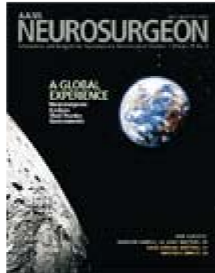


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## Feature

### Practicing Neurosurgery in the United States

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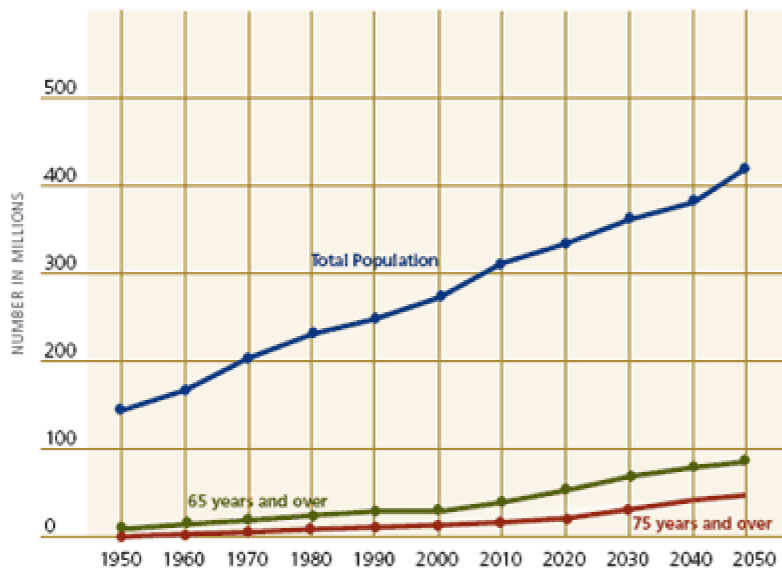
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Compared with other developed countries, the U.S. spends a high percentage of its gross domestic product on healthcare: 16 percent in 2005, up from 15 percent in 2004. This is far and away the greatest percentage of GDP spent on healthcare of any nation for which such data is collected. However, the high level of healthcare spending is not reflected in globally accepted indicators of quality such as comparatively longer life expectancy and lower infant mortality. Moreover, the U.S. government pays for the healthcare of less than half its population, and the percentage of uninsured people is a relatively high 15.3 percent.

**FIGURE 1**

Total Population and Older Population in the United States, 1950–2050



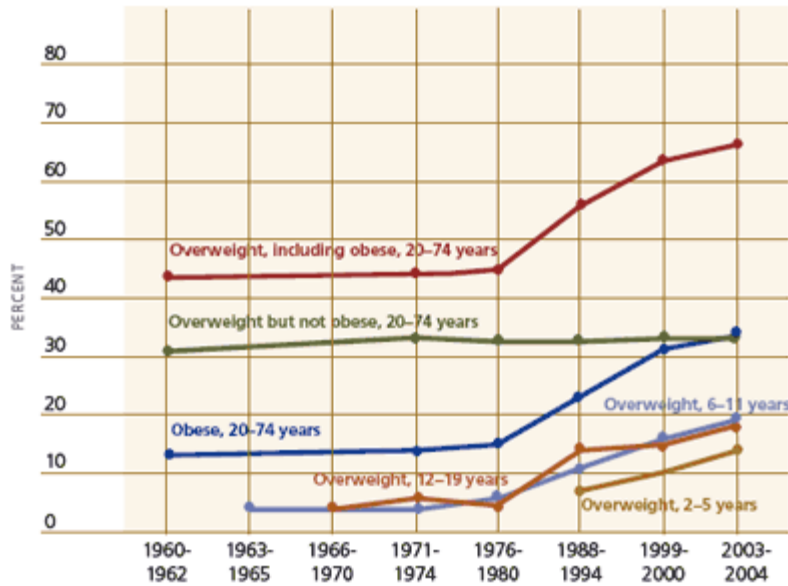
Data Source: U.S. Census Bureau

Both neurosurgical innovation and patient care are excellent in the U.S. The approximately 3,500 neurosurgeons in the U.S. serve a population of more than 299 million, a ratio of 1 neurosurgeon to 85,542 people. The number of practicing neurosurgeons in the U.S. remained relatively static over the last 15 years, while during this period the U.S. population increased by 20 percent, from roughly 250 million in 1990 to 300 million in 2005.

Every year approximately 150 residents graduate from the 99 accredited U.S. neurosurgery training programs. Since July 2003 residents in most programs

**FIGURE 2**

Overweight and Obesity by Age of Americans, 1960-2004



Data Source: CDC/NCHS, Health, United States, 2007

have been limited to an 80-hour workweek, although in some programs they are allowed to work up to 88 hours. The six- or seven-year training program begins with one year of internship (recently changed to NS-1 of residency) and traditionally ends with one year of chief residency.

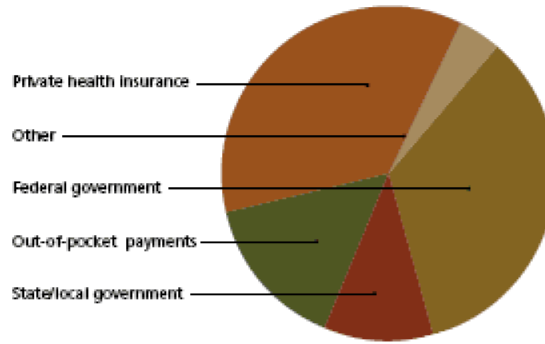
U.S. neurosurgeons remain concerned about the unfavorable medical liability climate, the scope of which varies significantly by state.

Although there is some evidence that liability insurance premiums have been stabilizing recently, the U.S. continues to be a litigious nation. Even so, lawsuits brought against physicians are actually tried only 6 percent of the time, and plaintiffs receive monetary awards in only 27 percent of claims made against physicians. For cases in which the physician prevailed, the legal fees for the defense averaged \$94,284 in 2004. U.S. neurosurgeons can expect to be sued, and more than once, during their careers.

The risk of being sued is among the factors that seem to have changed practice patterns among some U.S. neurosurgeons. Financial stress caused by expensive liability insurance premiums and low reimbursement, among other things, make it attractive to focus a practice on low-risk, high-volume procedures without the interruption of emergency cases. A 2004 survey of neurosurgical emergency care found that nearly two-thirds of respondents did not take emergency call for pediatric cases. These cases carry long exposure for liability litigation and, frequently, a low incidence of reimbursement, which may in turn have negatively impacted the pediatric neurosurgery workforce, as fewer than 10 graduating residents are entering this subspecialty area annually.

The apparent changes in practice patterns and the difficulties in some areas of patient access to emergency neurosurgical care also are leading to regionalization of care. Other general trends include decreases in the numbers of solo and private practitioners and an increase in the number of full-time academicians. A survey of neurosurgical procedural statistics conducted by the AANS in 2007 found that the number of neurosurgeons practicing alone decreased by 13 percent from 1999 to 2006. During the same period the number in private practice decreased by 14 percent while the number in full-time academic practice increased by 11 percent. The survey also found that neurosurgeons typically performed between 200 and 300 surgeries per year and that more than half of all operative procedures were related to the spine.

The high number of spinal procedures performed by neurosurgeons probably is related not only to recent innovations in spinal devices and the increasing incidence of spinal disease in an aging

**FIGURE 3****Healthcare Expenditures, United States, 2005****Source of Funds**

Private health insurance	35.9%
Federal government	34.2%
Out-of-pocket payments	15%
State/local government	10.7%
Other private funds	4.1%

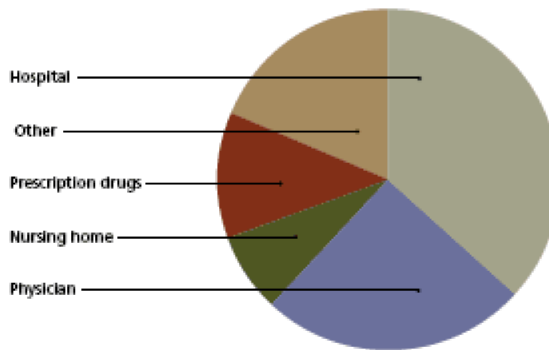
population, but also to organized neurosurgery's initiative for training neurosurgeons in complex spinal surgery. But while the success in the area of spine surgery is laudable, it is noteworthy that neurosurgery is a specialty of few practitioners, and without demonstrated commitment, many procedures considered "neurosurgical"—pain or peripheral nerve surgery, for example—may increasingly fall under the purview of other specialties.

Three trends in the U.S. expected to greatly impact neurosurgeons in the near future are the aging population, unhealthy lifestyles, and advancing technology. These trends are reviewed in *Health, United States, 2007*, and are summarized below.

**Aging population.** Life expectancy in the U.S. continues to lengthen. In 2004, American men could expect to live more than three years longer, and women more than one year longer, than they did in 1990. Mortality from heart disease, stroke and cancer has continued to decline in recent years.

Yet, even as progress is made in improving life expectancy, increased longevity is accompanied by increased prevalence of chronic conditions and their associated pain and disability. With the increasing population of older individuals (Figure 1), there will be significant increases in the incidence of age-related neurosurgical problems. At the top of this list are degenerative spine disease, cerebrovascular disease (both hemorrhagic and ischemic), primary and metastatic tumors involving the central nervous system or axial spine, and degenerative disease of the central nervous system, such as Parkinson's disease.

**Unhealthy lifestyles.** Insufficient exercise and being overweight are risk factors for many chronic diseases and disabilities, including heart disease, diabetes, hypertension, and back pain. The increasing number of overweight children and adults (Figure 2) and the high percentage of those who are physically inactive raise additional concerns about Americans' future health. The obesity epidemic, a topic well covered in a recent issue of the *AANS Neurosurgeon*, shows no evidence of slowing. Lifestyle-related illness will increase, and it certainly will be associated with an increasing incidence of degenerative spine disease, vascular disease, and prevalence of tumors (both cranial and axial spine) that will require treatment.

**Type of Expenditure**

Hospital	36.8%
Physician	25.4%
Other	18.4%
Prescription drugs	12.1%
Nursing home	7.3%

Data Source: CDC/NCHS, *Health, United States, 2007*

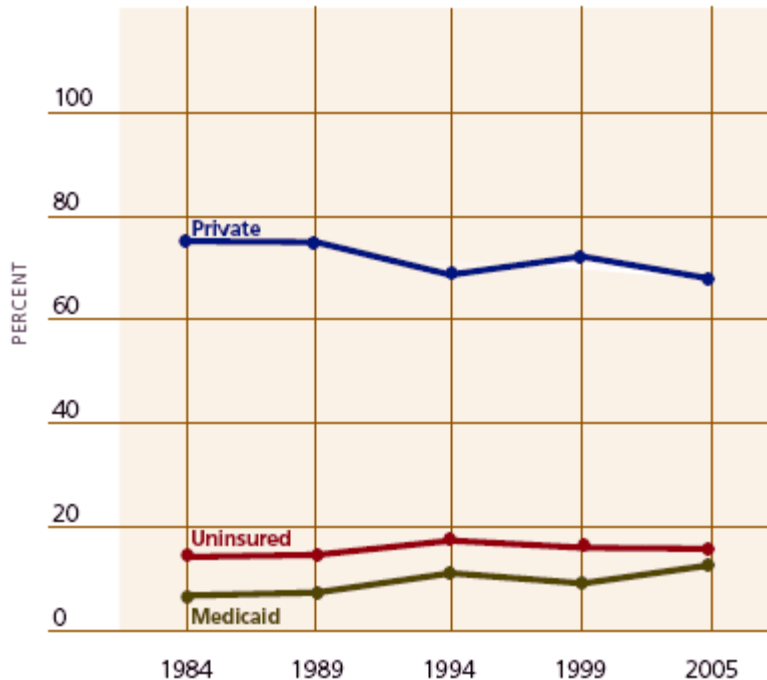
**Advancing technology.** Neurosurgery is a technology intensive specialty. Much of the recent innovation in such areas as spinal surgery, stimulation for pain or degenerative neurological disease, and endovascular interventions are contingent upon expensive technology. The continued expansion of spinal surgery, especially with the use of expensive implants such as fusion devices and disc replacement, maybe limited by the inability of payers in either the government or the private sector to cover the cost. For example, few payers initially have been willing to cover the cost of artificial disc technology until compelling, class I or class II evidence of benefit exists. Inevitably, the cost of technology innovation will be closely scrutinized in the future, and cost containment will become a foremost interest.

**Who Will Pay?**

With the cost of healthcare expected only to increase, one might well wonder who will pay for it. The demographics of health insurance coverage are changing. Currently, private insurers and the federal government provide most insurance coverage. Private health insurers paid for 36 percent of total personal health expenditures in 2005, the federal government 34 percent, state and local government 11 percent, and individuals accounted for 15 percent (Figure 3). The share of total expenditures paid out-of-pocket has declined from 27 percent in 1980 to 15 percent in 2005. This decline resulted from an expansion of benefits in both private health insurance plans and in government programs. Between 1984 and 1994, private coverage declined among people younger than 65 while Medicaid coverage and the percentage of uninsured people increased

**FIGURE 4**

**Health Insurance Among Individuals Younger Than 65, 1984–2005**



Data Source: CDC/NCHS, Health, United States, 2007

The cutbacks in Medicare physician payment that are expected beginning in 2010 may result in increasing numbers of neurosurgeons and other physicians who will choose not to participate in Medicare. Meanwhile, the increase in uninsured patients and the percentage of the population covered by Medicaid and Medicare is likely to exacerbate the shift in provision of their care to publicly funded hospitals and academic medical centers. AMCs already treat a high percentage of Medicaid patients, and this patient population, in addition to the population of nearly 50 million uninsured or underinsured (those who are working but who cannot afford health insurance), will impose an unsustainable financial burden to providers in these institutions.

Traditionally, the hospital has been reimbursed adequately for Medicaid patient care expenses, but the neurosurgical provider has not. Elective care for underinsured patients has been provided by altruistic neurosurgeons as charity care within their private practices and by teaching services at AMCs, which either may not be compensated at all or not compensated at fair market value. This fact simply has not been appreciated by the public or by politicians. As the ability of providers to subsidize such care within their practices erodes, other sources of support must be identified.

Of major concern to neurosurgery in the near future, therefore, is patient access to care, secondary to the question of who will pay for this care. Given the astronomical costs a patient having neurosurgery faces—the hospital, diagnostic tests and imaging, pharmaceuticals, devices and physician fees—resolving the question of who will pay is in the best interest of all neurosurgeons and their patients.

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