

SUPPLEMENTARY MATERIAL**Supplemental Table 1. ICD-9 Codes Utilized for Stroke and Stroke Risk Factors**

ICD 9 Code	Description
431	Intracerebral hemorrhage
432	Other and unspecified intracranial hemorrhage
434	Cerebral artery occlusion
401	Essential hypertension
250	Diabetes mellitus
V15.82	Personal history of tobacco use
305.1	Tobacco use disorder
427.31	Atrial fibrillation
272	Disorders of lipid metabolism

Supplemental Table 2. ICD-10 Codes Utilized for Stroke and Stroke Risk Factors

ICD 10 Code	Description
I61	Nontraumatic intracerebral hemorrhage
I62	Other and unspecified nontraumatic intracerebral hemorrhage
I63	Cerebral infarction
I10	Essential hypertension
E10	Type 1 Diabetes mellitus
E11	Type 2 Diabetes mellitus
Z72.0	Tobacco use
F17.21	Nicotine dependence, cigarettes
I48	Atrial fibrillation
E78	Disorders of lipid metabolism

Supplemental Table 3. Results of the Simple CPH Models among ESRD Stroke Patients

Variable	Level	Simple CPH Models		
		HR	95% CI	p-value
Main Independent Variable				
Dialysis Modality	CRRT	1.20	1.17-1.23	<0.0001
	IHD	1.00		
Demographic and Clinical Risk Factors				
Age at first stroke		1.020	1.020-1.021	<0.0001
Sex	Female	0.97	0.96-0.99	0.0001
	Male	1.00		
Race	Black	0.79	0.78-0.80	<0.0001
	Other	0.87	0.84-0.90	
	White	1.00		
Ethnicity	Hispanic	0.85	0.84-0.87	<0.0001
	Non-Hispanic	1.00		
Essential Hypertension	Yes	1.08	1.05-1.09	<0.0001
	No	1.00		
Diabetes	Yes	1.08	1.06-1.09	<0.0001
	No	1.00		
Tobacco	Yes	1.13	1.011-1.15	<0.0001
	No	1.00		
Atrial Fibrillation	Yes	1.50	1.47-1.52	<0.0001
	No	1.00		
Hyperlipidemia	Yes	1.05	1.04-1.07	<0.0001
	No	1.00		

Supplemental Table 4. ICD-9 and -10 Codes Used to Control for Risk Factors for Mortality in ESRD Patients with Stroke Admitted to the ICU

Codes Used for the Charlson Comorbidity Index (Not Including Stroke or Renal Disease)		
	ICD-9 Codes	ICD-10 Codes
Acute MI	410, 412	I21, I22, I252
Congestive Heart Failure	428	I50
Peripheral Vascular Disease	441, 4439, 7854, V434	I71, I790, I739, R02, Z958, Z959
Dementia	290	F00, F01, F02, F051
Pulmonary Disease	490, 491, 492, 493, 494, 495, 496, 500, 501, 502, 503, 504, 505	J40, J41, J42, J44, J43, J45, J46, J47, J67, J44, J60, J61, J62, J63, J66, J64, J65
Connective Tissue Disorder or Rheumatologic Disease	7100, 7101, 7104, 7140, 7141, 7142, 71481(now 5171), 725	M32, M34, M332, M053, M058, M059, M060, M063, M069, M050, M052, M051, M353
Peptic Ulcer	531, 532, 533, 534	K25, K26, K27, K28
Liver Disease	5712, 5714, 5715, 5716	K702, K703, K73, K717, K740, K742, K746, K743, K744, K745
Paraplegia	342, 3441	G81 G041, G820, G821, G822
Cancer	140-172, 174-195, 200, 201, 202, 203, 204, 205, 206, 207, 208	C0, C1, C2, C3, C40, C41, C43, C45, C46, C47, C48, C49, C5, C6, C70, C71, C72, C73, C74, C75, C76, C80, C81, C82, C83, C84, C85, C883, C887, C889, C900, C901, C91, C92, C93, C940, C941, C942, C943, C9451, C947, C95, C96
Metastatic Cancer	196, 197, 198, 1990, 1991	C77, C78, C79, C80
Severe Liver Disease	5722, 5723, 5724, 5728	K729, K766, K767, K721
HIV/Aids	042, 043, 044	B20, B21, B22, B23, B24
Other Variables (with the Appropriate ICD-9 and -10 Codes) Examined		
Obesity	278	E66
Alcohol Abuse	305.0, 305.3	F10.0, F10.1
Malnutrition/Hypoalbuminemia	262, 263.0, 263.1, 273.8, 263.8, 239.9	E43, E44, E88.09, E46

Supplemental Table 5: Descriptive statistics overall and by CRRT among ICU Stroke Patients

Variable	Level	Overall	CRRT				
			Yes	No	OR	95% CI	p-value
Outcome							
Mortality – n (%)	Died	33930 (89.8)					
	Alive	3872 (10.2)					
Time to Death – mean (SD)		1.5 (2)					
Main Independent Variable							
CRRT – n (%)	Yes	3127 (8.3)					
	No	34675 (91.7)					
Demographic and Clinical Risk Factors							
Age at first stroke – mean		68.2 (12.9)	64.6 (13.3)	68.5 (12.8)	0.978	0.975-0.981	<0.0001
Sex – n (%)	Female	19014 (50.3)	1517 (48.5)	17497 (50.5)	0.93	0.86-0.99	0.0371
	Male	18788 (49.7)	1610 (51.5)	17178 (49.5)			
Race – n (%)	Black	11933 (31.6)	818 (26.2)	11115 (32.1)	0.74	0.68-0.81	<0.0001
	Other	1870 (5)	144 (4.6)	1726 (5)	0.84	0.71-1.00	
	White	23999 (63.5)	2165 (69.2)	21834 (63)			
Ethnicity – n (%)	Hispanic	4906 (13)	297 (9.5)	4609 (13.3)	0.69	0.61-0.78	<0.0001
	Non-Hispanic	32896 (87)	2830 (90.5)	30066 (86.7)			
Stroke Type – n (%)	Hemorrhagic	9945 (26.3)	899 (28.8)	9046 (26.1)	1.14	1.05-1.24	0.0012
	Acute	27857 (73.7)	2228 (71.3)	25629 (73.9)			
Essential Hypertension – n (%)	Yes	27668 (73.2)	2123 (67.9)	25545 (73.7)	0.76	0.70-0.82	<0.0001
	No	10134 (26.8)	1004 (32.1)	9130 (26.3)			
Diabetes – n (%)	Yes	26805 (70.9)	2049 (65.5)	24756 (71.4)	0.76	0.71-0.82	<0.0001
	No	10997 (29.1)	1078 (34.5)	9919 (28.6)			
Tobacco – n (%)	Yes	8680 (23)	789 (25.2)	7891 (22.8)	1.15	1.05-1.25	0.0016
	No	29122 (77)	2338 (74.8)	26784 (77.2)			
Atrial Fibrillation – n (%)	Yes	8586 (22.7)	554 (17.7)	8032 (23.2)	0.71	0.65-0.79	<0.0001
	No	29216 (77.3)	2573 (82.3)	26643 (76.8)			
Hyperlipidemia – n (%)	Yes	21933 (58)	1905 (60.9)	20028 (57.8)	1.14	1.06-1.23	0.0006
	No	15869 (42)	1222 (39.1)	14647 (42.2)			
Obesity	Yes	6373 (16.9)	592 (18.9)	5781 (16.7)	1.17	1.06-1.28	0.0012
	No	31429 (83.1)	2535 (81.1)	28894 (83.3)			

Supplemental Table 5: Descriptive statistics overall and by CRRT among ICU Stroke Patients

Variable	Level	Overall	CRRT				
			Yes	No	OR	95% CI	p-value
Alcohol Use	Yes	1060 (2.8)	71 (2.3)	989 (2.9)	0.79	0.62-1.01	0.0599
	No	36742 (97.2)	3056 (97.7)	33686 (97.2)			
Malnutrition	Yes	3201 (8.5)	300 (9.6)	2901 (8.4)	1.16	1.03-1.32	0.0183
	No	34601 (91.5)	2827 (90.4)	31774 (91.6)			
Myocardial Infarction	Yes	14319 (37.9)	1198 (38.3)	13121 (37.8)	1.02	0.95-1.10	0.6019
	No	23483 (62.1)	1929 (61.7)	21554 (62.2)			
Congestive Heart Failure	Yes	28192 (74.6)	1994 (63.8)	26198 (75.6)	0.57	0.53-0.62	<0.0001
	No	9610 (25.4)	1133 (36.2)	8477 (24.5)			
Peripheral Vascular Disease	Yes	15993 (42.3)	1152 (36.8)	14841 (42.8)	0.78	0.72-0.84	<0.0001
	No	21809 (57.7)	1975 (63.2)	19834 (57.2)			
Dementia	Yes	2446 (6.5)	88 (2.8)	2358 (6.8)	0.40	0.32-0.49	<0.0001
	No	35356 (93.5)	3039 (97.2)	32317 (93.2)			
Pulmonary Disease	Yes	18087 (47.9)	1324 (42.3)	16763 (48.3)	0.79	0.73-0.85	<0.0001
	No	19715 (52.2)	1803 (57.7)	17912 (51.7)			
Connective Tissue Disease	Yes	2352 (6.2)	247 (7.9)	2105 (6.1)	1.33	1.16-1.52	<0.0001
	No	35450 (93.8)	2880 (92.1)	32570 (93.9)			
Peptic Ulcer Disease	Yes	3705 (9.8)	271 (8.7)	3434 (9.9)	0.86	0.76-0.98	0.0260
	No	34097 (90.2)	2856 (91.3)	31241 (90.1)			
Mild Liver Disease	Yes	1265 (3.4)	112 (3.6)	1153 (3.3)	1.08	0.89-1.32	0.4450
	No	36537 (96.7)	3015 (96.4)	33522 (96.7)			
Paraplegia	Yes	6518 (17.2)	596 (19.1)	5922 (17.1)	1.14	1.04-1.26	0.0050
	No	31284 (82.8)	2531 (80.9)	28753 (82.9)			
Non-Metastatic Cancer	Yes	4707 (12.5)	393 (12.6)	4314 (12.4)	1.01	0.91-1.13	0.8366
	No	33095 (87.6)	2734 (87.4)	30361 (87.6)			
Metastatic Cancer	Yes	1213 (3.2)	80 (2.6)	1133 (3.3)	0.78	0.62-0.98	0.0317
	No	36589 (96.8)	3047 (97.4)	33542 (96.7)			
Severe Liver Disease	Yes	1194 (3.2)	91 (2.9)	1103 (3.2)	0.91	0.73-1.13	0.4071
	No	36608 (96.8)	3036 (97.1)	33572 (96.8)			
HIV	Yes	557 (1.5)	50 (1.6)	507 (1.5)	1.10	0.82-1.47	0.5432
	No	37245 (98.5)	3077 (98.4)	34168 (98.5)			

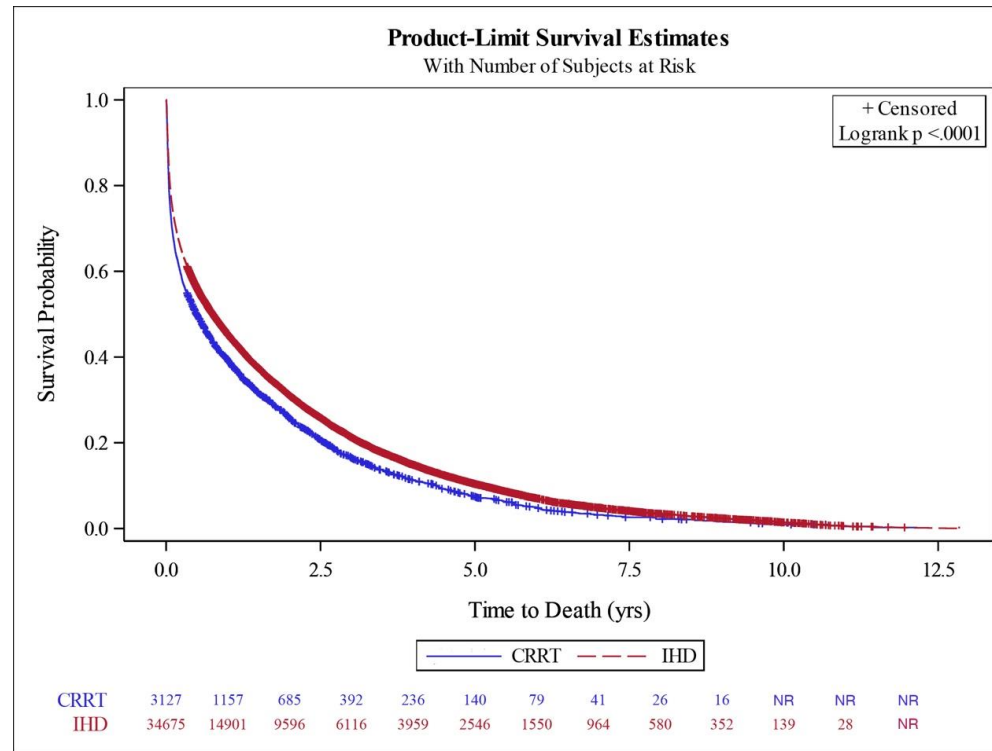
Supplemental Table 6: Descriptive statistics overall and by mortality and CPH model results among ICU Stroke Patients

Variable	Level	Mortality		Simple CPH Models			Final CPH Model			
		Died	Alive	HR	95% CI	p-value	HR	95% CI	p-value	
Time to Death		69 (12.6)	61.4 (13.1)							
Main Independent Variable										
CRRT	Yes	2794 (89.4)	333 (10.7)	1.17	1.13-1.33	<0.0001	1.32	1.27-1.37	<0.0001	
	No	31136 (89.8)	3539 (10.2)							
Demographic and Clinical Risk Factors*										
Age at first		1.3 (1.8)	2.9 (2.5)	1.018	1.017-	<0.0001	1.016	1.015-1.-017	<0.0001	
Sex	Female	17126 (90.1)	1888 (9.9)	0.99	0.97-1.01	0.4367				
	Male	16804 (89.4)	1984 (10.6)							
Race	Black	10316 (86.5)	1617 (13.6)	0.82	0.80-0.84	<0.0001	0.86	0.84-0.89	<0.0001	
	Other	1639 (87.7)	231 (12.4)	0.87	0.83-0.91			0.88		0.84-0.93
	White	21975 (91.6)	2024 (8.4)							
Ethnicity	Hispanic	4210 (85.8)	696 (14.2)	0.85	0.82-0.87	<0.0001	0.85	0.82-0.88	<0.0001	
	Non-	29720 (90.4)	3176 (9.7)							
Stroke Type	Hemorrhagic	8922 (89.7)	1023 (10.3)	1.03	1.00-1.05	0.0244	1.09	1.07-1.12	<0.0001	
	Acute	25008 (89.8)	2849 (10.2)							
Essential Hypertension	Yes	25409 (91.8)	2259 (8.2)	1.09	1.07-1.12	<0.0001				
	No	8521 (84.1)	1613 (15.9)							
Diabetes	Yes	24258 (90.5)	2547 (9.5)	1.10	1.07-1.13	<0.0001	1.12	1.09-1.15	<0.0001	
	No	9672 (88)	1325 (12.1)							
Tobacco	Yes	7600 (87.6)	1080 (12.4)	1.10	1.07-1.13	<0.0001	1.03	1.00-1.06	0.0301	
	No	26330 (90.4)	2792 (9.6)							
Atrial Fibrillation	Yes	8080 (94.1)	506 (5.9)	1.47	1.44-1.51	<0.0001	1.19	1.16-1.22	<0.0001	
	No	25850 (88.5)	3366 (11.5)							
Hyperlipidemia	Yes	19663 (89.7)	2270 (10.4)	1.07	1.04-1.09	<0.0001	0.90	0.88-0.92	<0.0001	
	No	14267 (89.9)	1602 (10.1)							
Obesity	Yes	5510 (86.5)	863 (13.5)	1.03	0.99-1.06	0.0923				
	No	28420 (90.4)	3009 (9.6)							
Alcohol Use	Yes	927 (87.5)	133 (12.6)	0.99	0.93-1.06	0.7470				
	No	33003 (89.8)	3739 (10.2)							

Supplemental Table 6: Descriptive statistics overall and by mortality and CPH model results among ICU Stroke Patients

Variable	Level	Mortality		Simple CPH Models			Final CPH Model		
		Died	Alive	HR	95% CI	p-value	HR	95% CI	p-value
Malnutrition	Yes	2865 (89.5)	336 (10.5)	1.28	1.24-1.33	<0.0001	1.17	1.13-1.22	<0.0001
	No	31065 (89.8)	3536 (10.2)						
Myocardial Infarction	Yes	13094 (91.4)	1225 (8.6)	1.26	1.23-1.28	<0.0001	1.11	1.09-1.14	<0.0001
	No	20836 (88.7)	2647 (11.3)						
Congestive Heart Failure	Yes	25720 (91.2)	2472 (8.8)	1.39	1.36-1.43	<0.0001	1.20	1.17-1.23	<0.0001
	No	8210 (85.4)	1400 (14.6)						
Peripheral Vascular	Yes	14645 (91.6)	1348 (8.4)	1.35	1.22-1.27	<0.0001	1.11	1.09-1.14	<0.0001
	No	19285 (88.4)	2524 (11.6)						
Dementia	Yes	2327 (95.1)	119 (4.9)	1.44	1.38-1.50	<0.0001	1.22	1.17-1.27	<0.0001
	No	31603 (89.4)	3753 (10.6)						
Pulmonary Disease	Yes	16648 (92)	1439 (8)	1.29	1.2601.32	<0.0001	1.11	1.09-1.14	<0.0001
	No	17282 (87.7)	2433 (12.3)						
Connective Tissue Disease	Yes	2083 (88.6)	269 (11.4)	1.04	0.99-1.09	0.0975			
	No	31847 (89.8)	3603 (10.2)						
Peptic Ulcer Disease	Yes	3365 (90.8)	340 (9.2)	1.17	1.12-1.21	<0.0001	1.07	1.03-1.11	0.0006
	No	30565 (89.6)	3532 (10.4)						
Mild Liver Disease	Yes	1143 (90.4)	122 (9.6)	1.16	1.10-1.23	<0.0001	1.16	1.09-1.23	<0.0001
	No	32787 (89.7)	3750 (10.3)						
Paraplegia	Yes	5817 (89.3)	701 (10.8)	1.07	1.04-1.10	<0.0001	1.11	1.08-1.14	<0.0001
	No	28113 (89.9)	3171 (10.1)						
Non-Metastatic Cancer	Yes	4277 (90.9)	430 (9.1)	1.24	1.20-1.28	<0.0001	1.11	1.08-1.15	<0.0001
	No	29653 (89.6)	3442 (10.4)						
Metastatic Cancer	Yes	1143 (94.2)	70 (5.8)	1.68	1.59-1.78	<0.0001	1.57	1.48-1.66	<0.0001
	No	32787 (89.6)	3802 (10.4)						
Severe Liver Disease	Yes	1089 (91.2)	105 (8.8)	1.45	1.36-1.54	<0.0001	1.45	1.36-1.54	<0.0001
	No	32841 (89.7)	3767 (10.3)						
HIV	Yes	464 (83.3)	93 (16.7)	0.88	0.80-0.96	0.0043	1.12	1.02-1.23	0.0174
	No	33466 (89.9)	3779 (10.2)						

*Demographic and clinical risk factors lacking from the final CPH model were not included because they were not significant and did not affect model fit.



Supplemental Figure 1: CRRT is Associated with Reduced Survival of ESRD Patients in the ICU after Stroke Compared to IHD. Shown is a Kaplan-Meier survival curve comparing ESRD patients with stroke administered intermittent hemodialysis (IHD) or continuous renal replacement therapy (CRRT). NR = Not Reported, per USRDS regulations that observations of 10 or less must be suppressed.