

SUPPLEMENTAL MATERIAL

Circulation: Cardiovascular Quality and Outcomes

“Neighborhood differences in post-stroke mortality”

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Elevated	339	74%	69%	78%	1001	90%	88%	92%	273	78%	73%	83%	1070	89%	87%	90%
Not Elevated	855	74%	71%	77%	3226	94%	93%	95%	696	79%	76%	82%	3398	93%	92%	94%
Missing	155	77%	70%	83%	566	89%	86%	92%	132	82%	75%	88%	590	88%	86%	91%
Memory functioning at baseline																
High*	454	73%	69%	77%	2138	95%	94%	96%	371	76%	72%	81%	2227	94%	93%	95%
Low	696	75%	72%	78%	1901	90%	88%	91%	572	81%	78%	85%	2033	88%	87%	90%
Missing	199	73%	67%	79%	754	92%	90%	94%	158	76%	69%	83%	798	90%	88%	92%
Current smoker																
Smoker	152	82%	75%	88%	530	92%	90%	95%	123	86%	80%	92%	558	91%	89%	93%
Non-smoker	1196	73%	71%	76%	4261	93%	92%	93%	977	78%	75%	81%	4498	91%	91%	92%
Hypertension																
Hypertensive	719	76%	73%	79%	2097	91%	90%	92%	590	81%	77%	84%	2235	90%	89%	91%
Not hypertensive	629	72%	69%	76%	2693	94%	93%	95%	510	77%	73%	81%	2820	92%	91%	93%
Diabetes																
Diabetic	229	78%	73%	84%	569	90%	87%	92%	192	82%	77%	88%	611	89%	86%	91%
Not diabetic	1119	73%	71%	76%	4221	93%	92%	94%	908	78%	76%	81%	4444	92%	91%	93%
Heart disease																
Heart disease	460	80%	76%	83%	1309	91%	90%	93%	385	82%	79%	86%	1388	90%	88%	91%
No heart disease	887	71%	68%	74%	3482	93%	92%	94%	715	77%	74%	80%	3667	92%	91%	93%

Sensitivity sample is 76 subjects less than the specificity sample (those false-negative cases who had missing first post-stroke proxy status).

We considered events strokes if the ICD-9 codes 430, 431, 433.01, 433.11, 433.21, 433.31, 433.81, 433.91, 434.00, 434.01, 434.10, 434.11, 434.90, 434.91, 435.0, 435.1, 435.3, 435.8, 435.9, 436, 997.02 were noted in any diagnosis on the claim. If the billing occasion included any ICD codes between 800 and 804.9 (inclusive) or between 850 and 854.1 (inclusive), or if the principal diagnosis for the billing occasion was V57.xx, this event was not considered a stroke, even if other ICD codes would have qualified as a stroke. If the diagnosis was based on outpatient services, we required two stroke-related claims within 12 months of each other to qualify the event as a stroke.

* High memory functioning indicates performance at or above the median

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Appendix Table 2: Main Effects of Neighborhood Context on Hazard Ratio of Mortality.

	Model 1			Model 2			Model 3			Model 4		
	HR	95% CI	p	HR	95% CI	p	HR	95% CI	p	HR	95% CI	p
Higher Neigh Social Ties	0.75	(0.68 ,0.83)	<.0001	0.86	(0.86 ,0.96)	0.007	0.75	(0.68 ,0.83)	<.0001	0.86	(0.78 ,0.96)	0.005
Higher Neigh Family Income (ordinal, 4th vs. 1st Q)	0.76	(0.70 ,0.83)	<.0001	0.88	(0.80 ,0.96)	0.005	0.94	(0.85 ,1.03)	0.156	0.95	(0.86 ,1.04)	0.239
Higher Neigh Deprivation (ordinal, 4th vs. 1st Q)	1.22	(1.11 ,1.35)	<.0001	1.04	(0.94 ,1.14)	0.489	0.98	(0.89 ,1.09)	0.748	0.95	(0.86 ,1.06)	0.373
High Neigh % Poverty	1.15	(1.06 ,1.24)	0.001	1.06	(0.98 ,1.15)	0.120	1.05	(0.97 ,1.14)	0.212	1.03	(0.95 ,1.12)	0.418
High Neigh % Black	1.08	(0.99 ,1.19)	0.096	1.02	(0.93 ,1.12)	0.702	1.04	(0.95 ,1.14)	0.400	1.01	(0.92 ,1.11)	0.838
High Neigh % White	0.89	(0.81 ,0.98)	0.015	0.96	(0.88 ,1.05)	0.369	0.92	(0.84 ,1.01)	0.076	0.97	(0.88 ,1.06)	0.480
High Neigh % Foreign Born	0.91	(0.78 ,1.06)	0.220	0.84	(0.72 ,0.98)	0.030	0.89	(0.77 ,1.04)	0.135	0.83	(0.71 ,0.97)	0.021
High Neigh % Residentially Stable	0.98	(0.92 ,1.05)	0.623	0.96	(0.90 ,1.03)	0.259	0.95	(0.88 ,1.01)	0.114	0.95	(0.89 ,1.02)	0.159

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NOTES: Main effects of neighborhood context on hazard rate of mortality derived from main effect models adjusting for covariates and for each neighborhood factor individually. Model 1 adjusted for demographic variables: (stroke status, age, gender, race, ethnicity, southern birth, nativity, and marital status). Model 2 adjusted for demographics plus CVD risk factors (physical activity, ADL, IADL, obesity, alcohol use, smoking status, depressive symptoms, hypertension, diabetes, self-rated health). Model 3 adjusted for demographics plus SES variables (parental education, education, income, and wealth). Model 4 adjusted for demographic vars, SES vars, and CVD risk factors. Reference group for neighborhood family income (ordinal) is the first quartile, and reference group for neighborhood deprivation (ordinal) is the first quartile. The reference groups for categorical covariates are: female, non-Hispanic White or Other Race, unmarried, US born, born outside the South, high parental education, own education was 12 years, income 1st quartile, wealth 1st quartile, no IADL, no ADL, non-vigorous physical activity, normal weight, heavy alcohol use, never smoker, excellent/very good/good self rated health, no hypertension, no diabetes, low CESD. Q=Quartile. Neigh=neighborhood. These estimates are also reported in Figure 1. These results exclude any missing covariate data from the models, n=15,560.

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Appendix Table 3: Multiple Imputation Results for Stratum-Specific Estimates of Neighborhood Context on Survival
 (Hazard Ratios of Mortality) within Strata of Ever-Stroke Status. Model 4.

	Ever Stroke		Never Stroke		Inter-
	HR	95% CI	HR	95% CI	action p
Higher Neighborhood Social Ties	0.93	(0.74 ,1.18)	0.86	(0.78 ,0.95)	0.53
Higher Neighborhood Family Income (ordinal, 4th vs. 1st Q)	0.96	(0.79 ,1.05)	0.99	(0.96 ,1.02)	0.93
Higher Neighborhood Deprivation (ordinal, 4th vs. 1st Q)	0.99	(0.80 ,1.21)	0.96	(0.87 ,1.06)	0.79
High Neighborhood % Poverty	1.07	(0.91 ,1.25)	1.02	(0.94 ,1.11)	0.59
High Neighborhood % Black	1.08	(0.91 ,1.28)	1.04	(0.95 ,1.13)	0.65
High Neighborhood % White	0.82	(0.68 ,0.98)	0.98	(0.90 ,1.08)	0.05
High Neighborhood % Foreign Born	1.09	(0.75 ,1.55)	0.85	(0.72 ,1.01)	0.24
High Neighborhood % Residentially Stable	0.96	(0.81 ,1.13)	0.94	(0.87 ,1.01)	0.82

NOTES: Stratum-specific neighborhood-mortality estimates within strata of ever-stroke status derived from interaction models (interacting neighborhood context variable with stroke status). Model 4 adjusted for demographic variables (stroke status, age, gender, race, ethnicity, southern birth, nativity, and marital status), for SES variables (parental education, education, income, and wealth), and CVD risk factors (physical activity, ADL, IADL, obesity, alcohol use, smoking status, depressive symptoms, hypertension, diabetes, self-rated health). Q=Quartile. Neighborhood social ties modeled with a 3-item index; hazard ratio models a change from 0 to 3 social ties. Neighborhood family income and neighborhood deprivation are modeled in quartiles modeled ordinally; hazard ratio models a change from 4th vs. 1st quartiles. N=17,960.

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Appendix Table 4: Stratum-Specific Estimates of Neighborhood Context on Survival (Hazard Ratios of Mortality) within Strata of Time Since Stroke. Model 4.

	Stroke < 3 mo			Stroke 3-12 mo			Stroke >1 yr			Never Stroke	
	HR	95% CI	p ¹	HR	95% CI	p ¹	HR	95% CI	p ¹	HR	95% CI
Higher Neighborhood Social Ties	2.90	(0.97 ,8.61)	0.03	0.75	(0.40 ,1.41)	0.71	0.90	(0.67 ,1.20)	0.74	0.85	(0.76 ,0.95)
Higher Neighborhood Family Income	0.92	(0.68 ,1.26)	0.68	1.03	(0.85 ,1.24)	0.67	0.96	(0.89 ,1.04)	0.48	0.99	(0.95 ,1.02)
Higher Neighborhood Deprivation	1.35	(1.03 ,1.77)	0.02	0.99	(0.82 ,1.18)	0.96	0.98	(0.90 ,1.06)	0.91	0.98	(0.95 ,1.02)
High Neighborhood % Poverty	0.93	(0.43 ,2.01)	0.82	1.05	(0.67 ,1.63)	0.92	1.11	(0.92 ,1.34)	0.44	1.02	(0.94 ,1.12)
High Neighborhood % Black	1.28	(0.65 ,2.52)	0.47	0.86	(0.54 ,1.36)	0.54	1.13	(0.92 ,1.39)	0.23	0.99	(0.90 ,1.10)
High Neighborhood % White	0.54	(0.26 ,1.11)	0.09	0.87	(0.56 ,1.35)	0.53	0.81	(0.65 ,1.00)	0.05	1.01	(0.91 ,1.11)
High Neighborhood % Foreign Born	2.04	(0.56 ,7.41)	0.16	0.83	(0.27 ,2.59)	0.93	1.12	(0.72 ,1.73)	0.15	0.79	(0.66 ,0.94)
High Neighborhood % Residentially Stable	1.70	(0.75 ,3.88)	0.16	0.84	(0.53 ,1.34)	0.62	0.96	(0.79 ,1.17)	0.88	0.95	(0.88 ,1.02)

NOTES: Model 4 adjusted for demographic variables, SEP variables, and CVD risk factors.¹ p-value from interaction test of association of neighborhood characteristic with mortality among this time since stroke patient group, contrasted against neighborhood association with mortality among those without stroke. Neighborhood social ties modeled with a 3-item index; hazard ratio models a change from 0 to 3 social ties. Neighborhood family income and neighborhood deprivation are modeled in quartiles modeled ordinally; hazard ratio models a one-quartile change. A subset of these estimates are presented in Figure 2. These results exclude any missing covariate data from the models, n=15,560.

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Appendix Table 5: Multiple Imputation Results for Stratum-Specific Estimates of Neighborhood Context on Survival (Hazard Ratios of Mortality) within Strata of Time Since Stroke. Model 4.

	Stroke < 3 mo			Stroke 3-12 mo			Stroke >1 yr			Never Stroke	
	HR	95% CI	p ¹	HR	95% CI	p ¹	HR	95% CI	p ¹	HR	95% CI
Higher Neighborhood Social Ties	1.74	(0.59 ,5.16)	0.31	0.66	(0.37 ,1.18)	0.16	0.94	(0.73 ,1.23)	0.66	0.86	(0.78 ,0.95)
Higher Neighborhood Deprivation	1.29	(1.03 ,1.62)	0.03	1.02	(0.86 ,1.20)	0.85	0.98	(0.90 ,1.05)	0.53	0.99	(0.95 ,1.02)
High Neighborhood % White	0.52	(0.27 ,1.02)	0.06	0.85	(0.57 ,1.26)	0.41	0.84	(0.69 ,1.02)	0.08	0.98	(0.90 ,1.08)

NOTES: Model 4 adjusted for demographic variables, SEP variables, and CVD risk factors. ¹ p-value from interaction test of association of neighborhood characteristic with mortality among this time since stroke patient group, contrasted against neighborhood association with mortality among those without stroke. Neighborhood social ties modeled with a 3-item index; hazard ratio models a change from 0 to 3 social ties. Neighborhood family income and neighborhood deprivation are modeled in quartiles modeled ordinally; hazard ratio models a one-quartile change. For comparison: non-imputed results found in Figure 2 and in Appendix Table 4. N=17,960.