Table I. The International Statistical Classification of Diseases Codes Used in Defining

 Stroke Population

Codes by	ICD-9-CM	ICD-10-CM	
Ischemic stroke	433, 434, 435, 438	163, 164, G45, 169	
Hemorrhagic stroke	430, 431, 432	160, 161, 162	

ICD-9-CM, International Statistical Classification of Disease and Related Health Problems, Ninth Revision, Clinical Modification; ICD-10-CM, International Statistical Classification of Disease and Related Health Problems, Tenth Revision, Clinical Modification

Table II.	. Oral	Anticoagu	lant Codes
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Medication	Codes
Warfarin	"A043862100" "A050095100" "A050423100" "A050423100"
	"A052559100" "AC43862100" "AC50095100" "AC50423100"
	"AC52559100" "AC55271100" "B020346100" "B020354100"
	"B020515100" "B020516100" "B023426100" "B023572100"
	"B023573100" "BC23572100" "BC23573100" "X000140100"
Rivaroxaban	"B025129100" "B025647100" "B025648100" "BC25129100"
	"BC25647100" "BC25648100"
Dabigatran	"B025458100" "B025459100" "BC25458100" "BC25459100"
	"BC26233100"
Apixaban	"BC26124100" "BC26133100"
Edoxaban	"BC26599100" "BC26600100" "BC26601100"

Comorbidities	Disease Codes
Atrial fibrillation	ICD-9 of 427.31; ICD-10 of I48
Peripheral arterial occlusion	ICD-9 of 440.2, 440.3; ICD-10 of I70.2, I70.3, I70.4, I70.5,
disease	170.6, 170.7, 175.0
Coronary heart disease	ICD-9 of 410, 411, 412, 413, 414; ICD-10 of I20, I21, I22,
	I24, I25
Chronic heart failure	ICD-9 of 428; ICD-10 of I50
Hypertension	ICD-9 of 401, 402, 403, 404, 405; ICD-10 of 110, 111, 112,
	113, 115
Diabetes mellitus	ICD-9 of 250; ICD-10of E08, E09, E10, E11, E13
Hyperlipidemia	ICD-9 of 272; ICD-10 of E78
Chronic kidney disease	ICD-9 of 580, 581, 582, 583, 584, 585, 586, 587, 588, 589;
	ICD-10 of N00, N01, N02, N03, N04, N05, N06, N07, N08,
	N10, N11, N14, N15, N17, N18, N19, N25, N27
Chronic liver disease	ICD-9 of 570, 571, 572; ICD-10 of K70, K72, K73, K74,
	K75, K76

Table III. Codes for Medical Comorbidities.

Table IV. Oral Antiplatelet Codes

Medications Codes

Aspirin

"A002107500" "A003092100" "A004813100" "A006485500" "A013465500" "A015219500" "A019702500" "A021870100" "A023330100" "A023534100" "A024465100" "A025160100" "A025160100" "A025160100" "A025160100" "A025160100" "A025848100" "A025848100" "A025848100" "A025855500" "A025855500" "A025855500" "A025855500" "A025855500" "A025855500" "A026164100" "A026164100" "A026164100" "A026523500" "A026523500" "A026523500" "A026523500" "A026523500" "A026523563" "A026523563" "A027304500" "A027304500" "A028108100" "A028108100" "A028108100" "A028108100" "A028591100" "A028591100" "A028591100" "A028591100" "A028936100" "A028936100" "A028936100" "A029219500" "A029219500" "A029219500" "A029219500" "A029219500" "A029536100" "A029536100" "A029536100" "A029740100" "A029740100" "A029740100" "A029740100" "A029740100" "A029740100" "A029754100" "A029754100" "A029754100" "A029754100" "A029754100" "A029754100" "A029788100" "A029788100" "A029788100" "A029788100" "A029788100" "A029888100" "A029888100" "A029888100" "A029888100" "A030696100" "A030696100" "A030696100" "A030775100" "A030775100" "A030775100" "A030775100" "A030775100" "A030775100" "A030784100" "A030784100" "A032045100" "A032045100" "A032045100" "A032045100" "A033292100" "A033292100" "A033292100" "A034028500" "A034028500" "A034028500" "A034028500" "A034975100" "A034975100" "A036599100" "A036599100" "A036599100" "A036599100" "A036599100" "A037344100" "A0373441G0" "A0373441G0" "A037702100" "A037702100" "A037702100" "A037702100" "A037702100" "A040658100" "A040658100" "A040658100" "A040658100" "A040658100" "A040658100" "A040658100" "A040658100" "A040658100" "A040665100" "A0406651G0" "A0406651G0" "A0406651G0" "A0406651G0" "A040826100" "A040826100" "A040826100" "A041018100" "A041018100" "A041018100" "A041018100" "A041018100" "A041018100" "A041073100" "A041220100" "A041511100" "A041511100" "A041511100" "A041511100" "A041511100" "A041511100" "A041511100" "A0415111G0" "A041814100" "A0418141G0" "A042461100" "A042461100"

Clopidogrel

"A0424611G0" "A0424611G0" "A0424611G0" "A042774100" "A042774100" "A042774100" "A042774100" "A042774100" "A042774100" "A042774100" "A042774100" "A042915100" "A042915100" "A042915100" "A042915100" "A042915100" "A042915100" "A042915100" "A0429151G0" "A0429151G0" "A042934100" "A042934100" "A042934100" "A042934100" "A042934100" "A042934100" "A042934100" "A042934100" "A042934160" "A043139100" "A043139100" "A043139100" "A043139100" "A043142100" "A043212100" "A043212100" "A043212100" "A043212100" "A043212100" "A043212100" "A043212100" "A043212100" "A043254100" "A043254100" "A043254100" "A043254100" "A043254100" "A043254100" "A043254100" "A043254100" "A043309100" "A043309100" "A043309100" "A043309100" "A043309100" "A043309100" "A043309100" "A0433091G0" "A0433091G0" "A043663100" "A043663100" "A043663100" "A043663100" "A043663100" "A043663100" "A043663100" "A043663100" "A0436631G0" "A0436631G0" "A043664100" "A043664100" "A043664100" "A043664100" "A043664100" "A043664100" "A043664100" "A0436641G0" "A0436641G0" "A044016100" "A044016100" "A044016100" "A044016100" "A044016100" "A044016100" "A0440161G0" "A044069100" "A044176100" "A044176100" "A044176100" "A044176100" "A044176100" "A044176100" "A0441761G0" "A0441761G0" "A044578100" "A044578100" "A044578100" "A044578100" "A044578100" "A045015100" "A045015100" "A045015100" "A045015100" "A045015100" "A045072100" "A045072100" "A048339100" "A0483391G0" "A048542100" "A048542100" "A048542100" "A0485421G0" "A0495361G0" "A0495361G0" "A054863100" "A054863100" "A0548631G0" "A0548631G0" "A0551041G0" "A0551041G0" "AC29754100" "AC37344100" "AC37344100" "AC373441G0" "AC373441G0" "AC37702100" "AC41220100" "AC41511100" "AC415111G0" "AC41814100" "AC418141G0" "AC42461100" "AC424611G0" "AC42774100" "AC42934100" "AC43139100" "AC43142100" "AC43212100" "AC43254100" "AC43254100" "AC43309100" "AC433091G0" "AC43663100" "AC43663100" "AC436631G0" "AC436631G0" "AC43664100" "AC436641G0" "AC44176100" "AC44176100" "AC44176100" "AC441761G0" "AC441761G0" "AC441761G0" "AC48542100" "AC495361G0" "AC548631G0" "AC54985100" "AC54985100" "AC549851G0" "AC549851G0" "AC551041G0" "B008262100" "B008262100" "B017332100" "B017332100" "B017332100" "B017332100" "B018755100" "B018755100" "B020365100" "B020365100" "B020365100" "B020365100" "B023619100" "B023619100" "B023619100" "B023919100" "B023919100" "B023919100" "B023919100" "B023919100" "B023919100" "B024025100" "B024025100" "B024025100" "B024025100" "B024025100" "B024025100" "B0240251G0" "B0240251G0" "B0240251G0" "BC23919100" "BC23919100" "BC23919100" "BC23919100" "BC23919100" "BC24025100" "BC240251G0" "C001621100" "C001621100" "N004155100" "N004155100" "N004155100" "N004155100" "N011693100" "N011693100"

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"BC27361100" "BC27362100"

Prasugrel

"BC27182100" "BC27182100"

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"K000489221" "K000489221" "K000489221"

Abciximab

Cilostazol "A044124100" "A044124100" "A044136100" "A044136100" "A044136100" "A044136100" "A048377100" "A048377100" "A048377100" "A049008100" "A049008100" "A049008100" "A049189100" "A049189100" "A049189100" "A050027100" "A050027100" "A050034100" "A050034100" "A050034100" "A050429100" "A050429100" "A050429100" "A050429100" "A050429100" "AB44124100" "AB44124100" "AB44124100" "AB44124100" "AB44124100" "AB44124100" "AB44124100" "AB44136100" "AB44136100" "AB44136100" "AB44136100" "AB44136100" "AB44136100" "AB44136100" "AB49189100" "AB49189100" "AB49189100" "AB49189100" "AB49189100" "AB49189100" "AB49189100" "AC44124100" "AC44124100" "AC44124100" "AC44136100" "AC44136100" "AC44136100" "AC48377100" "AC48377100" "AC48377100" "AC48377100" "AC48377100" "AC48377100" "AC48377100" "AC48377100" "AC49008100" "AC49008100" "AC49008100" "AC49008100" "AC49008100" "AC49008100" "AC49008100" "AC49189100" "AC49189100" "AC49189100" "AC50027100" "AC50027100" "AC50027100" "AC50027100" "AC50027100" "AC50027100" "AC50027100" "AC50027100" "AC50034100" "AC5003410" "AC5003410" "AC5003410" "AC5003410" "AC5003410"" "AC5003410"" "AC5003410"" "AC5003410"" "AC5003410"" "AC5003410"" "AC5003410"" "AC5003410"" "AC5003410""" "AC55010100" "AC55010100" "AC55010100" "AC55010100" "AC55010100" "AC55010100" "AC55010100" "AC57814100" "AC57814100" "AC57814100" "AC57814100" "AC57814100" "AC57814100" "AC57814100" "B023004100" "B023004100" "B023004100" "B023004100" "B023004100" "B023004100" "B023004100" "B023004100" "B023005100" "B023005100" "B023005100" "B025249100" "B025249100" "B025993100" "B025993100" "B025993100" "B025993100" "B025994100" "B025994100" "B025994100" "B025994100" "BC25249100" "BC25249100" "BC25249100" "BC25249100" "BC25249100" "BC25993100" "BC25993100" "BC25993100" "BC25993100" "BC25993100" "BC25994100" "BC25994100" "BC25994100" "BC25994100" "BC25994100"

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Tirofiban

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	NOA	ACS	War	farin	То	tal	SMD
N	37,129	48.87%	38,840	51.13%	75,	969	
Age (mean, SD)	74.966	9.498	70.046	12.689	72.451	11.509	0.439
Gender	-	•	•	•	•	· · · ·	
Male	19,994	53.85%	21,001	54.07%	40,995	53.96%	0.004
Female	17,135	46.15%	17,839	45.93%	34,974	46.04%	-0.004
Comorbidity							
PAOD	991	2.67%	1,515	3.90%	2,506	3.30%	0.069
CHD	20,920	56.34%	19,985	51.45%	40,905	53.84%	-0.098
CHF	14,040	37.81%	14,327	36.89%	28,367	37.34%	-0.019
HTN	33,628	90.57%	33,413	86.03%	67,041	88.25%	-0.142
DM	17,410	46.89%	18,575	47.82%	35,985	47.37%	0.019
Hyperlipidemia	22,626	60.94%	20,781	53.50%	43,407	57.14%	-0.151
CKD	11,757	31.67%	13,199	33.98%	24,956	32.85%	0.049
Liver Disease	8,163	21.99%	7,314	18.83%	15,477	20.37%	-0.078
Medical History							
Warfarin	14,008	37.73%	25,951	66.82%	39,959	52.60%	0.609
Antiplatelets	34,139	91.95%	34,323	88.37%	68,462	90.12%	-0.120
Event time (mean, SD)	626.600	505.600	995.700	730.500	815.308	657.088	

Table V. Baseline Characteristics of Ischemic Stroke Population before Inverse Probability of Treatment Weighting

AF, Atrial Fibrillation; PAOD, Peripheral arterial occlusion disease; CHD, Coronary heart disease; CHF, Chronic heart failure; CKD, chronic kidney disease; HTN, Hypertension; DM, Diabetes mellitus; SD, standard deviation; SMD, Standardized mean difference

	NO	ACS	Wa	rfarin	То	tal	SMD
Nw	75,319	49.54%	76,727	50.46%	152,0)46.0	
Age (mean,SD)	72.732	16.276	72.801	16.269	72.716	16.272	0.003
Gender							
Male	40,037	53.16%	35,420	46.16%	75,457	49.63%	0.014
Female	35,282	46.84%	41,307	53.84%	76,589	50.37%	-0.014
Comorbidity							
PAOD	2,677	3.55%	2,606	3.40%	5,283	3.47%	-0.009
CHD	41,347	54.90%	42,329	55.17%	83,676	55.03%	0.005
CHF	29,058	38.58%	29,492	38.44%	58,550	38.51%	-0.003
HTN	66,449	88.22%	67,922	88.52%	134,371	88.38%	0.009
DM	35,556	47.21%	36,428	47.48%	71,983	47.34%	0.005
Hyperlipidemia	42,746	56.75%	43,997	57.34%	86,743	57.05%	0.012
CKD	25,554	33.93%	25,882	33.73%	51,436	33.83%	-0.004
Liver Disease	15,636	20.76%	16,090	20.97%	31,726	20.87%	0.005
Medical history							
Warfarin	39,259	52.12%	39,869	51.96%	79,128	52.04%	-0.003
Antiplatelets	67,926	90.19%	69,406	90.46%	137,332	90.32%	0.009

Table VI. Baseline Characteristics of Ischemic Stroke Population after Inverse Probability of Treatment Weighting

N_w: expressed by weighted number, percentage, mean and SD.

AF, Atrial Fibrillation; PAOD, Peripheral arterial occlusion disease; CHD, Coronary heart disease; CHF, Chronic heart failure; CKD, chronic kidney disease; HTN, Hypertension; DM, Diabetes mellitus; SD, standard deviation; SMD, Standardized mean difference

	NO	ACS	War	farin	Tc	otal	SMD
N	2,711	42.00%	3,743	58.00%	6,4	154	
Age (mean, SD)	73.018	11.167	66.691	13.798	69.349	13.134	0.504
Gender							
Male	1,557	57.43%	2,114	56.48%	3,671	56.88%	0.010
Female	1,154	42.57%	1,629	43.52%	2,783	43.12%	0.019
Comorbidity							
PAOD	66	2.43%	135	3.61%	201	3.11%	0.069
CHD	1,379	50.87%	1,652	44.14%	3,031	46.96%	-0.135
CHF	997	36.78%	1,312	35.05%	2,309	35.78%	-0.036
HTN	2,479	91.44%	3,103	82.90%	5,582	86.49%	-0.258
DM	1,208	44.56%	1,617	43.20%	2,825	43.77%	-0.027
Hyperlipidemia	1,377	50.79%	1,600	42.75%	2,977	46.13%	-0.162
Kidney Disease	830	30.62%	1,246	33.29%	2,076	32.17%	0.057
Liver Disease	667	24.60%	783	20.92%	1,450	22.47%	-0.088
Medical History							
Warfarin	892	32.90%	2,379	63.56%	3,271	50.68%	0.645
Antiplatelets	2,210	81.52%	2,776	74.17%	4,986	77.25%	-0.178
Event time (mean, SD) 565.800	475.300	901.700	692.600	760.594	632.889	

Table VII. Baseline Characteristics of Hemorrhagic Stroke Population before Inverse Probability of Treatment Weighting

AF, Atrial Fibrillation; CHD, Coronary heart disease; CHF, Chronic heart failure; CKD, chronic kidney disease; DM, Diabetes mellitus; HTN, Hypertension; NOAC, non–vitamin K antagonist oral anticoagulants; PAOD, Peripheral arterial occlusion disease; SD, standard deviation; SMD, Standardized mean difference

	NO	ACS	Wa	rfarin	То	otal	SMD
Nw	6,453	49.87%	6,487	50.13%	12,9	939.2	
Age (mean, SD)	68.960	22.274	69.393	17.129	69.177	19.457	-0.035
Gender							
Male	3,577	55.43%	3,692	56.93%	7,269	56.18%	0.020
Female	2,876	44.57%	2,794	43.07%	5,670	43.82%	-0.030
Comorbidity							
PAOD	214	3.32%	211	3.25%	425	3.28%	-0.004
CHD	3,006	46.59%	3,090	47.64%	6,097	47.12%	0.021
CHF	2,244	34.78%	2,326	35.86%	4,570	35.32%	0.023
HTN	5,561	86.19%	5,617	86.59%	11,178	86.39%	0.012
DM	2,799	43.39%	2,874	44.30%	5,673	43.84%	0.018
Hyperlipidemia	2,956	45.81%	3,011	46.42%	5,967	46.12%	0.012
Kidney Disease	2,150	33.33%	2,129	32.82%	4,279	33.07%	-0.011
Liver Disease	1,528	23.69%	1,535	23.66%	3,064	23.68%	-0.001
Medical History							
Warfarin	3,243	50.25%	3,261	50.27%	6,503	50.26%	0.000
Antiplatelets	5,048	78.23%	5,040	77.69%	10,087	77.96%	-0.013

Table VIII. Baseline Characteristics of Hemorrhagic Stroke Population after InverseProbability of Treatment Weighting

N_w: expressed by weighted number, percentage, mean and SD.

AF, Atrial Fibrillation; CHD, Coronary heart disease; CHF, Chronic heart failure; CKD, chronic kidney disease; DM, Diabetes mellitus; HTN, Hypertension; NOAC, non–vitamin K antagonist oral anticoagulants; PAOD, Peripheral arterial occlusion disease; SD, standard deviation; SMD, Standardized mean difference

	Total population	NOACs	Warfarin	Crude HR	Adjusted HR	Adjusted HR under
	(<i>N</i> =82,423)	(<i>N</i> =39,840)	(<i>N</i> =42,583)			IPTW [†]
Intracerebral hemorrhag	ge (ICH)					
Total person-years	187193.47	68965.57	118227.90			
Follow-up years	2.27 ± 1.81	1.73 ± 1.39	2.78 ± 2.00			
Event number	630	180	450			
Incidence rate [‡]	0.337	0.261	0.381	$0.58 (0.49 {\sim} 0.69)^{***}$	$0.56 (0.46 \sim 0.68)^{***}$	$0.59 (0.52 \sim 0.66)^{***}$
Subdural hemorrhage (S	SDH)					
Total person-years	187624.64	69062.52	118562.12			
Follow-up years	2.28 ± 1.81	1.73 ± 1.39	2.78 ± 2.00			
Event number	133	33	100			
Incidence rate [‡]	0.071	0.048	0.084	$0.50 (0.33 \sim 0.74)^{***}$	0.52 (0.34~0.81)**	0.49 (0.38~0.65)***
Subarachnoid hemorrha	age (SAH)					
Total person-years	187733.25	69094.52	118638.72			
Follow-up years	2.28 ± 1.81	1.73 ± 1.39	2.79 ± 2.00			
Event number	43	16	27			
Incidence rate [‡]	0.023	0.023	0.023	0.93 (0.50~1.76)	1.01 (0.49~2.06)	1.11 (0.72~1.70)

Table IX. Incidence Rates of Different Types of Hemorrhagic Stroke for All Stroke Patients at Baseline Taking NOACs or Warfarin

Abbreviations: HR, hazard ratio; *N*, number; NOAC, non-vitamin K antagonist oral anticoagulants; IPTW, inverse probability of treatment weighting. * p < 0.05, ** p < 0.01, *** p < 0.001.

[†]Adjusted for age, gender, baseline stroke type, atrial fibrillation, peripheral arterial occlusive disease, coronary heart disease, chronic heart failure, hypertension, diabetes mellitus, use of warfarin, and use of antiplatelets.

[‡]Incidence rate denotes events/total person-years (per 100 person-years).

	Ischemic stroke population	NOACs	Warfarin	Crude HR	Adjusted HR	Adjusted HR under IPTW [†]
Variable	(<i>N</i> =75,969)	(<i>N</i> =37,129)	(<i>N</i> =38,840)			
Intracerebral hemorrhage (IC	CH)					
Total person-years	173384.50	64643.83	108740.67			
Follow-up years	2.28 ± 1.81	1.74 ± 1.39	2.80 ± 2.00			
Event number	297	88	209			
Incidence rate [‡]	0.171	0.136	0.192	$0.59 (0.46 \sim 0.76)^{***}$	$0.48 (0.36 \sim 0.63)^{***}$	$0.54 (0.46 \sim 0.64)^{***}$
Subdural hemorrhage (SDH)						
Total person-years	173574.84	64681.27	108893.57			
Follow-up years	2.28 ± 1.81	1.74 ± 1.39	2.80 ± 2.00			
Event number	58	20	38			
Incidence rate [‡]	0.033	0.031	0.035	0.73 (0.42~1.26)	$0.49~(0.27{\sim}0.90)^{*}$	0.52 (0.35~0.75)***
Subarachnoid hemorrhage (S	AH)					
Total person-years	173627.81	64703.99	108923.82			
Follow-up years	2.29 ± 1.81	1.74 ± 1.39	2.80 ± 2.00			
Event number	21	6	15			
Incidence rate [‡]	0.012	0.009	0.014	0.55 (0.21~1.43)	0.55 (0.19~1.58)	0.75 (0.40~1.43)

Table X. Incidence Rates of Different Types of Hemorrhagic Stroke among the Ischemic Stroke Population Taking NOACs or Warfarin

Abbreviations: HR, hazard ratio; IPTW, inverse probability of treatment weighting; NOAC, non-vitamin K antagonist oral anticoagulant

* p < 0.05, ** p < 0.01, *** p < 0.001.

[†]Adjusted for age, gender, atrial fibrillation, peripheral arterial occlusive disease, coronary heart disease, chronic heart failure, hypertension, diabetes mellitus, use of warfarin, and use of antiplatelets.

[‡]Incidence rate denotes events/total person-years (per 100 person-years).

	Hemorrhagic stroke population	NOACs	Warfarin	Crude HR	Adjusted HR	Adjusted HR under IPTW [†]
	(<i>N</i> =6454)	(<i>N</i> =2711)	(<i>N</i> =3743)			
Intracerebral hemorrhage (IC	H)					
Total person-years	13808.97	4321.74	9487.23			
Follow-up years	2.14 ± 1.75	1.59 ± 1.32	2.53 ± 1.91			
Event number	333	92	241			
Incidence rate [‡]	2.41	2.13	2.54	$0.74~(0.58{\sim}0.95)^*$	$0.64 (0.49 \sim 0.84)^{**}$	$0.63 (0.53 \sim 0.75)^{***}$
Subdural hemorrhage (SDH)						
Total person-years	14049.80	4381.26	9668.54			
Follow-up years	2.18 ± 1.76	1.62 ± 1.33	2.58 ± 1.92			
Event number	75	13	62			
Incidence rate [‡]	0.534	0.297	0.641	0.43 (0.24~0.80)**	$0.50 (0.26 \sim 0.96)^{*}$	0.45 (0.30~0.68)***
Subarachnoid hemorrhage (SA	AH)					
Total person-years	14105.44	4390.53	9714.91			
Follow-up years	2.19 ± 1.77	1.62 ± 1.33	2.60 ± 1.92			
Event number	22	10	12			
Incidence rate [‡]	0.156	0.228	0.124	1.98 (0.83~4.72)	1.78 (0.66~4.83)	1.51 (0.84~2.70)

Table XI. Incidence Rates of Different Types of Hemorrhagic Stroke among the Hemorrhagic Stroke Population Taking NOACs or Warfarin

Abbreviations: HR, hazard ratio; IPTW, inverse probability of treatment weighting; NOAC, non-vitamin K antagonist oral anticoagulant.

* p < 0.05, ** p < 0.01, *** p < 0.001.

[†]Adjusted for age, gender, atrial fibrillation, peripheral arterial occlusive disease, coronary heart disease, chronic heart failure, hypertension, diabetes mellitus, use of warfarin, and use of antiplatelets.

[‡]Incidence rate denotes events/total person-years (per 100 person-years)

NOACs	Subgroups by different dose	Comparison of subgroups	Crude HR	Adjusted HR†	Adjusted HR under IPTW
Rivaroxaban	Low dose: 9,613 (48.6%)	Standard dose vs. warfarin	$0.68 \; (0.59 {\sim} 0.77)^{***}$	$0.66 (0.57 {\sim} 0.76)^{***}$	$0.65 (0.50 \sim 0.71)^{***}$
(N = 19,783)	Standard dose: 10,170 (51.4%)	Low dose vs. warfarin	$0.65 \ (0.56{\sim}0.75)^{***}$	$0.67 \left(0.58{\sim}0.78 ight)^{***}$	$0.65 (0.60 \sim 0.71)^{***}$
	(missing: 904)	Standard vs. low dose	1.04 (0.87~1.25)	0.99 (0.82~1.19)	1.00 (0.90~1.11)
Dabigatran	Low dose: 10,677 (89.0%)	Standard dose vs. warfarin	0.84 (0.64~1.10)	0.84 (0.63~1.10)	$0.68 \left(0.58{\sim}0.79 ight)^{***}$
(N = 11,997)	Standard dose: 1320 (11.0%)	Low dose vs. warfarin	$0.76 \; (0.68 {\sim} 0.85)^{***}$	0.72 (0.64~0.81)***	$0.78 \; (0.74 {\sim} 0.83)^{***}$
	(missing: 93)	Standard vs. low dose	1.10 (0.82~1.47)	1.17 (0.87~1.56)	0.86 (0.74~1.01)
Apixaban	Low dose: 2991 (59.8%)	Standard dose vs. warfarin	0.63 (0.45~0.89)**	0.66 (0.46~0.93)*	$0.47 (0.41 {\sim} 0.54)^{***}$
(N = 4,998)	Standard dose: 2007 (40.2%)	Low dose vs. warfarin	0.51 (0.37~0.70)***	$0.49 (0.35 \sim 0.68)^{***}$	$0.56 (0.50 \sim 0.63)^{***}$
	(missing: 124)	Standard vs. low dose	1.25 (0.79~1.98)	1.34 (0.84~2.13)	$0.84~(0.72{\sim}0.99)^*$
Edoxaban	Low dose: 1281 (66.8%)	Standard dose vs. warfarin	0.92 (0.46~1.85)	0.82 (0.46~1.86)	$0.35 (0.28 \sim 0.43)^{***}$
(<i>N</i> = 1,918)	Standard dose: 637 (33.2%)	Low dose vs. warfarin	0.27 (0.11~0.66)**	0.28 (0.12~0.68)**	$0.18 (0.14 \sim 0.23)^{***}$
	(missing: 23)	Standard vs. low dose	3.36 (1.01~10.27)*	3.26 (1.07~9.97)*	1.95 (1.43~2.65)***

Table XII. Risk of Recurrent Stroke among Stroke Patients Using Various Doses of NOACs

Abbreviations: HR, hazard ratio; IPTW, inverse probability of treatment weighting; NOAC, non-vitamin K antagonist oral anticoagulant.

†Adjusted for age, gender, baseline stroke type, atrial fibrillation, peripheral arterial occlusion disease, coronary heart disease, chronic heart failure, hypertension, diabetes mellitus, use of warfarin, and use of antiplatelets.

Population of all		Primary outcome	Secondary outcome		
types of stroke	Exposure	Recurrent stroke	Recurrent ischemic stroke	Recurrent hemorrhagic stroke	
Crude HR	NOACs	0.862 (0.389~1.909)	0.861 (0.318~2.239)	0.873 (0.232~3.284)	
	Rivaroxaban	0.883 (0.355~2.199)	0.998 (0.333~2.997)	0.689 (0.133~3.579)	
	Dabigatran	0.599 (0.136~2.642)	0.465 (0.059~3.684)	0.856 (0.099~7.372)	
	Apixaban	1.625 (0.361~7.313)	1.307 (0.161~10.595)	2.176 (0.245~19.362)	
	NOACs	0.715 (0.290~1.762)	1.021 (0.329~3.167)	0.371 (0.066~2.076)	
Adjusted HR†	Rivaroxaban	0.999 (0.368~2.707)	1.317 (0.396~4.375)	0.481 (0.062~3.723)	
	Dabigatran	0.522 (0.097~2.805)	0.702 (0.068~7.282)	0.533 (0.030~9.399)	
	Apixaban	2.033 (0.328~12.613)	1.751 (0.172~17.827)	1.625 (0.032~83.758)	
	NOACs	0.787 (0.414~1.496)	1.309 (0.602~2.846)	0.292 (0.076-1.128)	
Adjusted HR under	Rivaroxaban	1.071 (0.540~2.124)	1.716 (0.763~3.862)	0.376 (0.080~1.776)	
IPTW	Dabigatran	0.272 (0.065~1.143)	0.518 (0.077~3.499)	0.217 (0.021~2.225)	
	Apixaban	1.426 (0.316~6.445)	1.133 (0.145~8.874)	1.121 (0.042~30.070)	

Table XIII. Recurrent Stroke among Stroke Patients with Morbid Obesity Using Various NOACs

Abbreviations: HR, hazard ratio ;NOAC, non-vitamin K antagonist oral anticoagulant.

* *p* < 0.05, ** *p* < 0.01, *** *p* < 0.001.

[†]Adjusted for age, gender, baseline stroke type, atrial fibrillation, peripheral arterial occlusion disease, coronary heart disease, chronic heart failure, hypertension, diabetes mellitus, use of warfarin, and use of antiplatelets.

Table XIV. Number and Proportions of Stroke Patients were Treated with Standard and Low Dose NOACs

N = 38,696			
Dose	Standard	14,134	36.53%
	low-dose	24,562	63.47%

Patients with missing dosage information (N=1,144).

NOAC, non-vitamin K antagonist oral anticoagulants

	NO	ACs	War	farin	Tc	otal	P value
	Mean	SD	Mean	SD	Mean	SD	
Ν	38,696	50.76%	37,535	49.24%	76,	231	
Use days	330.800	378.000	466.900	631.500	397.800	523.000	
1-30 days	7,072	18.28%	8,431	22.46%	15,503	20.34%	
31-90 days	5,910	15.27%	5,506	14.67%	11,416	14.98%	
91-180 days	5,738	14.83%	4,518	12.04%	10,256	13.45%	<.0001
181-360 days	7,363	19.03%	5,064	13.49%	12,427	16.30%	
>360 days	12,613	32.60%	14,016	37.34%	26,629	34.93%	
Missing	1,1	144	5,0)48	6,1	92	-

Table XV. The Number and Proportions of Stroke Patients Treated with NOACs andWarfarin by Days of Prescription

N, number; NOAC, non-vitamin K antagonist oral anticoagulants; SD, standard deviation

NOACs	All types of stroke	Ischemic stroke	Hemorrhagic stroke
Rivaroxaban	1.69 ± 1.26 years	1.70 ± 1.26 years	1.62 ± 1.25 years
Dabigatran	2.23 ± 1.61 years	2.24 ± 1.61 years	2.07 ± 1.54 years
Apixaban	$1.04\pm0.77 \ years$	1.04 ± 0.77 years	0.97 ± 0.74 years
Edoxaban	0.44 ± 0.32 years	0.44 ± 0.32 years	0.45 ± 0.33 years

Table XVI. The median follow-up time for NOACs

NOAC, non-vitamin K antagonist oral anticoagulants