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Rapid health transition in China, 1990–2010: findings from the Global Burden of Disease Study 2010

Gonghuan Yang, Yu Wang*, Yixin Zeng, George F Gao, Xiaofeng Liang, Maigeng Zhou, Xia Wan, Shicheng Yu, Yuhong Jiang, Mohsen Naghavi, Theo Vos, Haidong Wang, Alan D Lopez, Christopher J L Murray*

Summary

Background China has undergone rapid demographic and epidemiological changes in the past few decades, including striking declines in fertility and child mortality and increases in life expectancy at birth. Popular discontent with the health system has led to major reforms. To help inform these reforms, we did a comprehensive assessment of disease burden in China, how it changed between 1990 and 2010, and how China's health burden compares with other nations.

Methods We used results of the Global Burden of Diseases, Injuries, and Risk Factors Study 2010 (GBD 2010) for 1990 and 2010 for China and 18 other countries in the G20 to assess rates and trends in mortality, causes of death, years of life lost (YLLs), years lived with disability (YLDs), disability-adjusted life-years (DALYs), and healthy life expectancy (HALE). We present results for 231 diseases and injuries and for 67 risk factors or clusters of risk factors relevant to China. We assessed relative performance of China against G20 countries (significantly better, worse, or indistinguishable from the G20 mean) with age-standardised rates and 95% uncertainty intervals.

Findings The leading causes of death in China in 2010 were stroke (1·7 million deaths, 95% UI 1·5–1·8 million), ischaemic heart disease (948 700 deaths, 774 500–1 024 600), and chronic obstructive pulmonary disease (934 000 deaths, 846 600–1 032 300). Age-standardised YLLs in China were lower in 2010 than all emerging economies in the G20, and only slightly higher than noted in the USA. China had the lowest age-standardised YLD rate in the G20 in 2010. China also ranked tenth (95% UI eighth to tenth) for HALE and 12th (11th to 13th) for life expectancy. YLLs from neonatal causes, infectious diseases, and injuries in children declined substantially between 1990 and 2010. Mental and behavioural disorders, substance use disorders, and musculoskeletal disorders were responsible for almost half of all YLDs. The fraction of DALYs from YLDs rose from 28·1% (95% UI 24·2–32·5) in 1990 to 39·4% (34·9–43·8) in 2010. Leading causes of DALYs in 2010 were cardiovascular diseases (stroke and ischaemic heart disease), cancers (lung and liver cancer), low back pain, and depression. Dietary risk factors, high blood pressure, and tobacco exposure are the risk factors that constituted the largest number of attributable DALYs in China. Ambient air pollution ranked fourth (third to fifth; the second highest in the G20) and household air pollution ranked fifth (fourth to sixth; the third highest in the G20) in terms of the age-standardised DALY rate in 2010.

Interpretation The rapid rise of non-communicable diseases driven by urbanisation, rising incomes, and ageing poses major challenges for China's health system, as does a shift to chronic disability. Reduction of population exposures from poor diet, high blood pressure, tobacco use, cholesterol, and fasting blood glucose are public policy priorities for China, as are the control of ambient and household air pollution. These changes will require an integrated government response to improve primary care and undertake required multisectoral action to tackle key risks. Analyses of disease burden provide a useful framework to guide policy responses to the changing disease spectrum in China.

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*Joint first authors

Institute of Basic Medical Sciences, Chinese Academy of Medical Sciences & School of Basic Medicine, Peking Union Medical College, Beijing, China (Prof G Yang MD, X Wan PhD); **Chinese Center for Disease Prevention and Control, Beijing, China** (Y Wang MD, Y Zeng MD, G F Gao PhD, X Liang PhD, M Zhou PhD, S Yu PhD); **Peking Union Medical College, Beijing, China** (Y Jiang MBA); **Institute for Health Metrics and Evaluation, University of Washington, Seattle, WA, USA** (M Naghavi PhD, Prof T Vos PhD, H Wang PhD, Prof C J L Murray MD); **and Melbourne School of Population and Global Health, The University of Melbourne, Melbourne, Australia** (Prof A D Lopez PhD)

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

Introduction

China has made enormous strides in improving health in the past few decades. Between 1970 and 2010, male life expectancy increased from 60·4 years to 72·9 years and female life expectancy increased from 63·5 years to 79·0 years;[1] the under-5 mortality rate reduced from 100·6 per 1000 to 12·9 per 1000;[1] and the total fertility rate declined from 4·77 to 1·64 children per woman.[2] Rapidly increasing income per head, an ageing population, and longer lifespans have led to a rapid change in the health profile of the nation. Some counties within the country, however, remain relatively poor and continue to have a set of health challenges dominated by communicable, maternal, and neonatal causes.[3,4] China needs to understand and formulate a long-range strategy to tackle several challenges in public health and medical care at the same time.

Before health-care reform was announced in 2009,[5] the Chinese Government was faced with widespread public discontent stemming from unaffordable access to health care and growing inequalities in access to health care and health status across regions and populations.[6–9] Health improvement fell short of what China's rapid economic growth should have afforded.[10] Some previously eliminated

infectious diseases re-emerged[11] and incidence of some non-communicable diseases increased.[12,13] The 2002–03 severe acute respiratory syndrome (SARS) outbreak was a wake-up call exposing the inadequacies of the public health protection and surveillance system, and emphasising the important role for government in guidance of the evolution of health in China. Health system reforms focused on delivering improved access to quality clinical care[14] are now underway but can be better informed by a broad assessment of China's progress in health.

See Online for appendix

Several data systems provide substantial detail about levels and trends in health in China, including various national surveys of health, civil registration, medical certification of causes of death in some cities and counties,[15] the Disease Surveillance Points system,[16] a sophisticated infectious disease surveillance network,[17] population-based cancer registries,[18] a maternal and child surveillance system,[17] and demographic surveys[19,20] and censuses.[21,22] Despite these data systems, a comprehensive and comparable assessment of health challenges and how they change over time is not available. Opportunities to compare China's health performance with other countries to learn where China has done well and where scope for improvement exists have thus been limited.

In this report, we use the results of the Global Burden of Diseases, Injuries, and Risk Factors Study 2010 (GBD 2010) to examine in detail the transformation of health in China from 1990 to 2010 and to benchmark health challenges in China to 18 major high-income and rapidly developing countries that are members of the G20.

Methods

Overview

Detail on the data, approaches to enhancing data quality and comparability, and statistical modelling and metrics for the GBD 2010 have been reported elsewhere.[1,23–29] In brief, GBD 2010 lists 291 diseases and injuries, organised in a hierarchy. For each of these causes, up to 24 sequelae exist that are clinical outcomes related to specific diseases and injuries, such as neuropathy due to diabetes. The study included 1160 sequelae.

The 2010 GBD study used numerous metrics to report results on health loss related to specific causes of disease and injury: deaths and death rates, years of life lost due to premature mortality (YLLs), years lived with disability (YLDs), and disability-adjusted life-years (DALYs). YLLs are computed by multiplying the number of deaths in each age group by a reference life expectancy at that age. The life expectancy at birth in the reference life table is 86·0 years based on the lowest reported death rates for each age group across countries in 2010, and is intended to represent an achievable pattern of mortality.[26] Years lived with disability are calculated from the prevalence of a sequela multiplied by the disability weight for that sequela. Disability weights are based on surveys of the general population.[27] DALYs are the sum of YLLs and YLDs. The GBD uses another indicator, healthy life expectancy (HALE), to summarise overall population health in one number, accounting for both length of life and levels of ill health at different ages.[28]

Mortality

Wang and colleagues[1] provide a detailed description on how rates of age-specific mortality have been estimated for each sex, country, and year. Appendix p 1 provides details on each of the sources available for measurement of the under-5 mortality rate, and appendix pp 2–3 provides similar information on measuring the probability of death between ages 15 years and 60 years. Available national data sources on the age pattern of mortality provide similar distributions of deaths for individuals aged 15–79 years (appendix pp 4–5).

Causes of death

We calculated numbers of deaths and YLLs based on underlying cause of death estimates for 235 of 291 causes of mortality, and for 20 age groups, both sexes, and 187 countries.[24] The appendix p 11 provides a listing of the major sources of information used to assess causes of death in China since 1980, including population-based cancer registry data. We assessed the quality of each data source, and mapped the codes for various Chinese variants of the International Classification of Diseases and Injuries (ICD) tabulation lists to the GBD 2010 cause list. We reassigned deaths assigned to ill-defined diagnoses or to disorders that are not likely to be underlying causes of death with standard algorithms.[30,31] GBD 2010 provides the most comprehensive effort to date to enhance the comparability of cause of death data across countries because it adjusts for revisions of the ICD and the redistribution of garbage codes. Garbage codes are causes of death that should not be identified as underlying causes of death but have been entered as the underlying cause of death on death certificates. Classic examples of garbage codes include senility or cardiopulmonary arrest. Uncertainty in cause of death estimates has been captured with standard simulation methods by taking 1000 draws[32] for each age, sex, country, year, and cause.[24] Final uncertainty for death numbers and YLLs also reflects uncertainty in the levels of all-cause mortality in each age-sex-country-year.

YLDS and HALE

We undertook prevalence estimation for each sequela with a systematic analysis of published and available unpublished data sources for prevalence, incidence, remission, and excess mortality. For most sequelae, we made estimates on the basis of a database for all age-sex-country-year groups, with a Bayesian meta-regression technique developed for the GBD 2010 (DisMod-MR). Several data sources have been used for the estimates of YLDs in China, including published studies,[33–38] multiple national surveys,[39,40] a set of 46 cancer registries,[41–46] and the Centers for Disease Control and

	Age-standardised death rate (per 100 000)				Age-standardised YLLs (per 100 000)				Age-standardised YLDs (per 100 000)				Life expectancy at birth (years)				HALE at birth (years)			
	1990		2010		1990		2010		1990		2010		1990		2010		1990		2010	
	Rate	Rank	Rate	Rank	Rate	Rank	Rate	Rank	Rate	Rank	Rate	Rank	LE	Rank	LE	Rank	HALE	Rank	HALE	Rank
China	896 (859–944)	14 (14–15)	607 (581–633)	13 (11–14)	24 989 (23 792–26 293)	13 (13–14)	14 024 (13 416–14 996)	11 (11–12)	9639 (7954–11 700)	2 (1–4)	8782 (7291–10 497)	1 (1–2)	69·3 (68·3–70·3)	13 (13–15)	75·7 (74·9–76·5)	12 (11–13)	61·7 (59·9–63·3)	13 (12–13)	67·8 (66·1–69·3)	10 (8–10)
Argentina	731 (725–736)	10 (10–10)	597 (593–602)	11 (11–13)	19 400 (19 003–19 767)	11 (10–11)	14 343 (14 163–14 574)	12 (11–12)	11 154 (9280–13 517)	9 (5–15)	10 843 (8885–13 183)	7 5–15)	72·5 (72·5–72·6)	10 (9–11)	76·0 (75·9–76·0)	11 (11–12)	63·1 (61·2–64·7)	10 (9–12)	66·1 (64·0–67·9)	12 (11–13)
Australia	568 (564–571)	5 (5–5)	389 (386–393)	2 (2–3)	12 381 (12 213–12 520)	4 (4–4)	7722 (7610–7897)	3 (3–3)	11 153 (9223–13 293)	8 (6–13)	10 979 (9088–13 165)	9 (6–13)	76·9 (76·8–76·9)	5 (4–5)	81·5 (81·4–81·6)	2 (2–3)	66·6 (64·7–68·4)	4 (2–5)	70·4 (68·2–72·3)	2 (2–5)
Brazil	854 (846–863)	13 (13–13)	670 (665–674)	15 (15–15)	26 370 (25 718–27 152)	15 (14–15)	17 580 (17 240–17 932)	15 (14–15)	12 016 (9914–14 293)	14 (12–17)	11 637 (9670–13 849)	15 (11–17)	69·1 (68·9–69·3)	14 (13–14)	74·1 (73·9–74·3)	15 (14–15)	59·6 (57·8–61·3)	15 (14–15)	64·0 (62·0–65·7)	15 (14–15)
Canada	558 (554–561)	3 (3–3)	422 (418–427)	5 (5–5)	12 079 (11 923–12 203)	2 (2–2)	8546 (8429–8714)	5 (4–6)	10 806 (8988–12 878)	6 (4–10)	10 845 (9035–12 854)	6 (5–13)	77·2 (77·1–77·3)	2 (2–2)	80·6 (80·4–80·8)	5 (5–5)	67·1 (65·2–68·8)	2 (2–4)	69·7 (67·8–71·6)	5 (4–7)
Germany	644 (641–646)	9 (8–9)	433 (429–440)	6 (6–6)	14 032 (13 863–14 171)	7 (7–7)	8512 (8383–8739)	4 (4–5)	11 165 (9271–13 253)	10 (6–13)	11 015 (9177–13 070)	10 (6–13)	75·4 (75·3–75·4)	7 (7–8)	80·2 (80·1–80·4)	6 (6–6)	65·4 (63·5–67·1)	8 (6–8)	69·3 (67·3–71·1)	7 (6–8)
France	549 (545–553)	2 (2–2)	408 (403–416)	4 (4–4)	12 717 (12 535–12 858)	5 (5–5)	8666 (8516–8912)	6 (5–6)	11 358 (9418–13 475)	11 (7–14)	11 194 (9279–13 307)	12 (6–15)	77·1 (77·0–77·1)	3 (3–3)	80·9 (80·7–81·1)	4 (4–4)	66·6 (64·6–68·4)	5 (2–5)	69·7 (67·6–71·6)	6 (4–7)
UK	638 (634–642)	6 (6–8)	455 (452–458)	8 (8–8)	13 452 (13 296–13 581)	6 (6–6)	8949 (8871–9052)	8 (7–8)	11 453 (9466–13 603)	12 (8–14)	11 435 (9482–13 569)	14 (10–16)	75·7 (75·6–75·7)	6 (6–7)	79·9 (79·9–80·0)	7 (7–7)	65·5 (63·6–67·3)	7 (6–8)	68·8 (66·7–70·7)	8 (7–9)
Indonesia	1033 (1005–1062)	17 (17–17)	867 (831–903)	16 (16–16)	34 584 (33 009–36 082)	18 (17–18)	24 178 (23 026–25 502)	16 (16–17)	12 101 (9909–14 596)	15 (10–18)	11 107 (9122–13 402)	11 (5–16)	65·0 (64·5–65·5)	17 (17–18)	69·7 (68·5–70·9)	16 (16–17)	56·2 (54·4–57·8)	17 (17–18)	60·9 (59·0–62·7)	16 (16–17)
India	1447 (1389–1530)	19 (19–19)	1097 (1011–1166)	18 (18–18)	50 084 (47 613–53 409)	19 (19–19)	33 366 (30 670–35 506)	18 (18–18)	13 727 (11 265–16 542)	19 (18–19)	12 494 (10 287–14 967)	18 (16–18)	58·3 (56·9–59·7)	19 (19–19)	65·2 (63·5–66·9)	18 (18–18)	49·8 (47·8–51·7)	19 (19–19)	56·2 (53·8–58·3)	18 (18–18)
Italy	561 (558–563)	4 (4–4)	389 (386–396)	3 (2–3)	12 202 (12 053–12 330)	3 (3–3)	7485 (7359–7703)	2 (2–2)	11 038 (9150–13 174)	7 (5–12)	10 907 (9081–12 895)	8 (5–12)	77·0 (76·9–77·0)	4 (4–5)	81·5 (81·3–81·6)	3 (2–3)	66·8 (64·8–68·6)	3 (2–5)	70·3 (68·3–72·2)	3 (2–5)
Japan	469 (466–471)	1 (1–1)	352 (350–356)	1 (1–1)	9658 (9552–9750)	1 (1–1)	6827 (6761–6939)	1 (1–1)	9406 (7794–11 361)	1 (1–3)	9094 (7465–10 904)	2 (1–4)	79·1 (79·1–79·1)	1 (1–1)	82·6 (82·6–82·7)	1 (1–1)	69·9 (68·0–71·5)	1 (1–1)	73·0 (71·2–74·7)	1 (1–1)
South Korea	813 (802–822)	12 (12–12)	447 (441–452)	7 (7–7)	18 830 (18 158–19 318)	10 (9–10)	8941 (8801–9093)	7 (7–8)	10 074 (8289–12 073)	3 (2–7)	9575 (7888–11 559)	4 (2–5)	72·1 (71·6–72·6)	11 (10–11)	79·7 (79·6–79·8)	8 (8–8)	63·8 (62·1–65·4)	9 (9–11)	70·3 (68·4–72·0)	4 (2–6)
Mexico	740 (732–749)	11 (11–11)	604 (599–609)	12 (12–14)	22 775 (22 171–23 502)	12 (12–12)	15 658 (15 365–15 976)	13 (13–14)	10 092 (8414–12 094)	4 (2–6)	9364 (7762–11 245)	3 (2–4)	71·5 (71·2–71·9)	12 (11–12)	75·5 (75·2–75·7)	13 (12–14)	62·9 (61·1–64·4)	11 (10–12)	66·9 (65·2–68·4)	11 (11–12)
Russia	953 (947–959)	16 (15–16)	952 (947–959)	17 (17–17)	25 715 (25 268–26 205)	14 (13–14)	25 387 (25 067–25 797)	17 (16–17)	11 536 (9582–13 845)	13 (7–15)	11 444 (9494–13 509)	13 (8–17)	68·7 (68·4–69·0)	15 (14–15)	68·9 (68·6–69·1)	17 (16–17)	59·8 (58·1–61·3)	14 (14–15)	60·0 (58·4–61·6)	17 (16–17)

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	Age-standardised death rate (per 100 000)				Age-standardised YLLs (per 100 000)				Age-standardised YLDs (per 100 000)				Life expectancy at birth (years)				HALE at birth (years)			
	1990		2010		1990		2010		1990		2010		1990		2010		1990		2010	
	Rate	Rank	Rate	Rank	Rate	Rank	Rate	Rank	Rate	Rank	Rate	Rank	LE	Rank	LE	Rank	HALE	Rank	HALE	Rank
(Continued from previous page)																				
Saudi Arabia	641 (594–703)	8 (6–9)	538 (517–560)	10 (10–10)	17 367 (15 994–19 202)	9 (9–10)	12 637 (12 009–13 524)	10 (10–10)	12 745 (10 465–15 351)	17 (14–19)	12 489 (10 266–15 051)	17 (15–18)	74·0 (72·0–75·9)	9 (6–11)	77·1 (76·1–78·1)	10 (10–10)	62·7 (60·0–65·4)	12 (9–13)	65·3 (62·8–67·7)	13 (12–14)
Turkey	942 (895–980)	15 (14–16)	628 (584–660)	14 (11–14)	30 025 (28 350–31 541)	16 (16–16)	16 760 (15 331–18 071)	14 (13–15)	12 442 (10 380–14 783)	16 (14–18)	11 885 (9895–14 020)	16 (12–17)	67·1 (66·1–68·1)	16 (16–16)	74·4 (72·8–75·7)	14 (12–15)	57·7 (55·8–59·4)	16 (16–16)	64·0 (61·7–66·2)	14 (13–15)
USA	639 (637–642)	7 (6–8)	516 (513–519)	9 (9–9)	15 130 (14 957–15 283)	8 (8–8)	11 447 (11 312–11 630)	9 (9–9)	10 503 (8753–12 449)	5 (3–7)	10 509 (8803–12 375)	5 (5–9)	75·2 (75·2–75·2)	8 (8–9)	78·2 (78·2–78·3)	9 (9–9)	65·8 (64·0–67·4)	6 (6–8)	68·1 (66·3–69·8)	9 (9–10)
South Africa	1133 (1071–1180)	18 (18–18)	1266 (1200–1334)	19 (19–19)	34 540 (32 586–36 273)	17 (17–18)	48 286 (45 928–51 074)	19 (19–19)	12 905 (10 595–15 408)	18 (15–19)	13 826 (11 406–16 608)	19 (19–19)	64·6 (63·5–65·8)	18 (17–18)	59·9 (57·5–61·8)	19 (19–19)	55·5 (53·5–57·3)	18 (17–18)	51·1 (48·8–53·2)	19 (19–19)

Data in parentheses are 95% uncertainty intervals. Countries have been ranked such that the best performer is ranked 1 for each indicator. YLL=years of life lost. YLD=years lived with disability. LE=life expectancy. HALE=healthy life expectancy at birth.

Table 1: **Age-standardised death rates, YLLs, and YLDs, and life expectancy at birth and HALE at birth for 1990 and 2010 for both sexes combined for 19 members countries of the G20**

Prevention (CDC) surveillance system.[47–53] The effects of treatment depending on the cause are captured through changes in prevalence, changes in the severity distribution across sequelae (eg, for chronic obstructive pulmonary disease), and for some injuries different disability weights for treated and untreated outcomes. Access to treatment for injuries is estimated on the basis of an indicator of access to health systems.[29]

For GBD 2010, disability weights were measured for 220 unique health states that cover the 1160 disease and injury sequelae.[27] Disability weights were generated from more than 30 000 respondents collected through population-based surveys in five countries—USA, Peru, Tanzania, Bangladesh, and Indonesia—and an open internet survey. 271 respondents of the internet survey were from China. Uncertainty in the disability weight for each sequela has been propagated into the estimates of YLDs for each disease and injury. We combined information about age-specific mortality rates, and about overall age-specific YLDs per person into the overall measure of health expectancy, HALE, using a standard approach to extending the life table to capture adjustments for non-fatal health outcomes.[28]

Risk factors

Deaths, YLLs, YLDs, and DALYs attributable to 67 risk factors or clusters of risk factors were assessed with three key inputs.[23] First, for each risk–outcome pair, relative risks of mortality or morbidity, or both, were estimated on the basis of meta-analyses of the published literature. Second, each risk factor exposure distribution in each country, age, and sex group was estimated on the basis of published and unpublished data sources with mostly Bayesian estimation methods.[23] For China, key sources included the 2002 China National Nutrition and Health Survey, the China Global Youth Tobacco Survey, the Second National Health Services Survey, the 1996 Global Youth Tobacco Survey, the 1996 National Prevalence Survey, the After-MONICA, the INTERSALT Beijing, the INTERMAP Beijing, and the 2000 and 2005 national censuses. Third, we estimated attributable deaths or DALYs by comparing the present distribution of exposure to a theoretical minimum risk counterfactual distribution of exposure selected for each risk factor. Each risk factor or cluster of risk factors was analysed separately and therefore the sum of attributable fractions for a disease or injury can be greater than 100%. Uncertainty in the relative risks, exposure estimates, and theoretical minimum risk distributions and uncertainty in the background outcome rates have been propagated into the final estimates.

Benchmarking

For outcomes measured for specific age groups (deaths, YLLs, YLDs, and DALYs), we directly computed age-standardised rates with the WHO age-standard.[54] This standard is very close to the distribution of China's population in 2010. For each disease, injury, or risk

factor, we ranked countries in 1990 and 2010 by the age-standardised rates for each outcome measure. We compared China outcomes to the 18 other countries that are members of the G20 (the 20th member is the European Union). The G20 is the set of developed and developing countries identified as global agenda setters. Comparisons of China with this group provide insights into China's standing relative to this set of developed or rapidly developing countries. For each quantity of interest in the GBD, 1000 draws were taken from the posterior distribution. We computed ranks across causes and percentage change from 1990 to 2010 at the draw level. We report 95% uncertainty intervals for ranks. For percentage change from 1990 to 2010 computed at the level of each draw, we report the median percentage change, which is less sensitive to extreme values than the mean percentage change. For a specific country and cause, we tested whether a country was significantly greater than the G20 mean, indistinguishable from the mean, or below the mean.

Role of the funding source

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

Results

Table 1 provides an overall comparative view of health across the G20. Between 1990 and 2010, China had a 6·4 year improvement in life expectancy at birth for both sexes combined (from 69·3 years to 75·7 years), rising one rank past Mexico in a league table of G20 countries. In terms of the age-standardised death rate, China ranked 13th (95% uncertainty interval [UI] 11th to 14th) in 2010, ahead of Turkey, Brazil, Indonesia, Russia, India, and South Africa, but behind countries such as South Korea, USA, Saudi Arabia, Argentina, and Mexico. Across the G20, age-standardised YLL rate varied by more than sevenfold. China had the lowest levels of age-standardised YLDs in 2010 across the G20; although Japan, South Korea, and Mexico had rates that were statistically indistinguishable from China. Across G20 countries the ratio of the highest to lowest age-standardised YLD rate was only 1·6. China ranks at 10th (8th to 10th) for HALE in 2010, only 0·4 years (95% UI –0·4 to 1·2) behind the USA. Japan had a healthy life expectancy in 2010 that was 5·2 years (4·3–6·2) longer than that reported for China.

Changes in age-specific mortality rates in China from 1990 to 2010 varied widely by age and sex (figure 1). Under-5 mortality rates declined by nearly 70% (95% UI 61·3–77·9). We noted declines in female adult mortality with declines in excess of 50% for age groups 0 years to 30–34 years. Progress in reduction of male mortality was substantially worse than that noted for women. Figure 1 shows comparative progress in reduction of age-specific mortality with other G20 countries. For men, China's

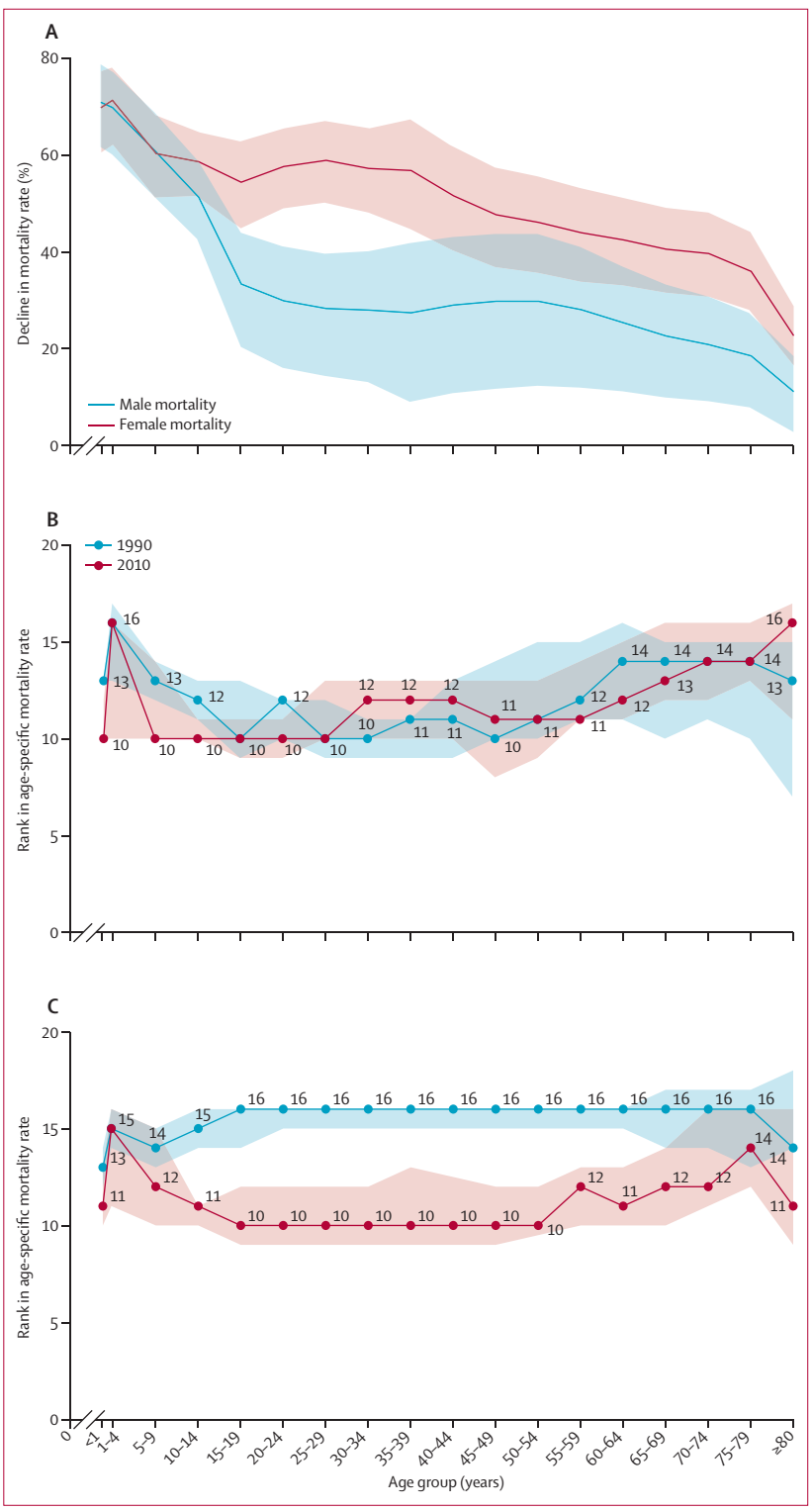

Figure 1: **Age-specific mortality in China, 1990–2010**
(A) Percentage change in age-specific mortality, by sex, in China between 1990 and 2010. (B) Rank of age-specific mortality for male individuals in China compared with 18 other members of the G20. (C) Rank of age-specific mortality for female individuals in China compared with 18 other members of the G20. Shaded areas show 95% uncertainty intervals (UI). In some cases, the 95% UI has an upper and lower bound equal to the rank of the mean death rate. Countries have been ranked such that the best performer is ranked as one for each indicator.

	All ages deaths (thousands)			Age-standardised death rate (per 100 000)		
	1990	2010	Median %Δ	1990	2010	Median %Δ
All causes	**7997·5 (7663·4–8426·7)**	**8303·7 (7939·6–8678·7)**	**4·0**	**895·9 (858·8–943·6)**	**606·8 (580·7–632·7)**	**–32·1**
Communicable, maternal, neonatal, and nutritional disorders	**1207·8 (1105·1–1303·8)**	**490·4 (441·9–548·5)**	**–59·5**	**108·5 (100·3–117·4)**	**40·7 (36·6–45·2)**	**–62·5**
HIV/AIDS and tuberculosis	169·2 (140·8–200·2)	80·9 (63·6–100·1)	–52·2	18·6 (15·4–22·0)	5·5 (4·3–6·8)	–70·2
Tuberculosis	169·0 (140·5–200·0)	44·7 (32·7–54·2)	–73·0	18·5 (15·4–21·9)	3·1 (2·3–3·8)	–82·8
HIV/AIDS	0·2 (0·0–0·6)	36·2 (25·1–49·2)	13 860·7	<0·05 (0·0–0·1)	2·4 (1·7–3·3)	9447·6
HIV disease resulting in mycobacterial infection	<0·05 (0·0–0·1)	2·0 (1·4–2·7)	6050·5	<0·05 (0·0–0·05)	0·1 (0·1–0·2)	4159·1
HIV disease resulting in other specified or unspecified diseases	0·2 (0·0–0·5)	34·2 (23·9–46·7)	14 809·7	<0·05 (0·0–0·1)	2·3 (1·6–3·1)	10 224·8
Diarrhoea, lower respiratory infections, meningitis, and other common infectious diseases	558·4 (492·7–623·3)	223·2 (188·9–257·3)	–59·9	50·6 (45·6–56·5)	18·2 (15·5–21·1)	–63·9
Diarrhoeal diseases	71·3 (61·5–83·2)	4·4 (3·7–5·3)	–93·9	6·4 (5·6–7·3)	0·4 (0·3–0·5)	–94·0
Cholera	2·0 (1·2–3·5)	0·1 (0·1–0·2)	–95·3	0·2 (0·1–0·3)	<0·05 (0·0–0·05)	–94·0
Other salmonella infections	5·6 (4·0–7·9)	0·4 (0·3–0·5)	–93·6	0·5 (0·4–0·7)	<0·05 (0·0–0·05)	–93·8
Shigellosis	4·8 (3·6–6·5)	0·3 (0·3–0·5)	–93·1	0·5 (0·4–0·6)	<0·05 (0·0–0·05)	–93·9
Enteropathogenic *E coli* infection	6·6 (4·0–10·2)	0·3 (0·2–0·5)	–95·4	0·5 (0·3–0·8)	<0·05 (0·0–0·1)	–94·1
Enterotoxigenic *E coli* infection	6·4 (4·8–8·4)	0·5 (0·3–0·6)	–92·9	0·6 (0·5–0·8)	<0·05 (0·0–0·1)	–93·9
Campylobacter enteritis	6·7 (4·3–9·8)	0·4 (0·3–0·6)	–94·4	0·6 (0·4–0·8)	<0·05 (0·0–0·1)	–94·0
Amoebiasis	1·8 (1·3–2·5)	0·2 (0·1–0·2)	–91·4	0·2 (0·1–0·3)	<0·05 (0·0–0·05)	–93·9
Cryptosporidiosis	5·5 (3·4–8·4)	0·3 (0·2–0·4)	–95·4	0·4 (0·3–0·7)	<0·05 (0·0–0·05)	–94·0
Rotaviral enteritis	17·8 (13·1–23·6)	0·9 (0·6–1·2)	–94·9	1·5 (1·1–1·9)	0·1 (0·1–0·1)	–94·0
Other diarrhoeal diseases	14·1 (9·6–20·0)	1·1 (0·8–1·5)	–92·2	1·4 (1·0–2·0)	0·1 (0·1–0·1)	–93·9
Typhoid and paratyphoid fevers	12·0 (1·4–22·6)	11·9 (1·4–21·9)	–1·0	1·0 (0·1–1·9)	0·9 (0·1–1·7)	–6·5
Lower respiratory infections	392·4 (342·3–441·9)	195·2 (162·9–226·3)	–50·1	36·4 (32·3–41·5)	15·9 (13·4–18·5)	–56·2
Influenza	75·2 (61·9–91·1)	40·8 (33·4–47·9)	–45·5	7·1 (6·0–8·6)	3·3 (2·7–3·9)	–53·7
Pneumococcal pneumonia	89·7 (74·8–107·1)	60·5 (48·9–72·4)	–32·3	9·0 (7·6–10·9)	4·8 (3·9–5·8)	–46·3
H influenzae type B pneumonia	102·2 (79·6–126·8)	30·4 (25·5–35·8)	–70·3	8·6 (6·8–10·5)	2·6 (2·2–3·1)	–69·9
Respiratory syncytial virus pneumonia	56·1 (39·4–74·7)	7·3 (5·5–10·0)	–87·2	4·3 (3·1–5·7)	0·8 (0·5–1·1)	–83·0
Other lower respiratory infections	69·2 (53·4–93·3)	56·2 (43·0–70·0)	–17·5	7·3 (5·7–9·6)	4·5 (3·4–5·6)	–38·2
Upper respiratory infections	0·3 (0·3–0·4)	<0·05 (0·0–0·1)	–89·4	<0·05 (0·0–0·05)	<0·05 (0·0–0·05)	–84·9
Otitis media	1·0 (0·0–11·6)	0·3 (0·0–2·9)	–74·6	0·1 (0·0–1·0)	<0·05 (0·0–0·3)	–74·1
Meningitis	30·6 (24·5–34·7)	7·7 (6·4–10·2)	–76·0	2·7 (2·2–3·1)	0·6 (0·5–0·8)	–78·3
Pneumococcal meningitis	5·8 (4·3–6·9)	1·4 (1·1–2·0)	–77·0	0·5 (0·4–0·6)	0·1 (0·1–0·2)	–79·5
H influenzae type B meningitis	4·8 (3·8–5·9)	0·9 (0·7–1·2)	–81·1	0·4 (0·3–0·5)	0·1 (0·1–0·1)	–78·5
Meningococcal infection	4·1 (3·0–4·9)	1·0 (0·8–1·3)	–77·7	0·4 (0·3–0·4)	0·1 (0·1–0·1)	–79·6
Other meningitis	15·9 (12·1–18·4)	4·4 (3·6–6·0)	–74·1	1·5 (1·1–1·7)	0·3 (0·3–0·5)	–78·1
Encephalitis	3·7 (3·0–4·4)	0·7 (0·5–0·8)	–82·1	0·3 (0·2–0·3)	0·1 (0·1–0·1)	–78·7
Diphtheria	0·2 (0·0–1·4)	<0·05 (0·0–0·4)	–73·4	<0·05 (0·0–0·1)	<0·05 (0·0–0·05)	–68·8
Whooping cough	3·3 (0·0–16·4)	0·5 (0·0–2·2)	–86·0	0·3 (0·0–1·3)	<0·05 (0·0–0·2)	–80·6
Tetanus	19·0 (8·9–34·8)	1·7 (0·5–5·2)	–91·9	1·6 (0·7–3·1)	0·1 (0·0–0·4)	–91·3
Measles	23·7 (7·9–60·2)	0·4 (0·1–1·1)	–98·3	1·8 (0·6–4·6)	<0·05 (0·0–0·1)	–97·7
Varicella	0·8 (0·0–5·5)	0·5 (0·0–3·7)	–34·0	0·1 (0·0–0·5)	<0·05 (0·0–0·3)	–42·6
Neglected tropical diseases and malaria	24·0 (10·9–65·7)	14·9 (4·7–57·6)	–45·7	2·4 (1·0–7·0)	1·1 (0·3–4·0)	–58·5
Malaria	0·2 (0·1–0·3)	0·1 (0·0–0·1)	–63·2	<0·05 (0·0–0·05)	<0·05 (0·0–0·05)	–72·1
Leishmaniasis	6·5 (2·8–14·7)	1·8 (0·8–3·6)	–71·2	0·6 (0·2–1·2)	0·1 (0·1–0·3)	–73·5
Schistosomiasis	8·5 (0·0–50·4)	8·5 (0·0–50·2)	0·2	0·9 (0·0–5·6)	0·6 (0·0–3·5)	–37·9
Cysticercosis	<0·05 (0·0–0·1)	<0·05 (0·0–0·2)	54·0	<0·05 (0·0–0·05)	<0·05 (0·0–0·05)	3·8
Echinococcosis	0·6 (0·0–2·3)	0·4 (0·0–1·6)	–31·5	0·1 (0·0–0·2)	<0·05 (0·0–0·1)	–56·1
Dengue	1·0 (0·2–3·2)	1·0 (0·4–2·3)	11·6	0·1 (0·0–0·3)	0·1 (0·0–0·2)	–5·6
Rabies	2·0 (1·2–3·2)	1·2 (0·4–2·2)	–52·6	0·2 (0·1–0·3)	0·1 (0·0–0·2)	–66·1
Intestinal nematode infections	1·4 (0·0–6·7)	0·3 (0·0–1·7)	–75·3	0·1 (0·0–0·5)	<0·05 (0·0–0·2)	–69·9
Ascariasis	1·4 (0·0–6·7)	0·3 (0·0–1·7)	–75·3	0·1 (0·0–0·5)	<0·05 (0·0–0·2)	–69·9

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	All ages deaths (thousands)			Age-standardised death rate (per 100 000)		
	1990	2010	Median %Δ	1990	2010	Median %Δ
(Continued from previous page)						
Other neglected tropical diseases	3·9 (1·8–5·3)	1·5 (0·6–4·1)	–73·0	0·4 (0·2–0·5)	0·1 (0·0–0·3)	–81·1
Maternal disorders	20·6 (15·9–28·5)	5·0 (3·6–6·3)	–75·7	1·6 (1·3–2·2)	0·3 (0·2–0·4)	–78·2
Maternal haemorrhage	5·6 (4·4–7·7)	1·6 (1·2–2·1)	–70·5	0·4 (0·3–0·6)	0·1 (0·1–0·1)	–74·4
Maternal sepsis	3·0 (2·3–4·1)	0·7 (0·5–0·9)	–75·4	0·2 (0·2–0·3)	0·1 (0·0–0·1)	–77·2
Hypertensive disorders of pregnancy	2·4 (1·9–3·3)	0·5 (0·4–0·6)	–79·0	0·2 (0·1–0·3)	<0·05 (0·0–0·05)	–80·7
Obstructed labour	0·2 (0·2–0·3)	<0·05 (0·0–0·1)	–74·5	<0·05 (0·0–0·05)	<0·05 (0·0–0·05)	–77·5
Abortion	3·4 (2·6–4·7)	0·8 (0·6–1·1)	–75·0	0·3 (0·2–0·4)	0·1 (0·0–0·1)	–77·4
Other maternal disorders	6·0 (4·7–8·3)	1·2 (0·9–1·5)	–79·6	0·5 (0·4–0·7)	0·1 (0·1–0·1)	–81·8
Neonatal disorders	343·0 (291·9–394·9)	83·4 (61·2–102·7)	–75·7	26·4 (22·5–30·4)	9·4 (6·9–11·6)	–64·5
Preterm birth complications	97·4 (69·2–131·7)	27·6 (20·0–37·3)	–71·6	7·5 (5·3–10·2)	3·1 (2·3–4·2)	–58·4
Neonatal encephalopathy (birth asphyxia/birth trauma)	109·7 (75·2–150·6)	26·8 (16·4–39·8)	–75·4	8·5 (5·8–11·6)	3·0 (1·9–4·5)	–64·0
Sepsis and other infectious disorders of the newborn baby	5·1 (1·9–11·2)	1·6 (0·8–3·2)	–65·9	0·4 (0·1–0·9)	0·2 (0·1–0·4)	–50·0
Other neonatal disorders	130·9 (77·9–186·4)	27·4 (18·0–40·1)	–79·2	10·1 (6·0–14·4)	3·1 (2·0–4·5)	–69·6
Nutritional deficiencies	20·0 (16·8–31·9)	13·4 (6·8–17·4)	–25·2	2·0 (1·7–3·1)	1·1 (0·5–1·4)	–40·2
Protein-energy malnutrition	14·8 (12·2–20·4)	9·2 (5·2–12·0)	–36·0	1·5 (1·2–2·0)	0·7 (0·4–1·0)	–47·5
Iodine deficiency	0·2 (0·2–0·2)	0·2 (0·1–0·3)	36·2	<0·05 (0·0–0·05)	<0·05 (0·0–0·05)	12·8
Iron-deficiency anaemia	3·9 (3·3–4·9)	2·8 (1·6–3·5)	–28·0	0·4 (0·3–0·5)	0·2 (0·1–0·3)	–44·9
Other nutritional deficiencies	1·1 (1·0–1·5)	1·2 (0·7–1·6)	9·5	0·1 (0·1–0·2)	0·1 (0·1–0·1)	–20·6
Other communicable, maternal, neonatal, and nutritional disorders	72·6 (63·1–82·5)	69·7 (57·7–78·6)	–4·0	7·0 (6·1–7·8)	5·1 (4·1–5·7)	–27·6
Sexually transmitted diseases excluding HIV	19·2 (11·2–27·8)	2·7 (1·7–4·3)	–86·8	1·7 (0·9–2·5)	0·3 (0·2–0·4)	–85·0
Syphilis	17·0 (10·7–25·2)	2·2 (1·3–3·7)	–87·2	1·4 (0·9–2·1)	0·2 (0·1–0·4)	–84·7
Sexually transmitted chlamydial diseases	0·5 (0·2–0·9)	0·1 (0·1–0·2)	–84·1	0·1 (0·0–0·1)	<0·05 (0·0–0·05)	–89·3
Gonococcal infection	0·4 (0·1–0·7)	0·1 (0·1–0·1)	–84·0	<0·05 (0·0–0·1)	<0·05 (0·0–0·05)	–89·3
Other sexually transmitted diseases	1·3 (0·4–2·2)	0·3 (0·2–0·5)	–84·0	0·1 (0·0–0·2)	<0·05 (0·0–0·05)	–89·3
Hepatitis	33·3 (30·1–36·7)	43·8 (37·7–50·7)	30·9	3·4 (3·1–3·8)	3·0 (2·5–3·4)	–13·5
Acute hepatitis A	7·0 (3·1–16·9)	5·2 (1·8–17·7)	–29·4	0·7 (0·3–1·7)	0·4 (0·1–1·2)	–53·6
Acute hepatitis B	21·3 (16·6–27·9)	35·1 (23·5–44·1)	67·8	2·3 (1·8–3·0)	2·3 (1·6–3·0)	7·0
Acute hepatitis C	0·7 (0·4–1·1)	1·2 (0·8–1·6)	88·2	0·1 (0·0–0·1)	0·1 (0·1–0·1)	16·0
Acute hepatitis E	4·2 (2·3–7·1)	2·3 (1·1–4·1)	–47·3	0·3 (0·2–0·6)	0·2 (0·1–0·3)	–52·0
Other infectious diseases	20·1 (16·6–27·2)	23·2 (13·0–28·5)	22·9	1·9 (1·6–2·5)	1·8 (1·0–2·3)	2·5
Non-communicable diseases	**5937·8 (5679·4–6331·6)**	**7017·1 (6663·3–7310·2)**	**18·7**	**708·5 (678·0–754·9)**	**509·4 (483·6–530·3)**	**–27·8**
Neoplasms	1503·6 (1362·6–1710·4)	2133·5 (1905·4–2314·6)	43·1	170·0 (154·5–193·7)	148·0 (131·9–160·4)	–12·0
Oesophageal cancer	168·8 (138·0–225·8)	176·0 (117·9–224·7)	10·1	19·8 (16·1–26·3)	12·3 (8·2–15·8)	–34·4
Stomach cancer	297·4 (228·5–403·4)	297·0 (209·5–385·3)	0·0	34·3 (26·3–46·6)	20·8 (14·7–27·0)	–39·2
Liver cancer	238·6 (199·6–283·9)	369·7 (322·0–467·0)	54·0	26·5 (22·3–31·7)	25·0 (21·6–31·4)	–6·4
Liver cancer secondary to hepatitis B	128·5 (107·6–153·3)	200·8 (170·0–253·6)	55·4	14·3 (12·0–17·0)	13·5 (11·4–16·9)	–5·6
Liver cancer secondary to hepatitis C	42·5 (36·1–51·8)	71·8 (60·0–89·4)	69·8	4·9 (4·2–6·0)	4·9 (4·1–6·1)	1·5
Liver cancer secondary to alcohol use	44·4 (36·2–53·5)	67·5 (56·2–87·6)	51·4	4·9 (4·0–5·9)	4·5 (3·8–5·8)	–8·2
Other liver cancer	23·3 (19·1–28·5)	29·5 (24·3–39·3)	25·1	2·4 (2·0–2·9)	1·9 (1·6–2·6)	–21·2
Larynx cancer	9·8 (4·4–18·8)	13·5 (5·6–25·3)	34·8	1·1 (0·5–2·2)	0·9 (0·4–1·8)	–19·3
Trachea, bronchus, and lung cancers	260·2 (216·2–372·9)	513·3 (353·4–598·5)	109·5	30·0 (25·0–43·2)	35·8 (24·5–41·8)	27·2
Breast cancer	29·2 (27·9–30·5)	52·5 (47·4–59·6)	78·4	3·3 (3·1–3·4)	3·5 (3·1–3·9)	5·0
Cervical cancer	20·7 (13·2–30·7)	25·4 (12·4–32·5)	31·3	2·4 (1·5–3·5)	1·7 (0·8–2·2)	–24·5
Uterine cancer	5·4 (3·7–11·8)	10·5 (3·7–13·8)	139·3	0·6 (0·4–1·3)	0·7 (0·3–0·9)	42·8
Prostate cancer	3·9 (2·4–7·0)	11·3 (4·7–17·6)	138·2	0·5 (0·3–0·9)	0·9 (0·4–1·3)	43·7
Colon and rectum cancers	93·0 (76·9–105·2)	150·4 (130·5–186·1)	59·4	10·7 (8·9–12·1)	10·6 (9·1–13·0)	–2·3
Mouth cancer	7·5 (6·2–8·5)	14·0 (10·3–18·4)	87·1	0·9 (0·7–1·0)	1·0 (0·7–1·3)	12·6
Nasopharynx cancer	22·1 (15·2–32·4)	34·4 (21·1–48·9)	49·5	2·4 (1·7–3·6)	2·3 (1·4–3·2)	–9·1

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	All ages deaths (thousands)			Age-standardised death rate (per 100 000)		
	1990	2010	Median %Δ	1990	2010	Median %Δ
(Continued from previous page)						
Cancer of other part of pharynx and oropharynx	4·1 (2·5–5·5)	5·1 (3·6–8·3)	20·9	0·5 (0·3–0·6)	0·3 (0·2–0·6)	–26·1
Gallbladder and biliary tract cancer	17·8 (12·7–27·3)	29·8 (19·5–40·5)	67·6	2·1 (1·5–3·2)	2·1 (1·4–2·9)	1·7
Pancreatic cancer	32·1 (24·9–43·1)	58·2 (43·2–74·8)	82·9	3·7 (2·9–5·0)	4·0 (3·0–5·2)	9·4
Malignant melanoma of skin	2·7 (1·4–3·4)	6·7 (4·5–11·4)	131·5	0·3 (0·2–0·4)	0·5 (0·3–0·8)	45·8
Non-melanoma skin cancer	3·2 (1·5–5·8)	4·5 (2·4–8·1)	41·1	0·4 (0·2–0·7)	0·3 (0·2–0·6)	–15·7
Ovarian cancer	14·4 (9·8–18·4)	20·7 (13·6–29·1)	34·4	1·6 (1·1–2·0)	1·4 (0·9–1·9)	–18·7
Testicular cancer	1·0 (0·5–1·4)	0·8 (0·4–1·5)	–18·3	0·1 (0·0–0·1)	0·1 (0·0–0·1)	–43·5
Kidney and other urinary organ cancers	13·7 (9·9–19·5)	32·0 (22·5–41·4)	134·9	1·5 (1·1–2·2)	2·2 (1·6–2·9)	47·2
Bladder cancer	14·5 (12·3–18·6)	22·9 (17·6–28·2)	59·2	1·8 (1·5–2·2)	1·7 (1·3–2·1)	–4·2
Brain and nervous system cancers	35·5 (23·1–48·4)	48·9 (29·3–67·1)	38·0	3·8 (2·5–5·2)	3·3 (2·0–4·6)	–11·5
Thyroid cancer	4·8 (3·7–6·5)	8·1 (5·7–10·6)	69·5	0·5 (0·4–0·7)	0·6 (0·4–0·7)	4·9
Hodgkin's disease	1·5 (1·0–2·2)	1·2 (0·7–1·7)	–20·2	0·1 (0·1–0·2)	0·1 (0·1–0·1)	–43·0
Non-Hodgkin lymphoma	21·0 (17·8–24·3)	27·7 (22·6–33·7)	30·3	2·2 (1·9–2·6)	2·0 (1·6–2·4)	–13·9
Multiple myeloma	5·1 (3·5–7·8)	9·4 (5·4–13·3)	90·2	0·5 (0·4–0·8)	0·7 (0·4–0·9)	21·4
Leukaemia	53·0 (42·3–67·5)	58·0 (44·2–69·2)	13·7	4·9 (3·9–6·2)	4·2 (3·2–5·0)	–10·5
Other neoplasms	122·5 (84·9–149·0)	131·6 (95·7–171·3)	6·3	13·4 (9·3–16·4)	9·2 (6·7–11·9)	–32·1
Cardiovascular and circulatory diseases	2167·5 (2054·9–2462·4)	3136·2 (2827·1–3274·6)	47·4	267·7 (253·5–304·4)	230·8 (207·4–241·1)	–12·2
Rheumatic heart disease	131·4 (120·1–147·3)	57·1 (49·8–63·0)	–56·4	14·9 (13·7–16·8)	4·0 (3·5–4·5)	–72·7
Ischaemic heart disease	450·3 (409·2–594·5)	948·7 (774·5–1024·6)	120·3	55·7 (50·6–73·9)	70·1 (57·2–76·0)	31·6
Cerebrovascular disease	1340·6 (1237·6–1623·2)	1726·7 (1463·2–1848·6)	34·5	167·0 (154·5–201·6)	126·9 (107·9–135·8)	–20·8
Ischaemic stroke	426·4 (304·4–639·7)	609·6 (478·3–808·4)	44·7	56·3 (40·8–83·3)	46·7 (36·7–61·6)	–16·2
Haemorrhagic and other non-ischemic stroke	914·2 (657·9–1146·4)	1117·2 (887·1–1359·1)	22·1	110·7 (79·1–139·5)	80·2 (63·8–97·9)	–27·7
Hypertensive heart disease	133·7 (106·7–174·0)	172·9 (136·4–210·6)	31·5	16·9 (13·4–21·8)	12·8 (10·1–15·7)	–22·8
Cardiomyopathy and myocarditis	32·6 (20·4–48·1)	35·2 (24·5–49·5)	8·8	3·6 (2·3–5·1)	2·5 (1·8–3·6)	–28·5
Atrial fibrillation and flutter	4·8 (1·9–10·3)	12·9 (5·6–26·6)	175·1	0·6 (0·2–1·5)	1·0 (0·4–2·1)	58·7
Aortic aneurysm	36·3 (12·9–62·6)	58·2 (30·7–90·3)	61·4	4·5 (1·6–7·8)	4·3 (2·2–6·6)	–3·9
Peripheral vascular disease	3·3 (1·2–6·6)	9·1 (4·1–17·2)	180·4	0·4 (0·1–0·9)	0·7 (0·3–1·3)	63·7
Endocarditis	9·5 (6·8–12·8)	12·4 (9·8–15·8)	31·6	1·0 (0·7–1·3)	0·9 (0·7–1·1)	–8·4
Other cardiovascular and circulatory diseases	25·0 (20·1–31·1)	103·0 (94·5–112·6)	318·5	3·1 (2·5–3·9)	7·5 (6·9–8·3)	148·6
Chronic respiratory diseases	1496·5 (1444·7–1550·5)	1022·9 (965·4–1089·3)	–31·8	189·0 (182·1–196·2)	77·2 (72·8–82·3)	–59·3
Chronic obstructive pulmonary disease	1426·9 (1340·1–1509·5)	934·4 (846·6–1032·3)	–34·3	180·7 (169·9–190·9)	70·6 (64·0–78·1)	–60·8
Pneumoconiosis	6·1 (3·6–10·6)	4·1 (1·9–7·2)	–32·7	0·7 (0·4–1·3)	0·3 (0·1–0·5)	–59·1
Asthma	25·2 (16·9–34·8)	19·9 (16·6–27·3)	–22·2	3·1 (2·1–4·3)	1·5 (1·2–2·0)	–52·7
Interstitial lung disease and pulmonary sarcoidosis	5·0 (2·8–8·0)	8·6 (4·8–12·9)	73·6	0·6 (0·3–0·9)	0·6 (0·3–0·9)	6·9
Other chronic respiratory diseases	33·4 (25·8–43·2)	55·9 (33·6–69·0)	72·4	4·0 (3·0–5·2)	4·2 (2·6–5·2)	9·2
Cirrhosis of the liver	174·9 (127·0–198·9)	114·4 (90·0–187·8)	–45·7	19·6 (14·2–22·3)	7·7 (6·1–12·7)	–67·3
Cirrhosis of the liver secondary to hepatitis B	78·7 (55·0–93·1)	52·3 (39·3–86·5)	–44·1	9·0 (6·2–10·6)	3·5 (2·7–5·9)	–66·7
Cirrhosis of the liver secondary to hepatitis C	37·9 (25·9–44·5)	24·5 (18·8–40·7)	–45·2	4·4 (3·0–5·2)	1·7 (1·3–2·8)	–67·5
Cirrhosis of the liver secondary to alcohol use	35·9 (24·2–43·7)	25·3 (18·8–42·9)	–41·0	4·0 (2·7–4·9)	1·7 (1·3–2·9)	–64·5
Other cirrhosis of the liver	22·4 (15·5–26·9)	12·3 (9·0–20·8)	–54·2	2·3 (1·6–2·8)	0·8 (0·6–1·4)	–70·5
Digestive diseases (except cirrhosis)	163·4 (142·8–181·2)	133·0 (116·8–153·1)	–19·0	19·1 (16·7–21·2)	9·7 (8·5–11·2)	–49·4
Peptic ulcer disease	54·9 (41·4–61·0)	19·3 (16·5–23·2)	–65·4	6·5 (4·9–7·3)	1·4 (1·2–1·7)	–78·9
Gastritis and duodenitis	2·5 (1·2–5·7)	1·3 (0·8–2·7)	–43·8	0·3 (0·1–0·7)	0·1 (0·1–0·2)	–64·1
Appendicitis	5·6 (3·3–7·7)	1·4 (0·9–2·5)	–76·7	0·6 (0·4–0·8)	0·1 (0·1–0·2)	–84·2
Paralytic ileus and intestinal obstruction without hernia	17·3 (9·7–21·7)	11·2 (7·8–18·9)	–44·6	1·9 (1·1–2·3)	0·8 (0·6–1·4)	–62·0
Inguinal or femoral hernia	2·0 (1·9–2·0)	1·1 (1·0–1·1)	–43·4	0·2 (0·2–0·2)	0·1 (0·1–0·1)	–65·9
Non-infective inflammatory bowel disease	2·8 (1·0–4·9)	2·4 (1·2–3·9)	–10·0	0·3 (0·1–0·5)	0·2 (0·1–0·3)	–38·9
Vascular disorders of intestine	6·0 (1·8–17·6)	10·3 (3·8–26·5)	86·0	0·7 (0·2–2·2)	0·8 (0·3–2·0)	11·6
Gall bladder and bile duct disease	15·5 (11·3–21·1)	18·2 (11·5–27·1)	16·5	1·8 (1·3–2·5)	1·3 (0·8–2·0)	–26·4

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	All ages deaths (thousands)			Age-standardised death rate (per 100 000)		
	1990	2010	Median %Δ	1990	2010	Median %Δ
(Continued from previous page)						
Pancreatitis	6·2 (3·2–9·6)	8·3 (5·2–11·5)	34·7	0·7 (0·4–1·1)	0·6 (0·4–0·8)	–18·0
Other digestive diseases	50·7 (33·2–63·2)	59·5 (45·7–91·5)	11·1	6·0 (3·9–7·5)	4·3 (3·3–6·6)	–31·1
Neurological disorders	58·5 (46·1–74·8)	80·6 (65·1–112·4)	34·5	6·5 (5·1–8·3)	6·1 (4·9–8·5)	–8·9
Alzheimer's disease and other dementias	25·8 (17·0–35·8)	50·0 (36·8–77·6)	87·9	3·4 (2·2–4·8)	3·9 (2·8–6·1)	13·0
Parkinson's disease	4·1 (2·4–5·9)	7·3 (4·7–11·3)	73·6	0·5 (0·3–0·7)	0·5 (0·3–0·8)	9·5
Epilepsy	18·7 (12·0–23·0)	12·2 (10·4–17·8)	–37·3	1·7 (1·1–2·0)	0·9 (0·7–1·3)	–50·1
Multiple sclerosis	3·2 (1·3–5·3)	1·6 (1·0–2·6)	–54·2	0·3 (0·1–0·6)	0·1 (0·1–0·2)	–71·8
Other neurological disorders	6·6 (3·6–17·1)	9·5 (5·3–18·8)	53·9	0·7 (0·4–1·6)	0·7 (0·4–1·4)	12·6
Mental and behavioural disorders	23·3 (15·0–30·0)	20·7 (16·7–29·8)	–16·9	2·4 (1·6–3·1)	1·4 (1·1–2·1)	–44·4
Schizophrenia	12·6 (8·3–16·0)	8·9 (7·1–14·1)	–33·4	1·3 (0·9–1·7)	0·6 (0·5–1·0)	–57·7
Alcohol use disorders	3·3 (1·7–7·1)	4·6 (2·3–8·2)	44·6	0·3 (0·2–0·7)	0·3 (0·2–0·5)	–7·8
Drug use disorders	3·2 (0·5–6·6)	4·8 (3·2–10·5)	41·3	0·3 (0·1–0·6)	0·3 (0·2–0·8)	12·8
Opioid use disorders	1·0 (0·2–2·0)	1·5 (1·0–3·4)	45·1	0·1 (0·0–0·2)	0·1 (0·1–0·3)	15·6
Cocaine use disorders	0·1 (0·0–0·3)	<0·05 (0·0–0·05)	–96·7	<0·05 (0·0–0·05)	<0·05 (0·0–0·05)	–97·4
Amphetamine use disorders	0·1 (0·0–0·1)	<0·05 (0·0–0·05)	–93·4	<0·05 (0·0–0·05)	<0·05 (0·0–0·05)	–94·7
Other drug use disorders	2·0 (0·3–4·1)	3·2 (2·1–6·7)	53·5	0·2 (0·0–0·4)	0·2 (0·2–0·5)	22·3
Eating disorders	1·5 (0·4–2·6)	0·7 (0·5–1·4)	–69·1	0·1 (0·0–0·3)	0·1 (0·0–0·1)	–76·9
Other mental and behavioural disorders	2·7 (0·8–4·7)	1·6 (1·0–3·2)	–63·4	0·3 (0·1–0·5)	0·1 (0·1–0·2)	–74·8
Diabetes, urogenital, blood, and endocrine diseases	186·2 (158·2–245·1)	294·9 (252·1–323·1)	65·3	20·6 (17·6–27·3)	21·3 (18·2–23·3)	7·9
Diabetes mellitus	70·5 (64·2–102·4)	160·1 (123·7–176·2)	141·6	8·0 (7·3–11·8)	11·5 (8·8–12·7)	52·3
Acute glomerulonephritis	16·2 (1·7–61·4)	3·0 (1·1–6·4)	–72·0	1·7 (0·2–6·5)	0·2 (0·1–0·5)	–80·5
Chronic kidney diseases	53·9 (47·6–75·5)	82·0 (66·6–93·1)	62·0	6·0 (5·3–8·4)	5·8 (4·7–6·6)	2·5
Chronic kidney disease due to diabetes mellitus	8·8 (7·2–12·6)	14·5 (11·5–17·4)	75·9	1·0 (0·8–1·5)	1·0 (0·8–1·2)	5·7
Chronic kidney disease due to hypertension	10·5 (9·0–14·9)	16·6 (13·3–19·2)	66·8	1·2 (1·0–1·7)	1·2 (0·9–1·4)	3·4
Chronic kidney disease unspecified	34·6 (30·0–48·5)	51·0 (41·3–58·7)	57·1	3·8 (3·3–5·3)	3·6 (2·9–4·2)	1·5
Urinary diseases and male infertility	14·8 (7·9–20·1)	13·0 (9·8–20·1)	–19·4	1·7 (0·9–2·3)	1·0 (0·7–1·5)	–47·8
Tubulointerstitial nephritis, pyelonephritis, and urinary tract infections	7·8 (4·5–11·0)	8·5 (6·4–12·7)	7·7	0·9 (0·5–1·2)	0·6 (0·5–0·9)	–27·7
Urolithiasis	5·6 (2·3–12·5)	3·0 (0·9–7·8)	–46·9	0·7 (0·3–1·5)	0·2 (0·1–0·6)	–67·3
Other urinary diseases	1·5 (0·8–2·0)	1·5 (1·1–2·5)	–3·7	0·2 (0·1–0·2)	0·1 (0·1–0·2)	–40·0
Gynaecological diseases	2·7 (2·0–3·7)	1·7 (1·3–2·2)	–38·3	0·3 (0·2–0·4)	0·1 (0·1–0·2)	–58·3
Uterine fibroids	<0·05 (0·0–0·05)	<0·05 (0·0–0·05)	–76·8	<0·05 (0·0–0·05)	<0·05 (0·0–0·05)	–75·2
Endometriosis	0·0 (0·0–0·0)	0·0 (0·0–0·0)	0·0	0·0 (0·0–0·0)	0·0 (0·0–0·0)	0·0
Genital prolapse	0·1 (0·0–0·1)	<0·05 (0·0–0·05)	–36·1	<0·05 (0·0–0·05)	<0·05 (0·0–0·05)	–58·9
Other gynaecological diseases	2·6 (1·9–3·7)	1·6 (1·3–2·2)	–38·2	0·3 (0·2–0·4)	0·1 (0·1–0·1)	–58·1
Haemoglobinopathies and haemolytic anaemias	20·5 (8·1–39·0)	15·2 (8·5–24·5)	–23·6	2·1 (0·8–4·0)	1·2 (0·6–1·8)	–43·8
Thalassaemias	7·5 (4·3–13·5)	3·7 (2·7–4·8)	–49·3	0·6 (0·4–1·1)	0·3 (0·2–0·4)	–54·8
Sickle cell disorders	0·1 (0·0–0·1)	<0·05 (0·0–0·05)	–43·4	<0·05 (0·0–0·05)	<0·05 (0·0–0·05)	–53·2
G6PD deficiency	0·8 (0·5–1·5)	0·6 (0·5–0·8)	–21·9	0·1 (0·1–0·1)	<0·05 (0·0–0·1)	–42·3
Other haemoglobinopathies and haemolytic anaemias	12·1 (4·3–25·2)	10·8 (4·5–20·1)	–4·3	1·4 (0·5–2·9)	0·8 (0·3–1·6)	–36·6
Other endocrine, nutritional, blood, and immune disorders	7·5 (4·7–13·3)	20·0 (10·7–30·7)	176·8	0·7 (0·5–1·4)	1·5 (0·8–2·3)	119·2
Musculoskeletal disorders	17·3 (9·7–22·4)	26·2 (19·3–40·7)	41·2	2·0 (1·1–2·5)	1·9 (1·4–2·9)	–11·2
Rheumatoid arthritis	8·9 (5·2–11·8)	11·3 (7·9–16·6)	22·9	1·1 (0·6–1·4)	0·8 (0·6–1·2)	–24·2
Other musculoskeletal disorders	8·3 (3·6–12·0)	14·9 (11·6–25·1)	55·3	0·9 (0·4–1·3)	1·1 (0·8–1·8)	2·5
Other non-communicable diseases	146·6 (122·3–195·6)	54·8 (42·8–73·6)	–62·8	11·6 (9·7–15·4)	5·4 (4·1–7·4)	–54·0
Congenital anomalies	130·1 (106·0–176·9)	45·7 (33·5–65·1)	–65·0	10·0 (8·2–13·6)	4·6 (3·4–6·7)	–53·9
Neural tube defects	25·0 (11·6–43·5)	3·2 (1·7–6·6)	–87·5	1·9 (0·9–3·4)	0·3 (0·2–0·7)	–82·7
Congenital heart anomalies	73·4 (63·2–86·0)	31·3 (24·6–40·4)	–57·5	5·6 (4·9–6·6)	3·2 (2·5–4·1)	–44·1
Cleft lip and cleft palate	4·3 (1·1–11·9)	0·7 (0·3–1·5)	–81·1	0·3 (0·1–0·9)	0·1 (0·0–0·2)	–72·4

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	All ages deaths (thousands)			Age-standardised death rate (per 100 000)		
	1990	2010	Median %Δ	1990	2010	Median %Δ
(Continued from previous page)						
Down's syndrome	2·1 (0·9–4·3)	0·9 (0·6–1·3)	–56·4	0·2 (0·1–0·3)	0·1 (0·1–0·1)	–50·1
Other chromosomal abnormalities	11·4 (2·6–35·8)	2·9 (1·3–6·9)	–69·5	0·9 (0·2–2·8)	0·3 (0·1–0·8)	–58·6
Other congenital anomalies	14·0 (3·4–32·5)	6·8 (4·1–13·6)	–43·5	1·1 (0·3–2·5)	0·7 (0·4–1·4)	–28·4
Skin and subcutaneous diseases	12·7 (9·0–15·3)	7·4 (5·5–9·0)	–41·7	1·3 (1·0–1·6)	0·6 (0·4–0·7)	–57·0
Cellulitis	3·4 (2·4–4·2)	1·6 (1·3–1·9)	–53·1	0·3 (0·2–0·4)	0·1 (0·1–0·1)	–64·6
Abscess, impetigo, and other bacterial skin diseases	5·5 (3·6–6·9)	2·3 (1·8–2·7)	–58·4	0·5 (0·4–0·6)	0·2 (0·1–0·2)	–66·6
Decubitus ulcer	3·7 (2·9–4·7)	3·5 (2·4–4·5)	–7·7	0·5 (0·4–0·6)	0·3 (0·2–0·4)	–41·4
Other skin and subcutaneous diseases	<0·05 (0·0–0·05)	<0·05 (0·0–0·05)	–64·6	<0·05 (0·0–0·05)	<0·05 (0·0–0·05)	–69·8
Sudden infant death syndrome	3·8 (0·8–15·1)	1·6 (0·5–4·3)	–49·6	0·3 (0·1–1·1)	0·2 (0·1–0·5)	–26·8
Injuries	**851·9 (738·8–968·8)**	**796·2 (697·4–992·5)**	**–9·9**	**78·9 (68·7–89·3)**	**56·7 (49·8–70·4)**	**–30·5**
Transport injuries	159·5 (108·6–245·1)	287·0 (204·7–415·0)	79·0	14·7 (9·8–22·3)	19·8 (14·2–28·6)	33·5
Road injury	155·5 (105·5–231·8)	282·6 (205·2–414·9)	90·3	14·3 (9·7–21·2)	19·5 (14·2–28·6)	42·4
Pedestrian injury by road vehicle	34·7 (16·1–57·7)	105·4 (75·3–142·1)	188·9	3·2 (1·5–5·3)	7·2 (5·2–9·6)	113·8
Pedal cycle vehicle	6·0 (3·3–9·9)	8·8 (4·8–13·0)	48·2	0·6 (0·3–0·9)	0·6 (0·3–0·9)	11·2
Motorised vehicle with two wheels	33·2 (18·5–51·8)	48·7 (37·5–62·1)	48·6	3·0 (1·7–4·7)	3·3 (2·6–4·2)	12·4
Motorised vehicle with three or more wheels	34·5 (21·0–48·7)	74·0 (55·2–92·9)	111·5	3·1 (1·9–4·5)	5·1 (3·8–6·4)	59·8
Road injury other	47·1 (9·8–114·0)	45·7 (10·1–122·0)	–5·8	4·4 (0·9–10·6)	3·2 (0·7–8·6)	–28·0
Other transport injury	4·0 (1·9–6·5)	4·4 (2·5–7·2)	7·3	0·4 (0·2–0·6)	0·3 (0·2–0·5)	–18·3
Unintentional injuries other than transport injuries	458·6 (412·0–508·7)	316·4 (277·2–349·5)	–30·7	41·9 (38·2–46·4)	23·6 (20·7–26·1)	–43·6
Falls	88·1 (75·4–109·8)	115·3 (89·1–136·0)	32·9	9·7 (8·2–12·2)	8·5 (6·6–10·0)	–11·7
Drowning	147·4 (107·8–175·8)	67·4 (56·7–93·2)	–56·5	12·2 (9·1–14·4)	5·5 (4·5–7·7)	–57·4
Fire, heat, and hot substances	15·8 (12·7–19·9)	10·7 (8·4–15·4)	–33·7	1·6 (1·3–2·0)	0·8 (0·6–1·2)	–51·5
Poisonings	52·7 (39·6–93·6)	37·0 (19·3–49·0)	–14·5	4·9 (3·7–8·8)	2·6 (1·4–3·4)	–37·1
Exposure to mechanical forces	30·8 (23·1–44·0)	21·0 (12·2–27·0)	–28·0	2·8 (2·1–4·1)	1·4 (0·8–1·8)	–45·2
Mechanical forces (firearm)	11·4 (4·8–19·6)	3·6 (1·5–6·8)	–69·3	1·0 (0·4–1·8)	0·2 (0·1–0·5)	–76·2
Mechanical forces (other)	19·4 (9·3–36·9)	17·4 (7·1–28·0)	–5·8	1·8 (0·8–3·4)	1·2 (0·5–1·9)	–28·8
Adverse effects of medical treatment	4·2 (1·9–7·0)	7·0 (4·3–10·2)	72·4	0·4 (0·2–0·6)	0·5 (0·3–0·8)	34·1
Animal contact	8·0 (3·4–14·5)	3·0 (1·3–5·3)	–61·7	0·8 (0·3–1·4)	0·2 (0·1–0·4)	–71·0
Animal contact (venomous)	3·5 (1·2–9·1)	1·2 (0·5–2·5)	–60·8	0·3 (0·1–0·9)	0·1 (0·0–0·2)	–71·2
Animal contact (non-venomous)	4·5 (1·5–9·6)	1·8 (0·8–3·4)	–59·3	0·4 (0·1–0·9)	0·1 (0·1–0·3)	–68·1
Unintentional injuries not classified elsewhere	111·6 (81·2–128·8)	55·0 (39·9–62·4)	–50·8	9·5 (7·0–10·8)	4·1 (3·1–4·7)	–56·9
Self-harm and interpersonal violence	233·7 (157·5–278·0)	192·9 (152·2–309·3)	–29·4	22·3 (15·4–26·7)	13·4 (10·5–21·3)	–48·5
Self-harm	206·1 (132·3–248·9)	173·0 (134·6–286·0)	–28·5	20·0 (13·1–24·6)	12·0 (9·3–19·7)	–48·6
Interpersonal violence	27·7 (18·5–35·4)	19·9 (15·3–33·3)	–36·0	2·3 (1·6–3·0)	1·4 (1·1–2·3)	–47·0
Assault by firearm	4·9 (2·0–10·3)	2·2 (1·2–3·9)	–54·7	0·4 (0·2–0·9)	0·1 (0·1–0·3)	–63·8
Assault by sharp object	7·3 (3·6–12·0)	6·1 (3·9–9·7)	–13·2	0·6 (0·3–1·0)	0·4 (0·3–0·7)	–27·7
Assault by other means	15·5 (10·1–21·5)	11·7 (7·5–17·4)	–23·9	1·3 (0·9–1·8)	0·8 (0·5–1·2)	–36·9

Data are deaths (95% UI) or % change. 95% UIs are shown in parentheses. Percentage change is computed for 1000 draws of each quantity in 1990 and 2010 and median percentage change is reported. UI=uncertainty interval. DALYs=disability-adjusted life-years. %Δ=percentage change. *E coli=Escherichia coli*. *H influenzae=Haemophilus influenzae*.

***Table 2*: Deaths (in thousands) and age-standardised death rates per 100 000 for 231 causes in 1990 and 2010 for all ages, both sexes combined, and percentage change from 1990 to 2010 in China**

relative rank in terms of age-specific mortality was lower than the G20 average at ages older than 50 years and relatively little changed between 1990 and 2010. For women and girls, however, we noted a substantial relative improvement, with ranks improving from 16th to 10th in the age groups 15–19 years through to 50–54 years. Although we noted a relative improvement for women older than 60 years, the improvement was less pronounced.

Table 2 shows the number of deaths and the age-standardised death rate for each cause in 1990 and 2010. Communicable, maternal, neonatal, and nutritional disorders have declined by 59·5% (95% UI 54·4–63·8). Among these disorders, however, the large increase in HIV deaths is notable. The number of deaths from non-communicable disease rose from 5·9 million (5·7–6·3) to 7·0 million (6·7–7·3), but age-standardised death rates declined 27·8% (24·2–33·1);

this difference was caused by population growth and ageing. Rising age-standardised rates have occurred for some causes such as lung cancer, ischaemic heart disease, atrial fibrillation, peripheral vascular disease, diabetes, and road injury.

China has made substantial progress in reduction of the number of child deaths from 1·0 million (95% UI 0·9–1·1 million) in 1990 to 213 0000 (179 600–260 700) in 2010 (table 3). During this period, the main causes of child mortality also changed. The top five specific causes, accounting for 59·7% (51·7–69·1) of child deaths in 2010 were (in order of frequency) congenital anomalies, preterm birth complications, lower respiratory infections, neonatal encephalopathy, and drowning. Diarrhoeal diseases were ranked sixth (95% UI fifth to seventh) in 1990 but accounted for 0·9% (95% UI 0·6–1·3) of child deaths in 2010, and measles were ranked seventh (sixth to 13th) in 1990 but accounted for 0·2% (95% UI <0·05–0·4) of child deaths in 2010.

Figure 2 shows the striking transition in YLLs that took place in China between 1990 and 2010. The number of YLLs attributable to neonatal causes, diarrhoea, pneumonia, and other infectious causes and injuries in children declined profoundly in this period. At the same time, a shift occurred towards a large number of cardiovascular and cancer YLLs at older ages with a notable peak in cancer YLLs in the 55–59 year age group in 2010. The number, age pattern, and composition of injury YLLs also changed: we noted increases and shifts to older ages in transport injuries and large declines in intentional injuries.

Figure 3 shows the transition in leading causes of YLLs from 1990 to 2010. We noted striking declines in major communicable and neonatal causes of premature mortality: lower respiratory infections moved from first (95% UI first to third) to ninth (eighth to 11th); neonatal encephalopathy dropped 14 ranks (sixth to 20th); preterm birth complications dropped ten ranks (ninth to 19th); a 77% (95% UI 72–84) decline in YLLs from tuberculosis led it to drop from 15th (13th to 16th) to 29th (26th to 35th); and diarrhoea and meningitis also had substantial improvements. YLLs from stroke, ischaemic heart disease, road injury, lung cancer, liver cancer, colorectal cancer, and diabetes increased. Although population ageing was a key driver of these increases, age-standardised YLL rates (data not shown) for ischaemic heart disease, road injury,

	1990		2010		Median %Δ in deaths
	Deaths (thousands)	% of total	Deaths (thousands)	% of total	
All causes	1038·9 (927·4 to 1136·5)	..	213·0 (179·6 to 260·7)	..	−79·7 (−83·2 to −73·5)
Congenital anomalies	109·6 (87·5 to 153·2)	10·6 (8·6 to 14·4)	33·2 (23·0 to 50·1)	15·5 (11·3 to 19·9)	−69·7 (−81·8 to −49·7)
Preterm birth complications	97·4 (69·2 to 131·7)	9·4 (6·6 to 13·1)	27·6 (20·0 to 37·3)	13·0 (9·2 to 18·0)	−71·6 (−81·6 to −57·7)
Other neonatal disorders	130·9 (77·9 to 186·4)	12·6 (7·4 to 18·7)	27·4 (18·0 to 40·1)	13·0 (8·2 to 19·4)	−79·2 (−87·7 to −61·3)
Lower respiratory infections	254·7 (199·2 to 298·4)	24·5 (20·0 to 27·7)	26·9 (20·6 to 37·4)	12·7 (9·5 to 17·4)	−89·9 (−92·3 to −83·9)
Neonatal encephalopathy (birth asphyxia/birth trauma)	109·7 (75·2 to 150·6)	10·6 (7·2 to 14·8)	26·8 (16·4 to 39·8)	12·6 (7·7 to 18·9)	−75·4 (−86·4 to −60·2)
Other non-communicable diseases	48·1 (37·0 to 64·5)	4·6 (3·7 to 6·2)	19·7 (16·1 to 24·2)	9·3 (7·4 to 11·6)	−58·8 (−69·5 to −44·7)
Drowning	63·2 (36·3 to 87·6)	6·1 (3·8 to 8·1)	12·5 (7·6 to 25·2)	5·8 (3·8 to 10·4)	−81·9 (−89·4 to −42·8)
Other injuries	64·5 (46·6 to 79·3)	6·2 (4·7 to 7·7)	11·2 (8·2 to 14·6)	5·3 (3·7 to 7·0)	−82·7 (−87·4 to −74·5)
Other communicable, maternal, neonatal, and nutritional diseases	12·3 (7·4 to 21·8)	1·2 (0·7 to 2·1)	6·0 (3·3 to 8·4)	2·8 (1·5 to 4·1)	−46·3 (−80·3 to −10·3)
Road injury	9·0 (5·5 to 15·0)	0·9 (0·5 to 1·4)	5·5 (3·5 to 9·2)	2·6 (1·6 to 4·2)	−38·9 (−69·8 to 38·0)
Falls	7·1 (5·0 to 12·0)	0·7 (0·5 to 1·1)	2·7 (1·7 to 4·2)	1·3 (0·8 to 1·9)	−59·4 (−82·3 to −28·8)
Meningitis and encephalitis	13·6 (10·6 to 17·9)	1·3 (1·0 to 1·8)	2·1 (1·4 to 2·8)	1·0 (0·6 to 1·4)	−85·1 (−90·1 to −78·0)
Diarrhoeal diseases	47·4 (37·9 to 58·8)	4·6 (3·7 to 5·7)	1·9 (1·4 to 2·7)	0·9 (0·6 to 1·3)	−95·9 (−97·2 to −93·8)
Syphilis	12·2 (6·8 to 19·9)	1·2 (0·6 to 1·9)	1·7 (0·8 to 3·1)	0·8 (0·4 to 1·5)	−86·8 (−91·6 to −78·7)
Sepsis and other infectious disorders of the newborn baby	5·1 (1·9 to 11·2)	0·5 (0·2 to 1·1)	1·6 (0·8 to 3·2)	0·8 (0·4 to 1·5)	−65·9 (−88·3 to −21·8)
Typhoid and paratyphoid fevers	2·4 (0·3 to 4·5)	0·2 (<0·05 to 0·4)	1·6 (0·2 to 3·1)	0·7 (0·1 to 1·5)	−33·6 (−54·1 to −1·2)
Nutritional deficiencies	6·1 (4·1 to 12·3)	0·6 (0·4 to 1·2)	1·4 (0·5 to 2·2)	0·7 (0·2 to 1·1)	−74·2 (−94·8 to −54·5)
Tetanus	15·3 (7·4 to 27·1)	1·5 (0·7 to 2·5)	0·7 (0·3 to 1·7)	0·3 (0·1 to 0·8)	−96·0 (−98·2 to −86·7)
Fire, heat, and hot substances	3·1 (2·0 to 4·6)	0·3 (0·2 to 0·4)	0·7 (0·4 to 1·3)	0·3 (0·2 to 0·6)	−80·7 (−89·0 to −46·2)
Epilepsy	1·6 (0·8 to 3·0)	0·2 (0·1 to 0·3)	0·5 (0·3 to 0·9)	0·3 (0·2 to 0·4)	−65·6 (−84·3 to −17·6)
Whooping cough	3·2 (<0·05 to 15·8)	0·3 (<0·05 to 1·5)	0·4 (<0·05 to 2·0)	0·2 (<0·05 to 1·0)	−87·1 (−89·0 to −84·5)
HIV/AIDS	<0·05 (<0·05 to 0·05)	<0·05 (<0·05 to 0·05)	0·4 (0·2 to 0·6)	0·2 (0·1 to 0·3)	4232·1 (1493·7 to 46 693·7)
Measles	20·0 (6·6 to 50·9)	1·9 (0·6 to 4·8)	0·3 (0·1 to 0·9)	0·2 (<0·05 to 0·4)	−98·4 (−99·0 to −97·3)
Tuberculosis	2·5 (1·8 to 3·2)	0·2 (0·2 to 0·3)	0·2 (0·1 to 0·4)	0·1 (<0·05 to 0·2)	−91·3 (−96·1 to −84·1)

Data in parentheses are 95% uncertainty intervals. Cause groups are ordered by the number of deaths in 2010. %Δ=percentage change.

Table 3: **Deaths (in thousands), percentage of all-cause mortality, and median percentage change by cause from 1990 to 2010 for children younger than 5 years (both sexes) in China**

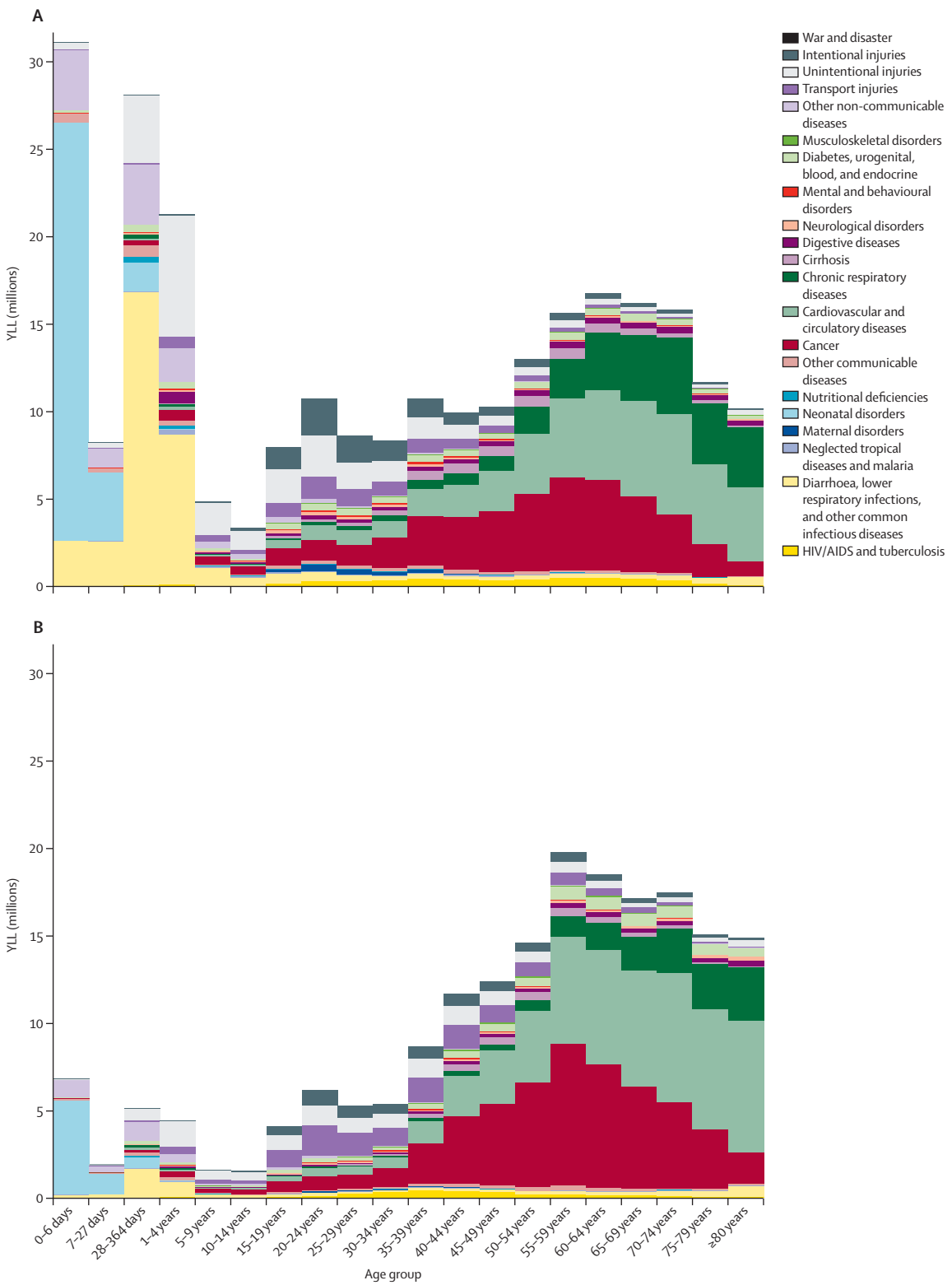

Figure 2: **Years of life lost in China for both sexes for 21 cause groups, by age**
(A) 1990. (B) 2010.

lung cancer, and diabetes also increased between 1990 and 2010. Several disorders that did not increase in incidence remained leading causes of YLLs in 2010: chronic obstructive pulmonary disease, stomach cancer, self-harm, oesophageal cancer, drowning, falls, and congenital anomalies. The substantial decrease we noted in premature mortality from drowning deserves note. Incidence of HIV/AIDS increased strikingly in the 20-year period to become the 23rd biggest cause (20th to 29th) of YLLs.

Figure 4 shows the levels of premature mortality in China relative to other members of the G20 in 2010. For men in China in 2010, age-standardised rates of years of life lost due to ischaemic heart disease, lower respiratory infections, cirrhosis, diabetes, preterm birth complications, chronic kidney diseases, HIV/AIDS, and tuberculosis were significantly better than the G20 mean. China had significantly worse ranks than the mean for stroke, chronic obstructive pulmonary disease, liver cancer, stomach cancer, oesophageal cancer, leukaemia, drowning, and falls. The YLL rates of road injury and lung cancer for 2010 are indistinguishable from the mean but the absolute increase in YLLs from these causes is concerning. For women in China, we noted better than G20 average performance on ischaemic heart disease, lower respiratory infections, diabetes, breast cancer, preterm birth complications, chronic kidney diseases, cervical cancer, cirrhosis, and cardiovascular and circulatory diseases. We noted worse than G20 average outcomes for stroke, chronic obstructive pulmonary disease, road injury, self-harm, liver cancer, stomach cancer, oesophageal cancer, falls, drowning, and rheumatic heart disease. Even for conditions such as ischaemic heart disease, lung cancer, and diabetes (for which China was better than average in the G20 in 2010), rising rates suggest that this status might change in the near future.

Appendix p 6 shows YLDs per head by age in China, by sex, in 1990 and 2010. Compared with substantial declines in mortality, we noted relatively little change in the age-specific YLDs per head. The percentage of DALYs attributable to YLDs increased from 28·1% (95% UI 24·2–32·5) to 39·4% (34·9–43·8) in 2010. Figure 5 shows the prominent role played by mental and behavioural disorders (23·6%, 18·9–28·6) and

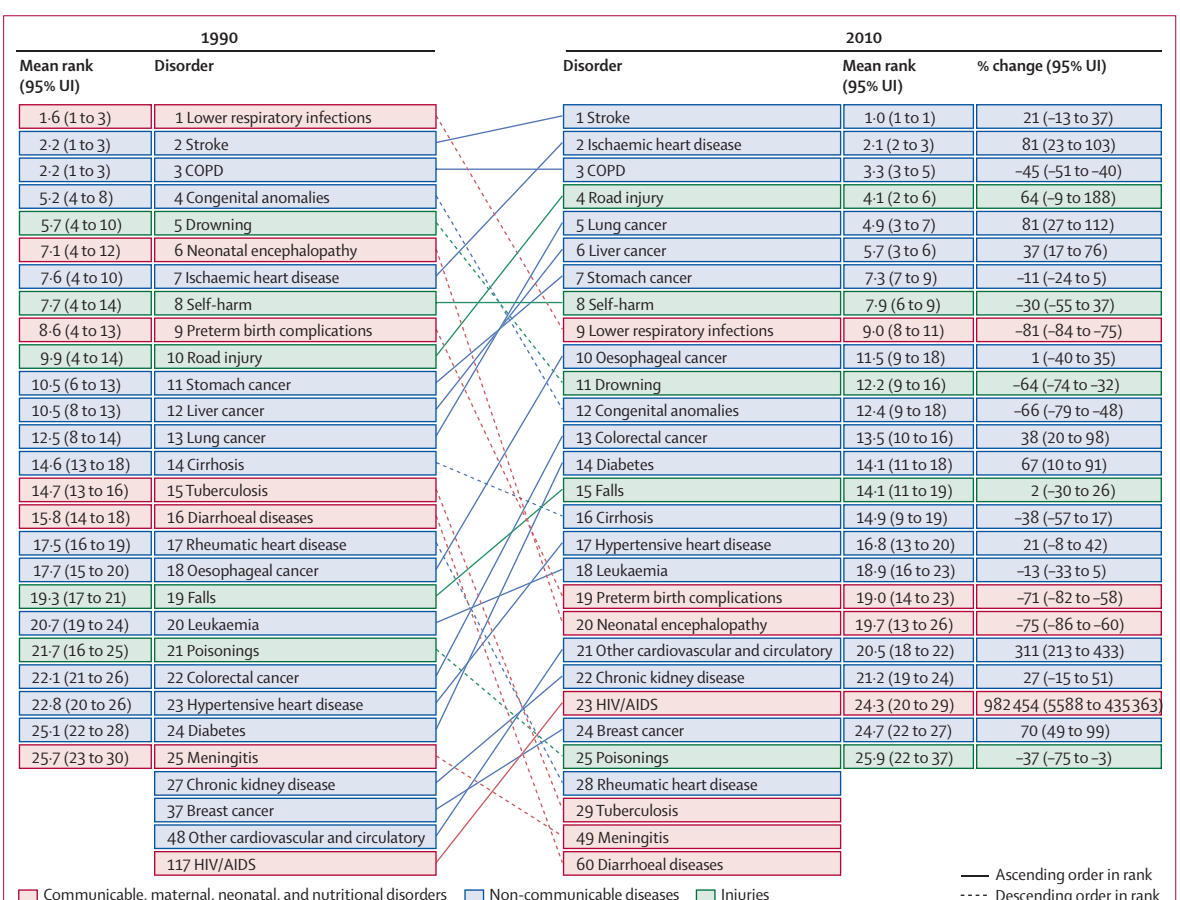

Figure 3: **Ranks for the top 25 causes of years of life lost in China for both sexes and all ages combined with 95% UIs in 1990 and 2010 and median percentage change from 1990 to 2010**

UI=uncertainty interval. COPD=chronic obstructive pulmonary disease.

musculoskeletal disorders (25·8%, 21·7–29·9) as causes of YLDs in adults. At younger ages, however, nutritional deficiencies, and some neglected tropical diseases make an important contribution. Other important causes included diabetes, urogenital, blood, and endocrine causes; other non-communicable diseases, which includes vision loss, hearing loss, and skin diseases; and unintentional injuries, which includes falls. Although age-specific YLDs per head rise with age, the effect of population age-structure leads to 77·2% (76·5–78·0) of YLDs occurring before age 60 years in China.

Figure 6 compares the leading causes of YLDs in 1990 and 2010. The top 11 causes of YLDs all increased in terms of the absolute numbers of YLDs. Of the top ten causes of disability in 2010, four were musculoskeletal

A

	Stroke	Ischaemic heart disease	Road injury	COPD	Lung cancer	Liver cancer	Stomach cancer	Self-harm	Oesophageal cancer	Lower respiratory infections	Drowning	Cirrhosis	Falls	Congenital anomalies	Colorectal cancer	Hypertensive heart disease	Diabetes	Leukaemia	Preterm birth complications	Other cardiovascular and circulatory diseases	Neonatal encephalopathy	Chronic kidney disease	HIV/AIDS	Poisonings	Tuberculosis
Japan	9	2	1	1	8	17	16	17	12	9	8	5	5	3	12	3	1	4	1	3	1	9	1	4	8
Italy	7	4	8	4	11	15	11	4	4	1	3	6	8	6	13	8	7	13	5	5	4	4	9	2	5
Australia	2	5	5	6	7	3	3	11	7	2	5	1	2	5	16	1	5	12	4	4	9	3	6	13	1
Canada	1	8	4	7	13	2	4	14	5	4	6	4	7	8	10	2	10	9	7	6	8	5	10	14	2
UK	6	9	2	9	9	1	6	9	15	8	2	8	11	7	14	5	2	5	9	11	5	1	3	12	6
Germany	5	10	3	8	15	7	9	10	9	5	1	12	12	4	17	7	6	8	6	12	3	6	5	3	4
France	4	3	7	3	16	16	7	15	16	3	7	11	13	2	15	4	4	11	3	14	7	2	8	6	7
South Korea	11	1	10	5	10	18	19	16	10	6	10	14	16	1	11	6	13	6	2	1	2	7	7	5	15
USA	3	13	11	11	14	11	2	12	8	7	9	10	10	9	9	10	11	10	10	9	6	12	12	18	3
Saudi Arabia	12	16	19	2	1	13	1	1	2	12	12	3	9	13	2	14	14	1	17	13	12	16	4	11	14
China	17	6	13	18	17	19	18	8	19	10	17	7	17	12	7	12	8	18	8	10	13	10	11	16	11
Argentina	10	15	12	12	12	5	13	13	13	14	13	13	3	15	18	13	12	17	13	16	11	14	13	9	9
Mexico	8	11	14	10	2	10	8	5	3	13	14	19	14	18	3	9	18	16	12	7	14	19	15	10	12
Turkey	16	18	6	17	19	12	15	7	1	11	4	2	6	19	8	17	9	19	14	17	10	8	2	7	10
Brazil	14	14	17	14	4	9	14	6	14	15	16	15	15	14	6	16	15	7	16	15	16	15	16	1	13
Indonesia	18	12	18	16	6	8	10	2	6	17	11	18	4	10	4	18	17	15	15	19	19	17	14	15	19
India	13	17	16	19	3	4	12	18	17	19	18	17	19	16	1	15	16	3	19	8	18	13	17	17	17
Russia	19	19	15	15	18	6	17	19	11	16	19	16	18	17	19	11	3	14	11	2	15	11	18	19	16
South Africa	15	7	9	13	5	14	5	3	18	18	15	9	1	11	5	19	19	2	18	18	17	18	19	8	18

B

	Stroke	Ischaemic heart disease	COPD	Lung cancer	Road injury	Self-harm	Liver cancer	Stomach cancer	Lower respiratory infections	Diabetes	Breast cancer	Congenital anomalies	Colorectal cancer	Hypertensive heart disease	Neonatal encephalopathy	Drowning	Preterm birth complications	Leukaemia	Oesophageal cancer	Chronic kidney disease	Falls	Other cardiovascular and circulatory diseases	Cervical cancer	Rheumatic heart disease	Cirrhosis
Japan	7	1	1	6	1	17	15	16	8	1	4	3	10	5	1	10	1	3	5	5	3	3	6	4	3
Italy	6	4	4	9	6	4	10	12	1	7	15	6	15	10	4	2	6	13	1	3	8	5	3	8	7
France	1	2	2	11	5	14	8	5	3	3	17	2	12	4	6	6	2	12	8	1	15	10	9	10	10
Australia	3	5	8	14	8	9	1	3	2	5	11	5	18	2	8	8	4	10	11	4	5	4	4	5	1
South Korea	11	3	3	10	9	18	17	19	6	11	1	1	8	6	2	7	3	7	2	9	14	2	12	1	8
Germany	4	8	7	15	3	10	4	9	4	4	14	4	14	7	3	4	5	6	6	6	12	12	10	9	14
Canada	2	7	10	18	10	13	2	4	5	8	13	8	13	1	9	5	7	8	7	8	6	8	5	3	6
UK	8	6	14	17	2	6	3	6	9	2	19	7	16	3	5	1	9	5	16	2	13	11	8	7	13
USA	5	14	17	19	14	12	6	2	7	12	12	9	11	9	7	9	11	11	9	12	10	13	7	2	15
Saudi Arabia	14	16	5	1	18	1	12	1	13	14	2	13	1	14	12	14	17	1	12	16	9	15	2	6	5
China	16	10	18	16	15	15	19	17	10	9	3	12	7	11	15	18	8	18	18	11	17	7	11	15	4
Argentina	10	12	9	8	11	11	11	10	15	13	18	17	17	13	11	11	13	15	14	13	2	16	16	16	11
Mexico	9	13	13	2	12	3	16	14	14	17	6	18	3	12	13	13	12	17	3	19	7	9	17	11	18
Brazil	12	15	15	7	13	5	13	13	16	16	8	15	9	17	16	15	16	9	13	14	11	14	15	12	12
Turkey	17	18	16	12	4	7	7	15	11	10	10	19	5	15	10	3	14	16	4	7	4	18	1	19	2
Russia	18	19	6	4	17	16	9	18	12	6	16	14	19	8	14	17	10	14	10	10	16	1	13	13	19
Indonesia	19	11	12	13	19	8	18	8	17	18	9	10	6	18	19	12	15	19	15	18	18	19	18	17	16
India	13	17	19	3	16	19	5	11	19	15	5	16	2	16	18	19	19	4	17	15	19	6	14	18	17
South Africa	15	9	11	5	7	2	14	7	18	19	7	11	4	19	17	16	18	2	19	17	1	17	19	14	9

Ranking legend (95% confidence) Lower than mean | Indistinguishable from mean | Higher than mean

Figure 4: **Age-standardised YLL rates in China in 2010 relative to 18 other members of G20, ranked by cause**

(A) Male individuals. (B) Female individuals. Numbers in cells show the ranks of each country for each cause, with 1 representing the best performing country. Countries have been sorted on the basis of age-standardised all-cause YLLs for that year. Causes are ordered by the 25 leading causes of YLLs in China. YLL=years of life lost. COPD=chronic obstructive pulmonary disease.

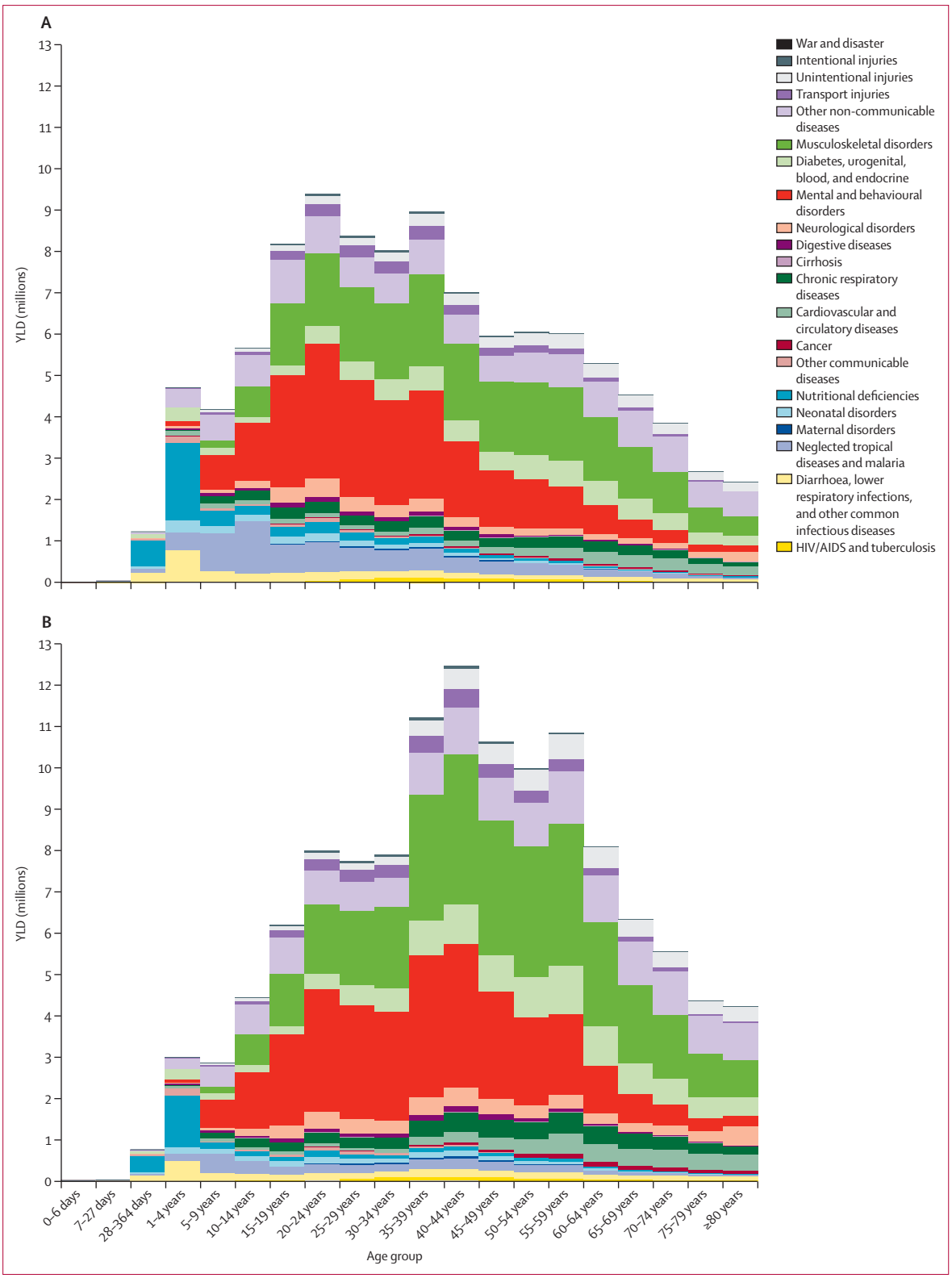

Figure 5: **Years lived with disability in China for both sexes for 21 cause groups, by age**
(A) 1990. (B) 2010.

disorders (low back pain, neck pain, other musculoskeletal disorders, and osteoarthritis). Major depression was the second leading cause of disability and alcohol use disorders was the ninth most common cause of YLDs. China ranked among the G20 as having the fifth lowest age-standardised rate of major depression. Diabetes, falls, chronic obstructive pulmonary disease, and hearing loss constituted the other top ten causes of YLDs. Progress on tackling communicable diseases was also evident in the analysis of YLDs. We noted substantial declines (>30·0%) for iron-deficiency anaemia, hookworm, tuberculosis, and ascariasis.

Putting premature mortality and disability together in terms of DALYs provides an overall picture of the leading health problems in China. Table 4 shows the number and rate of DALYs in 1990 and 2010 and the percentage change between 1990 and 2010. The top ten causes have prominent roles for cardiovascular disorders (stroke and ischaemic heart disease) and cancers (lung and liver). Two disorders that largely cause disability, low back pain and major depression, are also leading causes of DALYs. Four other disorders make up the top ten: chronic obstructive pulmonary disease, diabetes, road injuries, and falls, which all make up an important component of premature mortality and disability.

Appendix pp 7–8 ranks each country by the age-standardised DALY rate across the G20 for men and women in 2010. Men in China had higher than G20 average rates of DALYs caused by stroke, chronic obstructive pulmonary disease, liver cancer, stomach cancer, oesophageal cancer, and drowning. Chinese women had increased rates of DALYs caused by stroke, chronic obstructive pulmonary disease, road injury, self-harm, liver cancer, and stomach cancer. For some of the leading causes of disability, including low back pain and neck pain, China had rates that are indistinguishable from the G20 mean. Comparing 1990 (data not shown) with 2010, eight causes switched from significantly better than average to indistinguishable from average: falls, congenital anomalies, neonatal encephalopathy, poisonings, rheumatic heart disease, hookworm, ascariasis, and cysticercosis. For ischaemic heart disease, road injury and lung cancer (for which China was below the G20 average in 2010), rising rates mean that this situation might soon change.

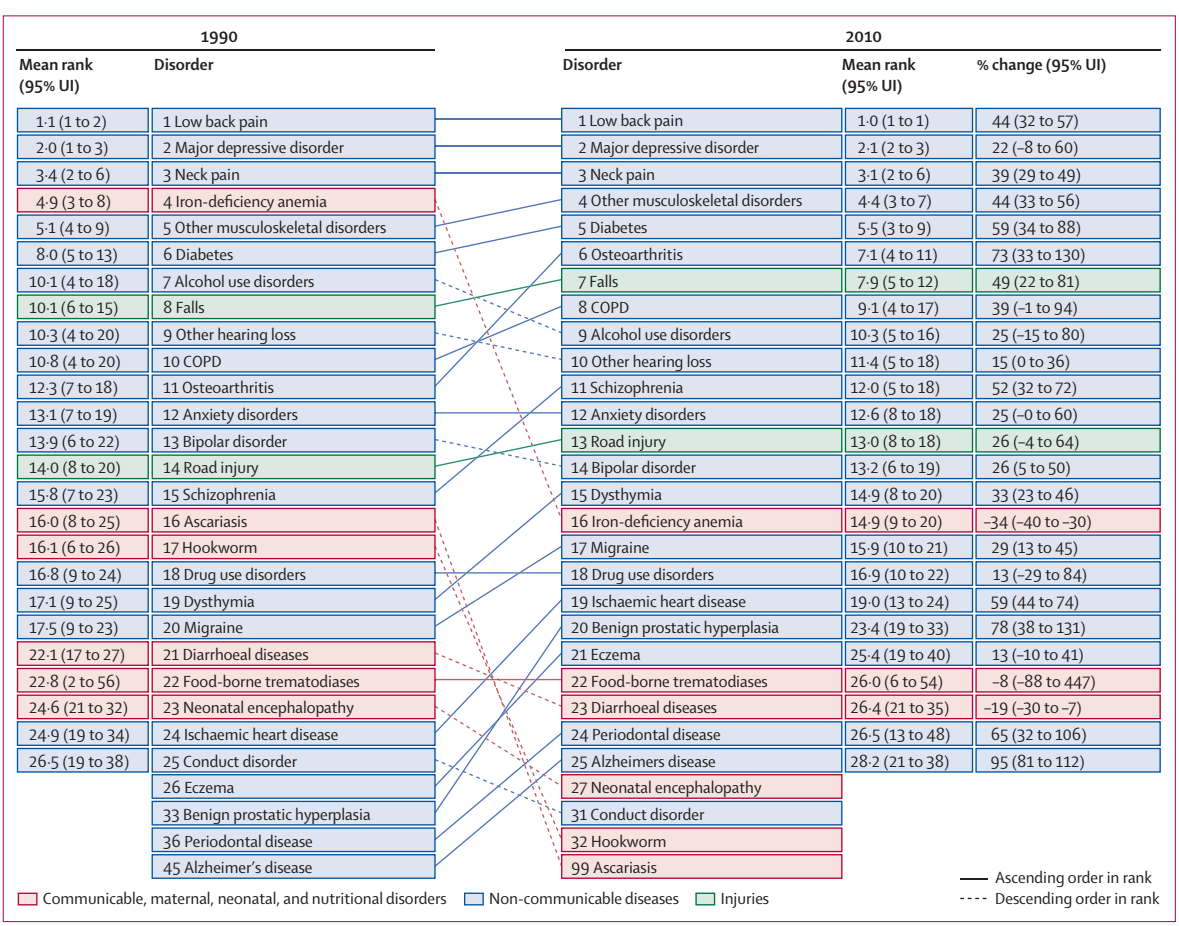

Figure 6: **Top 25 ranks causes of YLDs for both sexes and all ages in China in 1990 and 2010, with median percentage change from 1990 to 2010**
UI=uncertainty level. COPD=chronic obstructive pulmonary disease. YLDs=years lived with disability.

	All ages DALYs (thousands)			Age-standardised DALY rate (per 100 000)		
	1990	2010	Median %Δ	1990	2010	Median %Δ
All causes	**365 390·8 (342 403·1–390 433·0)**	**316 616·1 (292 429·2–341 996·6)**	**–13·4**	**34 627·6 (32 546·7–36 963·9)**	**22 805·6 (21 125·1–24 630·4)**	**–34·2**
Communicable, maternal, neonatal, and nutritional disorders	**97 065·4 (87 592·0–108 572·4)**	**32 024·5 (28 260·9–36 819·7)**	**–67·0**	**7897·2 (7130·3–8857·0)**	**2843·8 (2489·4–3247·7)**	**–63·9**
HIV/AIDS and tuberculosis	6163·8 (5178·9–7105·7)	3484·6 (2829·3–4197·3)	–43·6	620·1 (518·8–715·0)	236·1 (191·8–284·2)	–62·0
Tuberculosis	6150·8 (5170·7–7096·4)	1732·9 (1352·2–2098·1)	–71·5	618·9 (517·9–714·7)	117·8 (91·7–142·5)	–80·8
HIV/AIDS	13·0 (1·8–31·3)	1751·7 (1258·8–2330·9)	12 400·0	1·2 (0·2–2·9)	118·2 (84·8–157·5)	9009·4
HIV disease resulting in mycobacterial infection	1·3 (0·1–3·5)	113·8 (83·2–147·9)	7451·5	0·1 (0·0–0·3)	7·7 (5·6–10·0)	5439·7
HIV disease resulting in other specified or unspecified diseases	11·7 (1·8–27·7)	1637·9 (1173·2–2184·2)	12 995·8	1·1 (0·2–2·6)	110·6 (78·8–147·2)	9483·0
Diarrhoea, lower respiratory infections, meningitis, and other common infectious diseases	39 694·8 (33 504·7–44 936·4)	9202·9 (7907·1–10 842·0)	–77·0	3162·3 (2698·5–3559·1)	805·6 (691·9–947·5)	–74·7
Diarrhoeal diseases	6016·0 (5080·9–7135·2)	1297·4 (923·5–1752·6)	–78·7	478·3 (405·4–564·6)	115·6 (83·0–155·3)	–76·0
Cholera	178·2 (104·9–301·2)	15·4 (9·1–25·5)	–91·5	13·6 (8·1–22·9)	1·5 (0·9–2·5)	–89·1
Other salmonella infections	411·5 (281·4–593·8)	73·0 (46·4–107·2)	–82·3	32·7 (22·7–46·4)	6·3 (4·0–9·4)	–80·9
Shigellosis	402·8 (289·3–557·6)	109·8 (68·1–170·7)	–72·8	32·9 (24·1–45·1)	9·2 (5·7–14·5)	–72·3
Enteropathogenic *E coli* infection	680·0 (427·6–1019·6)	132·3 (70·6–232·2)	–81·1	51·9 (32·8–77·6)	13·6 (7·1–24·3)	–74·7
Enterotoxigenic *E coli* infection	534·9 (393·2–728·3)	189·4 (121·4–300·3)	–64·8	44·1 (32·9–59·1)	15·5 (9·8–25·0)	–65·5
Campylobacter enteritis	590·2 (384·8–882·4)	125·9 (72·7–204·4)	–78·9	46·2 (30·5–68·5)	11·7 (6·5–19·6)	–75·1
Amoebiasis	101·4 (72·2–140·4)	36·2 (21·2–56·5)	–64·5	9·1 (6·6–12·2)	2·7 (1·6–4·1)	–71·1
Cryptosporidiosis	554·2 (357·6–831·1)	88·3 (47·3–147·7)	–84·4	42·3 (27·4–63·2)	8·9 (4·7–15·2)	–79·5
Rotaviral enteritis	1567·4 (1150·5–2046·1)	230·2 (149·7–340·7)	–85·4	120·9 (89·2–157·4)	22·6 (14·3–33·9)	–81·5
Other diarrhoeal diseases	995·5 (671·2–1385·3)	296·9 (156·1–476·9)	–70·6	84·6 (58·1–117·1)	23·6 (12·4–38·4)	–72·6
Typhoid and paratyphoid fevers	772·9 (96·8–1455·1)	682·9 (89·7–1255·7)	–11·6	62·0 (7·8–116·7)	57·2 (7·5–105·9)	–7·8
Lower respiratory infections	25 300·9 (20 527·7–29 014·8)	5135·0 (4492·8–6092·5)	–80·1	2006·9 (1648·0–2285·2)	464·7 (401·2–565·5)	–77·4
Influenza	4671·2 (3519·9–5865·6)	1067·1 (909·2–1282·3)	–77·3	374·6 (287·9–465·0)	93·7 (78·1–115·1)	–75·2
Pneumococcal pneumonia	4839·2 (3770·6–6127·1)	1235·2 (1057·1–1457·0)	–74·6	394·6 (314·7–492·9)	106·0 (89·1–127·0)	–73·3
H influenzae type B pneumonia	7623·1 (5682·2–9727·9)	1192·7 (950·1–1534·7)	–84·7	590·6 (443·6–748·8)	114·5 (88·6–151·5)	–81·1
Respiratory syncytial virus pneumonia	4723·5 (3295·0–6322·1)	512·1 (348·0–745·3)	–89·5	359·4 (250·9–480·7)	55·7 (37·5–81·6)	–84·9
Other lower respiratory infections	3444·0 (2318·6–5218·0)	1127·8 (918·1–1404·1)	–66·4	287·8 (201·3–425·4)	94·7 (75·6–120·4)	–66·5
Upper respiratory infections	231·5 (127·1–387·5)	212·1 (105·4–371·5)	–9·3	19·4 (10·6–32·6)	16·6 (8·2–28·9)	–15·6
Otitis media	1012·8 (573·6–1805·1)	893·4 (533·8–1422·2)	–8·3	90·2 (51·9–158·2)	69·0 (41·2–108·0)	–21·4
Meningitis	2229·3 (1863·5–2559·9)	674·6 (534·6–890·1)	–70·1	186·6 (155·8–214·1)	53·9 (43·3–69·2)	–71·5
Pneumococcal meningitis	443·1 (348·3–526·5)	127·9 (97·5–166·5)	–71·7	37·2 (29·5–44·2)	10·0 (7·7–12·8)	–73·7
H influenzae type B meningitis	407·0 (328·9–502·0)	88·0 (68·1–110·4)	–78·5	32·4 (26·3–39·5)	8·0 (6·2–10·1)	–75·4
Meningococcal infection	303·9 (238·9–364·9)	84·4 (65·5–110·0)	–72·7	25·2 (19·9–30·1)	6·7 (5·2–8·6)	–73·8
Other meningitis	1072·1 (868·3–1259·7)	372·4 (286·5–504·6)	–65·8	91·4 (73·9–108·1)	29·0 (22·6–38·1)	–68·7
Encephalitis	312·5 (260·7–377·3)	67·7 (53·8–84·7)	–78·4	24·7 (20·7–29·6)	6·1 (4·8–7·6)	–75·5
Diphtheria	12·2 (0·0–107·6)	2·9 (0·0–24·8)	–76·3	0·9 (0·0–8·3)	0·3 (0·0–2·4)	–70·0
Whooping cough	290·1 (9·5–1396·2)	39·7 (1·8–182·8)	–85·8	22·0 (0·7–106·0)	4·3 (0·2–19·7)	–79·8
Tetanus	1457·4 (697·9–2530·1)	90·2 (34·2–227·9)	–94·4	114·1 (54·9–197·3)	8·7 (3·6–21·2)	–92·9
Measles	1975·7 (666·8–5000·0)	33·8 (9·3–93·2)	–98·3	149·6 (50·5–378·7)	3·6 (1·0–9·9)	–97·7
Varicella	83·5 (22·7–346·5)	73·2 (29·0–221·1)	6·2	7·4 (2·2–28·6)	5·7 (2·1–19·1)	–16·8
Neglected tropical diseases and malaria	8656·2 (5002·0–16 670·9)	3697·5 (1947·9–7386·2)	–58·0	762·1 (441·2–1459·8)	287·4 (155·1–553·1)	–62·5
Malaria	15·2 (10·5–22·2)	11·7 (7·2–18·3)	–22·8	1·3 (0·9–1·9)	1·0 (0·6–1·5)	–25·0
Leishmaniasis	426·5 (187·3–970·8)	110·2 (52·8–212·1)	–73·8	34·6 (15·4–77·6)	9·4 (4·3–18·7)	–72·7
Schistosomiasis	273·4 (13·1–1548·5)	250·6 (20·8–1344·8)	–0·7	27·8 (1·1–158·5)	17·5 (1·9–90·8)	–26·8
Cysticercosis	104·8 (73·3–148·9)	67·5 (44·0–96·5)	–35·6	9·3 (6·6–13·0)	4·7 (3·0–6·7)	–49·9

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	All ages DALYs (thousands)			Age-standardised DALY rate (per 100 000)		
	1990	2010	Median %Δ	1990	2010	Median %Δ
(Continued from previous page)						
Echinococcosis	41·7 (7·9–121·2)	44·9 (9·0–144·0)	–1·3	4·1 (0·8–11·9)	3·1 (0·6–9·8)	–30·5
Lymphatic filariasis	123·5 (76·7–180·5)		–100·0	11·6 (7·2–16·9)		–100·0
Trachoma	25·9 (16·3–38·6)	39·9 (25·9–56·8)	55·2	2·8 (1·8–4·2)	2·7 (1·8–3·8)	–4·7
Dengue	57·2 (12·5–196·5)	47·2 (18·9–112·2)	–8·3	4·7 (1·0–16·0)	4·0 (1·5–9·5)	–8·8
Rabies	94·3 (53·7–156·2)	45·1 (13·3–84·5)	–60·1	8·4 (4·9–13·7)	3·4 (1·0–6·4)	–66·5
Intestinal nematode infections	4431·0 (2391·4–7631·5)	1043·0 (459·1–1991·9)	–76·6	389·3 (211·0–672·4)	92·0 (39·0–174·5)	–76·3
Ascariasis	2152·3 (1169·7–3626·8)	90·8 (43·4–195·4)	–96·1	190·1 (103·5–321·0)	7·5 (3·4–17·1)	–96·5
Trichuriasis	237·8 (126·8–402·5)	14·1 (7·7–25·2)	–94·1	21·1 (11·3–35·4)	1·1 (0·6–1·9)	–95·0
Hookworm disease	2040·9 (960·6–3650·7)	938·1 (387·0–1831·4)	–54·3	178·1 (85·0–319·1)	83·4 (32·9–162·9)	–53·2
Food-borne trematodiases	2034·5 (349·5–8097·9)	1529·2 (406·1–4437·5)	–7·9	180·0 (31·3–709·9)	108·5 (28·8–316·7)	–27·2
Other neglected tropical diseases	1028·3 (556·3–2492·1)	508·1 (284·8–1046·0)	–47·5	88·1 (47·5–214·3)	41·2 (24·4–76·9)	–48·8
Maternal disorders	1401·2 (1061·6–2050·8)	545·9 (317·4–1266·9)	–64·9	111·6 (83·0–169·6)	37·4 (22·3–83·2)	–69·4
Maternal haemorrhage	319·3 (247·7–439·2)	95·2 (69·7–119·6)	–69·9	25·2 (19·6–34·6)	6·8 (4·9–8·5)	–72·9
Maternal sepsis	174·6 (133·9–241·6)	41·5 (30·5–54·2)	–76·0	13·2 (10·2–18·4)	3·0 (2·2–3·9)	–77·2
Hypertensive disorders of pregnancy	159·7 (124·9–215·5)	46·6 (34·1–64·3)	–70·9	12·2 (9·6–16·4)	3·4 (2·5–4·7)	–72·3
Obstructed labour	155·3 (28·2–568·3)	196·3 (23·1–790·5)	25·0	14·7 (2·5–54·3)	12·6 (1·6–50·8)	–12·8
Abortion	204·3 (159·2–280·4)	55·3 (39·2–79·2)	–73·0	15·7 (12·3–21·7)	3·9 (2·8–5·7)	–75·0
Other maternal disorders	388·0 (296·4–539·3)	111·1 (69·9–225·9)	–73·5	30·6 (23·4–43·5)	7·7 (4·9–15·0)	–76·4
Neonatal disorders	31 212·8 (26 661·0–35 682·6)	8678·8 (6681·0–10 384·2)	–72·3	2418·1 (2066·0–2763·7)	926·8 (706·3–1117·6)	–61·9
Preterm birth complications	8804·0 (6344·9–11 790·5)	2858·1 (2187·8–3742·5)	–67·3	683·1 (494·2–913·6)	304·6 (230·1–403·0)	–55·1
Neonatal encephalopathy (birth asphyxia/ birth trauma)	10 569·3 (7655·4–14 118·2)	3255·8 (2338·5–4438·7)	–69·0	823·4 (598·2–1097·9)	333·6 (231·9–465·3)	–59·2
Sepsis and other infectious disorders of the newborn baby	436·9 (165·5–962·7)	139·8 (69·7–271·6)	–65·8	33·7 (12·8–74·3)	15·8 (7·9–30·7)	–49·9
Other neonatal disorders	11 402·6 (6837·5–16 172·4)	2425·2 (1622·1–3505·8)	–78·9	878·0 (525·7–1245·8)	272·8 (182·0–394·7)	–69·1
Nutritional deficiencies	5513·7 (4040·5–7469·5)	3307·5 (2350·5–4613·3)	–39·4	445·9 (328·2–600·8)	305·9 (216·7–428·4)	–30·8
Protein-energy malnutrition	1013·8 (804·4–1385·8)	321·2 (231·1–406·1)	–68·1	82·5 (66·7–112·0)	30·1 (21·3–39·2)	–63·3
Iodine deficiency	322·7 (207·8–490·4)	300·9 (183·8–480·3)	–7·2	27·9 (17·8–42·3)	21·3 (13·1–34·0)	–23·8
Vitamin A deficiency	117·9 (86·6–154·0)	63·4 (44·3–86·8)	–46·1	9·4 (6·9–12·3)	5·2 (3·7–7·1)	–44·8
Iron-deficiency anemia	4000·3 (2679·3–5881·1)	2588·9 (1693·2–3834·7)	–35·2	320·8 (215·5–472·1)	246·8 (162·5–363·5)	–23·1
Other nutritional deficiencies	59·0 (49·5–76·6)	33·2 (22·0–40·0)	–42·7	5·3 (4·5–6·7)	2·6 (1·7–3·1)	–51·0
Other communicable, maternal, neonatal, and nutritional disorders	4422·9 (3724·9–5283·1)	3107·2 (2579·9–3591·2)	–29·0	377·0 (322·5–444·2)	244·7 (197·3–285·9)	–34·5
Sexually transmitted diseases excluding HIV	1631·0 (1059·3–2349·6)	510·6 (302·4–812·9)	–69·2	130·3 (85·2–189·0)	42·3 (25·7–66·2)	–68·0
Syphilis	1241·4 (766·4–1910·3)	183·6 (101·2–310·0)	–85·3	98·8 (62·0–150·5)	18·8 (10·0–32·6)	–81·3
Sexually transmitted chlamydial diseases	231·2 (97·1–427·4)	220·9 (81·4–438·9)	–5·9	17·9 (7·7–32·8)	16·1 (5·9–31·9)	–11·6
Gonococcal infection	50·3 (25·9–83·5)	43·9 (18·9–82·2)	–14·1	4·2 (2·2–7·0)	3·1 (1·3–5·8)	–28·3
Trichomoniasis	33·0 (0·2–99·6)	24·8 (0·1–77·4)	–25·1	2·6 (0·0–7·6)	1·8 (0·0–5·6)	–30·0
Other sexually transmitted diseases	75·1 (35·4–117·4)	37·4 (20·8–65·6)	–51·8	6·7 (3·1–10·5)	2·5 (1·4–4·5)	–63·5
Hepatitis	1480·7 (1323·3–1673·3)	1442·8 (1221·6–1714·3)	–3·2	138·3 (124·0–155·5)	97·8 (82·9–116·1)	–29·8
Acute hepatitis A	308·5 (147·7–703·3)	179·1 (76·0–539·5)	–44·6	28·9 (13·7–66·3)	12·8 (5·7–37·5)	–56·4
Acute hepatitis B	864·6 (636·5–1100·3)	1083·7 (739·2–1394·0)	25·8	84·8 (63·8–108·4)	71·7 (49·5–91·9)	–14·8
Acute hepatitis C	25·9 (15·2–41·4)	41·8 (28·3–57·1)	66·0	2·6 (1·6–4·2)	2·8 (1·9–3·8)	8·1
Acute hepatitis E	281·7 (160·9–461·6)	138·2 (71·0–240·2)	–51·6	21·9 (12·6–35·9)	10·5 (5·5–18·0)	–53·0
Leprosy	0·3 (0·1–0·8)	<0·05 (0·0–0·2)	–85·1	<0·05 (0·0–0·1)	<0·05 (0·0–0·05)	–88·3
Other infectious diseases	1311·0 (1047·1–1870·7)	1153·8 (711·7–1417·5)	–5·9	108·5 (88·2–151·5)	104·7 (64·0–130·1)	3·1
Non-communicable diseases	**217 135·5 (202 900·7–234 686·3)**	**243 787·7 (224 298·4–264 558·7)**	**12·3**	**22 358·9 (20 943·7–24 144·9)**	**17 021·8 (15 673·6–18 458·5)**	**–23·8**
Neoplasms	42 123·6 (38 081·6–47 195·5)	53 105·5 (48 351·7–58 136·7)	26·3	4471·5 (4041·5–5040·1)	3579·6 (3257·3–3908·9)	–19·8

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	All ages DALYs (thousands)			Age-standardised DALY rate (per 100 000)		
	1990	2010	Median %Δ	1990	2010	Median %Δ
(Continued from previous page)						
Oesophageal cancer	3868·4 (3168·4–5255·7)	3858·1 (2534·0–4960·1)	4·9	437·5 (357·9–593·1)	258·8 (170·7–334·5)	–37·9
Stomach cancer	7440·6 (5626·0–10 084·2)	6615·6 (4806·1–8739·3)	–11·1	819·7 (621·2–1109·4)	444·8 (323·8–584·2)	–45·8
Liver cancer	7370·7 (6070·8–8874·6)	10 088·6 (8790·2–13 301·8)	35·0	784·3 (653·3–935·5)	659·7 (574·1–866·3)	–16·9
Liver cancer secondary to hepatitis B	3944·8 (3240·8–4694·3)	5464·1 (4654·1–7228·2)	36·5	421·2 (344·7–500·7)	357·1 (304·1–467·1)	–16·2
Liver cancer secondary to hepatitis C	1094·2 (907·5–1303·4)	1693·8 (1419·4–2194·8)	53·7	122·5 (101·4–146·1)	112·3 (94·3–144·0)	–8·8
Liver cancer secondary to alcohol use	1404·6 (1128·7–1680·3)	1892·6 (1564·1–2514·5)	32·8	149·1 (120·0–177·2)	122·9 (101·5–162·6)	–18·6
Other liver cancer	927·0 (755·7–1166·9)	1038·0 (836·5–1413·1)	9·8	91·5 (74·5–112·2)	67·5 (54·3–92·7)	–27·9
Larynx cancer	236·8 (108·3–441·7)	311·2 (136·0–571·1)	30·1	26·8 (12·3–50·4)	20·8 (9·1–38·3)	–23·2
Trachea, bronchus, and lung cancers	6305·9 (5233·5–8931·3)	11 318·4 (7921·4–13 281·6)	88·0	702·8 (582·5–996·2)	760·4 (529·6–890·0)	13·5
Breast cancer	954·6 (903·0–1001·7)	1670·7 (1499·1–1912·8)	73·7	101·9 (96·6–106·8)	107·0 (96·3–122·3)	4·1
Cervical cancer	557·4 (374·8–868·3)	742·0 (331·3–984·4)	51·4	60·6 (40·6–94·0)	48·0 (21·7–63·1)	–10·8
Uterine cancer	154·1 (103·9–325·1)	287·0 (106·1–380·5)	127·0	16·5 (11·3–35·0)	18·8 (7·0–24·7)	38·7
Prostate cancer	69·7 (44·1–118·7)	178·4 (80·5–264·4)	115·9	8·0 (5·1–13·5)	12·9 (5·8–19·1)	37·0
Colon and rectum cancers	2447·4 (1966·7–2710·3)	3422·6 (3003·7–4487·9)	35·9	263·8 (213·7–292·0)	230·7 (203·2–300·8)	–14·9
Mouth cancer	205·2 (169·5–234·5)	360·7 (262·5–469·6)	76·1	22·1 (18·3–25·2)	23·9 (17·5–31·0)	8·2
Nasopharynx cancer	739·8 (505·1–1063·6)	1059·7 (644·8–1540·3)	39·3	76·7 (53·1–111·7)	68·8 (42·5–98·2)	–13·0
Cancer of other part of pharynx and oropharynx	120·6 (75·5–164·7)	144·2 (99·1–227·6)	18·3	12·7 (7·9–17·1)	9·6 (6·6–15·2)	–25·0
Gallbladder and biliary tract cancer	415·6 (289·7–643·7)	644·2 (417·1–934·4)	56·2	45·3 (31·9–70·1)	43·9 (28·3–63·7)	–2·7
Pancreatic cancer	767·0 (585·1–1016·7)	1321·8 (998·7–1698·2)	74·1	84·9 (65·1–112·4)	88·5 (66·7–113·2)	5·3
Malignant melanoma of skin	79·3 (41·7–97·2)	155·8 (109·5–278·8)	82·3	8·0 (4·3–9·9)	10·6 (7·4–18·9)	21·9
Non-melanoma skin cancer	76·1 (40·5–131·5)	96·1 (56·8–161·0)	24·8	8·4 (4·4–14·7)	6·6 (3·9–11·1)	–22·1
Ovarian cancer	457·6 (312·0–591·8)	602·9 (399·9–850·1)	21·9	47·9 (32·6–61·6)	39·3 (26·2–55·4)	–24·2
Testicular cancer	39·1 (19·9–55·7)	29·4 (15·7–53·5)	–30·6	3·6 (1·8–5·1)	2·0 (1·1–3·7)	–48·4
Kidney and other urinary organ cancers	425·6 (292·4–595·7)	836·6 (587·4–1096·6)	97·7	43·1 (30·2–59·9)	57·7 (40·4–75·9)	34·5
Bladder cancer	296·4 (242·4–368·9)	411·1 (320·1–510·0)	39·3	33·6 (27·6–42·1)	28·6 (22·3–35·4)	–14·3
Brain and nervous system cancers	1256·5 (806·0–1674·0)	1496·5 (912·7–2075·0)	19·9	125·3 (81·2–169·0)	102·3 (61·7–142·7)	–17·9
Thyroid cancer	136·9 (106·3–184·2)	212·6 (148·5–282·8)	56·7	14·3 (11·1–19·2)	14·3 (10·0–18·9)	0·7
Hodgkin's disease	64·7 (42·7–98·6)	41·4 (25·9–61·9)	–36·4	5·8 (3·9–8·9)	3·1 (1·9–4·8)	–48·1
Non-Hodgkin lymphoma	738·5 (624·8–860·0)	812·2 (649·9–982·0)	8·9	70·6 (59·7–81·9)	57·6 (45·9–70·1)	–19·0
Multiple myeloma	157·5 (104·8–235·0)	250·1 (146·6–363·8)	59·6	15·5 (10·4–23·1)	17·0 (10·0–24·8)	10·8
Leukaemia	2772·1 (2166·2–3533·1)	2418·1 (1856·4–2975·7)	–9·5	235·0 (184·5–298·9)	184·2 (141·0–226·4)	–18·7
Other neoplasms	3969·6 (2815·5–4898·8)	3719·4 (2707·8–4860·7)	–7·7	396·8 (277·6–487·5)	259·7 (189·7–335·5)	–35·5
Cardiovascular and circulatory diseases	45 267·9 (42 851·2–51 606·5)	58 205·5 (53 245·8–61 100·3)	30·6	5114·5 (4842·2–5826·4)	4065·1 (3707·6–4264·6)	–19·3
Rheumatic heart disease	4140·4 (3766·9–4548·5)	1486·6 (1306·6–1691·0)	–64·1	420·7 (382·5–462·8)	101·6 (89·3–115·9)	–75·8
Ischaemic heart disease	10 127·0 (9193·6–12 758·3)	17 885·8 (15 135·4–19 306·6)	83·0	1139·8 (1036·0–1434·6)	1242·5 (1053·5–1339·7)	13·1
Cerebrovascular disease	24 876·8 (22 724·2–30 679·9)	30 138·9 (25 523·4–32 406·0)	28·9	2894·6 (2651·5–3550·7)	2101·5 (1783·9–2257·2)	–23·0
Ischaemic stroke	6252·0 (4408·0–9652·9)	8383·8 (6523·0–11 529·4)	35·9	767·5 (547·0–1169·1)	612·4 (478·1–835·8)	–19·1
Haemorrhagic and other non-ischaemic stroke	18 624·7 (13 636·3–23 424·5)	21 755·1 (17 436·2–25 934·6)	16·8	2127·0 (1557·1–2669·7)	1489·1 (1192·7–1781·1)	–30·0
Hypertensive heart disease	2307·1 (1866·1–2994·8)	2767·4 (2169·8–3284·5)	22·8	271·2 (218·8–351·2)	194·7 (152·4–230·9)	–26·6
Cardiomyopathy and myocarditis	1139·2 (619·8–1796·4)	1012·6 (683·4–1380·0)	–8·5	107·8 (61·2–166·2)	74·5 (49·5–102·4)	–29·1
Atrial fibrillation and flutter	337·3 (232·9–465·3)	596·2 (425·6–809·7)	76·9	39·9 (27·6–55·4)	42·6 (30·3–58·0)	6·7
Aortic aneurysm	692·1 (243·1–1208·2)	1010·1 (563·5–1569·9)	45·5	78·7 (27·8–136·2)	70·4 (39·1–109·7)	–10·8
Peripheral vascular disease	81·7 (46·3–126·5)	181·5 (110·9–279·6)	120·9	10·0 (5·7–15·7)	13·0 (7·9–20·2)	29·2
Endocarditis	397·0 (268·7–545·9)	386·7 (275·0–507·2)	–2·0	36·1 (25·2–48·8)	27·2 (19·7–35·5)	–24·2
Other cardiovascular and circulatory diseases	1169·3 (813·0–1678·6)	2739·7 (2367·5–3187·2)	137·1	115·8 (83·3–162·2)	197·1 (169·4–230·3)	72·5

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	All ages DALYs (thousands)			Age-standardised DALY rate (per 100 000)		
	1990	2010	Median %Δ	1990	2010	Median %Δ
(Continued from previous page)						
Chronic respiratory diseases	29 139·1 (27 286·2–31 283·1)	19 898·2 (17 579·2–23 062·4)	–32·1	3336·8 (3142·6–3562·9)	1425·5 (1264·5–1642·1)	–57·5
Chronic obstructive pulmonary disease	26 470·3 (24 344·5–28 530·7)	16 723·8 (14 413·7–19 402·9)	–36·8	3074·8 (2833·2–3295·2)	1190·6 (1033·8–1373·3)	–61·3
Pneumoconiosis	169·4 (104·6–290·6)	153·4 (65·0–365·6)	–21·0	19·2 (11·8–33·1)	10·7 (4·5–26·0)	–51·2
Asthma	1238·0 (898·2–1713·5)	1094·9 (781·9–1503·2)	–11·9	119·2 (88·0–160·8)	83·6 (58·7–115·9)	–30·0
Interstitial lung disease and pulmonary sarcoidosis	144·9 (79·4–254·4)	199·1 (122·3–290·0)	41·9	15·1 (8·5–25·4)	14·2 (8·6–20·9)	–5·0
Other chronic respiratory diseases	1116·5 (892·3–1378·7)	1727·0 (1192·8–2198·4)	57·7	108·6 (86·5–134·8)	126·4 (87·2–160·0)	18·6
Cirrhosis of the liver	5403·9 (3935·6–6147·2)	3316·1 (2613·4–5377·2)	–48·7	567·4 (416·2–645·6)	217·1 (171·5–352·5)	–68·0
Cirrhosis of the liver secondary to hepatitis B	2282·4 (1619·0–2720·9)	1447·3 (1103·7–2362·8)	–46·1	244·7 (173·3–291·3)	94·8 (72·4–154·7)	–67·1
Cirrhosis of the liver secondary to hepatitis C	1035·7 (728·1–1210·3)	647·1 (499·2–1061·8)	–46·6	112·7 (79·2–131·6)	42·6 (32·9–69·5)	–67·7
Cirrhosis of the liver secondary to alcohol use	1173·7 (801·0–1427·9)	784·1 (583·3–1330·7)	–43·4	122·9 (83·3–149·5)	50·6 (37·8–85·9)	–65·2
Other cirrhosis of the liver	912·1 (634·2–1101·4)	437·6 (322·6–734·8)	–59·7	87·2 (61·2–105·0)	29·1 (21·6–48·8)	–71·9
Digestive diseases (except cirrhosis)	5435·6 (4637·1–6243·7)	3869·5 (3298·6–4664·5)	–29·2	540·0 (464·3–614·9)	273·3 (232·9–327·9)	–49·7
Peptic ulcer disease	1411·5 (1069·1–1646·3)	453·1 (372·3–594·1)	–68·5	150·5 (114·0–173·5)	31·0 (25·5–40·7)	–79·7
Gastritis and duodenitis	296·9 (148·5–562·3)	229·0 (101·6–520·0)	–25·8	26·5 (13·6–49·1)	15·6 (7·1–35·3)	–43·3
Appendicitis	231·5 (149·5–328·0)	63·7 (38·8–104·9)	–73·5	21·2 (13·5–29·5)	4·8 (2·9–7·9)	–78·1
Paralytic ileus and intestinal obstruction without hernia	619·0 (304·7–873·0)	241·9 (161·6–439·4)	–70·5	56·4 (29·3–76·9)	17·9 (11·8–32·6)	–76·2
Inguinal or femoral hernia	115·4 (57·7–270·1)	113·5 (41·7–286·5)	–5·2	11·6 (6·1–26·0)	8·4 (3·1–21·1)	–31·3
Non-infective inflammatory bowel disease	413·0 (225·2–720·5)	377·8 (209·7–687·2)	–9·3	36·3 (20·3–63·7)	27·9 (15·4–50·4)	–23·8
Vascular disorders of intestine	120·4 (35·0–362·3)	174·2 (63·2–471·4)	55·1	13·4 (4·0–39·9)	12·4 (4·5–33·2)	–0·3
Gall bladder and bile duct disease	476·7 (361·8–618·6)	448·2 (330·9–573·5)	–6·0	48·3 (36·6–61·4)	31·3 (22·8–40·4)	–35·4
Pancreatitis	177·8 (99·6–270·1)	204·5 (141·1–287·9)	15·6	18·7 (10·5–28·3)	13·8 (9·6–19·1)	–26·0
Other digestive diseases	1573·5 (1106·9–1887·9)	1563·6 (1240·6–2215·8)	–4·7	157·1 (110·1–189·0)	110·2 (87·2–156·0)	–32·7
Neurological disorders	5482·5 (4638·7–6496·5)	6711·1 (5681·0–7763·9)	22·0	515·6 (442·1–602·5)	481·5 (409·0–553·7)	–7·1
Alzheimer's disease and other dementias	957·3 (732·6–1179·8)	1592·9 (1261·6–2015·3)	62·4	116·1 (89·7–142·8)	118·4 (93·3–149·5)	0·2
Parkinson's disease	173·8 (117·6–230·5)	265·1 (195·9–371·1)	47·4	19·5 (13·6–26·1)	18·7 (13·8–26·1)	–7·3
Epilepsy	1723·1 (1354·1–2040·6)	1507·4 (1261·8–1805·5)	–13·2	145·9 (115·5–171·0)	111·7 (93·2–134·5)	–24·2
Multiple sclerosis	174·4 (102·0–247·4)	148·9 (105·9–199·1)	–16·3	17·5 (10·0–24·9)	9·7 (6·9–12·9)	–45·4
Migraine	1781·7 (1203·1–2480·3)	2293·4 (1504·3–3185·7)	29·0	155·4 (104·8–216·6)	157·9 (103·5–219·3)	1·7
Tension-type headache	285·1 (170·6–446·3)	375·0 (225·1–589·9)	31·6	25·8 (15·4–40·4)	25·7 (15·4–40·3)	–0·3
Other neurological disorders	387·1 (228·2–1032·1)	528·4 (374·6–859·9)	51·0	35·5 (22·1–87·9)	39·4 (27·1–66·9)	19·6
Mental and behavioural disorders	24 450·5 (20 025·4–29 182·9)	29 954·1 (24 451·7–35 839·5)	22·7	2173·9 (1779·6–2591·3)	2091·6 (1708·3–2502·6)	–3·8
Schizophrenia	2554·2 (1756·7–3396·2)	3472·3 (2307·5–4719·6)	35·6	250·8 (172·5–333·4)	225·5 (150·1–305·9)	–10·4
Alcohol use disorders	2801·0 (1814·0–4208·7)	3489·3 (2219·0–5163·9)	25·2	245·9 (159·3–370·4)	236·6 (150·5–349·9)	–3·6
Drug use disorders	2073·4 (1368·7–2961·2)	2369·2 (1536·5–3534·6)	13·5	166·5 (110·3–237·5)	168·6 (109·3–250·5)	0·9
Opioid use disorders	880·2 (456·7–1544·8)	1034·7 (533·3–1767·4)	18·0	72·1 (37·4–126·5)	72·9 (37·7–124·2)	1·6
Cocaine use disorders	38·7 (20·5–65·9)	36·8 (16·5–67·4)	–8·0	3·2 (1·7–5·4)	2·6 (1·2–4·7)	–20·4
Amphetamine use disorders	342·1 (167·8–601·2)	389·5 (192·1–684·3)	14·0	27·7 (13·5–48·2)	27·5 (13·5–48·3)	0·0
Cannabis use disorders	353·9 (169·4–637·1)	367·5 (177·3–686·7)	3·3	26·4 (12·6–47·6)	26·5 (12·8–49·5)	0·2
Other drug use disorders	458·4 (263·0–732·9)	540·7 (328·1–861·5)	15·9	37·2 (21·2–59·4)	39·0 (23·6–62·0)	3·0
Unipolar depressive disorders	9470·7 (6727·6–12 275·5)	11 767·3 (8485·4–15 358·2)	24·3	858·5 (608·4–1112·8)	818·3 (591·4–1069·2)	–4·5
Major depressive disorder	7633·8 (5302·1–10 095·7)	9318·1 (6511·2–12 393·1)	22·0	690·3 (479·7–915·9)	649·8 (453·8–864·0)	–5·8
Dysthymia	1836·9 (1193·2–2565·0)	2449·2 (1604·8–3381·2)	33·4	168·2 (109·6–234·1)	168·6 (110·3–233·4)	0·2
Bipolar affective disorder	2192·2 (1352·7–3238·7)	2758·5 (1700·3–4021·4)	26·0	193·7 (119·6–286·3)	185·8 (114·9–270·9)	–3·9
Anxiety disorders	2302·7 (1566·4–3227·2)	2885·0 (1914·7–4132·3)	24·8	201·8 (137·5–281·6)	202·4 (134·6–289·0)	–0·1
Eating disorders	156·1 (82·7–234·3)	234·8 (144·2–357·4)	51·3	12·9 (6·9–19·3)	16·6 (10·3–25·3)	28·5

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	All ages DALYs (thousands)			Age-standardised DALY rate (per 100 000)		
	1990	2010	Median %Δ	1990	2010	Median %Δ
(Continued from previous page)						
Pervasive development disorders	1331·0 (898·0–1880·3)	1570·3 (1048·7–2258·6)	18·2	114·9 (77·5–162·2)	117·3 (77·9–168·8)	2·2
Autism	700·2 (455·4–1037·3)	831·9 (521·2–1212·7)	18·8	60·4 (39·3–89·0)	62·3 (39·1–90·7)	3·1
Asperger's syndrome	630·8 (404·1–938·4)	738·4 (483·0–1095·2)	16·6	54·5 (35·0–80·7)	55·0 (35·9–81·5)	0·6
Childhood behavioural disorders	1146·9 (664·9–1833·9)	1054·6 (625·7–1617·9)	–7·7	91·6 (52·8–146·6)	94·3 (56·0–144·7)	3·1
Attention-deficit hyperactivity disorder	105·5 (60·2–166·4)	99·5 (55·4–156·4)	–5·9	8·3 (4·7–13·0)	8·3 (4·6–13·1)	0·2
Conduct disorder	1041·4 (580·3–1716·3)	955·2 (548·7–1503·9)	–8·0	83·3 (46·3–137·5)	86·0 (49·4–136·1)	3·4
Idiopathic intellectual disability	181·7 (86·9–300·3)	126·4 (51·0–232·3)	–30·1	14·8 (7·0–24·8)	9·6 (3·8–17·4)	–35·3
Other mental and behavioural disorders	240·6 (132·5–350·9)	226·4 (146·9–341·3)	–13·8	22·4 (12·4–32·7)	16·6 (10·9–25·0)	–32·1
Diabetes, urogenital, blood, and endocrine diseases	13 110·6 (10 822·3–16 111·4)	16 976·7 (14 276·6–20 599·6)	30·7	1291·3 (1066·6–1582·5)	1186·5 (998·3–1439·8)	–7·3
Diabetes mellitus	4845·8 (3822·2–6253·6)	7834·7 (6342·2–9799·0)	63·4	512·6 (402·2–665·7)	531·8 (431·6–664·0)	5·1
Acute glomerulonephritis	636·5 (64·8–2360·9)	87·3 (32·8–198·1)	–80·1	58·4 (5·9–219·4)	6·4 (2·4–14·3)	–83·8
Chronic kidney diseases	2085·3 (1827·2–2789·1)	2781·6 (2381·3–3118·3)	39·7	210·9 (185·3–279·9)	191·0 (163·5–214·6)	–5·1
Chronic kidney disease due to diabetes mellitus	304·2 (251·9–404·5)	471·7 (389·1–550·4)	60·9	33·4 (27·6–44·2)	31·5 (26·1–36·8)	–2·0
Chronic kidney disease due to hypertension	383·0 (327·6–515·4)	530·8 (447·8–607·2)	44·4	39·7 (34·0–52·5)	36·2 (30·4–41·4)	–5·2
Chronic kidney disease unspecified	1398·2 (1215·6–1894·5)	1779·1 (1521·4–2016·5)	33·5	137·8 (119·6–183·6)	123·2 (105·4–139·6)	–6·2
Urinary diseases and male infertility	1292·4 (906·2–1774·1)	1767·2 (1191·9–2561·3)	35·4	139·0 (97·2–192·1)	120·7 (82·1–174·4)	–14·0
Tubulointerstitial nephritis, pyelonephritis, and urinary tract infections	303·8 (177·9–469·5)	240·5 (183·9–335·3)	–21·2	28·1 (16·7–41·7)	18·0 (13·8–24·9)	–36·4
Urolithiasis	215·6 (124·0–392·7)	197·4 (122·5–313·8)	–5·9	23·0 (13·1–41·9)	13·3 (8·3–21·1)	–40·5
Benign prostatic hyperplasia	701·7 (438·0–1079·4)	1252·5 (772·5–1981·4)	78·4	80·9 (50·6–124·4)	84·3 (52·1–133·2)	4·2
Male infertility	28·1 (9·4–67·2)	37·2 (13·0–88·2)	32·1	2·5 (0·8–5·9)	2·4 (0·8–5·5)	–4·5
Other urinary diseases	43·2 (27·1–56·3)	39·5 (29·6–57·4)	–13·5	4·6 (2·8–5·9)	2·8 (2·1–4·0)	–42·5
Gynaecological diseases	1575·7 (988·5–2500·9)	1844·2 (1109·5–3063·5)	16·2	138·4 (87·5–218·8)	124·4 (74·7–204·7)	–10·8
Uterine fibroids	339·9 (208·3–544·5)	451·2 (240·2–791·3)	30·6	33·2 (19·6–54·1)	28·4 (15·2–49·5)	–15·5
Polycystic ovarian syndrome	452·1 (214·5–861·1)	535·5 (252·3–1012·5)	18·3	37·3 (17·7–70·9)	36·7 (17·2–69·6)	–1·7
Female infertility	20·0 (6·9–46·6)	27·5 (9·9–64·6)	37·0	1·8 (0·6–4·1)	1·7 (0·6–4·1)	–1·1
Endometriosis	95·4 (33·6–181·6)	116·1 (40·1–235·4)	21·6	7·9 (2·8–15·0)	8·1 (2·8–16·4)	3·1
Genital prolapse	262·7 (103·7–583·9)	383·7 (145·4–822·0)	46·7	25·3 (10·1–55·5)	25·3 (9·6–54·3)	0·3
Premenstrual syndrome	255·8 (0·0–682·6)	250·3 (0·0–656·6)	–2·7	19·7 (0·0–52·7)	18·7 (0·0–49·1)	–5·2
Other gynaecological diseases	149·7 (108·4–204·4)	79·8 (58·0–111·7)	–46·8	13·3 (9·8–18·3)	5·4 (3·9–7·4)	–59·6
Haemoglobinopathies and haemolytic anaemias	1858·0 (1191·7–2755·5)	1512·5 (1106·9–2063·0)	–17·1	159·0 (102·6–235·2)	122·3 (89·5–167·8)	–21·7
Thalassaemias	1255·6 (910·9–1752·0)	1152·2 (824·3–1619·9)	–7·3	105·2 (76·1–146·1)	91·6 (65·7–127·6)	–11·9
Sickle cell disorders	28·0 (18·0–42·8)	37·4 (22·2–59·9)	33·3	2·4 (1·5–3·7)	3·3 (1·9–5·4)	37·5
G6PD deficiency	50·4 (30·7–91·8)	36·4 (27·2–48·4)	–22·9	4·3 (2·7–7·7)	2·9 (2·2–4·0)	–27·6
Other haemoglobinopathies and haemolytic anaemias	523·9 (239·4–1149·3)	286·6 (157·4–480·8)	–38·5	47·0 (21·5–100·3)	24·5 (13·8–42·2)	–42·0
Other endocrine, nutritional, blood, and immune disorders	816·9 (609·5–1093·4)	1149·3 (839·3–1606·3)	40·8	73·0 (55·3–99·1)	89·9 (64·1–126·7)	23·7
Musculoskeletal disorders	22 450·5 (17 056·0–28 497·3)	32 746·0 (25 008·9–40 768·0)	45·7	2205·4 (1690·1–2780·6)	2216·8 (1690·7–2758·4)	0·5
Rheumatoid arthritis	595·6 (440·8–756·9)	791·5 (601·7–1013·2)	31·4	61·3 (45·6–77·4)	53·8 (40·9–68·9)	–13·0
Osteoarthritis	2393·7 (1556·3–3516·5)	4164·5 (2778·2–6066·1)	73·2	273·3 (177·7–401·9)	272·0 (181·6–395·7)	–0·9
Low back and neck pain	15 419·9 (10 644·3–21 027·7)	21 939·0 (15 213·0–29 528·8)	42·4	1478·6 (1023·0–2010·8)	1494·1 (1036·4–2009·4)	1·1
Low back pain	10 523·5 (7159·4–14 513·5)	15 131·8 (10 278·6–20 522·3)	43·9	1019·5 (696·8–1403·7)	1028·5 (699·1–1396·1)	0·9
Neck pain	4896·4 (3404·7–6729·8)	6807·2 (4772·2–9378·6)	39·1	459·1 (318·8–630·2)	465·6 (326·9–641·1)	1·6
Gout	12·4 (7·6–18·2)	20·5 (12·6–30·4)	65·6	1·4 (0·8–2·0)	1·4 (0·8–2·0)	–0·4
Other musculoskeletal disorders	4028·8 (3306·4–4604·7)	5830·4 (4828·6–6636·4)	44·6	390·9 (322·5–447·1)	395·6 (327·9–449·6)	1·1

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	All ages DALYs (thousands)			Age-standardised DALY rate (per 100 000)		
	1990	2010	Median %Δ	1990	2010	Median %Δ
(Continued from previous page)						
Other non-communicable diseases	24 271·1 (19 351·4–31 778·1)	19 005·1 (13 581·9–27 514·6)	−22·0	2142·4 (1684·7–2851·3)	1484·7 (1095·4–2093·1)	−30·9
Congenital anomalies	11 234·4 (9294·0–15 172·2)	4098·6 (3132·6–5655·8)	−63·5	865·0 (716·6–1166·8)	414·1 (310·3–584·2)	−52·1
Neural tube defects	2275·4 (1108·8–3887·1)	427·8 (271·1–710·4)	−81·0	176·5 (86·3–300·6)	41·2 (24·9–73·6)	−76·8
Congenital heart anomalies	6040·9 (5191·6–7098·7)	2508·9 (1975·0–3243·6)	−58·4	462·8 (398·7–542·3)	258·9 (201·3–337·6)	−44·0
Cleft lip and cleft palate	448·1 (177·9–1097·8)	113·1 (68·9–186·2)	−71·8	34·3 (13·8–83·5)	10·9 (6·4–18·7)	−64·8
Down's syndrome	242·1 (129·4–421·5)	175·6 (123·8–245·8)	−24·3	19·4 (10·6–33·2)	14·2 (10·0–19·6)	−23·9
Other chromosomal abnormalities	1000·8 (254·9–3085·3)	296·0 (157·8–639·5)	−63·6	77·3 (20·2–236·8)	29·8 (15·1–68·0)	−53·1
Other congenital anomalies	1227·2 (333·2–2834·7)	577·1 (345·7–1160·4)	−44·9	94·7 (26·5–216·8)	59·1 (33·7–123·6)	−28·4
Skin and subcutaneous diseases	5604·0 (3661·2–8513·9)	5926·4 (3709·7–9185·6)	5·2	491·6 (321·5–745·8)	442·0 (275·6–684·5)	−10·5
Eczema	1053·2 (532·6–1694·8)	1192·6 (592·9–1943·4)	13·3	91·1 (46·2–146·1)	91·3 (45·3–149·0)	0·5
Psoriasis	168·5 (79·3–285·0)	239·4 (110·6–407·4)	42·7	16·3 (7·7–27·6)	16·3 (7·6–27·6)	0·1
Cellulitis	220·7 (131·7–387·8)	106·6 (48·9–301·0)	−59·1	19·4 (11·7–34·4)	8·0 (3·7–22·7)	−65·1
Abscess, impetigo, and other bacterial skin diseases	478·5 (316·1–688·1)	259·8 (144·0–484·9)	−47·1	40·3 (26·7–58·1)	21·0 (11·5–38·9)	−49·3
Scabies	350·7 (158·3–700·7)	256·1 (116·2–497·8)	−26·6	30·0 (13·6–60·1)	19·8 (9·0–38·4)	−33·4
Fungal skin diseases	273·5 (85·1–635·9)	355·2 (113·4–837·3)	29·8	25·4 (7·9–59·2)	25·8 (8·2–60·5)	1·3
Viral skin diseases	498·3 (189·4–895·9)	509·2 (196·9–913·7)	3·1	41·9 (15·9–75·2)	41·0 (15·8–73·9)	−1·6
Acne vulgaris	819·3 (372·3–1536·1)	794·7 (362·1–1527·6)	−3·2	61·6 (28·0–115·3)	61·8 (28·1–119·0)	0·0
Alopecia areata	206·3 (60·2–419·8)	252·1 (70·3–538·2)	22·5	18·4 (5·4–37·3)	18·0 (5·0–38·4)	−1·8
Pruritus	261·9 (114·1–491·9)	375·5 (171·0–751·3)	42·4	25·7 (11·2–47·9)	25·6 (11·7–51·2)	−0·8
Urticaria	432·1 (177·6–756·1)	523·3 (209·4–932·8)	20·4	38·4 (15·7–66·7)	38·3 (15·3–68·1)	−0·8
Decubitus ulcer	155·6 (103·8–248·1)	136·7 (75·0–256·4)	−15·0	16·6 (10·9–27·0)	9·8 (5·4–18·2)	−42·5
Other skin and subcutaneous diseases	685·4 (318·1–1295·3)	925·1 (438·7–1750·2)	35·1	66·6 (30·8–126·0)	65·2 (30·9–123·3)	−2·0
Sense organ diseases	4802·5 (3355·8–6779·3)	5906·2 (4136·2–8413·2)	22·9	527·4 (369·2–736·6)	412·5 (289·3–586·9)	−21·8
Glaucoma	101·0 (71·6–139·4)	157·7 (113·9–213·2)	57·0	11·7 (8·3–16·3)	11·0 (7·9–14·9)	−6·2
Cataracts	646·2 (492·0–831·6)	504·8 (380·9–653·5)	−21·9	74·5 (56·7–95·8)	35·1 (26·4–45·3)	−53·0
Macular degeneration	205·9 (148·4–276·7)	431·3 (324·9–556·0)	109·9	25·6 (18·5–34·3)	31·5 (23·8–40·6)	23·6
Refraction and accommodation disorders	564·9 (425·6–743·0)	767·1 (571·1–1005·7)	35·8	63·3 (47·8–83·2)	54·3 (40·5–71·0)	−14·3
Other hearing loss	2715·1 (1597·2–4262·8)	3151·4 (1849·7–5120·5)	15·5	292·6 (173·7–455·2)	219·6 (129·1–355·3)	−25·1
Other vision loss	548·0 (252·0–1014·6)	866·7 (403·3–1642·5)	58·3	57·7 (26·5–106·9)	59·1 (27·5–112·0)	2·4
Other sense organ diseases	21·4 (7·3–50·2)	27·3 (9·3–61·0)	27·4	2·0 (0·7–4·7)	2·0 (0·7–4·5)	0·3
Oral disorders	2299·9 (1224·0–4066·9)	2934·1 (1468·5–5368·6)	26·5	233·2 (127·1–406·9)	200·5 (100·4–364·6)	−14·8
Dental caries	886·6 (348·4–1759·8)	1056·9 (437·7–2040·2)	18·9	77·4 (30·6–152·6)	77·0 (31·8–149·2)	−0·8
Periodontal disease	745·0 (285·5–1593·9)	1231·5 (460·3–2676·4)	65·2	78·9 (30·2–168·4)	79·5 (29·7–172·8)	0·7
Edentulism	668·3 (386·0–1048·1)	645·8 (376·2–1013·0)	−3·3	76·9 (44·5–120·6)	44·0 (25·7–69·2)	−42·7
Sudden infant death syndrome	330·3 (67·8–1297·6)	139·9 (47·0–370·1)	−49·6	25·1 (5·2–98·7)	15·5 (5·2–41·0)	−26·8
Injuries	**51 189·9 (44 186·7–57 117·4)**	**40 804·0 (35 982·2–48 950·1)**	**−22·3**	**4371·5 (3798·2–4872·8)**	**2939·9 (2596·8–3515·1)**	**−34·3**
Transport injuries	10 583·2 (7969·0–15 143·4)	15 726·6 (11 842·4–21 218·3)	50·3	921·4 (694·4–1306·4)	1103·2 (828·2–1494·9)	20·7
Road injury	10 017·3 (7555·8–13 977·9)	14 962·3 (11 418·0–19 995·4)	55·6	870·8 (654·8–1209·0)	1050·3 (800·7–1403·5)	25·2
Pedestrian injury by road vehicle	2257·3 (1318·3–3423·7)	5595·6 (4267·2–7256·6)	139·6	197·5 (116·2–299·5)	389·8 (296·4–502·3)	90·8
Pedal cycle vehicle	391·7 (242·1–614·6)	451·4 (283·6–615·0)	16·3	34·0 (21·5–51·9)	32·4 (20·4–43·8)	−4·3
Motorised vehicle with two wheels	2182·7 (1381·6–3179·7)	2646·2 (2093·6–3353·9)	22·9	189·0 (122·1–272·4)	184·5 (146·5–233·5)	−1·8
Motorised vehicle with three or more wheels	2264·6 (1542·0–3013·1)	4004·5 (3158·4–4940·2)	73·4	196·4 (135·0–260·7)	280·3 (220·3–348·0)	40·8
Road injury other	3088·8 (1196·6–6449·1)	2464·4 (924·6–5589·7)	−22·3	269·6 (105·9–557·3)	177·0 (66·4–399·0)	−36·4
Other transport injury	565·9 (406·7–770·7)	764·3 (542·4–1037·1)	34·7	50·6 (36·5–68·3)	52·9 (37·4–71·7)	4·1
Unintentional injuries other than transport injuries	29 833·2 (25 958·0–33 260·9)	17 783·1 (15 550·7–20 527·2)	−40·8	2516·9 (2214·1–2805·9)	1334·5 (1174·5–1541·1)	−47·4

(Continues on next page)

	All ages DALYs (thousands)			Age-standardised DALY rate (per 100 000)		
	1990	2010	Median %Δ	1990	2010	Median %Δ
(Continued from previous page)						
Falls	5752·0 (4694·8–7259·2)	7058·3 (5624·8–8834·5)	24·3	567·7 (462·1–720·7)	494·4 (394·5–613·6)	−11·9
Drowning	10 212·4 (7166·0–12 426·4)	3663·4 (3008·1–5370·1)	−66·0	802·5 (572·7–967·1)	315·6 (254·2–484·9)	−62·9
Fire, heat, and hot substances	892·0 (700·7–1132·8)	582·7 (442·2–826·8)	−35·8	77·4 (61·3–98·1)	42·8 (32·5–61·9)	−45·9
Poisonings	2686·9 (1996·5–4710·1)	1613·7 (885·2–2123·1)	−27·3	230·5 (172·0–406·7)	114·1 (63·7–150·3)	−40·0
Exposure to mechanical forces	1792·8 (1348·8–2453·6)	1130·0 (739·9–1436·6)	−34·8	152·3 (116·6–209·4)	77·9 (51·4–99·1)	−47·1
Mechanical forces (firearm)	677·4 (334·9–1134·0)	208·2 (113·8–355·7)	−69·2	56·9 (28·7–92·7)	14·6 (8·0–24·9)	−74·2
Mechanical forces (other)	1149·5 (607·8–2098·5)	975·6 (530·3–1450·2)	−11·6	98·5 (52·5–181·4)	66·9 (37·0–99·0)	−28·9
Adverse effects of medical treatment	287·9 (141·7–475·1)	370·0 (255·7–519·0)	32·2	25·6 (13·6–40·3)	27·6 (18·4–39·0)	10·3
Animal contact	474·6 (237·5–836·1)	156·0 (92·9–246·4)	−66·2	41·5 (20·8–71·5)	11·7 (7·0–18·2)	−71·1
Animal contact (venomous)	215·9 (99·1–495·7)	71·9 (40·2–123·5)	−63·4	19·4 (9·2–43·5)	5·2 (2·9–9·1)	−70·7
Animal contact (non-venomous)	258·7 (92·0–571·9)	84·1 (46·3–148·6)	−64·1	22·1 (8·1–47·2)	6·4 (3·4–11·2)	−68·4
Unintentional injuries not classified elsewhere	7734·6 (5740·5–9057·6)	3209·0 (2493·5–3694·6)	−58·8	619·4 (464·8–720·1)	250·4 (197·3–293·3)	−59·9
Self-harm and interpersonal violence	10 773·5 (7173·7–12 847·8)	7294·3 (5797·7–11 344·9)	−42·3	933·1 (627·3–1102·1)	502·3 (401·7–780·4)	−53·9
Self-harm	8959·3 (5433·1–10 915·0)	5969·9 (4645·7–9717·0)	−44·3	785·0 (484·2–954·3)	408·3 (318·3–664·1)	−56·2
Interpersonal violence	1814·2 (1322·0–2249·4)	1324·4 (1034·3–1987·4)	−31·7	148·2 (108·8–184·4)	94·0 (73·3–141·2)	−40·9
Assault by firearm	323·9 (165·9–625·7)	150·4 (99·0–239·7)	−51·5	27·2 (14·2–51·3)	10·5 (6·9–16·9)	−60·0
Assault by sharp object	484·5 (271·0–752·0)	423·7 (290·1–621·4)	−8·6	39·0 (22·4–59·9)	29·5 (20·1–43·2)	−21·5
Assault by other means	1030·9 (696·4–1403·7)	789·4 (561·5–1069·5)	−23·2	84·3 (58·0–113·3)	56·6 (40·6–76·1)	−32·6

Data are DALYs (95% UI) or % change. UI=uncertainty interval. DALYs=disability-adjusted life-years. %Δ=percentage change. *E coli=Escherichia coli*. *H influenza=Haemophilus influenza*.

Table 4: **DALYs (in thousands) for 285 causes in 1990 and 2010 for all ages, both sexes, and per 100 000 with 95% UI and percentage change, in China**

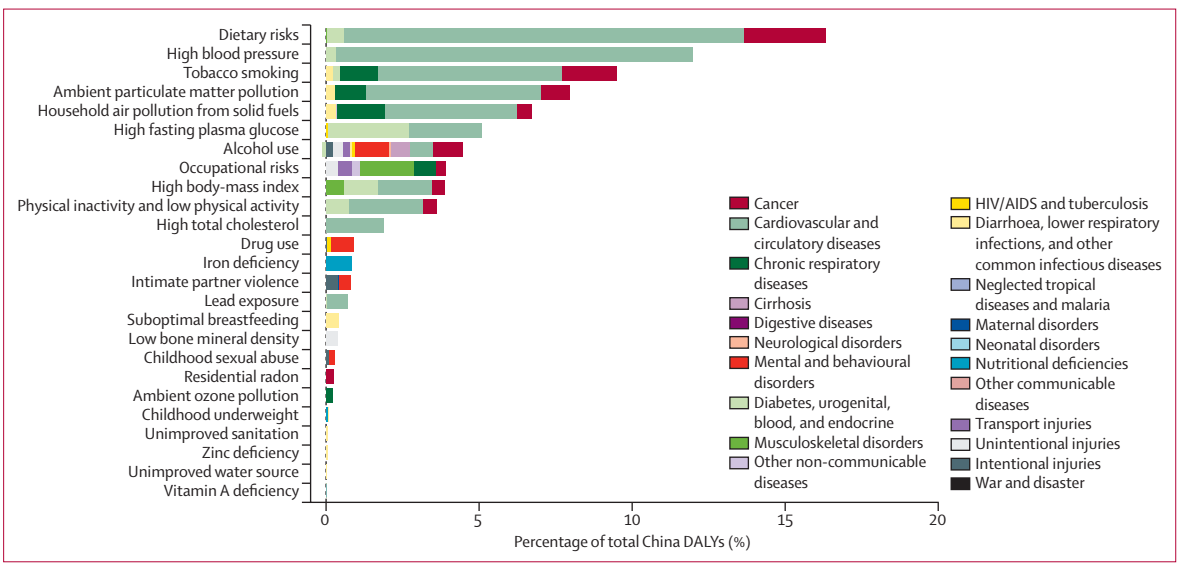

Figure 7: **Disability-adjusted life-years (DALYs) for both sexes in China in 2010**

Figure 7 shows the percentage of DALYs attributable to major risk groups in 2010. The leading risk factor in China was a composite of dietary risk factors, accounting for 16·3% (14·5–18·0%) of DALYs and 30·6% (27·5–33·3%) of deaths. The composite diet risk factor is made up of 14 different components (appendix p 8). Analysed component by component, the most important factors in the dietary composite factor were diets that were low in fruits, high in sodium, or low in whole grains; all of which are problems with diet even in rural areas. The second leading risk factor was high blood pressure, which accounted for 12·0% (10·4–13·5) of DALYs and 24·6% (21·9–27·2) of deaths. The third major risk was tobacco, accounting for 9·5% (7·4–11·4) of DALYs and 16·4% (12·8–19·9) of deaths. Two sources of particulate matter (PM) 2·5 exposure, ambient air

	DALYs (thousands) in male individuals		DALYs (thousands) in female individuals		DALYs (thousands) in both sexes	
	1990	2010	1990	2010	1990	2010
Unimproved water and sanitation	976 (35–1911)	139 (5–359)	886 (32–1686)	118 (4–303)	1861 (67–3486)	257 (9–663)
Unimproved water source	395 (15–957)	53 (2–171)	359 (14–864)	44 (1–147)	754 (29–1792)	97 (3–319)
Unimproved sanitation	671 (17–1358)	92 (2–263)	609 (17–1199)	78 (2–219)	1279 (34–2525)	170 (4–479)
Air pollution						
Ambient particulate matter pollution	13 452 (11 054–15 846)	16 068 (13 612–18 419)	10 806 (8840–13 055)	9160 (7767–10 570)	24 258 (20 317–28 401)	25 227 (21 771–28 595)
Household air pollution from solid fuels	21 923 (16 783–26 583)	12 382 (8705–16 206)	20 844 (17 619–23 989)	8910 (6644–11 222)	42 767 (35 924–48 879)	21 292 (15 869–26 661)
Ambient ozone pollution	490 (150–920)	400 (135–737)	430 (134–802)	250 (81–444)	920 (284–1712)	651 (220–1175)
Other environmental risks	437 (271–667)	1930 (1131–3085)	456 (251–657)	1105 (679–1648)	893 (608–1216)	3035 (1943–4573)
Residential radon	..	540 (52–1522)	..	222 (22–650)	..	762 (75–2092)
Lead exposure	437 (271–667)	1389 (811–2134)	456 (251–657)	883 (538–1292)	893 (608–1216)	2273 (1550–3154)
Child and maternal undernutrition	10 206 (6303–14 355)	1859 (1269–2612)	10 530 (7376–14 390)	2406 (1708–3297)	20 736 (13 935–27 847)	4264 (3066–5835)
Suboptimal breastfeeding	6067 (2456–9863)	731 (279–1301)	5045 (2064–8341)	521 (198–883)	11 113 (4498–17 488)	1252 (488–2052)
Non-exclusive breastfeeding	5656 (2098–9424)	641 (186–1197)	4661 (1785–7975)	443 (120–789)	10 317 (3924–16 607)	1085 (307–1881)
Discontinued breastfeeding	411 (43–934)	89 (9–198)	384 (36–857)	78 (8–166)	795 (82–1701)	167 (17–366)
Childhood underweight	3495 (2229–5095)	169 (106–243)	3005 (1967–4351)	126 (74–188)	6500 (4307–9377)	295 (194–426)
Iron deficiency	1254 (848–1817)	901 (603–1297)	2950 (2013–4287)	1709 (1084–2565)	4204 (2869–6062)	2609 (1712–3861)
Vitamin A deficiency	336 (113–769)	27 (12–47)	305 (102–642)	23 (10–41)	641 (255–1259)	49 (23–85)
Zinc deficiency	734 (120–1703)	93 (32–184)	668 (137–1442)	76 (30–140)	1402 (271–2935)	169 (64–322)
Tobacco smoking	17 871 (13 586–23 735)	22 710 (17 091–28 270)	10 451 (7269–15 690)	7295 (4467–9735)	28 322 (22 504–35 727)	30 005 (23 431–35 918)
Tobacco smoking, excluding second-hand smoke	13 956 (9733–19 432)	21 193 (15 459–26 815)	6228 (3208–11 636)	5061 (2197–7504)	20 184 (14 644–28 362)	26 254 (19 643–32 224)
Second-hand smoke	3916 (2649–5219)	1517 (1068–1967)	4222 (3122–5373)	2234 (1562–2979)	8138 (6067–10 360)	3751 (2665–4873)
Alcohol and drug use	11 659 (9477–14 051)	13 438 (10 801–16 389)	3681 (2558–4892)	3183 (2223–4358)	15 340 (12 458–18 572)	16 621 (13 436–20 283)
Alcohol use	10 232 (8216–12 384)	11 617 (9192–14 277)	2791 (1811–3917)	2163 (1247–3104)	13 023 (10 502–15 741)	13 780 (10 890–16 881)
Drug use	1459 (905–2141)	1841 (1198–2784)	902 (564–1338)	1024 (660–1573)	2360 (1615–3263)	2865 (1985–4021)
Physiological risks						
High fasting plasma glucose	5143 (3695–6681)	9199 (6530–12 137)	4534 (3410–5837)	6903 (5247–8653)	9677 (7570–11 979)	16 103 (12 903–19 824)
High total cholesterol	1109 (576–1785)	3356 (1496–5266)	1128 (661–1718)	2555 (1256–3873)	2237 (1437–3265)	5912 (3603–8473)
High blood pressure	13 553 (11 374–16 218)	23 326 (19 489–27 142)	12 488 (10 500–15 025)	14 614 (12 167–16 954)	26 041 (22 752–30 040)	37 940 (33 309–42 707)
High body-mass index	2323 (1349–3368)	6852 (4719–9263)	2480 (1547–3527)	5404 (3570–7315)	4803 (2984–6833)	12 256 (8625–16 166)
Low bone mineral density	437 (338–567)	761 (553–957)	350 (268–446)	474 (363–611)	787 (642–965)	1234 (973–1523)
Dietary risks	21 170 (18 259–24 481)	32 913 (28 434–36 538)	16 113 (13 900–19 320)	18 787 (16 314–20 922)	37 283 (32 882–42 124)	51 700 (46 070–56 650)
Diet low in fruits	12 401 (9336–15 668)	19 203 (14 551–23 129)	9136 (6809–11 954)	10 275 (7812–12 510)	21 537 (16 764–26 123)	29 478 (23 464–34 689)
Diet low in vegetables	2709 (1274–4411)	3734 (1901–5848)	1692 (719–2947)	1529 (682–2550)	4401 (2115–6869)	5263 (2678–8079)
Diet low in whole grains	3951 (3070–4998)	6591 (5157–8019)	3216 (2490–4123)	3989 (3126–4851)	7167 (5633–8853)	10 580 (8394–12 742)
Diet low in nuts and seeds	2508 (1619–3540)	4907 (3093–6366)	1971 (1252–2911)	2745 (1704–3648)	4479 (2906–6150)	7652 (4971–9943)
Diet low in milk	241 (74–404)	350 (105–606)	192 (59–324)	263 (71–461)	433 (132–718)	613 (176–1055)
Diet high in red meat	150 (71–247)	297 (132–484)	118 (53–197)	225 (96–376)	268 (126–439)	522 (237–855)
Diet high in processed meat	289 (106–501)	517 (184–883)	264 (102–450)	386 (162–617)	553 (224–916)	903 (356–1444)
Diet high in sugar-sweetened beverages	605 (22–1487)	186 (24–1236)	376 (17–1258)	192 (20–1040)	981 (46–2549)	378 (47–1820)
Diet low in fibre	1472 (727–2256)	2762 (1307–4167)	1111 (535–1689)	1532 (732–2315)	2582 (1261–3910)	4294 (2036–6510)
Diet low in calcium	332 (244–413)	470 (347–675)	258 (173–335)	344 (242–482)	590 (438–732)	814 (603–1118)
Diet low in seafood omega-3 fatty acids	1222 (862–1759)	2456 (1692–3134)	941 (665–1436)	1288 (868–1679)	2163 (1522–3042)	3745 (2633–4789)
Diet low in polyunsaturated fatty acids	492 (232–778)	751 (331–1179)	368 (166–610)	398 (190–638)	860 (405–1332)	1150 (516–1806)

(Continues on next page)

	DALYs (thousands) in male individuals		DALYs (thousands) in female individuals		DALYs (thousands) in both sexes	
	1990	2010	1990	2010	1990	2010
(Continued from previous page)						
Diet high in *trans* fatty acids	239 (159–342)	595 (378–814)	190 (124–284)	339 (221–465)	430 (301–594)	934 (632–1252)
Diet high in sodium	6978 (4571–9388)	10 897 (7367–14 469)	5142 (3311–7122)	5934 (3838–7956)	12 120 (7899–15 991)	16 831 (11 210–21 998)
Physical inactivity and low physical activity	..	6341 (5091–7744)	..	5098 (4212–6050)	..	11 439 (9492–13 679)
Occupational risks	9750 (7143–12 888)	8775 (6511–11 597)	3732 (2599–5023)	3620 (2479–4987)	13 482 (10 005–17 268)	12 395 (9234–16 106)
Occupational carcinogens	396 (241–659)	803 (420–1220)	174 (102–300)	286 (152–450)	570 (354–907)	1089 (626–1627)
Occupational exposure to asbestos	1 (0–10)	1 (0–11)	10 (0–29)	6 (0–25)	11 (0–31)	7 (0–28)
Occupational exposure to arsenic	13 (5–26)	26 (9–48)	8 (3–17)	13 (5–24)	22 (8–42)	38 (15–70)
Occupational exposure to benzene	8 (3–15)	14 (6–25)	9 (3–18)	13 (4–26)	17 (7–31)	27 (11–50)
Occupational exposure to beryllium	1 (0–1)	2 (1–3)	0 (0–1)	1 (0–2)	1 (0–2)	2 (1–4)
Occupational exposure to cadmium	2 (1–4)	6 (2–9)	1 (1–2)	2 (1–4)	3 (2–6)	8 (4–13)
Occupational exposure to chromium	7 (4–12)	18 (9–27)	5 (3–9)	10 (5–15)	12 (7–19)	28 (17–41)
Occupational exposure to diesel engine exhaust	121 (69–206)	235 (115–362)	32 (18–58)	49 (24–77)	153 (89–248)	284 (150–428)
Occupational exposure to second-hand smoke	98 (68–157)	190 (108–259)	55 (37–95)	97 (51–138)	153 (110–227)	287 (191–382)
Occupational exposure to formaldehyde	5 (2–11)	9 (3–18)	4 (2–8)	5 (2–10)	10 (4–18)	14 (6–27)
Occupational exposure to nickel	38 (10–84)	88 (22–183)	25 (6–55)	48 (13–101)	63 (17–136)	136 (36–279)
Occupational exposure to polycyclic aromatic hydrocarbons	16 (8–30)	41 (18–67)	8 (4–15)	16 (7–28)	24 (11–42)	57 (27–94)
Occupational exposure to silica	92 (62–151)	196 (109–275)	21 (14–37)	34 (18–50)	113 (78–177)	231 (138–319)
Occupational exposure to sulphuric acid	8 (2–20)	12 (3–30)	1 (0–2)	1 (0–2)	8 (2–21)	13 (4–31)
Occupational asthmagens	111 (46–188)	82 (45–128)	70 (25–130)	54 (26–93)	181 (100–285)	137 (83–208)
Occupational particulate matter, gases, and fumes	2470 (1172–3735)	1578 (759–2405)	1041 (487–1640)	503 (227–848)	3511 (1679–5286)	2080 (966–3203)
Occupational noise	472 (263–767)	488 (280–804)	252 (138–421)	247 (141–415)	725 (410–1164)	735 (428–1216)
Occupational risk factors for injuries	3516 (1938–6185)	2538 (1435–4599)	253 (94–549)	145 (39–327)	3769 (2135–6505)	2682 (1562–4745)
Occupational low back pain	2786 (1707–4148)	3286 (2016–4876)	1941 (1115–3057)	2386 (1414–3643)	4727 (3007–6897)	5672 (3615–8227)
Sexual abuse and violence	..	422 (285–610)	..	2835 (1800–4146)	..	3258 (2175–4620)
Childhood sexual abuse	..	422 (285–610)	..	463 (303–672)	..	885 (617–1232)
Intimate partner violence	..	..	..	2485 (1479–3768)	..	2485 (1479–3768)

0 suggests no deaths or DALYs were attributable to risk factors or risk factor clusters. ..=attributable deaths or DALYs not quantified.

Table 5: **Disability-adjusted life-years (in thousands) attributable to risk factors or risk factor clusters in China**

pollution and household air pollution, were the fourth and fifth leading risks, respectively. Total PM2·5 burden in China–the combination of ambient air pollution, household air pollution, and second-hand tobacco smoke—is very large. Four more risks or clusters of risks accounted for between 4% and 5·5% of DALYs: high fasting plasma glucose, alcohol use, occupational risks, high body-mass index, and physical inactivity. Table 5 provides estimates for 1990 and 2010 of the attributable DALYs for 67 risk factors or clusters of risk factors. Compared with the G20 mean attributable DALY rates, China had significantly higher rates for ambient and household air pollution and low bone mineral density in 1990 and 2010. Dietary risks and high blood pressure worsened compared with the G20 average between 1990 and 2010 whereas occupational risks in 2010 were no longer distinguishable from the G20 average, but in 1990 were worse than the G20 average

(appendix p 9). DALYs attributable to six risk factors increased in China from 1990 to 2010 by more than 40·0%: diet, high blood pressure, high fasting plasma glucose, high body-mass index, high cholesterol, and lead exposure. Four dietary factors each contributed more than 2·0% to total DALYs in 2010: low consumption of fruit, whole grain, and nuts and seeds and high intake of sodium. The burden of tobacco is also disaggregated into the burden from tobacco smoking (26·2 million DALYs [95% UI 19·6–32·2]) and from second-hand smoke exposure (3·8 million DALYs [2·7–4·9]).

Discussion

Between 1990 and 2010, the health profile of China changed rapidly. Premature mortality in children declined by almost 80%. The contribution of communicable, maternal, neonatal, and nutritional disorders to DALYs declined for all ages from nearly 27% in 1990 to about 10% in 2010. The burden of disease is now dominated by cardiovascular diseases, lung cancer, chronic obstructive pulmonary disease, road injuries, and key causes of chronic disabilities such as mental and musculoskeletal disorders. Although the burden of suicide, drowning, and many injuries declined, the burden of road injuries and falls is increasing. The rise of non-communicable diseases and chronic disability is fuelled by a shift away from risks for communicable diseases in children toward those for non-communicable diseases in adults. The one child policy in China implies the demographic shifts contributing to this rapid transition in health problems will intensify in the coming decades.

China has had remarkable success in decreasing death rates and disability from communicable diseases. Deaths from diarrhoea and lower respiratory infections in children younger than 5 years declined by 90% in the two decades from 1990. DALYs caused by tuberculosis dropped by about 71%. We also noted large declines for incidence of infection with intestinal nematodes, meningitis, tetanus, measles, and diarrhoea. The speed of some of these declines provides a model for other developing countries. Communicable disease-control challenges, however, are not over. The burden of HIV increased between 1990 and 2010 (table 2). 213 000 (95% UI 179 600–260 700) children younger than 5 years died in 2010, almost 60% of them from communicable, neonatal, and nutritional causes. Subnational assessments would probably reveal that the burden of communicable diseases is high in some poor provinces. China faces challenges dealing with the ongoing risk of pandemic influenza. The 2013 outbreak of H7N9 shows how the interaction between animal and human populations continues to lead to new epidemics. Through the internet-based surveillance system run by the Chinese CDC, early detection of the first human cases of H7N9 led to a coherent response. Despite progress, continued attention to the unfinished agenda for communicable disease control is required and ongoing epidemic surveillance and response is a necessity.

The burden of diseases attributable to individual behaviours and practices is steadily rising. The most important behaviours included diets low in fruit, high in sodium and low in whole grains, smoking, alcohol, and physical inactivity. Smoking prevalence in China for men is 52·9% (one of the highest rates in the world) and for women is 2·4% (one of the lowest),[55] and second-hand smoke exposure is as high as 72·4%.[23,56] The fraction of deaths attributable to tobacco increased from 12·8% (9·9–16·9) in 1990 to 16·4% (12·8–19·9) in 2010 (appendix p 10) and will increase because of the lag between consumption and death rates. The aggregation of 14 components of diet was the leading risk factor for DALYs in China, including the consumption of sodium and inadequate intake of fruit, whole grains, and nuts and seeds. Reliable data from the national nutrition surveys show that even rural Chinese diets dominated by rice are low in fruit, high in sodium, low in whole grains, and low in nuts and seeds. Rising incomes and a larger fraction of the population living to older ages mean that the burden attributable to these behaviours will increase. The extraordinary pace of urbanisation in China might exacerbate this transformation. The urban population in China has more than tripled in the past 30 years and the rate of urbanisation is accelerating.[57,58] Although urbanisation offers opportunities for improvements in population health in China (such as access to improved health care and basic infrastructure), it also can lead to substantial health risks including ambient air pollution, occupational and traffic hazards, and poor diet and little physical activity. Associated social and economic challenges will accompany these shifts. For example, the ratio of the population older than 65 years to the working-aged population (aged 20–64 years) was 0·127 in 2010 and is expected to rise to 0·184 in 2020 and 0·26 in 2030.[2]

The physical environment is an important driver of health in China. High levels of PM2·5, particularly in eastern China, have made ambient air pollution the fourth leading risk factor for DALYs.[59] Use of solid fuels—in particular coal in inadequately ventilated homes—also contributes to excess mortality.[59] Policies to change the physical layout of the road system and vehicle safety equipment might need to be enacted to restrict the burden of road injuries.[59] Physical activity might also be influenced by urban layout. Actions to address the physical environment, however, are far beyond the scope of the National Health and Family Planning Commission. Addressing these new and substantial risks to Chinese health will require multisectorial action at national, provincial, and local levels. Such action will need careful documentation of the health harms at a local level and the potential for affordable alternative policies to reduce these harms.

Rapid reductions in fertility and age-specific mortality rates have led to many more Chinese individuals living to an old age, when rates of chronic disability are high. Incidence of health loss and health-care costs from

mental disorders, musculoskeletal disorders, neurological disorders, and vision and hearing loss will steadily rise. China needs to plan for how the health system can prevent and manage these disorders cost-effectively. Along with Japan, South Korea, and Mexico, China seems to benefit from lower rates of major depression, anxiety disorders, and low back pain than do other members of the G20. This finding, however, has been challenged; true rates might be higher.[36] Our findings on these rates are based on the careful assessment of all the available evidence; resolution will require more in-depth research on the potential for reporting biases in China and other countries in east Asia. The rise of chronic disability also has implications for the types of health workers China will need in the next 10–20 years; disciplines such as psychiatry, rheumatology, rehabilitation medicine, audiology, and ophthalmology might need increased investment. The recent adoption of China's first mental health law is a positive development in this area. The key obstacle China confronts in strengthening its public health and primary health care is a shortage of human resources. Although the Chinese Government has identified the training of family doctors as a top priority[60] (and plans to train 300 000 of them in the next 10 years), these targets seem challenging to reach. Retention of qualified health professionals in rural areas, especially in poor regions, has been difficult.

Compared with many countries, China is relatively unique in having five cancers in the top 15 causes of premature mortality (Mexico, for example, has none): lung, liver, stomach, oesophageal, and colorectal. Of these cancers, the burden of lung, liver, and colorectal cancers increased between 1990 and 2010. China also has worse than G20 average rates for these cancers and oesophageal cancer. What are the policy options for China to address this unusually high burden of selected cancers? Tobacco and diet can account for important shares of stomach, colorectal, and lung cancers. Aggressive tobacco control and national efforts to encourage changes in diet will be important. Hepatitis B is related to 54·2% (95% UI 49·5–58·8) of the increasing burden of liver cancer; immunisation programmes will lead eventually to reductions but, because the median age of liver cancer burden is 55 years, several decades will need to pass before the effect of vaccination can substantially reduce the burden of this cancer. Benefits from screening and treatment for colorectal cancer[61] should be assessed as to whether they are cost effective for China. Access to improved screening and treatment might also lead to improved outcomes for other cancers such as breast and cervical cancers.

Stroke and ischaemic heart disease accounted for 15·2% (13·3–16·6) of DALYs in 2010. DALY rates from stroke are nearly twice as high as ischaemic heart disease. Age-standardised rates for ischaemic heart disease increased between 1990 and 2010, although stroke rates in China were relatively constant. Increased blood pressure is the second leading risk factor in China ahead of tobacco consumption. Increased fasting plasma glucose and total cholesterol are also important risks of DALYs. Public health programmes to reduce tobacco consumption, sodium intake, and change other dietary risks are clearly important strategies for tackling of cardiovascular diseases in China. Primary care can also be a platform for delivery of interventions such as the detection and pharmacological management of raised blood pressure and cholesterol, and screening and management of diabetes, and impaired glucose tolerance. Because of China's hospital-centred health system, strengthening primary care to handle these and other problems will require a shift in policy focus. The massive declines in rates of death from ischaemic heart disease in many high-income countries have also been attributable to improved management of acute cardiac events and post-event care.[62–66] China increasingly needs to provide access to high-quality medical services in communities with rising rates of cardiovascular diseases.

The Chinese Government needs to take responsibility for expansion of prevention strategies for behavioural risks; even small reductions in these risks could generate substantial health benefits. Subsidies, taxation, regulation, and information campaigns need to be prioritised to reduce tobacco use and exposure to second-hand smoke, increase consumption of fruits, whole grain, nuts, and seeds, reduce salt intake, increase physical activity, and reduce alcohol consumption. Effective policies will need to be multisectorial, engaging other sectors such as employment, income maintenance, social welfare, housing, education, and the mass media. To engender multisectorial action, the Chinese Government needs to define the goals and indicators for health development, monitor key health risk factors, select intervention strategies, and track policy implementation at a national level. This strategy will not only improve the levels of health status of the population, but contribute to sustainable development of the Chinese economy and society.

This analysis of the burden of disease in China has several important limitations. The results have the same limitations as GBD 2010.[1,23–29] In GBD 2010, no data existed for some of the 1160 disabling sequelae for some or even many of the countries. Results have been informed by several data sources available for China but for some disorders the data are weak or absent (eg, autism, cannabis dependence, endometriosis, and genital prolapse). In other cases, substantial differences exist between the available data sources (eg, for some cancers the cause of death data and population-based cancer registry data are inconsistent in some age groups). The reporting of UIs provides the reader with some information on the extent of the information available for China. Uncertainty could, for various reasons such as unrecognised bias in published studies, still be underestimated. The analysis of risk factors has focused on proximal and behavioural risks. The

important role of social determinants[67] was not quantified in the GBD 2010 because of a dearth of available data and sufficient evidence. The assessment of YLDs depends crucially on the validity of the disability weights measured by Salomon and colleagues.[27] Although investigation across several countries reported no evidence of systematic differences; disability weights obtained in a national survey in China could be different from other countries.[68,69] Most importantly, a national analysis for a country as large and diverse as China could mask substantial variations in key outcomes. For example, the HIV epidemic is very concentrated in some provinces.[70,71] The rapid transition towards non-communicable diseases and disability is probably more advanced in eastern provinces. In view of improvements in some data systems in the previous decade, the possibility of bias exists in the measurement of some diseases overtime. We believe that the substantial efforts to correct for these biases that are part of the GBD method minimises this possibility.

In view of the pace of health change in China, the burden of diseases, injuries, and risk factors should be monitored every year. Annual assessments along with subnational detail at the provincial level ought to be undertaken. Key developments in the health information system that are underway will facilitate such an analysis. Development of a complete national vital events registration system with certification of cause of death would strikingly aid in this endeavour. In the previous 2 years alone, a rapid expansion has occurred in coverage of cause of death certification so that more than half of all deaths were captured in 2012. The national internet case reporting system can provide local level detail on 39 diseases since 2004. Several national surveys are underway or planned with large sample sizes. Ensuring that the various surveillance systems and topic-specific national surveys ultimately combine to provide a coherent picture of the prevalence of major diseases, injuries, and risk factors at the provincial level will also reduce the role of statistical estimation in generating burden of disease results. Robust annual assessments of the burden will provide China with a powerful method to benchmark progress against developed and other rapidly developing nations and assess where investments and policy action have been effective. Setting priorities for the health system, however, will also need information on the costs and consequences of different policy options, a better understanding of health inequalities and the capacity of the health system to implement change that is both efficient and fair.

Contributors

GY wrote the first draft of the report. All authors had key roles in formulation of the analysis for China with Global Burden of Diseases, Injuries, and Risk Factors Study 2010 (GBD 2010) results, and also commented on and reviewed the report.

Conflicts of interest

We declare that we have no conflicts of interest.

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