

## Compelling Statistics

### General Facts

- There is only 1 neurologist for approximately 19.8 generalists in the US. (D. Smart. Physician characteristics and distribution in the US. 2006 ed. Department of Data Quality and Measurement, ed. American Medical Association;2006:312)

### In-Patient Studies

#### **General**

- Neurological intervention resulted in a significant change in diagnosis in 55.5% and a significant change in case management in nearly 70%. 65% were discharged earlier as a result of neurological consultation. (Roberts N, Costelloe D, Hutchinson M, et al. What difference does a neurologist make in a general hospital? Estimating the impact of neurology consultations on in-patient care. *Ir J Med Sci* 2007; 76:211-214.)

#### **Stroke**

- The risk of 1-year mortality for stroke patients who received neurology care was 77% of the risk for patients who did not. (Smith M, Shahar E, McGovern P, et al. HMO Membership and Patient Age and the Use of Specialty Care for Hospitalized Patients with Acute Stroke. *Medical Care*; 1999; 37:1186-1198.)
- Stroke patients seen by a neurologist (5.6%) were less likely to die during hospitalization than those seen by a non-neurologist (13.5%). (Goldstein L, Matchar D, Hoff-Lindquist J, et al. VA Stroke Study: Neurologist care is associated with increased testing but improved outcomes. *Neurology* 2003;61;792-796.)
- TIA patients treated by a neurologist were significantly more likely to undergo cerebrovascular testing but were significantly less likely to undergo surgery, compared with those patients treated by physicians in other specialties. (Mitchell J, Ballard D, Matchar D, et al. Racial Variation in Treatment for Transient Ischemic Attacks: Impact of Participation by Neurologists. *Health Services Research* 2000;34; 1413-1428.)
- Though one-year mortality was 21% in both patients treated by the departments of Medicine and those treated by the Department of Neurology, patients treated by the Department of Neurology were discharged an average of 16 days earlier (24 versus 40 days) and patients randomized to neurological wards more often went directly home. The functional status was better in patients randomized to neurological wards compared with those randomized to medical wards at 1-year follow-up. Conclusions: (1) Well-organized management of elderly stroke patients was associated with a better outcome. (2) It was also the more economical alternative. Elderly stroke patients randomized to receive care in the Department of Neurology were able to leave the hospital earlier, more often went directly home on discharge, and were more independent in activities of daily living at 1 year than those randomized to receive care in the Departments of Medicine. (Kaste M, Palomäki H, and Sarna, S. Where and how should elderly stroke patients be treated? A randomized trial. *Stroke*. 1995; 26:249-253) **\*Note that the hospital studied is located in Finland.**

- Neurologists treating stroke patients were significantly more expensive than other physicians but obtained better outcomes. However, stroke patients treated by a combination of neurologists and primary care physicians were more expensive still, averaging almost \$1000, or 5%, more than patients treated by a neurologist alone. Ninety-day mortality rates for patients treated by neurologists were significantly lower than those for other specialists. The cost and outcome differences persisted even after adjustment for patient age, comorbidity, hospital teaching status, and other characteristics. Stroke patients treated by neurologists are more apt to be discharged to inpatient rehabilitation facilities or to be sent home compared with other stroke patients, suggesting that functional outcomes also may have been better among those treated by neurologists. Stroke patients treated by neurologists do stay in the hospital longer, and neurologists were significantly more likely to order diagnostic cerebrovascular tests, particularly MRI scans. These, along with their greater use of specialized rehabilitation facilities, are likely factors that lead to neurologists' higher costs in treating stroke patients. (J.B. Mitchell, D.J. Ballard, J.P. Whisnant, C.J. Ammering, G.P. Samsa and D.B. Matchar. What role do neurologists play in determining the costs and outcomes of stroke patients? *Stroke* 1996;27;1937-1943)
- Patients admitted to the neurology services had better prognostic profiles, i.e., lower likelihood of having either completed stroke or cardiac comorbidity, and were less likely to die within one and six months of stroke onset. Ischemic stroke patients who are treated by neurologists experience lower all-cause and stroke-related mortality. Even when the researchers attempted to adjust the all-cause mortality rates for the substantial difference in prognostic profiles, the magnitude of the survival advantage of patients treated by neurologists was essentially unchanged, although its statistical significance was reduced. **Therefore, it may not be possible to sufficiently adjust for such differences statistically and, thereby, to determine the importance of physician specialty for stroke outcomes.** (R.D. Horner, D.B. Matchar, G.W. Divine, and J.R. Feussner. Relationship between Physician Specialty and the Selection and Outcome of Ischemic Stroke Patients. *Health Services Research*. 1995)
- Neurologists improved outcomes for in-patient acute ischemic stroke patients compared to non-neurologists (generalists). Patients admitted to neurologists had a lower risk of in-hospital mortality (4.6%) than non-neurologists (9.5%). Patients admitted to neurologists received tPA significantly more often than those admitted to generalist. Patients admitted to neurologists also had shorter hospital stays and lower charges. However, differences in ischemic stroke outcomes between neurologists and generalists may be a result of differences in initial prognosis because outcomes are no better at hospitals that admit patients to the care of neurologists more frequently. (L. A. Gillum, S. C. Johnston. Influence of physician specialty on outcomes after acute ischemic stroke. *Journal of Hospital Medicine* 2008;3-184-192)

## **Mixed Setting Studies**

### ***Electrodiagnostic Testing***

- Neurologists and other specialists are more accurate compared to general practitioners in their referral diagnosis and need for EMG. The authors suggest that patients be seen by a neurologist in order to reduce unnecessary EMGs by about 25 percent. (Mondelli M, Giacchi M, Federico A.

Requests for electromyography from general practitioners and specialists: critical evaluation. *Ital J Neurol Sci.* 1998;19; 195-203.) **This study was based in Italy.**

- Physicians improve value for electrodiagnostic testing (EMG, NCV) when assessing polyneuropathy in diabetic patients. Using the claims data available for a large (6,381) and diverse sample of employees and their dependents, the probability of recognizing polyneuropathy for neurologists and psychiatrists was nearly 6-fold that of non-physician providers. Demographic and health differences across groups of patients seen by these different providers could not explain the 6-fold difference in recognizing polyneuropathy. Recognition of polyneuropathy in nonelderly diabetic persons referred for electrodiagnostic testing is an important aspect of high-quality healthcare, particularly in view of rising rates of diabetes, and the disabling nature of painful polyneuropathy. (T. R. Dellingham, L. E. Pezzin. Under-recognition of polyneuropathy in persons with diabetes by nonphysician electrodiagnostic services providers. *Am J Phys Med Rehabil* 2005;84:399-406)

### ***Multiple Sclerosis***

- Of 2,156 people with MS, 72.2% saw a neurologist for their usual MS care. The probability of seeing a neurologist was significantly lower for people who did not have health insurance, were poor, lived in rural areas, or were African American; had been ill for more than 15 years; had difficulty walking but did not use an assistive device; or required a wheelchair/scooter or were confined to bed. Patients of a neurologist were significantly more likely to take a disease modifying agent (DMA), attend an outpatient rehabilitation program, or see an occupational therapist, urologist, or physical therapist. Economic, insurance, racial, and geographic factors appear to limit access to neurologists. The third most pronounced negative effect of receiving MS care from a neurologist was living in a rural location, behind only lack of health insurance and lower family income. (S.L. Minden, D.C. Hoaglin, L. Hadden, D. Frankel, T. Robbins and J. Perloff. *Neurology* 2008;70;1141-1149.)
- Patients consider MS-related care significantly superior when it is delivered by neurologists compared to other docs. (Buchanan R, Kaufman M, Zhu L, et al. Patient perceptions of multiple sclerosis-related care: comparisons by practice. *Neurorehabilitation* 2008;23:267-272.)

### ***EEG***

- Study showed there may be over-utilization of EEG by non-neurologists. When non-neurologists ordered EEG testing without oversight, the rate of normal results was 73%. However, when non-neurologists had neurologist oversight when ordering EEGs, the rate of normal results decreased to 43%. The rate of normal results for neurologists over the same period was 28%. (Gurbani N, Gurbani S, Mittal M, et al. *Clinical EEG and Neuroscience.* 2006;37:30-33.)

### ***Neuroimaging***

- Overall, emergency physicians read cranial computed tomography scans correctly 67% of the time, while neurologists and general radiologists read them correctly an equal amount: 83%. (Schriger D, Kalafut M, Starkman S, et al. Cranial computed tomography interpretation in acute

stroke: Physician accuracy in determining eligibility for thrombolytic therapy. *JAMA* 1998;279(16);1293-1297.)

- Neuroradiologists saw more early ischemic changes in images than did stroke physicians, general radiologists, geriatricians, or neurologists. Neuroradiologists took, on average, 30 seconds longer to read each scan than did most other specialists. (J.M. Wardlaw, A.J. Farrall, D. Perry, R. von Kummer, O. Mielke, T. Moulin, A. Ciccone, M. Hill, and for the Acute Cerebral CT Evaluation of Stroke Study (ACCESS) Study Group. Factors influencing detection of early CT signs of cerebral ischemia: An internet-based, international multi-observer study. *Stroke* 2007;38;1250-1256)