

CRCS-5 Statistics – 2014 Report

Global Statistics of CRCS-5

Acute Treatment Statistics of CRCS-5

Outcome Statistics of CRCS-5

Selected Subgroup Statistics of CRCS-5



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Clinical Research Center For Stroke

About CRCS-5 and these statistics

Clinical Research Center for Stroke (director: Byung-Woo Yoon, Seoul National University Hospital) established in 2006 to facilitate multi-center collaborations in clinical research and to develop clinical practice guideline, with research support from the Korea Healthcare Technology R&D Project, Ministry of Health and Welfare, Republic of Korea (HI10C2020). CRCS is consisted of six divisions, and CRCS-5 (principal investigator: Hee-Joon Bae, Seoul National University Bundang Hospital) is engaged in epidemiological researches. From the commencement of CRCS-5, stroke physicians from academic and regional centers have constructed multicenter cohort and gather prospective outcomes of acute ischemic stroke patients.

In April 2008, 9 centers (Eulji General Hospital, Eulji University Hospital, Dong-A University Hospital, Seoul National University Bundang Hospital, Seoul Medical Center, Soonchunhyang University Hospital Seoul, Yeungnam University Medical Center, Inje University Ilsan Paik Hospital, and Hallym University Sacred Heart Hospital) established a prospective registry of consecutive acute stroke patients based on web-database system (<http://www.stroke-crc.or.kr/ecrf/>). At this stage, CRCS-5 aimed to improve quality of stroke care in participating centers as well as to develop and spread e-QI system to Korean hospitals. CRCS-5 data manager collects and audits all the data registered by each participating center. In November 2009, 5 centers kicked off prospective capture of stroke outcomes including modified Rankin Scale (mRS) scores at 3 month and 1 year after stroke.

In January 2011, two stroke centers (Dongguk University Ilsan Hospital, Chonnam National University Hospital) were introduced to CRCS-5, expanding

CRCS-5's regional coverage to southwestern part of South Korea. Also in this year, all the participating centers started prospective outcome capture system, and its collecting information was expanded to occurrence of early neurological deterioration (END), NIHSS scores and mRS scores at 3 month and 1 year after stroke, and medication adherence with patients' self-knowledge. Jeju National University Hospital, at the southernmost island of Korea, joined CRCS-5 in October 2011. Ulsan University Hospital and Chungbuk National University Hospital joined the CRCS-5 registry in February 2013 and Keimyung University Dongsan Medical Center participated in May 2014. Current, the CRCS-5 registry member sites are 15 covering most part of the Republic of Korea.

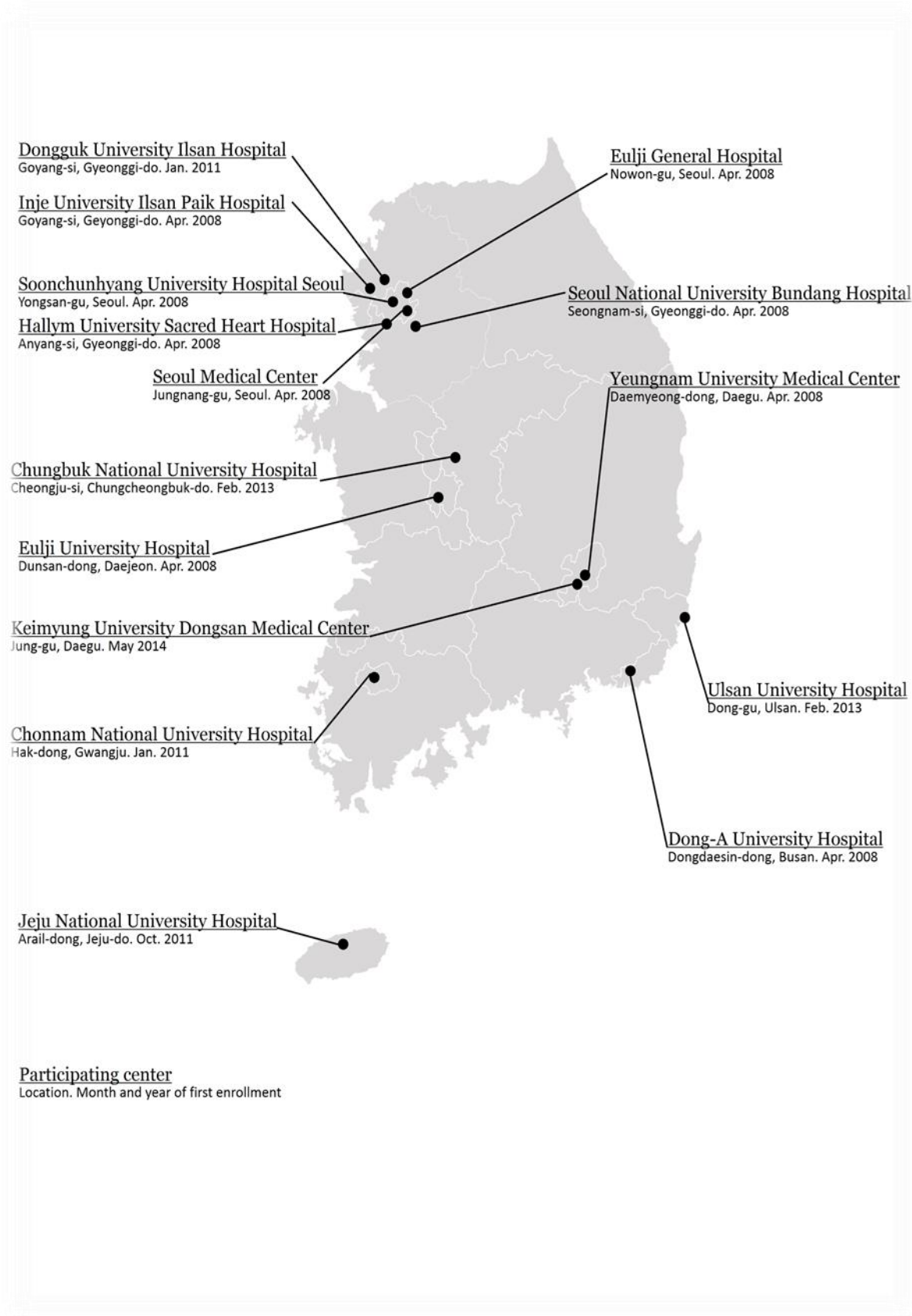


Figure 1 Participating centers and their geographic location

Participating stroke centers and site investigators

- Seoul National University Bundang Hospital: Hee-Joon Bae (director), Moon-Ku Han, Beom Joon Kim
- Eulji General Hospital, Eulji Univeristy: Jong-Moo Park, Kyusik Kang
- Eulji University Hospital: Soo Joo Lee, Youngchai Ko
- Dong-A University Hospital: Jae-Kwan Cha, Dae-Hyun Kim, Hyun-Wook Nah
- Seoul Medical Center: Tai Hwan Park, Sang-Soon Park
- Soonchunhyang University Hospital Seoul: Kyung Bok Lee
- Yeungnam University Medical Center: Jun Lee
- Inje University Ilsan Paik Hospital: Keun-Sik Hong, Yong-Jin Cho
- Hallym University Sacred Heart Hospital: Mi-Sun Oh, Kyung-Ho Yu, Byung-Chul Lee
- Dongguk University Ilsan Hospital: Dong-Eog Kim, Wi-Sun Ryu
- Chonnam National University Hospital: Joon-Tae Kim, Ki-Hyun Cho
- Jeju National University Hospital: Jay Chol Choi
- Ulsan University Hospital: Wook-Joo Kim
- Chungbuk National University Hospital: Dong-Ick Shin, Min-Ju Yeo
- Keimyung University Dongsan Medical Center: Sung Il Sohn, Jeong-Ho Hong
- *Statistical advisors*
 - Juneyoung Lee (Department of Biostatistics, Korea University College of Medicine)
 - Ji Sung Lee (Clinital Trial Center, Asan Medical Center)

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Global Statistics of CRCS-5

Recruitment of acute stroke patients

- A total of 28,348 acute strokes were registered in the CRCS-5 database until November 2013 (Figure 2 Number of acute stroke patients since April 2008 (N=28348))
- Number of monthly recruitment was 414 cases on average. Monthly numbers of recruitment on average were 460 in year 2011, 506 in year 2012, and 580 in year 2013 (January to Dec 2013)
 - Recruitment profiles of participating hospitals differ according to the volume of acute stroke patients and the time of joining CRCS-5. Seoul National University Bundang Hospital topped on the list as registered 4782 cases until January 2013 and 70 subjects per month on average (Table 1 Number of registered acute stroke patients). However, Cheonnam National University Hospital has been most rapidly recruiting acute stroke patients, as 92 cases per month on average from Jan 2011

Demographic profile of acute ischemic stroke

- Number of acute ischemic strokes in CRCS-5 was 25,712 (91%).

cf. Hemorrhagic stroke patients are customarily admitted to neurosurgical department in usual Korean stroke centers. So that above statistics should not be interpreted as 91% of acute stroke patients are ischemic stroke in Korea.

- Number of male was 14,968 (58%) and female was 10,749 (42%).
- Average age at onset was 68 ± 13 and median 70 [interquartile range, 59 – 77] years old with minimum 12 and maximum 105. Young-age stroke patients (age of onset < 45 year-old) were 1290 (5%), and oldest olds (age ≥ 85 year-old) were 1691 (7%).
- Female stroke patients exceeded male counterpart in a group of more than 75 year-old (Table 2 Number of acute ischemic stroke patients stratified by sex and age group).
- Among male stroke patients, the largest age-group was 65-74 year-old (32%). However, female patients were most frequent in 75-84 year-old group (35%) (Figure 4 Number of acute ischemic stroke patients stratified by age group per year).

Characteristics of Acute Ischemic Strokes

- Among a total of 25,712 acute ischemic strokes, large artery atherosclerosis (LAA) accounted for 38%, small vessel occlusion (SVO) for 19%, and cardioembolism (CE) for 22%. Ischemic strokes due to other specified etiology (ODE) were 2% (Table 3 Fractions of TOAST classification components in CRCS-5) and (Figure 5 TOAST classification).
- Undetermined etiology (UDE) was 20%; two or more etiologies for 4%, negative etiology (cryptogenic stroke) for 8%, and incomplete work-ups for 8%.

- Fifty-eight percent of ischemic strokes were located in middle cerebral artery (MCA) territories. As for anatomical territories, 47% located at cerebral cortex, 30% at corona radiata or adjacent white matters, and 33% at deep structures including putamen, internal capsule or thalamus. Thirty percent of strokes have infratentorial lesions (Table 4 Arterial territory of ischemic stroke (multiple choices permitted), Table 5 Anatomical location of ischemic stroke (multiple choices permitted) and Table 6 Angiographic location of steno-occluded arteries (multiple choices permitted)).
- Regarding steno-occluded arteries, MCA accounted for 30% and extracranial internal carotid artery (ICA) for 13% (Figure 6 Arterial territories of ischemic strokes (multiple choices permitted), Figure 7 Anatomical locations of ischemic strokes (multiple choices permitted) and Figure 8 Angiographic locations of steno-occluded arteries (multiple choices permitted)).
- NIHSS score at hospital arrival was 6.0 ± 6.3 on average and median 4 [interquartile range, 2 – 8] points, with range between 0 and 40. NIHSS score ≤ 4 was documented in 57%, NIHSS score of 5 – 8 in 18%, and NIHSS score ≥ 25 in 1% of acute ischemic stroke patients (Figure 9 Distribution of NIHSS score at hospital arrival).
- Onset (last normal time) to hospital arrival time was 41.2 ± 238.5 hour on average and median 9.4 [interquartile range, 2.5 – 38.8] hour, for whose time-related record is available. Twenty-eight percent of patients arrived within 3 hours and 42% within 6 hours. Sixty-six percent of ischemic strokes admitted within 24 hours after onset (Figure 10 Onset (last normal time) to hospital arrival time).
- At the time of discharge, NIHSS score was 5.1 ± 7.4 on average and median 2 [interquartile range, 1 – 6]; mRS score is 2.3 ± 1.7 on average and median 2 [interquartile range, 1 – 4]. Missing cases were 228 and 39, respectively. Functional independence at discharge (mRS score 0 or 1) was achieved in 9629(37%) cases, and catastrophic consequences at discharge (mRS score 5 or 6) was documented in 3277(12%) cases. Missing cases were 207 and 19, respectively. In-hospital mortality was 784 (3%) (Figure 11 NIHSS score at discharge (missing in 207 cases)).
- Duration of hospitalization was 11.6 ± 17.7 days on average and median 8

[Interquartile range, 1 – 6].

In-hospital mortality was occurred in 679(3%) subjects, after 12.3 ± 23.8 days after stroke on average and median 8 [interquartile range, 6 – 13] days. Among the mortality cases, 437 (64%) were directly related to stroke;199(29%) were from complications related to stroke;43(6%) were from other causes unrelated to stroke

- Twenty-two percent of stroke cases (3213 subjects) had experienced stroke events before, and 80% was ischemic. Frequencies of other vascular events before index stroke were less than 5 percent.
- Frequencies of major vascular risk factors were as follows; Hypertension in 18,521 (72%) cases, diabetes in 8943 (35%) cases, dyslipidemia in 8323 (32%) cases, current smoking in 6840 (27%) cases, and atrial fibrillation in 5199 (20%) cases. (Table 7 History of vascular events in CRCS-5 registered strokes, Table 8 Major modifiable vascular risk factors and Figure 12 Percentages of major modifiable vascular risk factors in CRCS-5 database).
- Potential sources of cardioembolic stroke are detected in 4886 (19%) for high risk sources and in 1537 (8%) for medium risk sources. Atrial fibrillation was the most common high risk source (89%); patent foramen ovale (37%) and congestive heart failure (29%) were leading sources of medium risk cardioembolism (Table 9 Frequencies of potential cardioembolic sources (risk stratification according to the TOAST classification scheme)).
- Magnetic resonance images (MRI) including diffusion-weighted image (DWI) or gradient-echo contrast image (GRE) were performed in more than 90% of registered strokes. Most common cardiac evaluation was transthoracic echocardiography (71%), followed by echocardiogram (Holter) monitoring (30%), transesophageal echocardiography (13%), and 24-hour blood pressure monitoring (30%). Only 31% had carotid Doppler, but MR angiography was done in 86% of strokes (Table 10 Frequency of etiological work-ups and Table 11 Profile of laboratory tests).

- Hyperacute revascularization treatments were performed in 3457 (13%) cases. Combined intravenous and intraarterial thrombolysis comprised 21% of hyperacute revascularization. Regarding pharmacological modality of thrombolysis, recombinant tissue plasminogen activator was the most frequently utilized medication (82%) (Table 12 Profile of hyperacute treatment for ischemic strokes and Figure 13 Composition of hyperacute revascularization treatment modalities).
- Regarding acute stroke medications, aspirin (81%) and clopidogrel (31%) were the two most frequently prescribed drugs (Table 13 Profile of acute stroke medications (multiple choices permitted) and Figure 14 Percentages of acute stroke medications (multiple choices permitted)).
- As with acute stroke medications, aspirin (69%) and clopidogrel (35%) were the two most frequently utilized medications for secondary prevention of stroke at discharge (Table 14 Profile of secondary preventive medications at discharge (multiple choices permitted) and Figure 15 Percentages of secondary preventive medications at discharge (multiple choices permitted)).
- Surgical or radiological interventions were not frequently performed (n=623;2%) in CRCS-5 registered stroke cases (Table 15 Profile of surgical interventions during acute period of stroke (multiple choices permitted) and Figure 16 Percentages of surgical interventions during acute period of stroke (multiple choices permitted)).
- Duration of hospitalization was 11.3 ± 17.9 days on average and median 7.5 [interquartile range, 5.3 – 12.3].
- NIHSS score at discharge was 5.3 ± 7.8 points on average and median 2 [interquartile range, 1 – 6]. Modified Rankin Scale (mRS) score at discharge was 2.3 ± 1.7 points on average and median 2 [interquartile range, 1 – 4]. Functional independence at discharge (mRS score 0 or 1) was achieved in 5720 (39%) cases, and catastrophic consequences at discharge (mRS score 5 or 6) was documented in 1854 (13%) cases.

- In-hospital mortality was occurred in 784 (3%) subjects, after 10.3 ± 13.0 days after stroke on average and median 6 [interquartile range, 3 – 11] days. Among the mortality cases, 297 (66%) were directly related to stroke; 140 (31%) were from complications related to stroke; 14 (3%) were from other causes unrelated to stroke. Cause of death was not recorded in 1 case.
- Regarding major vascular risk factors, hypertension and diabetes were fairly well documented before stroke (89% and 82%, respectively) and on regular management (78% and 74%, respectively). However, detection rates of dyslipidemia and atrial fibrillation were below expectation (49% and 44%, respectively) and regular treatment for these risk factors was less than adequate (43% and 43%) (Table 16 Major vascular risk factors and their management before index strokes, Figure 17 Percentages of regular treatment for vascular risk factors and Figure 18 Percentages of undocumented vascular risk factors).
- Habitual smoking was reported from 10079 (39%) and 32% of them were ex-smokers. Mean smoking doses were 38.7 ± 72.8 pack-years.
- Before index stroke, 88% of stroke cases (22,287 subjects) maintained independent living, mRS score of 0 or 1 (Based on 25,712 ischemic stroke cases.

Table 17 Distribution of premorbid mRS score in the included stroke cases).

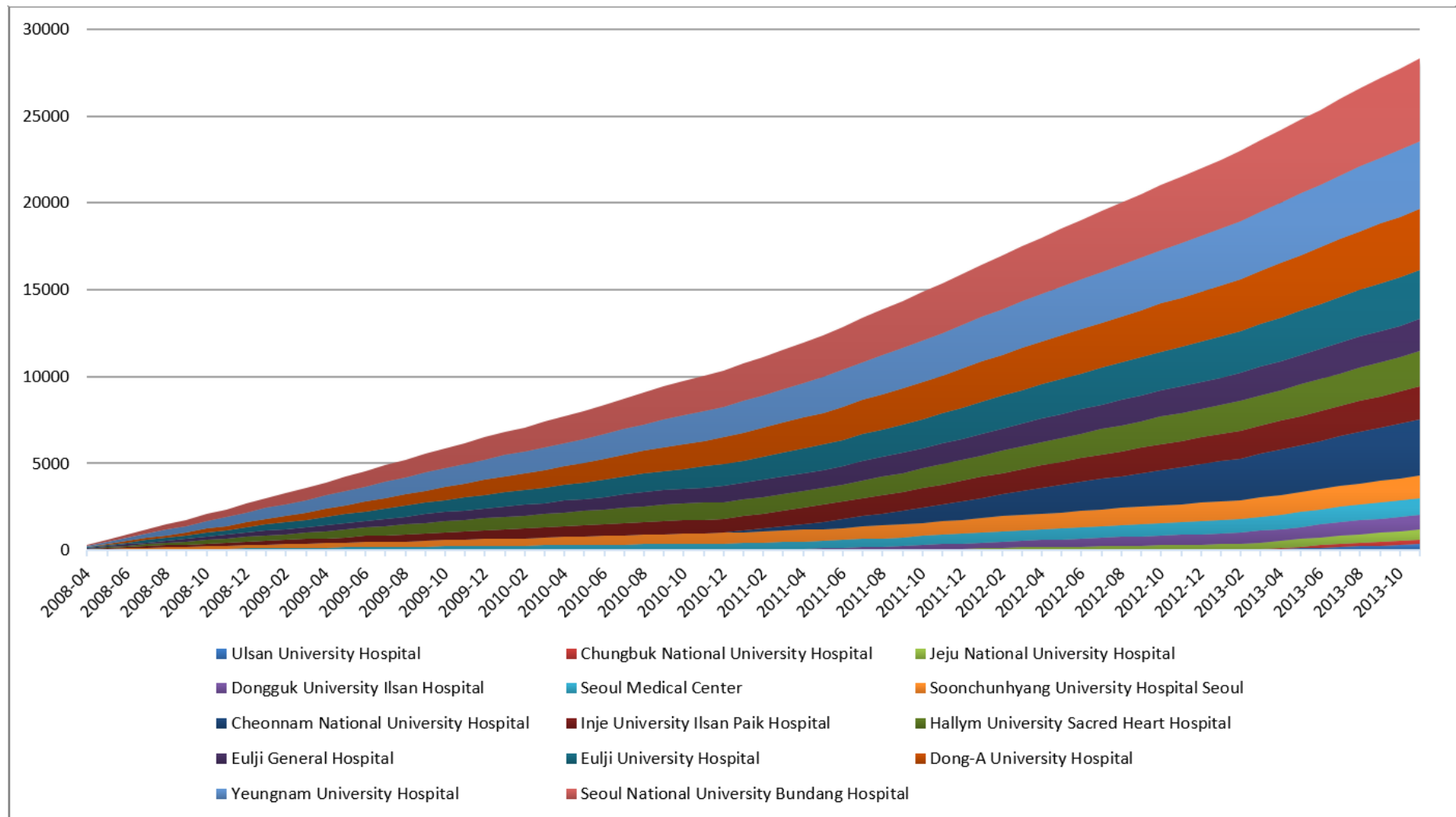


Figure 2 Number of acute stroke patients since April 2008 (N=28348)

Table 1 Number of registered acute stroke patients

Participating center	'08 2Q	'08 3Q	'08 4Q	'09 1Q	'09 2Q	'09 3Q	'09 4Q	'10 1Q	'10 2Q	'10 3Q	'10 4Q	'11 1Q	'11 2Q	'11 3Q	'11 4Q	'12 1Q	'12 2Q	'12 3Q	'12 4Q	'13 1Q	'13 2Q	'13 3Q	'13 4Q	Sum
Ulsan University Hospital	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	40	118	119	78	355
Chungbuk National University Hospital	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	27	107	90	52	276
Jeju National University Hospital	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	86	50	63	47	60	69	63	45	564
Dongguk University Ilsan Hospital	0	0	0	0	0	0	0	0	0	0	0	60	81	96	69	92	64	68	67	69	62	84	61	873
Seoul Medical Center	43	32	38	34	33	38	34	34	31	37	35	23	37	54	58	48	50	43	47	58	55	58	29	949
Soonchunhyang University Hospital Seoul	65	51	60	56	55	43	62	49	61	60	52	43	41	52	58	61	70	56	67	70	55	76	45	1308
Cheonnam National University Hospital	0	0	0	0	0	0	0	0	0	0	0	245	260	272	292	300	293	265	290	273	281	263	209	3243
Inje University Ilsan Paik Hospital	62	81	60	62	88	96	67	71	79	89	68	81	106	86	79	102	94	92	83	92	83	98	62	1881
Hallym University Sacred Heart Hospital	94	85	114	92	94	114	88	79	101	101	0	0	37	95	109	117	99	110	108	101	92	123	64	2017
Eulji General Hospital	82	71	92	76	82	93	83	75	84	84	79	89	72	79	76	87	81	91	79	84	88	77	47	1851
Eulji University Hospital	110	86	101	122	125	105	111	123	111	127	141	131	111	135	139	148	150	123	125	143	151	123	78	2819

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Dong-A University Hospital	90	88	113	130	133	157	168	137	160	189	185	180	182	163	164	163	160	148	167	190	174	200	103	3544
Yeungnam University Hospital	201	174	173	165	157	166	132	140	142	158	171	151	195	202	190	192	150	174	179	198	193	179	104	3886
Seoul National University Bundang Hospital	163	185	186	153	195	187	206	183	209	225	200	196	190	243	220	246	229	232	218	209	258	242	207	4782
Sum	910	853	937	890	962	999	951	891	978	1070	931	1199	1312	1477	1535	1642	1490	1465	1477	1614	1786	1795	1184	28348

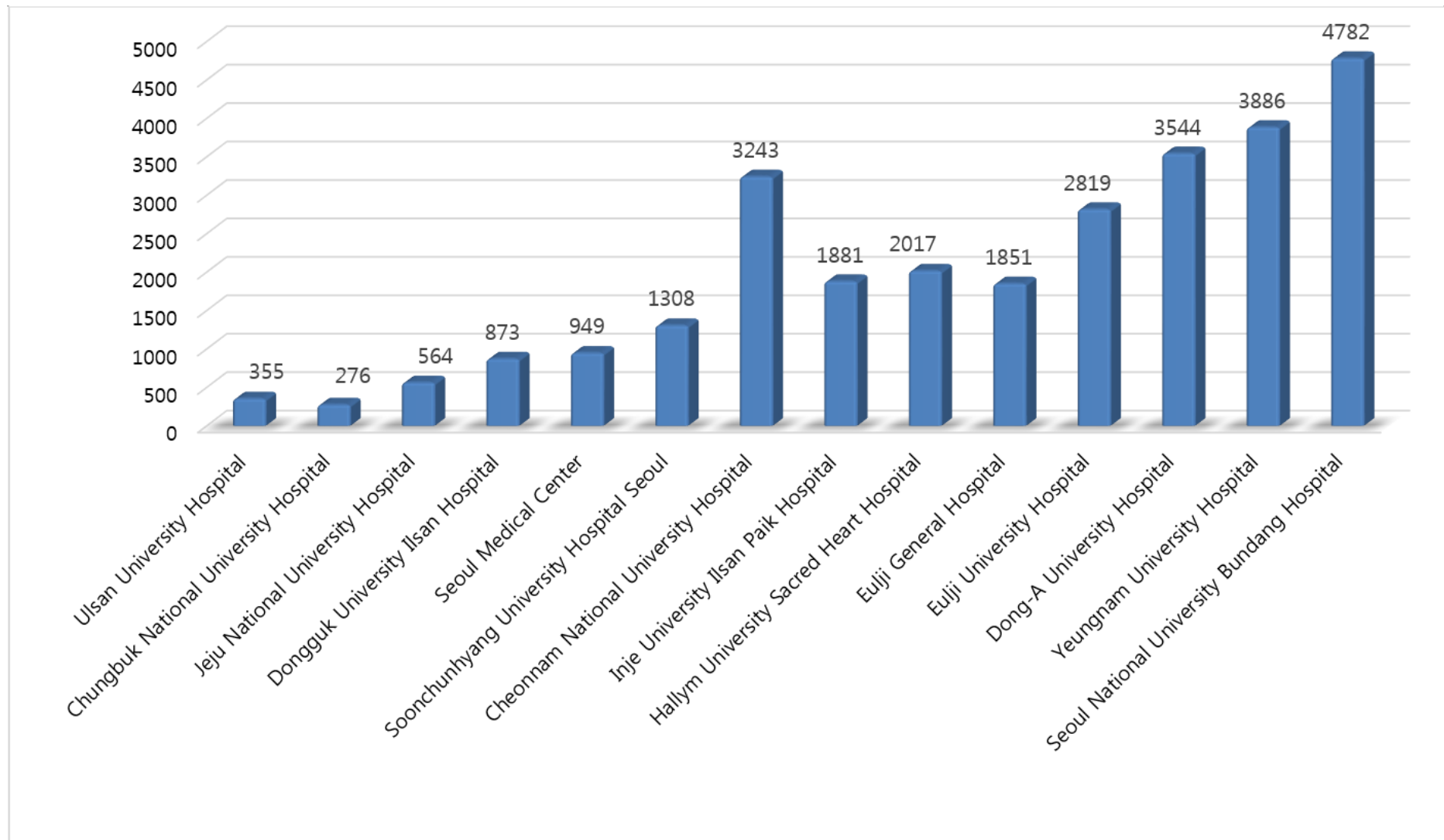


Figure 3 Number of registered acute stroke patients from each center (N=28348)

Table 2 Number of acute ischemic stroke patients stratified by sex and age group

Age group	Whole(n)	Per (%)	Male(n)	Per (%)	Female(n)	Per (%)
45	1290	5.0	917	6.1	373	3.5
45-54	2977	11.6	2216	14.8	761	7.1
55-64	4932	19.2	3554	23.8	1378	12.8
65-74	8125	31.6	4720	31.5	3405	31.7
75-84	6697	26.0	2975	19.9	3722	34.6
85	1691	6.6	581	3.9	1110	10.3
	25712		14963		10749	

● Based on 25,712 ischemic stroke cases.

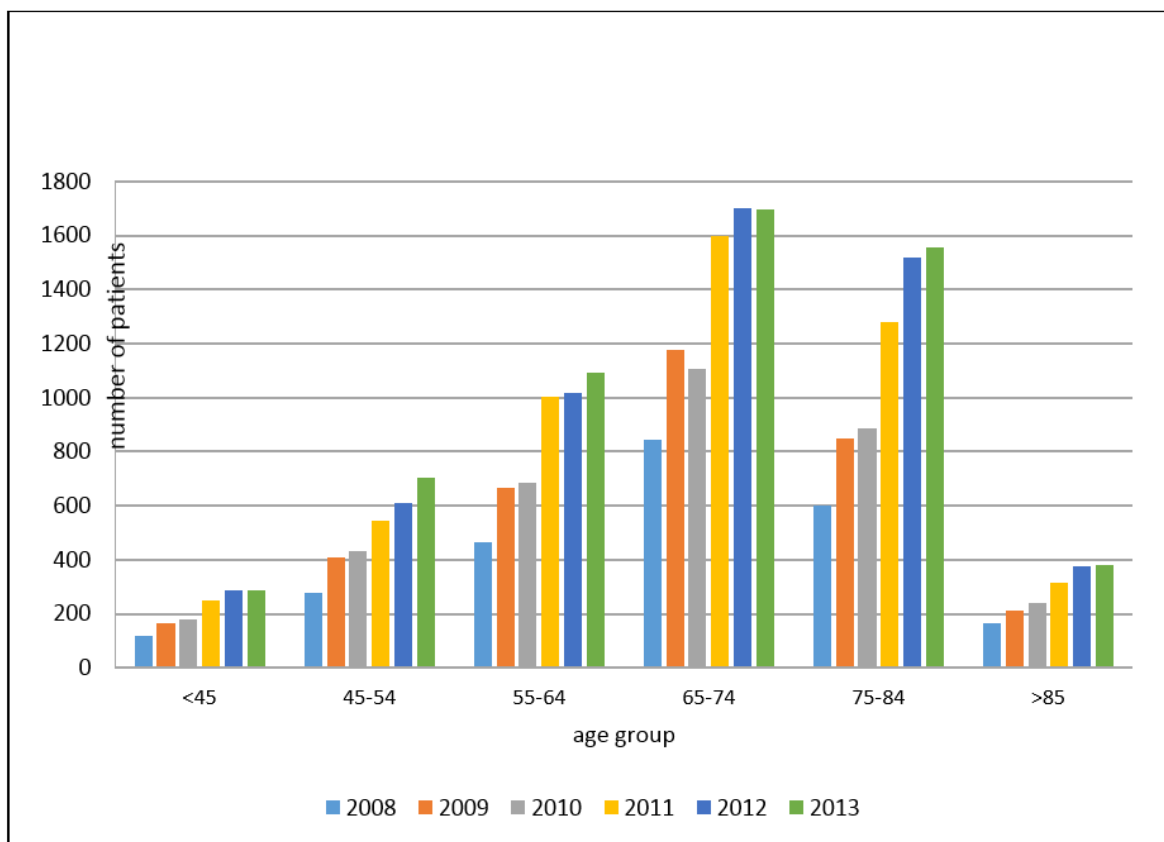


Figure 4 Number of acute ischemic stroke patients stratified by age group per year

● Based on 25,712 ischemic stroke cases.

Table 3 Fractions of TOAST classification components in CRCS-5

	Frequency(n)	Percentage (%)
Large Artery Atherosclerosis	9674	37.6
Small Vessel Occlusion	4805	18.7
Cardioembolism	5494	21.4
Other Determined Etiology	623	2.4
Undetermined Etiology - 2 or more	1082	4.2
Undetermined Etiology - Negative	2039	7.9
Undetermined Etiology - Incomplete work-ups	1995	7.8
	25712	

- Based on 22,519 ischemic stroke cases.

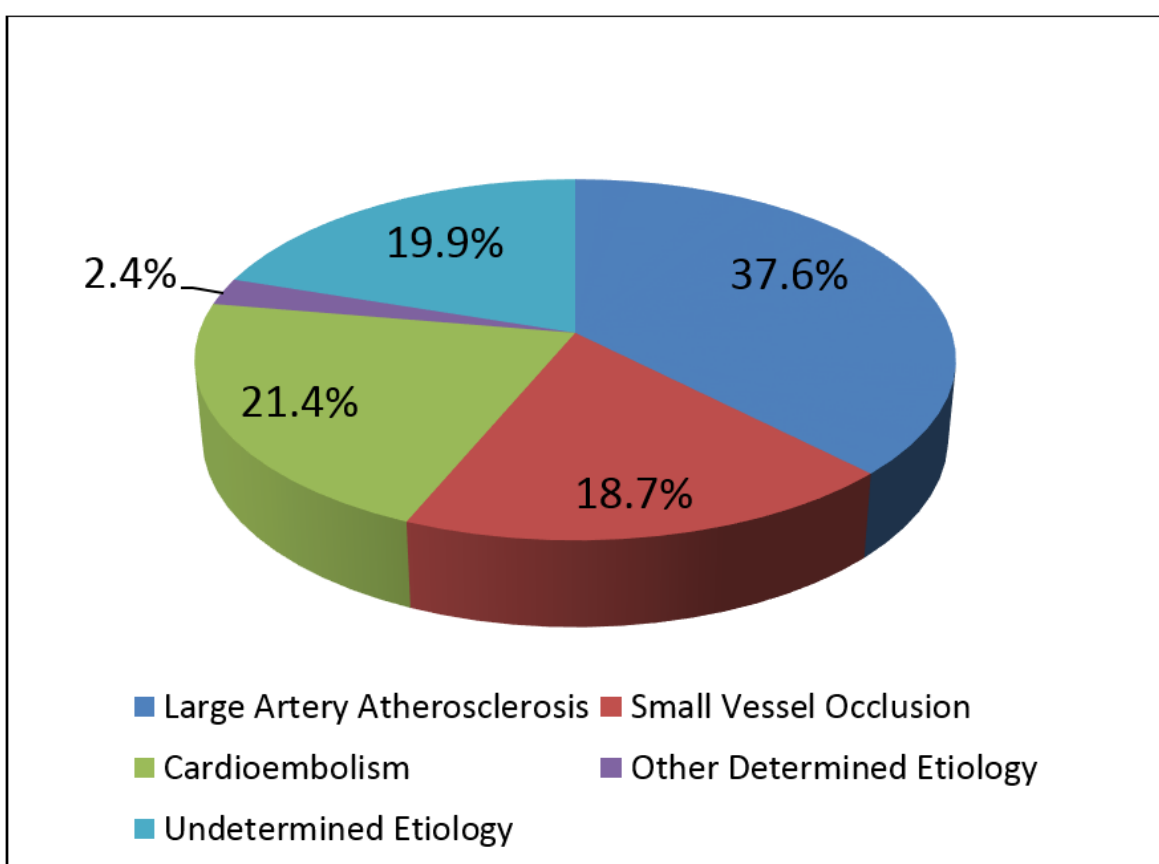


Figure 5 TOAST classification

- Based on 22,519 ischemic stroke cases.

Table 4 Arterial territory of ischemic stroke (multiple choices permitted)

Arterial Territory of Ischemic Stroke	Frequency (n)	Percentage (%)
Internal Carotid Artery	766	3.0
Middle Cerebral Artery	14727	57.3
Anterior Cerebral Artery	1459	5.7
Posterior Cerebral Artery	3486	13.6
Basilar artery	2936	11.4
Vertebral artery	667	2.6
Superior Cerebellar Artery	770	3.0
Anterior Inferior Cerebellar Artery	283	1.1
Posterior Inferior Cerebellar Artery	2319	9.0
Borderzone	792	3.1
Total	28205	

- Based on 25,712 ischemic stroke cases.

Table 5 Anatomical location of ischemic stroke (multiple choices permitted)

Anatomical Location of Ischemic Stroke	Frequency (n)	Percentage (%)
Cortex	12075	47.0
Corona Radiata	7591	29.5
Putamen - Internal capsule	6253	24.3
Thalamus	2123	8.3
Midbrain	585	2.3
Pons	3015	11.7
Medulla Oblongata	974	3.8
Cerebellum	2840	11.0
Total	35456	

- Based on 25,712 ischemic stroke cases.

Table 6 Angiographic location of steno-occluded arteries (multiple choices permitted)

Angiographic Location of Steno-Occlusion	Frequency (n)	Percentage (%)
Anterior Cerebral Artery	933	3.6
Middle Cerebral Artery	7692	29.9
Posterior Cerebral Artery	1924	7.5
Basilar Artery	1887	7.3
Vertebral Artery	2226	8.7
Extracranial Internal Carotid Artery	3278	12.7
Intracranial Internal Carotid Artery	2208	8.6
Common Carotid Artery	168	0.7
Aorta	43	0.2
Total	20359	

- Based on 25,712 ischemic stroke cases.

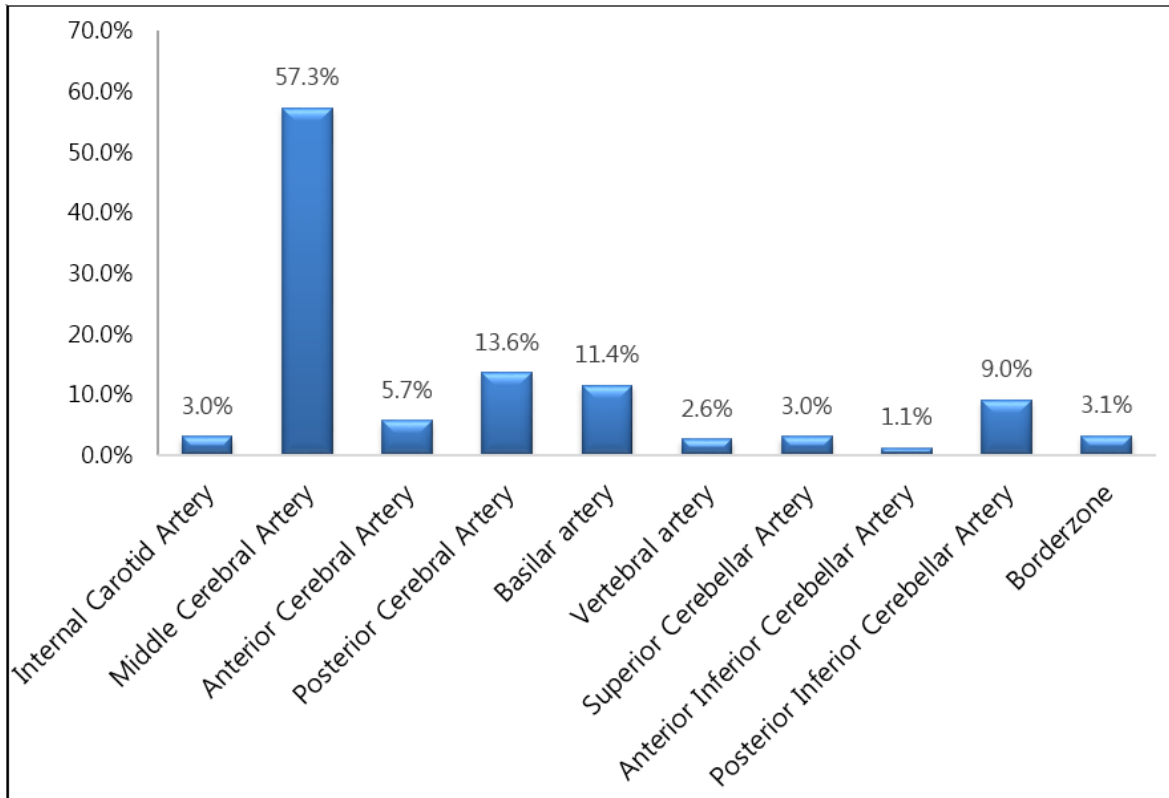


Figure 6 Arterial territories of ischemic strokes (multiple choices permitted)

- Based on 25,712 ischemic stroke cases.

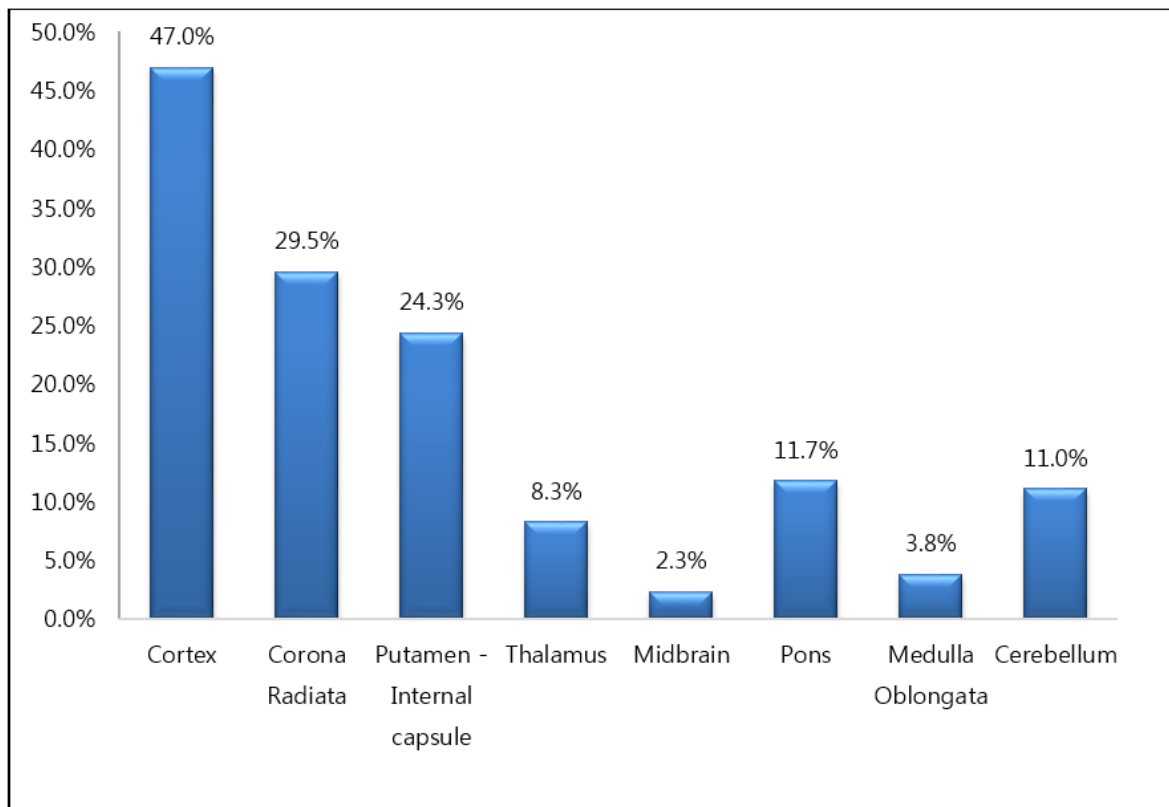


Figure 7 Anatomical locations of ischemic strokes (multiple choices permitted)

- Based on 25,712 ischemic stroke cases.

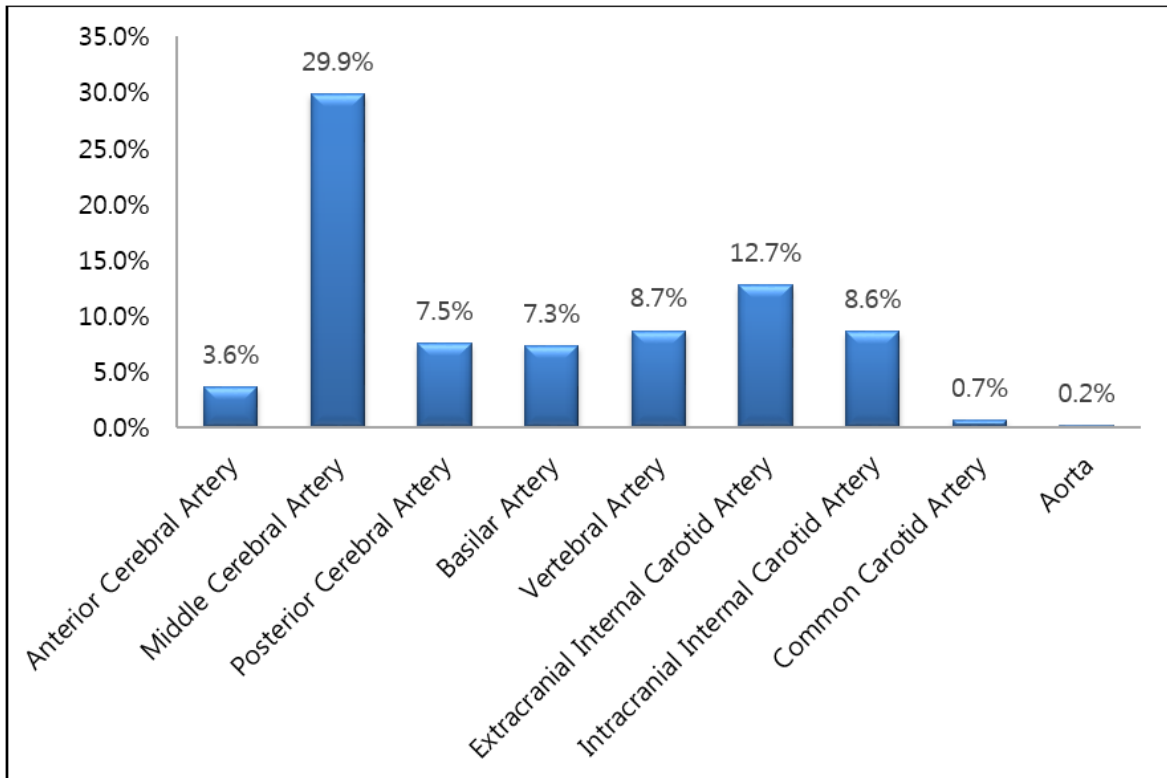


Figure 8 Angiographic locations of steno-occluded arteries (multiple choices permitted)

● Based on 25,712 ischemic stroke cases.

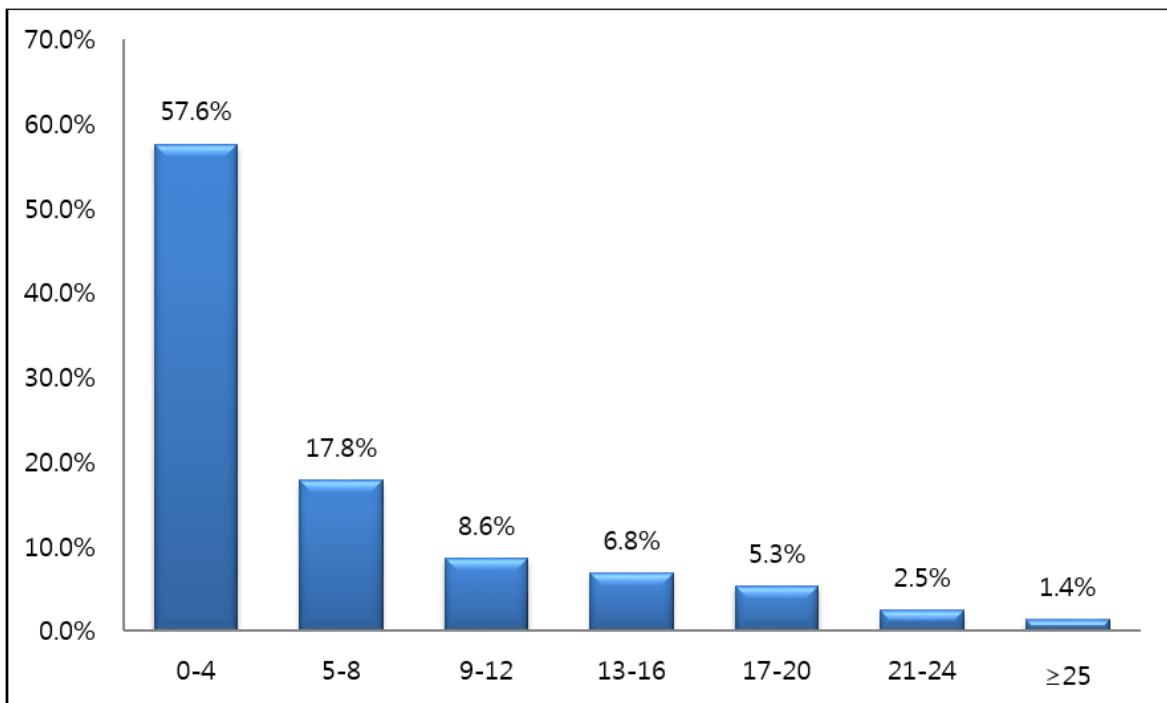


Figure 9 Distribution of NIHSS score at hospital arrival

● Based on 25,712 ischemic stroke cases.

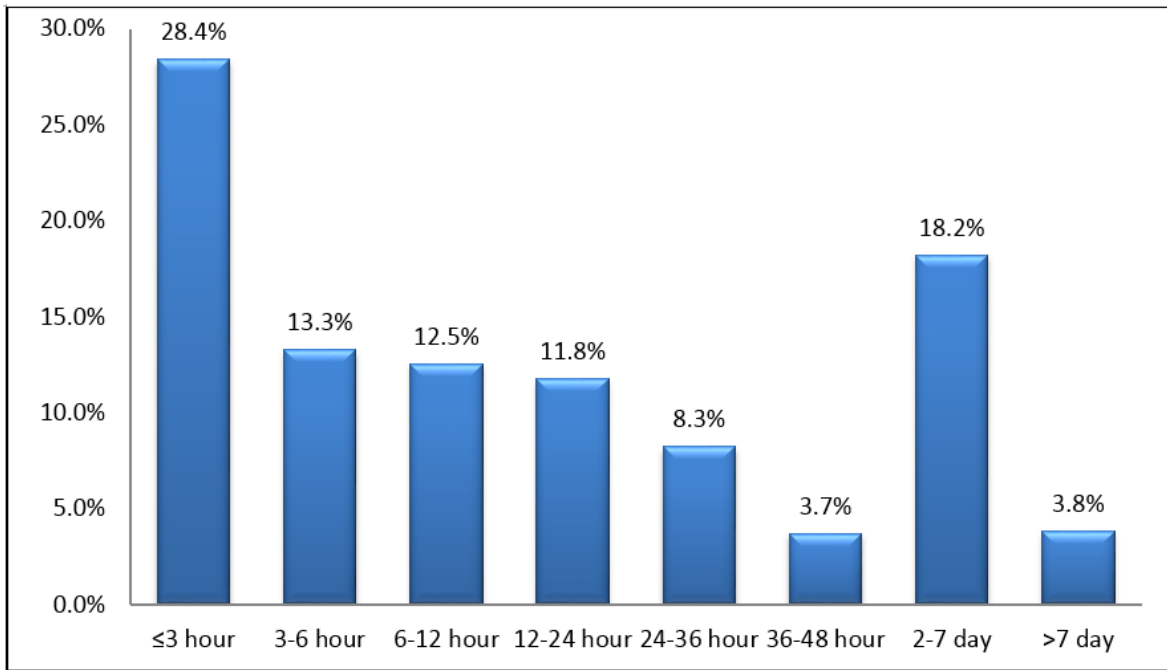


Figure 10 Onset (last normal time) to hospital arrival time

● Based on 25,712 ischemic stroke cases.

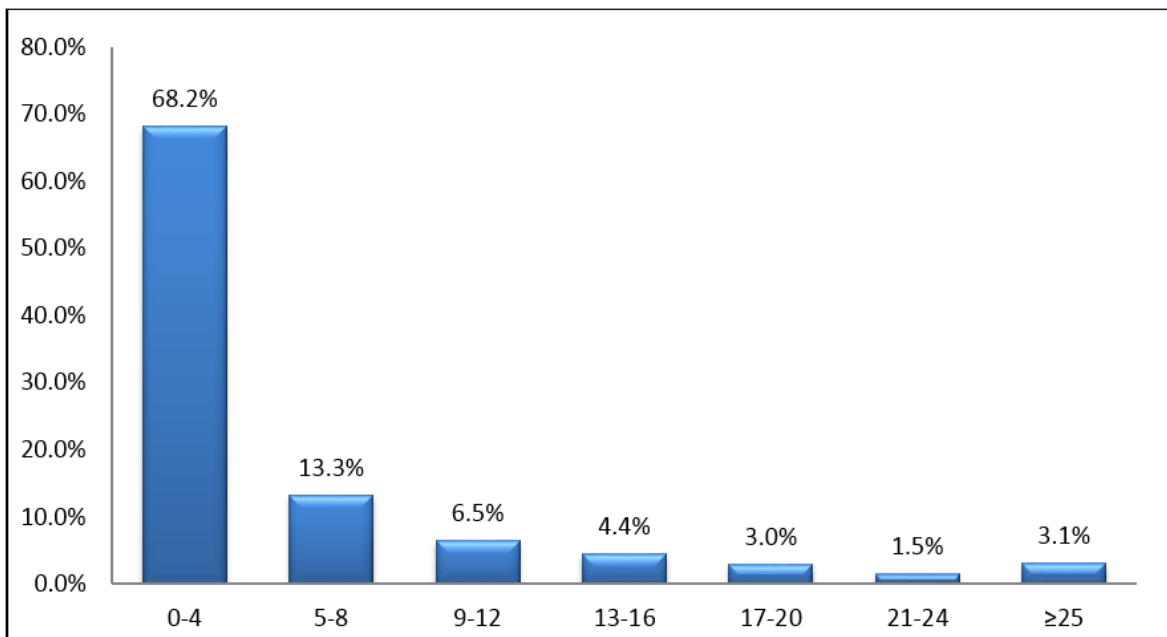


Figure 11 NIHSS score at discharge (missing in 207 cases)

● Based on 25,712 ischemic stroke cases.

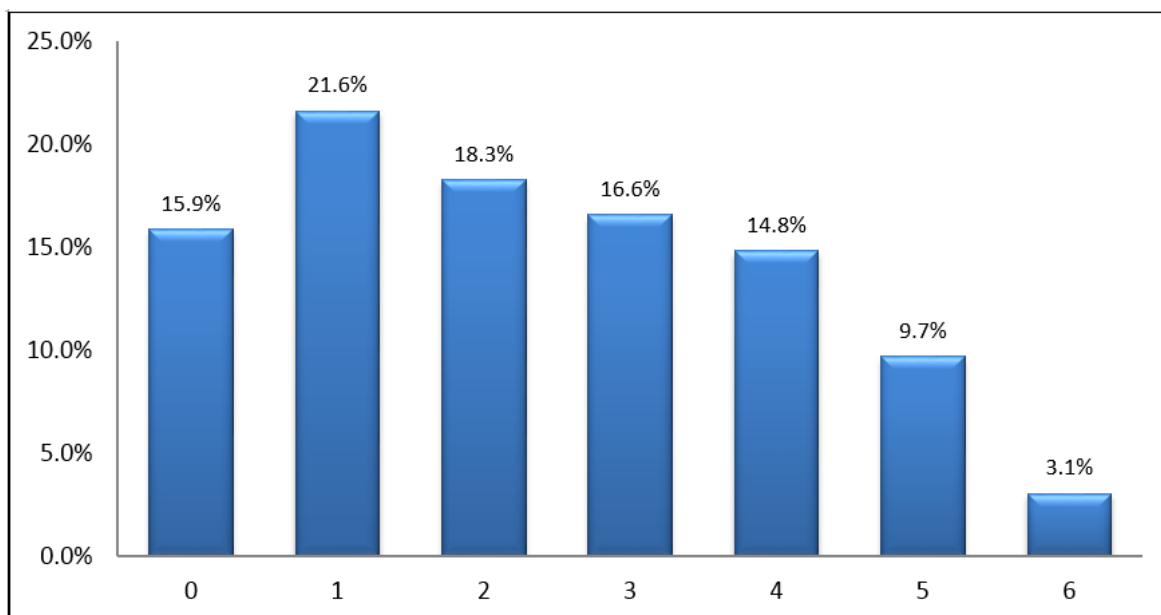


Figure 12 mRS score at discharge (missing in 19 cases)

- Based on 25,712 ischemic stroke cases.

Table 7 History of vascular events in CRCS-5 registered strokes

	Frequency (n)	Percentage (%)
History of TIA	657	2.7
History of stroke	5483	21.3
Hemorrhagic stroke	614	11.2*
Ischemic stroke	4377	79.8*
Mixed stroke	123	2.2*
Unknown	366	6.7*
Family history of coronary heart disease	240	0.9
History of peripheral arterial disease	186	0.7
History of symptomatic carotid artery disease	906	3.5
History of acute myocardial infarction	633	2.5
History of anginal attack	1035	4.0
History of coronary artery intervention [†]	935	3.6

* Percentages of stroke history are calculated from 5483 subjects.

† including coronary artery stenting or bypass graft surgery

- Based on 25,712 ischemic stroke cases.

Table 8 Major modifiable vascular risk factors

	n	Per (%)	Male		Female	
			n	Per (%)	n	Per (%)
Hypertension	18521	72.0	9570	64.0	7705	71.7
Diabetes	8943	34.8	4919	32.9	3474	32.3
Dyslipidemia	8323	32.4	4308	28.8	3397	31.6
Current smoking	6840	26.6	9323	62.3	756	7.0
Atrial fibrillation	5199	20.2	2569	17.2	2485	23.1

● Based on 25,712 ischemic stroke cases. (Male=14,963, Female=10749)

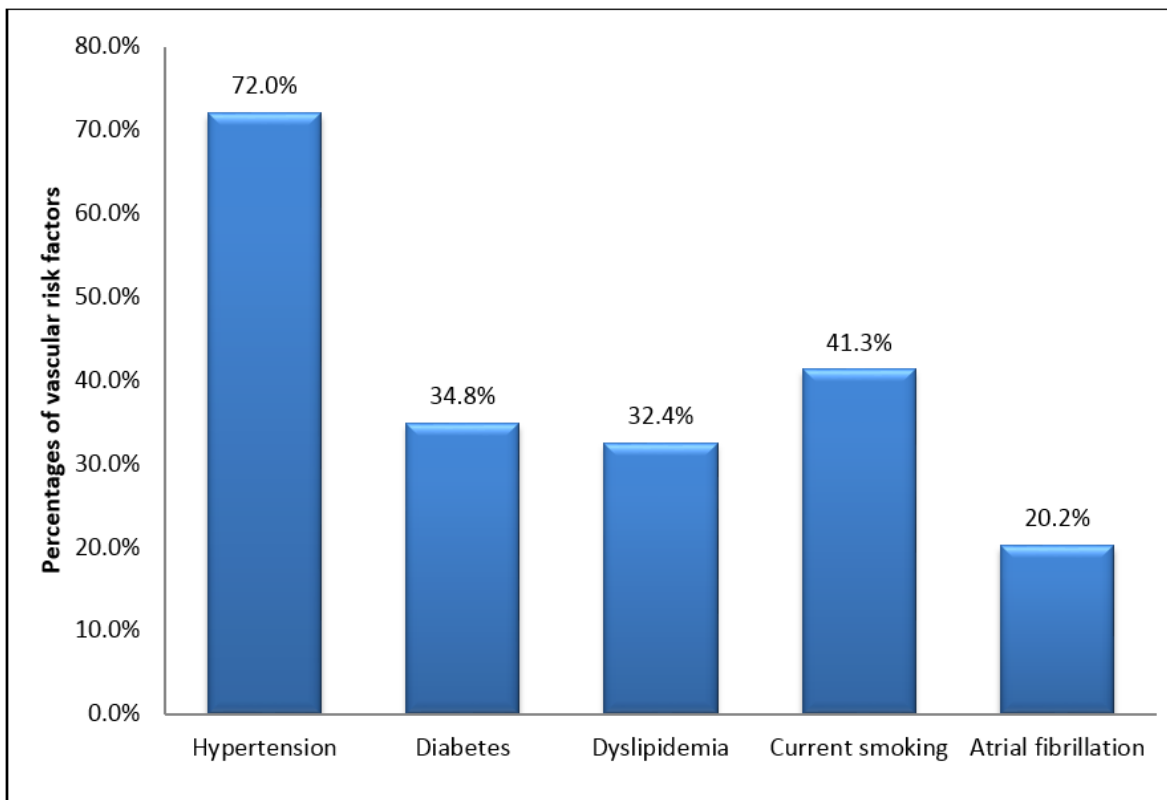


Figure 13 Percentages of major modifiable vascular risk factors in CRCS-5 database

● Based on 25,712 ischemic stroke cases.

Table 9 Frequencies of potential cardioembolic sources (risk stratification according to the TOAST classification scheme)

	Frequency(n)	Percentage (%)*
Potential cardioembolic source - high risk	4886	21.7
Mechanical prosthetic valve	49	1.0
Mitral stenosis with atrial fibrillation	112	2.3
Atrial fibrillation(other than lone atrial fibrillation)	4332	88.7
Left atrial/atrial appendage thrombus	98	2.0
Sick sinus syndrome	69	1.4
Recent myocardial infarction(<4 week)	82	1.7
Left ventricular thrombus	26	0.5
Dilated cardiomyopathy	97	2.0
Akinetic left ventricular segment	141	2.9
Atrial myxoma	19	0.4
Infective endocarditis	31	0.6
Others	107	2.2
Potential cardioembolic source - medium risk	1537	6.0
Mitral valve prolapse	16	1.0
Mitral annulus calcification	3	0.2
Mitral stenosis without atrial fibrillation	23	1.5
Left atrial turbulence(smoke)	7	0.5
Atrial septal aneurysm	16	1.0
Patent foramen ovale	565	36.8
Atrial flutter	65	4.2
Lone atrial fibrillation	262	17.0
Bioprosthetic cardiac valve	15	1.0
Nonbacterial thrombotic endocarditis	3	0.2
Congestive heart failure	447	29.1
Hypokinetic left ventricular segment	236	15.4
Myocardial infarction(>4weeks, <6months)	53	3.4

* Percentages of components are calculated from the total number of each risk stratum.

- Based on 25,712 ischemic stroke cases.

Table 10 Frequency of etiological work-ups

Work-ups	Frequency (n)	Percentage (%)
CT	14159	56.1
CT angiography	8894	35.2
CT perfusion image	2196	8.7
MRI	21043	81.8
MR Angiography	22152	86.2
Diffusion-weighted image	24002	93.3
Perfusion-weighted MR image	7883	30.7
Gradient-echo MR image	21147	82.2
Contrast-enhanced MR angiography	3646	14.2
Transthoracic echocardiography	18268	71.0
Transesophageal echocardiography	3417	13.3
24-hour Holter monitoring	7803	30.3
Transcranial Doppler sonography	18557	72.2
Carotid Doppler sonography	7904	30.7
Peripheral vascular study	3927	15.3
24-hour BP monitoring	550	2.1
Single-Photon Emission Computed Tomography (SPECT)	814	3.2
Positron Emission Tomography (PET)	46	0.2
Other studies	1630	6.3

- Based on 25,712 ischemic stroke cases.

Table 11 Profile of laboratory tests

Laboratory variables	Mean ± SD	Median [IQR]
White blood cell count ($\times 10^3 / \mu\text{L}$)	8.5 ± 7.7	7.7 [6.3 – 9.7]
Blood Urea Nitrogen (mg/dL)	17.8 ± 4.3	17.6 [12 – 20]
Creatinine (mg/dL)	1.0 ± 1.0	0.9 [0.71 – 1.1]
GOT (IU/L)	28.1 ± 37.2	23 [19 – 30]
GPT (IU/L)	23.0 ± 31.7	18 [13 – 26]
Hemoglobin (g/dL)	13.6 ± 2.0	13.7 [12.4 – 14.9]
Hematocrit (%)	40.5 ± 17.8	40 [26.5 – 43.3]
Total cholesterol (mg/dL)	178.5 ± 43.1	176 [149 – 204]
High density lipoprotein cholesterol (mg/dL)	44.7 ± 13.3	43 [36 – 52]
Low density lipoprotein cholesterol (mg/dL)	109.9 ± 37.2	107 [84 – 132]
Glucose (mg/dL)	123.9 ± 53.4	108 [92 – 137]
Platelet count ($\times 10^3 / \mu\text{L}$)	234.9 ± 79.1	227 [186 – 275]
Hb A1c (%)	6.4 ± 1.4	6.0 [5.6 – 6.8]
Prothrombin time (INR)	1.0 ± 0.3	1.0 [1.0 – 1.1]
Systolic blood pressure (mm Hg)	146.5 ± 27.1	142 [130 – 161]
Diastolic blood pressure (mm Hg)	85.1 ± 15.7	83 [75 – 95]

- Based on 25,712 ischemic stroke cases.

Table 12 Profile of hyperacute treatment for ischemic strokes

	Frequency (n)	Percentage (%)
Hyperacute thrombolysis	3457	13.4
IV thrombolysis	2190	63.3
IA thrombolysis	542	15.7
Combined IV and IA thrombolysis	725	21.0
Modality of pharmacological thrombolysis		
rt-PA	2925	84.6
Urokinase	686	19.8
Abciximab	43	1.2

- Based on 25,712 ischemic stroke cases

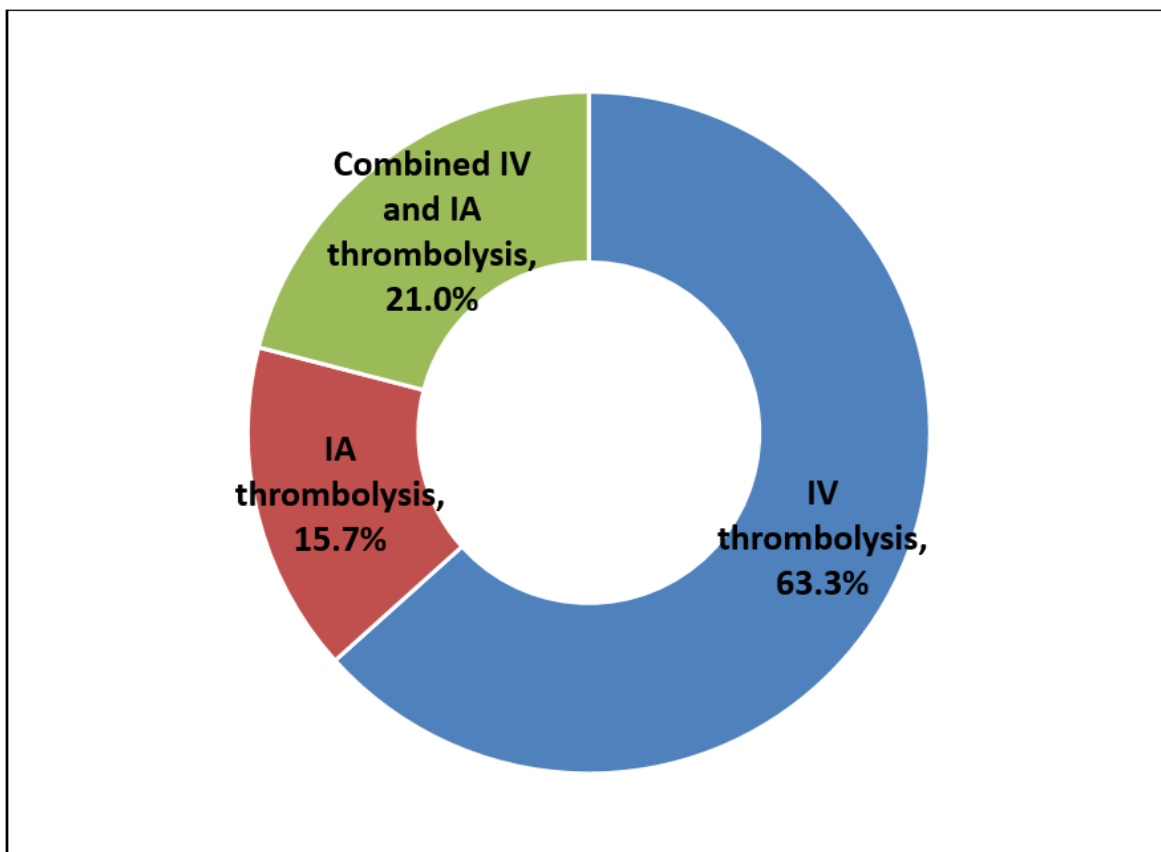


Figure 14 Composition of hyperacute revascularization treatment modalities

- Based on 25,712 ischemic stroke cases.

Table 13 Profile of acute stroke medications (multiple choices permitted)

	Frequency (n)	Percentage (%)
Aspirin	20928	81.4
Clopidogrel	8028	31.2
Dipyridamole	3	0.0
Cilostazol	865	3.4
Triflusal	121	0.5
Ticlopidine	75	0.3
Heparin	1740	6.8
Warfarin	2029	7.9
Low-molecular weight heparin	307	1.2
Thrombin inhibitor	124	0.5
Other medication	73	0.3

● Based on 25,712 ischemic stroke cases.

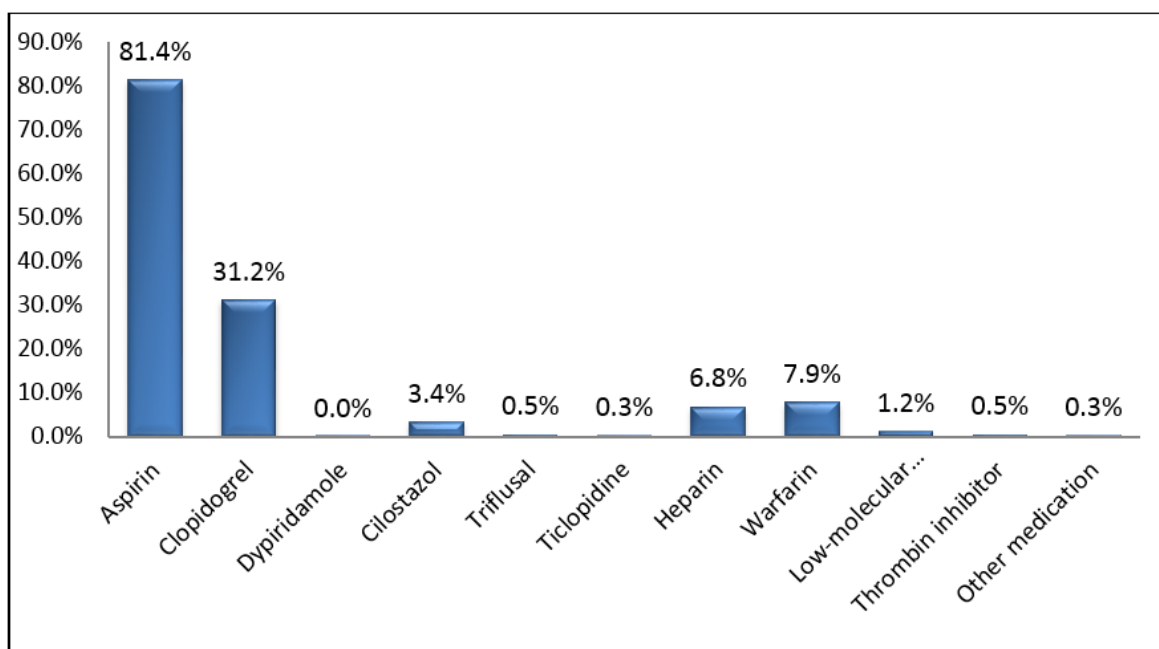


Figure 15 Percentages of acute stroke medications (multiple choices permitted)

● Based on 25,712 ischemic stroke cases.

Table 14 Profile of secondary preventive medications at discharge (multiple choices permitted)

	Frequency (n)	Percentage (%)
Aspirin	15547	69.0
Clopidogrel	7964	35.4
Dipyridamole	1	0.0
Cilostazol	1666	7.4
Triflusal	308	1.4
Ticlopidine	218	1.0
Other antiplatelets	95	0.4
Warfarin	4030	17.9
Other anticoagulants	279	1.2

● Based on 25,712 ischemic stroke cases.

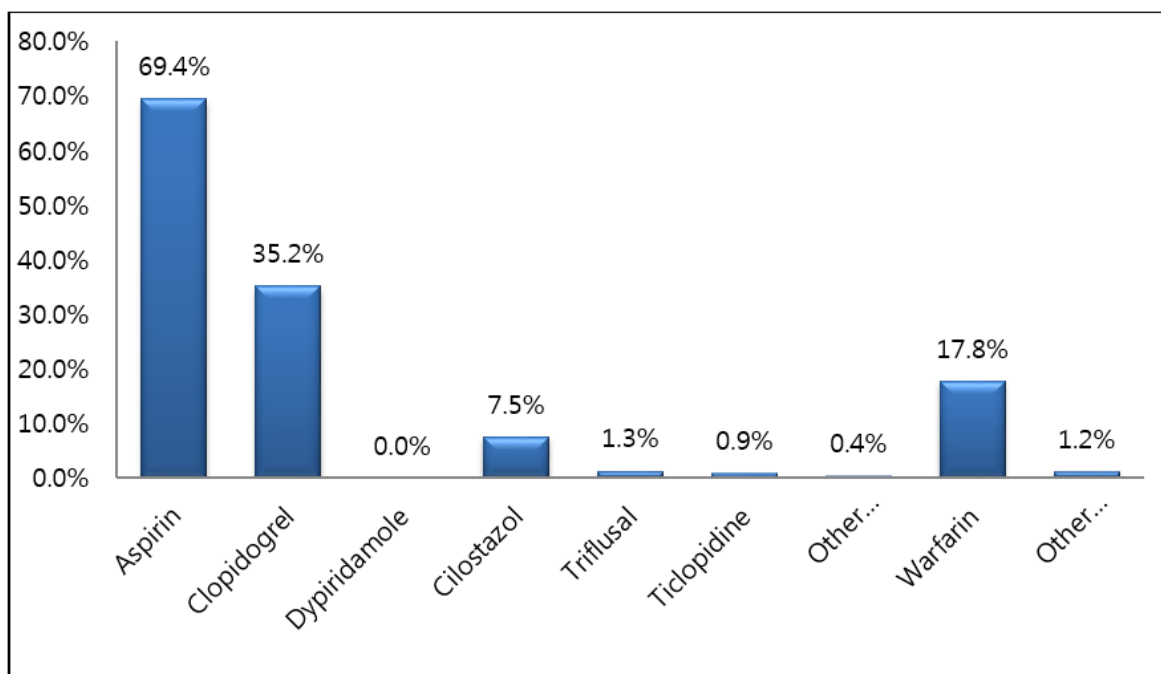


Figure 16 Percentages of secondary preventive medications at discharge (multiple choices permitted)

● Based on 25,712 ischemic stroke cases.

Table 15 Profile of surgical interventions during acute period of stroke (multiple choices permitted)

	Frequency (n)	Percentage (%)
Decompressive surgery	112	0.4
Bypass surgery	16	0.1
Endarterectomy	68	0.3
Angioplasty or stenting	427	1.7

● Based on 25,712 ischemic stroke cases.

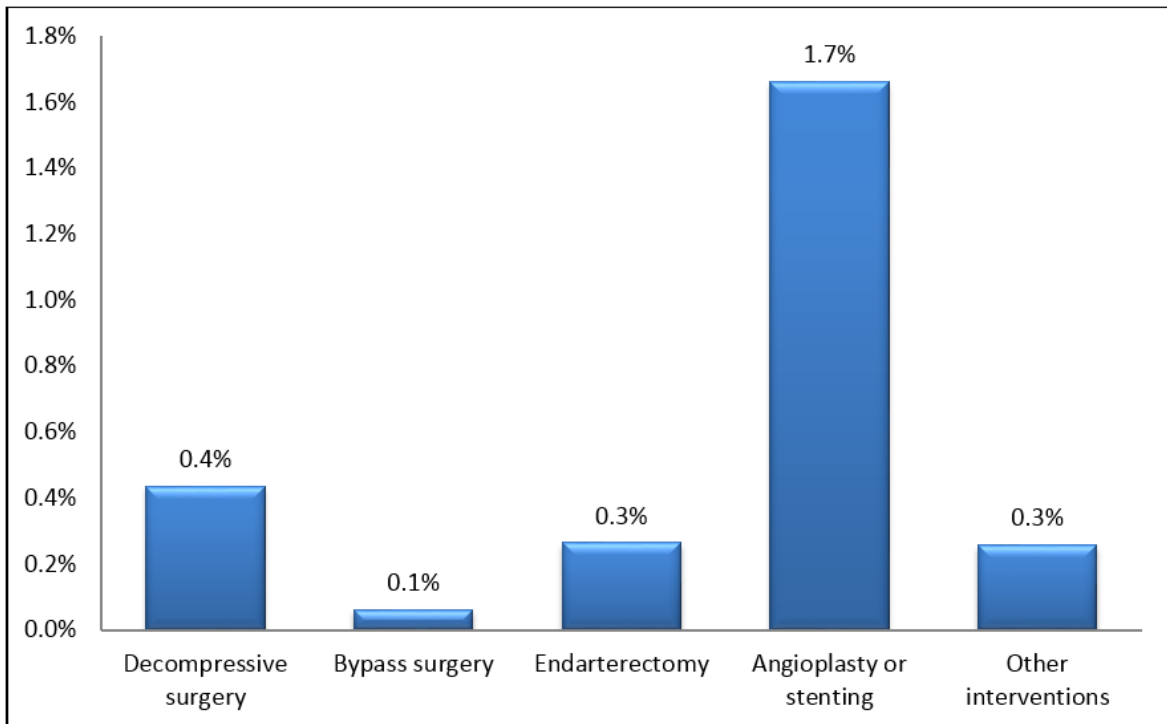


Figure 17 Percentages of surgical interventions during acute period of stroke (multiple choices permitted)

● Based on 25,712 ischemic stroke cases.

Table 16 Major vascular risk factors and their management before index strokes

Risk factors and prior managements	Frequency (n)	Percentage (%)
Hypertension	17275	67.2
Never diagnosed as hypertension	1860	10.8
Diagnosed but never treated of hypertension	798	4.6
Ever-used BP-lowering medications	14800	85.7
Ceased using BP-lowering medications	645	3.7
Currently using BP-lowering medications	14164	82.0
Without regular treatment	482	2.8
With regular treatment	13682	79.2
Diagnosed at the index admission	1679	9.7
Diabetes	8393	32.6
Never diagnosed as diabetes	1511	18.0
Diagnosed but never treated of diabetes	316	3.8
Ever-used glucose-lowering medications	6899	82.2
Ceased using glucose-lowering medications	301	3.6
Currently using glucose-lowering medications	6601	78.7
Without regular treatment	238	2.8
With regular treatment	6363	75.8
Diagnosed at the index admission	1182	14.9
Dyslipidemia	7705	30.0
Never diagnosed as dyslipidemia	3797	49.3
Diagnosed but never treated of dyslipidemia	253	3.3
Ever-used cholesterol-lowering medications	3704	48.1
Ceased using cholesterol -lowering medications	229	2.9
Currently using cholesterol -lowering medications	3480	45.2
Without regular treatment	90	1.2
With regular treatment	3390	44.0
Diagnosed at the index admission	3751	48.7
Habitual smoking	10079	39.2
Current smoker	6840	67.9
Ex-smoker, quit within 5 years	1133	11.2
Ex-smoker, quit more than 5 years ago	2105	20.9
Pack-year	38.67	72.8
Atrial fibrillation	5054	19.7
Diagnosed at the index admission	2211	43.8
Diagnosed before index stroke	2842	56.2
Without regular treatment	640	12.7
With regular treatment	2203	43.6

* Percentages of management categories were calculated based on the frequency of each risk factor.

- Based on 25,712 ischemic stroke cases.

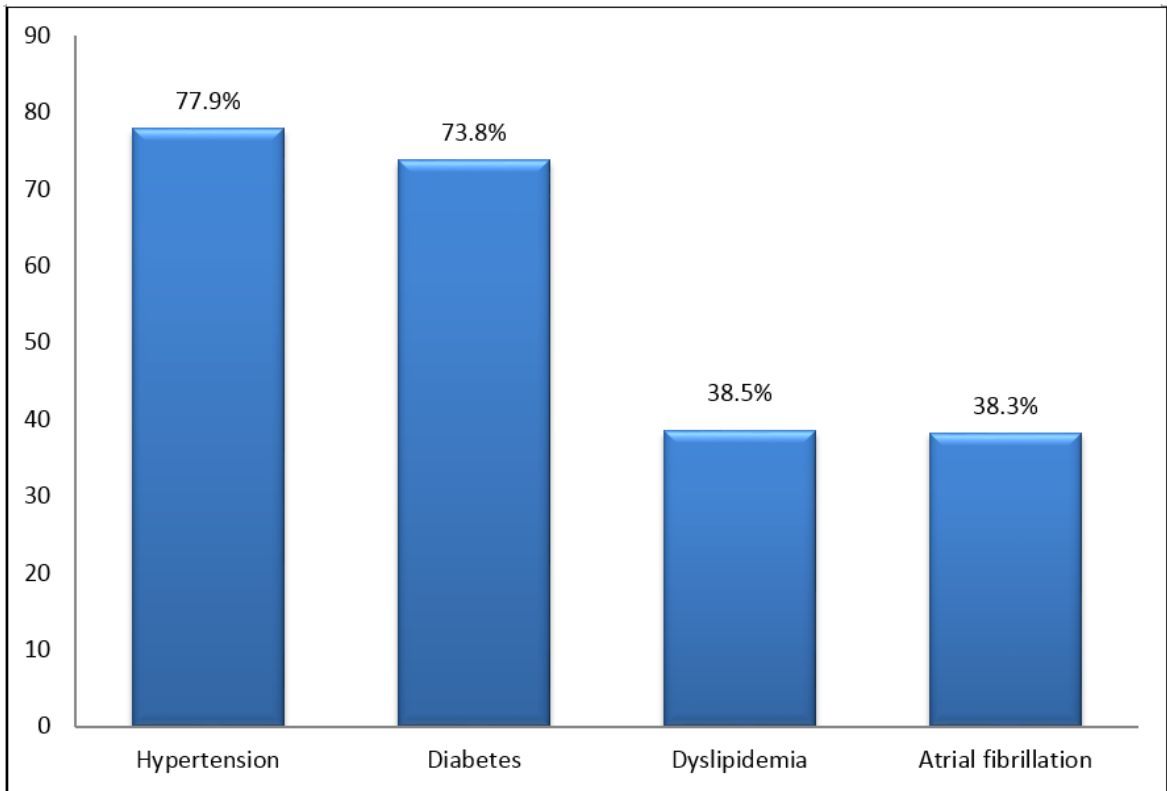


Figure 18 Percentages of regular treatment for vascular risk factors

● Based on 25,712 ischemic stroke cases.

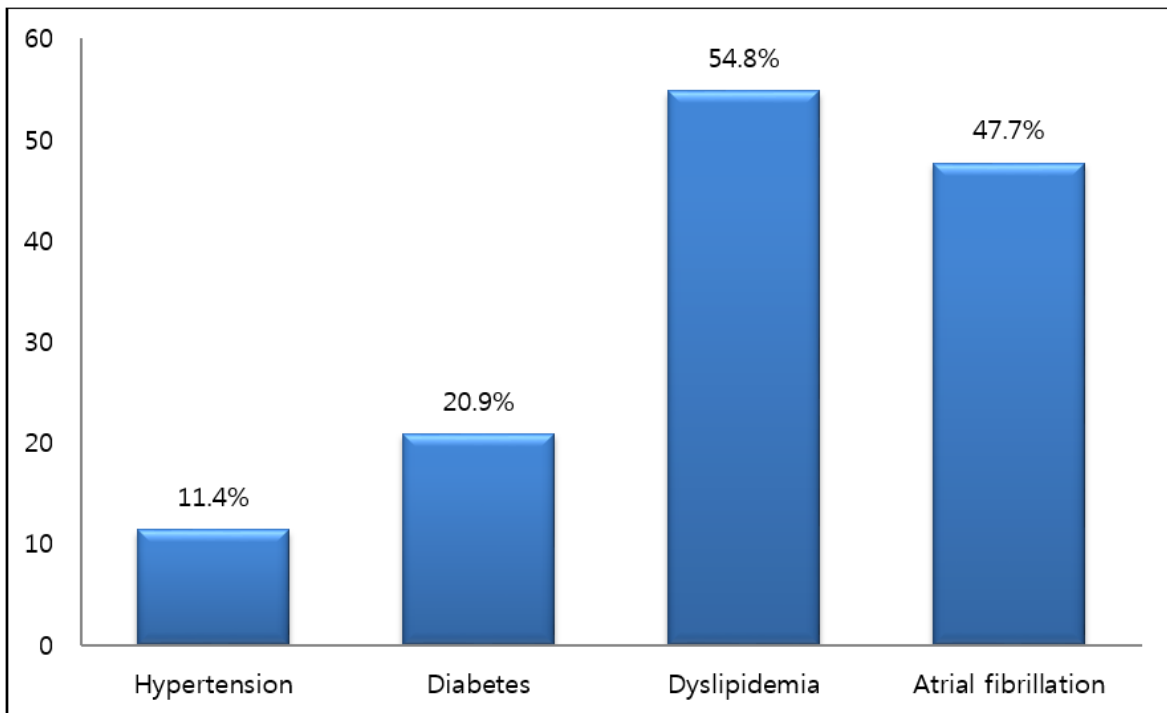


Figure 19 Percentages of undocumented vascular risk factors

● Based on 25,712 ischemic stroke cases.

Table 17 Distribution of prestroke mRS score in the included stroke cases

Prestroke mRS score	Frequency (n)	Percentage (%)
0	20603	80.1
1	1684	6.5
2	1279	5.0
3	1238	4.8
4	626	2.4
5	280	1.1

- Based on 25,712 ischemic stroke cases.

Acute Treatment Statistics of CRCS-5

Establishment of acute treatment database in CRCS-5

- From November 2009, five centers (Eulji General Hospital, Seoul National University Bundang Hospital, Seoul Medical Center, Soonchunhyang University Hospital Seoul and Inje University Ilsan Paik Hospital) initiated acute treatment database devoted to collect clinical and treatment information of acute ischemic stroke. At January 2011, six new members were introduced to acute treatment database (Eulji University Hospital, Dong-A University Hospital, Yeungnam University Medical Center, Hallym University Sacred Heart Hospital, Chonnam National University Hospital and Dongguk University Ilsan Hospital) and Jeju National University Hospital further participated in at October 2011.
- Data registration and auditing process are identical to the CRCS-5 DB.
- Acute treatment database is focusing on the revascularization process of hyperacute ischemic stroke patients.

Revascularization treatment for acute ischemic stroke

- A total of 1269 (21% of 16474 registered stroke cases during identical period) cases received revascularization treatment for acute ischemic stroke. Intravenous-only pharmacological thrombolysis (IV thrombolysis) was performed in 2151 (64%), endovascular-only revascularization (IA thrombolysis) in 514 (15%), and combined IV-endovascular revascularization (Combined IV-IA thrombolysis) in 717 (21%) strokes (Table 18 Modality of revascularization treatment for acute ischemic stroke). Overall, endovascular recanalization strategies were utilized in 36% of revascularization treatments

- For stroke cases with hyperacute treatment, onset-to-arrival time delay was 2.8 ± 3.4 hours on average, with median 1.5 [interquartile range, 0.75 – 3.0]. Average onset-to-arrival time of IV thrombolysis and combined IV-IA thrombolysis was around 2 hours, but that of IA thrombolysis exceeded 6 hours (median 4.7 hour).
- Acute ischemic strokes with revascularization treatment, 98% of cases arrived stroke centers within 6 hours after onset. (Table 19 Discrepancy in onset (last normal time) to arrival time according to the treatment modality).
- Medications used in pharmacological thrombolysis was as follows (multiple choices permitted); recombinant tissue plasminogen activator 2925 (81.7%), urokinase 686 (21%), and abciximab 23 (1.4%).
- Average NIHSS score at arrival was 6.8 ± 6.7 points, with median 4 [interquartile range, 2 – 11]. At day #1 after revascularization treatment, average NIHSS score was 9.7 ± 7.8 points, with median 8 [interquartile range, 3 – 15] (available in 2950 cases). 816 (28%) cases showed early neurological improvement, defined as NIHSS score decrease ≥ 4 -point.
- Symptomatic hemorrhagic transformation, associated with NIHSS score increase ≥ 4 -point, occurred in 99 (7.8%) cases. Sixty-seven percent of symptomatic hemorrhagic transformations (67 cases) developed within 2 days after revascularization treatment.

Stroke center statistics for revascularization treatment

- Volume of acute revascularization treatment varied for each stroke center. Revascularization modality also varied among stroke centers. Rate of endovascular treatment, including both IA thrombolysis and combined IV-IA thrombolysis, range from 6% (Hospital #08) to 64% (Hospital #01). However, onset-to-arrival time and NIHSS score at arrival did not show noticeable difference between stroke centers

- (Table 21 Discrepancy of revascularization modality among stroke centers, Figure 22 Discrepancy of revascularization modality among stroke centers) and (Table 22 Onset-to-arrival times and NIHSS scores between stroke centers).

Table 18 Modality of revascularization treatment for acute ischemic stroke

Treatment modality	Frequency (n)	Percentage (%)
Intravenous-only thrombolysis	2151	63.6
Endovascular-only revascularization	514	15.2
Combined IV-endovascular revascularization	717	21.2
Total	3382	

- Based on 16,474 cases from acute treatment database

Table 19 Discrepancy in onset (last normal time) to arrival time according to the treatment modality

Treatment modality	Mean ± SD (hour)	Median [IQR]
Intravenous-only thrombolysis	2.2 ±2.7	1.5 [0.78,2.5]
Endovascular-only revascularization	6.2 ±5.0	4.7[2.6,8.7]
Combined IV-endovascular revascularization	2.1 ±2.4	1.4[0.7,2.4]

- Based on 16,474 cases from acute treatment database

Table 20 Categorized onset-to-arrival time

Onset-to-arrival time	Frequency (n)	Percentage (%)
≤3 hours	2484	73.4
3 – 6 hours	542	16.0
6 – 12 hours	225	6.7
12 – 24 hours	131	3.9
Total	3382	

- Based on 16,474 cases from acute treatment database

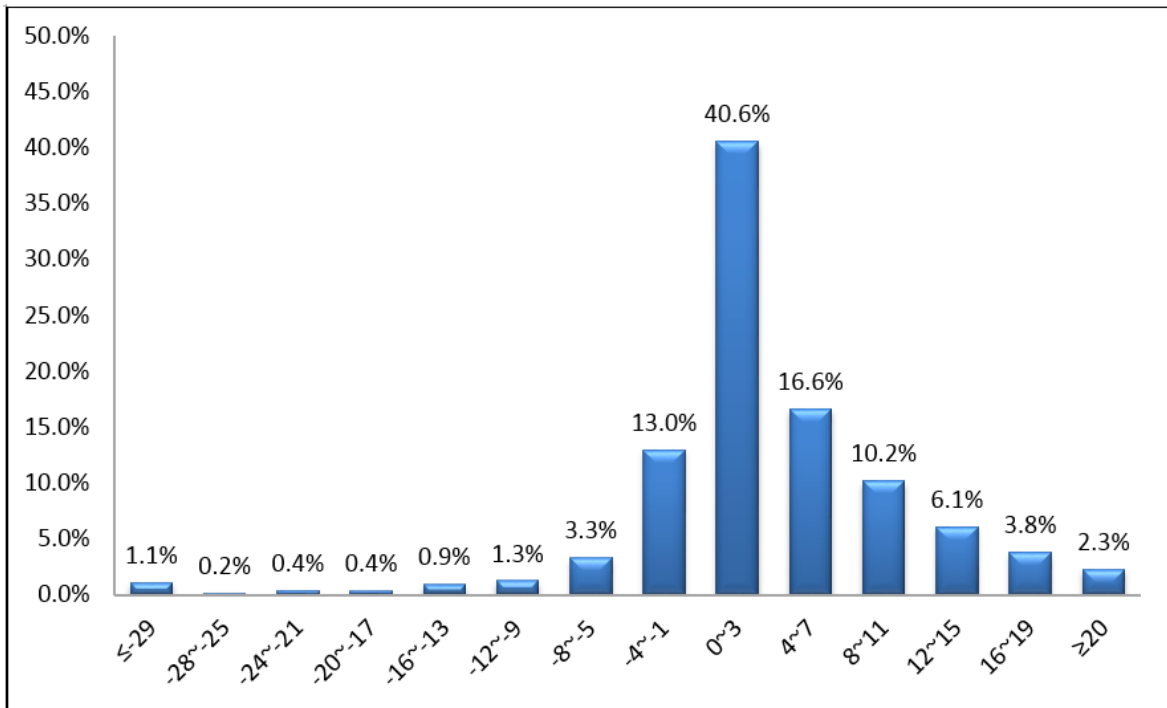


Figure 20 Difference of NIHSS score over arrival and day #1 post-revascularization (available in 2950 strokes)

- Based on 16,474 cases from acute treatment database

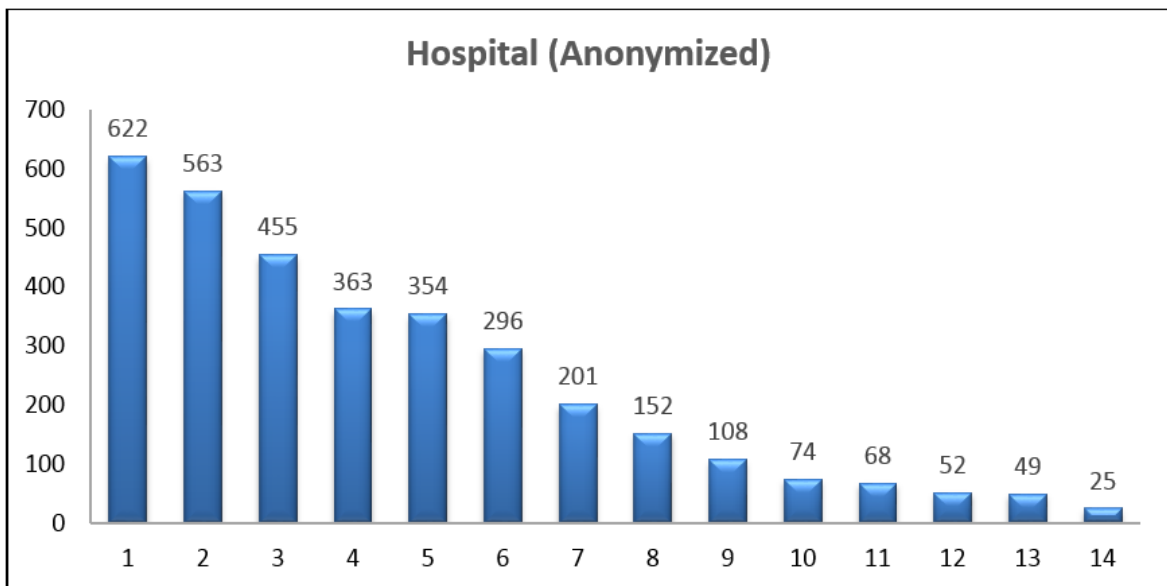


Figure 21 Volume of acute revascularization treatment for each stroke center (Available in 3382 cases)

- Based on 16,474 cases from acute treatment database

Table 21 Discrepancy of revascularization modality among stroke centers

Hospital (Anonymized)	IV-only (n)	Per (%)	IA-only (n)	Per (%)	Combined (n)	Per (%)	Total
1	392	63.0	100	16.1	130	20.9	622
2	205	36.4	164	29.1	194	34.5	563
3	317	69.7	57	12.5	81	17.8	455
4	272	74.9	37	10.2	54	14.9	363
5	249	70.3	51	14.4	54	15.3	354
6	181	61.1	32	10.8	83	28.0	296
7	116	57.7	35	17.4	50	24.9	201
8	143	94.1	6	3.9	3	2.0	152
9	85	78.7	5	4.6	18	16.7	108
10	63	85.1	2	2.7	9	12.2	74
11	53	77.9	7	10.3	8	11.8	68
12	33	63.5	4	7.7	15	28.8	52
13	32	65.3	5	10.2	12	24.5	49
14	10	40.0	9	36.0	6	24.0	25
Total	2151		514		717		3382

● Based on 16,474 cases from acute treatment database

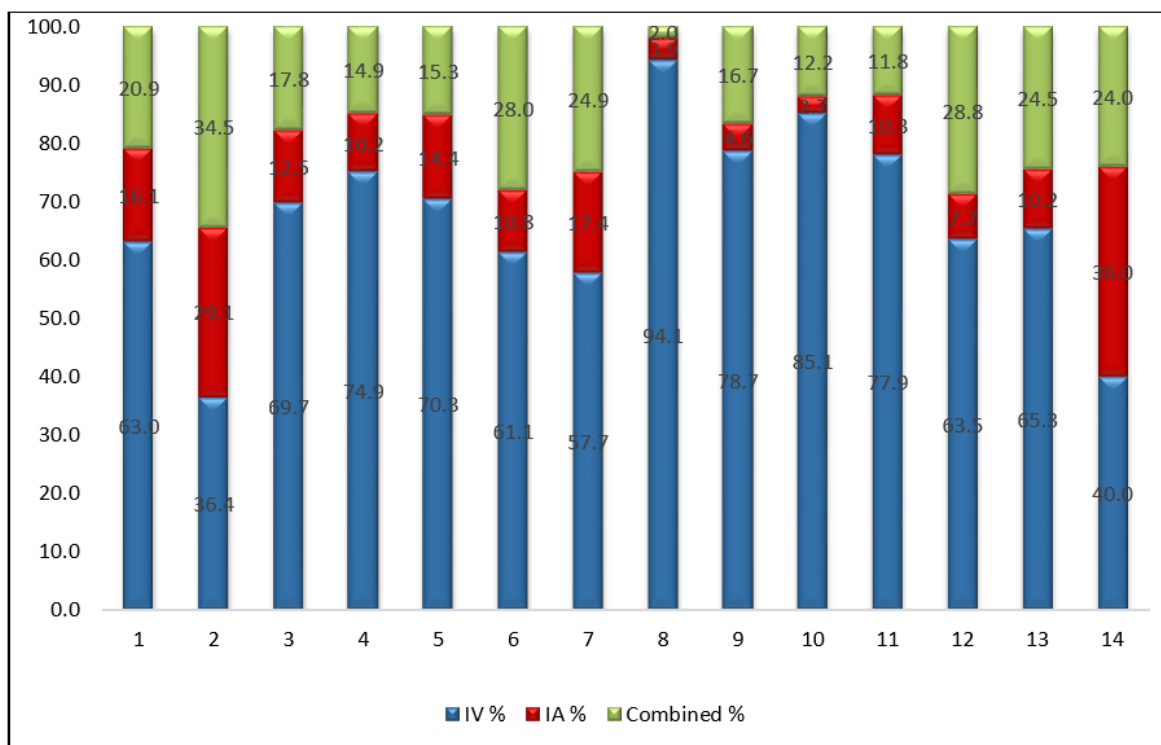


Figure 22 Discrepancy of revascularization modality among stroke centers

● Based on 16,474 cases from acute treatment database

Table 22 Onset-to-arrival times and NIHSS scores between stroke centers

Hospital (Anonymized)	Onset to arrival time*	NIHSS score at arrival *
1	8.7±7.2	6.5±6.3
2	8.4±6.6	6.3±6.2
3	8.4±6.7	6.8±7.0
4	8.4±7.1	7.2±6.7
5	8.4±6.7	5.9±5.9
6	8.3±6.9	6.8±6.5
7	8.2±7.1	7.2±7.1
8	8.0±6.5	7.1±6.9
9	8.0±6.8	6.4±7.2
10	7.9±7.1	7.0±7.0
11	7.8±6.8	7.5±8.0
12	7.7±6.7	6.0±5.9
13	7.1±6.1	7.6±6.6
14	6.4±5.9	6.6±5.8
Total	7.8±6.7	6.8±6.8

*Mean ± SD

- Based on 16,474 cases from acute treatment database

Outcome Statistics of CRCS-5

Establishment of stroke outcome database in CRCS-5

- Along with acute treatment database, five centers (Eulji General Hospital, Seoul National University Bundang Hospital, Seoul Medical Center, Soonchunhyang University Hospital Seoul and Inje University Ilsan Paik Hospital) initiated prospective capture system of stroke outcomes and constructed stroke outcome database. Registrars of each stroke center contacted stroke survivors by telephone 3 months and 1 year after stroke onset, and rated modified Rankin scale score and occurrence of any vascular events.
- After January 2011, six centers participated in the prospective capture of stroke outcomes, and gathering information was expanded to include early neurological deteriorations within 3 weeks after stroke and medication adherence until 3 months, as well as modified Rankin scale scores at 3 month and 1 year. With current outcome gathering strategy, CRCS-5 launched a separate but parallel study, MOSAIC (Multicenter prospective Observational Study about recurrence and its determinants after Acute IsChemic stroke).
- Definition of early neurological deterioration (END) is any new neurological symptoms/signs or any neurological worsening occurred 3 weeks within the onset of index stroke. Aggravated neurological status includes 1) NIHSS score increase ≥ 2 -point; 2) NIHSS score 1a, 1b or 1c subscore increase ≥ 1 -point; 3) NIHSS score 5a, 5b, 6a, 6b (motor subscore) increase ≥ 1 -point; or 4) any kind of newly developed neurological symptom.
- Causes of ENDs include recurrence of stroke, progression of stroke, symptomatic hemorrhagic transformation, other causes (deep venous thrombosis, pulmonary embolism, myocardial infarction or others), or unknown etiologies.
- Early stroke recurrence is defined as END associated with new infarctions

documented by diffusion-weighted image or computed tomography image after stabilization of initial neurological symptoms/signs more than 24 hours, and excluding potential influence from edema, mass effect, brain shifting or hemorrhagic transformation of the incident cerebral infarction.

- Stroke progression is defined as an END after neurological stability lasting more than 24 hours associated with progressive ischemia, swelling or edema of index infarction and documented by neuroimaging studies.
- Symptomatic hemorrhagic transformation is defined as an END associated with neuroimaging-documented hemorrhagic transformation.
- Other cause of END is defined as an END associated with other general medical conditions, such as deep venous thrombosis or pulmonary embolism.
- Unknown etiology of END is defined as an END associated with other causes no mentioned previously.
- Late stroke outcomes include late recurrence of stroke, myocardial infarction, vascular death, and all kinds of death.
- Late recurrence of stroke is defined as a new neurological symptom/sign due to cerebrovascular causes lasting more than 24 hours and documented by medical doctors.
- Myocardial infarction is defined as a new diagnosis of acute myocardial infarction by medical doctors and related visit to a hospital.
- Vascular death is defined as a death caused by stroke, acute myocardial infarction, or sudden death.
- All kinds of death are defined as a death caused by other etiologies than stroke, acute myocardial infarction, or sudden death.
- The present outcome statistics is based on the database distributed on November 2013, which is as current of November 2014.

Modified Rankin scale score at 3 month and 1 year after stroke

- From MOSAIC study database, mRS scores at 3 month after stroke are available in 15199 (97%) cases and mRS score at 1 year in 11794 (75%) cases (Table 23 Distribution of mRS score at discharge and 3 month and 1 year after stroke) and (Table 24 mRS score matrix of 3 months and 1 year after stroke).
- Early neurological deterioration occurred in 2354(15%) cases (Figure 26 Frequencies of post-stroke events and table 27 frequencies of early neurological deteriorations (END) occurred within 3 weeks after stroke).

Prospective Capture of Vascular Events after Stroke Onset

- CRCS-5 implemented a systemic protocol for prospective capture of vascular events after stroke onset throughout all the participating centers. With the commencement of MOSAIC cohort, returning cases at 3 months or 1 year after stroke who admitted before MOSAIC cohort were subjective to the surveillance system. Registered data from the five centers which started to gather prospective outcomes (Eulji General Hospital, Seoul National University Bundang Hospital, Seoul Medical Center, Soonchunhyang University Hospital Seoul, Inje University Ilsan Paik Hospital) were also gathered together for the vascular event database. Through the above process, CRCS-5 database secured prospective vascular outcomes from a total of 20,485 cases.
- At 3 months after stroke, the event rates of vascular outcomes were as following; recurrent stroke 3.1%, myocardial infarction 0.2%, vascular death 2.5%, composite outcomes 8.7%, and all-cause death 6.3%. At 1 year after stroke, the event rates were as following; recurrent stroke 4.8%, myocardial infarction 0.3%, vascular death 3.2%, composite outcomes 14.2% and all-cause death 10.6%.

Table 23 Distribution of mRS score at discharge and 3 month and 1 year after stroke

mRS score	Discharge(n)	%	3 months (n)	%	1 year(n)	%
0	3325	21.2	4418	28.1	3891	24.8
1	3240	20.6	3239	20.6	2229	14.2
2	2776	17.7	2373	15.1	1332	8.5
3	2535	16.1	1916	12.2	1145	7.3
4	2041	13.0	1426	9.1	788	5.0
5	1418	9.0	918	5.8	1443	9.2
6	323	2.1	909	5.8	966	6.2
Available case	15658	100	15199	96.8	11794	75.1

● Based on 15,706 cases for MOSAIC study.

Table 24 mRS score matrix of discharge and 3 months after stroke

		3 months							total
		0	1	2	3	4	5	6	
At discharge	0	2343 74.9%	373 11.9%	151 4.8%	101 3.2%	73 2.3%	50 1.6%	36 1.2%	3127
	1	1184 38.9%	1516 49.9%	184 6.1%	82 2.7%	33 1.1%	15 0.5%	26 0.9%	3040
	2	426 18.1%	719 30.5%	961 40.8%	147 6.2%	52 2.2%	23 1.0%	28 1.2%	2356
	3	168 7.6%	308 14.0%	542 24.6%	938 42.5%	147 6.7%	50 2.3%	53 2.4%	2206
	4	45 2.5%	84 4.7%	159 8.8%	410 22.8%	769 42.8%	167 9.3%	164 9.1%	1798
	5	6 0.5%	12 0.9%	18 1.4%	87 6.7%	245 18.8%	602 46.2%	333 25.6%	1303
	6	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	453 100.0%	453
	total	4172	3012	2015	1765	1319	907	1093	14283

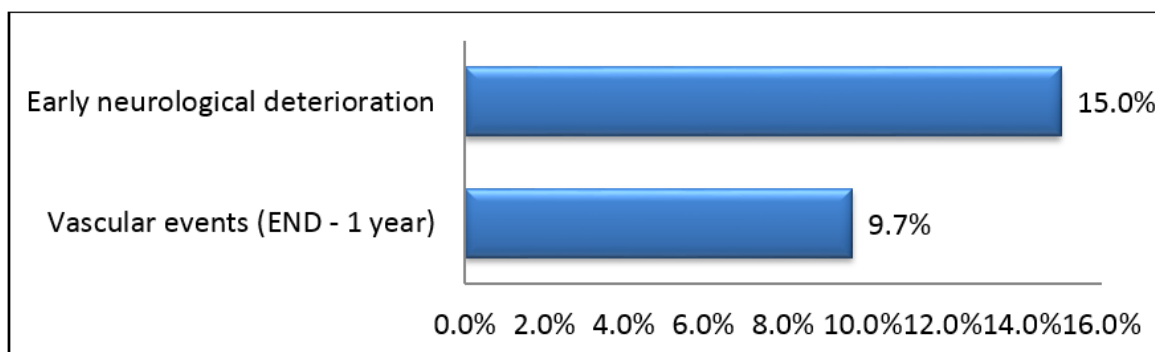
● Based on 14,283 cases whose mRS scores at discharge and 3 months were available.

Table 25 mRS score matrix of 3 months and 1 year after stroke

		1 year							total
		0	1	2	3	4	5	6	
3 months	0	2621 91.5%	139 4.9%	43 1.5%	23 0.8%	12 0.4%	5 0.2%	22 0.8%	2865
	1	554 28.1%	1263 64.0%	85 4.3%	30 1.5%	9 0.5%	7 0.4%	26 1.3%	1974
	2	146 11.5%	280 22.0%	704 55.3%	84 6.6%	19 1.5%	17 1.3%	23 1.8%	1273
	3	36 3.3%	68 6.1%	193 17.5%	661 59.8%	78 7.1%	19 1.7%	51 4.6%	1106
	4	4 0.5%	7 0.9%	31 3.9%	120 15.0%	434 54.1%	110 13.7%	96 12.0%	802
	5	1 0.2%	2 0.4%	4 0.7%	23 4.0%	73 12.8%	284 49.9%	182 32.0%	569
	6	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	1093 100.0%	1093
total		3362	1759	1060	941	625	442	1493	9682

● Based on 9,682 cases whose mRS scores at 3 months and 1 year were available.

Figure 23 Frequencies of post-stroke events



● Based on 15,706 cases for MOSAIC study.

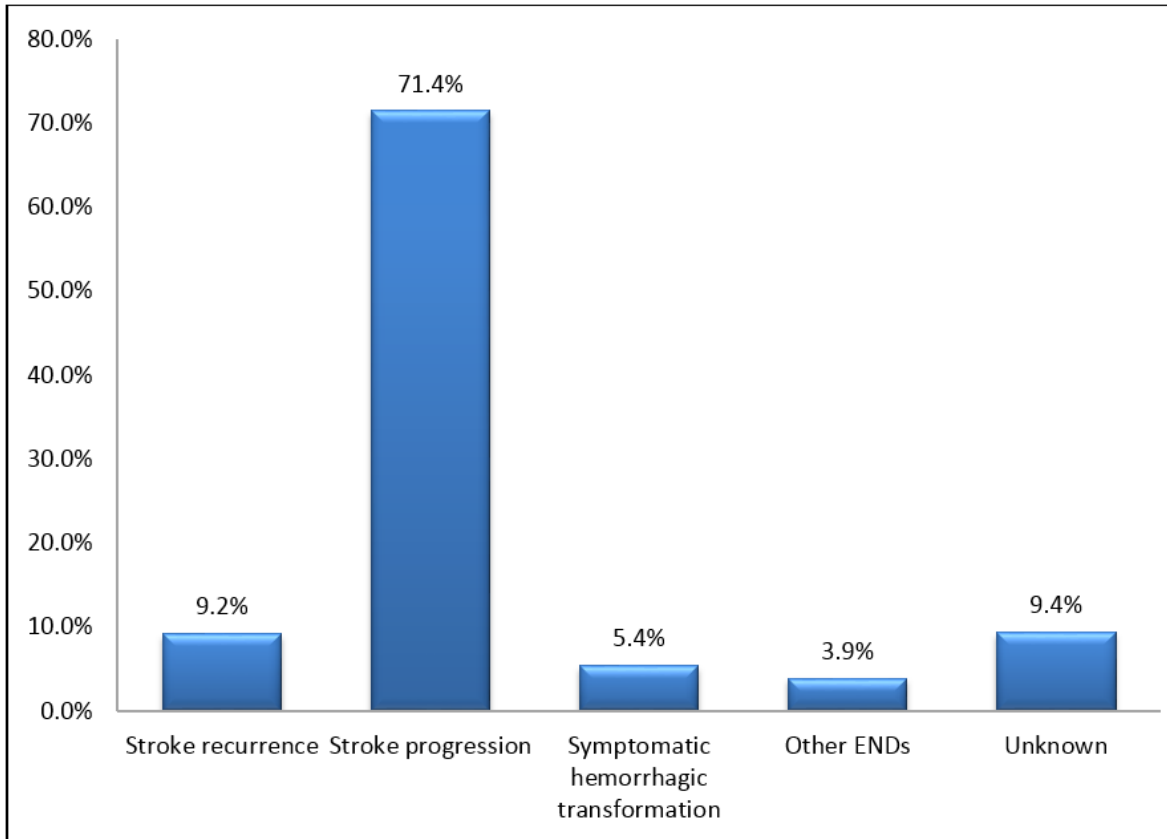
Table 26 Frequencies of early neurological deteriorations (END) occurred within 3 weeks after stroke

Type of early neurological deterioration	Frequency (n)	Percentage (%)
Stroke recurrence	216	9.2
Stroke progression	1678	71.4
Symptomatic hemorrhagic transformation	127	5.4
Other ENDs	92	3.9

Unknown	220	9.4
Missing	16	0.7
Total events	2349	

- Based on 15,706 cases for MOSAIC study.

Figure 24 Frequencies of early neurological deteriorations (END) occurred within 3 weeks after stroke



- Based on 15,706 cases for MOSAIC study.

Table 27 Rates of vascular events after stroke onset*

Vascular events	7 days	30 days	3 months	1 year
Recurrent stroke	1.1%	2.1%	3.1%	4.8%
	20036	19457	18125	10069
Myocardial infarction	0.1%	0.1%	0.2%	0.3%
	20252	19855	18427	11480
Vascular Death	1.3%	2.1%	2.5%	3.2%
	20031	19537	18302	11264
Composite outcomes†	2.9%	5.7%	8.7%	14.2%
	19740	18869	17222	10124
All-cause death	1.9%	3.9%	6.3%	10.6%
	19941	19214	17674	9692

*By Kaplan-Meier analysis

†Stroke Recurrence + MI + Vascular death

- Based on 20,485 cases for the prospective outcome capture surveillance data

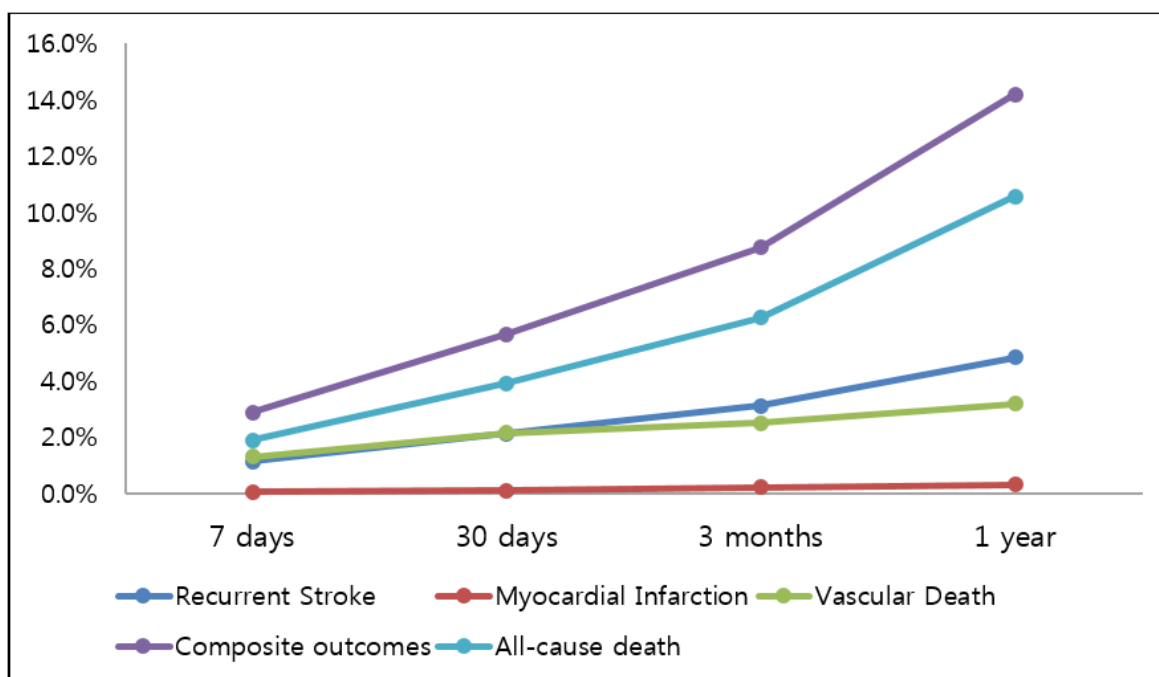


Figure 25 Rate of vascular events after stroke onset

- Based on 20,485 cases for the prospective outcome capture surveillance data

Selected Subgroup Statistics of CRCS-5

Subgroup statistics according to sex

- From a total of 25,712 registered acute ischemic stroke cases, male was 14,963 (58%) and female was 10,749 (42%) (Table 28 Subgroup statistics according to sex)
- Age showed noticeable difference between two sexes; 71 ± 12 year-old in female and 65 ± 13 year-old in male cases.
- For vascular risk factors, 62% of male cases reported to smoke, whereas only 7% of female cases smoked.
- Overall, there was no disparity in revascularization and medications between male and female.
- Initial severity and morbidity after stroke were higher in female cases.

Subgroup statistics according to age

- Stroke cases in young-age group (<45 year-old) was 1,290 (5%), extreme-old age group (≥ 80 year-old) was 4,394 (17%) and middle-age group (45 – 79 year-old) was 20,028 (78%) (Table 29 Subgroup statistics to age).
- Noticeable difference was detected in sex and vascular risk factors among age-groups.
- Regarding TOAST classification of ischemic stroke, young-age cases had higher frequency of other determined etiology and cryptogenic stroke (undetermined etiology – negative).
- Overall, there was no disparity in revascularization and medications among age-groups.

- Stroke cases from young-age groups had milder initial neurological severity. Neurological and functional dependency after stroke as well as mortality was rather proportional to age-groups.

Table 28 Subgroup statistics according to sex

	Female [n=10749]		Male [n=14963]	
	n	%	n	%
Age	71.23	±12.2*	64.96	±12.5*
Vascular Risk Factors				
Hypertension	7705	71.7	9570	64.0
Diabetes	3474	32.3	4919	32.9
Dyslipidemia	3397	31.6	4308	28.8
Current Smoking	592	5.5	6248	41.8
Atrial Fibrillation	2485	23.1	2569	17.2
TOAST classification				
Large Artery Atherosclerosis	3757	38.9	5917	61.2
Small Vessel Occlusion	1972	41.0	2833	59.0
Cardioembolism	2617	47.6	2877	52.4
Other Determined Etiology	252	40.5	371	59.6
Undetermined-2 or more	479	44.3	603	55.7
Negative	814	39.9	1225	60.1
Incomplete work-ups	858	43.0	1137	57.0
Stroke Characteristics				
Onset to arrival time (hour)	43.9	±207.2* 14.4[4,45]†	44.39	±260.1* 13[3.6,41.6]†
NIHSS score at admission	6.52	±6.6* 4[2.0,10.0]†	5.54	±6.01* 3[1.0,7.0] †
NIHSS score ≥10 point	2747	29.3	2896	22.1
Revascularization treatment				
Thrombolytic treatment	1409	40.8	2048	59.2
IV thrombolysis	873	39.9	1317	60.1
IA thrombolysis	226	41.7	316	58.3
Combined IV and IA Thrombolysis	310	42.8	415	57.2
Admission medication				
Aspirin	8658	41.4	12270	58.6
Clopidogrel	3167	39.5	4861	60.6
Heparin	748	43.0	992	57.0
Warfarin	931	45.9	1098	54.1
Discharge medication				
Aspirin	7172	40.2	10661	59.8
Clopidogrel	148	44.6	184	55.4
Warfarin	2044	44.7	2528	55.3
Consequences of stroke				
NIHSS score at discharge	6.72	±30.02* 3[1.0,4.0]†	5.38	±29.09* 2[1,5] †
mRS score at discharge	3.21	±25.49*	3.05	±29.42*

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		3[1,4]†		2[1,3] †
In-hospital mortality	427	54.5	357	45.5
mRS score at 3 month				
0	1587	41.8	2206	58.2
1	1431	41.1	2049	58.9
2	1105	43.4	1442	56.6
3	877	42.7	1175	57.3
4	654	41.5	921	58.5
5	453	41.5	638	58.5
6	499	41.6	700	58.4
9	20	38.5	32	61.5

*±SD

†MEDIAN[IQR]

- Based on 25,712 ischemic stroke cases.

Table 29 Subgroup statistics according to the age group

	Age < 45		45 ≤ Age ≤ 79		Age ≥ 80	
	n	%	n	%	n	%
Male	917	6.1	12373	82.7	1673	11.2
Vascular Risk Factors						
Hypertension	374	3.9	8023	83.8	1173	12.3
Diabetes	136	2.8	4364	88.7	419	8.5
Dyslipidemia	255	5.9	3643	84.6	410	9.5
Current Smoking	590		5339		319	
Atrial Fibrillation	23	0.9	2077	80.9	469	18.3
TOAST classification						
Large Artery Atherosclerosis	300	5.1	4974	84.1	643	10.9
Small Vessel Occlusion	201	7.1	2435	86.0	197	7.0
Cardioembolism	92	3.2	2343	81.4	442	15.4
Other Determined Etiology	125	33.7	230	62.0	16	4.3
Undetermined-2 or more	14	2.3	472	78.3	117	19.4
Negative	124	10.1	990	80.8	111	9.1
Incomplete work-ups	61	5.4	929	81.7	147	12.9
Stroke Characteristics						
Onset to arrival time (hour)	42.6	±104.44*	43.1	±155.39*	55	±648.61*
		13.6[3.5,43.2]†		12.9[3.6,41.2]†		13.4[3.8,44.3]
NIHSS score at admission	4.1	±5.2*	5.4	±5.9*	7.2	±6.7*
		2[1,5] †		3[1,7] †		5.0[2.0,11] †
NHSS score ≥10 point	101		2311		484	
Revascularization treatment						
Thrombolytic treatment	105	5.1	1747	85.3	196	9.6
IV thrombolysis	76	5.8	1108	84.1	133	10.1
IA thrombolysis	15	4.8	275	87.0	26	8.2
Combined IV and IA Thrombolysis	14	3.4	364	87.7	37	8.9
Admission medication						
Aspirin	783	6.4	10157	82.8	1330	10.8
Clopidogrel	230	4.7	4113	84.6	518	10.7
Heparin	56	5.7	810	81.7	126	12.7

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Warfarin	41	3.7	886	80.7	171	15.6
Discharge medication						
Aspirin	721	6.8	8858	83.1	1082	10.2
Clopidogrel	6	3.3	147	79.9	31	16.9
Warfarin	116	4.6	2091	82.7	321	12.7
Consequences of stroke						
NIHSS score at discharge	2.09	±5.12*	5.23	±29.2*	7.84	±35.5*
		1[0,3] †		2[1,5] †		3.0[1.0,9.0] †
mRS score at discharge	2.72	±33.0*	2.94	±28.4*	4.03	±34.5*
		1[0,3] †		2[1,3] †		3.0[1.0,4.0] †
In-hospital mortality	8	2.2	280	78.4	69	19.3
mRS score at 3 month						
0	143	6.5	1831	83.0	232	10.5
1	125	6.1	1707	83.3	217	10.6
2	82	5.7	1183	82.0	177	12.3
3	72	6.1	953	81.1	150	12.8
4	56	6.1	765	83.1	100	10.9
5	34	5.3	535	83.9	69	10.8
6	48	6.9	566	80.9	86	12.3
9	3	9.4	29	90.6	0	0

*±SD

†MEDIAN[IQR]

- Based on 25,712 ischemic stroke cases.