

BMJ Open Burden of neurological diseases in Asia from 1990 to 2019: a systematic analysis using the Global Burden of Disease Study data

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ABSTRACT

Objectives The burden of neurological disorders is increasing worldwide, including Asia. The purpose of this study was to determine the burden of neurological disorders between 1990 and 2019 in Asia using the Global Burden of Disease (GBD) Sociodemographic Index.

Design, setting, outcome and participants The GBD Study is updated every year and the most recent version provides the burden of diseases according to age, gender and region from 1990 to 2019. The burden of neurological disorders was evaluated as incidence, prevalence, mortality, disability-adjusted life-years (DALYs), years of life lost and years lived with disability.

Results In 2019, DALYs of neurological diseases were 64.4 million in South-East Asia (95% uncertainty interval (UI) 45.2 to 94.2) and 85.0 million in Western Pacific regions (95% UI 63.0 to 118.5). Stroke, migraine, Alzheimer's disease and other dementias had the highest DALYs in the WHO South-East Asia and WHO Western Pacific regions in 2019. DALYs of stroke, Alzheimer's disease and other dementias, Parkinson's disease, brain and central nervous system cancer, multiple sclerosis, migraine and tension-type headache increased in both regions in 2019 compared with 1990. Infectious diseases such as tetanus, meningitis and encephalitis decreased in both regions. DALYs of idiopathic epilepsy and motor neuron disease increased in the WHO South-East Asia region and decreased in the WHO Western Pacific region.

Conclusions This study demonstrated the burden of neurological diseases in Asia. To reduce the burden of neurological diseases, strategies suitable for each country's real healthcare needs and challenges are needed; this study can serve as the cornerstone of these strategies.

INTRODUCTION

Neurological disorders are among the major causes of death and permanent or transient disabilities in human beings.¹ Globally, the burden of neurological disorders is increasing.² According to the 2016 Global Burden of Disease (GBD), it was the second most common cause of death and the leading cause of disability-adjusted life-years

STRENGTHS AND LIMITATIONS OF THIS STUDY

- ⇒ Our study showed the disability-adjusted life-years of 13 key neurological diseases in the Asian region in 2019 and compared the difference in disease patterns with those reported in 1990.
- ⇒ The Global Burden of Disease methodology offers standardised statistical approaches that are comparable across countries and time, which can reduce the challenges of trying to estimate disease burdens in terms of incidence, prevalence, mortality, years of life lost or years lived with disability, diminishing potential biases.
- ⇒ The quality of the information varies in the countries and there may be incomplete data.

(DALYs).² In addition, the incidence, prevalence and DALYs of neurological disorders are expected to increase with the increasing ageing population across the world. The ageing population is increasing in many countries, including the Asian countries.^{3,4} In Asia, the gap between the rich and the poor is also large and varies across countries.⁵ Notably, the prevalence and mortality of neurological diseases vary according to age and socioeconomic status^{6,7}; and in Asia, these characteristics are likely to directly or indirectly affect the burden of neurological disorders. Moreover, different characteristics of the Asian population, including genetic, climatic, cultural and economic conditions, may present differences in the burden of neurological disorders between the Asian countries. Therefore, evaluating the burden of neurological diseases in the individual Asian countries is essential for health policymaking.

The GBD Study is a collaborative study of diseases worldwide, providing systematic information on 369 diseases in 204 countries each year.⁸ According to the recent GBD Study,^{9,10} neurological diseases are increasing worldwide including in Asia, but studies

analysing each neurological disease in detail in Asia are lacking.

The purpose of this study was to determine the burden of neurological disorders, including incidence, prevalence, death, DALYs, years lived with disability (YLDs) and years of life lost (YLLs) between 1990 and 2019 in the Asian region and each Asian country using estimates from the GBD Study website.

METHODS

Overview

Our data were extracted from GBD's publicly provided website; all GBD's research results can be freely accessed and downloaded from the GBD Compare and the Global Health Data Exchange websites (GBD Compare available at <https://vizhub.healthdata.org/gbd-compare/>; Global Health Data Exchange available at <http://ghdx.healthdata.org/>).⁸ The GBD 2019 methods are described in detail on the GBD website and in a previous study.⁹ The GBD 2019 is a worldwide multinational collaborative study. The GBD Study is updated every year and the most recent version provides the burden of diseases according to age, gender and region (369 diseases and injuries in 204 countries and territories) from 1990 to 2019. Our study data acquisition and analysis followed the methodology provided on the GBD website. Our study included 13 neurological diseases (the International Classification of Diseases (ICD) -10 codes) including stroke (I63), Alzheimer's disease and other dementias (F01~03), Parkinson's disease (G20), brain and central nervous system cancer (C71~72), idiopathic epilepsy (G40), motor neuron disease (G12.2), multiple sclerosis (G35), migraine (G43), tension-type headache (G44.2), meningitis (G00~03), encephalitis (G04~05), tetanus (A33~35) and other neurological disorders.

DALYs, YLDs and YLLs

The burden of each neurological disorder was separately evaluated as incidence, prevalence, death, DALYs, YLDs and YLLs.¹¹ DALYs are defined as the sum of YLDs and YLLs. YLD is the individual sequela prevalence of each disease multiplied by disability weight, quantifying the severity of the sequela as a number between 0 (indicating full health) and 1 (indicating death).¹² YLL is the number of deaths multiplied by the standard life expectancy at the time of death. Standard life expectancy is obtained from the lowest observed age-specific mortality rate among a world population of over 5 million.¹¹ Disability weights were estimated from nine US population surveys and an open internet survey that asked respondents to choose the healthier option among random pairs of health conditions provided with brief descriptions of key characteristics.¹²

Detailed methods for obtaining non-fatal estimates and death information have been described in a previous research study.⁹ Considering DALYs, YLDs and YLLs, the neurological disorder estimates were acquired from

disease surveillance systems, registries, survey microdata, health claims data and systematic reviews of reports.⁹ These datasets are repositioned to the Global Health Data Exchange, and data of different characteristics are analysed using DisMod-MR V.2.1, a Bayesian meta-regression tool.^{13 14} Age-standardised rate, which is a weighted average of the age-specific rates, was calculated to remove the confounding effect of age (standard age structure: a population structure used in the GBD Study to provide a constant distribution of covariates). Data were described using 95% uncertainty intervals (UIs) and changes from 1990 to 2019 as a percentage (95% UIs) provided by the GBD website.

Asian countries

In our study, the Asian region was analysed by dividing it into WHO South-East Asia region (11 countries) and WHO Western Pacific region (31 countries) according to the range of locations provided by GBD, and the burden of diseases calculated as an age-standardised rate per 100 000 was converted and compared with global data. Age-standardised rate of incidence, prevalence, death, DALYs, YLDs and YLLs, the total number for 1990 and 2019 and changes between 1990 and 2019 were investigated in WHO South-East Asia region and WHO Western Pacific Region. The WHO South-East Asia region countries were Bangladesh, Bhutan, Democratic People's Republic of Korea, India, Indonesia, Maldives, Myanmar, Nepal, Sri Lanka, Thailand and Timor-Leste. The WHO Western Pacific region countries were American Samoa, Australia, Brunei Darussalam, Cambodia, China, Cook Islands, Fiji, Guam, Japan, Kiribati, Lao People's Democratic Republic, Malaysia, Marshall Islands, Micronesia, Federated States of Mongolia, Nauru, New Zealand, Niue, Northern Mariana Islands, Palau, Papua New Guinea, Philippines, Republic of Korea, Samoa, Singapore, Solomon Islands, Tokelau, Tonga, Tuvalu, Vanuatu and Viet Nam (online supplemental figure 1).

In Asia, the GBD Study separates high-income regions (Australasia: Australia and New Zealand; Asia Pacific countries: Brunei Darussalam, Japan, Republic of Korea and Singapore). Because the income level of the region may have influence on the mortality and prevalence of neurological diseases,¹⁵⁻¹⁷ our study investigated changes in DALYs between 1990 and 2019 in neurological disorders in Australasia and high-income Asia and Pacific regions.

Sociodemographic Index

Sociodemographic Index (SDI) is an index developed by GBD researchers, which measures the degree of socioeconomic development.¹⁸ It is a composite of the ranking of incomes per capita, educational attainment and fertility rates. SDI of 0 means the lowest level of development, while SDI of 1 means the theoretical maximal level. SDI was a predictor of the health-related indexes,¹⁹ and widely used in predicting health outcomes and comparing different regions.^{20 21} The limitations of other GBD

indicators also apply to this index, including measurement bias of different sources.^{22 23}

Patient and public involvement

Patients and the public were not involved in our research's design, conduct, reporting or dissemination plans.

RESULTS

The 2019 burden of neurological diseases in Asia

The 2019 DALYs of neurological diseases in WHO South-East Asia and WHO Western Pacific regions are shown in [table 1](#). In 2019, there were 821.8 million cases of newly diagnosed neurological diseases worldwide: 227 million in the WHO South-East Asia region and 178.6 million in the WHO Western Pacific region. The total number of DALYs of neurological diseases was 64.4 million in South-East Asia region (95% UI 45.2 to 94.2) and 85.0 million in Western Pacific region (95% UI 63.0 to 118.5). Stroke, migraine, and Alzheimer's disease and other dementias had the highest DALYs in WHO South-East Asia and WHO Western Pacific regions. This pattern was identical to the global trend of neurological diseases. When the incidence, prevalence and mortality of each neurological disease were compared in the two regions, stroke, Alzheimer's disease and other dementias, Parkinson's disease, brain and central nervous system cancer and motor neuron disease were higher in the WHO Western Pacific region, while multiple sclerosis, migraine, tension-type headache, meningitis, encephalitis and tetanus were higher in the WHO South-East Asia region (online supplemental table 1).

[Figure 1](#) shows age-standardised DALYs in the WHO South-East Asia and WHO Western Pacific regions. The burden of age-standardised DALYs was highest in both regions in the order of stroke, Alzheimer's disease and other dementias, and migraine. The age-standardised DALYs of stroke, Alzheimer's disease and other dementias, and brain and central nervous system cancer were higher in the WHO Western Pacific region. On the other hand, DALYs of multiple sclerosis, idiopathic epilepsy, migraine, meningitis and encephalitis were higher in the WHO South-East Asia region ([figure 1](#)).

[Figure 2](#) shows DALYs of neurological diseases in the Asian region by age. The total number of DALYs of stroke, Alzheimer's disease and other dementias was higher in old age in both areas, and the age-standardised rate of stroke and dementia increased with age ([figure 2A](#)). However, the total number of DALYs of migraine was relatively higher in the younger generation. The highest DALYs of stroke were in the ages between 60 and 64 years in the WHO South-East Asia region and 70 and 74 years in the WHO Western Pacific region ([figure 2B](#)). When compared according to sex, the trend of DALYs in neurological diseases showed a similar pattern in the WHO South-East Asia and the WHO Western Pacific regions. The number of DALYs of stroke was higher in men, while DALYs of dementia and migraine were higher in women.

DALYs according to age and sex are described in the online supplemental tables 2 and 3.

The difference of neurological diseases in Asia from 1990 to 2019

In the WHO South-East Asia region, stroke, tetanus and meningitis had the highest age-standardised DALYs in 1990, which changed to stroke, migraine, Alzheimer's disease and other dementias in 2019. Age-standardised DALYs in the Western Pacific region showed a similar trend between 1990 and 2019, in the order of stroke, Alzheimer's disease and other dementias, and migraine ([table 2](#)). The DALYs of stroke and Alzheimer's disease and other dementias, Parkinson's disease, brain and central nervous system cancer, multiple sclerosis, migraine and tension-type headache increased in both regions in 2019 compared with 1990. Infectious diseases such as tetanus, meningitis and encephalitis decreased in both regions. The number of DALYs of idiopathic epilepsy and motor neuron disease increased in the WHO South-East Asia region and decreased in the WHO Western Pacific region. The age-standardised rate of stroke incidence (-10%, 157 to 141 in South-East Asia; -12%, 211 to 186 in Western Pacific) and mortality (-30%, 135 to 95 in South-East Asia; -42%, 180 to 104 in Western Pacific) decreased markedly in both regions. The age-standardised incidence of dementia declined in South-East Asia (-3%, 71 to 69) and increased in Western Pacific regions (14%, 92 to 105). Mortality of dementia was increased in both regions. The age-standardised incidence and prevalence of migraine and tension-type headache in the WHO South-East Asia region have not changed since 1990, but these increased in the WHO Western Pacific region (online supplemental table 4).

When age-standardised DALYs for each region were compared by income classification, motor neuron disease, multiple sclerosis and encephalitis increased in the Australasia region, in contrast to a decrease in the high-income Asia Pacific region. DALYs for Parkinson's disease increased in the Australasia and the high-income Asia-Pacific regions, but DALYs for stroke, idiopathic epilepsy, meningitis and tetanus decreased ([table 3](#)). The age-standardised DALYs of stroke, Alzheimer's disease and other dementias, and migraine according to SDI by country are presented in [figures 3–5](#).

When analysed by country, DALYs of stroke increased in China and India and decreased in Australia, Japan, the Republic of Korea and Singapore. Stroke mortality was raised in Australia, China, India and Japan, and dropped in the Republic of Korea and Singapore. Age-standardised rates of incidence, prevalence, death, DALYs, YLDs and YLLs burden by country are described in the online supplemental table 5. DALYs of Alzheimer's disease and other dementias, and Parkinson's disease increased in most countries, but decreased in Nauru, Niue and Tokelau. DALYs of

Table 1 Disability-adjusted life-years of neurological diseases, comparison of South-East Asia and Western Pacific regions

	WHO South-East Asia region		WHO Western Pacific region		Global	
	Age-standardised rate per 100 000	Total	Age-standardised rate per 100 000	Total	Age-standardised rate per 100 000	Total
All neurological disorders	3634 (2610 to 5245)	64 373 789 (45 229 328 to 94 249 122)	3432 (2486 to 4891)	85 008 645 (63 024 027 to 118 461 528)	3464 (2521 to 4945)	273 063 453 (199 632 801 to 388 511 035)
Stroke	2008 (1811 to 2193)	34 460 498 (31 035 171 to 37 670 399)	2121 (1891 to 2369)	56 185 166 (49 950 162 to 62 813 530)	1768 (1641 to 1889)	143 232 184 (133 095 809 to 153 241 824)
Alzheimer's disease and other dementias	278 (114 to 644)	3 485 650 (1 444 595 to 8 150 443)	377 (170 to 797)	9 195 842 (4 102 641 to 19 647 700)	339 (151 to 731)	25 276 989 (11 204 523 to 54 558 243)
Parkinson's disease	81 (72 to 91)	1 197 394 (1 057 423 to 1 339 100)	79 (70 to 89)	2 090 741 (1 839 874 to 2 355 241)	80 (73 to 87)	6 292 616 (5 769 210 to 6 827 207)
Brain and central nervous system cancer	80 (60 to 93)	1 592 948 (1 153 447 to 1 796 140)	112 (86 to 132)	2 470 092 (1 887 397 to 2 919 034)	109 (85 to 121)	8 659 871 (6 718 029 to 9 574 458)
Idiopathic epilepsy	187 (146 to 237)	3 721 812 (2 894 671 to 4 718 264)	102 (73 to 137)	1 909 337 (1 365 698 to 2 534 086)	171 (130 to 218)	13 077 624 (9 986 730 to 16 734 086)
Motor neuron disease	4 (3 to 5)	78 631 (64 804 to 93 556)	8 (8 to 9)	195 642 (178 225 to 213 956)	13 (12 to 13)	1 034 607 (979 911 to 1 085 401)
Multiple sclerosis	7 (6 to 9)	147 786 (124 902 to 179 583)	4 (4 to 6)	113 019 (95 485 to 141 751)	14 (12 to 17)	1 159 832 (1 001 180 to 1 381 870)
Migraine	543 (67 to 1250)	11 496 964 (1 378 922 to 26 551 209)	456 (66 to 1047)	9 804 347 (1 563 046 to 22 190 876)	526 (79 to 1194)	42 077 666 (6 418 383 to 95 645 211)
Tension-type headache	52 (15 to 193)	1 079 949 (299 851 to 4 031 993)	47 (14 to 160)	1 041 113 (336 537 to 3 331 809)	56 (17 to 189)	4 541 689 (1 395 546 to 14 981 336)
Meningitis	157 (136 to 181)	2 853 048 (2 491 747 to 3 283 248)	45 (40 to 51)	638 116 (570 390 to 710 280)	234 (196 to 288)	16 333 198 (13 775 122 to 19 609 767)
Encephalitis	149 (119 to 231)	2 734 495 (2 187 604 to 4 270 395)	37 (31 to 42)	551 783 (478 145 to 627 604)	65 (55 to 87)	4 797 407 (4 059 493 to 6 418 088)
Tetanus	44 (28 to 62)	741 167 (478 331 to 1 059 882)	4 (3 to 5)	68 690 (43 256 to 82 825)	34 (26 to 48)	2 316 381 (1 770 002 to 3 279 408)
Other neurological disorders	43 (31 to 56)	843 447 (617 859 to 1 104 911)	39 (31 to 48)	744 757 (613 170 to 892 837)	56 (45 to 68)	4 263 390 (3 458 864 to 5 174 136)

Contribution of neurological disorders in 2019

percentages represent proportion of DALYs

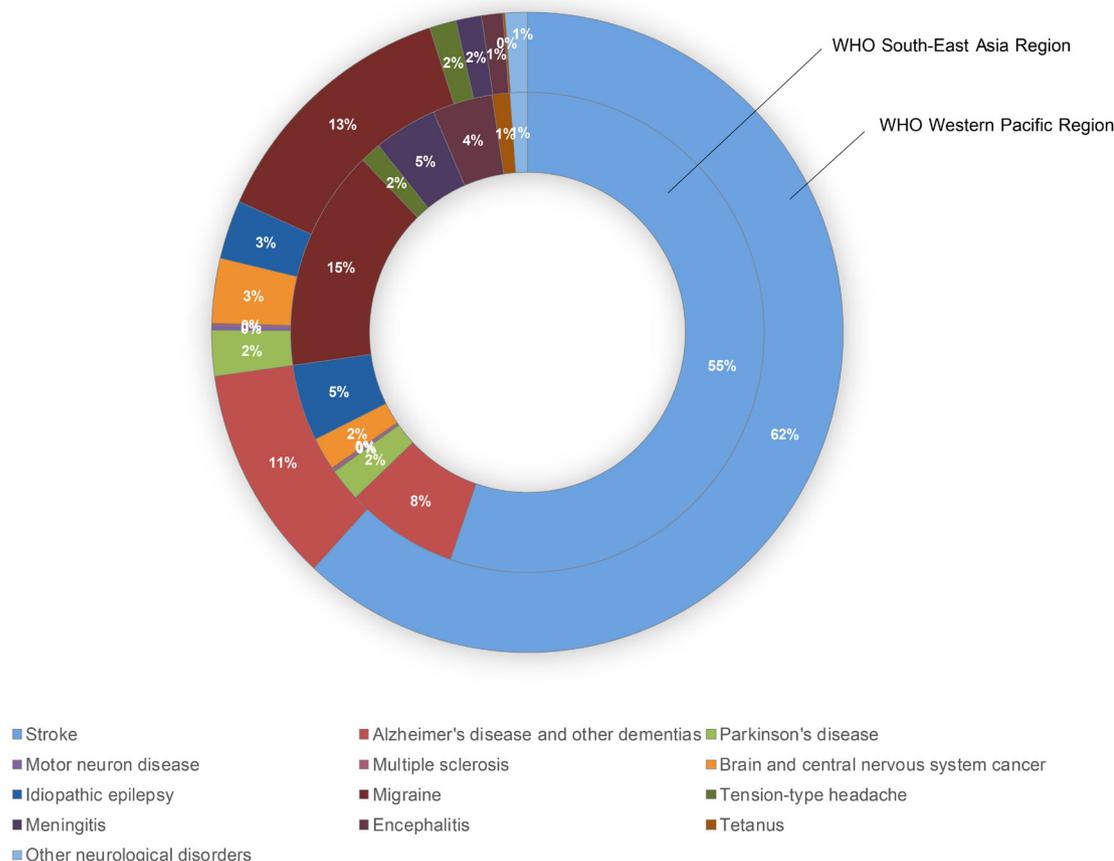


Figure 1 2019 Contribution of DALYs in the WHO South-East Asia and WHO Western Pacific regions. DALYs, disability-adjusted life-years.

motor neuron disease increased in Australia, Singapore and Japan, and decreased in China and the Republic of Korea. Mortality increased in Australia, China, Singapore and Japan, but decreased in the Republic of Korea. The DALYs of multiple sclerosis rose in all countries except Niue and Sri Lanka. Brain and central nervous system cancer decreased in Armenia, Niue and Tokelau, but increased in other countries. DALYs of idiopathic epilepsy increased in Australia and Singapore, and decreased in China and the Republic of Korea. Mortality decreased in Japan, the Republic of Korea and Singapore. Migraine's DALYs increased in all the Asian countries apart from Armenia, Georgia, Niue, Northern Mariana Islands and Tokelau. DALYs of tension-type headaches increased in most countries except for Georgia, Niue and Tokelau. Meningitis decreased in all countries except Vanuatu, and mortality decreased in all countries except Guam and Vanuatu. DALYs of encephalitis increased in Australia, the Republic of Korea and Singapore, and decreased in China, Japan and India. Mortality increased in Australia, China, Japan, the Republic of Korea and Singapore. Tetanus increased

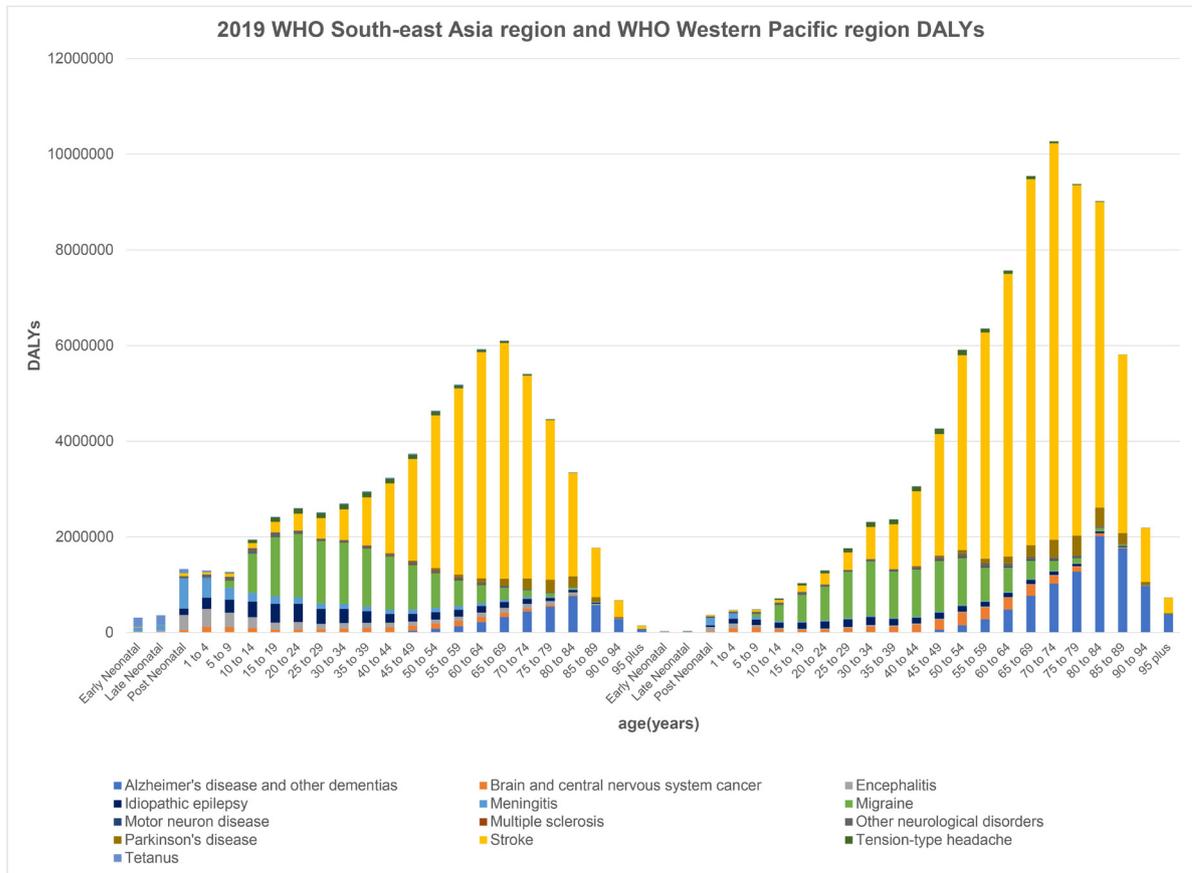
in Guam, Kiribati, Papua New Guinea, Tajikistan and Vanuatu, but decreased in other countries.

DISCUSSION

In the WHO South-East Asia and WHO Western Pacific regions, neurological diseases accounted for 3% and 5% of age-standardised DALYs in 2019.⁹ Among the leading causes of the global burden of disease all-age DALYs, stroke ranked 3rd and headache ranked 15th. Stroke, migraine and dementia accounted for the highest number of DALYs in the WHO South-East Asia and WHO Western Pacific regions, which did not differ significantly from the global trend. High DALYs of neurological diseases in the Asian region are thought to be due to increased life expectancy, as DALYs of neurological diseases were higher in the elderly. In particular, stroke and dementia have a higher incidence with advancing age, and the long life expectancy of these patients increases as medical technology advances. Headache frequently occurred in the young population. The increase in the burden of headaches might be due to changes in recognition of the disease and diagnostic criteria.



A



B

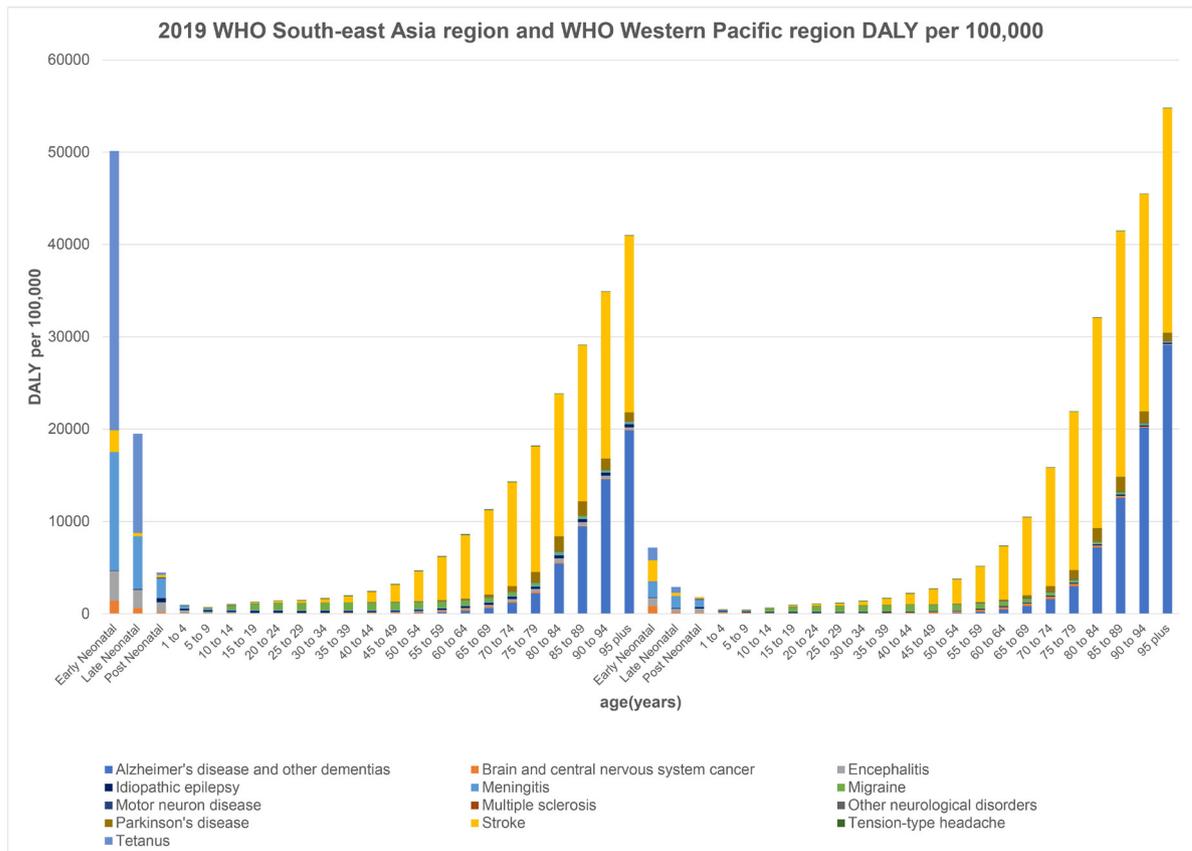


Figure 2 DALYs of neurological diseases in the Asian regions by age: (A) DALYs and (B) rate. DALYs, disability-adjusted life-years.

Table 2 Trends of neurological diseases in South-East Asia and Western Pacific regions between 1990 and 2019

		WHO Western Pacific region									
		WHO South-East Asia region			WHO Western Pacific region						
Age-standardised rate 1990	Age-standardised rate 2019	Change from 1990 to 2019	Total, 1990	Total, 2019	Change from 1990 to 2019	Age-standardised rate 1990	Age-standardised rate 2019	Change from 1990 to 2019	Total, 1990	Total, 2019	Change from 1990 to 2019
Stroke											
DALYs 2839 (2594 to 3097)	2008 (1811 to 2193)	-29% (-38% to -21%)	20 183 896 (18 482 460 to 21 850 550)	34 460 498 (31 035 171 to 37 670 399)	71% (51% to 90%)	3584 (3250 to 3984)	2121 (1691 to 2369)	-41% (-49% to -32%)	40 811 727 (36 975 527 to 45 349 220)	56 185 166 (49 950 162 to 62 813 530)	38% (18% to 60%)
Alzheimer's disease and other dementias											
DALYs 260 (108 to 623)	278 (114 to 644)	7% (-1% to 16%)	990 724 (415 186 to 2 337 548)	3 485 650 (1 444 595 to 8 150 443)	252% (222% to 284%)	345 (145 to 784)	377 (170 to 797)	9% (-1% to 21%)	2 711 166 (1 136 067 to 6 270 660)	9 195 842 (4 102 641 to 19 647 700)	239% (202% to 284%)
Parkinson's disease											
DALYs 82 (71 to 100)	81 (72 to 91)	-1% (-17% to 13%)	417 460 (358 716 to 506 514)	1 197 394 (1 057 423 to 1 339 100)	187% (140% to 229%)	86 (78 to 95)	79 (70 to 89)	-8% (-18% to 3%)	854 035 (768 070 to 944 762)	2 090 741 (1 839 874 to 2 355 241)	145% (117% to 176%)
Brain and central nervous system cancer											
DALYs 84 (59 to 129)	80 (60 to 93)	-6% (-44% to 28%)	1 103 726 (707 940 to 1 781 878)	1 532 948 (1 153 447 to 1 796 140)	39% (-21% to 101%)	138 (104 to 189)	112 (86 to 132)	-19% (-48% to 8%)	2 033 299 (1 521 466 to 2 779 444)	2 470 092 (1 887 397 to 2 919 034)	21% (-21% to 61%)
Idiopathic epilepsy											
DALYs 259 (186 to 322)	187 (146 to 237)	-28% (-41% to 0%)	3 545 290 (2 494 855 to 4 454 038)	3 721 812 (2 894 671 to 4 718 264)	5% (-16% to 48%)	144 (114 to 178)	102 (73 to 137)	-29% (-44% to -9%)	2 301 988 (1 834 995 to 2 835 846)	1 909 337 (1 365 698 to 2 534 086)	-17% (-35% to 7%)
Motor neuron disease											
DALYs 3 (3 to 4)	4 (3 to 5)	27% (5% to 49%)	34 733 (28 437 to 41 104)	78 631 (64 804 to 93 556)	126% (89% to 164%)	14 (13 to 15)	8 (8 to 9)	-40% (-46% to -31%)	199 306 (181 271 to 217 406)	195 642 (178 225 to 213 956)	-2% (-13% to 13%)
Multiple sclerosis											
DALYs 7 (5 to 10)	7 (6 to 9)	5% (-17% to 38%)	69 126 (51 225 to 96 038)	147 786 (124 902 to 179 583)	114% (67% to 179%)	5 (5 to 6)	4 (4 to 6)	-19% (-34% to 5%)	77 463 (63 701 to 91 450)	113 019 (95 485 to 141 751)	46% (19% to 92%)
Migraine											
DALYs 545 (67 to 1258)	543 (67 to 1250)	0% (-3% to 3%)	6 637 060 (720 531 to 15 495 588)	11 496 964 (1 378 922 to 26 551 209)	73% (66% to 93%)	423 (69 to 949)	456 (66 to 1047)	8% (-5% to 13%)	6 768 009 (1 059 137 to 15 293 657)	9 804 347 (1 563 046 to 22 190 876)	45% (36% to 55%)
Tension-type headache											
DALYs 51 (14 to 194)	52 (15 to 193)	1% (-5% to 8%)	589 905 (155 480 to 2 406 405)	10 799 949 (2 998 551 to 4 031 993)	83% (60% to 99%)	47 (15 to 163)	47 (14 to 160)	0% (-7% to 10%)	719 450 (222 679 to 2 586 630)	10 411 113 (336 537 to 3 331 809)	45% (21% to 63%)
Meningitis											
DALYs 632 (546 to 727)	157 (136 to 181)	-75% (-80% to -70%)	10 288 577 (8 807 057 to 11 946 290)	2 853 048 (2 491 747 to 3 283 248)	-72% (-77% to -66%)	247 (217 to 279)	45 (40 to 51)	-82% (-85% to -78%)	3 808 929 (3 340 387 to 4 298 041)	638 116 (570 390 to 710 280)	-83% (-86% to -80%)
Encephalitis											

Continued

Table 2 Continued

	WHO South-East Asia region					WHO Western Pacific region						
	Age-standardised rate 1990	Age-standardised rate 2019	Change from 1990 to 2019	Total, 1990	Total, 2019	Change from 1990 to 2019	Age-standardised rate 1990	Age-standardised rate 2019	Change from 1990 to 2019	Total, 1990	Total, 2019	Change from 1990 to 2019
DALYs	400 (319 to 493)	149 (119 to 231)	-63% (-72% to -38%)	6 110 657 (4 667 671 to 7 761 085)	2 734 495 (2 187 604 to 4 270 395)	-55% (-68% to -23%)	75 (51 to 90)	37 (31 to 42)	-51% (-61% to -31%)	11 665 784 (7 955 140 to 13 999 876)	5 511 783 (4 781 145 to 6 276 604)	-53% (-62% to -31%)
Tetanus												
DALYs	808 (661 to 945)	44 (28 to 62)	-95% (-96% to -92%)	14 068 396 (11 826 744 to 16 609 293)	741 167 (478 331 to 1 059 882)	-95% (-97% to -92%)	130 (102 to 156)	4 (3 to 5)	-97% (-98% to -95%)	1 980 966 (1 551 335 to 2 373 157)	68 690 (43 256 to 82 825)	-97% (-98% to -95%)
Other neurological disorders												
DALYs	39 (28 to 49)	43 (31 to 56)	9% (-7% to 37%)	552 728 (368 319 to 701 791)	843 447 (617 859 to 1 049 911)	53% (30% to 98%)	35 (30 to 41)	39 (31 to 48)	10% (-5% to 30%)	538 294 (454 920 to 639 130)	744 757 (613 170 to 892 837)	38% (21% to 60%)
DALYs, disability-adjusted life-years.												

Stroke was the most common neurological disease in 1990 and 2019; compared with 1990, the total DALYs of stroke increased in both regions, but the age-standardised incidence and mortality rate decreased. Risk factors included hypertension, diabetes, dyslipidaemia, atrial fibrillation, smoking, alcohol, obstructive sleep apnea and other minor elements.^{24 25} The mortality attributed to hypertension and diabetes significantly reduced between 1990 and 2019.^{26 27} As awareness of the effects of these diseases on stroke has increased and the change of public health policies implemented, there is a possibility that it may have had the effect of reducing the burden. In addition, with the gradual development of medical treatment methods for each disease, the preventive effect of a stroke may have increased. Medications for hypertension, diabetes and dyslipidaemia have been continuously developed for decades, and researchers are focusing on the impact of these drugs on cardiovascular risk reduction.²⁸⁻³⁰ For atrial fibrillation, non-vitamin K antagonist oral anticoagulants, which have lower haemorrhagic complication rates than warfarin,³¹ are being widely used. Treatment methods for stroke have also made great strides. Intravenous thrombolytic therapy and endovascular thrombectomy are widely used and can effectively reduce mortality and disability after stroke.^{32 33} Furthermore, it is possible to maximise the treatment effect by educating the general public about the importance of the time window, developing a patient transport system and using stroke units. When the age-standardised DALYs according to SDI for each country were plotted, high-income countries showed lower DALYs. This suggests that there may be differences in access to medical care and preventive medicine depending on economic status. Therefore, it is necessary to develop prevention and treatment strategies for stroke in low-income countries.

DALYs of Alzheimer's disease and other dementias were increased in both the WHO South-East Asia and WHO Western Pacific regions, which may be the consequence of an increased ageing population. However, the age-standardised rate of dementia in the WHO South-East Asia and WHO Western Pacific regions showed somewhat different patterns. In the WHO South-East Asia region, the change of dementia incidence was -3%, prevalence did not change and mortality and DALYs were increased by 10% and 7% each. In the WHO Western Pacific region, the incidence, prevalence, mortality and DALYs of dementia were increased by 14%, 25%, 7% and 9%, respectively. In the 2019 GBD report, DALYs of Alzheimer's disease and other dementias were slightly increased from 1990.⁹ The exact cause of these differences is unknown, but nutrition, physical activity, genetic influence and access to healthcare may have affected the results.^{34 35} As for dementia, there seems to be no significant improvement compared with 1990, which could be attributed to the lack of development of new powerful preventive and therapeutic drugs.^{36 37} Considering the current global change into an ageing society, medical research and social support for dementia are essential.

Table 3 Trends of neurological diseases in high-income Asia and Pacific regions between 1990 and 2019

	High-income Asia and Pacific					
	Australasia			High-income Asia-Pacific		
	1990	2019	Change	1990	2019	Change
Stroke	1076 (1005 to 1132)	461 (414 to 503)	-57% (-60% to -55%)	1936 (1815 to 2030)	739 (659 to 814)	-62% (-64% to -59%)
Alzheimer's disease and other dementias	327 (147 to 726)	320 (146 to 682)	-2% (-6% to 3%)	323 (144 to 711)	385 (179 to 792)	19% (1% to 26%)
Parkinson's disease	80 (73 to 86)	84 (75 to 93)	6% (0% to 12%)	53 (49 to 57)	58 (51 to 63)	10% (-2% to 15%)
Brain and central nervous system cancer	174 (152 to 217)	145 (110 to 161)	-17% (-46% to -7%)	59 (52 to 82)	59 (36 to 67)	0% (-56% to 16%)
Idiopathic epilepsy	138 (83 to 221)	116 (66 to 198)	-16% (-53% to 49%)	103 (70 to 146)	80 (51 to 125)	-22% (-44% to 7%)
Motor neuron disease	46 (44 to 48)	55 (50 to 60)	20% (8% to 32%)	21 (19 to 23)	15 (13 to 16)	-30% (-39% to -22%)
Multiple sclerosis	25 (20 to 31)	29 (23 to 35)	18% (-10% to 33%)	6 (5 to 8)	6 (4 to 8)	-9% (-23% to 5%)
Migraine	495 (85 to 1112)	496 (84 to 1113)	0% (-3% to 3%)	410 (83 to 928)	410 (82 to 923)	0% (-3% to 3%)
Tension-type headache	60 (18 to 190)	60 (18 to 188)	0% (-6% to 8%)	63 (18 to 214)	64 (18 to 213)	1% (-4% to 5%)
Meningitis	50 (45 to 55)	14 (13 to 16)	-71% (-75% to -67%)	49 (45 to 54)	10 (8 to 11)	-80% (-83% to -77%)
Encephalitis	4 (4 to 6)	6 (5 to 7)	51% (-8% to 87%)	14 (12 to 17)	11 (10 to 13)	-18% (-29% to -9%)
Tetanus	0 (0 to 0)	0 (0 to 0)	-63% (-83% to -43%)	2 (1 to 2)	0 (0 to 0)	-86% (-89% to -81%)
Other neurological disorders	66 (56 to 80)	72 (59 to 92)	9% (-12% to 36%)	47 (41 to 55)	51 (43 to 63)	8% (-5% to 25%)

Age-standardised incidence and prevalence of epilepsy increased, but YLL and mortality were markedly decreased, and YLD did not show significant change. It is estimated that there will be an impact from the development of various anti-epileptic drugs and advances in critical care medicine.³⁸ The incidence of infectious diseases such as meningitis and encephalitis is decreasing worldwide,⁹ but that of encephalitis has increased in the Australasia region. Further investigations are needed to determine the exact cause of the increase in encephalitis in this region.

The neurological diseases show various patterns in each country, which is in line with previous reports.^{6 15-17 39 40} Environmental and geographical factors may have influenced these results. A rural area in Europe showed a higher prevalence of untreated hypertension, alcohol abuse, and higher incidence of stroke and cerebral haemorrhage compared with an urban area.⁴¹ A study in China also showed a geographical difference in hypertension and stroke between the north and south regions.⁴² Latitude gradient is reported to be influencing the prevalence of multiple sclerosis.⁴³ In a systematic review, air pollution

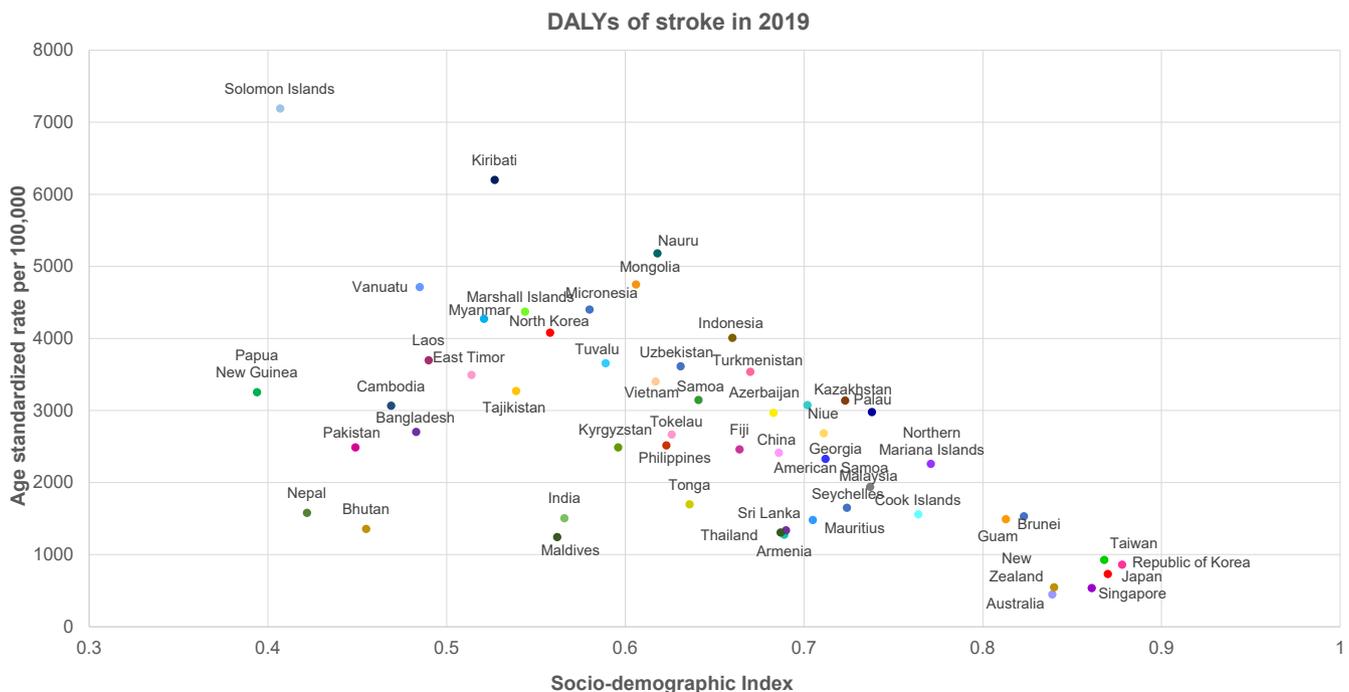


Figure 3 DALYs of stroke according to country-specific Sociodemographic Index. DALYs, disability-adjusted life-years.

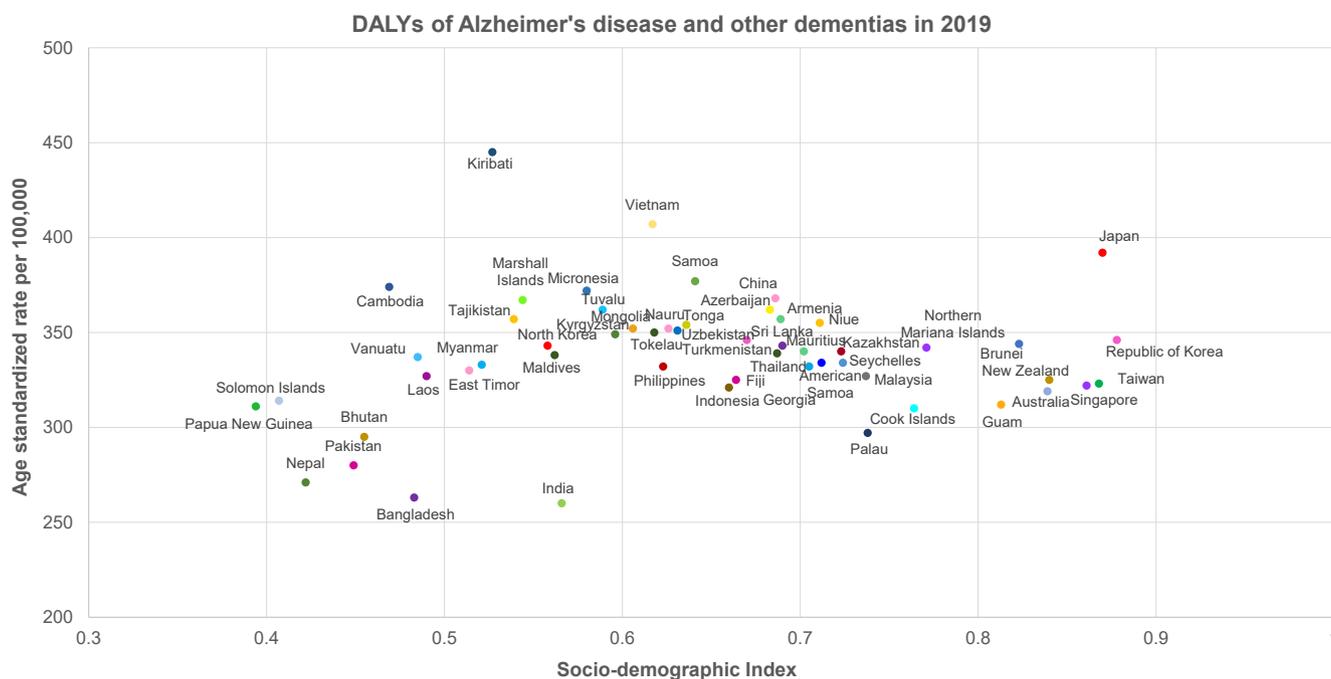


Figure 4 DALYs of Alzheimer’s disease and other dementias according to country-specific Sociodemographic Index. DALYs, disability-adjusted life-years.

exposures were related to an increased risk of dementia.⁴⁴ Thus, individual healthcare strategies should be applied according to the characteristics of each country.

LIMITATION

General limitations of the GBD Study also apply to this report. First, the quality of the information varies across the countries, and there may be incomplete data. Because

we do not have access to the original dataset, we could not conduct further statistical analysis to reduce bias. Second, the definition of cause of death may vary across different medical data sources; a study in India reported that there is marked heterogeneity in reporting of deaths across states of India.⁴⁵ These restrictions apply to other Asian countries as well. The results of this study should be interpreted with caution, due to limited access to

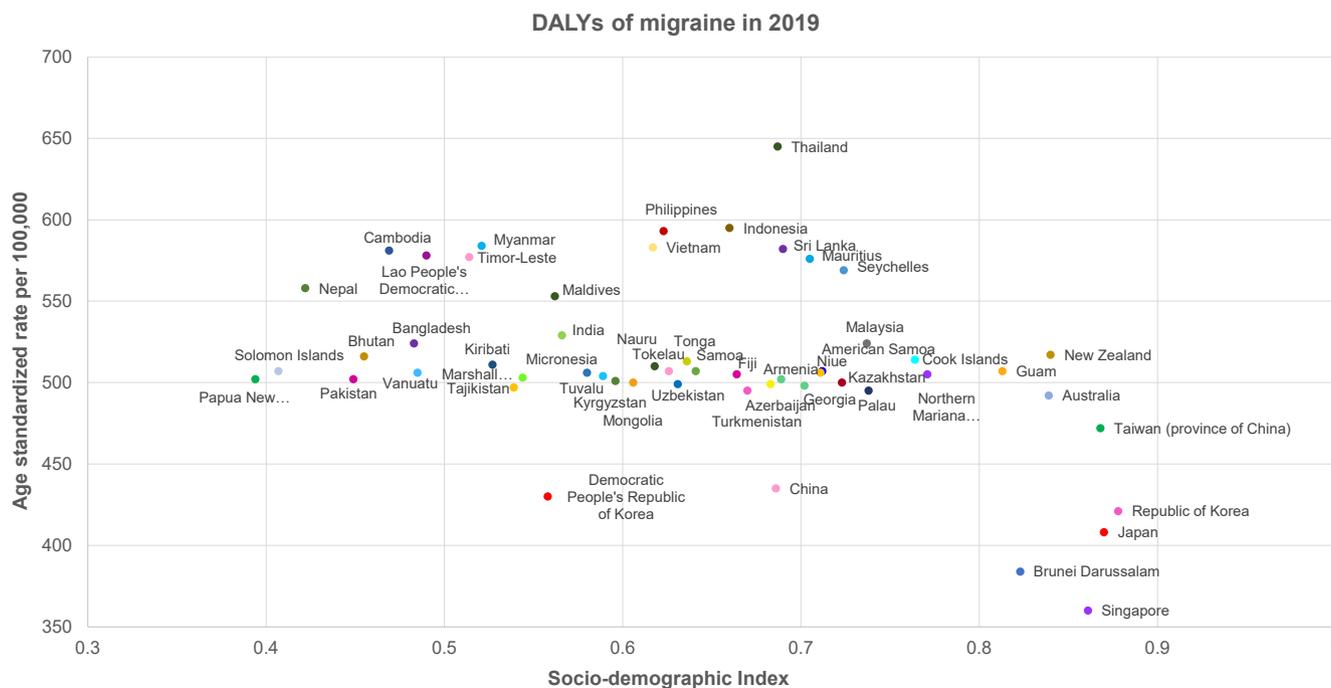


Figure 5 DALYs of migraine according to country-specific Sociodemographic Index. DALYs, disability-adjusted life-years.

original data, and most of the results are derived from the computation of a large dataset. However, the GBD Study takes these differences into account to make standard definitions and standard health indicators that can be compared among regions, countries and subnational settings. Third, the disability weights used to calculate YLD may vary across the countries. Fourth, a wide 95% UI is frequently noted, which implies the low precision of the estimate. Fifth, other neurological diseases, including peripheral neuropathy, tremor, dizziness and sleep disorders, were not included in the analysis because the GBD dataset does not have information on these diseases. Sixth, we could not suggest genetic epidemiological evidence for the Asian regions, which is a major limitation of our study. In a further study, information on the financial burden of neurological diseases will be helpful in making health policy decisions in Asia.

Conclusion

This study described the burden of neurological diseases in Asia. Although the DALYs of some neurological diseases are decreasing, it is necessary to pay attention to the diseases that are increasing. To reduce the burden of neurological disease, strategies suited to the reality of each country's healthcare needs and challenges are needed, and this study can serve as the cornerstone of such effective strategies. Also, as COVID-19 became a pandemic in 2019, further research will help identify changes in disease burden before and after COVID-19. Due to the possible bias resulting from the limitations of the GBD research method, additional research is needed for accurate statistics for each country.

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Appendix

The burden of neurological diseases in Asia: an analysis for the Global Burden of Disease Study 2019

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Supplementary Figure 1. Definition of WHO South-East Asia region and WHO Western Pacific region.

WHO South-East Asia region		WHO Western Pacific region		
				
Bangladesh Bhutan Democratic People's Republic of Korea India Indonesia Maldives	Myanmar Nepal Sri Lanka Thailand Timor-Leste	American Samoa Australia Brunei Darussalam Cambodia China Cook islands Fiji Guam Japan Kiribati Lao people's -Democratic Republic Malaysia	Marshall islands Micronesia -Federated States of Mongolia Nauru New Zealand Niue Northern Mariana -Islands Palau Papua New Guinea Philippines Republic of Korea	Samoa Singapore Solomon Islands Tokelau Tonga Tuvalu Vanuatu Viet Nam

Supplementary table 1. Global burden of neurologic diseases, comparison of South-East Asia and Western Pacific regions

	WHO South-East Asia Region		WHO Western Pacific Region		Global	
	age standardized rate per 100,000	total	age standardized rate per 100,000	total	age standardized rate per 100,000	total
All neurologic disorders						
Incidence	10994 (9744 to 12287)	226998829 (200601270 to 254330446)	8916 (7883 to 9979)	178623423 (158333885 to 200437404)	10470 (9238 to 11694)	821776610 (727488041 to 919318436)
Prevalence	43051 (37682 to 48745)	894030244 (780335832 to 1016465795)	35568 (31066 to 40414)	756740040 (664386310 to 859419226)	41772 (36516 to 47456)	3325372960 (2907966956 to 3769513797)
Deaths	131 (104 to 177)	1887646 (1588078 to 2451216)	140 (106 to 193)	3461708 (2675849 to 4704952)	123 (96 to 167)	9381103 (7434071 to 12592144)
DALYs	3634 (2610 to 5245)	64373789 (45229328 to 94249122)	3432 (2486 to 4891)	85008645 (63024027 to 118461528)	3464 (2521 to 4945)	273063453 (199632801 to 388511035)
YLDs	994 (353 to 1981)	19737182 (6512402 to 40284964)	1032 (442 to 1915)	23834461 (10847769 to 42769329)	1066 (430 to 2030)	84664628 (34113447 to 161432585)
YLLs	2640 (2176 to 3361)	44636607 (37336170 to 55748014)	2400 (1919 to 3103)	61174183 (49197722 to 79105935)	2398 (2004 to 3013)	188398824 (158532246 to 234960422)
Stroke						
Incidence	141 (128 to 157)	2459950 (2228862 to 2738665)	186 (166 to 211)	4968330 (4390222 to 5682575)	151 (137 to 167)	12224551 (11041816 to 13589312)
Prevalence	1006 (916 to 1102)	18711833 (17039072 to 20483835)	1432 (1299 to 1580)	38077336 (34325689 to 42131345)	1240 (1140 to 1353)	101474558 (93211910 to 110526302)
Deaths	95 (85 to 104)	1409305 (1266526 to 1544474)	104 (91 to 117)	2657992 (2329878 to 2992210)	84 (77 to 90)	6552725 (5995200 to 7015139)
DALYs	2008 (1811 to 2193)	34460498 (31035171 to 37670399)	2121 (1891 to 2369)	56185166 (49950162 to 62813530)	1768 (1641 to 1889)	143232184 (133095809 to 153241824)

YLDs	173 (124 to 221)	3170198 (2279562 to 4040730)	299 (211 to 384)	7861628 (5539716 to 10094189)	218 (157 to 277)	17741742 (12759419 to 22587415)
YLLs	1835 (1647 to 2016)	31290299 (28062279 to 34507727)	1822 (1592 to 2058)	48323539 (42236848 to 54716916)	1550 (1435 to 1661)	125490442 (116154749 to 134427938)
Alzheimer's disease and other dementias						
Incidence	69 (59 to 79)	914160 (784215 to 1050976)	105 (89 to 120)	2647125 (2240264 to 3036566)	95 (82 to 108)	7236385 (6217239 to 8232672)
Prevalence	470 (402 to 541)	6282408 (5348571 to 7222877)	775 (658 to 893)	19243137 (16313439 to 22148027)	682 (585 to 783)	51624193 (44276969 to 59021502)
Deaths	20 (5 to 53)	209371 (50293 to 569326)	25 (6 to 64)	559566 (141027 to 1435145)	23 (6 to 59)	1623276 (407465 to 4205719)
DALYs	278 (114 to 644)	3485650 (1444595 to 8150443)	377 (170 to 797)	9195842 (4102641 to 19647700)	339 (151 to 731)	25276989 (11204523 to 54558243)
YLDs	66 (47 to 89)	857947 (607194 to 1145962)	113 (79 to 152)	2774288 (1946073 to 3737698)	99 (70 to 133)	7417069 (5226780 to 9927706)
YLLs	212 (51 to 576)	2627704 (618718 to 7280232)	264 (66 to 682)	6421554 (1608173 to 16980491)	240 (58 to 627)	17859920 (4374613 to 47064787)
Parkinson's disease						
Incidence	10 (9 to 12)	164617 (141238 to 188411)	14 (12 to 16)	381973 (323674 to 440966)	13 (12 to 15)	1081723 (953265 to 1211202)
Prevalence	79 (66 to 93)	1236275 (1036369 to 1470605)	131 (109 to 154)	3532065 (2939286 to 4199916)	106 (91 to 122)	8511022 (7288530 to 9841378)
Deaths	5 (4 to 6)	66316 (58359 to 75120)	4 (4 to 5)	110560 (97589 to 122300)	5 (4 to 5)	362907 (326855 to 388200)
DALYs	81 (72 to 91)	1197394 (1057423 to 1339100)	79 (70 to 89)	2090741 (1839874 to 2355241)	80 (73 to 87)	6292616 (5769210 to 6827207)

YLDs	11 (8 to 15)	174558 (118998 to 238504)	19 (13 to 26)	509134 (346961 to 702768)	15 (10 to 20)	1210093 (841166 to 1640683)
YLLs	70 (62 to 79)	1022835 (900696 to 1152766)	60 (53 to 67)	1581607 (1390754 to 1758379)	65 (60 to 69)	5082522 (4673385 to 5409853)
Brain and central nervous system cancer						
Incidence	2 (2 to 3)	43379 (31926 to 50978)	5 (4 to 6)	120200 (90121 to 140470)	4 (3 to 5)	347992 (262084 to 388896)
Prevalence	4 (3 to 5)	77034 (57609 to 91309)	22 (16 to 25)	453450 (335491 to 524264)	13 (10 to 15)	1065294 (800441 to 1199906)
Deaths	2 (2 to 2)	36918 (27664 to 42969)	3 (2 to 4)	75706 (56624 to 89363)	3 (2 to 3)	246253 (185642 to 270930)
DALYs	80 (60 to 93)	1532948 (1153447 to 1796140)	112 (86 to 132)	2470092 (1887397 to 2919034)	109 (85 to 121)	8659871 (6718029 to 9574458)
YLDs	1 (0 to 1)	13122 (8509 to 18098)	2 (1 to 3)	49116 (32267 to 68440)	2 (1 to 2)	129402 (83870 to 174962)
YLLs	79 (59 to 92)	1519827 (1144514 to 1778575)	110 (84 to 130)	2420976 (1851199 to 2860880)	107 (83 to 119)	8530468 (6625077 to 9447558)
Idiopathic epilepsy						
Incidence	34 (24 to 46)	670517 (458321 to 902665)	28 (20 to 38)	480158 (339198 to 630891)	39 (28 to 51)	2898222 (2098718 to 3823376)
Prevalence	288 (211 to 369)	5683680 (4118542 to 7301504)	235 (170 to 305)	4468232 (3248818 to 5776859)	326 (248 to 408)	25111110 (19033571 to 31433013)
Deaths	2 (2 to 2)	38242 (31793 to 45119)	1 (1 to 1)	15594 (13564 to 17955)	1 (1 to 2)	114011 (100178 to 129928)
DALYs	187 (146 to 237)	3721812 (2894671 to 4718264)	102 (73 to 137)	1909337 (1365698 to 2534086)	171 (130 to 218)	13077624 (9986730 to 16734086)

YLDs	97 (59 to 142)	1932824 (1148469 to 2830045)	66 (38 to 100)	1224420 (702688 to 1851608)	101 (63 to 147)	7740804 (4810323 to 11216664)
YLLs	90 (75 to 109)	1788988 (1513365 to 2157506)	36 (32 to 42)	684917 (598182 to 792351)	69 (62 to 81)	5336821 (4722718 to 6170046)
Motor neuron disease						
Incidence	0 (0 to 1)	7877 (6454 to 9715)	1 (1 to 1)	14425 (12435 to 17144)	1 (1 to 1)	63700 (57296 to 71343)
Prevalence	2 (1 to 2)	36074 (28793 to 45132)	3 (3 to 4)	64252 (53666 to 76668)	3 (3 to 4)	268674 (231894 to 310664)
Deaths	0 (0 to 0)	2144 (1699 to 2602)	0 (0 to 0)	6851 (6172 to 7509)	0 (0 to 1)	39081 (36567 to 41130)
DALYs	4 (3 to 5)	78631 (64804 to 93556)	8 (8 to 9)	195642 (178225 to 213956)	13 (12 to 13)	1034607 (979911 to 1085401)
YLDs	0 (0 to 1)	7663 (5233 to 10701)	1 (0 to 1)	13652 (9353 to 18660)	1 (0 to 1)	57068 (39982 to 76338)
YLLs	4 (3 to 5)	70968 (57011 to 85840)	8 (7 to 8)	181990 (165357 to 200233)	12 (11 to 13)	977539 (926348 to 1025430)
Multiple sclerosis						
Incidence	0 (0 to 0)	7326 (5919 to 8777)	0 (0 to 0)	4884 (4075 to 5745)	1 (1 to 1)	59345 (51818 to 66943)
Prevalence	7 (5 to 8)	133149 (104679 to 162846)	4 (3 to 5)	97656 (78961 to 117302)	21 (19 to 24)	1756792 (1531919 to 1973623)
Deaths	0 (0 to 0)	3090 (2588 to 3850)	0 (0 to 0)	2678 (2239 to 3506)	0 (0 to 0)	22439 (20226 to 27792)
DALYs	7 (6 to 9)	147786 (124902 to 179583)	4 (4 to 6)	113019 (95485 to 141751)	14 (12 to 17)	1159832 (1001180 to 1381870)

YLDs	2 (1 to 3)	37457 (24802 to 52575)	1 (1 to 2)	26837 (17991 to 37122)	5 (4 to 7)	451204 (320712 to 591541)
YLLs	6 (5 to 7)	110328 (92181 to 139573)	3 (3 to 4)	86182 (71800 to 112420)	9 (8 to 11)	708628 (645137 to 897753)
Migraine						
Incidence	1230 (1076 to 1380)	26046477 (22798840 to 29262475)	1013 (887 to 1140)	18292329 (16118069 to 20494099)	1143 (996 to 1289)	87648969 (76635688 to 98654602)
Prevalence	14982 (13027 to 17162)	316734874 (274176841 to 363846694)	12187 (10561 to 14040)	260784747 (226812263 to 301419267)	14107 (12270 to 16239)	1128087261 (979598830 to 1298138078)
DALYs	543 (67 to 1250)	11496964 (1378922 to 26551209)	456 (66 to 1047)	9804347 (1563046 to 22190876)	526 (79 to 1194)	42077666 (6418383 to 95645211)
YLDs	543 (67 to 1250)	11496964 (1378922 to 26551209)	456 (66 to 1047)	9804347 (1563046 to 22190876)	526 (79 to 1194)	42077666 (6418383 to 95645211)
Tension-type headache						
Incidence	9427 (8378 to 10520)	195278793 (172937877 to 218506222)	7535 (6682 to 8414)	151301373 (134464822 to 169511609)	8968 (7932 to 9991)	706190114 (626723555 to 788575302)
Prevalence	25984 (22866 to 29186)	540547852 (474735815 to 610313741)	20692 (18177 to 23301)	428252237 (378886064 to 480860531)	25113 (22021 to 28316)	1995172549 (1751946846 to 2242204885)
DALYs	52 (15 to 193)	1079949 (299851 to 4031993)	47 (14 to 160)	1041113 (336537 to 3331809)	56 (17 to 189)	4541689 (1395546 to 14981336)
YLDs	52 (15 to 193)	1079949 (299851 to 4031993)	47 (14 to 160)	1041113 (336537 to 3331809)	56 (17 to 189)	4541689 (1395546 to 14981336)
Meningitis						
Incidence	37 (30 to 44)	669482 (552202 to 794001)	9 (7 to 11)	132795 (109381 to 157159)	35 (30 to 42)	2507224 (2113069 to 2988698)
Prevalence	127 (109 to 150)	2569405 (2186846 to 3028860)	26 (22 to 31)	509277 (436456 to 591205)	100 (86 to 119)	7683540 (6590288 to 9132199)

Deaths	3 (2 to 3)	45101 (39479 to 51199)	1 (1 to 1)	11158 (10023 to 12372)	3 (3 to 4)	236222 (204381 to 277426)
DALYs	157 (136 to 181)	2853048 (2491747 to 3283248)	45 (40 to 51)	638116 (570390 to 710280)	234 (196 to 283)	16333198 (13775122 to 19609767)
YLDs	12 (8 to 16)	245531 (171501 to 332356)	3 (2 to 3)	45970 (31976 to 61948)	9 (6 to 12)	683333 (480874 to 924320)
YLLs	145 (124 to 170)	2607517 (2246012 to 3042005)	43 (37 to 48)	592146 (524401 to 665944)	225 (187 to 273)	15649865 (13102961 to 18930650)
Encephalitis						
Incidence	39 (36 to 43)	707383 (636882 to 776165)	18 (15 to 21)	275200 (238867 to 314275)	19 (17 to 22)	1444722 (1280147 to 1614941)
Prevalence	100 (74 to 124)	1976424 (1473377 to 2443468)	60 (46 to 75)	1241619 (945430 to 1551531)	57 (43 to 70)	4499425 (3372091 to 5573174)
Deaths	3 (3 to 5)	57265 (45832 to 89466)	0 (0 to 1)	7899 (6843 to 9310)	1 (1 to 2)	89897 (76532 to 122874)
DALYs	149 (119 to 231)	2734495 (2187604 to 4270395)	37 (31 to 42)	551783 (478145 to 627604)	65 (55 to 87)	4797407 (4059493 to 6418088)
YLDs	11 (8 to 15)	221171 (157506 to 297608)	6 (4 to 8)	123120 (85292 to 166065)	6 (4 to 8)	482436 (343282 to 647343)
YLLs	138 (109 to 220)	2513325 (1971560 to 4065901)	30 (25 to 35)	428663 (361548 to 508836)	59 (50 to 81)	4314970 (3623222 to 5928341)
Tetanus						
Incidence	2 (1 to 2)	28867 (18533 to 41397)	0 (0 to 0)	4630 (2756 to 5906)	1 (1 to 1)	73662 (53347 to 101149)
Prevalence	1 (1 to 2)	29238 (21190 to 38358)	0 (0 to 0)	5883 (3918 to 8256)	1 (1 to 1)	61660 (44603 to 81241)

Deaths	1 (0 to 1)	11901 (7465 to 16276)	0 (0 to 0)	1508 (888 to 1890)	0 (0 to 1)	34684 (25943 to 48457)
DALYs	44 (28 to 62)	741167 (478331 to 1059882)	4 (3 to 5)	68690 (43256 to 82825)	34 (26 to 48)	2316381 (1770002 to 3279408)
YLDs	0 (0 to 0)	792 (456 to 1234)	0 (0 to 0)	145 (78 to 243)	0 (0 to 0)	1745 (1022 to 2663)
YLLs	44 (28 to 62)	740375 (477596 to 1059241)	4 (3 to 5)	68544 (43146 to 82653)	34 (26 to 48)	2314636 (1768800 to 3276980)
Other neurological disorders						
Incidence	0 (0 to 0)	0 (0 to 0)	0 (0 to 0)	0 (0 to 0)	0 (0 to 0)	0 (0 to 0)
Prevalence	1 (0 to 1)	11999 (8128 to 16565)	1 (0 to 1)	10147 (6829 to 14054)	1 (0 to 1)	56882 (39066 to 77832)
Deaths	0 (0 to 1)	7993 (6087 to 10812)	1 (0 to 1)	12195 (11002 to 13391)	1 (1 to 1)	59610 (55082 to 64551)
DALYs	43 (31 to 56)	843447 (617859 to 1104911)	39 (31 to 48)	744757 (613170 to 892837)	56 (45 to 68)	4263390 (3458864 to 5174136)
YLDs	25 (16 to 36)	499006 (311400 to 733949)	20 (12 to 29)	360690 (235791 to 507905)	28 (18 to 40)	2130376 (1392089 to 3016404)
YLLs	18 (13 to 25)	344440 (252238 to 478649)	19 (17 to 21)	384066 (346315 to 426832)	28 (25 to 31)	2133013 (1915236 to 2381088)

WHO: World Health Organization, DALYs: disability-adjusted life-years, YLDs: years lived with disability, YLLs: years of life lost

Supplementary table 2. DALYs of neurological diseases in Asia by age.

Total DALYs	Alzheimer's disease and other dementias	Brain and central nervous system cancer	Encephalitis	Idiopathic epilepsy	Meningitis	Migraine	Motor neuron disease	Multiple sclerosis	Other neurological disorders	Parkinson's disease	Stroke	Tension-type headache	Tetanus
Early Neonatal	0	8974.48	20075.03	377.1395	80516.02	0	41.28643	0	0	0	14755.88	0	189970.3
Late Neonatal	0	11170.16	37234.2	1107.899	106667.3	0	55.03913	0	0	0	6594.87	0	200284.7
Post Neonatal	0	51758.07	317606.4	132989.6	629864.6	0	3504.961	0	42758.98	0	66320.18	0	82763.17
1 to 4	0	128003	367157.8	233826.6	419916.4	0	1963.326	0	66666.4	0	42838	0	38100.08
5 to 9	0	118115.9	299885.7	270919.2	251296.8	147718	1298.177	81.90644	78196.39	0	68461.37	15559.22	16508.22
10 to 14	0	96306.77	224625.8	326059	187984.1	818572.1	1728.74	302.7679	110528.6	0	107821.6	60525.88	9904.685
15 to 19	0	63038.62	147351.1	392487.1	155862.6	1234650	2113.877	1266.534	99326.97	0	219117.2	94754.23	12506.04
20 to 24	0	64840.97	155921.1	382352.4	136321.2	1318116	2135.063	4726.629	66719.75	262.7458	355854.2	105090.1	13216.2
25 to 29	0	74335.32	110107.1	310890.2	116316.9	1298506	1857.779	7640.088	43671.2	701.2859	431180.1	108523.3	12641.38
30 to 34	0	85110.94	114155.6	296203.5	107297	1277408	2313.651	12109.88	36177.75	1838.62	642105.3	109348.8	14962.22
35 to 39	0	96997.54	106897.6	244146.1	98620.27	1212245	3461.918	16941.85	39325.75	3319.805	1004147	110048.7	16950.46
40 to 44	7935.427	101130.9	96777.57	183153.9	94030.29	1103465	4787.308	20023.03	39040.25	12921.98	1455995	99592.42	20306.56
45 to 49	41492.28	104834.8	86220.43	159015.3	93215.7	925686.2	7764.761	20252.97	43300.31	23640.67	2123781	89782.16	24397.17
50 to 54	79110.46	113387.1	81655.41	153964.2	89419.17	722664.7	9287.658	18839.65	40702.61	39085.01	3193599	80673.61	22717.06
55 to 59	134134.2	113227.7	87035.97	144972.7	78228.84	534365.9	11273.03	16414.57	38066.71	53988.46	3894871	61238.9	19811.96
60 to 64	219369.8	103912.9	98382.31	132412.8	58459.62	383969.7	9997.067	11909.09	32092.88	85968.63	4725751	52040.48	14011.54
65 to 69	325495.3	86705.24	105030.9	122114.8	48526.65	253192.7	8583.401	7943.339	25982.62	143521.6	4926818	41176.64	10526.88
70 to 74	445346.2	57096.28	102932.8	95988.95	40337.97	140415	3840.802	4755.678	18315.25	222919.2	4240469	26449.79	9956.176
75 to 79	542408.4	32887.03	83848.22	62895.19	29674.41	73271.68	1832.339	2599.45	12314.4	266531.5	3335346	14616.21	6911.04
80 to 84	764378.6	15091.2	61158.84	47796.4	19220.21	35742.31	632.5458	1340.779	6691.235	225241	2160171	7074.8	2912.639
85 to 89	574383.2	4794.331	23465.5	20454.64	8435.599	13275.26	127.6924	505.565	2574.42	91040.62	1028574	2650.169	1353.255

90 to 94	280788.7	1050.819	5946.926	6482.527	2303.629	3268.417	25.94741	114.462	825.3142	22964.97	347693.6	689.4411	364.6131
95 plus	70807.78	178.3772	1022.909	1201.887	532.9592	432.4695	4.40659	17.52323	168.8534	3447.587	68232.76	113.7477	90.733
Early Neonatal	0	3597.796	3729.215	204.338	7385.118	0	50.18207	0	0	0	9647.245	0	5881.3
Late Neonatal	0	2164.956	4850.555	613.7786	16795.08	0	132.8228	0	0	0	4421.475	0	8032.681
Post Neonatal	0	30617.78	86889.5	32188.34	157530.7	0	10334.48	0	25097.37	0	29007.35	0	3102.274
1 to 4	0	89357.69	102495.7	98491.22	109827.9	0	2809.309	0	36232.62	0	29117.2	0	4716.72
5 to 9	0	108725.7	48617.41	115984.4	54400.64	64922.16	1655.655	113.4079	37774.55	0	44656.18	8488.347	3593.216
10 to 14	0	68639.69	27742.51	112335.9	30550.53	337522.7	1886.374	179.5575	48723.85	0	55738.59	29251.46	2528.696
15 to 19	0	56568.08	24436.4	126960.9	24015.98	555858.3	4263.464	654.8902	55491.03	0	137244.9	45578.26	2306.615
20 to 24	0	64116.78	23368.12	143720.5	25876.44	699442.8	4197.213	2095.003	43566.37	226.596	231510.8	58660.22	2374.005
25 to 29	0	89853.81	28406.2	158283.2	24290.56	966847.6	3682.297	3820.282	32100.84	667.7181	369095.9	84065.48	2597.986
30 to 34	0	126568.3	31057.08	166057.1	24991.94	1141372	4738.794	7052.895	31017.84	2261.181	674660.7	102175.6	3527.751
35 to 39	0	128212.4	23786.5	130951.3	20549.28	974382.4	5260.668	9230.759	29128.45	3590.815	941062.6	98141.19	3512.262
40 to 44	8466.37	159947.2	23125.79	122236.7	19220.96	985146.6	8284.223	12532.14	33841.23	15667.79	1564385	100445.3	3955.47
45 to 49	61040.5	205967	24966.54	126217.1	19826.04	1061421	13106.69	15634.19	47783.55	36962.17	2537971	110510	4586.246
50 to 54	155950.8	256490.5	24129.99	117842.9	19173.65	985828.9	19211.35	16911.21	56033.4	71209.9	4074602	111211.8	4321.577
55 to 59	281233.5	244919.9	19230.44	95522.08	16643.74	701010	21669.07	14701.59	55608.41	95545.03	4727239	80167.41	3901.937
60 to 64	484391.3	239931.2	16588.13	90047.8	15841.26	512958.7	23479.43	10455.1	52435.75	143360.8	5910137	68176.26	2939.5
65 to 69	770810.7	231360.3	13395.69	87129.81	14982.25	383679.1	24683.68	7863.133	49719.23	243578.3	7655045	60953.93	2473.416
70 to 74	1024661	170345	10178.86	69552.4	12937.24	215839.7	20923.61	5004.212	42090.84	370070.2	8288054	40653.69	1815.648
75 to 79	1273567	105243.4	7146.407	50363.87	9659.433	115538.9	14467.84	3074.381	32266.43	416674.5	7326300	22673.77	1328.939
80 to 84	2016598	57919.72	3968.179	35674.2	7702.787	65230.35	7224.349	2011.672	21260.25	395649.9	6391654	12314.39	679.988
85 to 89	1762297	23691.45	2553.682	19530.1	4329.524	28345.11	2735.399	1227.981	10271.71	224756.3	3727537	5557.467	390.7401
90 to 94	969582.9	5019.813	812.4803	7157.087	1222.476	7625.519	666.3478	364.7583	3389.705	59197.46	1132937	1675.867	94.49626
95 plus	387243.2	833.1771	307.7385	2271.81	362.3747	1374.923	178.4829	91.9909	923.3712	11322.44	323139.8	412.759	28.05288

DALYs: disability-adjusted life-years

Supplementary table 3. DALYs of neurological diseases in Asia by sex.

all ages	Total DALYs	Alzheimer's disease and other dementias	Brain and central nervous system cancer	Encephalitis	Idiopathic epilepsy	Meningitis	Migraine	Motor neuron disease	Multiple sclerosis	Other neurological disorders	Parkinson's disease	Stroke	Tension-type headache	Tetanus
south-east asia	Male	1470723.17 6	858829.684	1334033.69 2	2013424.71 2	1428452.72 4	4547918.39 2	43212.4362 4	62550.8056 7	441067.730 4	675643.048 6	18269917.1 3	495224.988 8	413109.266
	Female	2014927.11 6	674118.688 4	1400461.44 1	1708387.17 5	1424595.44 9	6949046.09 6	35418.3377 7	85234.9563 4	402378.873 4	521750.628 5	16190580.6 1	584723.687 3	328057.832 9
western pacific	Male	3299486.25 5	1416804.61 9	328891.292 6	1084723.96 1	379935.867 4	3746985.20 2	119831.461 5	54971.1177 4	426665.746 2	1243423.32 6	32887918.7 3	500613.398 8	47331.9789 5
	Female	5896356.12 3	1053287.08 8	222891.785 6	824612.802 2	258180.064	6057361.79 8	75810.2752 8	58048.0334 3	318091.081 4	847317.827 4	23297247.5 5	540499.843 7	21357.5386 6

DALYs: disability-adjusted life-years

Supplementary table 4. Trends of neurological diseases in Asia between 1990 and 2019

	WHO South-east asia region						WHO Western pacific region					
	Age standardized rate 1990	Age standardized rate 2019	Change from 1990 to 2019	Total, 1990	Total, 2019	Change from 1990 to 2019	Age standardized rate 1990	Age standardized rate 2019	Change from 1990 to 2019	Total, 1990	Total, 2019	Change from 1990 to 2019
Stroke												
Incidence	157 (143 to 174)	141 (128 to 157)	-10% (-11 to -9)	1167100 (1058416 to 1295701)	2459950 (2228862 to 2738665)	111% (106 to 116)	211 (190 to 236)	186 (166 to 211)	-12% (-17 to -8)	2391667 (2145740 to 2692493)	4968330 (4390222 to 5682575)	108% (97 to 119)
Prevalence	1040 (947 to 1140)	1006 (916 to 1102)	-3% (-4 to -2)	8662016 (7884576 to 9473645)	18711833 (17039072 to 20483835)	116% (112 to 121)	1363 (1249 to 1497)	1432 (1299 to 1580)	5% (1 to 9)	16643878 (15192382 to 18203021)	38077336 (34325689 to 42131345)	129% (118 to 139)
Deaths	135 (121 to 151)	95 (85 to 104)	-30% (-39 to -20)	728151 (660414 to 803793)	1409305 (1266526 to 1544474)	94% (69 to 118)	180 (161 to 203)	104 (91 to 117)	-42% (-51 to -33)	1695838 (1529976 to 1907563)	2657992 (2329878 to 2992210)	57% (32 to 83)
DALYs	2839 (2594 to 3097)	2008 (1811 to 2193)	-29% (-38 to -21)	20183896 (18482460 to 21850550)	34460498 (31035171 to 37670399)	71% (51 to 90)	3584 (3250 to 3984)	2121 (1891 to 2369)	-41% (-49 to -32)	40811727 (36975527 to 45349220)	56185166 (49950162 to 62813530)	38% (18 to 60)
YLDs	180 (130 to 229)	173 (124 to 221)	-4% (-5 to -3)	1469868 (1053735 to 1874166)	3170198 (2279562 to 4040730)	116% (111 to 121)	277 (198 to 353)	299 (211 to 384)	8% (4 to 12)	3342751 (2396325 to 4284362)	7861628 (5539716 to 10094189)	135% (124 to 147)
YLLs	2659 (2415 to 2929)	1835 (1647 to 2016)	-31% (-40 to -22)	18714028 (17027271 to 20338338)	31290299 (28062279 to 34507727)	67% (47 to 87)	3308 (2975 to 3694)	1822 (1592 to 2058)	-45% (-54 to -35)	37468976 (33712590 to 41838641)	48323539 (42236848 to 54716916)	29% (8 to 52)
Alzheimer's disease and other dementias												

Incidence	71 (60 to 81)	69 (59 to 79)	-3% (-4 to -1)	293249 (251382 to 336908)	914160 (784215 to 1050976)	212% (203 to 222)	92 (78 to 106)	105 (89 to 120)	14% (11 to 16)	765876 (650811 to 888946)	2647125 (2240264 to 3036566)	246% (235 to 257)
Prevalence	470 (402 to 540)	470 (402 to 541)	0% (-1 to 1)	1961175 (1678973 to 2260360)	6282408 (5348571 to 7222877)	220% (212 to 230)	621 (530 to 719)	775 (658 to 893)	25% (22 to 27)	5035031 (4255991 to 5838138)	19243137 (16313439 to 22148027)	282% (270 to 294)
Deaths	18 (4 to 50)	20 (5 to 53)	10% (-1 to 25)	49738 (11472 to 143583)	209371 (50293 to 569326)	321% (276 to 379)	23 (6 to 63)	25 (6 to 64)	7% (-3 to 22)	144824 (33886 to 399564)	559566 (141027 to 1435145)	286% (242 to 355)
DALYs	260 (108 to 623)	278 (114 to 644)	7% (-1 to 16)	990724 (415186 to 2337548)	3485650 (1444595 to 8150443)	252% (222 to 284)	345 (145 to 784)	377 (170 to 797)	9% (-1 to 21)	2711166 (1136067 to 6270660)	9195842 (4102641 to 19647700)	239% (202 to 284)
YLDs	66 (47 to 87)	66 (47 to 89)	0% (-1 to 2)	259750 (184190 to 347274)	857947 (607194 to 1145962)	230% (218 to 243)	90 (63 to 122)	113 (79 to 152)	25% (22 to 28)	705045 (497129 to 954454)	2774288 (1946073 to 3737698)	293% (278 to 309)
YLLs	195 (45 to 558)	212 (51 to 576)	9% (-2 to 22)	730974 (164633 to 2078670)	2627704 (618718 to 7280232)	259% (218 to 309)	255 (60 to 697)	264 (66 to 682)	4% (-7 to 18)	2006121 (466424 to 5609301)	6421554 (1608173 to 16980491)	220% (184 to 277)
Parkinson's disease												
Incidence	10 (9 to 11)	10 (9 to 12)	7% (5 to 8)	55599 (47865 to 63878)	164617 (141238 to 188411)	196% (186 to 205)	12 (10 to 14)	14 (12 to 16)	18% (15 to 21)	127630 (107882 to 148599)	381973 (323674 to 440966)	199% (192 to 208)
Prevalence	72 (60 to 85)	79 (66 to 93)	10% (8 to 12)	403687 (341038 to 482246)	1236275 (1036369 to 1470605)	206% (197 to 217)	97 (81 to 115)	131 (109 to 154)	34% (30 to 38)	1025379 (850469 to 1219187)	3532065 (2939286 to 4199916)	244% (235 to 255)

Deaths	5 (4 to 6)	5 (4 to 6)	0% (-17 to 16)	20751 (17463 to 25677)	66316 (58359 to 75120)	220% (163 to 273)	5 (5 to 5)	4 (4 to 5)	-11% (-22 to 0)	42278 (38308 to 46325)	110560 (97589 to 122300)	162% (127 to 198)
DALYs	82 (71 to 100)	81 (72 to 91)	-1% (-17 to 13)	417460 (358716 to 506514)	1197394 (1057423 to 1339100)	187% (140 to 229)	86 (78 to 95)	79 (70 to 89)	-8% (-18 to 3)	854035 (768070 to 944762)	2090741 (1839874 to 2355241)	145% (117 to 176)
YLDs	10 (7 to 13)	11 (8 to 15)	11% (8 to 14)	57608 (39221 to 79703)	174558 (118998 to 238504)	203% (192 to 215)	14 (9 to 19)	19 (13 to 26)	35% (30 to 39)	148614 (100418 to 207212)	509134 (346961 to 702768)	243% (231 to 255)
YLLs	72 (61 to 89)	70 (62 to 79)	-3% (-20 to 13)	359852 (304471 to 445251)	1022835 (900696 to 1152766)	184% (133 to 233)	72 (65 to 79)	60 (53 to 67)	-16% (-27 to -4)	705420 (637528 to 776822)	1581607 (1390754 to 1758379)	124% (93 to 159)
Brain and central nervous system cancer												
Incidence	2 (2 to 3)	2 (2 to 3)	8% (-33 to 36)	24150 (16746 to 37007)	43379 (31926 to 50978)	80% (6 to 140)	4 (3 to 5)	5 (4 to 6)	29% (-19 to 57)	56295 (45265 to 75331)	120200 (90121 to 140470)	114% (36 to 162)
Prevalence	3 (2 to 5)	4 (3 to 5)	16% (-32 to 58)	45694 (29691 to 73671)	77034 (57609 to 91309)	69% (-7 to 144)	9 (8 to 12)	22 (16 to 25)	135% (38 to 186)	134973 (112039 to 178551)	453450 (335491 to 524264)	236% (98 to 308)
Deaths	2 (1 to 3)	2 (2 to 2)	5% (-33 to 29)	19887 (14090 to 29907)	36918 (27664 to 42969)	86% (12 to 140)	3 (3 to 4)	3 (2 to 4)	-7% (-38 to 15)	44040 (34575 to 58338)	75706 (56624 to 89363)	72% (14 to 114)
DALYs	84 (59 to 129)	80 (60 to 93)	-6% (-44 to 28)	1103726 (707940 to 1781878)	1532948 (1153447 to 1796140)	39% (-21 to 101)	138 (104 to 189)	112 (86 to 132)	-19% (-48 to 8)	2033299 (1521466 to 2779444)	2470092 (1887397 to 2919034)	21% (-21 to 61)

YLDs	1 (0 to 1)	1 (0 to 1)	11% (-32 to 42)	7266 (4413 to 11708)	13122 (8509 to 18098)	81% (5 to 144)	1 (1 to 2)	2 (1 to 3)	65% (1 to 103)	18620 (12659 to 26616)	49116 (32267 to 68440)	164% (62 to 224)
YLLs	84 (58 to 128)	79 (59 to 92)	-6% (-44 to 27)	1096460 (703194 to 1770455)	1519827 (1144514 to 1778575)	39% (-21 to 101)	137 (103 to 187)	110 (84 to 130)	-20% (-49 to 7)	2014680 (1506822 to 2757908)	2420976 (1851199 to 2860880)	20% (-22 to 60)
Idiopathic epilepsy												
Incidence	29 (18 to 42)	34 (24 to 46)	19% (-9 to 65)	414806 (256605 to 605174)	670517 (458321 to 902665)	62% (22 to 125)	21 (14 to 29)	28 (20 to 38)	34% (8 to 69)	329496 (221284 to 450479)	480158 (339198 to 630891)	46% (15 to 86)
Prevalence	245 (164 to 338)	288 (211 to 369)	18% (-10 to 63)	3154023 (2100859 to 4392601)	5683680 (4118542 to 7301504)	80% (36 to 151)	181 (131 to 234)	235 (170 to 305)	30% (4 to 67)	2795254 (2005360 to 3649152)	4468232 (3248818 to 5776859)	60% (25 to 108)
Deaths	3 (2 to 4)	2 (2 to 2)	-37% (-48 to -8)	37349 (25363 to 45137)	38242 (31793 to 45119)	2% (-19 to 57)	1 (1 to 2)	1 (1 to 1)	-48% (-57 to -34)	22035 (18692 to 24997)	15594 (13564 to 17955)	-29% (-42 to -10)
DALYs	259 (186 to 322)	187 (146 to 237)	-28% (-41 to 0)	3545290 (2494855 to 4454038)	3721812 (2894671 to 4718264)	5% (-16 to 48)	144 (114 to 178)	102 (73 to 137)	-29% (-44 to -9)	2301988 (1834995 to 2835846)	1909337 (1365698 to 2534086)	-17% (-35 to 7)
YLDs	96 (54 to 149)	97 (59 to 142)	1% (-27 to 46)	1262880 (696293 to 1988162)	1932824 (1148469 to 2830045)	53% (11 to 121)	63 (38 to 93)	66 (38 to 100)	5% (-24 to 45)	977330 (585233 to 1473577)	1224420 (702688 to 1851608)	25% (-12 to 77)
YLLs	162 (109 to 198)	90 (75 to 109)	-45% (-57 to -11)	2282410 (1495684 to 2833435)	1788988 (1513365 to 2157506)	-22% (-40 to 32)	82 (68 to 93)	36 (32 to 42)	-55% (-64 to -41)	1324658 (1094655 to 1507268)	684917 (598182 to 792351)	-48% (-58 to -32)
Motor neuron disease												

Incidence	0 (0 to 1)	0 (0 to 1)	-2% (-3 to -1)	4567 (3757 to 5544)	7877 (6454 to 9715)	72% (62 to 83)	1 (1 to 1)	1 (1 to 1)	-6% (-7 to -5)	8677 (7408 to 10218)	14425 (12435 to 17144)	66% (57 to 75)
Prevalence	2 (1 to 2)	2 (1 to 2)	10% (9 to 11)	20039 (15782 to 25230)	36074 (28793 to 45132)	80% (73 to 88)	3 (2 to 3)	3 (3 to 4)	10% (8 to 12)	41930 (34137 to 50958)	64252 (53666 to 76668)	53% (42 to 65)
Deaths	0 (0 to 0)	0 (0 to 0)	36% (8 to 67)	741 (575 to 933)	2144 (1699 to 2602)	189% (134 to 248)	0 (0 to 0)	0 (0 to 0)	-18% (-27 to -8)	4210 (3918 to 4490)	6851 (6172 to 7509)	63% (44 to 84)
DALYs	3 (3 to 4)	4 (3 to 5)	27% (5 to 49)	34733 (28437 to 41104)	78631 (64804 to 93556)	126% (89 to 164)	14 (13 to 15)	8 (8 to 9)	-40% (-46 to -31)	199306 (181271 to 217406)	195642 (178225 to 213956)	-2% (-13 to 13)
YLDs	0 (0 to 0)	0 (0 to 1)	10% (9 to 11)	4257 (2869 to 5929)	7663 (5233 to 10701)	80% (73 to 88)	1 (0 to 1)	1 (0 to 1)	10% (8 to 12)	8908 (6069 to 12326)	13652 (9353 to 18660)	53% (42 to 65)
YLLs	3 (2 to 4)	4 (3 to 5)	28% (5 to 53)	30476 (24468 to 37005)	70968 (57011 to 85840)	133% (90 to 175)	13 (12 to 14)	8 (7 to 8)	-42% (-49 to -33)	190397 (172674 to 208863)	181990 (165357 to 200233)	-4% (-16 to 10)
Multiple sclerosis												
Incidence	0 (0 to 0)	0 (0 to 0)	10% (8 to 11)	3685 (2935 to 4474)	7326 (5919 to 8777)	99% (92 to 105)	0 (0 to 0)	0 (0 to 0)	0% (-2 to 3)	3298 (2702 to 3938)	4884 (4075 to 5745)	48% (37 to 58)
Prevalence	6 (4 to 7)	7 (5 to 8)	15% (14 to 17)	58376 (45325 to 72570)	133149 (104679 to 162846)	128% (122 to 134)	3 (3 to 4)	4 (3 to 5)	14% (11 to 16)	49951 (40016 to 60696)	97656 (78961 to 117302)	96% (86 to 104)

Deaths	0 (0 to 0)	0 (0 to 0)	4% (-21 to 50)	1353 (939 to 1944)	3090 (2588 to 3850)	128% (71 to 227)	0 (0 to 0)	0 (0 to 0)	-23% (-39 to 2)	1719 (1408 to 2062)	2678 (2239 to 3506)	56% (23 to 113)
DALYs	7 (5 to 10)	7 (6 to 9)	5% (-17 to 38)	69126 (51225 to 96038)	147786 (124902 to 179583)	114% (67 to 179)	5 (5 to 6)	4 (4 to 6)	-19% (-34 to 5)	77463 (63701 to 91450)	113019 (95485 to 141751)	46% (19 to 92)
YLDs	2 (1 to 2)	2 (1 to 3)	15% (14 to 17)	16431 (10796 to 23308)	37457 (24802 to 52575)	128% (121 to 134)	1 (1 to 1)	1 (1 to 2)	13% (10 to 17)	13828 (9283 to 19351)	26837 (17991 to 37122)	94% (84 to 104)
YLLs	5 (4 to 8)	6 (5 to 7)	2% (-23 to 46)	52694 (36873 to 77292)	110328 (92181 to 139573)	109% (54 to 198)	5 (4 to 5)	3 (3 to 4)	-26% (-42 to 3)	63635 (50941 to 76209)	86182 (71800 to 112420)	35% (5 to 91)
Migraine												
Incidence	1237 (1087 to 1392)	1230 (1076 to 1380)	-1% (-2 to 1)	17348640 (15091228 to 19671770)	26046477 (22798840 to 29262475)	50% (44 to 56)	938 (820 to 1053)	1013 (887 to 1140)	8% (6 to 10)	15524981 (13518213 to 17478317)	18292329 (16118069 to 20494099)	18% (12 to 24)
Prevalence	15104 (13107 to 17306)	14982 (13027 to 17162)	-1% (-3 to 2)	184098610 (158314544 to 213329721)	316734874 (274176841 to 363846694)	72% (65 to 78)	11258 (9799 to 12976)	12187 (10561 to 14040)	8% (5 to 11)	180443568 (156396589 to 207651597)	260784747 (226812263 to 301419267)	45% (37 to 53)
DALYs	545 (67 to 1258)	543 (67 to 1250)	0% (-3 to 3)	6637060 (720531 to 15495588)	11496964 (1378922 to 26551209)	73% (66 to 93)	423 (69 to 949)	456 (66 to 1047)	8% (-5 to 13)	6768009 (1059137 to 15293657)	9804347 (1563046 to 22190876)	45% (36 to 55)
YLDs	545 (67 to 1258)	543 (67 to 1250)	0% (-3 to 3)	6637060 (720531 to 15495588)	11496964 (1378922 to 26551209)	73% (66 to 93)	423 (69 to 949)	456 (66 to 1047)	8% (-5 to 13)	6768009 (1059137 to 15293657)	9804347 (1563046 to 22190876)	45% (36 to 55)
Tension-type headache												

Incidence	9405 (8355 to 10497)	9427 (8378 to 10520)	0% (0 to 0)	117289877 (102353715 to 132438563)	195278793 (172937877 to 218506222)	66% (62 to 71)	7347 (6550 to 8234)	7535 (6682 to 8414)	3% (0 to 5)	115308449 (101723775 to 130449744)	151301373 (134464822 to 169511609)	31% (24 to 38)
Prevalence	25952 (22793 to 29129)	25984 (22866 to 29186)	0% (0 to 0)	313853099 (272568461 to 358396745)	540547852 (474735815 to 610313741)	72% (68 to 77)	19929 (17575 to 22539)	20692 (18177 to 23301)	4% (1 to 7)	312840784 (273602837 to 356493659)	428252237 (378886064 to 480860531)	37% (30 to 44)
DALYs	51 (14 to 194)	52 (15 to 193)	1% (-5 to 8)	589905 (155480 to 2406405)	1079949 (299851 to 4031993)	83% (60 to 99)	47 (15 to 163)	47 (14 to 160)	0% (-7 to 10)	719450 (222679 to 2586630)	1041113 (336537 to 3331809)	45% (21 to 63)
YLDs	51 (14 to 194)	52 (15 to 193)	1% (-5 to 8)	589905 (155480 to 2406405)	1079949 (299851 to 4031993)	83% (60 to 99)	47 (15 to 163)	47 (14 to 160)	0% (-7 to 10)	719450 (222679 to 2586630)	1041113 (336537 to 3331809)	45% (21 to 63)
Meningitis												
Incidence	73 (60 to 87)	37 (30 to 44)	-49% (-51 to -48)	1126780 (915025 to 1390381)	669482 (552202 to 794001)	-41% (-44 to -36)	22 (18 to 28)	9 (7 to 11)	-59% (-61 to -56)	345534 (272780 to 433191)	132795 (109381 to 157159)	-62% (-65 to -58)
Prevalence	315 (263 to 379)	127 (109 to 150)	-60% (-62 to -57)	3869693 (3216533 to 4680736)	2569405 (2186846 to 3028860)	-34% (-37 to -29)	98 (82 to 119)	26 (22 to 31)	-73% (-75 to -72)	1535547 (1280247 to 1871377)	509277 (436456 to 591205)	-67% (-69 to -64)
Deaths	10 (8 to 11)	3 (2 to 3)	-73% (-77 to -68)	133474 (115240 to 153948)	45101 (39479 to 51199)	-66% (-72 to -60)	3 (3 to 4)	1 (1 to 1)	-80% (-83 to -76)	48430 (42769 to 54018)	11158 (10023 to 12372)	-77% (-80 to -73)
DALYs	632 (546 to 727)	157 (136 to 181)	-75% (-80 to -70)	10288577 (8807057 to 11946290)	2853048 (2491747 to 3283248)	-72% (-77 to -66)	247 (217 to 279)	45 (40 to 51)	-82% (-85 to -78)	3808929 (3340387 to 4298041)	638116 (570390 to 710280)	-83% (-86 to -80)

YLDs	24 (17 to 32)	12 (8 to 16)	-50% (-54 to -46)	326837 (233552 to 438076)	245531 (171501 to 332356)	-25% (-31 to -18)	9 (6 to 12)	3 (2 to 3)	-72% (-73 to -70)	140636 (97259 to 191781)	45970 (31976 to 61948)	-67% (-69 to -65)
YLLs	608 (523 to 703)	145 (124 to 170)	-76% (-81 to -71)	9961740 (8469754 to 11637528)	2607517 (2246012 to 3042005)	-74% (-79 to -68)	239 (207 to 270)	43 (37 to 48)	-82% (-85 to -79)	3668293 (3188175 to 4146247)	592146 (524401 to 665944)	-84% (-86 to -81)
Encephalitis												
Incidence	53 (48 to 59)	39 (36 to 43)	-26% (-27 to -25)	671249 (591779 to 759860)	707383 (636882 to 776165)	5% (0 to 11)	19 (16 to 23)	18 (15 to 21)	-6% (-9 to -2)	298520 (248685 to 351632)	275200 (238867 to 314275)	-8% (-13 to -2)
Prevalence	178 (124 to 226)	100 (74 to 124)	-44% (-46 to -40)	1996329 (1415679 to 2529699)	1976424 (1473377 to 2443468)	-1% (-5 to 5)	94 (69 to 120)	60 (46 to 75)	-36% (-39 to -32)	1487198 (1101123 to 1880130)	1241619 (945430 to 1551531)	-17% (-20 to -12)
Deaths	8 (6 to 9)	3 (3 to 5)	-54% (-65 to -26)	86522 (68863 to 105629)	57265 (45832 to 89466)	-34% (-51 to 11)	1 (1 to 1)	0 (0 to 1)	-49% (-59 to -27)	13431 (9194 to 16073)	7899 (6843 to 9310)	-41% (-54 to -11)
DALYs	400 (319 to 493)	149 (119 to 231)	-63% (-72 to -38)	6110657 (4667671 to 7761085)	2734495 (2187604 to 4270395)	-55% (-68 to -23)	75 (51 to 90)	37 (31 to 42)	-51% (-61 to -31)	1165784 (795140 to 1399876)	551783 (478145 to 627604)	-53% (-62 to -31)
YLDs	17 (12 to 23)	11 (8 to 15)	-36% (-40 to -32)	207481 (149000 to 275839)	221171 (157506 to 297608)	7% (0 to 14)	10 (7 to 14)	6 (4 to 8)	-38% (-42 to -33)	163156 (113396 to 221556)	123120 (85292 to 166065)	-25% (-30 to -18)
YLLs	383 (301 to 474)	138 (109 to 220)	-64% (-74 to -38)	5903176 (4464330 to 7535819)	2513325 (1971560 to 4065901)	-57% (-70 to -24)	65 (42 to 80)	30 (25 to 35)	-54% (-64 to -29)	1002627 (637307 to 1225507)	428663 (361548 to 508836)	-57% (-67 to -32)
Tetanus												

Incidence	24 (19 to 30)	2 (1 to 2)	-93% (-95 to -90)	382009 (296927 to 484245)	28867 (18533 to 41397)	-92% (-95 to -89)	6 (4 to 8)	0 (0 to 0)	-96% (-97 to -94)	86713 (65331 to 114180)	4630 (2756 to 5906)	-95% (-97 to -92)
Prevalence	8 (6 to 10)	1 (1 to 2)	-81% (-83 to -79)	102645 (80054 to 129956)	29238 (21190 to 38358)	-72% (-75 to -69)	2 (2 to 3)	0 (0 to 0)	-87% (-89 to -84)	37727 (28210 to 48857)	5883 (3918 to 8256)	-84% (-87 to -81)
Deaths	11 (9 to 13)	1 (0 to 1)	-94% (-95 to -91)	174010 (147241 to 202533)	11901 (7465 to 16276)	-93% (-95 to -90)	2 (1 to 2)	0 (0 to 0)	-96% (-97 to -94)	26338 (21409 to 31533)	1508 (888 to 1890)	-94% (-97 to -92)
DALYs	808 (681 to 945)	44 (28 to 62)	-95% (-96 to -92)	14068396 (11826744 to 16609293)	741167 (478331 to 1059882)	-95% (-97 to -92)	130 (102 to 156)	4 (3 to 5)	-97% (-98 to -95)	1980966 (1551335 to 2373157)	68690 (43256 to 82825)	-97% (-98 to -95)
YLDs	0 (0 to 0)	0 (0 to 0)	-87% (-89 to -84)	4507 (2890 to 6564)	792 (456 to 1234)	-82% (-87 to -78)	0 (0 to 0)	0 (0 to 0)	-91% (-93 to -88)	1327 (827 to 1969)	145 (78 to 243)	-89% (-92 to -86)
YLLs	808 (680 to 944)	44 (28 to 62)	-95% (-96 to -92)	14063889 (11822388 to 16606742)	740375 (477596 to 1059241)	-95% (-97 to -92)	130 (102 to 156)	4 (3 to 5)	-97% (-98 to -95)	1979639 (1550162 to 2371558)	68544 (43146 to 82653)	-97% (-98 to -95)
Other neurological disorders												
Incidence	0 (0 to 0)	0 (0 to 0)	0% (0 to 0)	0 (0 to 0)	0 (0 to 0)	0% (0 to 0)	0 (0 to 0)	0 (0 to 0)	0% (0 to 0)	0 (0 to 0)	0 (0 to 0)	0% (0 to 0)
Prevalence	1 (0 to 1)	1 (0 to 1)	3% (-1 to 7)	7002 (4623 to 9710)	11999 (8128 to 16565)	71% (57 to 87)	1 (0 to 1)	1 (0 to 1)	0% (-4 to 4)	7642 (5107 to 10564)	10147 (6829 to 14054)	33% (19 to 48)

Deaths	0 (0 to 1)	0 (0 to 1)	4% (-16 to 34)	4783 (3261 to 5697)	7993 (6087 to 10812)	67% (40 to 118)	1 (0 to 1)	1 (0 to 1)	4% (-8 to 19)	6705 (6158 to 7284)	12195 (11002 to 13391)	82% (60 to 110)
DALYs	39 (28 to 49)	43 (31 to 56)	9% (-7 to 37)	552728 (368319 to 701791)	843447 (617859 to 1104911)	53% (30 to 98)	35 (30 to 41)	39 (31 to 48)	10% (-5 to 30)	538294 (454920 to 639130)	744757 (613170 to 892837)	38% (21 to 60)
YLDs	18 (11 to 28)	25 (16 to 36)	36% (2 to 83)	254265 (146482 to 399321)	499006 (311400 to 733949)	96% (45 to 173)	14 (9 to 20)	20 (12 to 29)	47% (14 to 88)	208487 (133343 to 304667)	360690 (235791 to 507905)	73% (35 to 123)
YLLs	21 (14 to 25)	18 (13 to 25)	-14% (-29 to 13)	298463 (183613 to 364919)	344440 (252238 to 478649)	15% (-2 to 60)	22 (20 to 24)	19 (17 to 21)	-12% (-24 to 2)	329807 (299556 to 361469)	384066 (346315 to 426832)	16% (1 to 37)

Supplementary table 5. Burden of stroke in each Asian country

Stroke		Incidence		Prevalence		Deaths		DALYs		YLDs		YLLs	
		rate	total	rate	total	rate	total	rate	total	rate	total	rate	total
American Samoa	age-standardised, 1990	208 (192 to 227)	54 (50 to 59)	1885 (1769 to 2012)	504 (473 to 537)	133 (118 to 147)	25 (22 to 27)	3045 (2743 to 3339)	750 (672 to 832)	379 (271 to 476)	100 (71 to 126)	2667 (2365 to 2951)	651 (574 to 730)
	age-standardised, 2019	191 (176 to 208)	91 (84 to 99)	1772 (1673 to 1892)	871 (823 to 931)	99 (85 to 114)	41 (35 to 47)	2327 (2004 to 2687)	1106 (944 to 1287)	355 (258 to 447)	172 (125 to 218)	1972 (1664 to 2312)	933 (784 to 1099)
	change from 1990 to 2019	-8% (-12 to -4)	69% (62 to 77)	-6% (-9 to -3)	73% (66 to 79)	-25% (-37 to -12)	67% (40 to 101)	-24% (-36 to -10)	47% (24 to 76)	-6% (-10 to -2)	73% (65 to 81)	-26% (-39 to -10)	43% (17 to 76)
Armenia	age-standardised, 1990	194 (178 to 211)	5146 (4729 to 5612)	1245 (1154 to 1344)	36073 (33575 to 38887)	125 (117 to 132)	2735 (2589 to 2861)	2375 (2260 to 2485)	59799 (56988 to 62600)	245 (175 to 311)	7041 (5088 to 8963)	2130 (2031 to 2218)	52759 (50527 to 54899)
	age-standardised, 2019	118 (108 to 128)	4624 (4242 to 5051)	911 (838 to 985)	36150 (33216 to 39160)	67 (57 to 78)	2667 (2239 to 3111)	1274 (1099 to 1481)	51584 (44336 to 59853)	179 (129 to 227)	7048 (5075 to 8895)	1095 (922 to 1288)	44536 (37369 to 52514)
	change from 1990 to 2019	-39% (-43 to -36)	-10% (-15 to -5)	-27% (-31 to -22)	0% (-5 to 6)	-46% (-54 to -38)	-2% (-17 to 13)	-46% (-54 to -39)	-14% (-26 to -1)	-27% (-32 to -22)	0% (-6 to 7)	-49% (-57 to -40)	-16% (-29 to -1)
Australia	age-standardised rate, 1990	112 (102 to 122)	21209 (19365 to 23252)	915 (841 to 990)	176758 (162447 to 191462)	63 (56 to 66)	11356 (10309 to 11932)	1059 (985 to 1116)	202095 (189257 to 213057)	145 (104 to 183)	27820 (20138 to 35147)	914 (849 to 953)	174275 (162596 to 181541)
	age-standardised rate, 2019	65 (59 to 72)	25524 (22906 to 28301)	651 (597 to 708)	242448 (221937 to 263215)	26 (22 to 29)	12763 (10612 to 14186)	445 (399 to 488)	188907 (168628 to 207363)	103 (75 to 131)	38558 (28180 to 48926)	342 (305 to 373)	150349 (131393 to 164558)
	change from 1990 to 2019	-42% (-45 to -37)	20% (12 to 30)	-29% (-33 to -25)	37% (30 to 45)	-58% (-62 to -55)	12% (1 to 22)	-58% (-61 to -55)	-7% (-13 to 0)	-29% (-33 to -25)	39% (30 to 47)	-63% (-65 to -60)	-14% (-21 to -7)
Azerbaijan	age-standardised rate, 1990	194 (181 to 208)	10066 (9377 to 10843)	1184 (1093 to 1276)	65069 (60247 to 69974)	120 (110 to 128)	5419 (4945 to 5788)	2607 (2402 to 2775)	129722 (119368 to 138204)	232 (166 to 293)	12700 (9087 to 16132)	2375 (2172 to 2535)	117022 (106782 to 124942)
	age-standardised rate, 2019	214 (200 to 230)	18000 (16638 to 19394)	1185 (1089 to 1294)	123039 (113407 to 134041)	172 (145 to 201)	10723 (8893 to 12677)	2965 (2499 to 3451)	240728 (201898 to 283087)	233 (166 to 296)	23656 (17018 to 30166)	2732 (2273 to 3223)	217072 (178481 to 258619)

	change from 1990 to 2019	10% (6 to 15)	79% (71 to 86)	0% (-5 to 6)	89% (80 to 100)	43% (21 to 72)	98% (65 to 138)	14% (-3 to 34)	86% (57 to 120)	1% (-5 to 6)	86% (76 to 98)	15% (-3 to 38)	85% (54 to 124)
Bangladesh	age-standardised rate, 1990	143 (133 to 154)	74159 (68422 to 80479)	984 (893 to 1085)	578241 (525980 to 636595)	181 (154 to 207)	74047 (63293 to 83930)	3806 (3254 to 4304)	1944440 (1620448 to 2196513)	149 (106 to 190)	88628 (62898 to 113574)	3657 (3117 to 4148)	1855811 (1539708 to 2115183)
	age-standardised rate, 2019	139 (129 to 150)	182856 (169382 to 198508)	997 (917 to 1094)	1417979 (1303988 to 1554853)	140 (107 to 169)	158806 (121873 to 193530)	2701 (2096 to 3293)	3493100 (2725562 to 4277692)	153 (110 to 193)	215431 (154086 to 272501)	2549 (1950 to 3132)	3277669 (2508515 to 4046653)
	change from 1990 to 2020	-3% (-6 to 1)	147% (135 to 158)	1% (-3 to 6)	145% (134 to 157)	-23% (-41 to -3)	114% (62 to 170)	-29% (-46 to -10)	80% (35 to 127)	2% (-3 to 8)	143% (129 to 158)	-30% (-48 to -11)	77% (30 to 126)
Bhutan	age-standardised rate, 1990	134 (124 to 144)	383 (352 to 417)	881 (819 to 952)	2868 (2646 to 3102)	102 (72 to 133)	199 (139 to 262)	2152 (1535 to 2794)	5534 (3952 to 7161)	134 (97 to 170)	438 (319 to 559)	2018 (1403 to 2652)	5096 (3468 to 6718)
	age-standardised rate, 2019	99 (91 to 108)	576 (529 to 627)	747 (692 to 806)	4767 (4410 to 5149)	69 (54 to 85)	338 (264 to 421)	1354 (1069 to 1678)	7511 (5884 to 9344)	115 (82 to 145)	726 (524 to 919)	1240 (956 to 1545)	6784 (5191 to 8606)
	change from 1990 to 2020	-26% (-29 to -23)	50% (43 to 58)	-15% (-19 to -11)	66% (58 to 75)	-32% (-50 to -5)	69% (24 to 138)	-37% (-53 to -13)	36% (1 to 94)	-15% (-20 to -10)	66% (55 to 76)	-39% (-55 to -13)	33% (-3 to 97)
Brunei Darussalam	age-standardised rate, 1990	287 (262 to 315)	311 (285 to 340)	2392 (2231 to 2592)	2565 (2395 to 2753)	169 (150 to 185)	118 (103 to 130)	3451 (3065 to 3774)	3383 (2953 to 3729)	427 (311 to 538)	441 (319 to 554)	3024 (2651 to 3323)	2943 (2544 to 3273)
	age-standardised rate, 2019	162 (148 to 179)	519 (471 to 573)	1614 (1484 to 1790)	5258 (4844 to 5775)	77 (69 to 87)	142 (127 to 161)	1532 (1373 to 1729)	4151 (3700 to 4697)	286 (208 to 366)	885 (636 to 1129)	1245 (1108 to 1410)	3266 (2878 to 3739)
	change from 1990 to 2020	-44% (-46 to -41)	67% (58 to 75)	-33% (-36 to -29)	105% (95 to 116)	-54% (-60 to -44)	21% (4 to 50)	-56% (-61 to -47)	23% (7 to 50)	-33% (-36 to -29)	101% (90 to 113)	-59% (-65 to -49)	11% (-6 to 41)
Cambodia	age-standardised rate, 1990	244 (228 to 264)	11782 (10973 to 12681)	1466 (1368 to 1573)	75010 (70112 to 80176)	186 (159 to 219)	7053 (6046 to 8256)	4141 (3578 to 4801)	204461 (175241 to 241675)	299 (215 to 376)	15399 (11106 to 19504)	3842 (3282 to 4519)	189063 (160214 to 226663)
	age-standardised rate, 2019	210 (194 to 227)	24922 (23080 to 27009)	1341 (1250 to 1443)	171429 (160064 to 184042)	153 (125 to 177)	14738 (12026 to 17130)	3066 (2534 to 3583)	354977 (291936 to 419668)	275 (197 to 348)	34838 (24918 to 44024)	2791 (2257 to 3279)	320139 (257382 to 383161)
	change from 1990 to 2020	-14% (-18 to -10)	112% (102 to 121)	-9% (-12 to -5)	129% (120 to 139)	-18% (-35 to -1)	109% (62 to 153)	-26% (-42 to -11)	74% (36 to 110)	-8% (-12 to -4)	126% (116 to 138)	-27% (-44 to -12)	69% (30 to 109)

China	age-standardised rate, 1990	222 (197 to 250)	1760442 (1560971 to 2005206)	1297 (1173 to 1439)	11619090 (10493268 to 12801317)	211 (188 to 244)	1377090 (1220668 to 1564239)	4134 (3697 to 4675)	33621256 (29916115 to 38026592)	272 (194 to 349)	2407815 (1713325 to 3105236)	3863 (3427 to 4387)	31213440 (27476461 to 35419800)
	age-standardised rate, 2019	201 (177 to 231)	3935182 (3431718 to 4579875)	1469 (1309 to 1640)	28760186 (25600008 to 32213485)	127 (110 to 145)	2189175 (1885901 to 2513772)	2413 (2103 to 2742)	45949134 (39813511 to 52335529)	315 (221 to 408)	6071576 (4253389 to 7827269)	2098 (1801 to 2422)	39877559 (34047714 to 46171553)
	change from 1990 to 2020	-9% (-16 to -3)	124% (108 to 139)	13% (8 to 19)	148% (133 to 163)	-40% (-51 to -29)	59% (31 to 91)	-42% (-51 to -31)	37% (14 to 64)	16% (10 to 22)	152% (137 to 169)	-46% (-56 to -34)	28% (3 to 56)
Cook Islands	age-standardised rate, 1990	191 (176 to 208)	25 (23 to 27)	1754 (1648 to 1871)	238 (224 to 253)	108 (89 to 125)	12 (10 to 14)	2593 (2169 to 3020)	342 (285 to 401)	354 (253 to 446)	48 (34 to 60)	2239 (1808 to 2651)	294 (237 to 352)
	age-standardised rate, 2019	176 (161 to 192)	41 (37 to 45)	1728 (1623 to 1844)	405 (379 to 433)	62 (53 to 74)	15 (12 to 17)	1558 (1320 to 1839)	366 (311 to 429)	346 (251 to 437)	81 (59 to 102)	1212 (996 to 1477)	285 (237 to 344)
	change from 1990 to 2020	-8% (-12 to -3)	61% (53 to 70)	-1% (-5 to 2)	70% (64 to 77)	-42% (-53 to -26)	21% (-3 to 55)	-40% (-51 to -24)	7% (-13 to 34)	-2% (-6 to 2)	70% (63 to 78)	-46% (-58 to -28)	-3% (-25 to 27)
Democratic People's Republic of Korea	age-standardised rate, 1990	275 (255 to 297)	43401 (40116 to 47240)	1746 (1623 to 1878)	286788 (268932 to 307315)	205 (167 to 248)	26493 (21347 to 32349)	4438 (3608 to 5354)	706371 (558687 to 864158)	373 (270 to 472)	59936 (42979 to 75708)	4065 (3237 to 4991)	646436 (502672 to 808218)
	age-standardised rate, 2019	285 (261 to 313)	89309 (81605 to 97969)	1728 (1601 to 1871)	552253 (512284 to 596814)	186 (158 to 216)	55468 (47128 to 64489)	4077 (3434 to 4788)	1298906 (1082994 to 1532006)	367 (264 to 465)	116170 (83762 to 147526)	3710 (3091 to 4421)	1182735 (978327 to 1417822)
	change from 1990 to 2020	4% (-1 to 9)	106% (96 to 116)	-1% (-6 to 4)	93% (84 to 102)	-9% (-26 to 11)	109% (70 to 160)	-8% (-26 to 14)	84% (46 to 132)	-2% (-7 to 4)	94% (84 to 105)	-9% (-28 to 15)	83% (43 to 136)
Fiji	age-standardised rate, 1990	207 (192 to 225)	850 (784 to 922)	1787 (1680 to 1920)	7694 (7204 to 8239)	144 (120 to 170)	424 (352 to 508)	3347 (2841 to 3959)	13437 (11304 to 15966)	361 (260 to 452)	1523 (1098 to 1911)	2986 (2485 to 3567)	11914 (9852 to 14335)
	age-standardised rate, 2019	183 (169 to 200)	1363 (1251 to 1495)	1694 (1585 to 1822)	13238 (12360 to 14191)	108 (89 to 129)	626 (510 to 768)	2460 (2025 to 2973)	18098 (14685 to 22140)	340 (247 to 426)	2599 (1871 to 3256)	2120 (1725 to 2609)	15499 (12371 to 19278)
	change from 1990 to 2020	-12% (-16 to -8)	60% (53 to 69)	-5% (-9 to -2)	72% (65 to 79)	-25% (-42 to -1)	48% (10 to 100)	-27% (-43 to -4)	35% (4 to 78)	-6% (-10 to -2)	71% (63 to 79)	-29% (-47 to -4)	30% (-4 to 79)
Georgia	age-standardised rate, 1990	233 (219 to 250)	13592 (12686 to 14605)	1382 (1272 to 1500)	85665 (78753 to 93097)	224 (207 to 239)	11982 (11134 to 12840)	4300 (3991 to 4612)	254952 (236569 to 273889)	271 (194 to 344)	16696 (11909 to 21072)	4030 (3732 to 4325)	238256 (220301 to 256548)

	age-standardised rate, 2019	184 (173 to 196)	10693 (10047 to 11435)	1225 (1120 to 1343)	66134 (60296 to 72761)	159 (134 to 184)	10322 (8721 to 11979)	3073 (2614 to 3546)	182044 (155407 to 210639)	238 (171 to 301)	12868 (9193 to 16387)	2836 (2404 to 3296)	169176 (143437 to 196332)
	change from 1990 to 2020	-21% (-24 to -18)	-21% (-25 to -18)	-11% (-16 to -7)	-23% (-27 to -19)	-29% (-40 to -16)	-14% (-27 to 2)	-29% (-39 to -16)	-29% (-40 to -16)	-12% (-17 to -7)	-23% (-28 to -18)	-30% (-41 to -17)	-29% (-41 to -16)
Guam	age-standardised rate, 1990	173 (159 to 189)	145 (133 to 158)	1713 (1608 to 1833)	1486 (1392 to 1590)	95 (84 to 108)	52 (45 to 58)	2077 (1834 to 2316)	1612 (1417 to 1807)	354 (256 to 444)	299 (214 to 377)	1722 (1510 to 1942)	1313 (1144 to 1484)
	age-standardised rate, 2019	166 (152 to 182)	308 (282 to 338)	1790 (1684 to 1910)	3335 (3136 to 3558)	51 (43 to 60)	93 (79 to 110)	1489 (1281 to 1713)	2758 (2367 to 3180)	366 (265 to 461)	678 (490 to 853)	1123 (954 to 1338)	2079 (1756 to 2491)
	change from 1990 to 2020	-4% (-9 to 1)	113% (101 to 125)	5% (1 to 8)	124% (114 to 134)	-47% (-56 to -35)	80% (50 to 123)	-28% (-39 to -15)	71% (45 to 105)	3% (-1 to 8)	127% (115 to 138)	-35% (-46 to -19)	58% (29 to 100)
India	age-standardised rate, 1990	121 (109 to 136)	610490 (545068 to 686081)	759 (683 to 842)	4401874 (3943429 to 4861798)	108 (95 to 125)	377138 (332420 to 428358)	2261 (2010 to 2552)	10377935 (9271824 to 11586805)	112 (81 to 143)	648902 (467656 to 829454)	2149 (1896 to 2445)	9729034 (8629182 to 10960298)
	age-standardised rate, 2019	111 (99 to 124)	1291245 (1150668 to 1453046)	762 (682 to 843)	9650716 (8640566 to 10685387)	70 (59 to 80)	699078 (593766 to 806599)	1505 (1296 to 1717)	17332326 (14914500 to 19804175)	114 (82 to 146)	1429789 (1034153 to 1836909)	1392 (1180 to 1605)	15902537 (13439030 to 18419000)
	change from 1990 to 2020	-9% (-10 to -8)	112% (106 to 117)	0% (-1 to 2)	119% (115 to 124)	-36% (-47 to -23)	85% (54 to 120)	-33% (-44 to -21)	67% (41 to 96)	1% (0 to 3)	120% (115 to 126)	-35% (-46 to -22)	63% (36 to 94)
Indonesia	age-standardised rate, 1990	272 (244 to 307)	288253 (258300 to 325575)	1980 (1784 to 2211)	2260359 (2045206 to 2490940)	178 (156 to 198)	143996 (128317 to 159349)	4022 (3627 to 4415)	4196351 (3799487 to 4583307)	398 (283 to 510)	448678 (319631 to 575329)	3624 (3239 to 4012)	3747673 (3383172 to 4111499)
	age-standardised rate, 2019	293 (262 to 332)	642943 (573041 to 729347)	2097 (1878 to 2352)	4918487 (4417107 to 5483594)	197 (168 to 214)	331349 (282004 to 367066)	4008 (3455 to 4421)	8407229 (7152083 to 9450909)	426 (305 to 548)	978770 (697292 to 1267277)	3582 (3041 to 3994)	7428459 (6256434 to 8454493)
	change from 1990 to 2020	8% (6 to 10)	123% (117 to 130)	6% (4 to 8)	118% (112 to 124)	11% (-8 to 30)	130% (90 to 168)	0% (-16 to 15)	100% (69 to 133)	7% (4 to 9)	118% (112 to 125)	-1% (-18 to 16)	98% (63 to 134)
Japan	age-standardised rate, 1990	166 (147 to 189)	272570 (240732 to 312657)	1387 (1268 to 1515)	2322985 (2114522 to 2543403)	85 (77 to 91)	127566 (117248 to 134233)	1545 (1436 to 1629)	2491761 (2324110 to 2625782)	252 (180 to 322)	416009 (297042 to 531151)	1294 (1216 to 1343)	2075752 (1963682 to 2148931)

	age-standardised rate, 2019	146 (131 to 162)	405022 (363744 to 454269)	1376 (1251 to 1506)	4027066 (3632870 to 4425113)	30 (25 to 33)	144662 (114371 to 162568)	730 (652 to 807)	2465284 (2128349 to 2727502)	247 (177 to 316)	763065 (546285 to 974064)	483 (435 to 511)	1702219 (1447046 to 1851223)
	change from 1990 to 2020	-12% (-18 to -6)	49% (40 to 58)	-1% (-5 to 4)	73% (66 to 82)	-65% (-68 to -63)	13% (-3 to 23)	-53% (-55 to -50)	-1% (-9 to 5)	-2% (-6 to 3)	83% (75 to 93)	-63% (-64 to -61)	-18% (-27 to -13)
Kazakhstan	age-standardised rate, 1990	279 (257 to 303)	35074 (32374 to 38036)	1677 (1553 to 1802)	225452 (209655 to 241662)	175 (164 to 184)	19191 (18065 to 20108)	3534 (3334 to 3716)	435714 (411174 to 458704)	328 (236 to 414)	43738 (31529 to 55494)	3206 (3031 to 3356)	391975 (370486 to 410478)
	age-standardised rate, 2019	206 (190 to 224)	34281 (31568 to 37312)	1352 (1248 to 1474)	246446 (227207 to 268784)	169 (147 to 191)	23367 (20133 to 26505)	3137 (2743 to 3532)	512353 (445828 to 583403)	264 (189 to 334)	47435 (34091 to 60255)	2873 (2483 to 3271)	464917 (399222 to 534308)
	change from 1990 to 2020	-26% (-30 to -22)	-2% (-7 to 3)	-19% (-24 to -15)	9% (3 to 16)	-4% (-15 to 8)	22% (7 to 39)	-11% (-22 to 2)	18% (3 to 36)	-20% (-24 to -15)	8% (2 to 15)	-10% (-22 to 4)	19% (2 to 39)
Kiribati	age-standardised rate, 1990	336 (317 to 357)	155 (147 to 164)	2577 (2434 to 2725)	1153 (1088 to 1218)	286 (240 to 336)	102 (85 to 121)	7835 (6596 to 9197)	3499 (2920 to 4136)	505 (360 to 634)	222 (158 to 281)	7330 (6107 to 8709)	3277 (2714 to 3920)
	age-standardised rate, 2019	296 (278 to 317)	241 (228 to 257)	2263 (2124 to 2402)	1865 (1750 to 1978)	238 (195 to 286)	146 (116 to 178)	6199 (5015 to 7435)	4971 (3955 to 6052)	445 (321 to 560)	359 (259 to 451)	5754 (4603 to 6950)	4612 (3596 to 5705)
	change from 1990 to 2020	-12% (-15 to -9)	55% (49 to 61)	-12% (-15 to -9)	62% (56 to 68)	-17% (-34 to 4)	44% (11 to 84)	-21% (-37 to -1)	42% (9 to 80)	-12% (-15 to -8)	61% (55 to 69)	-21% (-39 to 0)	41% (7 to 82)
Kyrgyzstan	age-standardised rate, 1990	249 (232 to 270)	7766 (7226 to 8363)	1489 (1379 to 1610)	47400 (44038 to 51186)	179 (166 to 190)	5158 (4815 to 5464)	3871 (3654 to 4084)	117658 (111059 to 124163)	292 (210 to 368)	9318 (6702 to 11755)	3579 (3385 to 3779)	108340 (102412 to 114522)
	age-standardised rate, 2019	160 (148 to 174)	7851 (7273 to 8505)	1026 (942 to 1106)	53369 (48902 to 57576)	114 (101 to 129)	4590 (4059 to 5201)	2486 (2202 to 2813)	116085 (102459 to 131889)	201 (143 to 254)	10353 (7394 to 13166)	2285 (2014 to 2587)	105732 (92868 to 120507)
	change from 1990 to 2020	-36% (-39 to -33)	1% (-4 to 6)	-31% (-34 to -27)	13% (7 to 19)	-36% (-44 to -28)	-11% (-22 to 1)	-36% (-43 to -28)	-1% (-13 to 12)	-31% (-35 to -27)	11% (5 to 19)	-36% (-44 to -27)	-2% (-15 to 12)
Lao People's Democratic Republic	age-standardised rate, 1990	307 (287 to 329)	6872 (6410 to 7376)	1942 (1818 to 2071)	45611 (42816 to 48600)	199 (158 to 253)	3507 (2804 to 4368)	4591 (3734 to 5629)	101637 (82815 to 124804)	393 (281 to 495)	9176 (6559 to 11585)	4199 (3350 to 5212)	92460 (73831 to 114763)
	age-standardised rate, 2019	245 (228 to 267)	11178 (10412 to 12078)	1628 (1513 to 1765)	79720 (74529 to 85761)	172 (142 to 207)	6197 (5034 to 7710)	3695 (3013 to 4565)	165435 (132617 to 208161)	332 (239 to 422)	16033 (11481 to 20346)	3363 (2684 to 4218)	149402 (117255 to 191762)

	change from 1990 to 2020	-20% (-23 to -16)	63% (56 to 70)	-16% (-19 to -13)	75% (68 to 82)	-14% (-32 to 10)	77% (37 to 127)	-20% (-37 to 2)	63% (25 to 112)	-15% (-19 to -11)	75% (67 to 84)	-20% (-39 to 4)	62% (20 to 116)
Malaysia	age-standardised rate, 1990	252 (232 to 276)	24823 (22935 to 27053)	1895 (1778 to 2037)	200081 (188225 to 214356)	154 (142 to 165)	12546 (11692 to 13349)	3527 (3301 to 3750)	341540 (319267 to 363147)	385 (278 to 487)	40180 (28812 to 50997)	3142 (2942 to 3332)	301360 (282764 to 318940)
	age-standardised rate, 2019	178 (163 to 196)	47911 (43757 to 52839)	1566 (1457 to 1683)	443995 (414703 to 476838)	88 (71 to 111)	19928 (15909 to 25000)	1940 (1598 to 2378)	512726 (420450 to 629695)	318 (228 to 401)	88935 (63987 to 111526)	1622 (1293 to 2044)	423791 (337585 to 533735)
	change from 1990 to 2020	-29% (-33 to -26)	93% (84 to 102)	-17% (-21 to -14)	122% (113 to 131)	-42% (-54 to -27)	59% (27 to 101)	-45% (-55 to -32)	50% (24 to 86)	-17% (-21 to -14)	121% (111 to 132)	-48% (-59 to -34)	41% (11 to 81)
Maldives	age-standardised rate, 1990	228 (211 to 247)	221 (204 to 241)	1653 (1544 to 1775)	1742 (1623 to 1859)	147 (126 to 168)	104 (90 to 116)	3324 (2917 to 3709)	3543 (3029 to 4009)	332 (238 to 419)	349 (247 to 445)	2992 (2589 to 3362)	3193 (2710 to 3648)
	age-standardised rate, 2019	125 (114 to 137)	414 (380 to 455)	1099 (1017 to 1178)	4108 (3782 to 4433)	62 (51 to 73)	155 (129 to 184)	1243 (1061 to 1446)	3948 (3360 to 4597)	223 (161 to 282)	812 (582 to 1028)	1020 (850 to 1219)	3137 (2597 to 3739)
	change from 1990 to 2020	-45% (-48 to -42)	87% (76 to 99)	-34% (-36 to -31)	136% (124 to 148)	-58% (-66 to -48)	49% (20 to 82)	-63% (-69 to -56)	11% (-8 to 35)	-33% (-36 to -29)	132% (119 to 147)	-66% (-72 to -58)	-2% (-22 to 23)
Marshall Islands	age-standardised rate, 1990	292 (274 to 312)	58 (54 to 62)	2101 (1976 to 2243)	419 (395 to 445)	213 (167 to 255)	31 (24 to 37)	5004 (3967 to 5976)	934 (731 to 1121)	421 (303 to 528)	84 (60 to 107)	4582 (3522 to 5560)	850 (649 to 1048)
	age-standardised rate, 2019	276 (259 to 298)	107 (99 to 114)	2052 (1926 to 2197)	833 (784 to 884)	182 (139 to 232)	50 (37 to 66)	4369 (3349 to 5591)	1665 (1248 to 2155)	407 (294 to 513)	161 (116 to 203)	3962 (2955 to 5212)	1504 (1085 to 2002)
	change from 1990 to 2020	-6% (-9 to -2)	84% (76 to 91)	-2% (-5 to 1)	99% (92 to 106)	-15% (-32 to 6)	65% (27 to 112)	-13% (-30 to 9)	78% (39 to 128)	-4% (-7 to 0)	92% (84 to 100)	-14% (-33 to 11)	77% (34 to 131)
Mauritius	age-standardised rate, 1990	266 (243 to 293)	1996 (1822 to 2205)	1997 (1862 to 2143)	15829 (14785 to 16999)	161 (152 to 169)	1023 (972 to 1073)	3596 (3415 to 3778)	26829 (25440 to 28188)	409 (297 to 515)	3192 (2313 to 4021)	3187 (3041 to 3337)	23637 (22600 to 24730)
	age-standardised rate, 2019	138 (126 to 152)	2262 (2073 to 2503)	1288 (1201 to 1384)	21709 (20223 to 23298)	65 (54 to 77)	1031 (849 to 1224)	1480 (1243 to 1745)	24722 (20669 to 29223)	259 (186 to 326)	4309 (3109 to 5437)	1222 (1003 to 1469)	20413 (16724 to 24678)
	change from 1990 to 2020	-48% (-51 to -45)	13% (7 to 21)	-36% (-38 to -32)	37% (32 to 43)	-60% (-66 to -52)	1% (-17 to 20)	-59% (-65 to -52)	-8% (-23 to 9)	-37% (-40 to -33)	35% (29 to 42)	-62% (-69 to -54)	-14% (-30 to 6)

Micronesia (Federated States of)	age-standardised rate, 1990	286 (269 to 307)	156 (146 to 166)	2129 (2013 to 2261)	1157 (1094 to 1226)	221 (172 to 274)	90 (70 to 112)	5377 (4243 to 6621)	2808 (2175 to 3482)	427 (307 to 538)	231 (166 to 292)	4950 (3792 to 6178)	2577 (1935 to 3247)
	age-standardised rate, 2019	238 (223 to 256)	181 (169 to 194)	1833 (1726 to 1955)	1450 (1364 to 1541)	186 (140 to 231)	107 (75 to 137)	4403 (3166 to 5587)	3278 (2215 to 4265)	367 (263 to 460)	284 (202 to 357)	4037 (2788 to 5209)	2995 (1917 to 3970)
	change from 1990 to 2020	-17% (-20 to -14)	16% (11 to 20)	-14% (-17 to -11)	25% (21 to 30)	-16% (-38 to 12)	18% (-19 to 62)	-18% (-42 to 11)	17% (-19 to 59)	-14% (-18 to -11)	23% (18 to 28)	-18% (-44 to 13)	16% (-22 to 63)
Mongolia	age-standardised rate, 1990	353 (332 to 375)	3840 (3616 to 4075)	1526 (1403 to 1654)	18309 (16928 to 19835)	184 (154 to 262)	1799 (1493 to 2482)	4526 (3780 to 5989)	52387 (44126 to 65002)	294 (211 to 373)	3564 (2556 to 4523)	4232 (3504 to 5689)	48823 (40743 to 61946)
	age-standardised rate, 2019	247 (234 to 262)	6175 (5803 to 6535)	1288 (1186 to 1396)	37060 (34081 to 40146)	220 (180 to 278)	4172 (3285 to 5387)	4747 (3781 to 6035)	119585 (93368 to 153705)	248 (176 to 315)	6997 (4987 to 8896)	4499 (3537 to 5789)	112589 (86725 to 147114)
	change from 1990 to 2020	-30% (-33 to -27)	61% (54 to 67)	-16% (-20 to -11)	102% (92 to 114)	20% (-9 to 53)	132% (72 to 205)	5% (-20 to 35)	128% (71 to 196)	-16% (-20 to -11)	96% (85 to 108)	6% (-21 to 39)	131% (68 to 204)
Myanmar	age-standardised rate, 1990	199 (185 to 216)	49232 (45648 to 53188)	1292 (1206 to 1392)	336621 (314439 to 360986)	278 (230 to 336)	56603 (46107 to 68402)	6396 (5231 to 7752)	1635583 (1308473 to 1998452)	255 (183 to 324)	66512 (47326 to 84681)	6140 (4970 to 7478)	1569071 (1242125 to 1936369)
	age-standardised rate, 2019	162 (149 to 177)	75852 (69687 to 82564)	1180 (1093 to 1275)	576567 (536016 to 620546)	210 (185 to 240)	82399 (71596 to 95580)	4271 (3660 to 4973)	1951121 (1639305 to 2308453)	237 (170 to 302)	114373 (82065 to 145769)	4035 (3388 to 4741)	1836748 (1512987 to 2191689)
	change from 1990 to 2020	-19% (-22 to -15)	54% (47 to 61)	-9% (-13 to -5)	71% (64 to 79)	-24% (-38 to -8)	46% (16 to 82)	-33% (-47 to -16)	19% (-7 to 52)	-7% (-12 to -3)	72% (63 to 80)	-34% (-48 to -17)	17% (-10 to 51)
Nauru	age-standardised rate, 1990	267 (248 to 288)	13 (12 to 14)	2248 (2118 to 2400)	109 (102 to 116)	240 (195 to 287)	8 (6 to 10)	5874 (4730 to 7097)	286 (225 to 354)	453 (327 to 570)	21 (15 to 27)	5421 (4281 to 6662)	265 (204 to 335)
	age-standardised rate, 2019	258 (239 to 278)	14 (13 to 15)	2145 (2022 to 2289)	118 (111 to 125)	209 (169 to 255)	7 (6 to 9)	5181 (4168 to 6382)	287 (221 to 365)	432 (311 to 545)	23 (17 to 29)	4749 (3742 to 5952)	264 (198 to 341)
	change from 1990 to 2020	-4% (-7 to 0)	6% (3 to 10)	-5% (-8 to -1)	8% (5 to 12)	-13% (-27 to 5)	-7% (-24 to 14)	-12% (-26 to 6)	0% (-17 to 22)	-5% (-8 to -1)	8% (3 to 13)	-12% (-28 to 7)	0% (-19 to 23)
Nepal	age-standardised rate, 1990	102 (94 to 110)	10927 (9967 to 11962)	666 (614 to 723)	78392 (71848 to 85285)	108 (80 to 144)	8355 (6307 to 11332)	2302 (1765 to 3067)	225183 (175653 to 294279)	100 (73 to 127)	12011 (8742 to 15397)	2202 (1669 to 2989)	213172 (164183 to 282661)

	age-standardised rate, 2019	83 (76 to 90)	19035 (17383 to 20822)	584 (538 to 633)	146771 (134958 to 159685)	80 (63 to 99)	15189 (11964 to 18675)	1579 (1252 to 1944)	346766 (272933 to 432724)	90 (65 to 114)	22601 (16474 to 28898)	1490 (1163 to 1863)	324164 (251268 to 411182)
	change from 1990 to 2020	-19% (-21 to -15)	74% (67 to 82)	-12% (-16 to -8)	87% (78 to 97)	-25% (-45 to -2)	82% (35 to 139)	-31% (-49 to -11)	54% (17 to 99)	-11% (-16 to -5)	88% (76 to 101)	-32% (-50 to -11)	52% (13 to 100)
New Zealand	age-standardised rate, 1990	97 (86 to 111)	3696 (3245 to 4253)	838 (748 to 946)	32311 (28583 to 36698)	66 (60 to 71)	2483 (2269 to 2657)	1162 (1085 to 1226)	44881 (41904 to 47489)	132 (95 to 170)	5088 (3649 to 6577)	1030 (963 to 1084)	39793 (37204 to 41946)
	age-standardised rate, 2019	65 (59 to 72)	4654 (4197 to 5178)	661 (591 to 735)	44801 (39959 to 50417)	32 (27 to 35)	2811 (2343 to 3136)	544 (489 to 593)	42197 (37643 to 46161)	104 (75 to 132)	7075 (5028 to 9093)	440 (387 to 480)	35121 (30579 to 38434)
	change from 1990 to 2020	-33% (-37 to -28)	26% (17 to 35)	-21% (-27 to -15)	39% (29 to 48)	-52% (-57 to -47)	13% (1 to 25)	-53% (-57 to -50)	-6% (-14 to 2)	-21% (-27 to -15)	39% (29 to 51)	-57% (-61 to -53)	-12% (-20 to -3)
Niue	age-standardised rate, 1990	207 (191 to 224)	5 (4 to 5)	1800 (1693 to 1919)	39 (36 to 41)	156 (132 to 186)	4 (3 to 4)	3631 (3031 to 4330)	79 (67 to 94)	364 (262 to 456)	8 (6 to 10)	3267 (2702 to 3959)	71 (59 to 86)
	age-standardised rate, 2019	188 (173 to 206)	4 (4 to 4)	1713 (1609 to 1834)	36 (33 to 38)	114 (91 to 140)	2 (2 to 3)	2683 (2150 to 3295)	56 (45 to 68)	343 (249 to 434)	7 (5 to 9)	2341 (1815 to 2937)	49 (38 to 61)
	change from 1990 to 2020	-9% (-13 to -5)	-14% (-18 to -10)	-5% (-8 to -1)	-8% (-11 to -5)	-27% (-42 to -10)	-34% (-47 to -18)	-26% (-41 to -7)	-29% (-44 to -12)	-6% (-10 to -2)	-10% (-14 to -6)	-28% (-45 to -7)	-31% (-47 to -12)
Northern Mariana Islands	age-standardised rate, 1990	221 (204 to 239)	51 (47 to 56)	1956 (1838 to 2085)	475 (443 to 508)	160 (138 to 188)	22 (19 to 27)	3634 (3132 to 4296)	817 (670 to 998)	398 (286 to 500)	93 (66 to 117)	3236 (2752 to 3903)	724 (575 to 905)
	age-standardised rate, 2019	182 (169 to 197)	90 (83 to 99)	1683 (1577 to 1805)	883 (827 to 945)	97 (84 to 111)	39 (33 to 44)	2258 (1955 to 2577)	1136 (972 to 1316)	340 (244 to 426)	173 (124 to 218)	1917 (1633 to 2234)	963 (807 to 1129)
	change from 1990 to 2020	-17% (-21 to -14)	76% (64 to 88)	-14% (-17 to -11)	86% (77 to 96)	-39% (-49 to -28)	73% (39 to 114)	-38% (-49 to -26)	39% (11 to 75)	-14% (-18 to -11)	87% (77 to 98)	-41% (-52 to -27)	33% (2 to 73)
Pakistan	age-standardised rate, 1990	179 (161 to 199)	112478 (101521 to 124903)	1124 (1012 to 1249)	753868 (676714 to 830042)	124 (96 to 152)	64112 (50515 to 77814)	2665 (2142 to 3214)	1604750 (1322289 to 1925910)	168 (121 to 215)	113461 (81346 to 145071)	2496 (1976 to 3049)	1491289 (1208581 to 1817499)
	age-standardised rate, 2019	165 (148 to 185)	204852 (183765 to 227527)	1115 (1001 to 1236)	1563878 (1412116 to 1723323)	115 (99 to 139)	105440 (90082 to 126572)	2486 (2148 to 2955)	2939645 (2518138 to 3459313)	168 (121 to 214)	233545 (167172 to 299983)	2318 (1976 to 2788)	2706100 (2294436 to 3230625)

	change from 1990 to 2020	-8% (-10 to -6)	82% (77 to 86)	-1% (-4 to 2)	107% (100 to 114)	-8% (-24 to 19)	64% (35 to 113)	-7% (-23 to 19)	83% (51 to 132)	0% (-4 to 3)	106% (98 to 114)	-7% (-24 to 20)	81% (48 to 134)
Palau	age-standardised rate, 1990	212 (195 to 231)	22 (21 to 24)	1885 (1766 to 2017)	205 (192 to 218)	144 (114 to 183)	13 (10 to 17)	3635 (2893 to 4603)	392 (307 to 501)	379 (273 to 474)	41 (29 to 51)	3256 (2504 to 4209)	351 (265 to 458)
	age-standardised rate, 2019	211 (193 to 231)	44 (40 to 48)	1910 (1785 to 2046)	414 (387 to 443)	116 (94 to 141)	21 (17 to 26)	2977 (2440 to 3627)	637 (512 to 786)	379 (274 to 477)	80 (58 to 100)	2597 (2057 to 3235)	557 (435 to 704)
	change from 1990 to 2020	-1% (-5 to 4)	95% (86 to 106)	1% (-2 to 5)	102% (95 to 110)	-19% (-41 to 8)	62% (16 to 121)	-18% (-40 to 9)	63% (18 to 120)	0% (-4 to 4)	97% (88 to 106)	-20% (-44 to 10)	59% (10 to 122)
Papua New Guinea	age-standardised rate, 1990	230 (215 to 247)	5103 (4758 to 5475)	1690 (1582 to 1809)	38172 (35848 to 40609)	137 (95 to 182)	2122 (1457 to 2894)	3312 (2367 to 4406)	71188 (50682 to 95548)	334 (240 to 419)	7483 (5387 to 9436)	2978 (2050 to 4055)	63706 (42860 to 87325)
	age-standardised rate, 2019	216 (201 to 232)	12835 (11954 to 13768)	1682 (1582 to 1792)	100401 (94494 to 106437)	135 (95 to 183)	5354 (3675 to 7396)	3252 (2342 to 4327)	180343 (126283 to 244402)	332 (237 to 413)	19496 (13961 to 24530)	2921 (2013 to 4012)	160847 (108010 to 225288)
	change from 1990 to 2020	-6% (-9 to -3)	152% (143 to 160)	0% (-4 to 3)	163% (154 to 174)	-1% (-20 to 23)	152% (96 to 228)	-2% (-22 to 24)	153% (96 to 228)	-1% (-5 to 3)	161% (150 to 173)	-2% (-24 to 27)	152% (89 to 239)
Philippines	age-standardised rate, 1990	201 (180 to 225)	66976 (60086 to 74996)	1511 (1372 to 1672)	531052 (483447 to 580818)	84 (74 to 95)	17673 (15533 to 20425)	1688 (1504 to 1979)	497006 (445957 to 608595)	304 (217 to 390)	106292 (75892 to 135483)	1384 (1214 to 1632)	390713 (344550 to 495679)
	age-standardised rate, 2019	192 (172 to 216)	157897 (141489 to 178001)	1479 (1346 to 1630)	1267640 (1150933 to 1393790)	107 (89 to 125)	72488 (58640 to 85338)	2514 (2051 to 2925)	2042700 (1653997 to 2403540)	300 (215 to 385)	253782 (181545 to 324681)	2214 (1765 to 2623)	1788919 (1404653 to 2147714)
	change from 1990 to 2020	-4% (-5 to -3)	136% (130 to 141)	-2% (-4 to 0)	139% (134 to 144)	27% (1 to 53)	310% (202 to 404)	49% (11 to 79)	311% (187 to 398)	-1% (-3 to 1)	139% (134 to 144)	60% (13 to 97)	358% (196 to 473)
Republic of Korea	age-standardised rate, 1990	306 (281 to 338)	92317 (84615 to 101719)	2374 (2210 to 2547)	727039 (677347 to 779703)	216 (186 to 229)	47728 (40869 to 50260)	4192 (3654 to 4415)	1185260 (1053397 to 1245689)	433 (312 to 547)	127813 (92029 to 161882)	3760 (3237 to 3959)	1057448 (914875 to 1113573)
	age-standardised rate, 2019	109 (99 to 120)	92934 (83777 to 102520)	1176 (1084 to 1299)	1019292 (935025 to 1128951)	44 (38 to 53)	36509 (31326 to 44085)	860 (762 to 1011)	735531 (652396 to 868110)	212 (152 to 273)	181398 (130196 to 233868)	648 (577 to 810)	554132 (495536 to 698343)
	change from 1990 to 2020	-64% (-66 to -62)	1% (-6 to 7)	-50% (-53 to -47)	40% (32 to 51)	-80% (-82 to -72)	-24% (-34 to 6)	-79% (-81 to -72)	-38% (-44 to -16)	-51% (-54 to -47)	42% (33 to 54)	-83% (-85 to -75)	-48% (-54 to -24)

Samoa	age-standardised rate, 1990	249 (232 to 267)	235 (218 to 252)	1970 (1858 to 2101)	1903 (1792 to 2025)	172 (141 to 205)	132 (108 to 160)	3931 (3219 to 4756)	3593 (2913 to 4417)	399 (285 to 500)	383 (272 to 483)	3532 (2833 to 4328)	3210 (2534 to 4006)
	age-standardised rate, 2019	219 (203 to 237)	333 (310 to 360)	1841 (1729 to 1971)	2880 (2706 to 3068)	135 (112 to 162)	177 (145 to 216)	3145 (2574 to 3836)	4737 (3772 to 5832)	371 (268 to 469)	575 (416 to 727)	2774 (2197 to 3462)	4161 (3208 to 5225)
	change from 1990 to 2020	-12% (-16 to -8)	42% (36 to 48)	-7% (-10 to -3)	51% (46 to 57)	-22% (-37 to 0)	34% (5 to 74)	-20% (-37 to 4)	32% (1 to 74)	-7% (-11 to -3)	50% (44 to 56)	-21% (-40 to 6)	30% (-4 to 78)
Seychelles	age-standardised rate, 1990	210 (191 to 230)	121 (110 to 132)	1687 (1572 to 1816)	984 (918 to 1058)	110 (100 to 121)	62 (56 to 68)	2600 (2370 to 2845)	1488 (1357 to 1627)	345 (250 to 437)	202 (146 to 256)	2255 (2055 to 2487)	1286 (1174 to 1415)
	age-standardised rate, 2019	178 (162 to 197)	194 (176 to 215)	1520 (1421 to 1634)	1701 (1591 to 1824)	71 (62 to 83)	69 (60 to 81)	1651 (1460 to 1924)	1800 (1579 to 2076)	307 (222 to 390)	337 (244 to 429)	1345 (1177 to 1583)	1462 (1270 to 1728)
	change from 1990 to 2020	-15% (-19 to -11)	60% (52 to 69)	-10% (-13 to -7)	73% (66 to 80)	-36% (-43 to -25)	11% (-2 to 30)	-36% (-43 to -28)	21% (8 to 38)	-11% (-15 to -7)	67% (59 to 75)	-40% (-48 to -30)	14% (-1 to 34)
Singapore	age-standardised rate, 1990	225 (203 to 249)	5163 (4671 to 5709)	1949 (1825 to 2084)	44334 (41587 to 47230)	90 (84 to 95)	1632 (1547 to 1705)	1957 (1840 to 2073)	42140 (39689 to 44591)	356 (261 to 450)	7880 (5768 to 9977)	1601 (1527 to 1668)	34259 (32870 to 35841)
	age-standardised rate, 2019	98 (88 to 110)	7687 (6845 to 8612)	1056 (979 to 1145)	82680 (76610 to 89734)	22 (19 to 25)	1580 (1345 to 1745)	535 (468 to 595)	40519 (35478 to 45102)	192 (138 to 243)	14650 (10573 to 18598)	343 (303 to 376)	25869 (23047 to 28251)
	change from 1990 to 2020	-56% (-60 to -52)	49% (36 to 62)	-46% (-49 to -43)	86% (77 to 97)	-76% (-78 to -73)	-3% (-14 to 6)	-73% (-75 to -71)	-4% (-12 to 3)	-46% (-49 to -43)	86% (75 to 97)	-79% (-81 to -77)	-24% (-32 to -18)
Solomon Islands	age-standardised rate, 1990	294 (276 to 317)	478 (445 to 515)	1974 (1860 to 2095)	3274 (3088 to 3465)	295 (240 to 362)	350 (276 to 439)	7292 (5894 to 9010)	11358 (8994 to 14132)	395 (284 to 498)	651 (465 to 828)	6897 (5483 to 8626)	10707 (8296 to 13486)
	age-standardised rate, 2019	267 (250 to 287)	986 (922 to 1059)	1836 (1729 to 1964)	6916 (6498 to 7377)	308 (260 to 360)	792 (646 to 967)	7189 (5971 to 8623)	24847 (20075 to 30436)	367 (264 to 459)	1364 (979 to 1716)	6822 (5582 to 8271)	23483 (18654 to 29106)
	change from 1990 to 2020	-9% (-12 to -6)	106% (99 to 113)	-7% (-10 to -4)	111% (104 to 119)	4% (-19 to 31)	126% (72 to 196)	-1% (-24 to 26)	119% (66 to 184)	-7% (-11 to -3)	109% (100 to 119)	-1% (-25 to 28)	119% (63 to 190)
Sri Lanka	age-standardised rate, 1990	175 (160 to 192)	18737 (17100 to 20524)	1346 (1246 to 1455)	157976 (146736 to 170017)	120 (107 to 134)	9615 (8649 to 10715)	2215 (2007 to 2472)	224911 (204271 to 252046)	277 (200 to 352)	32218 (23079 to 40928)	1938 (1747 to 2179)	192693 (174333 to 219001)

	age-standardised rate, 2019	135 (123 to 149)	32480 (29336 to 36011)	1196 (1108 to 1299)	300522 (278438 to 326897)	69 (53 to 88)	14364 (10917 to 18505)	1336 (1042 to 1672)	317412 (248001 to 401417)	244 (176 to 309)	60786 (43742 to 77050)	1091 (820 to 1425)	256626 (191331 to 337694)
	change from 1990 to 2020	-23% (-27 to -18)	73% (63 to 83)	-11% (-14 to -7)	90% (83 to 99)	-43% (-56 to -26)	49% (12 to 95)	-40% (-53 to -24)	41% (10 to 78)	-12% (-16 to -7)	89% (80 to 99)	-44% (-58 to -26)	33% (-1 to 77)
Taiwan (Province of China)	age-standardised rate, 1990	214 (197 to 236)	32758 (30064 to 36158)	1461 (1370 to 1566)	237961 (222846 to 254243)	126 (118 to 132)	16606 (15890 to 17283)	2669 (2548 to 2790)	414977 (396713 to 433608)	311 (224 to 394)	49761 (35692 to 63332)	2358 (2266 to 2446)	365215 (353256 to 377619)
	age-standardised rate, 2019	119 (107 to 131)	44367 (39859 to 49520)	1114 (1032 to 1201)	414156 (384049 to 447445)	37 (30 to 47)	14923 (11918 to 18521)	925 (760 to 1117)	350060 (286818 to 422817)	238 (170 to 302)	87897 (63075 to 111771)	688 (542 to 876)	262163 (206301 to 334778)
	change from 1990 to 2020	-45% (-49 to -41)	35% (25 to 46)	-24% (-28 to -20)	74% (65 to 83)	-70% (-76 to -63)	-10% (-28 to 12)	-65% (-71 to -58)	-16% (-30 to 2)	-23% (-27 to -19)	77% (66 to 87)	-71% (-77 to -63)	-28% (-43 to -9)
Tajikistan	age-standardised rate, 1990	146 (136 to 157)	4518 (4178 to 4908)	832 (768 to 903)	26131 (24084 to 28371)	127 (115 to 138)	3410 (3077 to 3702)	2778 (2535 to 2979)	78739 (72026 to 84518)	162 (115 to 205)	5227 (3712 to 6665)	2616 (2385 to 2825)	73512 (67137 to 79335)
	age-standardised rate, 2019	141 (130 to 152)	7734 (7054 to 8394)	780 (718 to 843)	50985 (46786 to 55210)	173 (144 to 207)	5907 (4785 to 7220)	3270 (2699 to 3949)	146642 (117926 to 178933)	152 (109 to 195)	9960 (7138 to 12843)	3117 (2544 to 3784)	136682 (108350 to 169628)
	change from 1990 to 2020	-3% (-7 to 1)	71% (64 to 79)	-6% (-11 to -2)	95% (85 to 106)	36% (12 to 64)	73% (40 to 113)	18% (-3 to 42)	86% (50 to 128)	-6% (-12 to 0)	91% (79 to 102)	19% (-3 to 46)	86% (47 to 132)
Thailand	age-standardised rate, 1990	192 (177 to 209)	70468 (65261 to 76683)	1401 (1304 to 1499)	551152 (515471 to 587544)	105 (92 to 119)	31302 (27556 to 35435)	2341 (2094 to 2608)	854670 (764495 to 958529)	285 (206 to 359)	111000 (79547 to 139709)	2056 (1816 to 2327)	743670 (658606 to 845879)
	age-standardised rate, 2019	126 (116 to 137)	123118 (112514 to 134892)	1132 (1058 to 1213)	1124258 (1048888 to 1205450)	52 (40 to 67)	51025 (38708 to 65560)	1305 (1016 to 1641)	1273783 (985697 to 1609779)	232 (167 to 293)	227630 (164331 to 287635)	1073 (801 to 1390)	1046153 (777552 to 1360647)
	change from 1990 to 2020	-34% (-38 to -31)	75% (66 to 84)	-19% (-23 to -16)	104% (96 to 113)	-50% (-63 to -35)	63% (23 to 116)	-44% (-57 to -28)	49% (15 to 94)	-19% (-22 to -15)	105% (96 to 115)	-48% (-61 to -29)	41% (3 to 91)
Timor-Leste	age-standardised rate, 1990	253 (234 to 274)	828 (772 to 890)	1681 (1569 to 1803)	6002 (5640 to 6406)	139 (106 to 178)	299 (229 to 391)	3016 (2385 to 3837)	9376 (7447 to 12024)	339 (244 to 427)	1195 (858 to 1521)	2677 (2034 to 3497)	8181 (6279 to 10789)
	age-standardised rate, 2019	257 (237 to 279)	2122 (1956 to 2317)	1753 (1632 to 1891)	15405 (14366 to 16546)	167 (131 to 214)	1135 (875 to 1464)	3493 (2720 to 4467)	28395 (21811 to 36615)	354 (252 to 448)	3110 (2213 to 3953)	3139 (2363 to 4130)	25285 (18543 to 33579)

	change from 1990 to 2020	2% (-3 to 6)	156% (143 to 171)	4% (1 to 8)	157% (146 to 169)	20% (-5 to 50)	279% (186 to 379)	16% (-11 to 44)	203% (124 to 287)	4% (0 to 9)	160% (147 to 176)	17% (-13 to 50)	209% (119 to 308)
Tokelau	age-standardised rate, 1990	206 (192 to 222)	3 (3 to 3)	1691 (1589 to 1809)	23 (21 to 24)	162 (130 to 201)	2 (2 to 3)	3752 (2989 to 4662)	50 (40 to 62)	344 (246 to 436)	5 (3 to 6)	3408 (2662 to 4303)	46 (36 to 57)
	age-standardised rate, 2019	180 (166 to 195)	2 (2 to 3)	1609 (1511 to 1716)	21 (20 to 23)	114 (93 to 140)	1 (1 to 2)	2667 (2113 to 3318)	35 (27 to 44)	323 (233 to 411)	4 (3 to 5)	2344 (1802 to 2978)	31 (23 to 39)
	change from 1990 to 2020	-13% (-17 to -10)	-15% (-19 to -11)	-5% (-8 to -1)	-5% (-9 to -2)	-29% (-44 to -9)	-34% (-48 to -14)	-29% (-45 to -6)	-31% (-46 to -10)	-6% (-10 to -2)	-8% (-12 to -4)	-31% (-48 to -6)	-33% (-50 to -10)
Tonga	age-standardised rate, 1990	171 (159 to 187)	101 (94 to 110)	1525 (1429 to 1631)	920 (861 to 986)	87 (72 to 102)	41 (34 to 48)	1961 (1664 to 2273)	1107 (940 to 1289)	312 (224 to 394)	188 (134 to 239)	1649 (1364 to 1951)	919 (757 to 1094)
	age-standardised rate, 2019	151 (138 to 165)	124 (113 to 135)	1417 (1323 to 1520)	1163 (1086 to 1245)	76 (63 to 90)	58 (48 to 69)	1696 (1428 to 2017)	1358 (1143 to 1619)	289 (208 to 365)	237 (170 to 300)	1406 (1150 to 1710)	1121 (912 to 1370)
	change from 1990 to 2020	-12% (-16 to -8)	22% (17 to 27)	-7% (-11 to -4)	26% (21 to 31)	-13% (-31 to 12)	42% (12 to 86)	-14% (-30 to 9)	23% (-1 to 55)	-7% (-11 to -3)	26% (20 to 32)	-15% (-34 to 13)	22% (-6 to 62)
Turkmenistan	age-standardised rate, 1990	231 (213 to 253)	4606 (4250 to 5016)	1340 (1249 to 1449)	28814 (26821 to 30922)	139 (131 to 145)	2369 (2250 to 2463)	3187 (3040 to 3325)	63051 (60154 to 66112)	264 (187 to 336)	5697 (4076 to 7252)	2924 (2790 to 3040)	57354 (54839 to 59842)
	age-standardised rate, 2019	232 (213 to 253)	9529 (8785 to 10347)	1463 (1359 to 1574)	63998 (59612 to 68712)	151 (124 to 183)	5263 (4280 to 6433)	3537 (2889 to 4268)	142895 (115819 to 173399)	284 (205 to 362)	12235 (8871 to 15561)	3253 (2619 to 3991)	130660 (104279 to 161525)
	change from 1990 to 2020	0% (-4 to 5)	107% (97 to 116)	9% (5 to 14)	122% (113 to 132)	9% (-11 to 32)	122% (79 to 173)	11% (-9 to 35)	127% (86 to 178)	8% (3 to 13)	115% (104 to 126)	11% (-11 to 38)	128% (82 to 186)
Tuvalu	age-standardised rate, 1990	222 (209 to 238)	16 (15 to 17)	1745 (1642 to 1854)	127 (119 to 134)	209 (165 to 256)	12 (10 to 15)	5046 (4041 to 6034)	361 (289 to 433)	355 (256 to 445)	25 (18 to 32)	4692 (3667 to 5686)	336 (263 to 408)
	age-standardised rate, 2019	201 (188 to 217)	21 (19 to 22)	1644 (1546 to 1753)	174 (164 to 185)	155 (125 to 194)	14 (11 to 18)	3655 (2900 to 4588)	376 (295 to 477)	330 (240 to 414)	35 (25 to 43)	3326 (2583 to 4277)	341 (262 to 444)
	change from 1990 to 2020	-9% (-13 to -6)	32% (27 to 37)	-6% (-9 to -3)	37% (32 to 42)	-26% (-44 to 0)	13% (-15 to 54)	-28% (-45 to -2)	4% (-21 to 43)	-7% (-11 to -3)	36% (30 to 42)	-29% (-48 to -1)	2% (-25 to 44)

Uzbekistan	age-standardised rate, 1990	220 (204 to 239)	26174 (24290 to 28286)	1266 (1165 to 1365)	158529 (146713 to 170566)	135 (127 to 141)	14116 (13288 to 14701)	2982 (2835 to 3102)	341881 (325163 to 356445)	248 (177 to 316)	31289 (22501 to 39706)	2734 (2600 to 2837)	310592 (295099 to 322461)
	age-standardised rate, 2019	214 (200 to 231)	44423 (40922 to 48282)	1246 (1137 to 1365)	319017 (291316 to 350035)	189 (165 to 215)	25022 (21394 to 29330)	3615 (3131 to 4141)	692508 (591463 to 808671)	244 (175 to 311)	61030 (43754 to 77916)	3372 (2895 to 3901)	631478 (533735 to 746374)
	change from 1990 to 2020	-3% (-8 to 3)	70% (60 to 79)	-2% (-8 to 5)	101% (89 to 114)	40% (22 to 60)	77% (50 to 109)	21% (5 to 40)	103% (73 to 137)	-2% (-8 to 5)	95% (82 to 108)	23% (6 to 43)	103% (70 to 141)
Vanuatu	age-standardised rate, 1990	315 (295 to 338)	247 (231 to 264)	2361 (2217 to 2507)	1869 (1759 to 1983)	204 (151 to 266)	115 (83 to 153)	4868 (3633 to 6352)	3620 (2649 to 4763)	473 (339 to 598)	370 (265 to 465)	4395 (3153 to 5868)	3250 (2290 to 4423)
	age-standardised rate, 2019	284 (266 to 304)	537 (504 to 576)	2180 (2043 to 2329)	4247 (3992 to 4534)	193 (148 to 258)	293 (223 to 400)	4711 (3614 to 6298)	8905 (6726 to 12036)	436 (313 to 546)	840 (600 to 1053)	4274 (3190 to 5896)	8065 (5860 to 11170)
	change from 1990 to 2020	-10% (-13 to -7)	118% (111 to 126)	-8% (-11 to -4)	127% (119 to 135)	-5% (-25 to 25)	155% (97 to 244)	-3% (-25 to 29)	146% (88 to 233)	-8% (-11 to -4)	127% (118 to 137)	-3% (-26 to 33)	148% (84 to 247)
Viet Nam	age-standardised rate, 1990	218 (202 to 236)	89868 (83126 to 96786)	1432 (1337 to 1536)	617608 (577439 to 661502)	191 (155 to 237)	68676 (55915 to 85300)	3909 (3196 to 4813)	1576300 (1287978 to 1935233)	294 (210 to 374)	127706 (90847 to 162583)	3615 (2921 to 4532)	1448594 (1164748 to 1803733)
	age-standardised rate, 2019	222 (205 to 242)	205362 (189887 to 222504)	1541 (1431 to 1679)	1484621 (1380218 to 1604865)	170 (139 to 199)	135999 (110645 to 160272)	3401 (2795 to 4028)	3076200 (2515064 to 3673875)	316 (229 to 402)	299179 (215830 to 378562)	3085 (2478 to 3682)	2777021 (2216636 to 3364920)
	change from 1990 to 2020	2% (-2 to 6)	129% (118 to 138)	8% (4 to 12)	140% (130 to 151)	-11% (-31 to 18)	98% (50 to 160)	-13% (-34 to 12)	95% (46 to 152)	7% (3 to 12)	134% (124 to 146)	-15% (-37 to 12)	92% (40 to 154)

DALYs: disability-adjusted life-years, YLDs: years lived with disability, YLLs: years of life lost

