Too Many? Too Few

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New Study Reveals Current Trends in U.S. Neurosurgical Workforce

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Remarkable changes in the neurosurgical specialty have taken place in the past 15 years. While advances in basic science have occurred and new technologies and therapies have proliferated, other, less propitious factors—such as the promises (some might say false promises) and hopes of managed care—heralded a period of downsizing in specialty care in the United States and an emergence of and emphasis on primary care.

This downsizing of the neurosurgical specialty is demonstrated by a 2003 University of Utah study that compares the number of practicing U.S. neurosurgeons to the number of positions open to them. The study reveals a 12-year trend toward a shortage of neurosurgeons that has resulted in a distinct shortage of neurosurgeons currently. Based on the study results released herein, this article will explore the factors underlying the shortage of U.S. neurosurgeons and examine how the neurosurgical workforce must adapt to assure U.S. patients of appropriate neurosurgical care in the future.

Shrinking Pool of Neurosurgeons

For the University of Utah study, 1991-2002 data were obtained from the American Board of Neurological Surgeons (ABNS) to determine the numbers of practicing neurosurgeons and matriculating residents, and from the San Francisco Matching Program Web site, http://www.sfmatch.org, to ascertain the number of neurosurgical residency positions.

The total number of ABNS-certified practicing neurosurgeons in the United States, after increasing gradually for many years, has decreased dramatically over the past five years. In fact, fewer neurosurgeons were practicing in late 2002-about 3,050—than 12 years ago (see graph, Neurosurgeons Practicing in the United States, 1991-2002). Several factors have contributed to such a decrease, the most salient of which are the static number of neurosurgical residency training program graduates and medicolegal pressures.
**Static number of neurosurgical residency training programs graduates.** The number of neurosurgical residency positions offered through the National Resident Matching Program has remained remarkably stable over the past 12 years (see graph, Neurosurgical Residency Applicants, Positions Matched, and Graduating Residents, 1991-2002). The number of matriculating residents almost mirrors the number of available residency positions. However, the decreasing number of applicants to the neurosurgical match, which may indicate a diminishing interest among graduating medical students in the pursuit of a neurosurgical career, is a worrisome trend.

**Increasing medicolegal pressure.** As detailed in the Fall 2003 issue of the Bulletin, the current medical liability crisis in the United States has exerted tremendous strain on neurosurgeons, particularly on those in private practice who do not have the benefit of working in a self-insured healthcare delivery system or hospital. Rising professional liability insurance costs have produced such pressure on many practicing neurosurgeons that continued practice in many regions of the country has become fiscally untenable. As a result, in many regions of the country patients' access to neurosurgeons has been severely limited. Given the persistent slump in the economy and the failure of federal medical liability reform thus far, a rapid solution to the problem of rising professional liability insurance premiums is unlikely.

In addition to those leaving practice, some neurosurgeons have addressed the problem of escalating liability insurance premiums by limiting their practices to procedures deemed “less risky” by insurance carriers. For example, in the Chicago metropolitan area as in some other regions of the country, many neurosurgeons in private practice have voluntarily limited their practices to spine surgery. Doing so achieves the dual goal of reducing professional liability insurance premiums and avoiding neurosurgical trauma coverage, which requires cranial privileges.

**Burgeoning Demand for Neurosurgeons**
While the number of practicing neurosurgeons has been decreasing, a steep increase in the number of advertised positions for both academic and private practice opportunities has occurred. Nearly 800 practice opportunities were available in 2002 compared with fewer than 550 in 1991 (see graph, Available U.S. Neurosurgical Positions 1991-2002).

For the University of Utah study, the number of available neurosurgical positions was estimated by reviewing the advertisements from 1991 to 2002 in the *Journal of Neurosurgery* and *Neurosurgery*. All positions for clinical neurosurgery in the United States were included, but fellowship and research positions were excluded. Although there are limitations to using a review of such advertisements as an estimate of workforce demand, this method has been used previously as a quantifiable and objective index of workforce trends over an extended period.

Adding anecdotal credence to the findings, many neurosurgical program directors have noted the trend toward an increasing number of jobs available to graduating residents and fellows.

**Implications of the Supply-Demand Mismatch**

The dramatic increase in practice opportunities coupled with the decreased number of available neurosurgeons places many pressures on the specialty as a whole. This supply-demand mismatch portends serious consequences for the future.

**Neurosurgery's decreased capacity to provide new services**

The sparsely populated neurosurgical workforce contributes to the need for the average neurosurgeon to work at capacity. However, this situation limits the specialty in its ability to expand practice into other areas that would be fruitful extensions of neurosurgeons' expertise. For example, the impending renaissance of surgery for psychiatric disease, such as stereotactic surgery for severe and refractory obsessive compulsive disorder, and new indications or procedures for pain management, such as spinal cord stimulation for angina, represent great potential to expand neurosurgery's breadth of practice.

Another area for potential expansion is endovascular treatment of cerebrovascular disease, a natural extension of neurosurgery that quickly has been accommodated by neuroradiology. Neurosurgery still has the potential for growth in this area. Lessons learned from cardiology's experience with the emergence of endovascular treatment for cardiovascular disorders demand that neurosurgery likewise embraces this improving technology. By doing so, neurosurgeons will be able to retain the ability to offer this therapy to patients.

**Neurosurgery's continued ceding of neurosurgical activity to competing specialties**

With neurosurgery constrained in its capacity to provide new services, the door is opened wide for other specialties to step through. One does not have to search far to see the effects of such competition. Over the past generation, there has been a steady decline in neurosurgeons' participation in the management of peripheral nerve disease. Orthopedic and plastic surgeons have undertaken many of the procedures that were once an integral part of neurosurgeons' practices. In particular, orthopedic surgeons' interest in performing spine surgery has diluted neurosurgeons' participation in spine care.
Similarly, anesthesiologists who subspecialize in pain management have undertaken many pain surgery procedures—including independent performance of invasive procedures such as implantation of morphine pumps and spinal stimulators—that once were a fundamental interest of neurosurgery. Further, otolaryngologists/head and neck surgeons now exceed neurosurgeons in Medicare billings for brachial plexus exploration, according to a recent AANS/CNS Washington Office review.

Will there be enough neurosurgeons to provide new services in the future, or will other specialties with greater workforce capacity continue to fill the void? Given the declining workforce and whittling away of neurosurgical services by competing specialties, neurosurgery now faces the threat of its own slow dissolution.

**Neurosurgery's lengthy pipeline.** Adding to the factors influencing the supply-demand mismatch is the length of time required to increase the neurosurgical workforce. Most neurosurgical residencies last six or seven years following medical school, and there is an increasing trend among graduates toward pursuing further subspecialty fellowship training. Because recruitment of neurosurgical trainees occurs in the senior year of medical school, it is reasonable to assume that it will take at least seven years to significantly increase the output of fully trained neurosurgeons by expansion of neurosurgical training programs, even if such expansion is initiated immediately.

**A Call for Increased Enrollment in Training Programs**
The increasing demand may result in serious shortages of neurosurgeons in the next few years, and increasingly patients' access to neurosurgical care will be jeopardized. The most rational and effective method of countering these trends will be to increase enrollment into the many quality neurosurgical training programs throughout the country.

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