



Singapore Stroke Registry Interim Annual Registry Report Trends In Stroke In Singapore 2009-2013

**National Registry of Diseases Office
(NRDO)**

Acknowledgement

This report was produced with joint efforts from the following:

HEALTH PROMOTION BOARD

Research & Strategic Planning Division

Director Dr Chew Ling

National Registry of Diseases Office

Deputy Director Dr Chow Khuan Yew

Epidemiologist Dr Jin Aizhen

Registry Coordinators Ms Yeo Nguang Luang

Ms Koh Geok Yan

Ms Teo Wan Cheng

Ms Yeo Siok Leng

Ms Lim Mui Yang

Ms Lucille Hoi

Data Management Mr William Ho

TABLE OF CONTENTS

EXECUTIVE SUMMARY	1
1 INCIDENCE	4
1.1 INCIDENCE TRENDS OF STROKE FOR ADMISSION TO PUBLIC HOSPITALS, 2009 - 2013	4
FIGURE 1.1.1: Number of Stroke (First-Ever and Recurrent) Cases among Singapore Residents Admitted to Public Hospitals, 2009-2013	4
FIGURE 1.1.2: Age-Standardised Incidence Rate of Total (First-Ever and Recurrent) Stroke among Singapore Residents aged above 15 Years Admitted to Public Hospitals, 2009-2013	4
FIGURE 1.1.3: Age-Standardised Incidence Rate of Total (First-Ever and Recurrent) Stroke among Singapore Residents aged 25-64 Years Admitted to Public Hospitals, 2009-2013.....	5
FIGURE 1.1.4: Age-specific Incidence Rates of Stroke among Singapore Residents Admitted to Public Hospitals by Gender, 2009-2013	5
1.2 INCIDENCE OF STROKE ADMITTED TO PUBLIC HOSPITALS, 2013	6
TABLE 1.2.1: Number of Stroke (First-Ever and Recurrent) Cases among Singapore Residents admitted to Public Hospitals, 2013.....	6
TABLE 1.2.2: Crude and Age-Standardised Incidence Rate of Total (First-Ever and Recurrent) Stroke among Singapore Residents aged above 15 Years Admitted to Public Hospitals, 2013 ...	7
TABLE 1.2.3: Crude and Age-Standardised Incidence Rate of Total (First-Ever and Recurrent) Stroke among Singapore Residents aged 25-64 Years Admitted to Public Hospitals, 2013	8
TABLE 1.2.4: Age-Specific Incidence Rates of Stroke among Singapore Residents Admitted to Public Hospitals by Gender and Race, 2013	9
2.1 MORTALITY TRENDS FROM STROKE DURING HOSPITALISATION, 2009-2013	9
FIGURE 2.1.1: Age-Standardised Mortality Rate of Total (first-Ever and Recurrent) Stroke among Singapore Residents aged above 15 Years Admitted to Public Hospitals, 2009-2013	9
FIGURE 2.1.2: Age-Standardised Mortality Rates of Total (first-Ever and Recurrent) Stroke among Singapore Residents aged 25-64 Years Admitted to Public Hospitals, 2009-2013.....	10
FIGURE 2.1.3: Age-Specific Mortality Rates of Stroke among Singapore Residents Admitted to Public Hospitals by Gender, 2009-2013	10
2.2 MORTALITY FROM STROKE DURING HOSPITALISATION, 2013.....	11
TABLE 2.2.1: Number of Hospital Deaths (First-Ever and Recurrent) among Singapore Residents Admitted to Public Hospitals, 2013	11
TABLE 2.2.2: Crude and Age-Standardised Mortality Rates of Total (First-Ever and Recurrent) Stroke among Singapore Residents aged above 15 years Admitted to Public Hospitals, 2013 ..	12
TABLE 2.2.3: Crude and Age-Standardised Mortality Rate of Total (First-Ever and Recurrent) Stroke among Singapore Residents aged 25-64 Years Admitted to Public Hospitals, 2013	13
TABLE 2.2.4: Age-Specific Mortality Rates of Stroke among Singapore Residents Admitted to Public Hospitals by Gender and Race, 2013	14
2.3 STROKE 30-DAY CASE-FATALITY 2009 – 2013	14
Table 2.3.1 Stroke 30-Day Case-Fatality, 2009 – 2013	14
2.3.1 STROKE 30-DAY CASE-FATALITY, BY GENDER, 2009 – 2013	14
Table 2.3.1.1 Age- Standardised Stroke 30-Day Case-Fatality Rates, by Gender, 2009 – 2013	14
2.3.2 STROKE 30-DAY CASE-FATALITY, BY ETHNICITY, 2009 – 2013.....	15
Table 2.3.2.1 Stroke 30-Day Case-Fatality Rates, by Gender and Race, 2009– 2013	15
2.3.3 STROKE 30-DAY CASE-FATALITY, BY SUBTYPE, 2009– 2013.....	15
Table 2.3.3.1 Stroke 30-Day Case-Fatality Rates, by Gender and Subtype, 2009 – 2013.....	15

EXECUTIVE SUMMARY

Period:

1 January 2009– 31 December 2013

Source of Data:

The source of data came mainly from the Mediclaims listing, supplemented by Hospital Inpatient Discharge Summary (HIDS) review and Death Registry, which resides with the Ministry of Home Affairs (MHA). Unless otherwise stated, all the age-standardised rates in this report are per 100,000 *world standard* population. This report is preliminary.

Findings:

Stroke Incidence, 2009-2013

There was an increasing trend in the number of ischaemic strokes in the males and haemorrhagic strokes in the female during the period 2009-2013 (**Figure 1.1.1**). But the corresponding age-standardised incidence rates were stable (156.4-159.9 per 100,000 among ischaemic males and 25.0-26.3 per 100,000 among haemorrhagic females) (**Figure 1.1.2**). Similarly, the incidence rates in those aged from 25-64 were also stable (**Figure 1.1.3**). Incidence of the stroke remained stable could be due to the national efforts to reduce preventable risk factors and to encourage healthy life style.

The age-specific incidence rates were highest among patients aged 75 years and above, whereas there was a decline in rates for those aged 75 years and above in the period 2009 to 2013 for both genders (**Figures 1.1.4**).

In the year 2013, the total number of stroke episodes among Singapore residents (citizens and permanent residents) in public hospitals was 6567, of which 9 were younger than 15 years old. Hence the number of stroke patients among Singapore Residents in the year 2013 who were 15 years and older was 6558 (**Table 1.2.1**).

Of all the stroke cases in 2013, 80.4% were ischaemic stroke, 16.5% were parenchymal haemorrhage, 2.7% were subarachnoid haemorrhage and 0.4% were of unknown aetiology.

Malays had the highest overall age-standardised incidence followed by Indians and Chinese (**Table 1.2.2**). Similarly, Malays had the highest age-standardised incidence rates for 25-64 years first-ever and recurrent stroke cases (**Table 1.2.3**). This could be due to the higher risk factors for stroke among Malays, such as hypertension and hyperlipidemia, which was reported by The Singapore National Health Survey 2010.

Generally males were affected more than females, with the incidence rate being 1.7 times higher in males. For the 25 – 64 years age group, the incidence of stroke among males was 2.2 times more than females. Malays had higher age specific rates than all other ethnic groups, among both males and females (**Table 1.2.4**).

Stroke In-Hospital Mortality, 2009-2013

Downward trends were observed among males (especially among ischaemic males) for all patients and also for patients aged 25-64 (**Figure 2.1.1, Figure 2.1.2**).

As with the age specific incidence rates, the age specific mortality rates were highest among patients aged 75 years and older in the period 2009-2013 for both genders (**Figure 2.1.3**).

A total of 692 hospital deaths occurred among stroke patients admitted to public hospitals in 2013 (**Table 2.2.1**). Of the hospital deaths, 51.4% were ischaemic stroke, 45.8% were hemorrhagic stroke while 2.7% were strokes of unknown aetiology.

Malays had the highest age-standardised mortality rate for both genders (**Table 2.2.2**), partly due to the high incidence of stroke. Similarly, Malays had the highest mortality in the 25-64 age group for females. But Indians had the highest mortality for males (**Table 2.2.3**). The numbers of in hospital death for Malays and Indians were both small, therefore there was a variation of the ordering. But the mortality rate for Chinese remained the lowest. The age specific mortality rates for hospital deaths are shown in **Table 2.2.4**.

Case Fatality Rate 2009-2013

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 overall crude 30-day case-fatality rates (CFR) have remained stable, ranging from 8.4% to 10.5% in 2009-2013 (**Table 2.3.1**). The age-standardised rates have also remained stable. The CFR for females is greater than that for males (**Table 2.3.1.1**).

Snapshot was done on 07.04.2014. Death information was updated to 28.02.2014.

DEFINITIONS / GLOSSARY

MediClaims	-	MediClaims is used in Singapore to process the patient's Medisave and MediShield claims.
Paediatric age group	-	Aged between 0 and 14 years (inclusive).
Singapore residents	-	Citizens and permanent residents
Internally Age-Standardised Incidence Rate	-	The internally age-standardised incidence rate is used to age-standardise incidence against the age structure of Singapore's population as at the 2010 Census. This metric is used to compare the incidence rates in Singapore over time.

MHA Ministry of Home Affairs

MONICA Monitoring Trends and Determinants in Cardiovascular Disease,
World Health Organization

NRDO National Registry of Diseases Office

NRIC National Registration Identity Card

TIA Transient Ischaemic Attack

1 INCIDENCE

1.1 INCIDENCE TRENDS OF STROKE FOR ADMISSION TO PUBLIC HOSPITALS, 2009 - 2013

FIGURE 1.1.1: Number of Stroke (First-Ever and Recurrent) Cases among Singapore Residents Admitted to Public Hospitals, 2009-2013

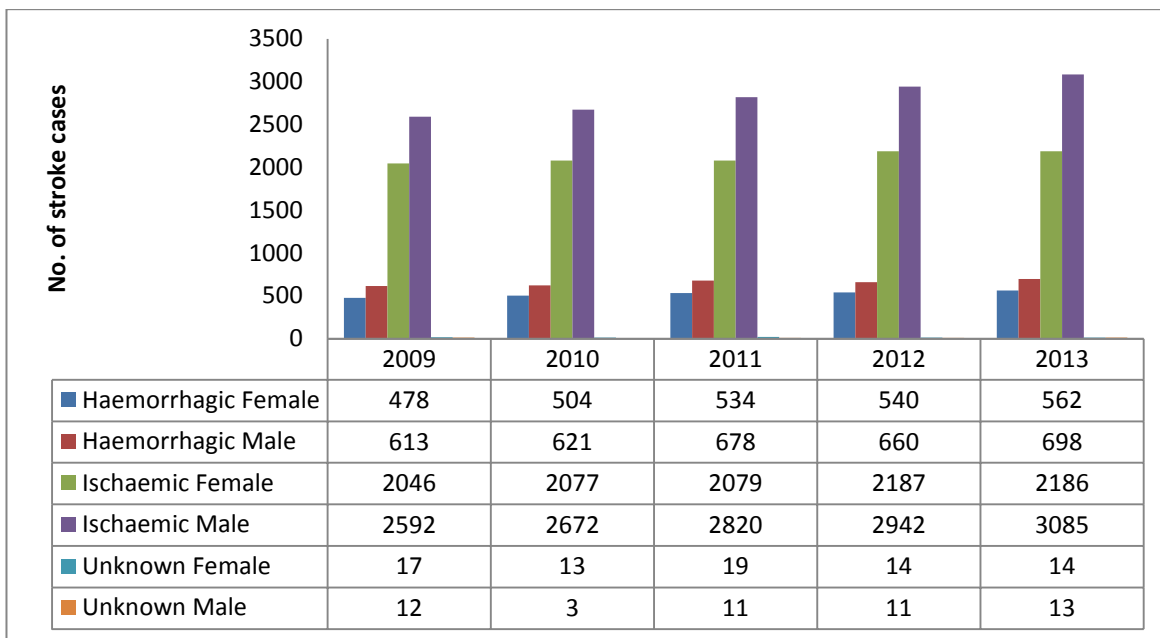


FIGURE 1.1.2: Age-Standardised Incidence Rate of Total (First-Ever and Recurrent) Stroke among Singapore Residents aged above 15 Years Admitted to Public Hospitals, 2009-2013

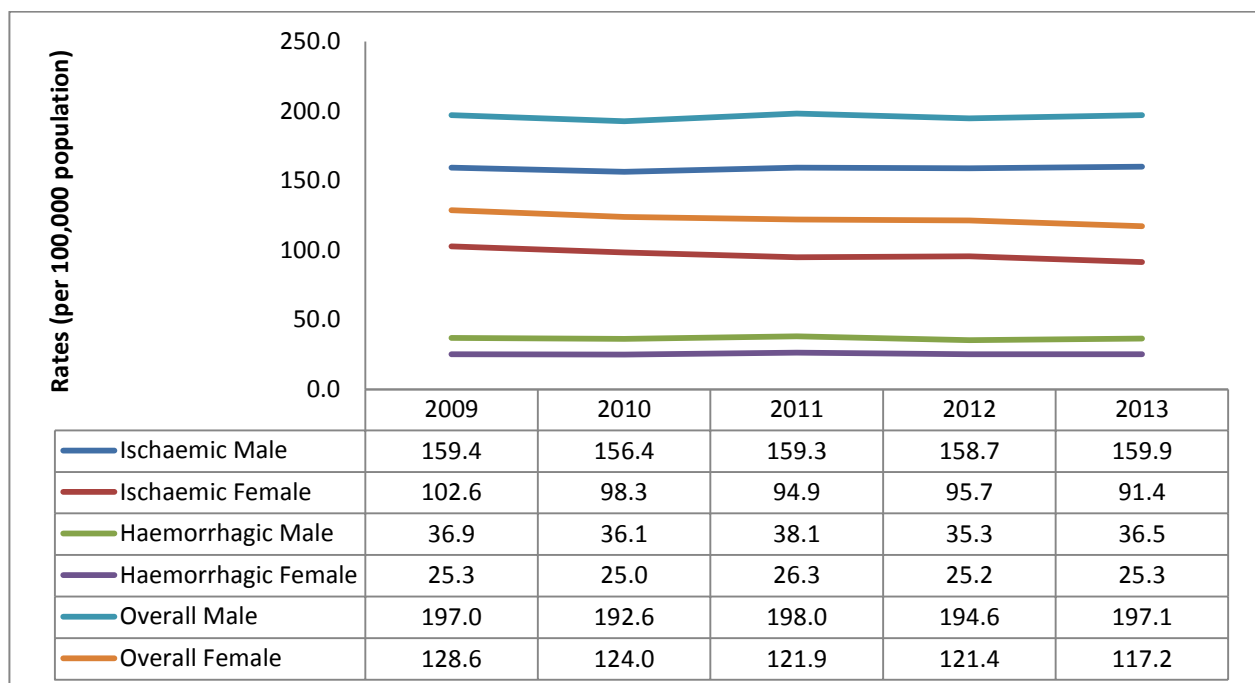


FIGURE 1.1.3: Age-Standardised Incidence Rate of Total (First-Ever and Recurrent) Stroke among Singapore Residents aged 25-64 Years Admitted to Public Hospitals, 2009-2013

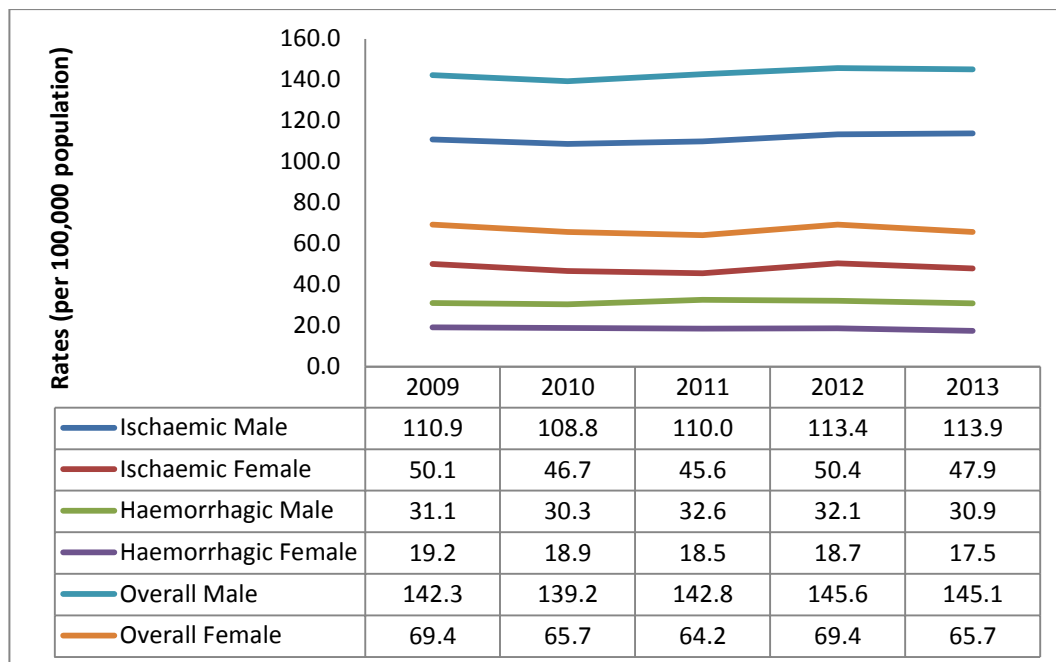
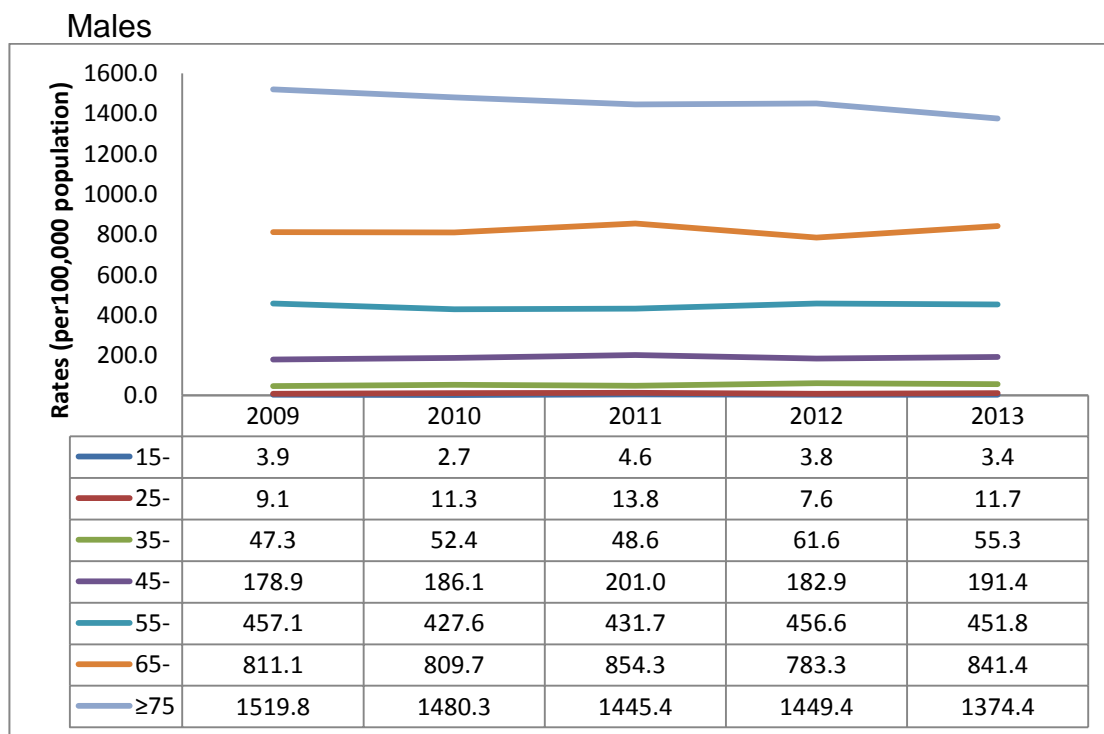
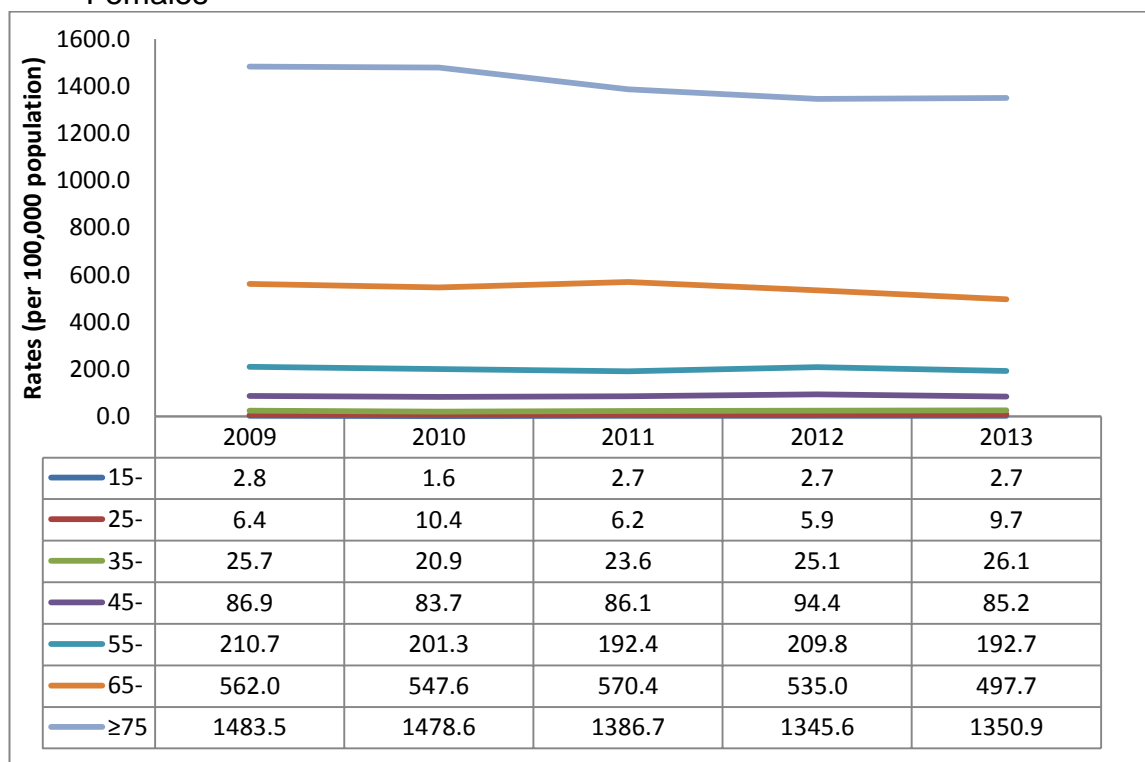


FIGURE 1.1.4: Age-specific Incidence Rates of Stroke among Singapore Residents Admitted to Public Hospitals by Gender, 2009-2013

a)



b) Females



1.2 INCIDENCE OF STROKE ADMITTED TO PUBLIC HOSPITALS, 2013

TABLE 1.2.1: Number of Stroke (First-Ever and Recurrent) Cases among Singapore Residents admitted to Public Hospitals, 2013.

Gender	Race	Ischaemic	Haemorrhagic		Unknown	Total
			Subarachnoid	Parenchymal		
Male	Chinese	2284	42	508	13	2847
	Malay	488	13	86	0	587
	Indian	251	2	32	0	285
	Other	62	3	12	0	77
	Subtotal	3085	698		13	3796
Gender	Race	Ischaemic	Haemorrhagic		Unknown	Total
			Subarachnoid	Parenchymal		
Female	Chinese	1645	91	346	10	2092
	Malay	343	22	68	0	433
	Indian	151	3	19	4	177
	Other	47	4	9	0	60
	Subtotal	2186	562		14	2762
Grand Total						6558

TABLE 1.2.2: Crude and Age-Standardised Incidence Rate of Total (First-Ever and Recurrent) Stroke among Singapore Residents aged above 15 Years Admitted to Public Hospitals, 2013

Gender	Race	Ischaemic		Haemorrhagic		Unknown		Total	
		CR	ASR 95% CI	CR	ASR 95% CI	CR	ASR 95% CI	CR	ASR 95% CI
Male	Chinese	193.2 (185.3-201.1)	147.5 (141.4-153.6)	46.5 (42.6-50.4)	36.5 (33.4-39.6)	1.1 (0.5-1.7)	0.8 (0.4-1.2)	240.8 (232.0-249.7)	184.8 (177.9-191.6)
	Malay	242.2 (220.7-263.7)	249.0 (226.2-271.9)	49.1 (39.5-58.8)	47.3 (37.7-57.0)	0.0 (0.0-0.0)	0.0 (0.0-0.0)	291.3 (267.7-314.9)	296.4 (271.6-321.1)
	Indian	172.0 (150.8-193.3)	177.0 (154.3-199.7)	23.3 (15.5-31.1)	22.8 (14.9-30.7)	0.0 (0.0-0.0)	0.0 (0.0-0.0)	195.3 (172.7-218.0)	199.8 (175.8-223.8)
	Other	130.3 (97.8-162.7)	162.0 (118.3-205.7)	31.5 (15.6-47.5)	43.9 (20.4-67.4)	0.0 (0.0-0.0)	0.0 (0.0-0.0)	161.8 (125.6-197.9)	205.8 (156.3-255.4)
	Subtotal	195.6 (188.7-202.5)	159.9 (154.2-165.6)	44.3 (41.0-47.5)	36.5 (33.8-39.3)	0.8 (0.4-1.3)	0.6 (0.3-1.0)	240.6 (233.0-248.3)	197.1 (190.8-203.4)
Female	Chinese	130.8 (124.5-137.2)	80.9 (76.8-85.0)	34.8 (31.5-38.0)	23.8 (21.4-26.1)	0.8 (0.3-1.3)	0.4 (0.1-0.7)	166.4 (159.3-173.5)	105.1 (100.4-109.8)
	Malay	165.5 (147.9-183.0)	156.4 (139.5-173.4)	43.4 (34.4-52.4)	39.3 (30.9-47.6)	0.0 (0.0-0.0)	0.0 (0.0-0.0)	208.9 (189.2-228.6)	195.7 (176.8-214.5)
	Indian	111.6 (93.8-129.4)	111.1 (92.9-129.2)	16.3 (9.5-23.1)	17.6 (10.1-25.1)	3.0 (0.1-5.9)	3.0 (0.0-6.1)	130.8 (111.5-150.1)	131.7 (111.9-151.5)
	Other	90.2 (64.4-116.0)	138.1 (95.3-180.9)	25.0 (11.4-38.5)	37.9 (14.8-60.9)	0.0 (0.0-0.0)	0.0 (0.0-0.0)	115.2 (86.0-144.3)	176.0 (127.4-224.5)
	Subtotal	132.3 (126.8-137.9)	91.4 (87.4-95.3)	34.0 (31.2-36.8)	25.3 (23.1-27.4)	0.8 (0.4-1.3)	0.6 (0.2-0.9)	167.2 (160.9-173.4)	117.2 (112.7-121.7)
Grand Total								203.1 (198.1-208.0)	156.3 (152.5-160.2)

TABLE 1.2.3: Crude and Age-Standardised Incidence Rate of Total (First-Ever and Recurrent) Stroke among Singapore Residents aged 25-64 Years Admitted to Public Hospitals, 2013

Gender	Race	Ischaemic		Haemorrhagic		Unknown		Total	
		CR	ASR 95% CI	CR	ASR 95% CI	CR	ASR 95% CI	CR	ASR 95% CI
Male	Chinese	121.4 (114.0-128.9)	97.9 (91.8-103.9)	35.7 (31.6-39.7)	30.0 (26.5-33.4)	0.5 (0.0-0.9)	0.4 (0.0-0.8)	157.6 (149.1-166.1)	128.3 (121.3-135.2)
	Malay	214.0 (189.5-238.5)	195.0 (172.2-217.7)	52.6 (40.4-64.7)	46.8 (35.7-57.8)	0.0 (0.0-0.0)	0.0 (0.0-0.0)	266.6 (239.3-294.0)	241.8 (216.5-267.0)
	Indian	152.1 (129.3-174.9)	166.2 (140.9-191.6)	23.1 (14.2-32.0)	25.5 (15.5-35.5)	0.0 (0.0-0.0)	0.0 (0.0-0.0)	175.3 (150.8-199.7)	191.7 (164.5-219.0)
	Other	94.9 (64.3-125.4)	104.6 (69.3-139.9)	17.9 (4.7-31.2)	22.7 (5.3-40.1)	0.0 (0.0-0.0)	0.0 (0.0-0.0)	112.8 (79.5-146.2)	127.3 (87.9-166.7)
	Subtotal	134.7 (128.0-141.5)	113.9 (108.1-119.6)	35.8 (32.4-39.3)	30.9 (27.9-34.0)	0.4 (0.0-0.7)	0.3 (0.0-0.6)	170.9 (163.3-178.6)	145.1 (138.6-151.7)
Gender	Race	Ischaemic		Haemorrhagic		Unknown		Total	
		CR	ASR 95% CI	CR	ASR 95% CI	CR	ASR 95% CI	CR	ASR 95% CI
Female	Chinese	45.4 (40.9-49.8)	38.7 (34.9-42.5)	19.1 (16.2-21.9)	16.4 (13.9-18.9)	0.1 (0.0-0.3)	0.1 (0.0-0.3)	64.5 (59.3-69.8)	55.2 (50.6-59.8)
	Malay	106.8 (89.8-123.8)	97.3 (81.5-113.0)	31.8 (22.5-41.1)	27.4 (19.3-35.6)	0.0 (0.0-0.0)	0.0 (0.0-0.0)	138.6 (119.2-158.0)	124.7 (107.0-142.4)
	Indian	65.7 (49.8-81.5)	70.1 (53.0-87.2)	10.9 (4.5-17.4)	11.8 (4.8-18.9)	2.0 (0.0-4.7)	2.5 (0.0-5.9)	78.6 (61.3-95.9)	84.4 (65.6-103.2)
	Other	28.2 (12.3-44.2)	40.1 (15.4-64.8)	11.8 (1.5-22.1)	16.2 (0.8-31.6)	0.0 (0.0-0.0)	0.0 (0.0-0.0)	40.0 (21.0-59.0)	56.3 (27.2-85.4)
	Subtotal	53.9 (49.7-58.1)	47.9 (44.2-51.7)	19.6 (17.1-22.2)	17.5 (15.2-19.7)	0.3 (0.0-0.5)	0.3 (0.0-0.6)	73.8 (68.9-78.7)	65.7 (61.3-70.1)
Grand Total								121.6 (117.1-126.1)	105.3 (101.4-109.2)

TABLE 1.2.4: Age-Specific Incidence Rates of Stroke among Singapore Residents Admitted to Public Hospitals by Gender and Race, 2013

Gender	Race	Age Group						
		15-	25-	35-	45-	55-	65-	≥ 75
Male	Chinese	4.3	8.8	51.9	172.6	395.1	805.6	1396.4
	Malay	2.1	26.6	98.7	311.8	716.9	1303.9	1491.5
	Indian	0.0	7.2	44.3	198.6	701.8	647.1	977.8
	Other	0.0	26.0	46.1	118.2	431.4	947.4	1666.7
	Subtotal	3.4	11.7	55.3	191.4	451.8	841.4	1374.4
Gender	Race	Age Group						
		15-	25-	35-	45-	55-	65-	≥ 75
Female	Chinese	2.2	8.2	24.3	66.3	167.4	451.9	1307.1
	Malay	2.2	10.6	45.9	183.5	346.2	834.7	1730.8
	Indian	4.4	23.0	24.0	103.3	241.0	560.0	1195.7
	Other	14.3	0.0	17.5	72.2	184.2	928.6	2416.7
	Subtotal	2.7	9.7	26.1	85.2	192.7	497.7	1350.9
Grand Total		3.1	10.7	40.3	138.6	321.9	660.6	1360.4

2 MORTALITY

2.1 MORTALITY TRENDS FROM STROKE DURING HOSPITALISATION, 2009-2013

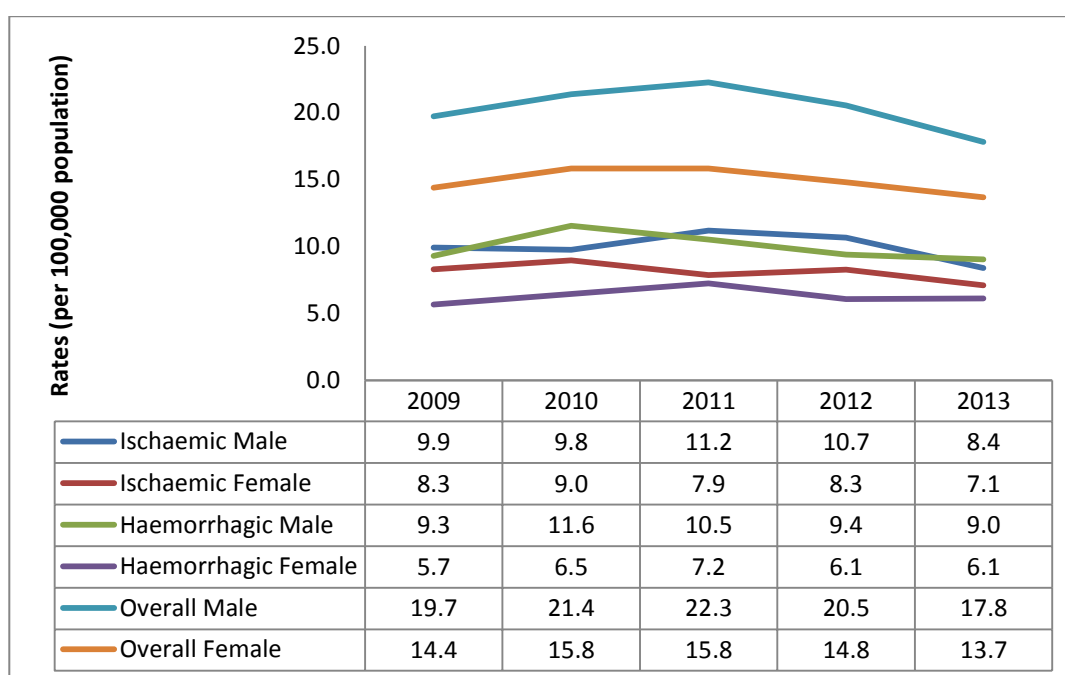
FIGURE 2.1.1: Age-Standardised Mortality Rate of Total (first-Ever and Recurrent) Stroke among Singapore Residents aged above 15 Years Admitted to Public Hospitals, 2009-2013

FIGURE 2.1.2: Age-Standardised Mortality Rates of Total (first-Ever and Recurrent) Stroke among Singapore Residents aged 25-64 Years Admitted to Public Hospitals, 2009-2013

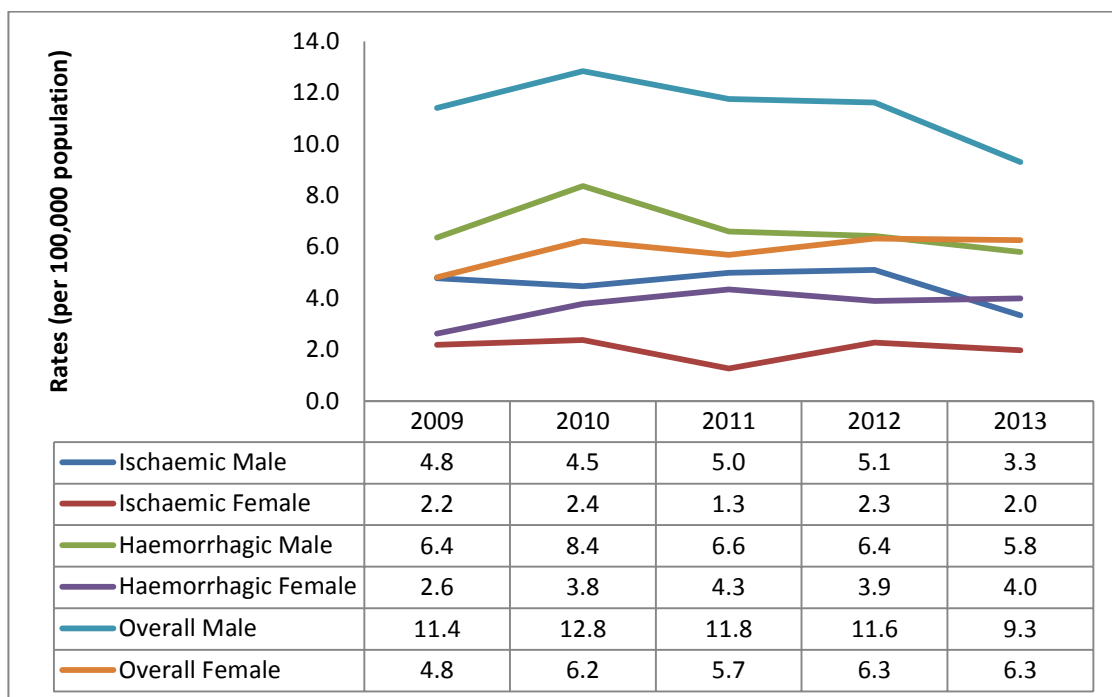
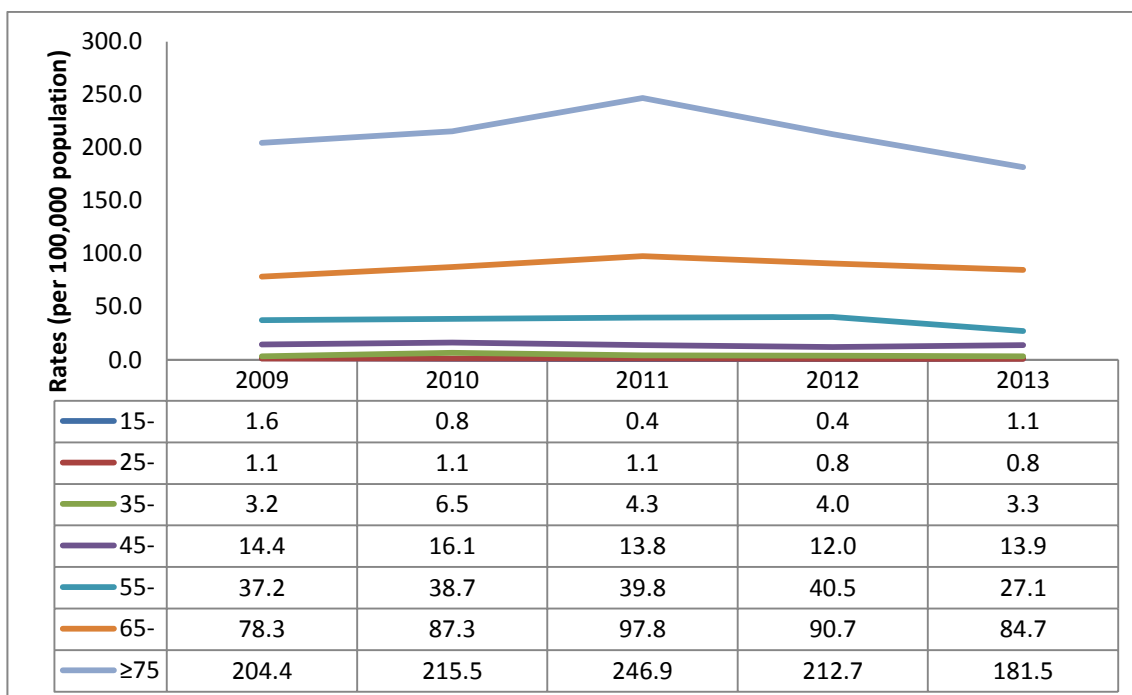
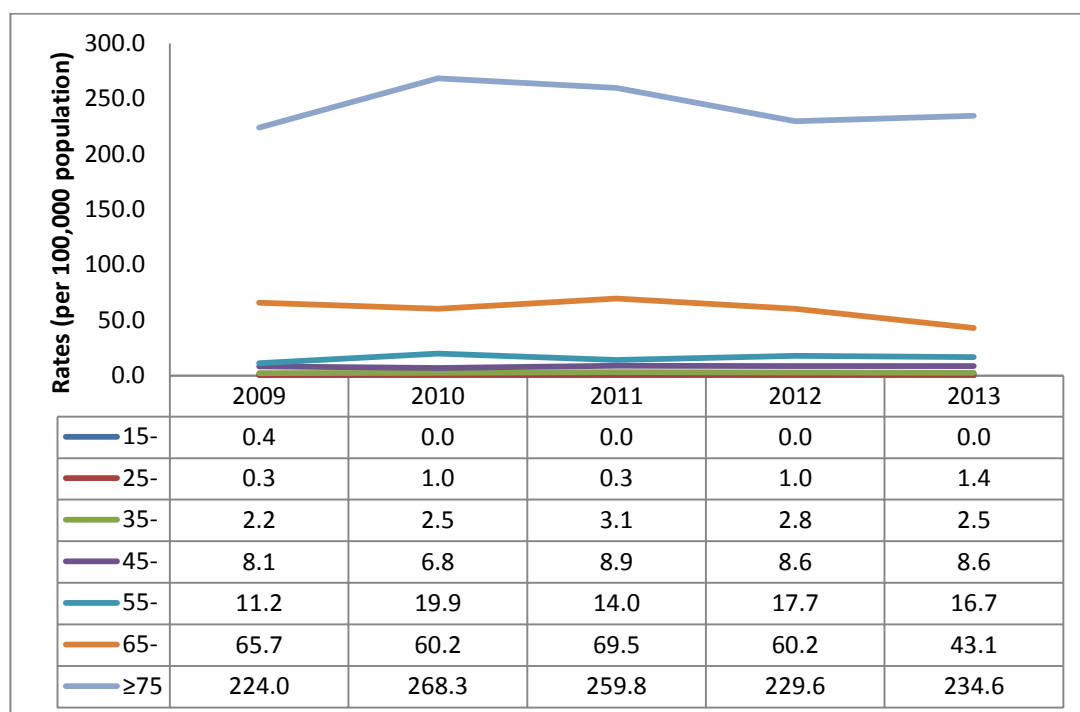


FIGURE 2.1.3: Age-Specific Mortality Rates of Stroke among Singapore Residents Admitted to Public Hospitals by Gender, 2009-2013

a) Males



b) Females



2.2 MORTALITY FROM STROKE DURING HOSPITALISATION, 2013

TABLE 2.2.1: Number of Hospital Deaths (First-Ever and Recurrent) among Singapore Residents Admitted to Public Hospitals, 2013

Gender	Race	Ischaemic	Haemorrhagic		Unknown	Total
			Subarachnoid	Parenchymal		
Male	Chinese	127	11	132	8	278
	Malay	19	6	12	0	37
	Indian	10	1	6	0	17
	Other	6	1	1	0	8
	Subtotal	162	170		8	340
Gender	Race	Ischaemic	Haemorrhagic		Unknown	Total
			Subarachnoid	Parenchymal		
Female	Chinese	153	26	91	8	278
	Malay	24	5	13	0	42
	Indian	10	1	7	3	21
	Other	7	1	3	0	11
	Subtotal	194	147		11	352
Grand Total						692

TABLE 2.2.2: Crude and Age-Standardised Mortality Rates of Total (First-Ever and Recurrent) Stroke among Singapore Residents aged above 15 years Admitted to Public Hospitals, 2013

Gender	Race	Ischaemic		Haemorrhagic		Unknown		Total	
		CR	ASR 95% CI	CR	ASR 95% CI	CR	ASR 95% CI	CR	ASR 95% CI
Male	Chinese	10.7 (8.9-12.6)	8.1 (6.7-9.5)	12.1 (10.1-14.1)	9.5 (7.9-11.1)	0.7 (0.2-1.1)	0.5 (0.1-0.8)	23.5 (20.8-26.3)	18.1 (15.9-20.3)
	Malay	9.4 (5.2-13.7)	9.9 (5.2-14.6)	8.9 (4.8-13.1)	9.1 (4.7-13.5)	0.0 (0.0-0.0)	0.0 (0.0-0.0)	18.4 (12.4-24.3)	19.0 (12.6-25.4)
	Indian	6.9 (2.6-11.1)	7.9 (2.8-13.1)	4.8 (1.2-8.4)	4.7 (1.2-8.3)	0.0 (0.0-0.0)	0.0 (0.0-0.0)	11.7 (6.1-17.2)	12.7 (6.4-18.9)
	Other	12.6 (2.5-22.7)	20.1 (3.3-36.9)	4.2 (0.0-10.0)	6.4 (0.0-16.4)	0.0 (0.0-0.0)	0.0 (0.0-0.0)	16.8 (5.2-28.5)	26.5 (7.0-46.1)
	Subtotal	10.3 (8.7-11.9)	8.4 (7.1-9.7)	10.8 (9.2-12.4)	9.0 (7.7-10.4)	0.5 (0.2-0.9)	0.4 (0.1-0.6)	21.6 (19.3-23.8)	17.8 (15.9-19.7)
Gender	Race	Ischaemic		Haemorrhagic		Unknown		Total	
		CR	ASR 95% CI	CR	ASR 95% CI	CR	ASR 95% CI	CR	ASR 95% CI
Female	Chinese	12.2 (10.2-14.1)	6.4 (5.4-7.5)	9.3 (7.6-11.0)	5.9 (4.8-7.0)	0.6 (0.2-1.1)	0.3 (0.1-0.6)	22.1 (19.5-24.7)	12.6 (11.1-14.2)
	Malay	11.6 (6.9-16.2)	11.2 (6.6-15.9)	8.7 (4.7-12.7)	7.4 (3.9-10.8)	0.0 (0.0-0.0)	0.0 (0.0-0.0)	20.3 (14.1-26.4)	18.6 (12.8-24.4)
	Indian	7.4 (2.8-12.0)	6.8 (2.4-11.1)	5.9 (1.8-10.0)	6.6 (2.0-11.2)	2.2 (0.0-4.7)	2.5 (0.0-5.4)	15.5 (8.9-22.2)	15.9 (8.9-22.9)
	Other	13.4 (3.5-23.4)	16.8 (3.7-29.9)	7.7 (0.2-15.2)	9.3 (0.0-19.1)	0.0 (0.0-0.0)	0.0 (0.0-0.0)	21.1 (8.6-33.6)	26.1 (9.8-42.5)
	Subtotal	11.7 (10.1-13.4)	7.1 (6.1-8.1)	8.9 (7.5-10.3)	6.1 (5.1-7.2)	0.7 (0.3-1.1)	0.4 (0.2-0.7)	21.3 (19.1-23.5)	13.7 (12.2-15.2)
Grand Total								21.4 (19.8-23.0)	15.9 (14.7-17.1)

TABLE 2.2.3: Crude and Age-Standardised Mortality Rate of Total (First-Ever and Recurrent) Stroke among Singapore Residents aged 25-64 Years Admitted to Public Hospitals, 2013

Gender	Race	Ischaemic		Haemorrhagic		Unknown		Total	
		CR	ASR 95% CI	CR	ASR 95% CI	CR	ASR 95% CI	CR	ASR 95% CI
Male	Chinese	3.9 (2.6-5.2)	3.1 (2.0-4.2)	6.9 (5.1-8.6)	5.7 (4.2-7.2)	0.2 (0.0-0.6)	0.2 (0.0-0.5)	11.0 (8.8-13.3)	9.1 (7.2-10.9)
	Malay	4.4 (0.9-7.9)	3.5 (0.6-6.3)	8.0 (3.3-12.8)	7.2 (2.8-11.5)	0.0 (0.0-0.0)	0.0 (0.0-0.0)	12.4 (6.5-18.3)	10.7 (5.5-15.8)
	Indian	4.4 (0.5-8.3)	5.1 (0.5-9.6)	6.2 (1.6-10.8)	7.3 (1.8-12.7)	0.0 (0.0-0.0)	0.0 (0.0-0.0)	10.7 (4.6-16.7)	12.3 (5.2-19.4)
	Other	2.6 (0.0-7.6)	2.1 (0.0-6.1)	2.6 (0.0-7.6)	2.5 (0.0-7.3)	0.0 (0.0-0.0)	0.0 (0.0-0.0)	5.1 (0.0-12.2)	4.5 (0.0-10.8)
	Subtotal	4.0 (2.8-5.1)	3.3 (2.4-4.3)	6.8 (5.3-8.3)	5.8 (4.5-7.1)	0.2 (0.0-0.4)	0.2 (0.0-0.4)	10.9 (9.0-12.9)	9.3 (7.7-10.9)
Gender	Race	Ischaemic		Haemorrhagic		Unknown		Total	
		CR	ASR 95% CI	CR	ASR 95% CI	CR	ASR 95% CI	CR	ASR 95% CI
Female	Chinese	2.1 (1.2-3.1)	1.8 (1.0-2.6)	4.2 (2.8-5.5)	3.7 (2.5-4.9)	0.1 (0.0-0.3)	0.1 (0.0-0.3)	6.4 (4.8-8.1)	5.6 (4.1-7.1)
	Malay	3.5 (0.4-6.6)	3.2 (0.4-6.0)	7.1 (2.7-11.5)	6.1 (2.3-9.9)	0.0 (0.0-0.0)	0.0 (0.0-0.0)	10.6 (5.2-16.0)	9.3 (4.5-14.0)
	Indian	0.0 (0.0-0.0)	0.0 (0.0-0.0)	3.0 (0.0-6.4)	3.4 (0.0-7.3)	2.0 (0.0-4.7)	2.5 (0.0-5.9)	5.0 (0.6-9.3)	5.9 (0.7-11.1)
	Other	4.7 (0.0-11.2)	7.4 (0.0-19.4)	4.7 (0.0-11.2)	8.8 (0.0-21.7)	0.0 (0.0-0.0)	0.0 (0.0-0.0)	9.4 (0.2-18.6)	16.2 (0.0-33.8)
	Subtotal	2.2 (1.4-3.1)	2.0 (1.2-2.7)	4.4 (3.2-5.6)	4.0 (2.9-5.1)	0.3 (0.0-0.5)	0.3 (0.0-0.6)	6.9 (5.4-8.4)	6.3 (4.9-7.6)
Grand Total								8.9 (7.7-10.1)	7.8 (6.7-8.9)

TABLE 2.2.4: Age-Specific Mortality Rates of Stroke among Singapore Residents Admitted to Public Hospitals by Gender and Race, 2013

Gender	Race	Age Group						
		15-	25-	35-	45-	55-	65-	≥ 75
Male	Chinese	1.1	1.0	3.7	13.2	25.8	84.7	195.2
	Malay	2.1	0.0	6.6	19.2	25.7	88.2	169.5
	Indian	0.0	0.0	0.0	10.3	52.6	44.1	44.4
	Other	0.0	0.0	0.0	18.2	0.0	210.5	222.2
	Subtotal	1.1	0.8	3.3	13.9	27.1	84.7	181.5
Gender	Race	Age Group						
		15-	25-	35-	45-	55-	65-	≥ 75
Female	Chinese	0.0	1.4	2.9	7.2	14.8	38.6	229.7
	Malay	0.0	0.0	0.0	18.8	24.5	74.4	230.8
	Indian	0.0	3.3	0.0	4.1	18.1	66.7	239.1
	Other	0.0	0.0	5.8	10.3	52.6	0.0	583.3
	Subtotal	0.0	1.4	2.5	8.6	16.7	43.1	234.6
Grand Total		0.6	1.1	2.9	11.3	21.9	62.8	213.2

2.3 STROKE 30-DAY CASE-FATALITY 2009 – 2013

Table 2.3.1 Stroke 30-Day Case-Fatality, 2009 – 2013

	2009	2010	2011	2012	2013
No. of cases	483	571	643	576	569
Crude rate	8.4 (7.6-9.1)	9.7 (8.9-10.5)	10.5 (9.7-11.3)	9.1 (8.3-9.8)	8.7 (8.0-9.4)
Age-standardised rate	8.3 (7.6-9.0)	9.6 (8.9-10.4)	10.5 (9.7-11.2)	9.0 (8.3-9.7)	8.6 (8.0-9.3)

2.3.1 STROKE 30-DAY CASE-FATALITY, BY GENDER, 2009 – 2013

The age-standardised case fatality rate is greater for females than males.

Table 2.3.1.1 Age- Standardised Stroke 30-Day Case-Fatality Rates, by Gender, 2009 – 2013

Gender	2009	2010	2011	2012	2013
Male	7.7 (6.7-8.7)	9.4 (8.3-10.5)	9.8 (8.7-10.8)	8.5 (7.5-9.4)	7.5 (6.6-8.4)
Female	8.8 (7.7-9.8)	9.8 (8.6-10.9)	11.2 (10.0-12.4)	9.6 (8.5-10.7)	9.8 (8.7-10.9)

2.3.2 STROKE 30-DAY CASE-FATALITY, BY ETHNICITY, 2009 – 2013

Table 2.3.2.1 Stroke 30-Day Case-Fatality Rates, by Gender and Race, 2009–2013

Gender	Race	2009	2010	2011	2012	2013
Males	Chinese	7.0 (6.0-8.0)	9.0 (7.8-10.1)	9.2 (8.0-10.4)	8.1 (7.1-9.2)	7.4 (6.4-8.4)
	Malay	7.7 (5.1-10.3)	7.9 (5.4-10.3)	9.3 (6.8-11.8)	7.3 (5.1-9.5)	5.5 (3.6-7.3)
	Indian	10.0 (5.9-14.1)	8.5 (4.8-12.3)	5.3 (2.4-8.2)	5.9 (2.7-9.1)	4.2 (1.8-6.6)
	Others	4.8 (0.0-11.4)	7.5 (0.2-14.9)	13.5 (3.5-23.4)	8.1 (1.0-15.1)	9.1 (2.4-15.8)
Females	Chinese	9.9 (8.5-11.3)	10.9 (9.5-12.4)	12.9 (11.4-14.5)	11.5 (10.1-13.0)	11.5 (10.1-13.0)
	Malay	10.7 (7.4-13.9)	11.8 (8.5-15.1)	11.5 (8.2-14.8)	8.0 (5.6-10.5)	8.1 (5.4-10.8)
	Indian	5.8 (2.0-9.6)	6.8 (2.6-11.1)	7.6 (3.3-12.0)	7.5 (2.8-12.1)	11.9 (6.8-16.9)
	Others	12.1 (0.2-24.0)	17.1 (3.4-30.9)	14.9 (3.9-25.9)	8.1 (0.0-17.3)	18.3 (7.5-29.2)

2.3.3 STROKE 30-DAY CASE-FATALITY, BY SUBTYPE, 2009– 2013

Table 2.3.3.1 Stroke 30-Day Case-Fatality Rates, by Gender and Subtype, 2009 – 2013

Gender	Subtype	2009	2010	2011	2012	2013
Males	Ischaemic	4.1 (3.3-4.8)	4.2 (3.4-5.0)	5.2 (4.4-6.1)	4.2 (3.5-5.0)	3.4 (2.8-4.1)
	Haemorrhagic	20.7 (17.1-24.3)	28.3 (24.2-32.5)	23.7 (20.1-27.4)	23.3 (19.6-27.0)	21.3 (17.9-24.8)
Females	Ischaemic	6.5 (5.4-7.7)	7.0 (5.8-8.1)	7.9 (6.7-9.1)	7.0 (5.9-8.1)	7.1 (6.0-8.3)
	Haemorrhagic	22.6 (18.3-26.9)	26.2 (21.7-30.7)	27.7 (23.3-32.2)	24.1 (19.9-28.2)	25.1 (20.9-29.2)