

Supplementary Online Content

Chan AK, McGovern RA, Brown LT, et al. Disparities in access to deep brain stimulation surgery for Parkinson disease: an interaction between African American race and Medicaid use. *JAMA Neurol*. Published online January 6, 2014. doi:10.1001/jamaneurol.2013.5798

eTable 1. Characteristics of discharges for PD, DBS for PD, and African-American PD (2002-2009) with primary diagnoses for PD.

eTable 2. Odds for utilization of DBS in patients with a primary diagnosis of Parkinson's disease from 2002-2009.

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

eTable 1: Characteristics of Discharges for PD, DBS for PD, and African-American PD (2002-2009) with Primary Diagnoses for PD.

	1A: Parkinson's Disease	1B: DBS for Parkinson's Disease	1C: Parkinson's Disease (African-American Patients)
Total Number of Discharges During Period	125,822	17,299	5,423
Mean Age (\pm s.d.)	74.1 \pm 13.6	63.7 \pm 11.2	74.0 \pm 13.1
Modified Comorbidity Score (\pm s.d.)	2.2 \pm 1.2	1.5 \pm 0.8	2.4 \pm 1.3
Average Density of Neurological Surgeons, by county (per 100,000 individuals) (\pm s.d.)	38.6 \pm 53.9	50.4 \pm 63.2	39.3 \pm 51.6
Average Density of Neurologists, by county (per 100,000 individuals) (\pm s.d.)	99.2 \pm 140.6	118.2 \pm 160.6	103.5 \pm 140.9
Female	40.3%	32.1%	46.5%
White	82.7%	85.7%	
African-American	5.7%	0.9%	
Hispanic	6.5%	7.8%	
Asian/Pacific Islander	2.2%	2.6%	
Native American	0.3%	0.4%	
Other	2.5%	2.6%	
Patient Residential Zip Codes in 1st Income Quartile (Lowest)	18.6%	16.2%	41.7%
Patient Residential Zip Codes in 2nd Income Quartile	24.1%	22.4%	22.6%
Patient Residential Zip Codes in 3rd Income Quartile	25.5%	27.1%	17.7%
Patient Residential Zip Codes in 4th Income Quartile (Highest)	31.7%	34.2%	18.0%
Medicare with neither Private insurance nor Medicaid	47.2%	43.7%	46.6%
Medicaid without Private insurance	8.8%	4.3%	19.8%
Private insurance	41.8%	49.8%	30.6%
Neither Medicare, Medicaid, nor Private Insurance	2.2%	2.2%	3.0%
Average number of PD discharges per hospital annually (\pm s.d.)	175.4 \pm 129.3	234.3 \pm 142.4	180.2 \pm 134.4
Teaching Hospital	48.6%	86.0%	58.7%
Urban Hospital	87.7%	98.1%	92.6%
Small Hospital	11.5%	3.9%	8.4%
Medium Hospital	21.5%	7.6%	23.6%
Large Hospital	67.0%	88.4%	68.0%
Northeastern Hospital	24.3%	15.4%	30.1%
Midwestern Hospital	25.4%	18.8%	14.8%
Southern Hospital	32.9%	32.2%	46.2%
Western Hospital	17.4%	33.6%	8.8%

**All comparisons (1A vs. 1B and 1A vs. 1C) were statistically significant at $p < 0.0001$

++ Continuous variables are presented mean \pm 1 standard deviation

eTable 2. Odds for Utilization of DBS in Patients with a primary diagnosis of Parkinson's Disease from 2002-2009.

	Odds Ratio (95% C.I.)++
Age (Per 1 Year)	0.93** (0.92 – 0.94)
Year (Per 1 Year)	1.06** (1.03 – 1.10)
Modified Comorbidity Score (Per 1 point increase in score)	0.61** (0.58 – 0.65)
Hospital Experience (Per 1 Patient with Parkinson's Disease)	1.002** (1.001 – 1.003)
Countywide Density of Neurological Surgeons / 100,000 individuals (Per 1 Neurological Surgeon)	0.998** (0.996 – 1.000)
Countywide Density of Neurologists / 100,000 individuals (Per 1 Neurologist)	1.001 (1.000 – 1.001)
Male	1.08 (0.96 – 1.20)
Female	REFERENCE
African-American	0.18** (0.12 – .26)
Native American	1.17 (0.41 – 3.39)
Hispanic	0.84 (0.66 – 1.07)
Asian or Pacific Islander	0.90 (0.61 – 1.35)
Other	0.98 (0.68 – 1.40)
White	REFERENCE
Patient Residential Zip Codes in 1st Income Quartile (Lowest)	1.16 (0.96 – 1.39)
Patient Residential Zip Codes in 2nd Income Quartile	1.30** (1.10 – 1.52)
Patient Residential Zip Codes in 3rd Income Quartile	1.17** (1.01 – 1.36)
Patient Residential Zip Codes in 4th Income Quartile (Highest)	REFERENCE
Medicare with neither Private insurance nor Medicaid	3.08** (2.34 – 4.07)
Private Insurance	2.44** (1.87 – 3.17)
Neither Medicare, Medicaid, nor Private Insurance	0.60** (0.40 – 0.91)
Medicaid without Private Insurance	REFERENCE
Southern Hospital	0.57** (0.34 – 0.95)
Northeastern Hospital	0.18** (0.10 – 0.34)
Midwestern Hospital	0.57** (0.25 – 0.76)
Western Hospital	REFERENCE
Teaching Hospital	5.10** (3.56 – 7.31)
Non-Teaching Hospital	REFERENCE
Large Hospital	2.98** (1.70 – 5.23)
Medium Hospital	1.67 (0.95 – 2.92)

Small Hospital	REFERENCE
Urban Hospital	6.78** (2.73 – 16.83)
Rural Hospital	REFERENCE

** Denotes a statistically significant association. ++The odds ratios are adjusted for age, year since 2002, modified comorbidity score, hospital experience, state density of neurological surgeons, state density of neurologists, sex, race, income of patient's zip code, primary form of payment, hospital region, hospital setting (urban or rural), hospital teaching status, and hospital bedsize.

eTable 3. Predictors of Utilization of DBS in Patients with a primary diagnosis of Parkinson's Disease differ between African-American and White Discharges from 2002-2009.

	White	African-American	White Odds Ratio	AA Odds Ratio
Age (Per 1 Year)	64.7± 11.0	65.6±12.8	0.93** (0.92-0.93)	0.93** (0.90-0.97)
Year (Per 1 Year)	--	--	1.07** (1.03-1.11)	1.15 (0.94-1.40)
Modified Comorbidity Score (Per 1 point increase in score)	1.52±0.8	1.91±1.0	0.61** (0.57-0.64)	0.65** (0.47-0.90)
Hospital Experience (Per 1 Patient with Parkinson's Disease)	225.8± 127.9	216.1± 128.5	1.003** (1.001-1.004)	1.003 (1.00-1.01)
Countywide Density of Neurological Surgeons / 100,000 individuals (Per 1 Neurological Surgeon)	49.1±61.6	39.2±48.7	0.998 (0.996-1.000)	0.99 (0.98-1.01)
Countywide Density of Neurologists / 100,000 individuals (Per 1 Neurologist)	113.1± 156.6	103.5± 121.7	1.001** (1.00-1.002)	1.002 (1.00-1.01)
Male	67.6%	63.5%	1.05 (0.93-1.19)	1.08 (0.46-2.53)
Female	32.4%	36.5%	REFERENCE	
Patient Residential Zip Codes in 1 st Income Quartile (Lowest)	13.9%	28.9%	1.08 (0.88-1.31)	0.83 (0.25-2.77)
Patient Residential Zip Codes in 2 nd Income Quartile	22.4%	25.4%	1.21** (1.02-1.44)	0.66 (0.18-2.41)
Patient Residential Zip Codes in 3 rd Income Quartile	27.9%	29.0%	1.16 (0.99-1.35)	0.94 (0.27-3.31)
Patient Residential Zip Codes in 4 th Income Quartile (Highest)	35.7%	16.7%	REFERENCE	
Medicare with neither Private insurance nor Medicaid	45.8%	54.0%	3.20** (2.28-4.47)	34.19** (1.82- 641.2)
Private Insurance	48.6%	38.9%	2.53** (1.83-3.47)	36.64** (1.92-700.4)
Neither Medicare, Medicaid, nor Private Insurance	1.9%	3.3%	0.63 (0.38-1.05)	10.13 (0.31-328.9)
Medicaid without Private insurance	3.7%	3.9%	REFERENCE	
Teaching Hospital	83.2%	92.3%	5.73** (4.00-8.22)	10.02** (1.69-59.60)
Non-Teaching Hospital	16.8%	7.7%	REFERENCE	
Large Hospital	88.9%	95.8%	2.36** (1.35-4.13)	3.58 (0.49-46.78)
Medium Hospital	6.5%	4.2%	1.57 (0.89-2.78)	1.57 (0.10-25.83)
Small Hospital	4.6%	0%	REFERENCE	
Urban Hospital	97.1%	100%	--*	
Rural Hospital	2.9%	0%	--*	

** Denotes a statistically significant association (alpha .05). ++The odds ratios are adjusted for age, year since 2002, modified comorbidity score, hospital experience, state density of neurological surgeons, state density of neurologists, sex, race, income of patient's zip code, primary form of payment, hospital region, hospital setting (urban or rural), hospital teaching status, and hospital bedsize.

*Hospital Setting was removed to allow for hierarchical regression model convergence