

SINGAPORE STROKE REGISTRY REPORT NO. 2

TRENDS IN STROKE IN SINGAPORE 2007 – 2011 (*Preliminary*)

SPONSORED BY



MINISTRY OF HEALTH
SINGAPORE

National Registry of Diseases Office (NRDO)

Health Promotion Board

Level 5

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Foreword

Since its set-up in 2001, the National Stroke Registry has worked hard to collect data on stroke in Singapore. The information collected includes data on age, gender, ethnicity, stroke risk factors, stroke subtype, performance of investigations, administered treatments, provision of care, complications, and outcome at time of hospital discharge.

This report would not have been possible without the whole-hearted support of many people and organisations, who made data available, collected data, analysed data, prepared reports, provided guidance. I am particularly grateful to the registry coordinators who have worked tirelessly and spared no effort to carefully extract valuable data, and statisticians who have painstakingly analysed the data.

I am sure the information in this report will be helpful to anyone interested in and caring for patients with stroke.

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EXECUTIVE SUMMARY

The crude incidence rates (CIR) have remained stable while the age-standardised incidence rates (ASIR) have been decreasing consistently over the 5-year period, with a 9.7 % lower ASIR of stroke in 2011 compared to 2007 (Table 4.1.1). The age-standardised mortality rate (ASMR) of stroke has declined in the 4-year period but went up in year 2011 (Figure 5.1.1).

The ratio of stroke episodes among men as compared to women was approximately 1.26:1 from 2007 to 2011 (Table 4.2.1). The age-standardised mortality rate is higher among males than females and both rates have declined until 2009 in both genders (Figure 5.2.3). Thereafter, the ASMR increased over 2010 and 2011.

The incidence rates for those aged 60 years and above have consistently declined since 2007 (Table 4.1.3). Similarly, there was a decline in mortality rates for those aged 60 years and above (Table 5.1.3).

Malays have the highest ASIR for stroke from 2008 onwards, followed by Indians and Chinese, whose rates are similar (Figure 4.3.3). The ASIR for Chinese has fallen significantly over the 5-year period while the ASIR for Indians has also fallen. The CMRs among the various ethnicities have remained stable while there was a decrease in ASMR among the Malays after 2008 (Figure 5.3.1). There were slight decreases in ASMR among Chinese and Indians (Figure 5.3.2). There was an upturn in 2011 among the Chinese. While the mortality trend for the Malays is encouraging, the risk factors for hypertension and high blood cholesterol should be better controlled to stem their increase in stroke incidence.

The age-standardised incidence rates of ischaemic stroke have fallen over the 5-year period while those for haemorrhagic stroke have remained stable (Figures 4.4.3).

The overall crude 30-day case-fatality rates (CFR) have remained stable, ranging from 8.7% to 10.7% in 2007-2011 (Table 6.1.1). Similar to crude mortality rates, the CFR for females is greater than that for males (Table 6.2.2).

Hypertension and hyperlipidaemia were the two most common risk factors among the stroke patients (Table 7.1.1). The proportion of first-ever stroke patients with hyperlipidaemia has increased over time while that of other risk factors has remained stable.

The percentage of ischaemic stroke patients given anticoagulants upon arrival and upon discharge had increased between 2009 and 2010 (Figures 8.1.1, 8.1.3) while the percentage of ischaemic stroke patients given antiplatelets upon arrival had increased from 2009 to 2011. While there was no discernible trend in the stroke medications given to ischaemic stroke patients during hospitalisation, the percentage of ischaemic stroke patients given antiplatelets during hospitalisation has exceeded 90% since 2009 (Figure 8.1.2).

The two most common complications seen in stroke cases include urinary tract infections (UTI) and pneumonia (Figure 9.1.1). The percentage of stroke patients with no common complications has remained above 80% since 2007.

1. GLOSSARY

Crude rate (CIR, CMR): Crude incidence or mortality rate is the number of first and recurrent stroke cases or deaths divided by the mid-year general population.

Age-standardised incidence rate (ASIR): Age-standardised incidence rate is the incidence rate that would be observed if the general population had the age structure of an external world standard population. Age standardisation facilitates the comparison of rates across time, and also across countries.

Age-standardised mortality rate (ASMR): Age-standardised mortality rate is the mortality rate that would be observed if the general population had the age structure of an external world standard population.

30-day Case Fatality Rate (CFR): This refers to the percentage of stroke patients who died of stroke within 30 days of stroke onset, regardless if the death occurred in the hospital or elsewhere.

2. INTRODUCTION

The primary aim of the National Registry of Diseases Office (NRDO) is to collect and analyse data to support the national disease management plans, policy formulation and programme planning.

The Singapore Stroke Registry was set up in 2002 to obtain epidemiological and clinical data on stroke cases diagnosed in Singapore from all public hospitals.

Stroke is a significant cause of death and disability in Singapore. In 2011, stroke was the 4th highest cause of death, accounting for 9.0% of total deaths in Singapore¹. In 2004, stroke was the second highest cause of premature mortality and the seventh highest cause of disability burden². It was also the third highest cause of the overall burden of disease burden in Singapore.

3. SOURCE OF DATA AND DATA COLLECTION

This report is based on the data collected for the year 2007-2011, as at 26th July 2012. The data used is mainly from Mediclaims listing. Case finding was supplemented by Hospital In-patient Discharge Summary (HIDS) review and death registry from the Ministry of Home Affairs (MHA). We merged the name lists from Mediclaims, HIDS and MHA using the NRIC number, to obtain the master patient list. The patient lists for the respective hospitals were then generated from the master list. Case notes were then traced from the medical record offices at the respective hospitals and the cases were verified by the registry coordinators.

Cases extracted from Mediclaims, HIDS and MHA were coded based on the International Classification of Diseases 9th Revision (ICD-9 Clinical Modification). It covered ICD-9 codes: 430, 431, 432, 433, 434, 436 and 437 while excluding 432.1 (Subdural haemorrhage), 435 (Transient cerebral ischaemia) and 438 (Late effects of cerebrovascular disease).

The MONICA (Monitoring Trends and Determinants in Cardiovascular Disease, World Health Organization) criteria were used for episode management. Recurrence of stroke

¹ Singapore Health Facts 2010, Principle Causes of Death.

http://www.moh.gov.sg/content/moh_web/home/statistics/Health_Facts_Singapore/Principal_Causes_of_Death.html

² Singapore Burden of Disease Study 2004, Epidemiology & Disease Control Division, MOH, Singapore.

after 28 days of the preceding recorded stroke episode was counted as another episode. Stroke episodes that occurred between the years 2007 to 2011 were recorded. Once the cases were verified, data was captured electronically into registry forms which were later uploaded and transferred into the database in the National Registry of Diseases System.

There are two types of stroke: ischaemic and haemorrhagic stroke. Ischaemic stroke is more common (about 80% of all strokes in Singapore) and occurs when a blood vessel becomes blocked, usually by a blood clot. Haemorrhagic stroke occurs when a blood vessel in the brain bursts or breaks, causing bleeding in or around the brain.

The analysis covers public hospitals in Singapore namely Alexandra Hospital, Changi General Hospital, National University Hospital, Singapore General Hospital, Tan Tock Seng Hospital, KK Women's & Children's Hospital and Khoo Teck Puat Hospital. Data from private hospitals (about 6% of all stroke episodes) are not included in the analysis.

This report can be downloaded at National Registry of Diseases Office Website: www.nrdo.gov.sg.

DATA CLEANING AND ANALYSIS

The data management team checks the data for obvious errors and inconsistencies. These data items were then extracted and passed to the stroke registry coordinators for verification and data cleaning.

Population denominators were derived using Department of Statistics mid-year population estimates. Crude rates were computed using these denominators. Segi World Population was used for direct standardisation to calculate age-standardised rates for stroke incidence and mortality while the age structure (5-year age groups from ages 15 to 85) of stroke incidence for all stroke cases in the registry was used for direct standardisation to calculate the age-standardised rate for 30-day case fatality rate. The 2011 Census population was used as the denominator to calculate incidence rates. Stroke cases of Singapore residents i.e. citizens and permanent residents of Singapore aged 15 years and above were included

in the analysis. The 95% confidence intervals were calculated in accordance to the methods used by the International Agency for Research on Cancer³.

When computing the percentages of patients on medications, only ischaemic stroke patients are included. Patients with contraindications to taking the medications were excluded in the analysis for all dose types. Patients may be contraindicated to a particular type of medication within the same broad category of the medications hence physicians can switch to its alternative. Patients who were transferred to another hospital for management upon discharge or who died, were also excluded in the analysis for medication on discharge. Information on medications on arrival and upon discharge was collected by the stroke registry from 2009 onwards.

³ Cancer Registration: Principles and Methods. IARC Scientific Publication No. 95.
<http://www.iarc.fr/en/publications/pdfs-online/epi/sp95/sp95-chap11.pdf>

4. STROKE INCIDENCE 2007 – 2011: ALL RESIDENTS

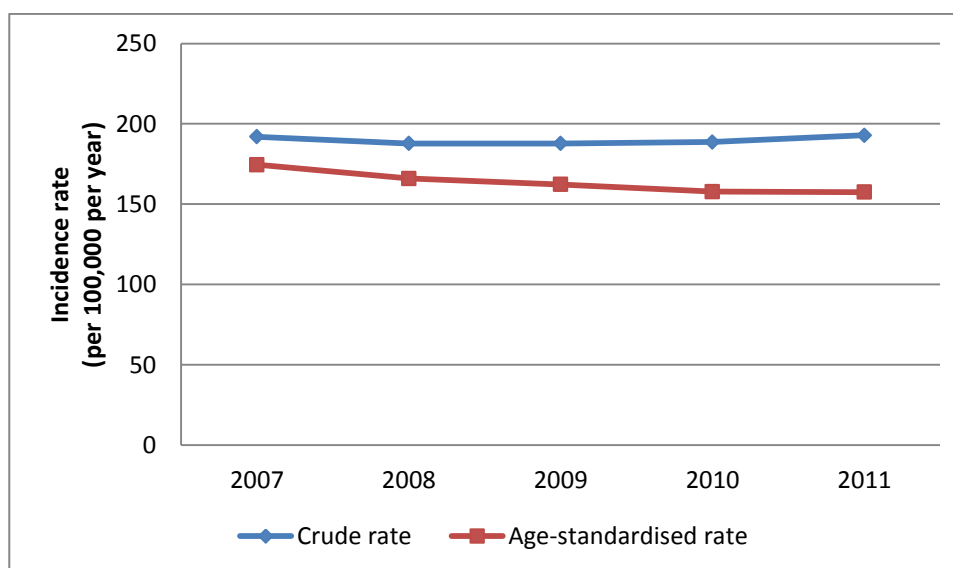
4.1 STROKE INCIDENCES, OVERALL, 2007 – 2011

The average number of stroke episodes from 2007 to 2011 was approximately 5,776 a year. The number of stroke episodes in 2011 was 6,082. (Table 4.1.1) The crude incidence rates have remained stable while the age-standardised incidence rates have been decreasing consistently over the 5-year period, with a 9.7% lower age-standardised incidence rate (ASIR) of stroke in 2011 compared to 2007.

Table 4.1.1 STROKE INCIDENCE (PER 100,000 POPULATION) OVERALL, 2007-2011

	2007	2008	2009	2010	2011
No. of cases	5576	5581	5757	5883	6082
Crude rate	192.0 (186.9-197.0)	187.8 (182.9-192.7)	187.8 (182.9-192.6)	188.7 (183.9-193.5)	192.9 (188.1-197.8)
Age-standardised rate	174.5 (169.8-179.1)	166.0 (161.6-170.4)	162.3 (158.0-166.5)	157.8 (153.7-161.9)	157.5 (153.5-161.6)

Figure 4.1.1 CRUDE AND AGE-STANDARDISED INCIDENCE RATES OF STROKE, (PER 100,000 POPULATION) OVERALL, 2007-2011



The number and crude incidence rate (CIR) of stroke increased with age. (Tables 4.1.2, 4.1.3) The incidence rates for those aged 60 years and above have consistently declined since 2007. The median age of incident stroke has remained at 67 years over the past 3 years (Table 4.1.4).

Table 4.1.2 INCIDENT STROKE CASES BY AGE GROUP, OVERALL, 2007-2011

Age Group	2007	2008	2009	2010	2011
15-19	6	9	9	2	7
20-24	5	8	8	9	11
25-29	15	14	14	19	15
30-34	30	32	30	43	40
35-39	60	59	76	86	68
40-44	150	138	153	143	150
45-49	309	256	321	310	306
50-54	469	478	505	536	596
55-59	583	629	645	671	667
60-64	631	649	721	710	784
65-69	784	708	683	649	647
70-74	743	734	701	720	829
75-79	722	747	725	737	742
80-84	536	541	584	686	611
85+	533	579	582	562	609

Table 4.1.3 AGE-SPECIFIC INCIDENCE RATE (PER 100,000 POPULATION), OVERALL, 2007-2011

Age Group	2007	2008	2009	2010	2011
15-19	2.3 (0.5-4.2)	3.4 (1.2-5.7)	3.4 (1.2-5.7)	0.8 (0.0-1.8)	2.7 (0.7-4.7)
20-24	2.3 (0.3-4.3)	3.5 (1.1-6.0)	3.3 (1.0-5.6)	3.6 (1.3-6.0)	4.3 (1.8-6.9)
25-29	5.9 (2.9-8.9)	5.3 (2.5-8.1)	5.1 (2.4-7.8)	7.0 (3.8-10.1)	5.7 (2.8-8.6)
30-34	10.2 (6.5-13.8)	11.0 (7.2-14.9)	10.1 (6.5-13.7)	14.4 (10.1-18.7)	13.4 (9.3-17.6)
35-39	19.9 (14.8-24.9)	19.2 (14.3-24.1)	24.0 (18.6-29.3)	26.9 (21.2-32.6)	21.5 (16.4-26.6)
40-44	46.7 (39.3-54.2)	43.5 (36.2-50.7)	48.9 (41.1-56.6)	46.2 (38.6-53.8)	48.9 (41.1-56.8)
45-49	97.9 (87.0-108.8)	80.5 (70.6-90.4)	99.5 (88.6-110.4)	95.8 (85.2-106.5)	94.4 (83.9-105.0)
50-54	168.0 (152.8-183.2)	165.3 (150.5-180.1)	169.8 (155.0-184.6)	176.9 (161.9-191.8)	193.4 (177.9-209.0)
55-59	263.9 (242.5-285.3)	274.2 (252.8-295.6)	268.9 (248.1-289.6)	269.8 (249.4-290.2)	255.8 (236.4-275.3)
60-64	465.7 (429.3-502.0)	423.6 (391.0-456.2)	424.9 (393.9-455.9)	369.8 (342.6-397.0)	376.6 (350.2-402.9)
65-69	688.9 (640.7-737.2)	614.6 (569.3-659.9)	587.3 (543.2-631.3)	582.0 (537.2-626.8)	575.6 (531.3-620.0)
70-74	945.3 (877.3-1013.3)	902.8 (837.5-968.1)	801.1 (741.8-860.5)	777.4 (720.6-834.2)	829.0 (772.6-885.4)
75-79	1271.1 (1178.4-1363.8)	1266.1 (1175.3-1356.9)	1180.8 (1094.8-1266.7)	1130.7 (1049.1-1212.4)	1109.1 (1029.3-1188.9)
80-84	1701.6 (1557.5-1845.6)	1595.9 (1461.4-1730.3)	1574.1 (1446.5-1701.8)	1721.9 (1593.1-1850.8)	1447.9 (1333.1-1562.7)
85+	2132.0 (1951.0-2313.0)	2193.2 (2014.5-2371.8)	2093.5 (1923.4-2263.6)	1922.0 (1763.1-2080.9)	1958.2 (1802.7-2113.7)

Table 4.1.4 MEDIAN AGE OF INCIDENT STROKE CASES, 2007-2011

	2007	2008	2009	2010	2011
Median Age	68	68	67	67	67

4.2 INCIDENCE OF STROKE CASES, BY GENDER, 2007 – 2011

The ratio of stroke episodes among men as compared to women was approximately 1.26:1 from 2007 to 2011 (Table 4.2.1). The CIRs have been observed to be stable (Figure 4.2.2) while the ASIRs have declined over the 5-year period in both genders (Figure 4.2.3).

Table 4.2.1 INCIDENT STROKE CASES, BY GENDER, 2007-2011

Gender	2007	2008	2009	2010	2011
Male	3073	3071	3217	3291	3471
Female	2503	2510	2540	2592	2611

Figure 4.2.2 CRUDE INCIDENCE RATE OF STROKE (PER 100,000 POPULATION), BY GENDER, 2007-2011

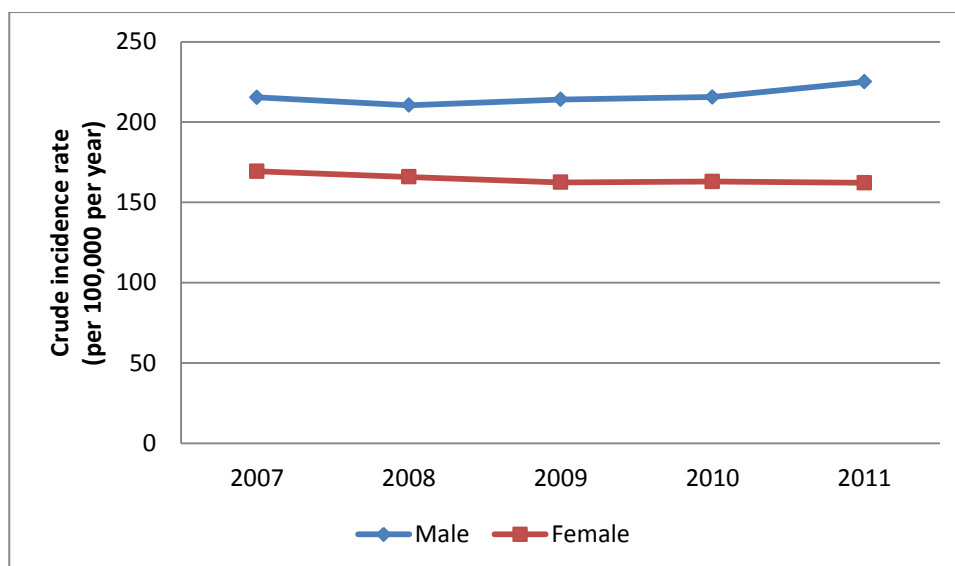


Table 4.2.2 CRUDE INCIDENCE RATES OF STROKE (PER 100,000 POPULATION), BY GENDER, 2007-2011

Gender	2007	2008	2009	2010	2011
Male	215.4 (207.8-223.0)	210.5 (203.1-218.0)	214.1 (206.7-221.5)	215.6 (208.2-222.9)	225.0 (217.5-232.5)
Female	169.4 (162.7-176.0)	165.9 (159.4-172.4)	162.5 (156.2-168.8)	163.0 (156.7-169.2)	162.2 (156.0-168.4)

Figure 4.2.3 AGE-STANDARDISED INCIDENCE RATES OF STROKE (PER 100,000 POPULATION), BY GENDER, 2007-2011

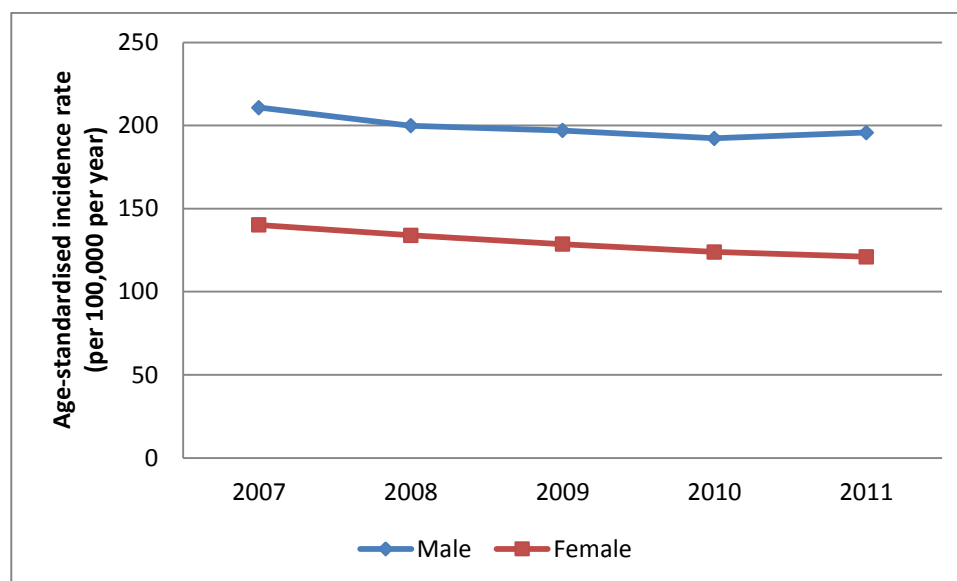


Table 4.2.3 AGE-STANDARDISED INCIDENCE RATES OF STROKE (PER 100,000 POPULATION), BY GENDER, 2007-2011

Gender	2007	2008	2009	2010	2011
Male	210.8 (203.2-218.4)	199.9 (192.7-207.1)	197.0 (190.1-203.9)	192.3 (185.6-199.0)	195.7 (189.1-202.4)
Female	140.2 (134.6-145.9)	133.9 (128.5-139.3)	128.6 (123.4-133.7)	123.9 (118.9-128.8)	121.0 (116.1-125.8)

Age-specific rates fluctuate among males and no obvious trend was found. The age-specific rates among females were decreasing above the 50-years age group (Table 4.2.4).

Table 4.2.4 AGE-SPECIFIC INCIDENCE RATES OF STROKE (PER 100,000 POPULATION), BY GENDER, 2007-2011

Male	Age Group	2007	2008	2009	2010	2011
	15-19	3.0 (0.1-6.0)	3.0 (0.1-5.9)	3.7 (0.5-7.0)	0.0 (0.0-0.0)	2.3 (0.0-4.8)
	20-24	3.6 (0.1-7.2)	3.5 (0.1-7.0)	4.1 (0.5-7.8)	5.6 (1.5-9.8)	6.2 (1.9-10.6)
	25-29	9.0 (3.7-14.3)	6.3 (1.9-10.7)	5.3 (1.4-9.2)	6.1 (1.9-10.3)	6.3 (1.9-10.7)
	30-34	12.7 (6.8-18.6)	13.7 (7.5-19.8)	12.6 (6.8-18.4)	16.1 (9.5-22.6)	20.4 (13.0-27.9)
	35-39	27.1 (18.7-35.5)	24.0 (16.2-31.9)	29.7 (21.1-38.2)	35.8 (26.4-45.2)	29.2 (20.7-37.7)
	40-44	58.3 (46.5-70.1)	49.1 (38.2-59.9)	64.8 (52.2-77.5)	69.3 (56.1-82.5)	66.4 (53.4-79.4)
	45-49	125.9 (108.5-143.4)	108.8 (92.7-125.0)	124.6 (107.5-141.8)	127.4 (110.1-144.7)	120.9 (104.0-137.7)
	50-54	220.2 (195.7-244.7)	221.7 (197.5-245.9)	238.0 (213.2-262.7)	247.5 (222.6-272.5)	282.5 (256.1-308.9)
	55-59	346.3 (311.6-381.1)	372.5 (337.2-407.8)	385.4 (350.3-420.4)	380.5 (346.3-414.8)	369.5 (336.6-402.5)
	60-64	613.2 (553.8-672.6)	541.8 (489.3-594.4)	560.3 (509.6-611.0)	487.4 (442.9-531.8)	501.9 (458.6-545.3)
	65-69	845.7 (768.0-923.4)	763.7 (690.4-837.0)	698.6 (629.0-768.2)	738.9 (666.0-811.9)	732.0 (659.9-804.1)
	70-74	1138.1 (1028.2-1248.0)	1088.0 (982.4-1193.6)	965.3 (869.5-1061.2)	895.4 (805.8-984.9)	965.3 (875.6-1055.0)
	75-79	1401.6 (1253.1-1550.2)	1414.1 (1268.4-1559.7)	1363.3 (1223.2-1503.3)	1276.0 (1144.2-1407.8)	1202.7 (1076.7-1328.8)
	80-84	1821.1 (1582.6-2059.6)	1689.4 (1467.7-1911.1)	1572.4 (1368.3-1776.5)	1770.5 (1561.3-1979.8)	1530.1 (1341.9-1718.3)
	85+	2012.0 (1706.9-2317.2)	2046.0 (1745.4-2346.5)	1891.3 (1610.3-2172.3)	1610.9 (1357.3-1864.5)	1941.2 (1670.8-2211.6)

Female	Age Group	2007	2008	2009	2010	2011
	15-19	1.6 (0.0-3.8)	3.9 (0.5-7.3)	3.1 (0.1-6.1)	1.5 (0.0-3.7)	3.1 (0.1-6.2)
	20-24	0.9 (0.0-2.7)	3.6 (0.1-7.1)	2.5 (0.0-5.3)	1.6 (0.0-3.9)	2.4 (0.0-5.0)
	25-29	3.0 (0.1-6.0)	4.4 (0.9-7.9)	4.9 (1.3-8.6)	7.8 (3.2-12.4)	5.2 (1.3-9.0)
	30-34	7.8 (3.4-12.3)	8.6 (3.9-13.3)	7.8 (3.4-12.2)	12.9 (7.2-18.5)	7.1 (2.9-11.2)
	35-39	12.9 (7.3-18.6)	14.6 (8.6-20.6)	18.5 (11.9-25.1)	18.3 (11.8-24.9)	14.2 (8.4-20.0)
	40-44	35.0 (25.9-44.2)	37.9 (28.3-47.5)	33.1 (24.1-42.1)	23.7 (16.0-31.3)	32.1 (23.2-41.0)
	45-49	69.2 (56.2-82.3)	51.5 (40.3-62.7)	73.9 (60.6-87.3)	63.7 (51.3-76.0)	67.7 (55.0-80.4)
	50-54	114.9 (97.0-132.7)	108.0 (91.0-125.0)	100.8 (84.6-117.0)	105.1 (88.7-121.5)	102.8 (86.7-118.9)
	55-59	181.7 (156.6-206.9)	175.5 (151.3-199.8)	151.5 (129.4-173.5)	158.2 (136.1-180.4)	141.5 (121.1-162.0)
	60-64	322.7 (280.2-365.1)	309.4 (270.3-348.4)	293.0 (256.8-329.2)	255.1 (223.4-286.9)	254.3 (223.8-284.7)
	65-69	548.3 (489.1-607.6)	480.2 (425.0-535.4)	486.0 (430.7-541.4)	438.2 (384.4-492.0)	430.5 (377.3-483.8)
	70-74	780.7 (696.6-864.8)	744.3 (663.5-825.1)	660.3 (586.9-733.7)	675.6 (603.4-747.9)	712.4 (641.2-783.7)
	75-79	1172.8 (1054.9-1290.8)	1152.7 (1037.6-1267.8)	1040.3 (933.0-1147.7)	1019.9 (917.0-1122.9)	1037.0 (934.4-1139.7)
	80-84	1625.0 (1444.7-1805.3)	1536.2 (1367.4-1705.1)	1575.2 (1411.6-1738.9)	1690.9 (1527.4-1854.3)	1394.5 (1249.9-1539.2)
	85+	2191.6 (1967.1-2416.1)	2265.5 (2043.8-2487.3)	2193.5 (1980.7-2406.4)	2074.5 (1873.0-2276.1)	1966.5 (1776.4-2156.6)

4.3 INCIDENCE OF STROKE CASES, BY ETHNIC GROUP, 2007 – 2011

Malays have the highest CIR for stroke, followed by Chinese and Indians (Figure 4.3.2).

Table 4.3.1 STROKE CASES, BY ETHNIC GROUP, 2007 – 2011

Ethnicity	2007	2008	2009	2010	2011
Chinese	4283	4292	4473	4493	4620
Malay	786	804	824	923	969
Indian	390	373	385	381	398
Others	117	112	75	86	95

Figure 4.3.2 CRUDE INCIDENCE RATE OF STROKE (PER 100,000 POPULATION), BY ETHNIC GROUP, 2007 – 2011

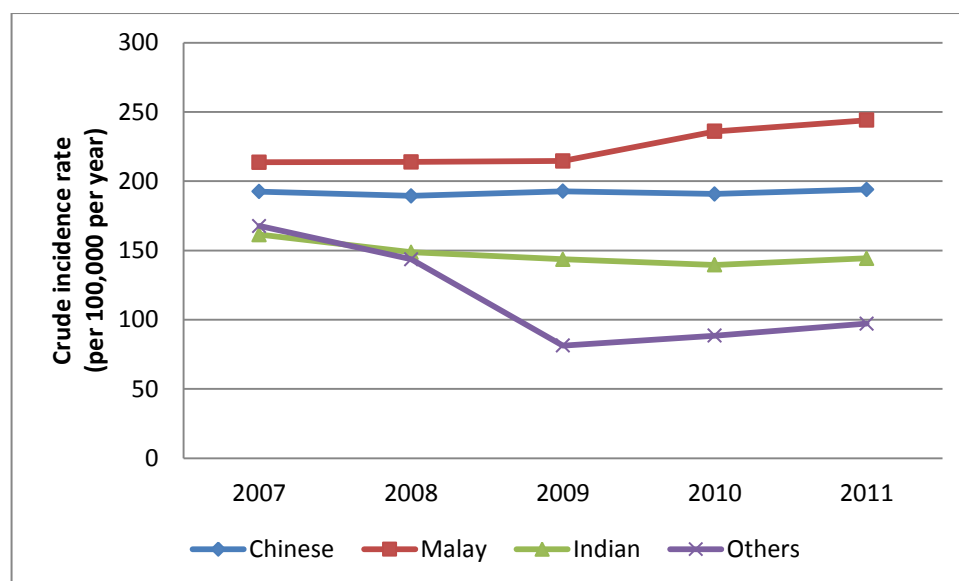


Table 4.3.2 CRUDE INCIDENCE RATE OF STROKE (PER 100,000 POPULATION), BY ETHNIC GROUP, 2007 – 2011

Ethnicity	2007	2008	2009	2010	2011
Chinese	192.5 (186.8-198.3)	189.4 (183.7-195.0)	192.7 (187.0-198.3)	190.7 (185.1-196.3)	194.0 (188.4-199.6)
Malay	213.6 (198.7-228.5)	213.8 (199.0-228.6)	214.5 (199.9-229.2)	235.9 (220.7-251.2)	244.0 (228.7-259.4)
Indian	161.4 (145.4-177.4)	148.7 (133.6-163.8)	143.6 (129.3-157.9)	139.5 (125.5-153.5)	144.3 (130.1-158.5)
Others	167.6 (137.2-198.0)	143.6 (117.0-170.2)	81.3 (62.9-99.6)	88.5 (69.8-107.2)	97.1 (77.6-116.7)

Malays have the highest ASIR from 2008 onwards, followed by Indians and Chinese, whose rates are similar (Figure 4.3.3).

The ASIR for Chinese and Indians has fallen over the 5-year period, more markedly/ significantly for Chinese.

Figure 4.3.3 AGE-STANDARDISED INCIDENCE RATE (PER 100,000 POPULATION) OF STROKE, BY ETHNIC GROUP, 2007 – 2011

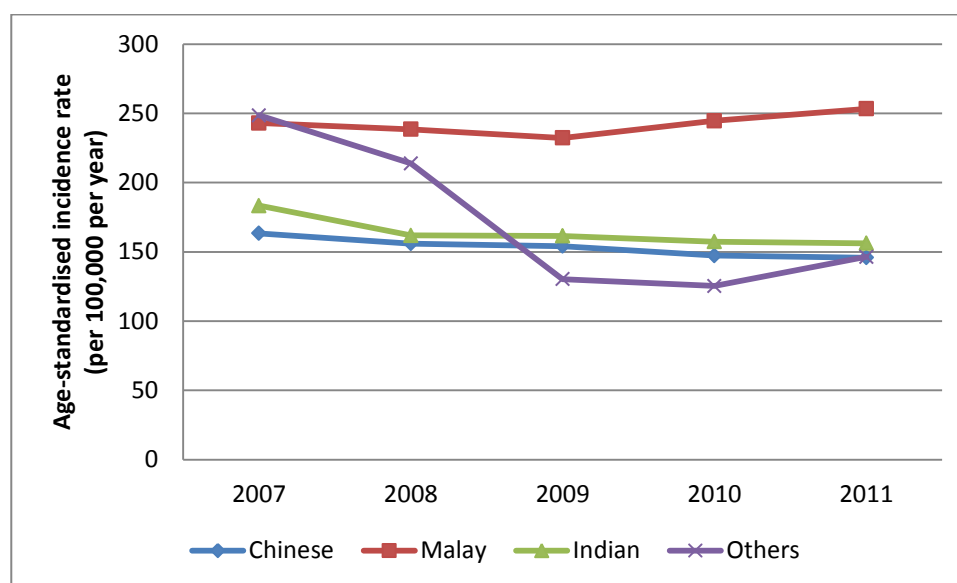


Table 4.3.3 AGE-STANDARDISED INCIDENCE RATE (PER 100,000 POPULATION) OF STROKE, BY ETHNIC GROUP, 2007 – 2011

Ethnicity	2007	2008	2009	2010	2011
Chinese	163.3 (158.4-168.3)	156.0 (151.2-160.7)	154.1 (149.5-158.7)	147.3 (142.9-151.7)	145.8 (141.5-150.1)
Malay	243.0 (225.4-260.7)	238.5 (221.5-255.5)	232.2 (215.7-248.6)	244.6 (228.2-261.1)	253.3 (236.6-270.0)
Indian	183.3 (164.4-202.2)	161.9 (144.9-179.0)	161.5 (144.7-178.2)	157.4 (141.0-173.8)	156.2 (140.2-172.1)
Others	248.5 (200.7-296.3)	213.9 (172.0-255.8)	130.3 (98.5-162.1)	125.3 (96.6-154.0)	146.4 (113.9-178.9)

Table 4.3.4 INCIDENT STROKE CASES, BY ETHNIC GROUP AND GENDER, 2007 – 2011

Gender	Ethnicity	2007	2008	2009	2010	2011
Males	Chinese	2349	2378	2505	2497	2613
	Malay	408	409	440	507	564
	Indian	239	229	230	234	242
	Others	77	55	42	53	52
Females	Chinese	1934	1914	1968	1996	2007
	Malay	378	395	384	416	405
	Indian	151	144	155	147	156
	Others	40	57	33	33	43

Table 4.3.5 CRUDE INCIDENCE RATE OF STROKE (PER 100,000 POPULATION), BY ETHNIC GROUP AND GENDER, 2007 – 2011

Gender	Ethnicity	2007	2008	2009	2010	2011
Males	Chinese	216.2 (207.5-224.9)	215.1 (206.5-223.8)	221.8 (213.1-230.4)	218.1 (209.5-226.6)	225.9 (217.3-234.6)
	Malay	224.7 (202.9-246.5)	220.5 (199.1-241.9)	232.6 (210.8-254.3)	263.0 (240.1-285.8)	288.2 (264.4-312.0)
	Indian	190.7 (166.6-214.9)	175.5 (152.8-198.2)	164.2 (143.0-185.4)	163.8 (142.8-184.8)	168.1 (146.9-189.2)
	Others	230.5 (179.0-282.0)	147.8 (108.8-186.9)	95.9 (66.9-124.9)	115.0 (84.1-146.0)	111.8 (81.4-142.2)
Females	Chinese	169.9 (162.4-177.5)	164.8 (157.5-172.2)	165.1 (157.8-172.4)	164.9 (157.6-172.1)	163.8 (156.7-171.0)
	Malay	202.8 (182.3-223.2)	207.3 (186.9-227.8)	197.0 (177.3-216.7)	209.7 (189.5-229.8)	201.1 (181.5-220.7)
	Indian	129.8 (109.1-150.5)	119.6 (100.1-139.1)	121.1 (102.0-140.2)	112.8 (94.6-131.0)	118.4 (99.8-136.9)
	Others	109.9 (75.8-143.9)	139.7 (103.4-176.0)	68.0 (44.8-91.3)	64.6 (42.6-86.7)	83.8 (58.8-108.9)

Malays had higher ASIR compared to Indians and Chinese among males and females. Among all combinations of gender and ethnicity, ASIR has been decreasing except for Malay males (Table 4.3.6)

Table 4.3.6 AGE-STANDARDISED INCIDENCE RATE OF STROKE (PER 100,000 POPULATION), BY ETHNIC GROUP AND GENDER, 2007 – 2011

Gender	Ethnicity	2007	2008	2009	2010	2011
Males	Chinese	201.6 (193.3-209.8)	193.7 (185.8-201.5)	192.3 (184.7-199.9)	182.5 (175.2-189.7)	183.5 (176.4-190.7)
	Malay	268.0 (241.0-295.1)	256.3 (230.6-282.1)	255.7 (230.8-280.6)	280.3 (254.7-306.0)	312.3 (285.1-339.5)
	Indian	212.1 (183.7-240.4)	191.2 (165.0-217.4)	189.7 (163.8-215.6)	185.3 (160.3-210.3)	186.2 (161.4-211.1)
	Others	310.1 (235.6-384.5)	212.9 (152.1-273.7)	134.2 (89.1-179.4)	149.8 (105.9-193.6)	143.4 (100.7-186.2)
Females	Chinese	127.9 (122.0-133.8)	120.8 (115.1-126.4)	117.9 (112.5-123.4)	112.9 (107.7-118.0)	110.4 (105.4-115.5)
	Malay	221.1 (198.0-244.3)	222.7 (200.1-245.2)	210.1 (188.4-231.8)	211.6 (190.5-232.8)	199.2 (179.0-219.4)
	Indian	160.8 (134.1-187.5)	131.5 (109.5-153.6)	135.9 (113.9-158.0)	129.6 (108.0-151.3)	126.4 (106.0-146.8)
	Others	183.6 (123.3-243.8)	221.6 (159.7-283.4)	124.2 (77.2-171.3)	101.6 (63.4-139.7)	144.2 (94.6-193.8)

4.4 INCIDENCE OF STROKE CASES, BY SUBTYPE, 2007 – 2011

Table 4.4.1 CRUDE INCIDENCE OF STROKE, BY SUBTYPE, 2007 – 2011

Subtype	2007	2008	2009	2010	2011
Ischaemic	4544	4454	4637	4743	4860
Haemorrhagic	1009	1096	1091	1124	1192
Unknown	23	31	29	16	30

The ASIR of ischaemic stroke has fallen over the 5-year period while the CIR of ischaemic stroke and incidence rates of haemorrhagic stroke have remained constant (Figure 4.4.2, 4.4.3).

Figure 4.4.2 CRUDE INCIDENCE RATE (PER 100,000 POPULATION) OF STROKE, BY SUBTYPE, 2007 – 2011

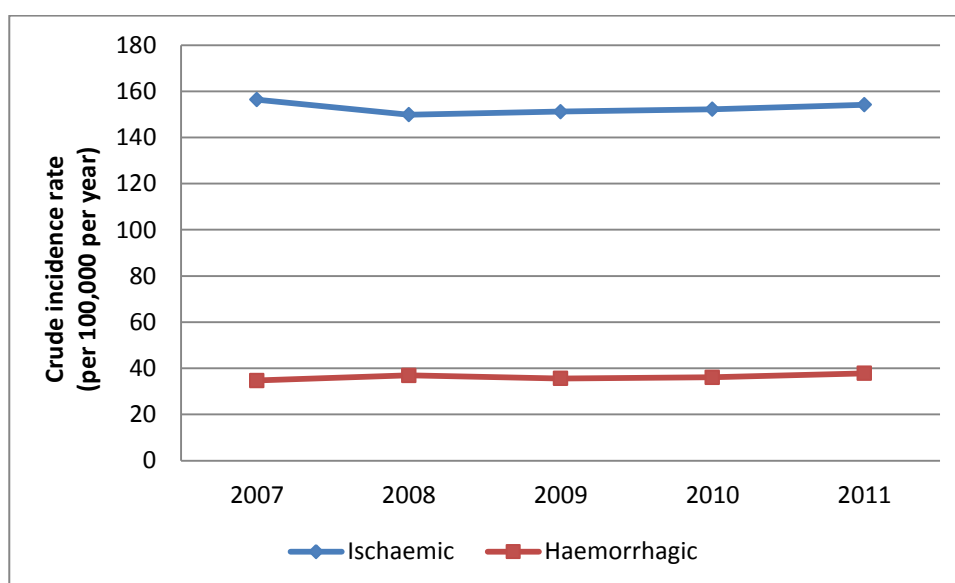


Table 4.4.2 CRUDE INCIDENCE RATE OF STROKE (PER 100,000 POPULATION), BY SUBTYPE, 2007 – 2011

Subtype	2007	2008	2009	2010	2011
Ischaemic	156.4 (151.9-161.0)	149.9 (145.5-154.3)	151.2 (146.9-155.6)	152.2 (147.8-156.5)	154.2 (149.8-158.5)
Haemorrhagic	34.7 (32.6-36.9)	36.9 (34.7-39.1)	35.6 (33.5-37.7)	36.1 (33.9-38.2)	37.8 (35.7-40.0)

Figure 4.4.3 AGE-STANDARDISED INCIDENCE RATE (PER 100,000 POPULATION) OF STROKE, BY SUBTYPE, 2007 – 2011

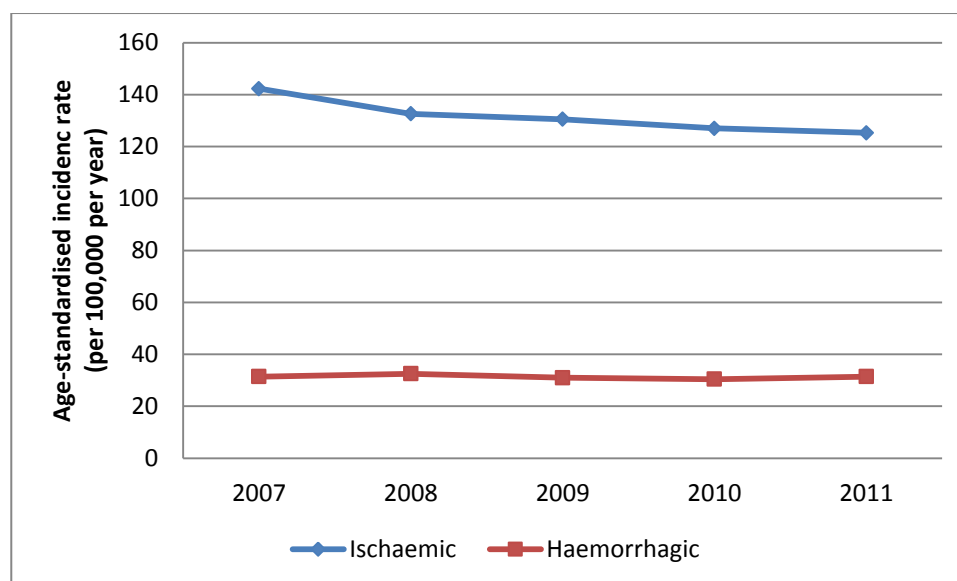


Table 4.4.3 AGE-STANDARDISED INCIDENCE RATE (PER 100,000 POPULATION) OF STROKE, BY SUBTYPE, 2007 – 2011

Subtype	2007	2008	2009	2010	2011
Ischaemic	142.3 (138.1-146.5)	132.6 (128.6-136.6)	130.5 (126.7-134.3)	127.0 (123.3-130.7)	125.3 (121.7-129.0)
Haemorrhagic	31.4 (29.5-33.4)	32.5 (30.5-34.5)	31.0 (29.1-32.9)	30.4 (28.6-32.2)	31.4 (29.6-33.3)

Table 4.4.4 CRUDE INCIDENCE OF STROKE, BY SUBTYPE AND GENDER, 2007 – 2011

Gender	Subtype	2007	2008	2009	2010	2011
Males	Ischaemic	2527	2450	2592	2667	2796
	Haemorrhagic	535	608	613	621	664
	Unknown	11	13	12	3	11
Females	Ischaemic	2017	2004	2045	2076	2064
	Haemorrhagic	474	488	478	503	528
	Unknown	12	18	17	13	19

Table 4.4.5 CRUDE INCIDENCE RATE OF STROKE (PER 100,000 POPULATION), BY SUBTYPE AND GENDER, 2007 – 2011

Gender	Subtype	2007	2008	2009	2010	2011
Males	Ischaemic	177.1 (170.2-184.0)	168.0 (161.3-174.6)	172.5 (165.8-179.1)	174.7 (168.1-181.3)	181.3 (174.5-188.0)
	Haemorrhagic	37.5 (34.3-40.7)	41.7 (38.4-45.0)	40.8 (37.6-44.0)	40.7 (37.5-43.9)	43.0 (39.8-46.3)
	Unknown	0.8 (0.3-1.2)	0.9 (0.4-1.4)	0.8 (0.3-1.3)	0.2 (0.0-0.4)	0.7 (0.3-1.1)
Females	Ischaemic	136.5 (130.5-142.4)	132.5 (126.7-138.3)	130.8 (125.2-136.5)	130.5 (124.9-136.1)	128.2 (122.7-133.8)
	Haemorrhagic	32.1 (29.2-35.0)	32.3 (29.4-35.1)	30.6 (27.8-33.3)	31.6 (28.9-34.4)	32.8 (30.0-35.6)
	Unknown	0.8 (0.4-1.3)	1.2 (0.6-1.7)	1.1 (0.6-1.6)	0.8 (0.4-1.3)	1.2 (0.6-1.7)

For ischaemic strokes, the ASIR among males was much higher than that among females, while the gender difference was small for haemorrhagic stroke. A downward trend was observed among both males and females for ischaemic stroke, but not for haemorrhagic stroke (Table 4.4.6)

Table 4.4.6 AGE-STANDARDISED INCIDENCE RATE OF STROKE (PER 100,000 POPULATION), BY SUBTYPE AND GENDER, 2007 – 2011

Gender	Subtype	2007	2008	2009	2010	2011
Males	Ischaemic	174.3 (167.3-181.2)	160.0 (153.5-166.4)	159.4 (153.1-165.6)	156.0 (150.0-162.1)	157.8 (151.9-163.8)
	Haemorrhagic	35.7 (32.6-38.8)	39.1 (35.9-42.2)	36.9 (33.9-39.8)	36.1 (33.2-39.0)	37.3 (34.4-40.1)
	Unknown	0.8 (0.3-1.3)	0.9 (0.4-1.4)	0.8 (0.3-1.2)	0.1 (0.0-0.3)	0.7 (0.3-1.1)
Females	Ischaemic	112.3 (107.2-117.3)	106.6 (101.8-111.4)	102.6 (98.0-107.2)	98.3 (93.9-102.7)	94.3 (90.0-98.5)
	Haemorrhagic	27.3 (24.8-29.8)	26.4 (24.0-28.8)	25.3 (22.9-27.6)	25.0 (22.7-27.2)	25.9 (23.7-28.2)
	Unknown	0.6 (0.3-1.0)	0.9 (0.5-1.4)	0.8 (0.4-1.1)	0.6 (0.3-0.9)	0.7 (0.4-1.1)

5. STROKE MORTALITY 2007 – 2011: ALL RESIDENTS

5.1 STROKE MORTALITY, OVERALL, 2007 – 2011

The age-standardised mortality rate (ASMR) of stroke has declined in the 4-year period but went up in year 2011 (Figure 5.1.1).

Table 5.1.1 STROKE MORTALITY (PER 100,000 POPULATION), OVERALL, 2007-2011

	2007	2008	2009	2010	2011
No. of death	1384	1358	1304	1373	1528
Crude rate	47.6 (45.1-50.2)	45.7 (43.3-48.1)	42.5 (40.2-44.8)	44 (41.7-46.4)	48.5 (46.0-50.9)
Age-standardised rate	41.1 (38.9-43.3)	38.5 (36.4-40.5)	34.9 (32.9-36.8)	34.7 (32.8-36.6)	36.8 (34.9-38.7)

Figure 5.1.1 STROKE MORTALITY (PER 100,000 POPULATION), OVERALL, 2007-2011

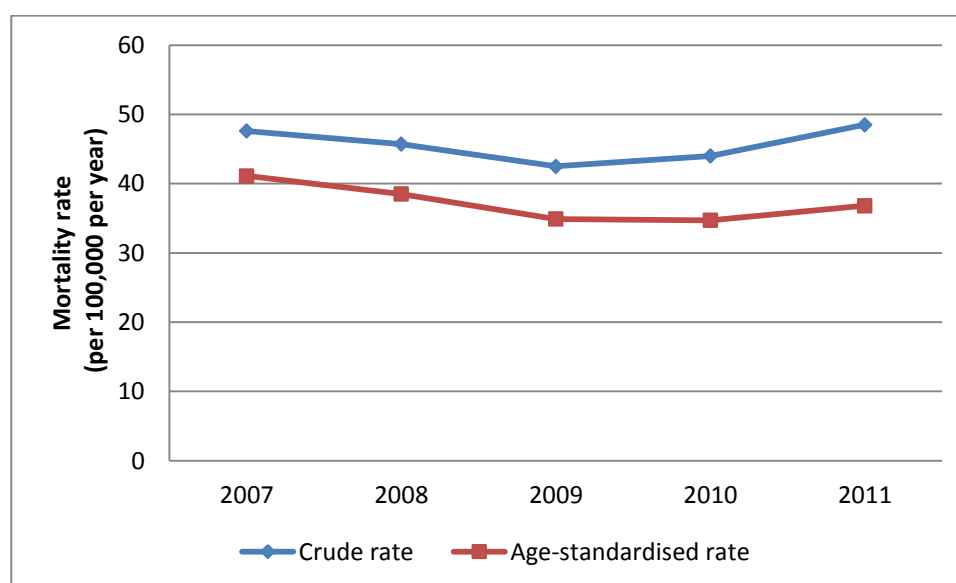


Table 5.1.2 STROKE MORTALITY BY AGE GROUP, OVERALL, 2007-2011

Age Group	2007	2008	2009	2010	2011
15-19	1	2	4	1	1
20-24	0	1	1	2	1
25-29	3	3	2	0	3
30-34	6	5	7	6	4
35-39	1	7	7	10	10
40-44	22	20	15	20	23
45-49	31	27	26	34	24
50-54	55	44	54	49	60
55-59	62	82	63	80	78
60-64	85	77	62	86	91
65-69	113	115	104	89	101
70-74	151	148	138	149	161
75-79	230	199	186	186	234
80-84	218	212	206	247	265
85+	406	416	429	414	472

There was a decline in age-specific mortality rates for those aged 60 years and above (Table 5.1.3).

Table 5.1.3 AGE-SPECIFIC STROKE MORTALITY RATE (PER 100,000 POPULATION), OVERALL, 2007-2011

Age Group	2007	2008	2009	2010	2011
15-19	0.4 (0.0-1.2)	0.8 (0.0-1.8)	1.5 (0.0-3.0)	0.4 (0.0-1.1)	0.4 (0.0-1.1)
20-24	0.0 (0.0-0.0)	0.4 (0.0-1.3)	0.4 (0.0-1.2)	0.8 (0.0-1.9)	0.4 (0.0-1.2)
25-29	1.2 (0.0-2.5)	1.1 (0.0-2.4)	0.7 (0.0-1.7)	0.0 (0.0-0.0)	1.1 (0.0-2.4)
30-34	2.0 (0.4-3.7)	1.7 (0.2-3.2)	2.4 (0.6-4.1)	2.0 (0.4-3.6)	1.3 (0.0-2.7)
35-39	0.3 (0.0-1.0)	2.3 (0.6-4.0)	2.2 (0.6-3.8)	3.1 (1.2-5.1)	3.2 (1.2-5.1)
40-44	6.9 (4.0-9.7)	6.3 (3.5-9.1)	4.8 (2.4-7.2)	6.5 (3.6-9.3)	7.5 (4.4-10.6)
45-49	9.8 (6.4-13.3)	8.5 (5.3-11.7)	8.1 (5.0-11.2)	10.5 (7.0-14.0)	7.4 (4.4-10.4)
50-54	19.7 (14.5-24.9)	15.2 (10.7-19.7)	18.2 (13.3-23.0)	16.2 (11.6-20.7)	19.5 (14.5-24.4)
55-59	28.1 (21.1-35.1)	35.7 (28.0-43.5)	26.3 (19.8-32.7)	32.2 (25.1-39.2)	29.9 (23.3-36.6)
60-64	62.7 (49.4-76.1)	50.3 (39.0-61.5)	36.5 (27.4-45.6)	44.8 (35.3-54.3)	43.7 (34.7-52.7)
65-69	99.3 (81.0-117.6)	99.8 (81.6-118.1)	89.4 (72.2-106.6)	79.8 (63.2-96.4)	89.9 (72.3-107.4)
70-74	192.1 (161.5-222.8)	182.0 (152.7-211.4)	157.7 (131.4-184.0)	160.9 (135.0-186.7)	161.0 (136.1-185.9)
75-79	404.9 (352.6-457.3)	337.3 (290.4-384.2)	302.9 (259.4-346.5)	285.4 (244.4-326.4)	349.8 (305.0-394.6)
80-84	692.1 (600.2-783.9)	625.4 (541.2-709.6)	555.3 (479.4-631.1)	620.0 (542.7-697.3)	628.0 (552.4-703.6)
85+	1624.0 (1466.0-1782.0)	1575.8 (1424.3-1727.2)	1543.2 (1397.1-1689.2)	1415.8 (1279.4-1552.2)	1517.7 (1380.8-1654.6)

The median age of stroke mortality was 77 years in the period 2007-2009 and it decreased to 76 years in the period 2010-2011 (Table 5.1.4).

Table 5.1.4 MEDIAN AGE OF STROKE MORTALITY, 2007-2011

	2007	2008	2009	2010	2011
Median Age	77	77	77	76	76

5.2 STROKE MORTALITY, BY GENDER, 2007 – 2011

Table 5.2.1 STROKE MORTALITY, BY GENDER, 2007-2011

Gender	2007	2008	2009	2010	2011
Male	634	608	594	640	703
Female	750	750	710	733	825

The CMR for females is higher than that for males and has remained more or less stable over the years (Figure 5.2.2).

Figure 5.2.2 CRUDE MORTALITY RATE (PER 100,000 POPULATION), BY GENDER, 2007-2011

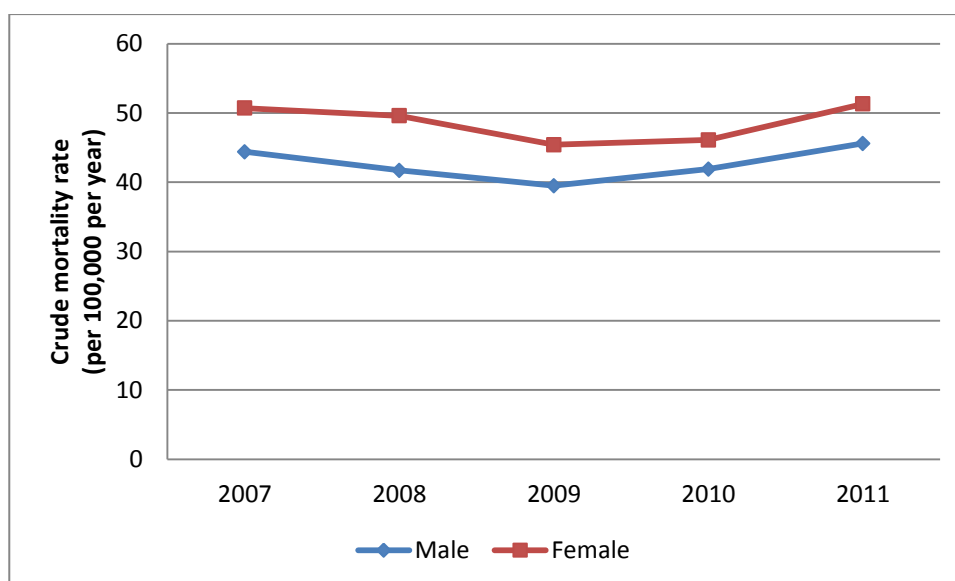


Table 5.2.2 CRUDE MORTALITY RATE (PER 100,000 POPULATION), BY GENDER, 2007-2011

Gender	2007	2008	2009	2010	2011
Male	44.4 (41.0-47.9)	41.7 (38.4-45.0)	39.5 (36.3-42.7)	41.9 (38.7-45.2)	45.6 (42.2-48.9)
Female	50.7 (47.1-54.4)	49.6 (46.0-53.1)	45.4 (42.1-48.8)	46.1 (42.7-49.4)	51.3 (47.8-54.7)

The ASMR is higher among males than females and has declined significantly until 2009 in both genders (Figure 5.2.3). Thereafter, the ASMR a slight upward trend appeared over 2010 and 2011.

Figure 5.2.3 AGE-STANDARDISED MORTALITY RATE (PER 100,000 POPULATION), BY GENDER, 2007-2011

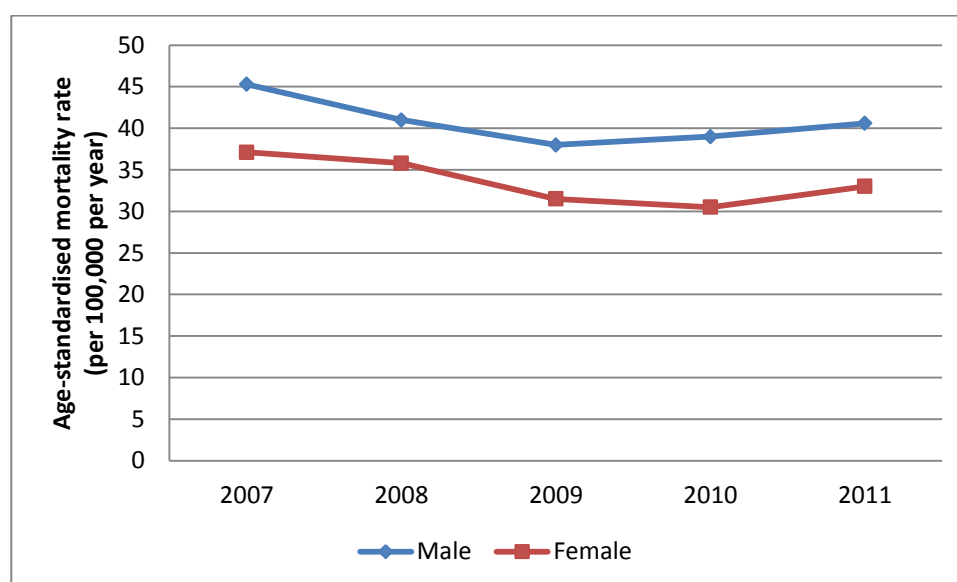


Table 5.2.3 AGE-STANDARDISED MORTALITY RATE (PER 100,000 POPULATION), BY GENDER, 2007-2011

Gender	2007	2008	2009	2010	2011
Male	45.3 (41.7-48.9)	41.0 (37.7-44.3)	38.0 (34.9-41.1)	39.0 (36.0-42.1)	40.6 (37.6-43.7)
Female	37.1 (34.4-39.8)	35.8 (33.1-38.4)	31.5 (29.1-33.9)	30.5 (28.2-32.8)	33.0 (30.6-35.3)

**Table 5.2.4 AGE-SPECIFIC MORTALITY RATE (PER 100,000 POPULATION), BY
GENDER, 2007-2011**

Male	Age Group	2007	2008	2009	2010	2011
	15-19	0.0 (0.0-0.0)	0.7 (0.0-2.2)	2.2 (0.0-4.8)	0.7 (0.0-2.2)	0.0 (0.0-0.0)
	20-24	0.0 (0.0-0.0)	0.0 (0.0-0.0)	0.0 (0.0-0.0)	1.6 (0.0-3.9)	0.8 (0.0-2.3)
	25-29	1.6 (0.0-3.9)	1.6 (0.0-3.8)	1.5 (0.0-3.6)	0.0 (0.0-0.0)	0.8 (0.0-2.3)
	30-34	1.4 (0.0-3.4)	2.2 (0.0-4.6)	2.8 (0.1-5.6)	2.1 (0.0-4.5)	2.1 (0.0-4.5)
	35-39	0.0 (0.0-0.0)	4.0 (0.8-7.2)	2.6 (0.1-5.1)	4.5 (1.2-7.8)	5.2 (1.6-8.8)
	40-44	9.3 (4.6-14.0)	8.2 (3.7-12.6)	6.4 (2.4-10.4)	8.5 (3.9-13.1)	6.6 (2.5-10.7)
	45-49	10.7 (5.6-15.7)	11.8 (6.5-17.1)	9.2 (4.5-13.9)	14.1 (8.3-19.8)	6.7 (2.8-10.7)
	50-54	23.4 (15.4-31.4)	17.2 (10.4-23.9)	24.7 (16.8-32.7)	21.0 (13.7-28.2)	25.7 (17.8-33.7)
	55-59	35.4 (24.3-46.5)	49.6 (36.7-62.5)	41.5 (30.0-53.0)	42.5 (31.0-53.9)	44.4 (33.0-55.8)
	60-64	81.0 (59.4-102.6)	61.1 (43.4-78.7)	52.6 (37.0-68.1)	59.1 (43.6-74.5)	53.5 (39.4-67.6)
	65-69	133.8 (102.9-164.7)	104.4 (77.3-131.5)	95.7 (69.9-121.4)	110.9 (82.4-138.9)	110.9 (82.8-139.0)
	70-74	209.9 (162.7-257.1)	202.7 (157.1-248.2)	188.1 (145.8-230.4)	177.2 (137.4-217.1)	193.1 (152.9-233.2)
	75-79	442.6 (359.1-526.1)	324.2 (254.5-394.0)	303.4 (237.3-369.4)	308.4 (243.6-373.2)	398.6 (326.1-471.2)
	80-84	674.8 (529.6-820.0)	712.1 (568.2-856.1)	600.0 (473.9-726.1)	624.5 (500.2-748.8)	644.6 (522.4-766.7)
	85+	1602.4 (1330.1-1874.7)	1448.3 (1195.4-1701.2)	1391.3 (1150.3-1632.3)	1361.5 (1128.3-1594.6)	1411.8 (1181.2-1642.4)

Female	Age Group	2007	2008	2009	2010	2011
	15-19	0.8 (0.0-2.4)	0.8 (0.0-2.3)	0.8 (0.0-2.3)	0.0 (0.0-0.0)	0.8 (0.0-2.3)
	20-24	0.0 (0.0-0.0)	0.9 (0.0-2.6)	0.8 (0.0-2.5)	0.0 (0.0-0.0)	0.0 (0.0-0.0)
	25-29	0.8 (0.0-2.2)	0.7 (0.0-2.2)	0.0 (0.0-0.0)	0.0 (0.0-0.0)	1.5 (0.0-3.5)
	30-34	2.6 (0.1-5.2)	1.3 (0.0-3.2)	1.9 (0.0-4.1)	1.9 (0.0-4.1)	0.6 (0.0-1.9)
	35-39	0.6 (0.0-1.9)	0.6 (0.0-1.9)	1.8 (0.0-3.9)	1.8 (0.0-3.9)	1.2 (0.0-2.9)
	40-44	4.4 (1.1-7.6)	4.4 (1.1-7.7)	3.2 (0.4-6.0)	4.5 (1.2-7.8)	8.3 (3.8-12.9)
	45-49	9.0 (4.3-13.7)	5.1 (1.6-8.6)	6.9 (2.8-11.0)	6.9 (2.8-10.9)	8.1 (3.7-12.5)
	50-54	15.9 (9.3-22.5)	13.2 (7.3-19.2)	11.5 (6.0-17.0)	11.3 (5.9-16.7)	13.1 (7.4-18.8)
	55-59	20.8 (12.3-29.3)	21.8 (13.3-30.4)	10.9 (5.0-16.8)	21.8 (13.6-30.0)	15.4 (8.6-22.1)
	60-64	45.1 (29.2-60.9)	39.8 (25.8-53.8)	20.9 (11.3-30.6)	30.9 (19.8-41.9)	34.2 (23.0-45.3)
	65-69	68.3 (47.4-89.3)	95.7 (71.1-120.3)	83.7 (60.8-106.7)	51.6 (33.1-70.0)	70.3 (48.8-91.9)
	70-74	176.9 (136.9-216.9)	164.4 (126.4-202.4)	131.6 (98.9-164.4)	146.8 (113.1-180.5)	133.6 (102.7-164.4)
	75-79	376.5 (309.7-443.4)	347.3 (284.1-410.5)	302.6 (244.7-360.5)	267.8 (215.1-320.6)	312.2 (255.8-368.5)
	80-84	703.1 (584.5-821.7)	570.0 (467.2-672.9)	526.5 (431.9-621.2)	617.1 (518.3-715.9)	617.2 (520.9-713.4)
	85+	1634.7 (1440.8-1828.6)	1638.4 (1449.8-1827.0)	1618.3 (1435.5-1801.1)	1442.5 (1274.4-1610.5)	1569.4 (1399.5-1739.2)

5.3 STROKE MORTALITY, BY ETHNICITY, 2007 – 2011

Table 5.3.1 STROKE MORTALITY, BY ETHNICITY, 2007-2011

Ethnicity	2007	2008	2009	2010	2011
Chinese	1051	1022	961	1024	1188
Malay	266	251	246	259	250
Indian	59	74	78	76	68
Others	8	11	19	14	22

The CMRs among the various ethnicities have remained stable while there was a decrease in ASMR among the Malays after 2008 (Figure 5.3.1). There were slight decreases in ASMR among Chinese and Indians (Figure 5.3.2). There was an upturn in 2011 among the Chinese.

Figure 5.3.1 CRUDE MORTALITY RATE OF STROKE (PER 100,000 POPULATION), BY ETHNICITY, 2007-2011

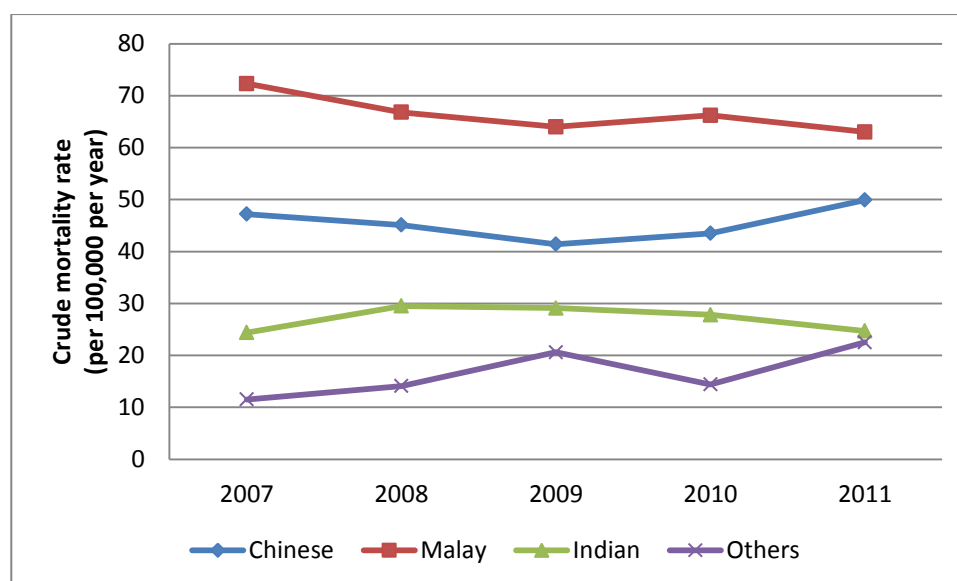


Table 5.3.2 CRUDE MORTALITY RATE OF STROKE (PER 100,000 POPULATION), BY ETHNICITY, 2007-2011

Ethnicity	2007	2008	2009	2010	2011
Chinese	47.2 (44.4-50.1)	45.1 (42.3-47.9)	41.4 (38.8-44.0)	43.5 (40.8-46.1)	49.9 (47.0-52.7)
Malay	72.3 (63.6-81.0)	66.8 (58.5-75.0)	64.0 (56.0-72.0)	66.2 (58.1-74.3)	63.0 (55.2-70.8)
Indian	24.4 (18.2-30.7)	29.5 (22.8-36.2)	29.1 (22.6-35.6)	27.8 (21.6-34.1)	24.7 (18.8-30.5)
Others	11.5 (3.5-19.4)	14.1 (5.8-22.4)	20.6 (11.3-29.8)	14.4 (6.9-22.0)	22.5 (13.1-31.9)

Figure 5.3.2 AGE-STANDARDISED MORTALITY RATE OF STROKE (PER 100,000 POPULATION), BY ETHNICITY, 2007-2011

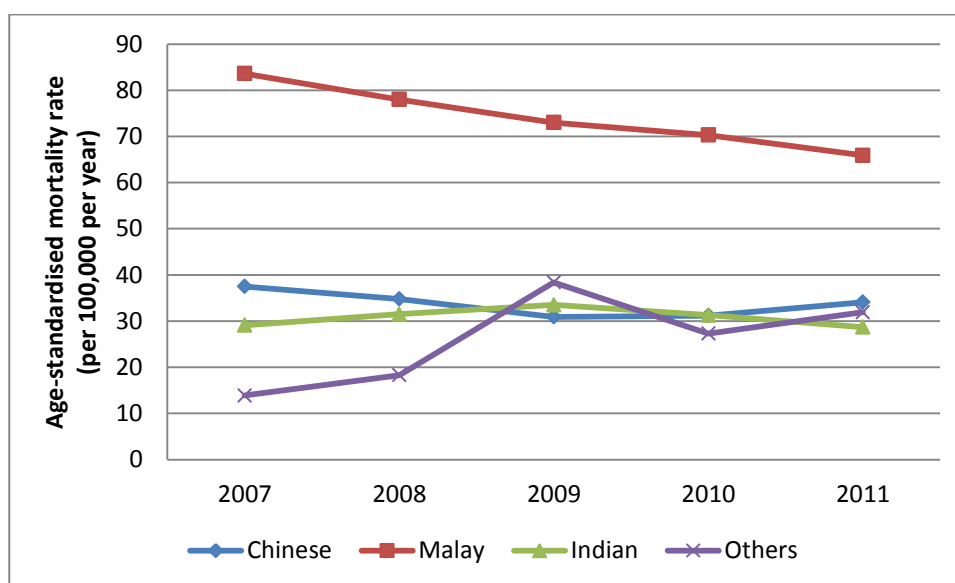


Table 5.3.3 AGE-STANDARDISED MORTALITY RATE OF STROKE, (PER 100,000 POPULATION), BY ETHNICITY, 2007-2011

Ethnicity	2007	2008	2009	2010	2011
Chinese	37.5 (35.2-39.8)	34.8 (32.6-37.0)	30.9 (28.9-32.9)	31.2 (29.3-33.2)	34.1 (32.1-36.1)
Malay	83.6 (73.2-94.0)	78.0 (68.1-87.9)	73.0 (63.6-82.4)	70.3 (61.5-79.2)	65.9 (57.4-74.4)
Indian	29.1 (21.4-36.7)	31.5 (24.1-38.9)	33.5 (25.8-41.2)	31.3 (24.0-38.5)	28.7 (21.6-35.9)
Others	13.9 (4.0-23.9)	18.3 (6.9-29.7)	38.4 (20.4-56.4)	27.3 (12.5-42.1)	31.9 (17.4-46.4)

Table 5.3.4 STROKE MORTALITY, BY ETHNIC GROUP AND GENDER, 2007 – 2011

Gender	Ethnicity	2007	2008	2009	2010	2011
Males	Chinese	472	448	427	481	537
	Malay	123	106	112	109	118
	Indian	34	50	48	45	36
	Others	5	4	7	5	12
Females	Chinese	579	574	534	543	651
	Malay	143	145	134	150	132
	Indian	25	24	30	31	32
	Others	3	7	12	9	10

Table 5.3.5 CRUDE MORTALITY RATE OF STROKE (PER 100,000 POPULATION), BY ETHNIC GROUP AND GENDER, 2007 – 2011

Gender	Ethnicity	2007	2008	2009	2010	2011
Males	Chinese	43.4 (39.5-47.4)	40.5 (36.8-44.3)	37.8 (34.2-41.4)	42.0 (38.3-45.8)	46.4 (42.5-50.4)
	Malay	67.7 (55.8-79.7)	57.1 (46.3-68.0)	59.2 (48.2-70.2)	56.5 (45.9-67.1)	60.3 (49.4-71.2)
	Indian	27.1 (18.0-36.3)	38.3 (27.7-48.9)	34.3 (24.6-44.0)	31.5 (22.3-40.7)	25.0 (16.8-33.2)
	Others	15.0 (1.8-28.1)	10.8 (0.2-21.3)	16.0 (4.1-27.8)	10.9 (1.3-20.4)	25.8 (11.2-40.4)
Females	Chinese	50.9 (46.7-55.0)	49.4 (45.4-53.5)	44.8 (41.0-48.6)	44.8 (41.1-48.6)	53.1 (49.1-57.2)
	Malay	76.7 (64.1-89.3)	76.1 (63.7-88.5)	68.8 (57.1-80.4)	75.6 (63.5-87.7)	65.5 (54.4-76.7)
	Indian	21.5 (13.1-29.9)	19.9 (12.0-27.9)	23.4 (15.1-31.8)	23.8 (15.4-32.2)	24.3 (15.9-32.7)
	Others	8.2 (0.0-17.6)	17.2 (4.4-29.9)	24.7 (10.7-38.7)	17.6 (6.1-29.1)	19.5 (7.4-31.6)

Table 5.3.6 AGE-STANDARDISED MORTALITY RATE OF STROKE (PER 100,000 POPULATION), BY ETHNIC GROUP AND GENDER, 2007 – 2011

Gender	Ethnicity	2007	2008	2009	2010	2011
Males	Chinese	42.8 (38.9-46.7)	38.2 (34.7-41.8)	34.2 (30.9-37.5)	36.8 (33.4-40.1)	38.6 (35.3-42.0)
	Malay	82.2 (67.2-97.2)	69.8 (56.1-83.4)	72.9 (59.1-86.8)	65.8 (53.0-78.6)	66.2 (53.8-78.7)
	Indian	31.3 (20.3-42.3)	38.3 (27.2-49.5)	38.9 (27.2-50.6)	35.9 (24.8-47.0)	30.0 (19.6-40.5)
	Others	14.5 (1.5-27.6)	10.5 (0.0-22.0)	34.0 (7.0-61.0)	18.8 (1.5-36.0)	38.4 (15.4-61.5)
Females	Chinese	33.0 (30.2-35.8)	31.5 (28.8-34.2)	27.2 (24.8-29.6)	26.2 (23.9-28.5)	29.7 (27.3-32.1)
	Malay	85.2 (70.7-99.7)	85.1 (71.0-99.2)	72.9 (60.2-85.7)	74.4 (62.1-86.7)	65.3 (53.7-76.9)
	Indian	30.7 (18.1-43.3)	24.7 (14.5-35.0)	30.3 (19.0-41.5)	26.8 (17.1-36.6)	29.5 (18.9-40.1)
	Others	12.1 (0.0-25.9)	20.9 (3.9-38.0)	39.1 (14.0-64.3)	35.1 (10.5-59.7)	21.6 (7.5-35.8)

5.4 STROKE MORTALITY, BY SUBTYPE, 2007 – 2011

Table 5.4.1 STROKE MORTALITY, BY SUBTYPE, 2007-2011

Subtype	2007	2008	2009	2010	2011
Ischaemic	146	139	95	106	106
Haemorrhagic	308	341	300	373	350
Unknown	930	878	909	894	1072

Figure 5.4.1 CRUDE MORTALITY RATE OF STROKE (PER 100,000 POPULATION), BY SUBTYPE, 2007-2011

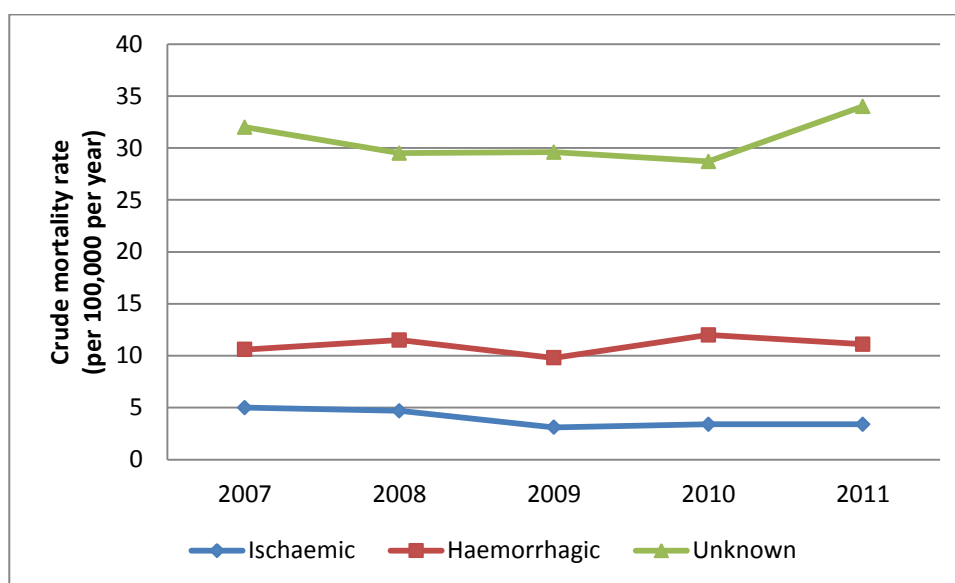


Table 5.4.2 CRUDE MORTALITY RATE (PER 100,000 POPULATION) OF STROKE, BY SUBTYPE, 2007-2011

Subtype	2007	2008	2009	2010	2011
Ischaemic	5.0 (4.2-5.8)	4.7 (3.9-5.5)	3.1 (2.5-3.7)	3.4 (2.8-4.0)	3.4 (2.7-4.0)
Haemorrhagic	10.6 (9.4-11.8)	11.5 (10.3-12.7)	9.8 (8.7-10.9)	12.0 (10.8-13.2)	11.1 (9.9-12.3)
Unknown	32.0 (30.0-34.1)	29.5 (27.6-31.5)	29.6 (27.7-31.6)	28.7 (26.8-30.6)	34.0 (32.0-36.0)

Figure 5.4.2 AGE-STANDARDISED MORTALITY RATE OF STROKE (PER 100,000 POPULATION), BY SUBTYPE, 2007-2011

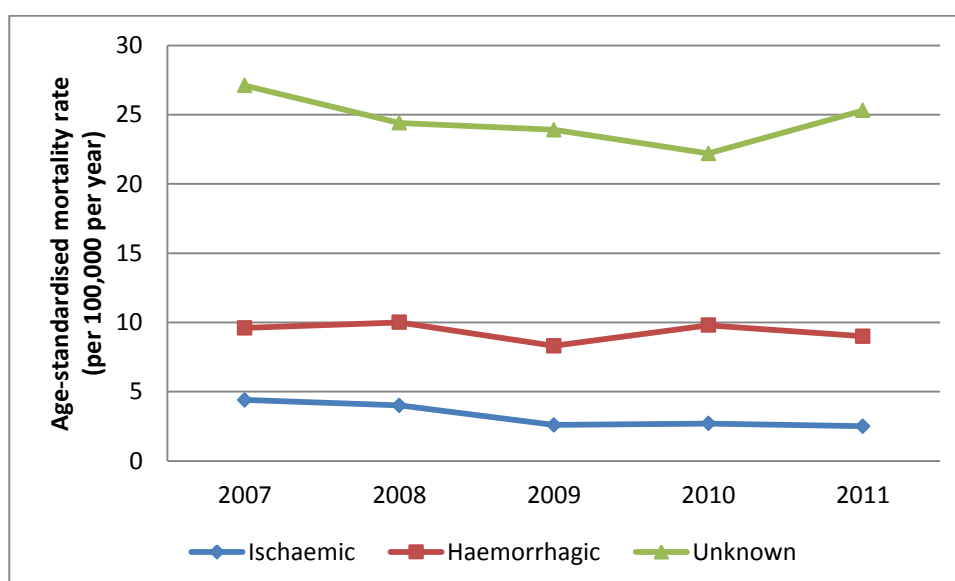


Table 5.4.3 AGE-STANDARDISED MORTALITY RATE (PER 100,000 POPULATION) OF STROKE, BY SUBTYPE, 2007-2011

Subtype	2007	2008	2009	2010	2011
Ischaemic	4.4 (3.7-5.1)	4.0 (3.3-4.7)	2.6 (2.1-3.2)	2.7 (2.2-3.3)	2.5 (2.0-3.0)
Haemorrhagic	9.6 (8.5-10.7)	10.0 (9.0-11.1)	8.3 (7.4-9.3)	9.8 (8.8-10.8)	9.0 (8.0-9.9)
Unknown	27.1 (25.3-28.8)	24.4 (22.7-26.0)	23.9 (22.3-25.5)	22.2 (20.7-23.6)	25.3 (23.7-26.8)

Table 5.4.4 STROKE MORTALITY, BY SUBTYPE AND GENDER, 2007 – 2011

Gender	Subtype	2007	2008	2009	2010	2011
Males	Ischaemic	55	65	45	40	53
	Haemorrhagic	167	180	165	215	183
	Unknown	412	363	384	385	467
Females	Ischaemic	91	74	50	66	53
	Haemorrhagic	141	161	135	158	167
	Unknown	518	515	525	509	605

Table 5.4.5 CRUDE MORTALITY RATE OF STROKE (PER 100,000 POPULATION), BY SUBTYPE AND GENDER, 2007 – 2011

Gender	Subtype	2007	2008	2009	2010	2011
Males	Ischaemic	3.9 (2.8-4.9)	4.5 (3.4-5.5)	3.0 (2.1-3.9)	2.6 (1.8-3.4)	3.4 (2.5-4.4)
	Haemorrhagic	11.7 (9.9-13.5)	12.3 (10.5-14.1)	11.0 (9.3-12.7)	14.1 (12.2-16.0)	11.9 (10.1-13.6)
	Unknown	28.9 (26.1-31.7)	24.9 (22.3-27.4)	25.6 (23.0-28.1)	25.2 (22.7-27.7)	30.3 (27.5-33.0)
Females	Ischaemic	6.2 (4.9-7.4)	4.9 (3.8-6.0)	3.2 (2.3-4.1)	4.1 (3.1-5.2)	3.3 (2.4-4.2)
	Haemorrhagic	9.5 (8.0-11.1)	10.6 (9.0-12.3)	8.6 (7.2-10.1)	9.9 (8.4-11.5)	10.4 (8.8-11.9)
	Unknown	35.0 (32.0-38.1)	34.0 (31.1-37.0)	33.6 (30.7-36.5)	32.0 (29.2-34.8)	37.6 (34.6-40.6)

Table 5.4.6 AGE-STANDARDISED MORTALITY RATE OF STROKE (PER 100,000 POPULATION), BY SUBTYPE AND GENDER, 2007 – 2011

Gender	Subtype	2007	2008	2009	2010	2011
Males	Ischaemic	3.9 (2.9-5.0)	4.3 (3.3-5.4)	2.9 (2.0-3.8)	2.4 (1.7-3.2)	3.0 (2.2-3.8)
	Haemorrhagic	11.3 (9.6-13.1)	11.5 (9.8-13.2)	10.1 (8.5-11.7)	12.7 (10.9-14.4)	10.5 (8.9-12.0)
	Unknown	30.0 (27.1-33.0)	25.1 (22.5-27.8)	25.0 (22.5-27.5)	24.0 (21.5-26.4)	27.2 (24.7-29.7)
Females	Ischaemic	4.7 (3.7-5.7)	3.5 (2.7-4.4)	2.2 (1.6-2.8)	2.9 (2.2-3.6)	2.1 (1.5-2.7)
	Haemorrhagic	8.1 (6.7-9.4)	8.7 (7.3-10.1)	6.7 (5.5-7.8)	7.3 (6.1-8.5)	7.6 (6.4-8.8)
	Unknown	24.3 (22.2-26.5)	23.5 (21.4-25.6)	22.6 (20.6-24.6)	20.3 (18.5-22.1)	23.3 (21.4-25.3)

The mortality rate of haemorrhagic stroke is 2 – 3.5 times that of ischaemic stroke. However, it is important to note the high percentage of stroke deaths with missing etiology at 65 - 70% (Table 5.4.2, 5.4.3).

6. STROKE 30-DAY CASE-FATALITY 2007 – 2011

6.1 STROKE 30-DAY CASE-FATALITY, OVERALL, 2007 – 2011

The 30-day case fatality refers to the percentage of stroke patients who died of stroke within 30 days of stroke onset, regardless if the death occurred in the hospital or elsewhere. This can be affected by several factors such as case severity, timing of presentation and treatment administered.

The number of stroke patients dying within 30 days had increased from 553 in 2007 to 634 in 2011. (Table 6.1.1) The crude case-fatality rates (CFR) have remained stable, ranging from 8.7% to 10.7% in 2007-2011. The age-standardised rates have also remained stable, ranging from 8.6% to 10.7% in 2007-2011.

Table 6.1.1 STROKE 30-DAY CASE-FATALITY, OVERALL, 2007 – 2011

	2007	2008	2009	2010	2011
No. of cases	553	576	483	571	634
Crude rate	10.2	10.7	8.7	10.0	10.7
Age-standardised rate	10.2	10.5	8.6	9.9	10.7

6.2 STROKE 30-DAY CASE-FATALITY, BY GENDER, 2007 – 2011

Table 6.2.1 STROKE 30-DAY CASE-FATALITY CASES, BY GENDER, 2007 – 2011

Gender	2007	2008	2009	2010	2011
Male	273	277	234	288	313
Female	280	299	249	283	321

Table 6.2.2 STROKE 30-DAY CASE-FATALITY RATES, BY GENDER, 2007 – 2011

Gender	2007	2008	2009	2010	2011
Male	9.2	9.3	7.5	9.0	9.3
Female	11.5	12.3	10.1	11.3	12.6

Similar to crude mortality rates, the CFR for females is greater than that for males (Table 6.2.2).

Table 6.2.3 AGE- STANDARDISED STROKE 30-DAY CASE-FATALITY RATES, BY GENDER, 2007 – 2011

Gender	2007	2008	2009	2010	2011
Male	9.9	9.9	7.9	9.7	10.1
Female	10.9	11.2	9.0	10.1	11.4

Also, the age-standardised case fatality rate is greater for females than males (Table 6.2.3).

6.3 STROKE 30-DAY CASE-FATALITY, BY ETHNICITY, 2007 – 2011

Chinese and Malays had similar case fatality rate, which were higher than Indians.

Table 6.3.1 STROKE 30-DAY CASE-FATALITY CASES, BY ETHNICITY, 2007 – 2011

Ethnicity	2007	2008	2009	2010	2011
Chinese	423	453	370	442	499
Malay	99	80	75	89	98
Indian	24	27	32	30	24
Others	7	16	6	10	13

Table 6.3.2 STROKE 30-DAY CASE-FATALITY RATES, BY ETHNICITY, 2007– 2011

Ethnicity	2007	2008	2009	2010	2011
Chinese	10.2	10.9	8.5	10.1	11.1
Malay	13.1	10.3	9.4	9.9	10.5
Indian	6.3	7.7	8.6	8.2	6.3
Others	6.3	14.4	8.2	11.8	14.3

Table 6.3.3 STROKE 30-DAY CASE-FATALITY CASES, BY ETHNICITY AND GENDER, 2007 – 2011

Gender	Ethnicity	2007	2008	2009	2010	2011
Males	Chinese	205	217	175	224	242
	Malay	46	36	34	40	52
	Indian	17	19	23	20	12
	Others	5	5	2	4	7
Females	Chinese	218	236	195	218	257
	Malay	53	44	41	49	46
	Indian	7	8	9	10	12
	Others	2	11	4	6	6

Table 6.3.4 STROKE 30-DAY CASE-FATALITY RATES, BY ETHNICITY AND GENDER, 2007– 2011

Gender	Ethnicity	2007	2008	2009	2010	2011
Males	Chinese	9.0	9.4	7.2	9.2	9.5
	Malay	11.6	9.1	8.0	8.1	9.5
	Indian	7.4	8.8	10.3	9.0	5.2
	Others	6.9	9.1	4.9	7.5	14.6
Females	Chinese	11.6	12.7	10.2	11.3	13.1
	Malay	14.7	11.5	11.0	12.1	11.9
	Indian	4.7	5.8	6.0	7.0	7.9
	Others	5.0	19.6	12.5	18.8	14.0

The 30-day CFR of haemorrhagic stroke is 4 – 5 times that of ischaemic stroke although the absolute number of cases is similar (Table 6.4.1, 6.4.2). However, unlike the mortality rate which had a large proportion of unknown subtypes, less than 2% of the in-hospital deaths were of unknown subtype.

6.4 STROKE 30-DAY CASE-FATALITY, BY SUBTYPE, 2007– 2011

Table 6.4.1 STROKE 30-DAY CASE-FATALITY CASES, BY SUBTYPE, 2007 – 2011

Subtype	2007	2008	2009	2010	2011
Ischaemic	282	285	239	257	304
Haemorrhagic	259	282	235	308	307
Unknown	12	9	9	6	23

Table 6.4.2 STROKE 30-DAY CASE-FATALITY RATES, BY SUBTYPE, 2007 – 2011

Subtype	2007	2008	2009	2010	2011
Ischaemic	6.4	6.6	5.3	5.6	6.4
Haemorrhagic	26.2	26.4	22.1	27.9	26.1

Table 6.4.3 STROKE 30-DAY CASE-FATALITY CASES, BY SUBTYPE AND GENDER, 2007 – 2011

Gender	Subtype	2007	2008	2009	2010	2011
Males	Ischaemic	132	130	105	112	145
	Haemorrhagic	134	144	127	176	160
	Unknown	7	3	2	0	8
Females	Ischaemic	150	155	134	145	159
	Haemorrhagic	125	138	108	132	147
	Unknown	5	6	7	6	15

Table 6.4.4 STROKE 30-DAY CASE-FATALITY RATES, BY SUBTYPE AND GENDER, 2007 – 2011

Gender	Subtype	2007	2008	2009	2010	2011
Males	Ischaemic	5.4	5.5	4.2	4.3	5.3
	Haemorrhagic	25.4	24.4	21.3	28.8	24.5
Females	Ischaemic	7.7	8.0	6.7	7.2	8.0
	Haemorrhagic	27.1	28.9	23.1	26.8	28.2

7. RISK FACTOR PROFILE OF INCIDENT STROKE (%), 2007 – 2011

7.1 RISK FACTOR PROFILE OF INCIDENT STROKE (%), OVERALL, 2007 – 2011

The risk factor profile of first incident stroke is given below and is defined as either having a history of or being newly diagnosed with the risk factor. The risk factor of smoker includes both ex and current smoker.

Hypertension and hyperlipidaemia were the two most common risk factors among the stroke patients (Table 7.1.1). The proportion of first-ever stroke patients with hyperlipidaemia has increased over time while that of other risk factors has remained stable.

Table 7.1.1 RISK FACTOR PROFILE OF INCIDENT STROKE (%), OVERALL, 2007 – 2011

Risk Factors (%)	Overall				
	2007	2008	2009	2010	2011
SMOKER	35.9	35.1	35.1	35.3	37.2
HYPERTENSION	78.3	79.2	79.4	78.1	78.6
DIABETES	40.1	39.4	38.5	39.0	39.1
HYPERLIPAEDEMIA	75.4	77.9	80.2	80.7	80.0
ATRIAL FIBRILLATION	13.4	15.2	13.7	15.0	16.3

There were higher proportions of women with diabetes, hypertension and atrial fibrillation compared to men (Table 7.1.2). Hyperlipidaemia and smoking were more common among men compared to women. There were 5 times more smokers among male stroke patients compared to female stroke patients.

Table 7.1.2 RISK FACTOR PROFILE OF INCIDENT STROKE (%), BY GENDER, 2007 – 2011

Risk Factor (%)	Male					Female				
	2007	2008	2009	2010	2011	2007	2008	2009	2010	2011
SMOKER	57.4	56.2	55.5	55.3	57.3	9.4	9.3	8.8	9.4	9.3
HYPERTENSION	76.9	78.0	76.6	76.3	76.9	80.2	80.8	83.0	80.4	81.0
DIABETES	37.7	38.0	37.0	37.5	37.1	43.0	41.1	40.3	40.9	41.8
HYPERLIPAEDEMIA	76.9	79.3	81.2	82.1	81.5	73.6	76.3	78.9	78.8	77.8
ATRIAL FIBRILLATION	11.9	13.3	12.1	11.4	13.8	15.1	17.4	15.7	19.6	19.7

Indians had the highest proportion of patients with diabetes and hyperlipidaemia, and the lowest proportion of patients with atrial fibrillation (Table 7.1.3). Hypertension was more common among Malay and Indian patients compared to Chinese patients.

Table 7.1.3 RISK FACTOR PROFILE OF INCIDENT STROKE (%), BY ETHNICITY, 2007 – 2011

Risk Factor (%)	Chinese					Malay				
	2007	2008	2009	2010	2011	2007	2008	2009	2010	2011
SMOKER	35.3	35.4	34.5	34.6	36.1	35.4	32.4	37.8	37.5	41.4
HYPERTENSION	78.4	78.3	78.9	77.9	78.2	79.2	83.3	82.1	78.5	79.7
DIABETES	36.2	36.3	35.2	35.7	35.1	52.0	45.9	47.0	47.6	49.3
HYPERLIPAEDEMIA	73.5	76.9	79.0	79.8	78.9	81.4	80.9	83.2	82.9	83.0
ATRIAL FIBRILLATION	14.3	15.9	14.4	15.5	17.3	12.2	14.2	13.7	14.9	13.5
Risk Factor (%)	Indian					Others				
	2007	2008	2009	2010	2011	2007	2008	2009	2010	2011
SMOKER	42.2	40.9	34.5	37.0	40.3	40.9	27.3	42.0	40.8	35.9
HYPERTENSION	77.5	82.9	78.8	80.2	80.9	74.2	73.9	78.0	73.7	80.8
DIABETES	59.2	60.7	57.9	57.3	60.1	34.4	42.0	36.0	40.8	41.0
HYPERLIPAEDEMIA	83.7	84.8	87.8	88.9	84.7	74.2	73.9	78.0	72.4	83.3
ATRIAL FIBRILLATION	5.9	9.7	6.1	9.5	10.4	11.8	12.5	8.0	13.2	19.2

Among all the ethnic groups, there were higher percentages of hypertensives, diabetics and patients with atrial fibrillation among females compared to males (Table 7.1.4). Conversely, there were higher percentages of smokers and patients with hyperlipaemia among males compared to females.

Table 7.1.4 RISK FACTOR PROFILE OF INCIDENT STROKE (%), BY ETHNICITY AND GENDER, 2007 – 2011

Risk Factor (%)	Chinese Males					Malay Males				
	2007	2008	2009	2010	2011	2007	2008	2009	2010	2011
SMOKER	55.3	55.0	53.9	53.4	55.0	63.8	61.5	63.0	63.5	65.5
HYPERTENSION	77.5	77.5	75.9	76.6	76.6	74.4	79.4	80.2	74.7	77.2
DIABETES	34.5	35.1	34.2	34.7	33.9	45.9	41.2	42.3	43.9	43.9
HYPERLIPAEDEMIA	75.4	78.9	80.1	81.2	80.7	81.3	79.7	84.7	83.9	84.1
ATRIAL FIBRILLATION	12.7	13.5	12.2	11.7	14.5	10.6	14.1	15.0	12.0	12.9
Risk Factor (%)	Indian Males					Others Males				
	2007	2008	2009	2010	2011	2007	2008	2009	2010	2011
SMOKER	65.9	62.9	57.2	57.1	66.5	58.1	45.7	58.1	56.3	47.6
HYPERTENSION	76.1	83.0	75.9	77.6	79.0	74.2	69.6	74.2	70.8	78.6
DIABETES	55.7	62.9	59.0	56.5	56.9	32.3	41.3	32.3	31.3	40.5
HYPERLIPAEDEMIA	83.5	84.3	87.3	90.1	85.6	75.8	71.7	77.4	75.0	78.6
ATRIAL FIBRILLATION	6.3	10.1	6.0	6.2	7.2	12.9	13.0	3.2	12.5	16.7

Risk Factor (%)	Chinese Females					Malay Females				
	2007	2008	2009	2010	2011	2007	2008	2009	2010	2011
SMOKER	11.1	10.7	9.7	10.5	10.3	2.5	4.3	6.6	5.1	5.2
HYPERTENSION	79.4	79.4	82.7	79.6	80.3	84.8	87.0	84.5	83.1	83.4
DIABETES	38.2	37.9	36.6	37.0	36.8	59.1	50.5	52.8	52.2	57.4
HYPERLIPAEDEMIA	71.2	74.4	77.7	77.9	76.4	81.5	82.1	81.4	81.5	81.3
ATRIAL FIBRILLATION	16.3	18.9	17.1	20.3	21.0	14.1	14.3	12.1	18.5	14.5
Risk Factor (%)	Indian Females					Others Females				
	2007	2008	2009	2010	2011	2007	2008	2009	2010	2011
SMOKER	5.3	5.1	0.9	5.0	4.1	6.5	7.1	15.8	14.3	22.2
HYPERTENSION	79.6	82.7	83.0	84.2	83.5	74.2	78.6	84.2	78.6	83.3
DIABETES	64.6	57.1	56.3	58.4	64.5	38.7	42.9	42.1	57.1	41.7
HYPERLIPAEDEMIA	84.1	85.7	88.4	87.1	83.5	71.0	76.2	78.9	67.9	88.9
ATRIAL FIBRILLATION	5.3	9.2	6.3	14.9	14.9	9.7	11.9	15.8	14.3	22.2

Diabetes and hyperlipidaemia were about twice as common among ischaemic stroke patients than among haemorrhagic stroke patients while atrial fibrillation was more than three times as common (Table 7.1.5).

Table 7.1.5 RISK FACTOR PROFILE OF INCIDENT STROKE (%), BY SUBTYPE, 2007 – 2011

Risk Factor (%)	Ischaemic					Haemorrhagic				
	2007	2008	2009	2010	2011	2007	2008	2009	2010	2011
SMOKER	38.4	38.0	38.1	38.1	40.2	25.7	24.5	22.5	23.9	25.5
HYPERTENSION	77.9	79.1	79.3	78.2	79.5	80.3	79.9	79.4	77.8	75.1
DIABETES	44.1	43.7	42.5	43.0	43.3	23.2	22.9	21.8	22.1	22.1
HYPERLIPAEDEMIA	84.1	87.8	89.0	88.7	88.9	38.8	40.7	44.2	47.5	44.9
ATRIAL FIBRILLATION	15.1	17.3	15.6	17.1	19.0	6.0	7.2	5.7	6.0	5.6

Table 7.1.6 RISK FACTOR PROFILE OF INCIDENT STROKE (%), BY SUBTYPE AND GENDER, 2007 – 2011

Risk Factor (%)	Ischaemic Males					Haemorrhagic Males				
	2007	2008	2009	2010	2011	2007	2008	2009	2010	2011
SMOKER	60.9	60.5	60.6	59.2	61.3	41.8	39.2	34.3	38.4	41.2
HYPERTENSION	75.4	77.0	75.3	75.4	77.0	83.7	81.9	81.6	79.8	76.8
DIABETES	41.0	41.8	40.9	41.8	40.9	22.9	23.3	20.6	18.9	21.1
HYPERLIPAEDEMIA	85.4	88.7	90.4	89.7	89.7	38.7	42.7	43.7	50.1	47.7
ATRIAL FIBRILLATION	12.9	15.0	13.4	12.8	15.9	7.8	6.6	6.4	5.5	5.5
Risk Factor (%)	Ischaemic Females					Haemorrhagic Females				
	2007	2008	2009	2010	2011	2007	2008	2009	2010	2011
SMOKER	9.8	10.0	9.1	10.3	10.3	7.8	7.0	7.6	5.8	5.5
HYPERTENSION	81.1	81.8	84.5	81.8	83.2	76.5	77.5	76.6	75.2	73.1
DIABETES	48.0	46.2	44.4	44.6	46.7	23.5	22.5	23.4	26.1	23.4
HYPERLIPAEDEMIA	82.5	86.6	87.3	87.5	87.8	38.9	38.4	44.8	44.3	41.4
ATRIAL FIBRILLATION	18.0	20.1	18.5	22.8	23.5	4.1	7.8	4.9	6.6	5.7

8. MEDICATION (%) 2007 – 2011: ISCHAEMIC STROKE PATIENTS

8.1 MEDICATION (%), 2007 – 2011

The percentage of patients given anticoagulants upon arrival and upon discharge had increased between 2009 and 2010 (Figure 8.1.1, 8.1.3). The percentage of patients given antiplatelets upon arrival had increased from 2009-2011 (Figure 8.1.1). While there was no discernible trend in the medication given to stroke patients during hospitalisation, the percentage of stroke patients given antiplatelets during hospitalisation has exceeded 90% since 2009 (Figure 8.1.2).

Among patients with either newly diagnosed or a history of atrial fibrillation (AF), the percentage of patients given anticoagulants upon arrival and upon discharge both increased from 2009 to 2010, but decreased a bit in 2011 (Figure 8.1.1, 8.1.3).

Figure 8.1.1 MEDICATION ON ARRIVAL (STAT DOSES) (%), OVERALL, 2009 – 2011

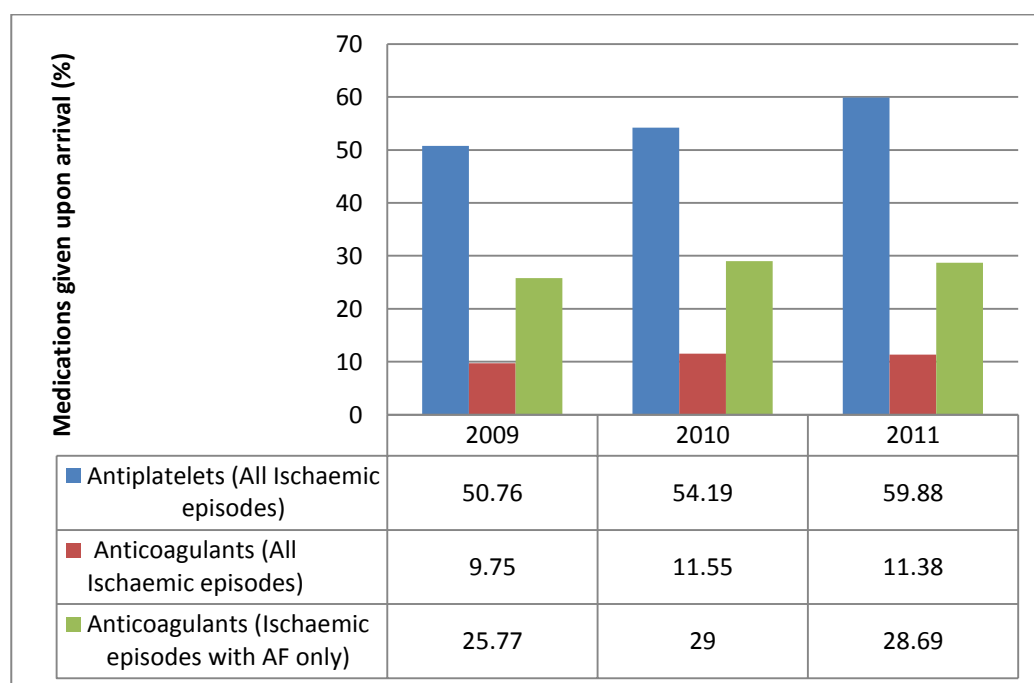


Figure 8.1.2 MEDICATION DURING HOSPITALISATION (%), OVERALL, 2007 – 2011

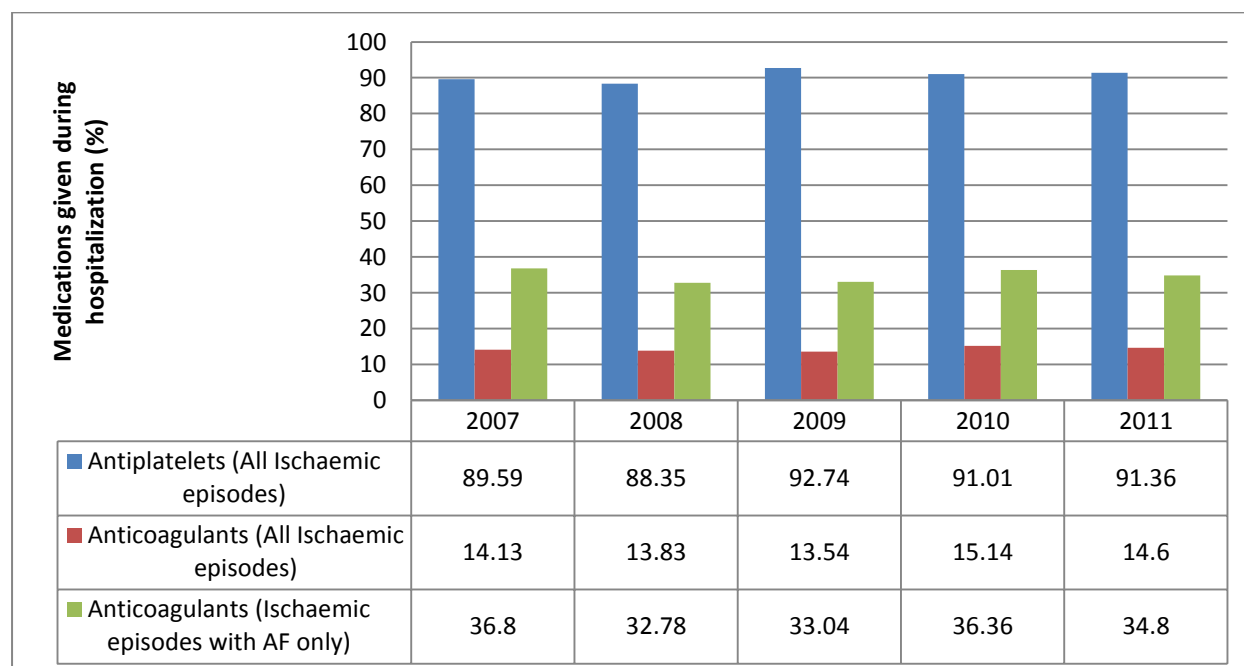
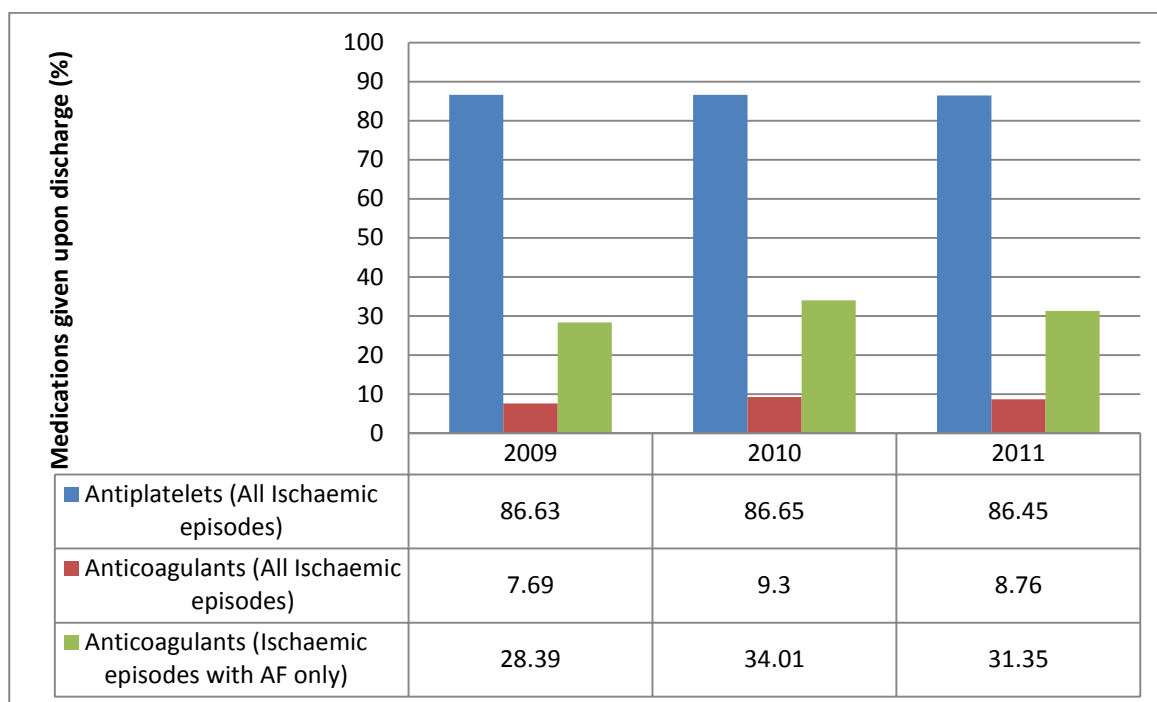


Figure 8.1.3 MEDICATION UPON DISCHARGE (%), OVERALL, 2009 – 2011



9. INPATIENT EVENTS / COMPLICATIONS (%), 2007-2011

The two most common complications seen in stroke cases include urinary tract infections (UTI) and pneumonia (Figure 9.1.1). As there were no discernible trends in specific complication rates over the 5-year period, they are not presented here. The percentage of stroke patients with no common complications has remained above 80% since 2007.

Figure 9.1.1 INPATIENT EVENTS / COMPLICATIONS (%), OVERALL, 2007 – 2011

