

Supplementary Online Content

Shen Y-C, Chen G, Hsia RY. Community and hospital factors associated with stroke center certification in the United States, 2009 to 2017. *JAMA Netw Open*. 2019;2(7):e197855. doi:10.1001/jamanetworkopen.2019.7855

eTable1. Stratified Multivariate Hazard Ratios of Hospitals Achieving Stroke Certification by Urban/Rural Status, 2009 to 2017

eTable2. Sensitivity Analysis Using Poverty Line

This supplementary material has been provided by the authors to give readers additional information about their work.

eTable 1. Stratified Multivariate Hazard Ratios of Hospitals Achieving Stroke Certification by Urban/Rural Status, 2009 to 2017

	Rural Hospitals		Urban Hospitals		No Cardiac Tech Capacity		Has Cardiac Tech Capacity		Independent Hospitals		Member of a System	
	Hazard ratio	95% CI	Hazard ratio	95% CI	Hazard ratio	95% CI	Hazard ratio	95% CI	Hazard ratio	95% CI	Hazard ratio	95% CI
Economic and financial characteristics												
HSA family income (ref. grp. = Upper 1/3)												
Middle income	0.86	[0.43,1.71]	0.77**	[0.68,0.86]	0.61**	[0.46,0.80]	0.83**	[0.74,0.93]	0.69**	[0.58,0.83]	0.83**	[0.72,0.95]
Low income	0.52	[0.26,1.05]	0.65**	[0.54,0.77]	0.49**	[0.34,0.72]	0.67**	[0.56,0.80]	0.50**	[0.38,0.67]	0.69**	[0.57,0.84]
Profit Margin (ref. grp. = Upper 1/3)												
Middle 1/3	0.84	[0.55,1.29]	0.96	[0.88,1.06]	1.32*	[1.02,1.71]	0.90*	[0.81,0.99]	1.05	[0.86,1.27]	0.93	[0.84,1.04]
Lower 1/3	0.95	[0.58,1.54]	0.86*	[0.77,0.97]	1.15	[0.88,1.51]	0.83**	[0.73,0.94]	0.99	[0.79,1.25]	0.85*	[0.75,0.97]
Hospital Characteristics												
Ownership (ref. grp. = Not-for-profit)												
For-profit	0.90	[0.53,1.52]	0.89	[0.79,1.00]	0.86	[0.66,1.13]	0.88	[0.78,1.00]	0.40**	[0.21,0.77]	0.92	[0.81,1.03]
Government	1.03	[0.58,1.85]	0.85*	[0.72,0.99]	0.70	[0.47,1.04]	0.87	[0.74,1.03]	0.83	[0.68,1.01]	0.76*	[0.60,0.97]
Designated critical access hospital	0.11**	[0.05,0.24]	0.16**	[0.06,0.43]	0.14**	[0.08,0.27]	0.00	[0.00,0.00]	0.20**	[0.09,0.43]	0.08**	[0.03,0.19]
Total Hospital Beds (ref. grp. = <100 beds)												
100-399 beds	2.77**	[1.71,4.51]	3.28**	[2.67,4.02]	3.30**	[2.56,4.27]	2.60**	[1.99,3.39]	3.43**	[2.33,5.06]	2.95**	[2.39,3.64]
400+ beds	5.89**	[2.87,12.08]	4.61**	[3.70,5.75]	6.59**	[4.45,9.76]	3.61**	[2.72,4.78]	5.04**	[3.27,7.77]	3.94**	[3.11,5.00]
Teaching hospitals	1.73*	[1.10,2.71]	1.39**	[1.26,1.53]	1.67**	[1.32,2.12]	1.34**	[1.21,1.48]	1.50**	[1.25,1.80]	1.35**	[1.20,1.51]
Has cardiac capacity (either cath. lab or CABG)	1.87*	[1.13,3.11]	1.55**	[1.34,1.81]					2.06**	[1.52,2.79]	1.44**	[1.22,1.69]
Hospital is part of a system	1.37	[0.93,2.02]	1.23**	[1.11,1.36]	1.94**	[1.50,2.50]	1.09	[0.98,1.21]				
Case mix index	6.85**	[2.98,15.71]	1.54**	[1.25,1.91]	1.86**	[1.23,2.83]	1.61**	[1.25,2.09]	1.97**	[1.34,2.92]	1.74**	[1.35,2.25]
Community Characteristics												
Stroke belt states	0.79	[0.48,1.30]	0.71**	[0.60,0.84]	0.51**	[0.32,0.80]	0.74**	[0.62,0.87]	0.78	[0.59,1.03]	0.67**	[0.55,0.82]
Has another stroke center within 15-mile radius	1.39	[0.60,3.21]	1.32**	[1.21,1.45]	1.34*	[1.04,1.73]	1.32**	[1.20,1.45]	1.27**	[1.07,1.51]	1.35**	[1.21,1.50]
Percent population in HSA that are >=65 years old	1.08**	[1.04,1.13]	1.03**	[1.02,1.04]	1.09**	[1.06,1.12]	1.02**	[1.01,1.03]	1.03*	[1.00,1.05]	1.03**	[1.02,1.05]
Total population in HSA (log transformed)	1.27*	[1.04,1.55]	1.05	[0.99,1.10]	1.04	[0.94,1.16]	1.08**	[1.03,1.14]	1.01	[0.92,1.10]	1.09**	[1.03,1.15]
Urban hospitals					2.72**	[1.88,3.94]	1.80**	[1.41,2.29]	2.10**	[1.48,2.98]	2.11**	[1.64,2.72]
N	60852		43227		77865		26214		48583		55496	

eTable 2. Sensitivity Analysis Using Poverty Line

	Hazard ratio	95% CI	Bonferroni-adjusted p-values
Economic and financial characteristics			
HSA poverty level (ref. grp. = Lower 1/3)			
Middle 1/3	0.77**	[0.69,0.86]	<0.001
Upper 1/3	0.74**	[0.65,0.84]	<0.001
Profit Margin (ref. grp. = Upper 1/3)			
Middle 1/3	0.96	[0.87,1.06]	0.829
Lower 1/3	0.88*	[0.78,0.98]	0.049
Hospital Characteristics			
Ownership (ref. grp. = Not-for-profit)			
For-profit	0.86*	[0.77,0.97]	0.021
Government	0.81**	[0.70,0.95]	0.017
Designated critical access hospital	0.13**	[0.07,0.23]	<0.001
Total Hospital Beds (ref. grp. = <100 beds)			
100-399 beds	3.20**	[2.65,3.87]	<0.001
400+ beds	4.41**	[3.58,5.43]	<0.001
Teaching hospitals	1.40**	[1.28,1.54]	<0.001
Has cardiac capacity (either cath. lab or CABG)	1.61**	[1.39,1.87]	<0.001
Hospital is part of a system	1.23**	[1.12,1.37]	<0.001
Case mix index	1.66**	[1.34,2.05]	<0.001
Community Characteristics			
Stroke belt states	0.67**	[0.57,0.79]	<0.001
Has another stroke center within 15-mile radius	1.32**	[1.20,1.45]	<0.001
Percent population in HSA that are ≥65 years old	1.03**	[1.02,1.04]	<0.001
Total population in HSA (log transformed)	1.13**	[1.07,1.18]	<0.001
Urban hospitals	2.26**	[1.85,2.77]	<0.001
N	104079		