

The appendix shows country-specific stroke burden in 1990, 2005, and 2010. We noted significant geographical variations in stroke incidence by country, ranging in 2010 from 60 cases (Kuwait) to 504 cases (Lithuania) per 100 000 person-years; mortality rates, ranging from 27 cases (France) to 264 cases (Afghanistan) per 100 000 person-years; prevalence, ranging from 82 stroke survivors (Burundi) to 1187 survivors (Canada) per 100 000 people; DALYs lost, ranging from 398 (Australia) to 5227 (Afghanistan) per 100 000 people; and in mortality-to-incidence ratios, ranging from 0·11 (Iran) to 1·35 (Afghanistan). Overall, in 2010, an estimated

16·9 million cases of incident stroke took place worldwide (69% in low-income and middle-income countries), 33·0 million prevalent stroke cases (52% in low-income and middle-income countries), 5·9 million stroke deaths (71% in low-income and middle-income countries), and 102·2 million DALYs lost (78% in low-income and middle-income countries; table 1). More than 38% of new strokes (50% in high-income countries and 32% in low-income and middle-income countries), 30% of prevalent strokes (40% in high-income countries and 22% in low-income and middle-income countries), 55% of stroke deaths (73% in high-income countries and 47% in

	1990		2005		2010		p value
	n	Rate (95% CI)	n	Rate (95% CI)	n	Rate (95% CI)	
High-income countries							
<75 years							
Incidence	2 226 621	152·72 (142·34–163·17)	2 528 962	142·37 (133·31–151·68)	2 642 503	138·93 (130·55–148·09)	0·019
Prevalence	5 729 947	411·26 (374·00–452·78)	8 462 714	503·96 (457·79–554·17)	9 557 183	534·75 (490·56–588·74)	<0·001
MIR	..	0·259 (0·232–0·284)	..	0·222 (0·201–0·244)	..	0·177 (0·161–0·197)	<0·001
DALYs lost	14 776 518	1049·06 (952·08–1119·57)	14 525 157	849·91 (786·29–922·56)	12 280 317	672·44 (621·88–730·65)	<0·001
Mortality	5 755 542	39·51 (35·83–42·35)	5 617 02	31·18 (28·81–33·91)	4 686 698	24·15 (22·28–26·28)	<0·001
≥75 years							
Incidence	2 009 626	3241·87 (3020·86–3458·76)	2 354 966	2743·67 (2561·36–2944·76)	2 661 739	2724·14 (2553·85–2899·80)	<0·001
Prevalence	3 009 760	4860·51 (4476·03–5372·19)	5 273 019	6167·96 (5590·18–6808·50)	6 228 998	6481·20 (5862·30–7281·34)	<0·001
MIR	..	0·594 (0·528–0·647)	..	0·515 (0·467–0·585)	..	0·467 (0·425–0·542)	0·004
DALYs	10 638 282	17 171·89 (15 668·51–18 080·50)	10 616 678	12 437·29 (11 768·72–13 645·15)	10 540 679	10 892·57 (10 270·52–12 122·25)	<0·001
Mortality	1 192 348	1 918·47 (1 746·93–2 031·94)	1 210 976	1 389·30 (1 314·25–1 551·37)	1 241 190	1 225·16 (1 155·41–1 393·90)	<0·001
All ages							
Incidence	4 236 247	246·32 (230·23–262·05)	4 883 928	221·19 (207·76–236·07)	5 304 242	217·26 (204·41–230·67)	0·002
Prevalence	8 739 707	546·07 (499·10–600·25)	13 735 732	675·58 (614·61–741·22)	15 786 180	714·93 (656·23–789·12)	<0·001
MIR	..	0·418 (0·377–0·453)	..	0·363 (0·332–0·404)	..	0·323 (0·296–0·368)	0·003
DALYs lost	25 414 800	1537·58 (1406·59–1624·38)	25 141 836	1201·01 (1128·31–1305·17)	22 820 996	982·11 (920·18–1068·68)	<0·001
Mortality	1 767 890	96·45 (88·31–102·17)	1 772 678	72·33 (68·42–79·05)	1 709 888	60·54 (57·21–67·00)	<0·001
Low-income and middle-income countries							
<75 years							
Incidence	4 127 247	163·52 (142·35–187·17)	6 759 086	179·93 (156·58–208·20)	7 827 122	182·58 (158·91–209·59)	0·135
Prevalence	7 504 115	277·96 (227·88–349·41)	11 724 532	295·89 (240·15–368·94)	13 495 621	299·56 (250·09–369·58)	0·296
MIR	..	0·415 (0·351–0·491)	..	0·321 (0·263–0·375)	..	0·281 (0·227–0·327)	0·001
DALYs lost	49 215 344	1791·70 (1688·10–2042·50)	60 330 360	1525·36 (1330·55–1601·80)	61 013 232	1357·25 (1169·49–1443·02)	<0·001
Mortality	1 725 893	67·43 (63·47–76·95)	2 172 550	57·63 (50·25–60·60)	2 199 801	51·24 (44·44–54·98)	<0·001
≥75 years							
Incidence	1 715 441	3081·37 (2631·04–3561·97)	3 091 111	3399·37 (2946·81–3940·52)	3 763 172	3434·76 (2979·24–3952·13)	0·157
Prevalence	1 671 516	2980·43 (2386·20–3823·99)	3 035 318	3310·62 (2674·61–4195·92)	3 743 156	3395·63 (2817·34–4251·89)	0·200
MIR	..	0·684 (0·580–0·815)	..	0·566 (0·469–0·664)	..	0·525 (0·430–0·611)	0·010
DALYs	11 380 237	20 187·55 (18 939·98–23 019·66)	16 479 499	17 921·03 (15 805·85–18 944·71)	18 398 076	16 667·18 (14 592·02–17 790·84)	<0·001
Mortality	1 166 665	2148·63 (2009·71–2459·35)	1 739 742	1953·20 (1713·02–2067·96)	1 964 492	1824·73 (1590·67–1947·79)	0·010
All ages							
Incidence	5 842 689	251·93 (218·36–288·93)	9 850 197	277·48 (241·22–320·23)	11 590 294	281·12 (244·51–322·28)	0·133
Prevalence	9 175 631	359·85 (292·68–450·58)	14 759 850	387·24 (313·91–484·51)	17 238 778	393·38 (329·67–483·05)	0·266
MIR	..	0·494 (0·419–0·585)	..	0·398 (0·328–0·464)	..	0·360 (0·292–0·419)	0·003
DALYs lost	60 595 584	2349·09 (2218·97–2677·90)	76 809 864	2022·15 (1776·26–2114·04)	79 411 312	1821·14 (1588·91–1925·01)	<0·001
Mortality	2 892 559	130·49 (123·48–149·30)	3 912 292	115·06 (101·31–120·34)	4 164 293	104·98 (91·23–111·61)	<0·001

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	1990		2005		2010		p value
	n	Rate (95% CI)	n	Rate (95% CI)	n	Rate (95% CI)	
(Continued from previous page)							
Globally							
<75 years							
Incidence	6 353 868	159.22 (145.32–174.98)	9 288 048	167.45 (150.96–187.11)	10 469 624	168.75 (152.43–187.09)	0.208
Prevalence	13 234 062	324.26 (288.74–374.96)	20 187 246	358.58 (317.58–412.79)	23 052 804	366.93 (328.04–420.66)	0.086
MIR	..	0.359 (0.318–0.409)	..	0.293 (0.249–0.332)	..	0.254 (0.212–0.287)	<0.001
DALYs lost	63 991 864	1543.96 (1452.03–1728.25)	74 855 520	1326.17 (1172.08–1388.74)	73 293 552	1163.448 (1011.43–1232.19)	<0.001
Mortality	2 301 435	57.38 (54.12–64.27)	2 734 251	49.16 (43.60–51.55)	2 668 499	42.89 (37.65–45.81)	<0.001
≥75 years							
Incidence	3 725 067	3173.50 (2932.14–3422.23)	5 446 077	3082.97 (2819.52–3372.55)	6 424 911	3113.00 (2850.95–3403.57)	0.361
Prevalence	4 681 276	3974.37 (3609.66–4441.23)	8 308 337	4700.18 (4239.37–5256.84)	9 972 153	4835.38 (4382.63–5433.92)	0.005
MIR	..	0.634 (0.575–0.709)	..	0.543 (0.476–0.607)	..	0.500 (0.439–0.560)	<0.001
DALYs	22 018 520	18665.35 (17 464.55–20 408.51)	27 096 178	15 300.36 (13 987.78–16 317.62)	28 938 754	14 053.63 (12 761.98–15 088.12)	<0.001
Mortality	2 359 013	2033.21 (1888.78–2233.65)	2 950 719	1678.65 (1528.60–1807.22)	3 205 682	1545.29 (1412.76–1685.12)	<0.001
All ages							
Incidence	10 078 935	250.55 (229.70–273.25)	14 734 124	255.79 (232.10–283.88)	16 894 536	257.96 (234.40–284.11)	0.335
Prevalence	17 915 338	434.86 (389.45–496.84)	28 495 582	490.13 (436.60–557.52)	33 024 958	502.32 (451.26–572.18)	0.047
MIR	..	0.461 (0.415–0.518)	..	0.386 (0.336–0.432)	..	0.348 (0.299–0.390)	<0.001
DALYs lost	86 010 384	2062.74 (1949.53–2280.29)	101 951 696	1749.59 (1568.67–1830.82)	102 232 304	1554.02 (1373.94–1642.26)	<0.001
Mortality	4 660 449	117.25 (111.51–129.68)	5 684 970	98.53 (89.02–103.86)	5 874 182	88.41 (79.84–94.41)	<0.001

*p value for the difference in age-adjusted rates between 1990 and 2010 only.

Table 1. Age-adjusted annual incidence and mortality rates (per 100 000 person-years), disability-adjusted life-years (DALYs) lost, prevalence (per 100 000 people), and mortality-to-incidence ratio (MIR) by age groups in high-income and low-income and middle-income countries, and globally in 1990, 2005, and 2010

low-income and middle-income countries), and 28% of DALYs lost (46% in high-income countries and 23% in low-income and middle-income countries) were in people aged 75 years and older (table 1).

Globally, in 2010, the mortality-to-incidence ratio was 0.35 (0.32 in high-income countries and 0.36 in low-income and middle-income countries; table 1). Although overall we noted no significant change in age-standardised incidence of stroke between 1990 and 2010 (table 1), the direction of changes was different between countries by income level (a 12% [95% CI 6%–17%] statistically significant decrease in high-income countries, and a 12% [–3 to 22] non-significant increase in low-income and middle-income countries). Furthermore, there was a significant 25% reduction in mortality rate (37% [31–41] in high-income countries and 20% [15–30] in low-income and middle-income countries), DALYs lost (36% [30–40] and 22% [18–32], respectively), and mortality-to-incidence ratio (23% [14–29] and 27% [14–38]). Stroke prevalence increased significantly by 27% (19–43) in high-income countries only; the 8.5% (–13 to 34) increase in low-income and middle-income countries was not significant. Globally, for 1990–2010, we noted a 25% (13–33) significant increase in stroke incidence in people aged 20–64 years, mostly attributable to an 18% (10–25) significant increase in low-income and middle-income countries.

In the past two decades globally, noticeable increases took place in the absolute numbers of people with

incident stroke (a 68% increase), stroke survivors (84%), stroke-related deaths (26%), and DALYs lost (12%; table 1). The most striking increases in the number of stroke survivors (113%), DALYs lost (31%), and stroke-related deaths (36%) were in people aged 75 years and older (table 1). Presently, age-standardised rates of stroke incidence in low-income and middle-income countries exceed those in high-income countries by 23% (24% in people younger than 75 years and 21% in people aged 75 years and older), but the number of people younger than 75 years with incident stroke in low-income and middle-income countries is more than three times that in high-income countries (table 1). Similarly, the number of DALYs lost in people younger than 75 years in low-income and middle-income countries exceeded those lost in high-income countries by almost five times (table 1), whereas in people aged 75 years and older, DALYs lost in low-income and middle-income countries exceeded those lost in high-income countries by less than two times (table 1). Conversely, the number of stroke survivors aged 75 years and older in high-income countries exceeded the number in low-income and middle-income countries by 40% (table 1), whereas there were almost 30% more survivors younger than 75 years in low-income and middle-income countries than in high-income countries (table 1). Age-standardised rates of stroke mortality in people aged 75 years and older in low-income and middle-income countries exceeded