjuku-ku, Japan (S Nomura MSc); University of Social Welfare and Rehabilitation Sciences, Iran (M Noroozi PhD); Independent Consultant, Accra, Ghana (R Ofori-Asenso MSc); Department of Preventive Medicine, Kyung Hee University, Dongdaemun-gu, South Korea (I Oh PhD); Department of HIV/AIDS, STIs & TB, Human Sciences Research Council, Durban, South Africa (O Oladimeji MD); School of Public Health, University of Namibia, Oshakati Campus, Namibia (O Oladimeji MD); Department of Psychiatry, University of Lagos, Lagos, Nigeria (A T Olagunju MD); Centre for Healthy Start Initiative, Ikoyi, Nigeria (B O Olusanya PhD); NCD Prevention & Control Unit, Ministry of Health, Bandar Seri



Begawan, Brunei (S Ong FAMS); Institute of Health Science, University of Brunei Darussalam, Gadong, Brunei (S Ong FAMS); Graduate School of Public Health, San Diego State University, San Diego, CA, USA (Prof E Oren PhD); School of Medicine (Prof A Ortiz MD), Pneumology Service (Prof J B Soriano MD), Autonomous University of Madrid, Madrid, Spain; Department of Nephrology and Hypertension, The Institute for Health Research Foundation Jiménez Díaz University Hospital, Madrid, Spain (Prof A Ortiz MD); Department of Global Health Nursing, St Luke's International University, Chuo-ku, Japan (Prof E Ota PhD); The Center for Healthcare Quality Assessment and Control, Ministry of Health of the Russian Federation, Moscow, Russia (S S Otvstavnov PhD); Moscow Institute of Physics and Technology, Moscow State University, Dolgoprudny, Russia (S S Otvstavnov PhD); Institute for Advanced Medical Research and Training, University of Ibadan, Ibadan, Nigeria (Prof M O Owolabi DrM); Department of TB & Respiratory Medicine, Jagadguru Sri Shivarathreeswara University, Mysore, India (Prof M P A DNB); University of Chichester, Chichester, UK (R Pacella PhD); Department of Medical Humanities and Social Medicine, Kosin University, Busan, South Korea (Prof E Park PhD); Department of Medicine, Maimonides Medical Center, Brooklyn, NY, USA (S Patel MD); Regional Medical Research Centre (S Pati MD), Division of Noncommunicable Diseases (M Sharma PhD), Indian Council of Medical Research, Bhubaneswar, India; Krishna Institute of Medical Sciences, Deemed University, Karad, India (S T Patil MPH); International Institute of Health Management Research, New Delhi, India (A Patle MPH); Population Health Group (Prof G C Patton MD), Murdoch Childrens Research Institute, Melbourne, VIC, Australia (R G Weintraub MB); Clinical Research Department, Diabetes Research Society, Hyderabad, India (Prof V R Paturi MD); Clinical Research Department, DiabetOmics, Portland, OR, USA (Prof V R Paturi MD); Cartagena University, Cartagena, Colombia (Prof D M Pereira PhD); Shanghai Mental Health Center, Shanghai Jiao Tong University, Shanghai, China (Prof M R Phillips MD); Basic Medical Sciences Department, Durban University of Technology, Durban, South Africa (J D Pillay PhD); Department of Environmental Hygiene, German Federal Environment Agency, Dessau-Roßlau, Germany (D Plass DrPH); Institute for Mental Health Policy Research, Centre for Addiction and Mental Health, Toronto, ON, Canada (S Popova PhD); University Medical Center Groningen, University of Groningen, Groningen, Netherlands (Prof M J Postma PhD); Ashok & Rita Patel Institute of Physiotherapy, Charotar University of Science and Technology, Anand, India (V Prakash PhD); Independent Consultant, Glenelg, SA, Australia (Prof K Pseudovs PhD); Government Medical College, Nagpur, India (Prof M B Purwar MD); Non-Communicable Diseases Research Center, Alborz University of Medical Sciences, Karaj, Iran (M Qorbani PhD); Department of Environmental & Occupational Health, Drexel University, Philadelphia, PA, USA (D Quistberg PhD); Medichem, Barcelona, Spain (A Radfar MD); Department of Epidemiology & Biostatistics, Contech School of Public Health, Lahore, Pakistan (A Rafay MS); Department of Clinical Pediatrics, Sweidi Hospital, Riyadh, Saudi Arabia (Prof S U Rahman MBBS); Department of Pediatrics, North-West University, Peshawar, Pakistan (Prof S U Rahman MBBS); Society for Health and Demographic Surveillance, Suri, India (R Rai MPH); Department of Economics, University of Göttingen, Göttingen, Germany (R Rai MPH); Department of Neurology, Capital & Coast District Health Board, Wellington, New Zealand (A Ranta PhD); University College London Hospitals, London, UK (D L Rawaf MD); Public Health England, London, UK (Prof S Rawaf PhD); Brien Holden Vision Institute, Sydney, NSW, Australia (Prof S Resnikoff MD); Organization for the Prevention of Blindness, Paris, France (Prof S Resnikoff MD); Department of Clinical Research, Federal University of Uberlândia, Uberlândia, Brazil (L Roeber PhD); Golestan Research Center of Gastroenterology and Hepatology, Golestan University of Medical Sciences, Gorgan, Iran (G Roshandel PhD); Biotechnology, Ikiam Amazon Regional University, Ciudad De Tena, Ecuador (E Rubagotti PhD); Department of Ocean Science and Engineering, Southern University of Science and Technology, Shenzhen, China (E Rubagotti PhD); Neuropsychiatric Institute, Prince of Wales Hospital, Randwick, NSW, Australia (Prof P S Sachdev MD); Medical Department, University of Sharjah, Sharjah, United Arab Emirates (B Saddik PhD); Neurogenic Inflammation Research Center (A Sahebkar PhD), Biotechnology Research Center (A Sahebkar PhD), Mashhad University of Medical Sciences, Mashhad, Iran; College of Medicine, Al-Imam Mohammad Ibn Saud Islamic University, Riyadh, Saudi Arabia (N Salam PhD); School of Health and Policy Management, Faculty of Health, York University, Toronto, ON, Canada (Prof P Salamati MD); Medical and Human Science Department, University of Manchester, Manchester, UK (K Saleem MSc); Punjab University College of Pharmacy, Anarkali, Pakistan (Z Saleem PharmD); Center for Health Policy & Center for Primary Care and Outcomes Research, Stanford University, Stanford, CA, USA (Prof J A Salomon PhD); Clinical Research Division, Chest Research Foundation, Pune, India (Prof S S Salvi MD); Health and Disability Intelligence Group, Ministry of Health, Wellington, New Zealand (I Salz MD); Department of Surgery, Marshall University, Huntington, WV, USA (Prof J Sanabria MD); Department of Nutrition and Preventive Medicine, Case Western Reserve University, Cleveland, OH, USA (Prof J Sanabria MD); Department of Public Health, Regional Health Administration Do Norte I P, Vila Nova De Gaia, Portugal (J V Santos MD); Department of Medicine, University of Massachusetts Medical School, Worcester, MA, USA (M Sardana MD); Surgery Department, Hamad Medical Corporation, Doha, Qatar (B Sathian PhD); Faculty of Health & Social Sciences, Bournemouth University, Bournemouth, UK (B Sathian PhD); UGC Centre of Advanced Study in Psychology, Utkal University, Bhubaneswar, India (M Satpathy PhD); Udyam-Global Association for Sustainable Development, Bhubaneswar, India (M Satpathy PhD); Department of Public Health Sciences, University of North Carolina at Charlotte, Charlotte, NC, USA (M Sawhney PhD); Market Access, Bayer, Istanbul, Turkey (M Saylan MD); School of Health Sciences, Federal University of Santa Catarina, Ararangua, Brazil (Prof I J C Schneider PhD); Department of Medical Statistics, Epidemiology and Medical Informatics, University of Zagreb, Zagreb, Croatia (M Sekerija PhD); Division of Epidemiology and Prevention of Chronic Noncommunicable Diseases, Croatian Institute of Public Health, Zagreb, Croatia (M Sekerija PhD); Langone Medical Center, New York University, New York, NY, USA (A Shafieesabet MD); Public Health Division, An-Najah National University, Nablus, Palestine (A A Shaheen PhD); Department of Molecular Hepatology, Middle East Liver Disease Center, Tehran, Iran (H Sharafi PhD); Department of Laboratory Sciences (Prof M Sharif PhD), Department of Basic Sciences (Prof M Sharif PhD), Islamic Azad University, Sari, Iran; University School of Management and Entrepreneurship, Delhi Technological University, New Delhi, India (R Sharma PhD); Department of Pulmonary Medicine, Fudan University, Shanghai, China (J She MD); Usher Institute of Population Health Sciences and Informatics, University of Edinburgh, Edinburgh, UK (Prof A Sheikh MD, I N Soyiri PhD); Independent Consultant, Karachi, Pakistan (M A Shaikh MD); Friedman School of Nutrition Science and Policy, Tufts University, Boston, MA, USA (P Shi PhD); National Institute of Infectious Diseases, Tokyo, Japan (M Shigematsu PhD); Washington State University, Pullman, WA, USA (K Shishani PhD); Institute of Medical Epidemiology, Martin Luther University Halle-Wittenberg, Halle, Germany (I Shiue PhD); School of Health, University of Technology Sydney, Sydney, NSW, Australia (S Siabani PhD); Department of Psychology, Reykjavik University, Reykjavik, Iceland (Prof I D Sigfusdottir PhD, R Sigurvinsdottir PhD); Brasília University, Brasília, Brazil (Prof D A Silveira MD); Max Hospital, Ghaziabad, India (Prof N P Singh MD); Department of Pulmonary Medicine, Asthma Bhawan, Jaipur, India (Prof V Singh MD); Department of Epidemiology, School of Preventive Oncology, Patna, India (D N Sinha PhD); Pediatric Department, King Khalid University Hospital, Riyadh, Saudi Arabia (B H Sobaih MD); Department of Endocrinology and Diabetes, Yaoundé Central Hospital, Yaoundé, Cameroon (Prof E Sobngwi PhD); The Dartmouth Institute for Health Policy, Dartmouth College, Lebanon, NH, USA (S S Soneji PhD); Service of Pulmonology, Health Research Institute of the University Hospital "de la Princesa", Madrid, Spain (Prof J B Soriano MD); Division of Community Medicine, International Medical University, Kuala Lumpur, Malaysia (C T Sreeramareddy MD); Department of Neuromedicine and Movement Science, Norwegian University of Science and Technology, Trondheim, Norway (Prof T J Steiner PhD, Prof L J Stovner PhD); Neuro Center, St Olavs Hospital, Trondheim, Norway (Prof L J Stovner PhD); Department of

Nursing, Muhammadiyah University of Surakarta, Kartasura, Indonesia (A Sudaryanto MPH); Department of Community Health (B F Sunguya PhD), Muhimbili University of Health and Allied Sciences, Dar Es Salaam, Tanzania (B F Sunguya PhD); School of Medicine, University of California Riverside, Riverside, CA, USA (P J Sur MPH); Department of Criminology, Law and Society, University of California Irvine, Irvine, CA, USA (Prof B L Sykes PhD); Department of Medicine (Prof R Tabarés-Seisdedos PhD), Department of Pediatrics, Obstetrics and Gynecology (Prof M Tortajada-Girbés PhD), University of Valencia, Valencia, Spain; Carlos III Health Institute, Biomedical Research Networking Center for Mental Health Network (CIBERSAM), Madrid, Spain (Prof R Tabarés-Seisdedos PhD); Department of Psychiatry and Behavioral Sciences, New York Medical College, Valhalla, NY, USA (M Tavakkoli MD); University Institute "Egas Moniz", Monte Da Caparica, Portugal (Prof N Taveira PhD); Research Institute for Medicines, Faculty of Pharmacy of Lisbon, University of Lisbon, Lisbon, Portugal (Prof N Taveira PhD); Anesthesiology Department, University of Virginia, Charlottesville, VA, USA (A S Terkawi MD); Syrian Expatriate Medical Association, Charlottesville, VA, USA (A S Terkawi MD); Department of Medicine, University of Calgary, Calgary, AB, Canada (Prof M Tonelli MD); Agency for Health Technology Assessment and Tariff System, Warszawa, Poland (R Topor-Madry PhD); Pediatric Department, University Hospital Doctor Peset, Valencia, Spain (Prof M Tortajada-Girbés PhD); Nutritional Epidemiology Research Team, National Institute of Health and Medical Research, Paris, France (M Touvier PhD); Department of Health Economics, Hanoi Medical University, Hanoi, Vietnam (B X Tran PhD); Clinical Hematology and Toxicology, Military Medical University, Hanoi, Vietnam (K B Tran MD); Medical Department, University of Crete, Heraklion, Greece (Prof M K Tsilimbaris MD); Lee Kong Chian School of Medicine, Nanyang Technological University, Singapore (L Tudor Car PhD); CV Medicine, Cleveland Clinic Abu Dhabi, Abu Dhabi, United Arab Emirates (Prof E Tuzcu MD); Department of Internal Medicine, Federal Teaching Hospital, Abakaliki, Nigeria (K N Ukwaja MD); Gomal Center of Biochemistry and Biotechnology, Gomal University, Dera Ismail Khan, Pakistan (I Ullah PhD); TB Culture Laboratory, Mufti Mehmood Memorial Teaching Hospital, Dera Ismail Khan, Pakistan (I Ullah PhD); School of Government, Pontifical Catholic University of Chile, Santiago, Chile (E A Undurraga PhD); Schneider Institutes for Health Policy, Brandeis University, Waltham, MA, USA (E A Undurraga PhD); Argentine Society of Medicine, Ciudad De Buenos Aires, Argentina (Prof P R Valdez Med); Velez Sarsfield Hospital, Buenos Aires, Argentina (Prof P R Valdez Med); UKK Institute, Tampere, Finland (Prof T J Vasankari MD); Raffles Neuroscience Centre, Raffles Hospital, Singapore, Singapore (Prof N Venketasubramanian MBBS); Occupational Health Unit, Sant'Orsola Malpighi Hospital, Bologna, Italy (Prof F S Violante MPH); Federal Research Institute for Health Organization and Informatics of the Ministry of Health, Moscow, Russia (S K Vladimirov PhD); Department of Information and Internet Technologies, I M Sechenov First Moscow State Medical University, Moscow, Russia (S K Vladimirov PhD); Department of Health Care Administration and Economy, National Research University Higher School of Economics, Moscow, Russia (Prof V Vlassov MD); Foundation University Medical College, Foundation University, Rawalpindi, Pakistan (Y Waheed PhD); Department of Preventive Medicine and Biostatistics, Uniformed Services University of Health Sciences, Bethesda, MD, USA (Prof S G Waller MD); Department of Epidemiology and Biostatistics (Y Wang BSA, Prof C Yu PhD), Global Health Institute (Prof C Yu PhD), Wuhan University, Wuhan, China; Department of Research, Cancer Registry of Norway, Oslo, Norway (Prof E Weiderpass PhD); Independent Consultant, Staufenberg, Germany (A Werdecker PhD); Department of Neurology, Technical University of Munich, Munich, Germany (A S Winkler PhD); Bone and Joint Research Group, Royal Cornwall Hospital, Truro, UK (Prof A D Woolf BSc); Kailuan General Hospital, Kailuan General Hospital, Tangshan, China (Prof S Wu PhD); University of Strathclyde, Glasgow, UK (G M A Wyper MSc); Department of Pharmacology, St John's National Academy of Health Sciences, Bangalore, India (Prof D Xavier MD); School of Medicine, Nanjing University, Nanjing, China (Prof G Xu MD); Clinical Cancer Research Center, Milad General Hospital, Tehran, Iran

(S Yahyazadeh Jabbari MD); Department of Earth Science, King Fahd University of Petroleum and Minerals, Dhahran, Saudi Arabia (Y J Yasin MPH); Wolkite University, Wolkite, Ethiopia (A Yeshaneh BHLthSci); Department of Psychopharmacology, National Center of Neurology and Psychiatry, Tokyo, Japan (N Yonemoto MPH); School of Public Health, University of Kinshasa, Kinshasa, Democratic Republic of the Congo (M Yotebieng PhD); Department of Health Policy and Management, Jackson State University, Jackson, MS, USA (Prof M Z Younis DrPH); Tsinghua University, Tsinghua University, Beijing, China (Prof M Z Younis DrPH); Epidemiology and Cancer Registry Sector, Institute of Oncology Ljubljana, Ljubljana, Slovenia (Prof V Zadnik PhD); Epidemiology, University Hospital of Setif, Setif, Algeria (Prof Z Zaidi PhD); Department of Epidemiology, Human Genetics and Environmental Sciences, University of Texas, Houston, TX, USA (K Zhang PhD); Noncommunicable Disease Control and Prevention Center, Chinese Center for Disease Control and Prevention, Beijing, China (M Zhou PhD); Israeli Center for Disease Control, Ministry of Health, Ramat Gan, Israel (I Zucker MD); and School of Public Health, Tel Aviv University, Tel Aviv, Israel (I Zucker MD).

#### Contributors

Please see appendix 1 for more detailed information about individual authors' contributions to the research, divided into the following categories: managing the estimation process; writing the first draft of the manuscript; providing data or critical feedback on data sources; developing methods or computational machinery; applying analytical methods to produce estimates; providing critical feedback on methods or results; drafting the work or revising it critically for important intellectual content; extracting, cleaning, or cataloguing data; designing or coding figures and tables; and managing the overall research enterprise.

#### Declaration of interests

Carl Abelardo Antonio reports personal fees from Johnson & Johnson (Philippines). Yannick Bejot reports grants and personal fees from AstraZeneca and Boehringer-Ingelheim and personal fees from Daiichi-Sankyo, BMS, Pfizer, Medtronic, Bayer, Novex pharma, and Merck Sharp & Dohme. Cyrus Cooper reports personal fees from Alliance for Better Bone Health, Amgen, Eli Lilly, GlaxoSmithKline, Medtronic, Merck & Co, Novartis, Pfizer, Roche, Servier, Takeda, and UCB. Louisa Degenhardt reports grants from Indivior, Mundipharma, and Seqirus. Seana Gall reports grants from the National Health and Medical Research Council and the National Heart Foundation of Australia. Panniyammakal Jeemon reports a Clinical and Public Health Intermediate Fellowship from the Wellcome Trust–DBT India Alliance (2015–20). Jacek Józwiak reports a grant from Valeant, personal fees from Valeant, ALAB Laboratoria and Amgen, and non-financial support from Microlife and Servier. Nicholas Kassebaum reports personal fees and other support from Vifor Pharmaceuticals. Srinivasa Vittal Katikireddi reports grants from NHS Research Scotland, the Medical Research Council, and the Scottish Government Chief Scientist Office. Jeffrey Lazarus reports personal fees from Janssen and CEPHEID and grants and personal fees from AbbVie, Gilead Sciences, and Merck Sharp & Dohme. Stefan Lorkowski reports personal fees from Amgen, Berlin-Chemie, Merck Sharp & Dohme, Novo Nordisk, Sanofi-Aventis, Synlab, Unilever, and non-financial support from Preventicus. Winfried März reports grants and personal fees from Siemens Diagnostics, Aegerion Pharmaceuticals, Amgen, AstraZeneca, Danone Research, Pfizer, BASF, Numares, and Berline-Chemie; personal fees from Hoffmann LaRoche, Merck Sharp & Dohme, Sanofi, and Synageva; grants from Abbott Diagnostics; and other support from Synlab. Walter Mendoza is currently a Program Analyst for Population and Development at the Peru Country Office of the United Nations Population Fund. Ted Miller reports an evaluation contract from AB InBev Foundation. Maarten Postma reports grants from Mundipharma, Bayer, BMS, AstraZeneca, ARTEG, and AscA; grants and personal fees from Sigma Tau, Merck Sharp & Dohme, GlaxoSmithKline, Pfizer, Boehringer-Ingelheim, Novavax, Ingress Health, AbbVie, and Sanofi; personal fees from Quintiles, Astellas, Mapi, OptumInsight, Novartis, Swedish Orphan, Innoval, Jansen, Intercept, and Pharmierit, and stock ownership in Ingress Health and Pharmacoeconomics Advice Groningen. Kazem Rahimi reports grants from the National Institute for Health Research Biomedical Research

For more on SHARE see  
<http://www.share-project.org>

Centre, the Economic and Social Research Council, and Oxford Martin School. Kenji Shibuya reports grants from the Ministry of Health, Labour, and Welfare and from the Ministry of Education, Culture, Sports, Science, and Technology. Mark Shrimme reports grants from Mercy Ships and Damon Runyon Cancer Research Foundation. Jasvinder Singh reports consulting for Horizon, Fidia, UBM, Medscape, WebMD, the National Institutes of Health, and the American College of Rheumatology; they serve as the principal investigator for an investigator-initiated study funded by Horizon pharmaceuticals through a grant to DINORA, a 501c3 entity; they are on the steering committee of OMERACT, an international organisation that develops measures for clinical trials and receives arms-length funding from 36 pharmaceutical companies. Jeffrey Stanaway reports a grant from Merck & Co. Denis Xavier reports grants from Cadila Pharmaceuticals, Boehringer Ingelheim, Sanofi Aventis, Pfizer, and Bristol-Myers Squibb.

**Data sharing**

To download the data used in these analyses, please visit the Global Health Data Exchange at <http://ghdx.healthdata.org/gbd-2017>.

**Acknowledgments**

Research reported in this publication was supported by the Bill & Melinda Gates Foundation, the University of Melbourne, Public Health England, the Norwegian Institute of Public Health, St Jude Children's Research Hospital, the National Institute on Ageing of the National Institutes of Health (award P30AG047845), and the National Institute of Mental Health of the National Institutes of Health (award R01MH110163). The content is solely the responsibility of the authors and does not necessarily represent the official views of the funders. We thank the Russia Longitudinal Monitoring Survey, done by the National Research University Higher School of Economics and ZAO Demoscope together with the Carolina Population Center, University of North Carolina at Chapel Hill and the Institute of Sociology RAS, for making these data available. Health Behaviour in School-aged Children (HBSC) is an international study carried out in collaboration with WHO/EURO. The international coordinator of the 1997–98, 2001–02, 2005–06, and 2009–10 surveys was Candace Currie and the databank managers were Bente Wold for the 1997–98 survey and Oddrun Samdal for the following surveys. A list of principal investigators in each country can be found on the HBSC website. The Health and Retirement Study is sponsored by the National Institute on Aging (grant number NIA U01AG009740) and is done by the University of Michigan. This research uses data from Add Health, a programme project designed by J Richard Udry, Peter S Bearman, and Kathleen Mullan Harris, and funded by grant P01-HD31921 from the Eunice Kennedy Shriver National Institute of Child Health and Human Development, with cooperative funding from 17 other agencies. Special acknowledgment is due to Ronald R Rindfuss and Barbara Entwisle for assistance in the original design of Add Health. People interested in obtaining data files from Add Health should contact Add Health, Carolina Population Center, 123 W. Franklin Street, Chapel Hill, NC 27516-2524 ([addhealth@unc.edu](mailto:addhealth@unc.edu)). No direct support was received from grant P01-HD31921 for this analysis. Researchers interested in using TILDA data can access the data for free from the following sites: Irish Social Science Data Archive at University College Dublin (<http://www.ucd.ie/issda/data/tilda>) and Interuniversity Consortium for Political and Social Research at the University of Michigan (<http://www.icpsr.umich.edu/icpsrweb/ICPSR/studies/34315>). Data for this research was provided by MEASURE Evaluation, funded by the United States Agency for International Development (USAID). Views expressed do not necessarily reflect those of USAID, the US Government, or MEASURE Evaluation. This research used data from the National Health Survey 2003. We are grateful to the Ministry of Health of Chile, the survey copyright owner, for allowing us to have the database. All results of the study are those of the authors and in no way committed to the Ministry. This work was supported by the National Heart, Lung and Blood Institute's Framingham Heart Study (Contract No. N01-HC-25195). The Palestinian Central Bureau of Statistics granted the researchers of GBD 2017 access to relevant data in accordance with license number SLN2014-3-170, after subjecting data to processing aiming to preserve the confidentiality of individual data in accordance with the General Statistics Law, 2000. The researchers are solely responsible for the conclusions and inferences drawn upon available

data. This paper uses data from SHARE Waves 1, 2, 3 (SHARELIFE), 4, 5 and 6 (DOIs: 10.6103/SHARE.w1.611, 10.6103/SHARE.w2.611, 10.6103/SHARE.w3.611, 10.6103/SHARE.w4.611, 10.6103/SHARE.w5.611, 10.6103/SHARE.w6.611); see Börsch-Supan et al (2013) for methodological details. The SHARE data collection has been primarily funded by the European Commission through FP5 (QLK6-CT-2001-00360), FP6 (SHARE-I3: RII-CT-2006-062193, COMPARE: CIT5-CT-2005-028857, SHARELIFE: CIT4-CT-2006-028812) and FP7 (SHARE-PREP: N°211909, SHARE-LEAP: N°227822, SHARE M4: N°261982). Additional funding from the German Ministry of Education and Research, the Max Planck Society for the Advancement of Science, the US National Institute on Aging (U01\_AG09740-13S2, P01\_AG005842, P01\_AG08291, P30\_AG12815, R21\_AG025169, Y1-AG-4553-01, IAG\_BSR06-11, OSHA\_04-064, HHSN271201300071C), and from various national funding sources is gratefully acknowledged by SHARE. This study was realised using data collected by the Swiss Household Panel, which is based at the Swiss Centre of Expertise in the Social Sciences FORS. The project is financed by the Swiss National Science Foundation. Data reported here were supplied by the United States Renal Data System. The interpretation and reporting of these data are the responsibility of the authors and in no way should be seen as an official policy or interpretation of the US Government.

**References**

- Nino F. United Nations Sustainable Development Goals. UNDP. <http://www.undp.org/content/undp/en/home/sustainable-development-goals.html> (accessed March 10, 2017).
- Vos T, Abajobir AA, Abate KH, et al. Global, regional, and national incidence, prevalence, and years lived with disability for 328 diseases and injuries for 195 countries, 1990–2016: a systematic analysis for the Global Burden of Disease Study 2016. *Lancet* 2017; **390**: 1211–59.
- Fullman N, Barber RM, Abajobir AA, et al. Measuring progress and projecting attainment on the basis of past trends of the health-related Sustainable Development Goals in 188 countries: an analysis from the Global Burden of Disease Study 2016. *Lancet* 2017; **390**: 1423–59.
- Afshin A, Forouzanfar MH, Reitsma MB, et al. Health effects of overweight and obesity in 195 countries over 25 years. *N Engl J Med* 2017; **377**: 13–27.
- Sajedinejad S, Majdzadeh R, Vedadhir A, Tabatabaei MG, Mohammad K. Maternal mortality: a cross-sectional study in global health. *Glob Health* 2015; **11**: 4.
- Say L, Chou D, Gemmill A, et al. Global causes of maternal death: a WHO systematic analysis. *Lancet Glob Health* 2014; **2**: e323–33.
- Kassebaum NJ, Lopez AD, Murray CJL, Lozano R. A comparison of maternal mortality estimates from GBD 2013 and WHO. *Lancet* 2014; **384**: 2209–10.
- Kassebaum NJ, Bertozzi-Villa A, Coggeshall MS, et al. Global, regional, and national levels and causes of maternal mortality during 1990–2013: a systematic analysis for the Global Burden of Disease Study 2013. *Lancet* 2014; **384**: 980–1004.
- Hogan MC, Foreman KJ, Naghavi M, et al. Maternal mortality for 181 countries, 1980–2008: a systematic analysis of progress towards Millennium Development Goal 5. *Lancet* 2010; **375**: 1609–23.
- Ginsburg O, Bray F, Coleman MP, et al. The global burden of women's cancers: a grand challenge in global health. *Lancet* 2017; **389**: 847–60.
- Bruni L, Diaz M, Barrionuevo-Rosas L, et al. Global estimates of human papillomavirus vaccination coverage by region and income level: a pooled analysis. *Lancet Glob Health* 2016; **4**: e453–63.
- Ginsburg OM, Love RR. Breast cancer: a neglected disease for the majority of affected women worldwide. *Breast J* 2011; **17**: 289–95.
- Denslow SA, Rositch AF, Firnhaber C, Ting J, Smith JS. Incidence and progression of cervical lesions in women with HIV: a systematic global review. *Int J STD AIDS* 2014; **25**: 163–77.
- Adler AJ, Ronsmans C, Calvert C, Filippi V. Estimating the prevalence of obstetric fistula: a systematic review and meta-analysis. *BMC Pregnancy Childbirth* 2013; **13**: 246.
- Kelly J. Vesico-vaginal fistula. The burden of maternal ill-health. *Safe Mother* 1999; **5**: 7.
- Ahmed S, Tunçalp Ö. Burden of obstetric fistula: from measurement to action. *Lancet Glob Health* 2015; **3**: e243–44.



- 17 Wall LL. Obstetric fistula is a “neglected tropical disease”. *PLoS Negl Trop Dis* 2012; **6**: e1769.
- 18 Higashi H, Barendregt JJ, Kassebaum NJ, Weiser TG, Bickler SW, Vos T. Surgically avertable burden of obstetric conditions in low- and middle-income regions: a modelled analysis. *BJOG Int J Obstet Gynaecol* 2014; **122**: 228–36.
- 19 GBD 2017 Mortality Collaborators. Global, regional, and national age-specific mortality and life expectancy, 1950–2017: a systematic analysis for the Global Burden of Disease Study 2017. *Lancet* 2018; **392**: 1684–735.
- 20 Stevens GA, Alkema L, Black RE, et al. Guidelines for accurate and transparent health estimates reporting: the GATHER statement. *Lancet* 2016; **388**: e19–23.
- 21 United Nations Population Division. Department of Economic and Social Affairs. Population. <https://www.un.org/development/desa/en/key-issues/population.html> (accessed May 6, 2017).
- 22 US Census Bureau. International Data Base (IDB). <https://www.census.gov/programs-surveys/international-programs/about/idb.html> (accessed May 6, 2018).
- 23 Salomon JA, Haagsma JA, Davis A, et al. Disability weights for the Global Burden of Disease 2013 study. *Lancet Glob Health* 2015; **3**: e712–23.
- 24 GBD 2017 Population and Fertility Collaborators. Population and fertility by age and sex for 195 countries and territories 1950–2017: a systematic analysis for the Global Burden of Disease 2017. *Lancet* 2018; **392**: 1995–2051.
- 25 GBD 2017 Cause of Death Collaborators. Global, regional, and national age-specific and sex-specific mortality for 282 causes of death in 195 countries and territories, 1980–2017: a systematic analysis for the Global Burden of Disease Study 2017. *Lancet* 2018; **392**: 1736–88.
- 26 Mckee S. Rethinking development and health: findings from the Global Burden of Disease Study. Seattle, WA: Institute for Health Metrics and Evaluation, 2016.
- 27 The Lancet. The global HIV/AIDS epidemic—progress and challenges. *Lancet* 2017; **390**: 333.
- 28 Locarnini S, Hatzakis A, Chen D-S, Lok A. Strategies to control hepatitis B: Public policy, epidemiology, vaccine and drugs. *J Hepatol* 2015; **62**: S76–86.
- 29 Razavi H, ElKhoury AC, Elbasha E, et al. Chronic hepatitis C virus (HCV) disease burden and cost in the United States. *Hepatology* 2012; **57**: 2164–70.
- 30 Hill A, Cooke G. Hepatitis C can be cured globally, but at what cost? *Science* 2014; **345**: 141–42.
- 31 Kamal-Yanni M. Hepatitis C drug affordability. *Lancet Glob Health* 2015; **3**: e73–74.
- 32 Attard SM, Herring AH, Zhang B, Du S, Popkin BM, Gordon-larsen P. Associations between age, cohort, and urbanization with Sbp and Dbp in China: a population-based study across 18 years. *J Hypertens* 2015; **33**: 948–56.
- 33 Song L, Shen L, Li H, et al. Height and prevalence of hypertension in a middle-aged and older Chinese population. *Sci Rep* 2016; **6**: 39480.
- 34 Muntner P, Gu D, Wu X, et al. Factors associated with hypertension awareness, treatment, and control in a representative sample of the Chinese population. *Hypertension* 2004; **43**: 578–85.
- 35 Ford ES, Ajani UA, Croft JB, et al. Explaining the decrease in US deaths from coronary disease, 1980–2000. *N Engl J Med* 2007; **356**: 2388–98.
- 36 Swinburn BA, Sacks G, Hall KD, et al. The global obesity pandemic: shaped by global drivers and local environments. *Lancet* 2011; **378**: 804–14.
- 37 Smith SC, Benjamin EJ, Bonow RO, et al. AHA/ACCF secondary prevention and risk reduction therapy for patients with coronary and other atherosclerotic vascular disease: 2011 update: a guideline from the American Heart Association and American College of Cardiology Foundation. *Circulation* 2011; **124**: 2458–73.
- 38 Eckel RH, Jakicic JM, Ard JD, et al. 2013 AHA/ACC guideline on lifestyle management to reduce cardiovascular risk: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines. *Circulation* 2014; **129**: S76–99.
- 39 Stone NJ, Robinson JG, Lichtenstein AH, et al. 2013 ACC/AHA guideline on the treatment of blood cholesterol to reduce atherosclerotic cardiovascular risk in adults: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines. *Circulation* 2014; **129**: S1–45.
- 40 Perk J, De Backer G, Gohlke H, et al. European Guidelines on cardiovascular disease prevention in clinical practice (version 2012). The Fifth Joint Task Force of the European Society of Cardiology and Other Societies on Cardiovascular Disease Prevention in Clinical Practice (constituted by representatives of nine societies and by invited experts). *Eur Heart J* 2012; **33**: 1635–701.
- 41 Daya MR, Schmicker RH, Zive DM, et al. Out-of-hospital cardiac arrest survival improving over time: results from the Resuscitation Outcomes Consortium (ROC). *Resuscitation* 2015; **91**: 108.
- 42 Girotra S, Nallamothu BK, Spertus JA, Li Y, Krumholz HM, Chan PS. Trends in survival after in-hospital cardiac arrest. *N Engl J Med* 2012; **367**: 1912.
- 43 Berger S. Survival from out-of-hospital cardiac arrest: are we beginning to see progress? *J Am Heart Assoc* 2017; **6**: e007469.
- 44 American College of Cardiology. Despite overall in-hospital cardiac arrest survival improvement, lower survival on nights, weekends persists. <https://www.acc.org/about-acc/press-releases/2018/01/22/14/16/despite-overall-in-hospital-cardiac-arrest-survival-improvement-lower-survival-on-nights-weekends-persists> (accessed May 7, 2018).
- 45 Malhotra A, Rakhit R. Improving the UK’s performance on survival after cardiac arrest. *BMJ* 2013; **347**: f4800.
- 46 Sasson C, Rogers MAM, Dahl J, Kellermann AL. Predictors of survival from out-of-hospital cardiac arrest: a systematic review and meta-analysis. *Circ Cardiovasc Qual Outcomes* 2010; **3**: 63–81.
- 47 Mora S, Wenger NK, DeMicco DA, et al. Determinants of residual risk in secondary prevention patients treated with high- versus low-dose statin therapy clinical perspective: the treating to new targets (TNT) study. *Circulation* 2012; **125**: 1979–87.
- 48 Critchley JA, Capewell S. Mortality risk reduction associated with smoking cessation in patients with coronary heart disease: a systematic review. *JAMA* 2003; **290**: 86.
- 49 Heaton RK, Grant I, McSweeney AJ, Adams KM, Petty TL. Psychologic effects of continuous and nocturnal oxygen therapy in hypoxemic chronic obstructive pulmonary disease. *Arch Intern Med* 1983; **143**: 1941–47.
- 50 Eaton T, Lewis C, Young P, Kennedy Y, Garrett JE, Kolbe J. Long-term oxygen therapy improves health-related quality of life. *Respir Med* 2004; **98**: 285–93.
- 51 Clini E, Vitacca M, Foglio K, Simoni P, Ambrosino N. Long-term home care programmes may reduce hospital admissions in COPD with chronic hypercapnia. *Eur Respir J* 1996; **9**: 1605–10.
- 52 Tanni SE, Vale SA, Lopes PS, Guiotoko MM, Godoy I, Godoy I. Influence of the oxygen delivery system on the quality of life of patients with chronic hypoxemia. *J Bras Pneumol* 2007; **33**: 161–67.
- 53 Ringbaek TJ, Viskum K, Lange P. Does long-term oxygen therapy reduce hospitalisation in hypoxaemic chronic obstructive pulmonary disease? *Eur Respir J* 2002; **20**: 38–42.
- 54 Weitzenblum E, Oswald M, Apprill M, Ratomaharo J, Kessler R. Evolution of physiological variables in patients with chronic obstructive pulmonary disease before and during long-term oxygen therapy. *Respir Int Rev Thorac Dis* 1991; **58**: 126–31.
- 55 Poole PJ, Chacko E, Wood-Baker RWB, Cates CJ. Influenza vaccine for patients with chronic obstructive pulmonary disease. *Cochrane Database Syst Rev* 2006; **1**: CD002733.
- 56 Wongsurakiat P, Maranetra KN, Wasi C, Kositanont U, Dejsomritrutai W, Charoenratanakul S. Acute respiratory illness in patients with COPD and the effectiveness of influenza vaccination: a randomized controlled study. *Chest* 2004; **125**: 2011–20.
- 57 Nichol KL, Baken L, Nelson A. Relation between influenza vaccination and outpatient visits, hospitalization, and mortality in elderly persons with chronic lung disease. *Ann Intern Med* 1999; **130**: 397–403.
- 58 Xu J, Zhang Y, Qiu C, Cheng F. Global and regional economic costs of dementia: a systematic review. *Lancet* 2017; **390**: S47.
- 59 Xu J, Wang J, Wimo A, Fratiglioni L, Qiu C. The economic burden of dementia in China, 1990–2030: implications for health policy. *Bull World Health Organ* 2017; **95**: 18–26.
- 60 Alzheimer’s Disease International. World Alzheimer Report 2015 reveals global cost of dementia set to reach US \$1 trillion by 2018. <https://www.alz.co.uk/news/world-alzheimer-report-2015-reveals-global-cost-of-dementia-set-to-reach-usd-1-trillion-by-2018> (accessed May 7, 2018).

- 61 Wimo A, Winblad B. The economic burden of Alzheimer's disease and dementia. In: Alzheimer's disease. Totowa, NJ: Humana Press, 2004: 57–63.
- 62 Hurd MD, Martorell P, Delavande A, Mullen KJ, Langa KM. Monetary costs of dementia in the United States. *N Engl J Med* 2013; **368**: 1326–34.
- 63 Walsh J. Dementia UK report. United Kingdom: Alzheimer's Society, 2015. [https://www.alzheimers.org.uk/info/20025/policy\\_and\\_influencing/251/dementia\\_uk](https://www.alzheimers.org.uk/info/20025/policy_and_influencing/251/dementia_uk) (accessed May 7, 2018).
- 64 Fairweather D, Frisancho-Kiss S, Rose NR. Sex differences in autoimmune disease from a pathological perspective. *Am J Pathol* 2008; **173**: 600–09.
- 65 Rubtsova K, Marrack P, Rubtsov AV. Sexual dimorphism in autoimmunity. *J Clin Invest* 2015; **125**: 2187–93.
- 66 Kassebaum NJ, Barber RM, Bhutta ZA, et al. Global, regional, and national levels of maternal mortality, 1990–2015: a systematic analysis for the Global Burden of Disease Study 2015. *Lancet* 2016; **388**: 1775–812.
- 67 Kinney MV, Boldosser-Boesch A, McCallon B. Quality, equity, and dignity for women and babies. *Lancet* 2016; **388**: 2066–68.
- 68 Graham G. Acute coronary syndromes in women: recent treatment trends and outcomes. *Clin Med Insights Cardiol* 2016; **10**: 1–10.
- 69 Lai M-C, Lombardo MV, Ruigrok ANV, et al. Cognition in males and females with autism: similarities and differences. *PLoS One* 2012; **7**: e47198.
- 70 Kopp S, Gillberg C. The autism spectrum screening questionnaire (ASSQ)-revised extended version (ASSQ-REV): an instrument for better capturing the autism phenotype in girls? A preliminary study involving 191 clinical cases and community controls. *Res Dev Disabil* 2011; **32**: 2875–88.
- 71 Lai M-C, Lombardo MV, Pasco G, et al. A behavioral comparison of male and female adults with high functioning autism spectrum conditions. *PLoS One* 2011; **6**: e20835.
- 72 The World Bank. Countries commit to strong action on human capital to drive economic growth. Oct 20, 2017. <http://www.worldbank.org/en/news/feature/2017/10/20/countries-commit-to-strong-action-on-human-capital-to-drive-economic-growth> (accessed May 7, 2018).
- 73 The World Bank. Human capital: the greatest asset of economies on the rise. April 3, 2017. <http://www.worldbank.org/en/news/opinion/2017/04/03/human-capital-the-greatest-asset-of-economies-on-the-rise> (accessed May 7, 2018).
- 74 Fricke T, Holden B, Wilson D, et al. Global cost of correcting vision impairment from uncorrected refractive error. *Bull World Health Organ* 2012; **90**: 728–38.
- 75 Frick KD, Joy SM, Wilson DA, Naidoo KS, Holden BA. The global burden of potential productivity loss from uncorrected presbyopia. *Ophthalmology* 2015; **122**: 1706–10.
- 76 Crews JE, DPA, Chou C-F, Stevens JA, Saaddine JB. Falls among persons aged ≥65 years with and without severe vision impairment—United States, 2014. *MMWR Morb Mortal Wkly Rep* 2016; **65**: 433–37.
- 77 Lord SR. Visual risk factors for falls in older people. *Age Ageing* 2006; **35** (suppl 2): 42–45.
- 78 MAL-ED Network Investigators. The MAL-ED study: a multinational and multidisciplinary approach to understand the relationship between enteric pathogens, malnutrition, gut physiology, physical growth, cognitive development, and immune responses in infants and children up to 2 years of age in resource-poor environments. *Clin Infect Dis* 2014; **59** (suppl 4): S193–206.
- 79 GEMS: Kotloff KL, Nataro JP, Blackwelder WC, et al. Burden and aetiology of diarrhoeal disease in infants and young children in developing countries (the Global Enteric Multicenter Study, GEMS): a prospective, case-control study. *Lancet* 2013; **382**: 209–22.
- 80 Platts-Mills J, Liu J, Rogawski E, et al. Aetiology, burden and clinical characteristics of diarrhoea in children in low-resource settings using quantitative molecular diagnostics: results from the MAL-ED cohort study. *Lancet Glob Health* (in press).
- 81 Walker CLF, Rudan I, Liu L, et al. Global burden of childhood pneumonia and diarrhoea. *Lancet* 2013; **381**: 1405–16.
- 82 Rudan I, O'Brien KL, Nair H, et al. Epidemiology and etiology of childhood pneumonia in 2010: estimates of incidence, severe morbidity, mortality, underlying risk factors and causative pathogens for 192 countries. *J Glob Health* 2013; **3**: 010401.
- 83 Stover J, Brown T, Puckett R, Peerapatanapokin W. Updates to the Spectrum/Estimations and Projections Package model for estimating trends and current values for key HIV indicators. *AIDS* 2017; **31**: S5.
- 84 Mahy M, Penazzato, Martina M, Ciaranello A, et al. Improving estimates of children living with HIV from the Spectrum AIDS Impact Model. *AIDS* 2017; **31**: S13–22.
- 85 UNAIDS. Methods for deriving UNAIDS estimates. Geneva, Switzerland: UNAIDS, 2016.
- 86 Younossi Z, Anstee QM, Marietti M, et al. Global burden of NAFLD and NASH: trends, predictions, risk factors and prevention. *Nat Rev Gastroenterol Hepatol* 2018; **15**: 11–20.
- 87 American Psychiatric Association. Diagnostic and statistical manual of mental disorders, 5th edn. Arlington, VA: American Psychiatric Publishing, 2013.
- 88 WHO. Falls. Jan 16, 2018. <http://www.who.int/news-room/fact-sheets/detail/falls> (accessed May 7, 2018).
- 89 WHO. Road traffic injuries. Jan 16, 2018. [http://www.who.int/violence\\_injury\\_prevention/road\\_traffic/en/](http://www.who.int/violence_injury_prevention/road_traffic/en/) (accessed May 7, 2018).
- 90 WHO. Burns. [http://www.who.int/violence\\_injury\\_prevention/burns/en/](http://www.who.int/violence_injury_prevention/burns/en/) (accessed May 7, 2018).
- 91 Makary MA, Daniel M. Medical error—the third leading cause of death in the US. *BMJ* 2016; **353**: i2139.
- 92 Feigin VL, Abajobir AA, Abate KH, et al. Global, regional, and national burden of neurological disorders during 1990–2015: a systematic analysis for the Global Burden of Disease Study 2015. *Lancet Neurol* 2017; **16**: 877–97.
- 93 Research Data Assistance Center. Medicare current beneficiary survey (MCBS). <https://www.resdac.org/cms-data/file-family/Medicare-Current-Beneficiary-Survey-MCBS> (accessed May 7, 2018).