Population Trends and Disparities in Outpatient Utilization of Neurologists for Ischemic Stroke

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Background: Inpatient stroke utilization may be decreasing over time and may vary by patient demographics. Less is known about temporal trends and demographic variations in outpatient stroke utilization. We assessed ischemic stroke (IS)–related outpatient utilization across physician specialty and time, exploring any demographic variability, using recent US population-based data. *Methods:* We identified all outpatient medical visits for IS by adults (≥18 years) using the National Ambulatory Medical Care Survey (NAMCS) years 1998 to 2009. Physician numbers were derived from American Medical Association or American Osteopathic Association data by NAMCS. We assessed IS-related outpatient visits to neurologists and generalists over time and by patient demographics. *Results:* We identified 9.7 million IS-related visits from 1998 to 2009. The rate of IS-related visits to neurologists increased from 0.56 million visits in 1998 to 2000 to 0.90 million visits in 2007 to 2009, representing a 62% increase over the study period. The rate of IS-related visits to generalists declined from 2.0 million visits in 1998 to 2000 to 1.6 million visits in 2007 to 2009 (18% decrease). Between 1998 and 2009, the number of neurologists increased by 23% and the number of generalists grew by 19%. The IS visit rate per 100 physicians increased by 90% for neurologists but decreased by 31% for generalists. Fewer ambulatory IS-related visits to neurologists were reported among stroke survivors who were older, female, nonwhite, or living in rural areas. *Conclusions:* Between 1998 and 2009, IS-related outpatient utilization increased substantially to neurologists but declined to generalists. We identified demographic variations in outpatient utilization of neurologists that potentially lead to disparities in stroke evaluation and management. **Key Words:** Ischemic stroke—medical care—neurologists—outcome research—utilization.

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In 2008, approximately 7 million US stroke survivors 20 years of age or older required comprehensive care, including risk factor modification.[1] Patients with ischemic stroke (IS) have an approximately 5% to 15% annual risk of recurrent stroke.[2,3] Recurrent strokes increase the morbidity, mortality, and health care costs of the IS population.[4,5] With improved stroke survival, constant age-specific stroke incidence, and increasing size of the 65 years of age and older population, secondary stroke prevention will constitute substantial health and economic concerns for medical and public health systems.[6-10]

Secondary stroke prevention requires access to physician care, often both generalist and specialist physician care, to determine stroke etiology and to identify modifiable stroke risk factors. Neurologists report substantial

Table 1. *Demographic characteristics of ischemic stroke patients seeking ambulatory care by physician specialty: National Ambulatory Medical Care Survey, 1998 to 2009*,†*

	Overall		Generalists‡		Neurologists	
	Population estimate	%	Population estimate	%	Population estimate	%
All visits	9,699,297	100.00	6,582,829	100.00	3,116,468	100.00
Race						
White	7,853,567	80.97	5,202,218	79.03	2,651,349	85.08
African American/other	1,845,730	18.16	1,380,611	20.97	465,119	14.92
Region						
Northeast	1,627,220	16.78	952,755	14.47	674,465	21.64
Midwest	2,096,923	21.62	1,561,453	23.72	535,470	17.18
South	4,056,114	41.82	2,638,833	40.09	1,417,281	45.48
West	1,919,040	19.79	1,429,788	21.72	489,252	15.70
Age (y)						
Mean (SE)	69.76 (0.84)		71.90 (1.10)		65.25 (0.92)	
18-54	374,967	3.87	374,967	5.70	298,295	9.57
55-64	2,807,301	28.94	1,692,206	25.71	1,115,095	35.78
≥65	6,517,029	67.19	4,813,951	73.13	1,703,078	54.65
Gender						
Female	5,321,653	54.87	3,714,075	56.42	1,607,578	51.58
Male	4,377,644	45.13	2,868,754	43.58	1,508,890	48.42
Primary payment source						
Private insurance	2,551,721	26.31	1,481,808	22.51	1,069,913	34.33
Medicare	5,921,762	61.05	4,319,632	65.62	1,602,130	51.41
Medicaid	221,727	2.29	56,575	0.86	165,152	5.30
Other	1,004,087	10.35	724,814	11.01	279,273	8.96
Location						
MSA	8,127,203	83.79	5,262,937	79.95	2,864,266	91.91
Non-MSA	1,572,094	16.21	1,319,892	20.05	252,202	8.09
Survey year						
1998-2000	2,591,236	26.72	2,030,465	30.84	560,771	17.99
2001-2003	1,898,853	19.58	1,229,816	18.68	669,037	21.47
2004-2006	2,631,157	27.13	1,652,817	25.11	978,340	31.39
2007-2009	2,578,051	26.58	1,669,731	25.36	908,320	29.15
Visit type						
Established patient	8,614,444	90.44	6,199,734	96.64	2,414,710	77.65
New patient	910,619	9.56	215,565	3.36	695,054	22.35
Type of office setting						
Private solo or group practice	9,129,953	94.13	6,173,401	93.78	2,956,552	94.87
Free standing clinic/urgent care center	256,091	2.64	162,543	2.47	93,548	3.00
Federally qualified health center	50,861	0.52	50,861	0.77	—	—
Health maintenance organization	78,917	0.81	38,226	0.58	40,691	1.31
Faculty practice plan	17,818	0.18	—	—	17,818	0.57
Other	165,657	1.71	157,798	2.40	7859	0.25
Major reason for visit						
New problem (onset <3 months)	2,966,072	31.08	2,135,157	32.56	830,915	27.84
Chronic problem, routine	5,560,967	58.28	3,740,771	57.05	1,820,196	60.98
Chronic problem, flare-up	567,981	5.95	378,656	5.77	189,325	6.34
Pre-/postsurgery	7226	0.08	—	—	7226	0.24
Preventive care/nonillness care	439,854	4.61	302,533	4.61	137,321	4.60
Comorbidities						
Hypertension	2,278,905	23.50	2,067,515	21.32	211,390	2.18
Hyperlipidemia	617,029	6.36	575,970	5.94	41,059	0.42

(*Continued*)