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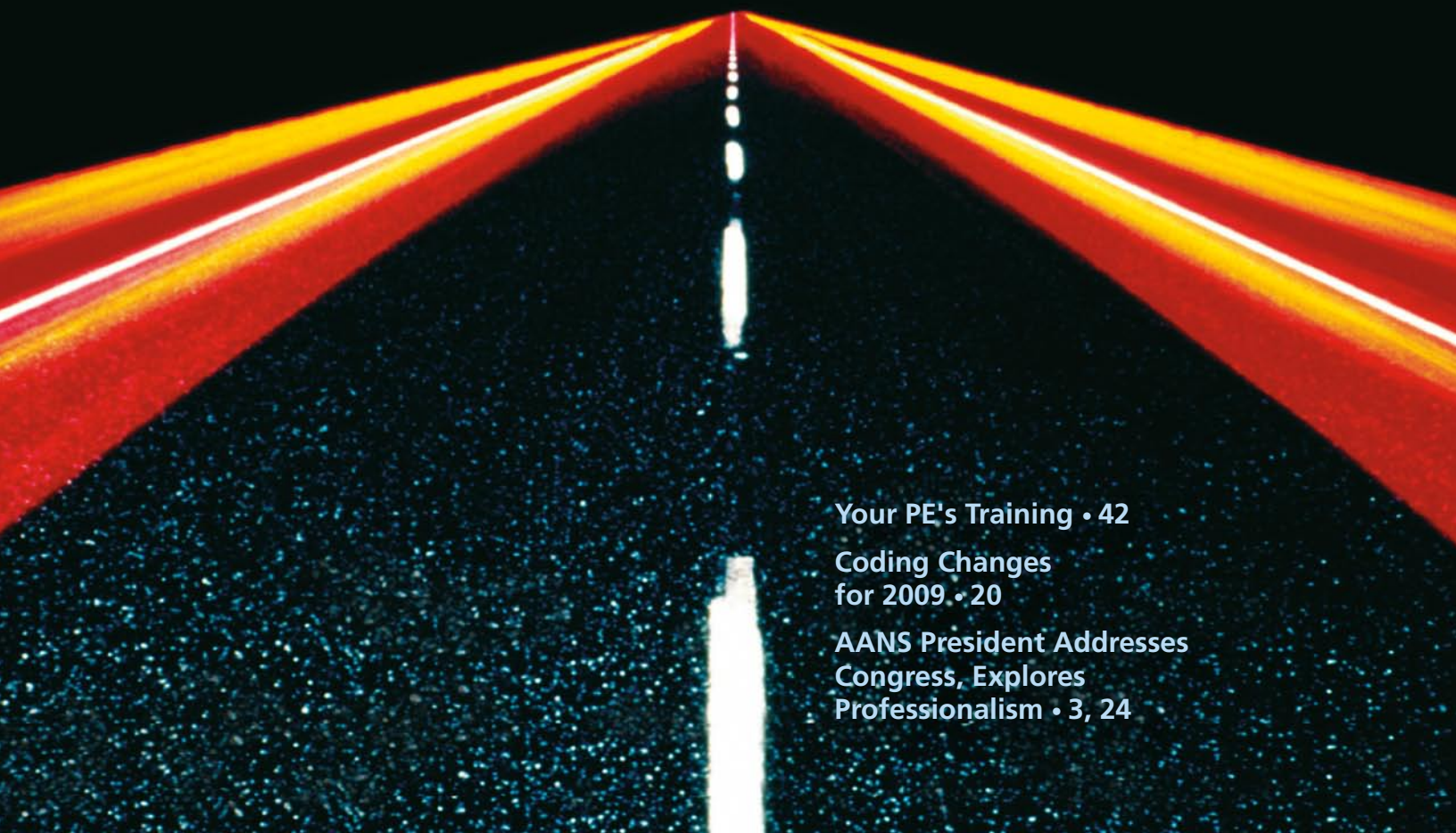
NEUROSURGERY IN 2050



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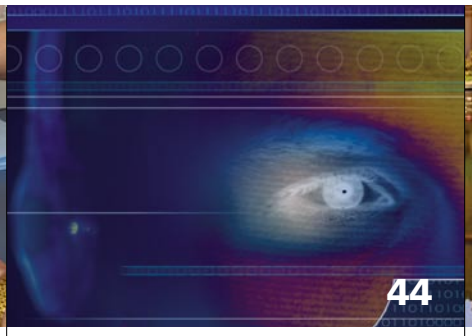

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IN THE LOUPE
Traumatic Brain Injury: This 3-D CT angiogram demonstrates placement of a balloon-tipped catheter through multiple skull base fractures into the cranial vault of a patient who sustained a high-velocity head injury. The patient underwent catheter placement while still in the trauma bay to tamponade severe epistaxis.

(Contributed by R. Webster Crowley, MD, Charlottesville, Va.)

U.S. Healthcare Reform Must Include Medical Liability Reform

AANS President Warns Congress of Defensive Medicine Dangers

In his testimony on March 24 to the health subcommittee of the House Energy and Commerce Committee, AANS President James R. Bean, MD, stressed the need to enfold medical liability reform into healthcare reform legislation.

"We will never be able to control costs—a critical component of any healthcare reform that works and is sustainable over time—if we don't do something about the constantly overhanging fear of lawsuits that drive physicians and hospitals to increasingly practice defensive medicine," he said.

Using the success of medical liability reform passed in Texas in 2003 as an example, Dr. Bean illustrated how the passage of similar legislation at the national level might reduce the number of medical liability case filings, reduce medical liability insurance rates, and encourage doctors to practice. He also expressed approbation for President Obama's description of medical liability reform legislation in "Modern Health Care for All Americans," which was published in the New England Journal of Medicine when he was a presidential candidate. However, Dr. Bean warned against a "one-size-fits-all" solution that would imply negligence whenever a healthcare provider, exercising judgment and expertise, offered a

Continues ▶

▲ **GET IN THE LOUPE.** Compelling digital photos that depict a contemporary event or clinical topic or technique in neurosurgery are sought for In the Loupe. Submit a low resolution image in JPG format to aansneurosurgeon@aans.org with "In the Loupe" in the subject line and a brief description of the photo and its significance in the e-mail message. Submitters must verify copyright ownership of the image and have a 300 DPI resolution image available for publication.

▶ Continued

AANS President James R. Bean (right) with Frank Pallone, D-N.J., chair of the health subcommittee of the House Energy and Commerce Committee. Dr. Bean testified before the health subcommittee in March on the need to include medical liability reform in a comprehensive healthcare reform package.

treatment outside of guidelines articulated by a medical society.

Frequency of Surgical Mistakes Is New Survey's Subject

In a new study of medical errors in orthopedics, published in the Journal of Bone and Joint Surgery, orthopedic surgeons were asked if they had observed a medical error in the past six months. More than half, 53 percent, responded affirmatively. Most errors involved equipment (29 percent) and communication (24.7 percent). Errors that could cause serious patient harm included medication errors (9.7 percent) and wrong-site surgery (5.6 percent). The reporting orthopedic surgeon was involved in 60 percent of the errors, a nurse in 37 percent, another orthopedic surgeon in 19 percent, other physicians in 16 percent, and house staff in 13 percent. Author D.A. Wong and colleagues concluded that medical errors continue to occur, representing a threat to patient safety, and called for quality assurance measures and additional research in the areas of higher error occurrence (equipment and communication) and high risk (medication and wrong-site surgery).

www.ejbjs.org

Zero Industry Funding Proposed for Medical Societies

A proposal to ideally reduce industry funding of professional medical associations' activities to zero was published in the April 1 issue of the Journal of the American Medical Association. David Rothman and colleagues sought to address what they termed a lack of uniformity and stringency among association policies regarding industry funding of their activities. They identified and analyzed conflicts of interest that could affect the activities, leadership, and members of associations, and then formulated short- and long-term guidelines intended to prevent the appearance or reality of undue industry influence. A short-term recommendation was to reduce industry support to no more than 25 percent of an association's budget. Industry funding that was clearly recognizable as "marketing," such as exhibit hall and advertising income, was exempt from their recommendations.

www.jama.com

Few U.S. Hospitals Have EHRs, Survey Finds

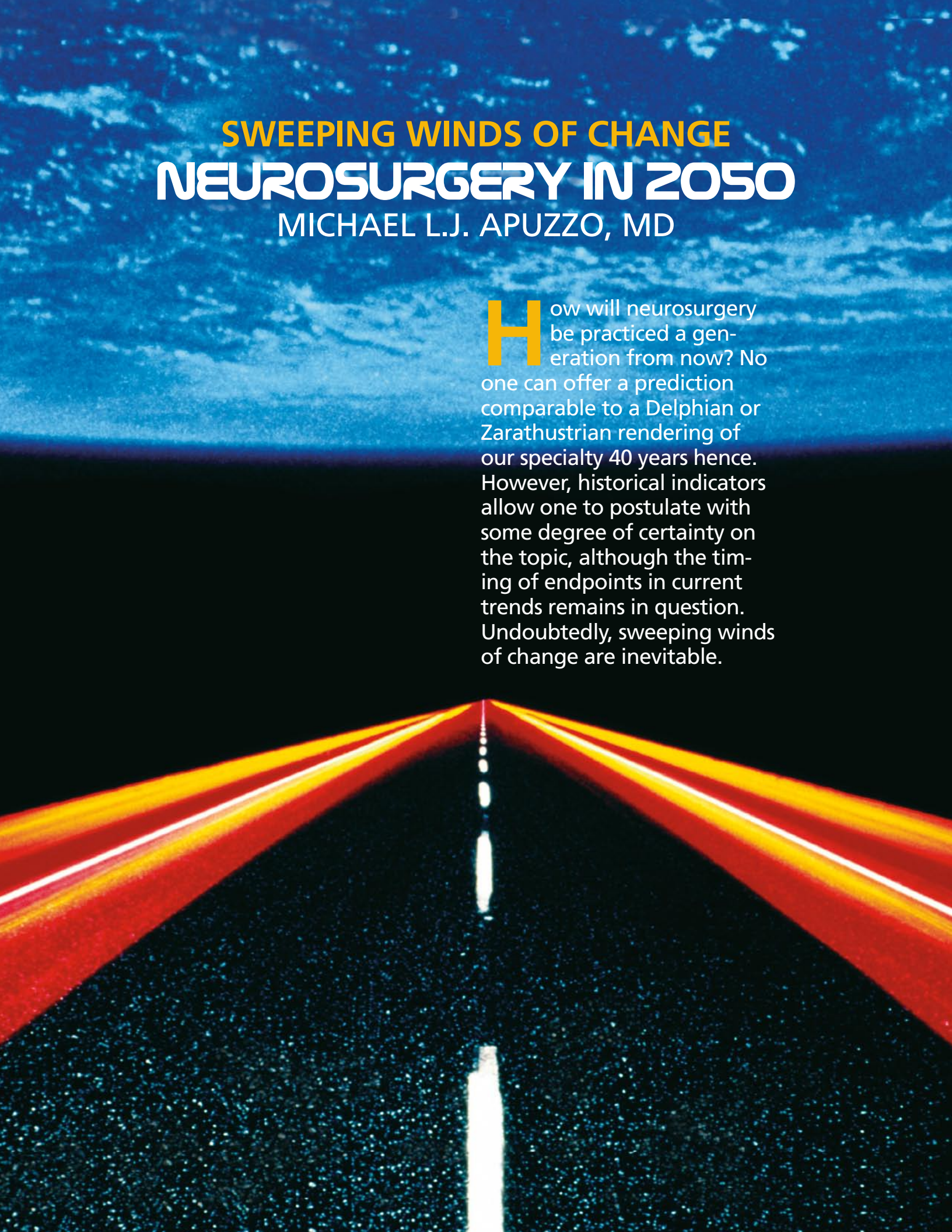
Although the American Recovery and Reinvestment Act of 2009 supports health information technology through significant funding, a recent survey suggests that there is a long way to go before achieving widespread adoption of electronic health records, let alone software compatibility and interoperability. Of nonfederal hospitals surveyed in a study published in the New England Journal of Medicine, only 1.5 percent currently had a comprehensive electronic records system, and 7.6 percent had a basic system. Author Ashish Jha and colleagues used an expert panel to define "comprehensive" and "basic" systems. Computerized provider-order entry for medications had been implemented in only 17 percent of hospitals. Survey respondents cited capital requirements and high maintenance costs as the primary barriers to implementation. The survey was sent to all American Hospital Association-member acute care hospitals. A previous study by the authors found that 17 percent of U.S physicians were using either a basic or comprehensive EHR. A related article, "Considering an EMR?," appears on page 40.

www.nejm.org

Doctors' Donations Help Close Hospital's Budget Gap

When Beth Israel Deaconess Medical Center in March announced a $20 million budget shortfall that would cause budget cuts and staff layoffs, 12 medical department heads took unusual action. They voluntarily cut their individual pay by about $27,000, a move that was expected to save about 10 jobs. They then sent letters requesting donations from other doctors affiliated with the hospital to "support job preservation among the hospital staff in order that they can continue to provide great service to our patients." Their action complemented the hospital's cost-cutting efforts, which included executive pay cuts and staff pay freezes, and donations from other staff and the business community to close the shortfall. The story, characterized as an example of innovative leadership and teamwork, was widely reported.

www.amednews.org; www.boston.com NS



SWEEPING WINDS OF CHANGE

NEUROSURGERY IN 2050

MICHAEL L.J. APUZZO, MD

How will neurosurgery be practiced a generation from now? No one can offer a prediction comparable to a Delphian or Zarathustrian rendering of our specialty 40 years hence. However, historical indicators allow one to postulate with some degree of certainty on the topic, although the timing of endpoints in current trends remains in question. Undoubtedly, sweeping winds of change are inevitable.

Neurological surgery may be considered the oldest surgical specialty, dating back more than 12 millennia. A hundred years ago, Cushing described the specialty of neurosurgery, which would flourish in the modern era. Since then there has been a dramatic escalation in the capabilities of the field. The current generation of neurosurgeons in particular has experienced and benefited from the realization of seminal discoveries, ideas, and disclosures—represented by concepts, tools, and methods employed in everyday practice—that have had immense impact on patient treatment. These advancements collectively include the microscope, the microprocessor, imaging modalities, endoscopy, endovascular techniques, stereotactic radiosurgery, navigation and the currently peripheral but ever-evolving areas of genomics, cellular and molecular neurosurgery, and robotics and nanotechnology used in nanoneurosurgery. These tools, which will allow upcoming generations of neurosurgeons to approach the current catalogue of neurosurgical disease at micro-, molecular and possibly atomic levels, may be considered the neurosurgeon's "machines of modernity."

Consideration of these implements, along with what might be termed established concepts of modernity, affords a conceptual aperture through which the practice environment and activities of the future neurosurgeon can be viewed. Major trends in the evolving continuum include progressive minimalism in tools and procedures; guidance systems, including imaging or molecular-based technologies; functional restoration, both genomic and anatomical; individual comprehension of pathological and functional processes; rehearsal using simulation; and biomechanical integration at macro-, micro- and nano-levels.

Beginning with consideration of these trends, it is reasonable to expand visualization over the course of 40 years. Although hardly forming a complete picture, the following predictions suggest the scope of neurosurgical activities in 2050.

Clinical Trends

By 2050 the need for craniotomy will be sharply reduced. Microsurgery of cerebrovascular disease will be highly limited and relegated principally to revascularization procedures. Genetic comprehension, endovascular methods and flow-modeling techniques along with radiosurgery will impact virtually all elements of vascular pathology. Advanced imaging will define structural alterations in vascularity and regions of retrievability in stroke.

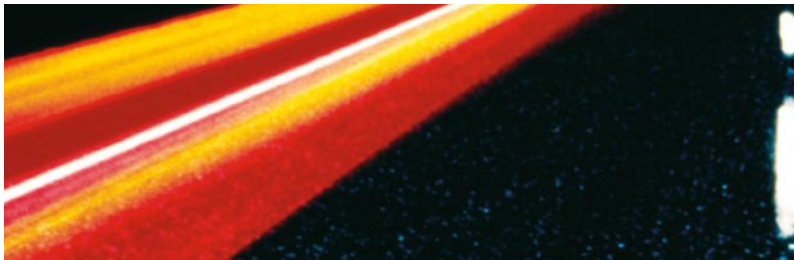
The role of craniotomy for tumors will be minimal, with endoscopic, molecular, biological, nanotechnological and radiosurgical methodologies predominating as treatment modes. Effective radioprotectors and enhancing agents in nanoconstructs will refine energy delivery with the precision of cellular targeting offered by nanoparticle localization. Tunable lasers and high-energy ultrasound will be valuable therapeutic modalities. A combination of imaging and nanobiological methods will precisely diagnose histological phenotypes, and advancements in genetic profiling will allow preventative surveillance.

Most spinal surgeries will be minimally invasive with frequent use of biologics as adjuvants. Nanoarray screening of high-risk genotype will augment imaging surveillance for degenerative and congenital spinal disorders.

Functional surgeries will be completely restorative, with the use of ablation fading into history. Structural and metabolic imaging will define aberrant pathways and regions of degeneration or aberrant activity. Modulation, cellular constructs, and restorative nanoarrays will be actively employed in extrapyramidal disease, epilepsy, pain, and a spectrum of other syndromes. Refinements in functional imaging of neuropsychiatric disorders will lead to the increased role of minimally invasive neurosurgical methods in management of obsessive-compulsive disorder, depression, autism and Alzheimer's disease, among others.

Surgery and management of craniospinal trauma will evolve as a separate neurosurgical discipline. Functional retrieval and restorative methods in trauma will enter an active phase in which modulation is used in comatose patients, and nanocellular amalgams are employed for injuries of the spine and cerebrum. Brain-machine interface devices will be in common use for rehabilitation. Genotyping will refine management of minor traumatic brain injury. Prediction of sequellae will come into clearer focus.

Pediatric neurosurgeons will use predictive genetic



screening to identify potential neurological pathology in a fetus, and techniques for intrauterine surgeries will be refined. Nanotechnology will be used to improve cerebrospinal fluid diversionary methods.

Training and Preparations

Rapid changes in economic, social, political and scientific trends in the global community will demand reassessment of needs, individuals, and training in neurosurgery. The role and definition of the neurosurgeon in the constellation of healthcare will undergo a metamorphosis based on technical evolution. In highly developed countries, demand for uniform outcomes will result in an attenuated role and training for the generalist and further definition of specialists and subspecialists, whose training and exposure will expand.

Spinal surgery, because of its unique catalogue of diseases and methods, will become a separate specialty.

In all surgical specialties, a central component of the training process will be virtual reality simulation, which will largely circumvent the need for "practical seminars" remote from residency or central training sites.

Because of the characteristics and needs of the specialty, individuals with engineering backgrounds will predominate in advanced clinical and research areas, and they will make the seminal contributions for the future.

Individuals with administrative policy and business backgrounds will assume the primary roles in administrative leadership, particularly at medical schools and larger healthcare institutions related to training and research. Departmental leadership will be clearly and equally partitioned into administrative, academic, and clinical areas.

Recertification will be more frequent than the current 10-year requirement, and the process will be facilitated by electronic media and methods.

Organized Neurosurgery

It is apparent, given the accessibility of air travel and the proliferation of the Internet and communication devices, that the world is "flattening." The globalization apparent in all aspects of daily life is highly relevant to all in neurosurgery. The sharing of ideas and problems with colleagues the world over will dominate our future. Organizations with a global reach not only will be the most influential but also will be the creative force guiding neurosurgical patient care toward greater organization and efficiency worldwide. The development of a global network for sharing ideas and problems will naturally evolve, providing the impetus for progress.

Given issues related to subspecialization, communication capabilities and the evolution of socioeconomic trends, particularly those involving industry, it is highly likely that the practice of holding two major national meetings annually in North America will end. However, truly global gatherings for the exchange of ideas and information in multiple relevant dimensions of the field will take place more frequently.

As a result of the information deluge, the body of useful knowledge is rapidly expanding. However, the expense associated with meaningful peer review and paper dissemination of new scientific data is becoming increasingly burdensome. It is inevitable that neurosurgurical journals primarily will be published electronically, complemented by intermittent and attenuated printed offerings.

Change is inevitable. We will have to reinvent ourselves. Neurological surgery, in its microcosm within the universe of social, political, economic, and scientific evolution, is fragile. Cushing could not have imagined neurosurgery in 2009; in fact, those of us who entered the field a generation ago could not have imagined it either! Neurosurgeons reading this article in 2050 will judge the accuracy of the foregoing predictions. Their judgment will be tempered by evaluation of their own progress as stewards of neurosurgery, even as they seek to navigate the winds of change that will sweep them into the next century.

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The author reported no conflicts for disclosure.

FOR FURTHER INFORMATION

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Neurosurgery in 2050

The Future of Spine, Stereotactic and Functional, and Neuroendovascular Surgery

While, as described in the cover story, great change is expected for all of neurosurgery over the next 40 years, three areas are particularly ripe for rapid advancement: spine, stereotactic and functional, and neuroendovascular surgery. The *AANS Neurosurgeon* asked experts in these areas to prognosticate on the types of innovations and resulting treatments that they expect by 2050.

TIMELINE OF NEUROSURGICAL EVENTS

Portions of this timeline were previously published in the AANS Bulletin *8(4), 1999, with updates contributed by Michael Schulder, MD, and prognostications from the cover story by Michael L.J. Apuzzo, MD.*

1861
Broca reports on localization of speech.

1867
Lister introduces surgical antisepsis.

Lister

1870
Fritsch and Hitzig introduce cerebral localization by brain stimulation in animals.

1884
Macewen and Godlee separately report removal of an intracranial tumor based on neurological localization.

1887
Horsley is the first to successfully remove a spinal cord tumor.

Horsley

1891
Horsley describes the surgical treatment for trigeminal neuralgia.

1892
Horsley introduces bone wax.

1898
Gigli describes a special saw for craniotomy.

The Future of Spinal Neurosurgery

PAUL C. McCORMICK, MD

The ascendancy of spinal surgery within neurosurgery over the last 15 years has been truly remarkable. Not long ago, for most neurosurgeons spinal neurosurgery was limited predominantly to spinal decompression and intradural surgery. Changing demographics, technical and technological advances, and a highly effective strategic plan initiated by organized neurosurgery have had a dramatic impact on the scope and volume of neurosurgical practice in spine. In the United States neurosurgeons now perform more spinal surgeries, including a majority of both cervical and lumbar fusions, than do orthopedic surgeons. Advances and innovations in techniques and technologies have fueled much of this growth, and neurosurgeons have played an integral role in these developments, particularly in the fields of implant development, biomechanics, image guidance, minimally invasive surgery, cellular and molecular biologics, spinal radiosurgery, spinal cord injury, and motion preservation surgery. Continued innovation in these areas will continue to advance spinal surgery.

As rapidly as spinal surgery has developed, however, it is likely that its pace and direction will continue to rapidly evolve over the next decade and beyond. Accumulating empirical data through clinical experience and investigation, basic science research, and both individual and collective initiative will undoubtedly result in significant incremental, transformational, and translational innovations in spinal surgery.

As increased capabilities lead to increased complexity of many aspects of spinal surgery, there not only will be continued innovation but also integration of numerous technologies. Biologics, minimally invasive and/or percutaneous techniques, image guidance, and real-time imaging will allow safer, more reliable and efficient achievement of the surgical objective.

Many of the specific innovations will be driven by changing patient needs. For example, an aging population with active lifestyles will create demand for safe and effective operative and nonoperative management of the degenerative and frequently osteoporotic spine. Thus, dynamic stabilization, "soft" fusions, modification of the material properties of spinal implants, augmentation of the precarious implant-bone interface, and even facet joint replacement will be active areas of development.

Perhaps as importantly, recent advances in cellular and molecular

1901 Cushing develops the anesthesia record for intraoperative monitoring of a patient.

1904 Cushing delivers paper on "the special field" of neurological surgery.

Cushing

1908 Horsley and Clarke design a stereotactic device to study deep-brain structures in animals.

1909 Cushing electrically stimulates the human sensory cortex.

1910 Publication of Medical Education in the U.S. and Canada by Flexner advances academic medicine.

1910 Elsberg introduces the clinical application of insufflation anesthesia.

1911 Spiller and Martin introduce cordotomy for relief of pain.

1911 Cushing introduces the use of a clip for clipping aneurysms.

1914 Dandy and Blackfan conduct studies on hydrocephalus.

Dandy

1918 Dandy introduces pneumoventriculography, revolutionizing the diagnosis of hydrocephalus.

biology have led to greater understanding of the mechanical, biochemical, and biological mechanisms underlying degenerative disc disease. It is likely that further investigation may lead to earlier and less invasive methods for modifying, stopping, or even reversing the degenerative process affecting the disc. Indeed, the use of biological materials may provide for retention or restoration of more normal spinal biomechanics without the implantation of a mechanical device.

With the increase in life expectancy and expectations, so too will the number of patients living with malignancy expand, particularly as adjuvant treatments become more effective in controlling systemic disease. More effective management of these patients by improving the quality and safety of tumor resection and spinal reconstruction will be an important area of future development. Continued advances in radiosurgery and other adjuvant treatments are also likely to become more prominent both in this patient population as well as in those with benign lesions.

The use of graft extenders, graft substitutes, and even biologics to enhance osteoinduction (e.g. recombinant human bone morphogenetic protein-2) and osteogenesis (e.g. mesenchymal stem cells, gene therapy) to improve fusion rates and reduce the reliance and morbidity of autograft harvest will continue to be an active area of development and innovation. Continued advances in motion preservation surgery will complement these innovations.

The fields of pediatric and adult deformity, long nearly exclusively the domains of orthopedic surgeons, are increasingly being populated by spinal neurosurgeons. This shift will require modification of resident and even fellowship training in neurosurgery, as it did 15 years ago. Motion preservation or restoration at junctional segments above and below long instrumented fusions, improved techniques for growth-permitting procedures for early onset scoliosis and chest wall deformities, and development of new and improvement of current techniques for less invasive anterior lumbar interbody fusion L1-S1, such as transpsoas and trans-sacral approaches, are but a few areas of current and future innovation in this rapidly developing field.

Lastly and no less importantly, the external environment within which these innovations will occur will continue to change significantly into the future. Increased scrutiny and regulation at a level not previously encountered from government, public agencies, third-party payers and advocacy groups will create new challenges. Appropriately aligned partnerships between physicians and industry, adaptive collaboration with allied physician and basic science investigators, rigorous reporting of valid clinical data, and accurate matching of specific treatment for each individual patient in an effort to maximize benefit and minimize the risk of our interventions will be crucial if we are to continue to serve the best interests of our patients. To relieve pain, restore function, and enhance the quality of life should remain unchanging principles of our specialty's continued progress. NS

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1919 Weed and McKibben introduce the use of IV hypertonic solutions to decrease brain bulk.

1926 Moniz performs the first successful cerebral angiogram on a living patient.

1927 Cushing introduces electrosurgery (Bovie unit).

1928 Stookey describes cervical spinal stenosis.

1929 Fleming discovers penicillin.

1931 Cushing performs his 2,000th brain tumor operation.

1931 Kirschner introduces electrocoagulation of the gasserian ganglion for the treatment of trigeminal neuralgia.

1933 Foerster defines sensory dermatomes in humans.

Foerster

1934 Mixter and Barr define disc herniation as a clinical entity.

1936 Moniz publishes work on the first human frontal lobotomy.

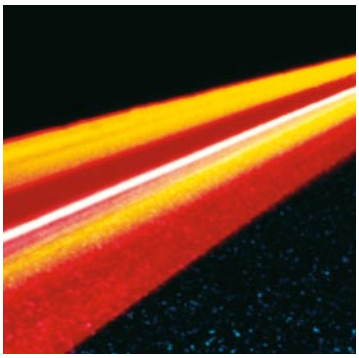
Stereotactic and Functional Neurosurgery: A 21st Century Frontier

MICHAEL SCHULDER, MD

A generation ago stereotactic neurosurgery was indeed a niche subspecialty. The introduction of levodopa in the late 1960s drastically reduced the number of patients in whom surgical alleviation of Parkinson's disease, or PD, was warranted. More generally, this welcome advance took the wind out of the sails of functional surgery, which now is practiced by only a handful of neurosurgeons dedicated to caring for the most disabled patients and to studying the human nervous system.

How times have changed. The last 25 years have seen the introduction of CT- and later MRI-guided biopsy (viewed for some time as a specialized "stereotactic" procedure); the widespread acceptance of stereotactic radiosurgery; functional neuroimaging; "frameless stereotaxy" (or surgical navigation); intraoperative MRI; increased interest in surgery for intractable epilepsy; and deep brain stimulation for a variety of functional disorders.

The latter field, that of DBS, deserves further elaboration. The revival of surgery for PD was fueled in the late 1980s by the realization that treatment with levodopa worked well only for a while, and that disease progression often required intolerable medication doses. The "rediscovery" of lesioning diencephalic targets (especially in the globus pallidus) showed that, done correctly, these procedures could alleviate symptoms and decrease medication requirements. DBS arose out of the search for a nonablative and adjustable method for PD. Better imaging, new physiological understanding, and modern electronics made this a practical reality. Now DBS is an accepted treatment for drug-resistant PD and for severe essential tremor. For patients with primary familial dystonia it is the treatment of choice.



As a result of the efficacy and very low morbidity of DBS for movement disorders, neurosurgeons and others are actively looking at other disorders that can be treated by modulating the brain. A great deal of activity is being directed toward patients with intractable psychiatric disorders, especially obsessive-compulsive disorder and depression. This work is not to be confused with the "psychosurgery" of the past. Today's surgery for psychiatric

1937
Dandy performs the first selective obliteration of an aneurysm.

1938
McKenzie becomes the first neurosurgeon to perform a hemispherectomy.

McKenzie

1947
Spiegel, Wycis, Marks and Lee introduce stereotactic techniques for operating on the human brain.

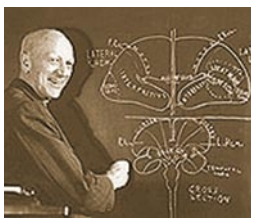
1951
Leksell invents stereotactic radiosurgery.

1954
Charged-particle radiosurgery introduced at the Lawrence Berkeley Laboratory.

1955
Talairach constructs a stereotactic frame for transnasal procedures.

1956
Holter shunt introduces a reliable valve system for ventriculoperitoneal shunting.

1957
Penfield and Rasmussen devise motor and sensory homunculus.



Penfield

1958
Cloward describes the anterior approach to the cervical spine.

1967
Hounsfield reconstructed the internal structure of a scanned object using a computer, the forerunner of the computed tomography scan.

disorders is being done with the utmost care and caution by multidisciplinary teams using strict selection criteria and advanced neuroimaging, and conducting the most scientific evaluation of results possible. Randomized clinical trials are in progress to evaluate the use of DBS of different targets in these patients. Results to date suggest that surgery will have an important role to play for patients in whom medical and other treatments (including electroconvulsive therapy) for depression and for obsessive-compulsive disorder have failed.

Functional neurosurgery is not limited to DBS, of course. Surgery for intractable epilepsy has moved beyond resection alone, although that method remains the best option for many patients. Neurosurgeons are evaluating various targets for DBS; implanted feedback systems that can electrically sense an aura and forestall an actual seizure by stimulation; and stereotactic radiosurgery as a minimally invasive means of ablating the epileptogenic cortex.

For patients with pain or spasticity, the implantation of intrathecal pumps may be offered. The development of new agents may revive the use of intraventricular pumps as the ideal means of drug delivery for these conditions as well as for other ailments that previously have had no surgical options. A dramatic example is the potential treatment of Alzheimer's disease. Possible therapies being explored for this progressive condition include drug infusion, gene therapy, and DBS.

Of course, as Yogi Berra said, "it's hard to make predictions, especially about the future." Looking ahead some 40 years, it is certain that more advances await. Intraoperative imaging will become routine, further eliminating the guesswork involved in stereotactic biopsy and catheter or electrode placement. Targeting will be based on techniques not yet available, including MRI of 9T or higher, with imaging increasingly based on function and not just structure. Today's implanted devices will appear quaintly cumbersome as a result of progress in electronics, computer processing speed and power, and materials engineering. Much of DBS as currently practiced may indeed be replaced by various biological modifiers. Improved understanding of neurophysiology and new treatments that arise will greatly increase the possibilities for neurosurgical interventions for patients with functional disorders.

At the same time, the levodopa experience of 40 years ago may be repeated. New medical advances may render some of today's surgery extinct. Neurosurgeons should welcome any such knowledge that improves our patients' lives, knowing that we can and will find new problems and techniques toward which we can apply our expertise. In this new era of scientific rationale and rigorous analysis of results, stereotactic and functional neurosurgery may be the most dynamic field of the 21st century. **NS**

Michael Schulder, MD, is a member of the AANS Neurosurgeon Editorial Board. He is the past president of the American Society for Stereotactic and Functional Neurosurgery, and vice chair of the Department of Neurosurgery at the North Shore Long Island Jewish Health System, Manhassett, N.Y. The author reported no conflicts for disclosure.

1968
Yasargil and Donaghy successfully perform extracranial-intracranial bypass in a human.

Yasargil

1968
First Leksell Gamma Knife protoype for clinical research introduced.

1971
Damadian recognizes the diagnostic potential of nuclear magnetic resonance imaging.

1972
Hounsfield develops X-ray computed tomography scan.

Hounsfield

1976
The first magnetic resonance imaging scanner was built at Nottingham University in England.

1976
Pilon and Baker report pain relief from intrathecal injection of local anesthetic agents using an implantable pump.

1982
Magnetic resonance imaging is introduced.

1982
Gildenberg proposes idea of frameless stereotaxy.

Gildenberg

1985
Linac-based radiosurgery described by Colombo.

1986
Roberts describes concept of frameless stereotaxy.

Neuroendovascular Therapy in Vascular Neurosurgery

L. NELSON HOPKINS, MD

Neuroendovascular therapy is a good example of "disruptive technology." From the introduction of coils in 1991 until the results of the International Subarachnoid Aneurysm Trial were reported in 2002, endovascular techniques were by and large relegated to a secondary role in the management of difficult or inoperable aneurysms in the United States. Since 2002, endovascular techniques have captured more than 50 percent of the aneurysm treatment market in the United States, and at many centers today open surgical techniques are reserved for more difficult or inoperable (uncoilable) aneurysms. The morbidity and mortality rates for surgical techniques appear to have plateaued, whereas endovascular morbidity and mortality rates are gradually improving as more experience is gained and better technology is developed.

There are now a significant number of industry competitors in the U.S. marketplace driving the evolution toward better, safer, and easier-to-use technology. Aneurysms increasingly can be treated safely using a combination of endosaccular occlusion and endoluminal reconstruction. Solutions even for giant fusiform aneurysms will be available in the next few years.

The future for neurosurgical treatment of vascular disease should be extremely bright if young neurosurgeons continue to seek endovascular training. There are two ways to accomplish this. The first is fellowship training, which often can be enfolded into the residency program. The second is interdisciplinary partnership

1994 Benabid reports stimulation of the subthalamic nucleus for patients with Parkinson's disease.

1994 Endovascular training for neurosurgeons advocated by Hopkins.

1997 Cyberknife described by Adler.

2002 Minimally invasive spine surgery described by Fessler.

2004 First artificial lumbar disc approved for use in the general population in the U.S.

2005 Temozolomide prolongs survival in patients with glioblastoma.

2009 Lozano and Rezai independently report relief of depression using deep brain stimulation.

FORESEEABLE EVENTS

Hopkins

with endovascular-trained specialists such as radiologists and cardiologists.

The future of neuroendovascular surgery is especially bright for the treatment and prevention of stroke. A significant percentage of the 700,000 or so ischemic strokes occurring annually in the United States is potentially treatable with endovascular techniques. It appears as though the treatment of acute stroke soon will parallel the success realized over the last 10 years in treatment of acute myocardial infarction.

In the foreseeable future, there are not enough neurointerventionists to handle the stroke volume. Other specialists such as interventional cardiologists and interventional neurologists seem ready to step into the void. Partnerships with interventional cardiologists and neurosurgeons or radiologists can benefit neurosurgery, cardiology, and most importantly, patients with acute stroke. Partnerships with cardiologists also can help neurosurgeons learn the techniques of carotid stenting, which cardiologists at many centers have mastered.

Neurosurgeons are uniquely positioned to become the leaders in minimally invasive prevention and treatment of stroke. In order to accomplish this, we must train more endovascular neurosurgeons and strongly encourage collaboration with those in other disciplines who can teach us endovascular skills as we guide them through the intricacies of the nervous system. NS

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FORESEEABLE EVENTS 2010-2050

- Nanoparticle localization precisely targets tumor cells.
- Craniospinal trauma becomes its own specialty.
- Brain-machine interface devices are commonly used for rehabilitation.
- Refined intrauterine neurosurgery is performed to correct fetal neurological pathology identified by predictive genetic screening.
- Individuals with engineering backgrounds predominate in advanced clinical and research areas of neurosurgery.
- Spinal surgery becomes its own specialty.
- Minimally invasive neurosurgical methods are used to manage obsessive-compulsive disorder, depression, and other disorders.
- Global information-communication network and professional organizations provide the impetus for continual progress in neurosurgery.

What Changes Do You Foresee?

Neurosurgery in 2050

The *AANS Neurosurgeon* asked AANS members to consider the future of neurosurgery and how it might have changed by 2050.

When asked to choose the area of greatest anticipated clinical change, a slight majority (27 percent) of respondents selected stereotactic and functional neurosurgery over tumor (24 percent). Other responses included spine and peripheral nerves (17 percent), neuroendovascular (12 percent), cerebrovascular and neurotrauma/critical care (each at 8 percent), and pediatric (1 percent). Of the 2 percent selecting "other," one respondent suggested neuroaugmentation as the area of greatest clinical change.

When asked to choose the area of greatest anticipated socioeconomic change, more than half of respondents selected reimbursement. Other responses included practice type (21 percent), workforce composition (16 percent), and training (11 percent).

A total of 88 percent of respondents foresaw a greater role for physician extenders in neurosurgery compared with 12 percent who did not.

Area of Greatest Clinical Change	% (Rounded)
Stereotactic and Functional	27%
Tumor	24%
Spine and Peripheral Nerves	17%
Neuroendovascular	12%
Neurotrama and Critical Care	8%
Cerebrovascular	8%
Other	2%
Pediatric	1%

Prognostications

Participants were invited to foresee developments in neurosurgery over the next 40 years, and 30 percent shared their views. Respondents ranged from sanguine to pessimistic in their views of anticipated changes in neurosurgery. Topics included economic pressures and how they will play out, the impact of technology, the allocation of resources, and training. Some of the signed responses follow.

Random Sample, a regular feature of the *AANS Neurosurgeon*, engages AANS members to assess their views and practices related to a topic of current interest.

Our biggest challenge is to continue to attract bright, motivated and earnest applicants in neurosurgery while offering the quality-of-life expectations (family time, wage expectations) that the next generation demands. The second challenge is confronting the regulatory and financial constraints imposed by government and private insurers. It is a fantastic profession full of some of the most innovative and brilliant minds. I am confident we can meet these challenges.
–J. Nozipo Maraire, MD, Klamath Falls, Ore.

Neurosurgery without economic protection will continue to be diluted by extraspecialty competition and central reimbursement compression. Until existing neurosurgical societies recognize the responsibility to represent the economic survival of the specialty, we will be relegated to the road to serfdom. Ask yourself, should the neurosurgical specialty be seen as eloquent esoteric philosophers, servile, submissive and spineless? I fear the road we are on foretells our destination.
–Mark E. Anderson, MD, Irvine, Calif.

For the last 30 years neurotrauma has progressed a lot but our understanding of basic pathophysiology of head injury still is in its infancy. The challenging job of the new generation of neurosurgeons

Continues on page 39 ▶

The "Global Experience" analysis of neurosurgeons' practice environments around the world continues with neurosurgery in Saudi Arabia. For a review of neurosurgery in other countries, see the *AANS Neurosurgeon* archive (17:3, 17:4) at www.aansneurosurgeon.org.

Practicing Neurosurgery in

Saudi Arabia

IMAD N. KANAAN, MD

Saudi Arabia's quest to establish a modern healthcare system that provides the best healthcare possible for all of its citizens began in 1970 with the launch of its first long-range plan. The constitution of the Kingdom of Saudi Arabia, adopted and approved by royal decree in March 1992, declared that the state is to guarantee the rights of its citizens and their families in the event of emergency, disease, disability and old age, take charge of all aspects of health, and ensure that healthcare is provided to all citizens.

Saudi Arabia has since invested heavily in healthcare. A number of initiatives and measures were introduced to provide excellent healthcare around the country; establish modern hospitals; acquire new facilities and equipment; support staffing, training, education and establishment of new programs; enhance healthcare networks, referral systems and outreach programs; introduce a credentialing body; and improve medicolegal legislation.

According to the 2008 budget, heralded as the largest in the kingdom's history, the government allocated 10.8 percent to health and social affairs, an increase from about 6 percent allocated in recent years. The healthcare sector now ranks second only to the education sector, which garners 25 percent of the budget. The increase in funding reflects the growing demands of steady population growth, increased public awareness, changing patterns of diseases, expansion and promotion of new programs and facilities, proliferation of high-tech medical equipment and increased costs overall.

The provision of healthcare is led by the Ministry of Health but is shared with other autonomous government agencies, the Armed Forces and Security Forces health services, the National Guard hospital, university hospitals and Royal commission, King Faisal Specialist Hospital and Research Center, and with the private sector.

Two major reforms have been proposed: the implementation of a health insurance system and engagement of the private sector in healthcare. Regarding the former, the recently enacted health insurance law will require employers to purchase approved health insurance; the government is now in the final stage of setting the regulation for implementation. With respect to the latter, the private sector is being encouraged to undertake a greater role in financing, construction and management of health facilities.

Neurosurgical practice in Saudi Arabia during the past 30 years has progressed to internationally recognized high standards. The total estimated number of neurosurgeons is 323, including 136 in the Ministry of Health, 142 in other governmental health facilities and 45 in the private sector. Although evaluation, diagnosis, and general and emergency neurosurgical interventions are widely available throughout the country, neurosurgeons are concentrated in Riyadh in the central region, in Jeddah, Mecca and Medina in the west, and in Dammam and Alkhobar in the east. In these areas, advanced neurosurgical equipment, sophisticated diagnostic laboratories, and modern imaging facilities are available to perform simple and complex neurosurgical interventions. The number of neurosurgical operations performed during 2006 was reported to be 4,003 interventions in the autonomous governmental sector hospitals and 2,499 in private sector hospitals.

A great amount of attention has been paid to the national training program in neurosurgery. The first fellowship program was initiated in the early 1990s, a fruitful collaboration among King Faisal Specialist Hospital and Research Center, King Faisal University and the Armed Forces Hospital. In later years, when the Saudi Council for Health Specialties was established, the Saudi training program in neurological surgery was initiated. The program has attracted many high-scoring graduates who have pursued certification by the Saudi Board of Neurological Surgery. The neurosurgical training program welds the European and the North American training guidelines into one modified system that consists of two parts, a junior and an advanced stage, for a total training period of six years. There are strict admission and selection guidelines, an annual evaluation examination, and a final qualifying complex examination toward the Saudi board certification.

The residents in training have several rotations, including neuropathology, neuroradiology, intensive care unit and emergency medicine, neurology, and elective rotation in addition to their rotation among the different aspects of neurosurgery. Trainees work approximately 40 hours per week. A strong involvement in research projects and contribution to scientific publications are highly recommended. The Saudi Council for Health Specialties

King Faisal Specialist Hospital and Research Center

King Faisal Specialist Hospital and Research Center in Riyadh reflects the high level of neurosurgical healthcare offered in the Kingdom of Saudi Arabia and serves as an inspiration to other national and regional institutions. The hospital is an 850-bed tertiary care facility with 400 medical consultants who cover approximately 20 departments, including several highly qualified subspecialty sections. The facility averages annual patient referrals of over 35,000 patients.

The Department of Neurosciences consists of five sections with 35 medical consultants and encompasses neurosurgery, adult neurology, pediatric neurology, neurophysiology, psychiatry and psychology. Six board-certified neurosurgeons cover a broad spectrum of neurosurgical practice. There are 30 neurosurgical beds, with an additional five epilepsy surgery/emergency medical unit beds. The 750 neurosurgical interventions annually include skull base and pituitary surgery, brain and spinal cord tumors, pediatric neurosurgery, neurovascular surgery, functional neurosurgery including epilepsy and movement disorders, neuroendoscopy, stereotactic surgery, and minimally invasive spinal surgery. The service is involved in a multidisciplinary approach to stereotactic radiosurgery and radiotherapy and is approved for acquiring intraoperative MRI capability.

The Department of Neurosciences has a neurosurgical training program toward certification by the Saudi Board in Neurosurgery, residency programs in neurology and neurophysiology, and a fellowship program in pediatric neurology. The hospital also was approved recently by the World Federation of Neurosurgical Societies as a center for the International Skull Base Training Fellowship.

Neurosurgery has two dedicated operating rooms five days a week that are fully equipped with special tables, three modern surgical microscopes with digital recording systems and navigational facilities, two stereotactic systems, power drill sets, skull plating systems for fixation and reconstruction, modern endoscopes with high definition cameras and digital recording, a carbon dioxide laser, and hardware for spinal fixation and spinal artificial disc implant. In addition, there is a complete setup for epilepsy surgery including invasive recording, awake resection, intraoperative mapping and vagus nerve stimulation, and deep brain stimulation and lesioning for treatment of movement disorders.

The hospital has several trained and competent neuroanaesthesists and qualified operating room nursing staff with great experience in preoperative, perioperative and postoperative care of neurosurgical patients. The surgical intensive care unit has 30 beds for adults, 15 beds for children, and a specialized unit for neonatology that is supported by highly trained medical intensivists and equipped with quality monitors and ventilators as well as intracranial pressure monitoring systems.

The Department of Pathology and Laboratory Medicine has two dedicated neuropathologists and state-of-the-art diagnostic facilities. The Section of Neurophysiology has a modern laboratory with expertise and facilities in electroencephalography, electromyography, monitoring for motor evoked potentials and somatosensory evoked potentials, and intraoperative monitoring. The Department of Radiology has a dedicated Section of Neuroradiology with three consultants. There are four helical computed tomography scanners, two magnetic resonance scanners, two angiography suites for diagnostic and interventional procedures performed by two interventionalists using different modalities (stents, coils, balloons), several ultrasound and fluoroscopy machines, three gamma cameras and a positron emission tomography/computed tomographic scanner.

The Oncology Center has several sections including: medical oncology, radiation and stereotactic radiation using a micro-multileaf system as well as intensity modulated radiation therapy supported by the Department of Medical Physics. The hospital has its own linear accelerator and a state-of-the-art Pharmacy Department.

In the Research Center senior scientists and doctoral students collaborate with the medical staff and perform clinical and basic science research, biomedical, biostatistics and bimolecular research. The center also has an animal laboratory for research and training. A stem cell research project and neuronal stem cell research program were approved recently.

The hospital uses integrated clinical information systems technology, and PACS, the picture archiving and communication system. It was recently reaccredited by the Joint Commission International, an affiliate of The Joint Commission.

is responsible for registration, monitoring and recognition of training in the kingdom as well as licensing and license renewal every two years.

All of the above mentioned measures are geared toward safe and excellent patient care. Medical liability is governed by the Islamic rules and Ministry of Health regulations. Medicolegal cases are evaluated by a committee that consists of an Islamic legal judge, a Ministry of Health representative and an invited expert from a recognized health facility as a third party.

Greater efforts for early diagnosis and public health awareness recently have been made. The most important challenges for neurosurgeons are: (1) delayed referral, and dealing with the resultant advanced stages of neurological diseases; (2) the shortage of qualified medical and paramedical staff generally and of nurses specifically; and (3) the need for more advanced facilities, resources and homogenous distribution throughout the country.

Future ambitions are to coordinate and integrate the provision of healthcare by the various agencies, to ensure regional balance regarding healthcare services, and to coordinate with educational and training institutions to meet the need for national healthcare. NS

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Patient, or Secret Shopper?

Marketplace Strategies Don't Always Apply

PATRICK W. McCORMICK, MD

Although many crossover innovations from the marketplace to the healthcare delivery sector are hailed as progress, the process sometimes generates ideas that garner much less enthusiasm and, in the case of "secret shoppers," raise serious concerns about appropriateness.

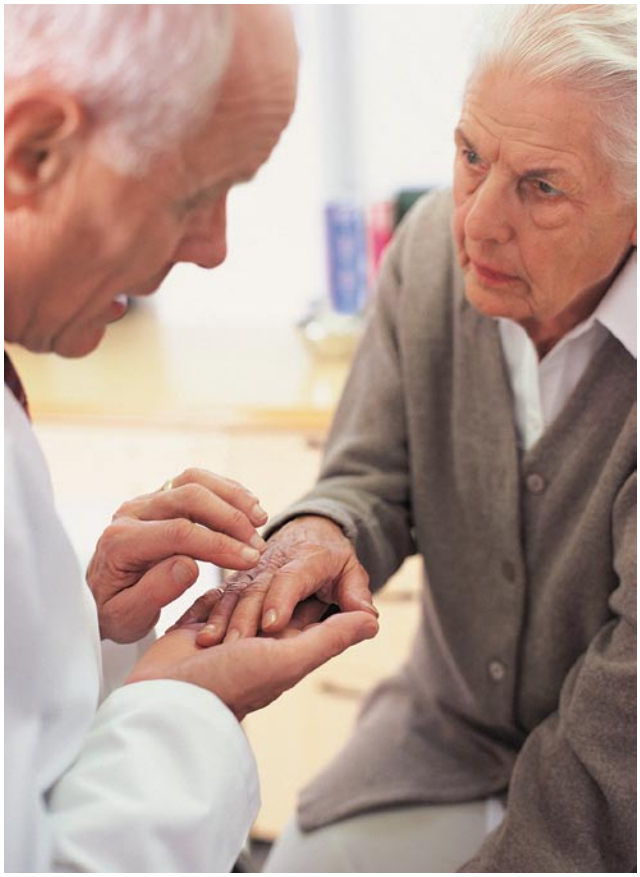
Secret shoppers are used in retail enterprises to provide feedback on customer service. Based on this paradigm, secret shopper "patients" provide information about their experiences—scheduling, greeting, processing, waiting, and interacting with physicians—in healthcare delivery settings such as private offices, multispecialty clinics and hospitals.

Secret shoppers may be used by physicians to evaluate their own practices, by hospitals to evaluate clinics and by employers to evaluate physician employees. Commercial organizations that train and supply secret shoppers are responding to the small but growing request for this type of evaluation by advertising secret shopper patients for random evaluations. These "consumer experience" reconnaissance organizations have identified as potential clients insurance plans, patient advocacy groups, and even physician practices that want to scout their competitors' services.

Pros and Cons

The secret shopper concept has met with support from medical facility managers and detraction from physicians who staff the facilities. Reported benefits from acting on patient shoppers' feedback include better patient wait times, increased attention to patient privacy issues, enhanced communication, and more time for patient evaluations. Concerns have focused on the differences between the retail enterprises where secret shopper programs originated, such as hotels, and the more nuanced environment of healthcare delivery, where "custom production" processes—the evaluation and management of patients—are tailored to individual needs.

At the most basic level, secret shoppers represent an individual interpretation of experiences on an episodic basis. The information they gather, therefore, is not generalizable and cannot be converted easily into validated metrics that legitimately evaluate patient quality of care or patient safety. At best, secret shoppers serve as random auditors to assess adherence to internal or external standardized behaviors promoted by an organization, such as seeing patients promptly or respecting patients' privacy.



Ethical Concerns

The use of secret shoppers in a medical setting also generates professional ethical concerns. The most common scenario calls for physicians to unknowingly enter into what they believe is a legitimate physician-patient relationship but in reality is a secret evaluation process. Sometimes physicians are alerted to the fact that such evaluations are being performed, but they will not know when or which "patients" are participating in the evaluation. Other situations make participation in patient shopper programs a

condition for physician employment or participation in a treatment panel. Because these evaluation programs cannot be validated as true patient safety or quality of care programs, and because they take advantage of the context of the patient-physician relationship, they create ethical tensions for practicing physicians. The balance between a professional obligation to participate in healthcare delivery improvement and a physician's right to refuse such participation, especially in the context of a physician-patient relationship, has yet to be found.

In addition to professional ethical concerns, secret shoppers might divert resources, such as office openings for new patient appointments, from those individuals who truly need care. Furthermore, routine patient surveys and physician evaluations following office visits offer equivalent information to that provided by shopper patients but are statistically more valuable and more likely to reflect patient safety and quality of care.

A final concern about data generated by patient shopper programs, especially when generated by employers and third parties, is how that data will be used. At a minimum, the data must be stripped of information that would violate patient privacy. It seems appropriate that any data for use in physician or practice evaluation, especially when the data will be posted on a public forum, must allow for physician review, comment and, when appropriate, robust due process for contesting the validity of information gained in this manner. As use of secret shopper programs increases, such limitations could become an excessive burden to already-stressed healthcare delivery resources. Furthermore, given the weakness of the data generated by these programs compared with more robust data from instruments like patient surveys, it is advisable that physicians maintain the right to opt out of secret shopper programs. **NS**

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The author reported no conflicts for disclosure.

Gregory J. Przybylski, MD

Facilitate Payment, Avoid Denials by Using Current Codes

Coding Changes for 2009

New codes pertinent to neurosurgeons are published in Current Procedural Terminology 2009. The changes include new category I codes for cervical total disc arthroplasty, and a complete revision of the stereotactic radiosurgery codes. In addition, there are new codes for disc aspiration and for the presacral approach to anterior lumbosacral fusion.

Revamped Radiosurgery Codes. The most significant change for 2009 is the revamped radiosurgery codes. With the evolution of framed and frameless systems, a new code (61800 with 3.93 relative value units) was developed for placement of the stereotactic frame. Frame placement previously was bundled into code 61793. For spinal applications, the initial lesion treated with radiosurgery is coded 63620 with 20.28 RVUs. Subsequent lesions to a maximum of five are described by code 63621, with total RVUs of 6.37. For cranial radiosurgery, a pair of codes was developed for simple as well as complex lesions. The initial simple lesion is coded 61796 with 20.28 RVUs. Additional lesions up to five are coded as 61797 with 5.54 total RVUs per lesion.

In contrast, a complex lesion would be coded 61798 and each additional lesion up to five as 61799. A complex lesion is defined as a target with any of these features: size more than 3.5 centimeters in diameter; certain target pathologies including ateriovenous malformation, schwannoma, pituitary adenoma, pineal and glomus tumors; tumor location such as cavernous sinus, parasellar and petroclival; or tumor proximity to critical structures such as the optic nerve or brainstem. In an unusual decision, the Centers for Medicare and Medicaid Services valued both codes 61798 and 61799 lower than the Relative Value Scale Update Committee of the American Medical Association recommendations and considered the differential work between the codes unnecessary. The CMS valued total RVUs for the initial complex lesion the same as for a single simple lesion.

Cervical Total Disc Arthroplasty. The single level placement of a cervical total disc arthroplasty and its related procedures now have become category I codes. The first placement of a cervical total disc arthroplasty is described using code 22856, and includes discectomy, end plate preparation and osteophytectomy for decompression; this procedure received 43.15 total RVUs. In contrast, an anterior cervical discectomy and arthrodesis with bone allograft is valued at 55.26 RVUs. Although both anterior cervical discectomy and anterior cervical arthrodesis were recently reexamined and revalued in 2007 by the CMS, this code pair currently is being reexamined by the Relative Value Scale Update Committee. The revision of a cervical total disc arthroplasty is coded 22861 at 52.24 total RVUs, and the removal of a cervical total disc arthroplasty is coded 22864 with 48.51 total RVUs. Since the Food and Drug Administration approved single interspace surgery, additional levels of treatment remain category III codes.

DOWN THE CODE ROAD

Code development and valuation typically begin within the specialty societies. The AANS/CNS Coding and Reimbursement Committee is the main source for neurosurgery codes, although other groups also develop codes pertinent to neurosurgeons. For example, the CRC supported the North American Spine Society in its development of the new codes for disc aspiration and for the presacral approach to anterior lumbosacral fusion. Neurosurgery has representatives on the American Medical Association's Relative Value Scale Update Committee, which provides recommendations to the Centers for Medicare and Medicaid Services for use in its annual updates to the new Medicare Relative Value Scale. Category III codes are not evaluated through the Relative Value Scale Update Committee and are not assigned a value by CMS. The AMA publishes Current Procedural Terminology, which is maintained by the CPT Editorial Panel.

Coding Q&A

Coding Q&A is an extra feature of the Coding Clarity department. Send your coding concerns to aansneurosurgeon @aans.org with Coding Q&A in the subject line and your question may be answered in an upcoming issue of the *AANS Neurosurgeon.*

Q Do you have any guidance or reference you could provide regarding anterior instrumentation (code 22845) done without arthrodesis? I'm specifically looking at a new procedure using the Nitinol staple system (Medtronic Sofamor Danek, Memphis, Tenn.), which repairs scoliosis by placement of staples.

I saw information in the *AANS Neurosurgeon* on the new add-on status for the instrumentation codes:

> "Although intuitively it would seem that these codes [22840–22847] should be added on to arthrodesis codes, there are examples of decompression with interbody placement of polymethylmethacrylate without arthrodesis but with instrumentation. I recommend that your coding staff review the list of primary procedures with which instrumentation codes can be used."

Any help would be greatly appreciated. We have co-surgeons doing this procedure thoracoscopically and aren't sure whether the arthrodesis code (22810) should be used for the approach, vertebral orientation, and stabilization (which would allow code 22845 to be billed in addition), or whether we're required to bill an unlisted code and forego the instrumentation (stapling).

–Eric Sandhusen, MPH, CHC, CPC
New York, N.Y.

• Minimize Denials for Improper Coding: Coding Changes for 2008. *AANS Neurosurgeon*, 16(4), 2007, www.aansneurosurgeon.org, article ID 51075

A Instrumentation codes can be used with certain decompression codes as well as arthrodesis codes, as listed in the introductory language of the Current Procedural Terminology arthrodesis section. If neither decompression nor arthrodesis is performed, then an unlisted code for instrumentation placement alone would be appropriate.

–Gregory J. Przybylski, MD
Edison, N.J.

Unilateral Posterior Cervical or Lumbar Discectomy. A minor revision was made to the description of code 63020, which formerly delineated a unilateral posterior cervical discectomy. Although the description for unilateral posterior lumbar discectomy (code 63030) was revised several years ago to include an open or endoscopic approach, the CPT editorial panel did not apply the same change to the parent code, 63020. This oversight has been corrected for 2009, allowing either open or endoscopic approaches to be used for either unilateral posterior cervical or lumbar discectomy.

Percutaneous Intervertebral Disc Biopsies. Although percutaneous intervertebral disc biopsies to diagnose discitis have been performed for decades, there has not been a code to describe this procedure. Beginning in 2009, percutaneous aspiration of the disc or paravertebral tissue for diagnostic purposes is coded 62267 at 4.38 total facility RVUs. Category III codes to describe the presacral approach to anterior lumbosacral fusion (e.g. AxiaLIF—TranS1 Inc., Wilmington, N.C.) include 0195T for the initial interspace including discectomy, instrumentation and imaging as well as 0196T for each additional interspace.

It is important for neurosurgeons performing these procedures to quickly adapt their practices to these new codes and code revisions. Early adoption will facilitate proper payment and avoid needless denials. Although the values for radiosurgery are significantly lower than those recommended by the Relative Value Scale Update Committee, every effort will be made to work with CMS to restore a more appropriate valuation. The AANS/CNS Coding and Reimbursement Committee already has written to the CMS concerning this matter. NS

Gregory J. Przybylski, MD, a member of the AANS Neurosurgeon Editorial Board, is chair of the AANS/CNS Coding and Reimbursement Committee and represents the AANS on the American Medical Association's Relative Value Scale Update Committee. He instructs coding courses for the AANS and for the North American Spine Society. He is 2nd vice-president of NASS, a member of the Practicing Physicians Advisory Council to the Centers for Medicare and Medicaid Services, and an advisory board member at United HealthCare and Humana Inc.

Gary D. VanderArk, MD

A Simple, Secure Solution for America

Healthcare, Guaranteed

In "Healthcare, Guaranteed," Ezekiel Emanuel, MD, chair of the Department of Bioethics at the Clinical Center of the National Institutes of Health, presents his solutions to the U.S. healthcare crisis in a succinct, understandable and very readable manner. He is a medical oncologist who, with well-known Stanford economist Victor Fuchs, has published several articles on health policy reform.

Dr. Emanuel briefly reviews the reasons why the U.S. healthcare system must be improved and then gets to the meat of his solution, which embraces these seven goals: (1) guaranteed coverage, (2) effective cost controls, (3) high-quality, coordinated care, (4) choice, (5) fair funding, (6) reasonable dispute resolution, and (7) economic revitalization.

He proposes the Guaranteed Access Plan, which would cover all Americans with a generous benefit package that resembles the Federal Employees Health Benefit Plan. The package would include office and home visits, hospitalization, preventive screening tests, prescription drugs, some dental care, mental health care, and physical and occupational therapies, all without deductibles and with minimal copayments. Everyone would be able to choose a health insurance plan and healthcare providers. The plan would be financed solely by a dedicated value-added tax of 10 percent on purchases of goods and services, and Congress would have the power to increase or decrease the tax rate. Those desiring healthcare coverage over and above the standard benefits could purchase additional insurance or services with after-tax dollars.

According to Dr. Emanuel, the plan would improve efficiency by reducing administrative costs and fraud. Programs such as Medicare, Medicaid and SCHIP would be phased out and those patients would be covered through the new Guaranteed Access Plan; states alone would save $70 to $100 billion on administration of Medicaid and SCHIP. The new plan would have a mechanism for reducing medical errors, hospital-acquired infections and high-cost/low-to-no benefit treatments. It would encourage coordinated care and innovation in healthcare delivery, while holding providers accountable for outcomes. Quality would be evaluated constantly. The medical liability system would be revolutionized with a mechanism for rational dispute resolution. Healthcare coverage would have nothing to do with employment, which would make coverage portable. Because employers would no longer be paying for health insurance, businesses would be revitalized and wages would rise accordingly.

Healthcare, Guaranteed: A Simple, Secure Solution for America, Ezekiel J. Emanuel, MD, PhD, 2008, PublicAffairs, New York, N.Y., 240 pp. (paperback)

Oversight is patterned after the Federal Reserve System: A national health board and 12 regional health boards would autonomously oversee the new healthcare system. These boards would be independent of annual congressional appropriations and insulated from special interest lobbying. Each would create a center for patient safety and dispute resolution. An institute for technology and outcomes assessment would evaluate the effectiveness and cost of new drugs, medical devices, diagnostic tests, and other interventions.

After detailing his plan, the author compares it with possible alternatives: incremental reform, mandated reform, and a single-payer system. He concludes that: incremental repairs have been tried for decades and have uniformly failed; mandates succeed only in perpetuating a fragmented, fee-for-service dysfunctional mess for a delivery system; and single-payer systems may work for a financing system but do nothing to improve the delivery of healthcare.

So, after 80 years of trying can we really get this done? Dr. Emanuel believes that there is widespread support for reform of the healthcare system and that the major actors now must agree on the proposal and champion it to the American people. With "Healthcare, Guaranteed," he has convinced me. NS

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INSIDE Neurosurgeon

News of Neurosurgical Organizations

Inside Neurosurgeon focuses on the news and views of the AANS and other neurosurgical organizations. A sampling of this section's content is listed at right. The *AANS Neurosurgeon* invites submissions of news briefs and bylined articles to Inside Neurosurgeon. Instructions for all types of submissions to the *AANS Neurosurgeon* are available at www.aansneurosurgeon.org.

AANS President's Perspective

The Future of Professionalism

James R. Bean, MD

At the dawn of the 20th century, medical professionalism began a transformation. This refinement of traditional principles was based on increasingly rigorous training standards, growing scientific discovery, and new technical applications. Medical school education became a four-year immersion in clinical and basic science, hospitals became the site for teaching and surgically treating disease, postgraduate hospital-based residency training became the model for advanced medical learning, specialties proliferated, and those practicing medicine and surgery acquired a social position unknown in the 19th century.

But it was still "traditional" professionalism, based on an individual doctor-patient relationship and a code of ethics meant to create a public and personal trust in the physician's motive and competence. The physician had an obligation to individual patients to advise and act in their best interest, to be knowledgeable and competent in the craft of medicine or surgery, and to be discrete, honest and compassionate.

The concept of professionalism changed in the last half of the 20th century, with the doctor no longer simply the Hippocratic oath-taker employing fancier tools. Technical complexity, growing effectiveness of medical care in combating disease and prolonging life, evolving concepts of social welfare, and steadily climbing costs all conspired to alter the responsibilities associated with professionalism.

The 1960s and 1970s saw uncomfortable challenges to the traditional concepts and image of professionalism. Accusations of physicians acting as part of a profit-seeking monopoly altered the public's perception of physician altruism. The presumption of scientific evidence as the basis for medical care was assailed by claims of idiosyncratic physician practice patterns, variable and undependable healthcare quality, and failure to ensure oversight of physicians by their peers.

At the same time, the advent of multihospital corporate chains, pharmaceutical giants, billion-dollar academic centers, an explosively expanding medical device industry, and health insurance consolidation burst the illusion of medical care as a charitable or altruistic service. Healthcare assumed the demeanor of a profit-making business, associated with a buyer-beware caution rather than an altruistic assurance. Medical schools, accrediting bodies, and medical professional organizations were regarded by the Federal Trade Commission as price-fixing monopolies rather than agents of public interest and welfare.

The battered concept of professionalism sparked an identity crisis for physicians. The underlying issues were exposed in an exchange of letters during 1984 and 1985 between Arnold Relman, MD, former editor of the New England Journal of Medicine, and Uwe Reinhardt, James Madison Professor of Economics at Princeton. The letters, subsequently published in Health Affairs in 1986, debated the role of professionalism in modern healthcare. Dr. Reinhardt questioned whether healthcare "providers" were any different than other "purveyors of goods and services" in the competitive, commercial healthcare system; whether medi-

cine's conflicts were an inevitable result of its traditional entrepreneurship; and whether the profession's concept of a "social contract" was disintegrating under commercial strains, or was simply an illusion, a self-justifying rhetorical device posing as a pseudo-bargain struck in a seller's market. Dr. Relman's defense of traditional professionalism was spirited, but unconvincing.

Responding to the perception of professionalism adrift in an increasingly commercial culture, the American College of Physicians, the American Board of Internal Medicine, and the European Federation of Internal Medicine proposed a new social contract in 2002, the Charter on Medical Professionalism. Notable in the proposal was a shift in the emphasis of physician responsibilities. In addition to the traditional commitments to competence, honesty, confidentiality, appropriate relations with patients, and managing conflicts of interest, the charter plowed new ground, asserting a commitment to scientific integrity, improving quality of care, improving access to care, and ensuring a fair distribution of finite resources. These last four responsibilities are public and social duties, not solely individual patient interactions. They imply an expanded professional responsibility to influence public policy for the general good.

Votive relief depicting a family sacrificing a bull to Asclepius, the god of health, and his daughter, Hygieia. Greek, 5th century B.C. (marble)

Modern healthcare is a megalithic melange provided in a social framework that involves a triad of actors with differing roles: government, business, and the medical profession. Government adopts public healthcare policy, business drives the economic engine by which healthcare is delivered, and medical professionals ensure that the core values of healthcare are preserved in policy-setting, financing, and healthcare delivery.

Therefore, professionalism in the 21st century requires involvement in public policy, including legislation, regulation, and terms of contracting, to ensure that patient welfare is the foremost consideration and the highest standards of quality are maintained. Neurosurgery must adapt to this expanded concept of professionalism. We cannot provide service adequately when public policy threatens 40 percent cuts in fee levels. We cannot provide optimal service if public policy disallows payment coverage of the service. We cannot provide scientific proof if public policy prevents research by underfunding it. We cannot ensure optimal training if the time permitted for training is reduced beyond workable levels. Neurosurgery must be able to influence national legislative and regulatory policy for these and other issues to ensure that standards of care are preserved or improved, and not lowered.

The access to public policy for neurosurgery is through our Washington office and the AANS/CNS Washington Committee. Both have steadily increased in size and expenditure over the past 18 years in proportion to growth in their responsibilities. The Washington staff monitors all health-related legislation, proposals and actions by dozens of federal agencies, works with coalitions of medical specialties, organizes neurosurgery's own quality and guideline initiatives, and coordinates position and policy proposals among neurosurgical organizations. There is no returning to simpler times, when healthcare primarily involved a physician advising and treating a patient.

Professionalism continues its transformation, and we are living through the process. Neurosurgeons today have a dual professional responsibility: the traditional responsibility to treat individual patients, and a contemporary charge to formulate public policy that ensures that the population as a whole enjoys the optimal benefits our science, training, and technical advances can provide.

This column and the AANS Annual Meeting will conclude my 2008–2009 term as president of the AANS. I want to thank the members of the Executive Committee and the entire AANS Board of Directors for their support and work throughout the year, making my task inexpressibly easier. I wish to thank every AANS member who served the organization on a committee or in another position this year. Commitment and personal sacrifice such as theirs have made the AANS the successful and highly regarded organization it has become over the years. And I must thank the AANS staff members for their reliability, commitment, and professionalism in keeping the association functioning smoothly and dependably, whatever the momentary challenge.

It has been an honor and a privilege beyond

Continues on page 33 ▶

AANS ANNUAL MEETING

Science in San Diego

77th Year for Neurosurgery's Premier Meeting

Delightful San Diego is the setting for the 77th AANS Annual Meeting, themed Shaping Neurosurgery's Future: A Global Perspective.

"This premier neurosurgical event will emphasize the global aspect of neurosurgery," said AANS President James R. Bean. "This will be a superlative event thanks to our many colleagues who are devoting their time and talent to its creation and successful execution."

In the global spirit, international events are the focus of Saturday's program, with international practical clinics in the morning and an international symposium in the afternoon, complemented by the international reception on Monday evening.

Notable celebrations scheduled in concert with the 2009 AANS Annual Meeting are the 25th anniversary of the AANS/CNS Section on Tumors, and the 20th anniversary of Women in Neurosurgery. NS

Balboa Park Reflecting Pool

2009 ANNUAL MEETING OVERVIEW

Friday, May 1	
Early Registration	5:00 PM–7:00 PM
Saturday, May 2	
Registration	6:30 AM–5:30 PM
Practical Clinics	8:00 AM–5:00 PM
International Master Practical Clinics	8:00 AM–12:00 PM
International Symposium	1:00 PM–5:00 PM
Sunday, May 3	
Registration	6:30 AM–5:30 PM
Practical Clinics	8:00 AM–5:00 PM
Opening Reception – Convention Center	6:30 PM–8:30 PM
Monday, May 4	
Registration	6:30 AM–4:00 PM
Breakfast Seminars	7:30 AM–9:30 AM
Exhibits	9:00 AM–4:00 PM
Plenary Session I	9:45 AM–1:00 PM
Richard C. Schneider Lecture – Edward R. Laws Jr., MD	
Hunt-Wilson Lecture – Evan Snyder, MD	
Cushing Medal – Edward H. Oldfield, MD	
Cushing Oration – Uwe Reinhardt, PhD	
Young Neurosurgeons Luncheon	1:00–2:00 PM
Electronic Poster Viewing	continuous
Scientific Sessions	2:45 PM–5:30 PM
Ronald L. Bittner Lecture – Robert L. Martuza, MD	
AANS Annual Business Meeting	5:30 PM–6:30 PM
International Reception – Mingei Int'l Museum	7:30 PM–9:30 PM
Tuesday, May 5	
Registration	6:30 AM–4:00 PM
Breakfast Seminars	7:30 AM–9:30 AM
Exhibits	9:00 AM–4:00 PM
Plenary Session II	9:45 AM–1:00 PM
Van Wagenen Lecture – Anders Bjorklund, MD	
Theodore Kurze Lecture – John C. Reed, MD	
Distinguished Service Award – Samuel J. Hassenbusch, MD	
Presidential Address –James R. Bean, MD	
Electronic Poster Viewing	continuous
Section Sessions	2:45 PM–5:30 PM
Wednesday, May 6	
Registration	6:30 AM–3:30 PM
Breakfast Seminars	7:30 AM–9:30 AM
Exhibits	9:00 AM–3:30 PM
Plenary Session III	9:45 AM–1:00 PM
Louise Eisenhardt Lecture – Geraldine Brooks	
Rhoton Family Lecture – Adm. William Joseph Fallon	
Humanitarian Award – Armando Basso, MD	
Electronic Poster Viewing	continuous
Section Sessions	2:45 PM–5:30 PM

www.aans.org/annual/2009

AANS Answers

Getting It Right

AANS Financial System Weathers Market Storm

Thomas A. Marshall

As the Dow plummeted last fall and the so-called experts rushed to point fingers away from themselves, Kiplinger.com ran a list of names under the banner "They Called It Right."

One expected to see the usual faces carved in stone on the media-anointed Mt. Rushmore of financial experts: Pickens ("I think you'll see oil at $150 a barrel by end of year," June 20, 2008); Cramer ("…which is why I've told you on weakness to buy Wachovia," Sept. 15, 2008); or Madoff ("In today's regulatory environment, it's virtually impossible to violate rules," Oct. 20, 2007). None was on the list.

The names on the list—Roubini; Schiff; Whitney; Tice; Grantham; Shiller; Rodriguez; Atteberry; Kiesel—were completely unknown to me.

What struck me was that, while logic suggested that someone had to see it coming, no one who did had a significant channel into America's consciousness to penetrate the fog of fiscal inattention and contentment that had become pervasive. Predictable or not, the axe has leveled both the mighty and the weak.

Not surprisingly—and quite appropriately—AANS members have repeatedly asked me the same questions over the past few months: "What about the AANS? How are we doing?" The answer is: Considering the universal economic challenges, fairly well.

As some members may recall, the AANS hit its own "financial wall" in 2000. Annual net losses in the millions were routine, budget management and oversight were inconsistent, and proactive trend analysis was nonexistent. Spending was unchecked, the AANS infrastructure was top-heavy, and the scheduled annual turnover of its physician leadership was occurring simultaneously with the unscheduled turnover of executive directors (three in three years). That crisis was not predicted either.

A significant downsizing and recovery plan was quickly implemented, and it had a relatively immediate, positive effect. The longer term value of that process is just now coming to light, illuminated by a nerve-rattling recession.

Clearly, the AANS investment portfolio is being jolted like every portfolio in the country right now. But, calibrated to play good defense, we are weathering the storm.

The noninvestment aspects of the AANS fiscal profile are stable and intact, benefiting from the constant monitoring policies put in place after our own "downturn."

The AANS leadership routinely receives detailed financial reports as a matter of policy. Monthly statements go out within two weeks of a month closing out. The Finance Committee meets twice a year to receive detailed reports from the AANS treasurer and senior management, and regularly scheduled conference calls provide additional accountability. The Finance Committee also receives oral reports each fall from the AANS' investments manager and a senior partner from the accounting firm that conducts our annual audit. The AANS Board of Directors receives an oral report from management and leadership twice a year. The AANS Executive Committee receives oral financial reports a minimum of four times a year as well as the monthly and year-end financials.

The AANS budget preparation, implementation, and year-end report are mandated by written policies and protocols. Once approved, an annual budget cannot be modified without a detailed Exception to Budget procedure involving the top physician and professional leadership of the AANS. No significant change to an operative budget is exempt from this process.

Without demonstrated competency in budget development and management, no candidate for a senior level management position at AANS will be hired.

As an AANS member, to aid in understanding of the fiscal viability of your organization you receive an annual report, and you can attend the annual business meeting at which a financial report is made by the AANS treasurer.

Overall, the finances of the AANS have never been more open to scrutiny, more frequently monitored, subjected to review and input by a larger or more diverse group of evaluators, and guarded by more rigorous early warning systems than in the past seven years.

Every crisis generates a subsequent system of safeguards. As a member of the AANS, you have benefited from our crisis in 2000 in a significant way: Today, the financial viability of the AANS is dependent on concrete, predictive data rather than merely trusting that, after the fact, someone might have "called it right." NS

Thomas A. Marshall is AANS executive director. The author reported no conflicts for disclosure.

AANS EDUCATION

Resident Education in 2008

7 Courses Highly Rated by Participants

Michele S. Gregory and Joni L. Shulman

Residents participating in the Spinal Deformity course receive hands-on training, exposure to concepts and accessibility to new technologies that are not always available within their residency programs.

The AANS continues its efforts to provide residents with advanced neurosurgical training in key areas of educational support that are not always available within their residency programs. A record seven residency education courses were held in 2008. They were produced by the AANS departments of education and development and represent an outstanding collaboration between organized neurosurgery and AANS corporate sponsors. Participating residents, faculty and corporate supporters ranked each course with a resounding A-plus in terms of hands-on training, exposure to concepts and accessibility to new technologies.

The seven courses included:

- Spinal Deformity, March 2008—Robert Heary, MD, course director (course supporter: DePuy Spine)
- Endovascular Techniques, April 2008—Robert Rosenwasser, MD, course director (course supporters: Boston Scientific, Cordis Neurovascular, EV3, and Micrus Endovascular Corporation)
- Minimally Invasive Spinal Techniques, August 2008—Kevin Foley, MD, and Charlie Branch, MD, course directors (course supporters: Medtronic, Medtronic Neurologic Technologies and Carl Zeiss Meditec)
- Peripheral Nerve, September 2008—Allan Friedman, MD, course director (course supporters: Integra and AANS)
- Pediatric Neurosurgery Review, October 2008—Rick Boop, MD, course director (course supporters: Codman, Medtronic Neurologic Technologies and Stryker Spine)
- Fundamentals in Spinal Surgery, November 2008—Regis Haid, MD, and Christopher Shaffrey, MD, course directors (course supporters: Biomet Spine, DePuy Spine, Globus Medical, and Medtronic)
- Socioeconomic Review, December 2008—Gary Bloomgarden, MD, and Rick Boop, MD, course directors (course supporter: Medtronic)

Offered for the first time this year were the Spinal Deformity and Peripheral Nerve courses. Both courses provided residents with hands-on training in specific neurosurgical areas using cadaver materials and were extremely well received.

"I think the quality of the AANS courses is exceptional, and much better when compared to courses sponsored solely by private companies," said Juan Martin Valdivia, MD, chief resident at the University of Arizona. "The residents get an unbiased review of the literature and it actually contributes to their learning and decision-making in the clinical setting … the AANS courses are the best out there in terms of academic improvement."

A survey conducted in 2008 asked neurosurgical program directors and neurosurgical residents to rank the existing five AANS resident course top-

ics and asked for suggestions on new topics. The program directors and the neurosurgical residents differed somewhat in their ranking of courses, indicating to AANS Education and Practice Management Committee Chair John A. Wilson, MD, and AANS Development Committee Chair William T. Couldwell, MD, the need to introduce additional course topics focusing on different areas of interest that would appeal to residents throughout the U.S. and Canada.

As a result of the survey, the 2009 course schedule includes two new courses: Stereotactic Radiosurgery, directed by Jason P. Sheehan, MD, and Nuances of Technique and Complication Avoidance in Cerebrovascular Neurosurgery, directed by Aaron A. Cohen-Gadol, MD. As for all of the courses, residents must be nominated by their program directors to participate. Announcements of each course are made to the program directors and residency coordinators about 12 weeks in advance.

The AANS resident education program began in 2006 thanks to Jon H. Robertson, MD, the 2007–2008 AANS president, who envisioned how residents and corporate sponsors could mutually benefit from educational courses that provide advanced training without added expense for the programs or residents. Since the inception of the AANS resident education program, 382 residents have been fortunate enough to participate.

From the industry perspective, there are many advantages for corporations in partnering with the AANS on this type of educational effort. Bill Christianson of DePuy Spine indicated that the company is firmly committed to the support of educational opportunities for medical students, residents and fellows. "The AANS resident education courses are one example of the type of program we are proud to support," he said.

Dr. Wilson noted that the courses are presented in an unbiased, noncommercialized setting by expert neurosurgical faculty members who have complete control over course content. "As a residency program director whose residents have attended several of the courses, I can attest to their great value to the residents' overall training," he said. "As a member of the AANS, I am proud of what our organization has done to bring organized neurosurgery and industry together for the benefit of our residents and their future patients." NS

Michele S. Gregory is AANS director of development, and **Joni L. Shulman** is AANS associate executive director, education and meetings. The authors reported no conflicts for disclosure.

CSNS REPORT

Medical Practices Committee

Addressing Professional and Political Factors Influencing Neurosurgical Practice

Ann R. Stroink, MD

The Medical Practices Committee was developed by the CSNS in response to socioeconomic concerns of actively practicing neurosurgeons. The MPC addresses everyday practice management issues such as partner recruitment, contract negotiation, professionalism, and clinical privileging and certification. At the same time, MPC also focuses on more vexing problems such as technological and medical information adoption and ethical controversies related to medical practice. These topics are researched for the purposes of reporting and recommending action or policy formation.

Joshua Rosenow, MD, serves as chair, and Charles Rosen, MD, as vice chair, of this active committee composed of a diverse group of talented neurosurgeons able to respond to socioeconomic challenges in a rapidly evolving healthcare environment. In particular, the MPC has been spearheading a number of interesting projects, many generated from resolutions adopted by the CSNS.

For example, the MPC recently addressed the standardization of digital imaging protocols and universal access to quality imaging across the clinical spectrum, from operating rooms to medical offices, with the goal of improving patient safety and care. The MPC is also involved in identifying how the Physician Quality Reporting Initiative, a quality-incentive program, will affect neurosurgeons and what to expect as this program evolves. Neurosurgeons receiving reimbursement from the Centers for Medicare and Medicaid Services now can expect bonus payments when adhering to and reporting certain clinical practice guidelines and benchmarks. As this program develops, it is widely expected that participation will become mandatory.

The MPC is always looking for and willing to accept new, energetic and insightful members. More information about the ongoing projects of the MPC and a detailed interview with Dr. Rosenow are available on the CSNS Web site, www.csnsonline.org. NS

Ann R. Stroink, MD, is a member of the Editorial/Publication Committee of the Council of State Neurosurgical Societies, www.csnsonline.org. The author reported no conflicts for disclosure.

ADVANCING NEURORESEARCH

NREF Contributors

July 1–Dec. 31, 2008

The Executive Council of the Neurosurgery Research and Education Foundation of the AANS gratefully acknowledges and appreciates the many individuals, groups, medical practices, corporate partners and members of the general public who compassionately supported the NREF between July 1 and Dec. 31, 2008.

It is important not only to recognize this generous support, but also to express gratitude for their continued support in the first half of the fiscal year. These contributors understand that, even when the economy is struggling and finances are tight, they have a critical role in the funding of NREF's annual resident research grants and clinician awards. Without their support, the scientific investigations of some of neurosurgery's most talented researchers would not receive funding. Innovation in the neurosciences is possible thanks in part to the donations of AANS members, AANS/CNS sections, affiliated neurosurgical organizations, NREF corporate associates, and grateful patients and their families.

NREF-supported studies have set a high standard for research in the neurosurgery community, serving as important indicators of our ability to advance technology and medicine while also improving the delivery of quality patient care.

The investment that NREF's supporters have made in the future of neurosurgery will stimulate new advances in the diagnosis and treatment of brain tumors, strokes, cerebrovascular disease, and spinal cord injury. It also will allow for significant advances in the areas of stem cell research, biomechanics, traumatic brain injury and disorders of the spine. Ultimately, the outcomes of funded research projects will translate into vital advances in medicine and patient care, positively influencing the lives of those affected by and living with neurological ailments, diseases and disorders.

Those supporting the NREF during the first six months of fiscal 2009 are listed below. Additional information about the NREF and the NREF-funded research projects is available at www.aans.org/research.

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AANS AWARDS

2009 International Awards

3 Recipients Announced

The AANS announces three international awards for 2009. Additional information about these awards is available at www.aans.org/international.

- **Best International Abstract.** Jizong Zhao, MD, Beijing Tian Tan Hospital, Beijing, China, is honored for his abstract, "Surgical Treatment for Hypertensive Intracerebral Hemorrhage in 2,464 Patients: A Multicenter Single-Blind Controlled Trial in Mainland China." Dr. Zhao will present his abstract during Plenary Session I on Monday, May, 4. There he will be presented with a framed scroll and the $500 award.
- **International Travel Scholarship.** Sang-Hyung Lee, MD, PhD, Seoul, South Korea, is the scholarship recipient for his abstract, "Apoptosis of Hippocampal Neurons on Synergistic Effect of Amyloid B-Peptide 1-42 and Ethanol." The scholarship provides $1,500 to support the attendance of a neurosurgeon from a developing country at the AANS Annual Meeting. Dr. Lee will receive the award at the AANS International Reception, 6:30 p.m. on Monday, May 4, at the Mingei International Museum.
- **International Visiting Surgeon Fellowship.** Haitham Handhel Shareef, MBChB, IBMS, Baghdad, Iraq, is the fellowship recipient. Dr. Shareef has planned an observational experience that includes studying recent advances in spinal instrumentation; cerebrovascular surgery, especially that of aneurysm clipping; and general neuroendovascular skull base surgery techniques. He will work with Alan S. Boulos, MD, at Albany Medical Center in Albany, N.Y. NS

NEW ONLINE

Member Announcements Now Posted Online

News Page Lists Appointments, Awards, Obituaries

The new AANS Member News area of the AANS Web site features announcement of members' professional appointments, awards, retirement and obituaries. The area, www.aans.org/membership/MemberNews.aspx, is restricted to postings about AANS members. Announcements can be submitted through the www.myaans.org password protected site by logging in with user name and password, selecting Member News from the tool bar at left, and following the submission instructions. Submissions are reviewed and usually are posted within one week. NS

AANS POLICY

3 Policy Statements Released

Neurocritical Care, Pediatric Emergency Care, VATS

The AANS recently released three policy statements concerning neurocritical care, pediatric emergency care, and video-assisted thoracic spinal surgery. Summaries of these statements follow; these and previous policy statements are available in their entirety at www.aans.org.

Neurosurgeons and Neurocritical Care

Neurosurgical residency training approved by the Accreditation Council for Graduate Medical Education includes critical care management of patients with neurological disorders. Neurosurgeons are fully trained in neurointensive care by reason of training program requirements and upon completion of training are competent to independently manage and direct treatment of patients with neurological disorders requiring critical care. Additional training in critical care is optional but not necessary for neurosurgeons to manage neurocritical care patients following residency training. Certification in neurological surgery through the American Board of Neurological Surgery includes certification for critical care of patients with neurological conditions. No other certification is required for ABNS diplomates for privileges in neurological surgery or neurocritical care management. Additional certification by organizations unrecognized by the American Board of Medical Specialties is unnecessary for ensuring neurosurgeon training, competency, or credentialing in intensive or critical care.

Optimizing Neurosurgical Emergency Care for the Pediatric Patient

Optimal pediatric neurosurgical emergency care is delivered when a board-eligible or board-certified neurosurgeon performs necessary lifesaving and stabilizing neurosurgical interventions and procedures for a pediatric patient prior to elective transfer to a pediatric hospital when that transfer will result in a significant delay. Regional hospitals and trauma centers, children's hospitals, and state legislatures should work collaboratively with their neurosurgeons to develop the financial and capital infrastructure, medicolegal protections, appropriate credentialing profiles, and efficient triage and transfer protocols to insure emergent neurosurgical intervention is provided for the pediatric patient at the earliest opportunity.

Video-Assisted Thoracic Spinal Surgery

Thoracic spinal surgery and peripheral nerve surgery, including sympathectomy, are traditional and integral components of neurosurgical training and practice. Video-assisted thoracic surgery, VATS, of the spine is a minimally invasive technique performed by neurosurgeons for conditions traditionally treated by neurosurgery. These conditions include thoracic sympathectomy for hyperhydrosis, upper extremity complex regional pain syndromes, and thoracic spinal surgery for thoracic disc herniation, spinal tumor, spinal instability, and scoliotic deformity. Neurosurgeons currently in training receive experience in VATS during residency and are examined for competency in the procedure and its indications by the American Board of Neurological Surgery. Neurosurgical residency programs provide opportunity for training in minimally invasive neurosurgical techniques, including VATS, for sympathectomy and spinal disorders. NS

AANS PRESIDENT'S PERSPECTIVE

▶Continued from page 25

description to serve. I have every confidence that the AANS will thrive under my successors, reach ever higher planes of success, and meet the inevitable challenges of the future with equanimity and resolve. Neurosurgery will continue to be a profession like no other, worth the commitment of a lifetime of dedication and effort. NS

James R. Bean, MD, is the 2008–2009 AANS president. He is president and managing director of Neurosurgical Associates PSC in Lexington, Ky. The author reported no conflicts for disclosure.

FOR FURTHER INFORMATION

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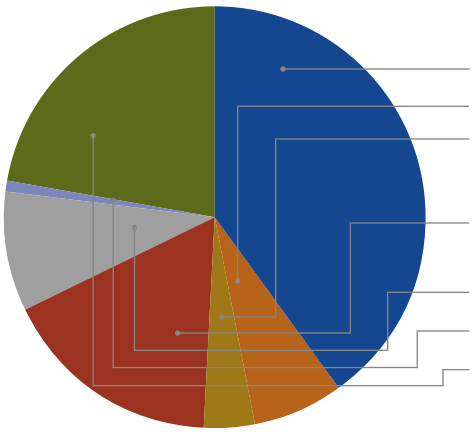
AANS MEMBERSHIP

AANS Welcomes 716 New Members in 2008

Membership Exceeds 7,500 in 2009

From four founding members in 1931 to more than 7,500 members in 2009, the AANS offers several categories of membership to neurosurgeons, residents, fellows and allied health professionals. Information detailing membership categories and benefits is available online at www.aans.org/membership.



AANS MEMBERSHIP AS OF MARCH 2009		
Active	3017	40%
Active Provisional	485	6%
Associate	301	4%
Allied	6	0%
Resident/Fellow	1264	17%
Honorary	20	0%
International	689	9%
International Resident	115	2%
Lifetime	1,677	22%
TOTAL MEMBERS	**7,574**	**100%**

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Goodman Oral Board Preparation: Neurosurgery Review by Case Management

May 24–26, 2009
Houston, Texas

Nov. 8–10, 2009
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Managing Coding and Reimbursement Challenges in Neurosurgery

June 26–27, 2009
Chicago, Ill.

July 17–18, 2009
Washington, D.C.

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CALENDAR/COURSES

May

2–6
77th AANS Annual Meeting
May 2–6, 2009, San Diego, Calif.
www.aans.org

7–9
3rd International Vocational Outcomes in Traumatic Brain Injury Conference
May 7–9, 2009, Vancouver, Canada
www.tbicvancouver.com

June

7–11
13th International Congress of Parkinson's Disease and Movement Disorders
June 7–11, 2009, Paris, France
www.movementdisorders.org/congress/congress09

9–12
44th Annual Congress of the Canadian Neurological Sciences Federation
June 9–12, 2009, Halifax, Canada
www.cnsfederation.org

20–24
44th Annual Meeting of the Rocky Mountain Neurosurgical Society
June 20–24, 2009, Girdwood, Alaska
www.rmns.org

July

10–11
Pennsylvania Neurosurgical Society 2009 Scientific Meeting
July 10–11, 2009, Hershey, Pa.
www.paneurosurgicalsociety.org

August

13–16
2nd Annual American Neurological Association Summer Course for Clinical and Translational Research in the Neurosciences
August 13–16, 2009, Vail, Colo.
www.aneuroa.org

17–23
2nd Annual NINDS/NIH sponsored Clinical Trial Methods Course in Neurology
August 17–23, 2009, Vail, Colo.
www.neurologytrials.org

30–Sept. 4
XIV World Congress of Neurological Surgery of the World Federation of Neurosurgical Societies
Aug. 30–Sept. 4, 2009, Boston, Mass.
www.aans.org/wfns2009

September

11–14
55th Annual Meeting of the Western Neurosurgical Society
Sept. 11–14, 2009, Sun River, Ore.
www.westnsurg.org

21–23
2009 World Stem Cell Summit
Sept. 21–23, 2009, Baltimore, Md.
www.worldstemcellsummit.com

October

11–15
37th Annual Meeting of the International Society for Pediatric Neurosurgery
Oct. 11–15, 2009, Los Angeles, Calif.
www.ispneurosurgery.org

Additional listings are available in the comprehensive and interactive Meetings Calendar at www.aans.org/education/meetings.aspx, where calendar items can be submitted.

RANDOM SAMPLE

▶Continued from page 15

is to find out how we can set back the cascades of events and improve the outcome of head injury. This progress has already started and it's getting more advanced every minute. Head injury has been the greatest challenge for neurosurgeons from prehistoric times until now.
–Kambiz Kamian, MD, FRCS(C), Ancaster, Canada

The term "physician extender" implies the hard-earned title of "physician" and can be misleading when used to describe nonphysicians. Nuances of best neurosurgical practice ranging across all aspects of patient evaluation and management are gained from rigorous application and experience unique to neurological surgeons; for that reason the best practice of neurological surgery does not conform well with a physician-extender paradigm.
–Timothy M. Wiebe, MD, Hattiesburg, Miss.

Methodology and Demographics

Randomly selected AANS members with e-mail addresses were asked in April 2009 to participate in this online survey. Invitations were sent by e-mail to 300 individuals, and 84 members participated in the survey for a response rate of 28 percent. Most respondents were neurosurgeons or residents (98 percent), while 2 percent were non-MD neuroscience professionals such as nurse practitioners or physician assistants.

A majority of respondents were affiliated with a private practice (35 percent) followed by those in full-time academic practice (23 percent), those in private practice with academic affiliation or appointment (18 percent), hospital employees (13 percent), other (11 percent), and federal government employees (1 percent). Survey participation was distributed among the age groups: Most were between the ages of 56 and 65 (32 percent), followed by those between 46 and 55 (29 percent), 35 and 45 (20 percent), 34 and younger (11 percent), and 66 and older (8 percent). NS

K. Michael Webb, MD

Electronic Medical Record Implementation

Considering an EMR?

The promise of decreased medical errors, increased office efficiency and cost savings is driving interest of physicians and others in the electronic medical record, or EMR. However, very little data exists to support these claims, there are a wide variety of EMR systems available, and the technology is often expensive and time-consuming to implement. This article offers an overview of the EMR, summarizes some available data regarding office cost savings, and details some decisions to be made when purchasing and implementing an EMR.

The EMR often is confused with the EHR, the electronic health record. The terms frequently are used interchangeably, but there are fundamental differences between the two. An EHR is patient-specific, while an EMR is physician-specific. Thus, theoretically an EHR should exist independently for every person, and should be able to be accessed by an EMR.

Another distinction to be made is between a document management system and a true EMR. A document management system is basically a "paper" chart on a computer, while an EMR is distinguished by its functionality: patient visit charting and document management, diagnostic test ordering and results management, electronic prescribing, decision support features for evaluation and management coding, treatment options based on clinical protocols or guidelines, and a patient portal through which patients can access and amend various portions of their medical record. An EMR also is distinguished by interoperability, such as between a hospital and laboratory.

Financial considerations are paramount when considering EMR adoption. Like any other asset, the benefits must outweigh the costs. The learning curve of the software and added time spent charting—the EMR almost always will take longer than the trusty dictaphone—also must be factored into the decision.

Cost Versus Savings

A report by Miller and colleagues in Health Affairs detailed the implementation of an EMR by several primary care practices. The average cost per physician to implement the EMR was $44,000. The average break-even time on their investment in the EMR was 2.5 years, which caused cash flow problems for some smaller practices. After the break-even period, the financial benefits from EMR conversion were approximately $33,000 per physician, which, after subtracting the ongoing expenses, amounted to $23,000 per year. For these primary care practices, about half of the financial benefit derived from the EMR was realized from decreased personnel costs for transcription and chart management, and the other half was attributed to increased revenue from more accurate evaluation and management coding. How-

ever, almost all physicians noted an increase in the amount of time spent in the office for an average of four months after EMR implementation.

Another study, by Grieger and colleagues in the Journal of the American College of Surgeons, detailed the implementation of an EMR in an academic surgical practice. This study reported annual total cost savings of $14,000 per physician, with ongoing costs of $4,000 per year. In contrast to the previous study, almost all of the cost savings were due to reduced personnel costs, and the effect on revenue from evaluation and management coding was neutral.

Based on these limited studies, it would seem that for a practice that derives most of its revenue from procedures, such as neurosurgery, the cost savings generated by an EMR are attributable to a 0.5 to 1.0 full-time-equivalent expense reduction rather than to increased revenue from more accurate coding. Thus, adding full-time-equivalent expenses for transcription and chart management and subtracting the ongoing expenses from the EMR cost offers a rough idea of the additional income that could be derived from an EMR implementation.

EMR Selection

Once the decision to move ahead with an EMR has been made, the first step is to choose the EMR functionality most important to one's practice. Probably the most important consideration is the method for charting patient visits. In order to support evaluation and management coding, most EMRs organize the visit charting based on Medicare coding guidelines. Thus, a patient visit is opened by picking a chief complaint from an exhaustive list, which usually can be customized. Based on the chief complaint chosen, the illness history will be broken down into the required fields such as location, duration, modifying factors, etc. The two most common ways to fill in these fields are by drop-down menu (for example, for a patient with left leg pain, select leg, then left, etc.) or via third-party voice recognition software. Drop-down menus can be filled in on a laptop or tablet computer during the office visit, which some patients may find impersonal, or after the patient visit, which is less efficient.

The EMR selected should be compatible with the practice's current practice management software for billing and appointment scheduling. Also check with area hospitals, imaging centers, and laboratories to see if they support electronic ordering, as many of these organizations have not yet implemented interoperable information technology.

Choosing a Vendor

The next step is to choose a vendor. The Certification Commission for Health Information Technology, created in 2004 to develop standards and certification criteria for health information systems, lists all CCHIT-certified EMR software programs on its Web site, www.cchit.org. Choosing a CCHIT-certified EMR will ensure maximum interoperability.

The most important element of vendor selection is whether to choose a Web-based model or to house the EMR software on a server in the office. Web-based models typically have less up-front costs for implementation, but the data resides elsewhere and there may be bandwidth issues that limit the connection speed if traffic is high on the company's server. Also, the ongoing charges for many Web-based models are based on a certain percentage of the practice's revenue rather than fixed. EMRs housed on an office-based server are more expensive initially—the server must be purchased and set up—but typically have lower, fixed maintenance costs. Especially for larger practices, the fixed costs of maintaining and upgrading the server and software may represent a smaller percentage of revenue than that charged by a Web-based software vendor. However, when working from varying locations it can be more difficult to access the EMR program remotely through an office-based server without losing some functionality such as voice recognition software compatibility, e-prescribing, and test ordering.

Lastly, studies suggest that EMR implementation is more likely to be successful when there is a physician champion who is able to convince the inevitable Luddites in the office to persevere.

Health information technology adoption is one of the fundamental tenets of the American Recovery and Reinvestment Act of 2009. There is a possibility that EMR adoption may be mandated in the near future. Barring a mandate, the decision to implement an EMR should be based on whether the potential cost savings are worth the extra time. If you decide to adopt an EMR, proceed carefully if your practice lacks an enthusiastic champion, as there is a very real chance you will decide in a pique of frustration to scrap the EMR, irretrievably losing your initial investment. Choose the vendor and functionality your practice needs and, in time, the cost savings can make your practice more competitive in today's healthcare environment. NS

K. Michael Webb, MD, is a member of the AANS Neurosurgeon Editorial Board. He is a founding partner with NeuroTexas PLLC, Austin, Texas, and an executive medical director of the NeuroTexas Institute at St. David's HealthCare.
The author reported no conflicts for disclosure.

Joseph Hlavin, PA-C

Postgraduate Neurosurgery Training for Physician Extenders

Is Your PE Optimally Trained for the Job?

Physician extenders—nurse practitioners and physician assistants—have been part of the medical team since the mid-1960s. Today, training for both NPs and PAs is based on internal/general medicine diagnosis and treatment. This leaves a deficit in the academic preparation of any new NP or PA who wants to go into neurosurgery, let alone gain enough exposure in this area of medicine to be able to determine that it is of interest.

At the same time, there is a demand for physician extenders: Most neurosurgeons already employ them and more than half of neurosurgeons surveyed in 2005 said they need more. But the vast majority of neurosurgeons employing physician extenders must provide them with "on the job" training in neurosurgery. There clearly is a need for standard, competency-based training programs that better prepare physician extenders for neurosurgery and thus better serve the needs of our patients and supervising neurosurgeons.

Formal Training for Physician Extenders

Standardized training for PAs in primary care is well established. Every PA currently practicing has undergone a national training curriculum and received a degree, and most PA programs in the United States confer a master's degree. Unfortunately, most PA programs offer no surgical subspecialty rotations or electives.

The NP route includes completing additional courses in family medicine and obtaining a master's degree, which is the entry level degree for certification. Additional course work and testing to become an RN first assistant is required for billing and reimbursement of surgical services. As for PAs, there is a lack of neurosurgery-focused training that would allow a smooth transition into the job market.

There are approximately 500 PAs currently employed in neurosurgery, according to the 2008 American Academy of Physician Assistants survey. However, only one postgraduate training program in neurosurgery is listed on the Postgraduate Physician Assistant Program site. There are no other formal training programs in neurosurgery available to either PAs or NPs.

Further, accurate measurement of competency in trainees requires some type of standardized testing. But currently no formal examination platform exists for physician extenders in neurosurgery.

Neurosurgeons want their physician extenders to undergo advanced training that prepares them for the neurosurgery setting. A survey conducted in 2005, the AANS Physician Extender survey, examined the attitude of neurosurgeons relative to the training of physician extenders. More than three quarters of neurosurgeons felt it would be beneficial to establish formal training programs in neurosurgery for physician extenders. In response to the survey findings, the AANS considered long-range plans that included development of a physician extender curriculum for competency in neurosurgery, an advanced curriculum for continued education, and Web-based training modules.

The AANS since has provided training for physician extenders in practical clinics, plenary sessions, scientific sessions, and breakfast seminars at its annual meeting. Such sessions are informative and insightful but fall short in practicality for the physician extender who desires basic training in neurosurgery. There are online modules for AANS members through the Web site, but again, basic educational modules are not provided, and most of the education offerings through professional neurosurgery are too advanced for the early career physician extender.

Industry-supported seminars that are offered year-round can be a source of advanced training, but since they are supported by business entities, they are label-focused and potentially biased. Further, continuing medical education credit is not offered in conjunction with these programs.

Proposed Postgraduate Training Program

There is a need for development of a postgraduate

training program in neurosurgery for physician extenders that includes a competency-based curriculum with didactic and practical sections based on the medical model. The program would be similar to neurosurgery residency programs but limited both in training time and depth of content. The direction of the training should parallel the responsibilities placed on the majority of physician extenders presently working in neurosurgery, and training would ensue under direct supervision of neurosurgeons who are program faculty.

There are, however, barriers to development of such a program, including those raised by PA and NP professional organizations. These organizations have dismissed consideration of a formal subspecialty program in neurosurgery because it potentially could "box" a PA or NP into one specialty for the rest of their careers or shift funding from a large, centrally located professional organization to smaller, specialized organizations.

There should be a way to keep physician extenders from being "stuck" in a particular specialty yet still allow them to demonstrate competence in general medicine. The void in physician extender education demands a solution, and such a solution should withstand the rigors of the medical credentialing process set by not only neurosurgery but also by the PA and NP accreditation bodies.

My experience of more than 17 years in neurosurgery has shown me that on a practical level physician extenders have in common the strongest desire to work as a member of the neurosurgical team and provide the best patient care. While there are training opportunities for physician extenders available now, ultimately a structured, competency-based system will need to be fully developed, implemented, and then evaluated for viability and reliability. With such a system in place, physician extenders will be able to display the confidence, knowledge, and practical and technical skills that are needed to be productive, efficient partners on the neurosurgical team. **NS**

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FOR FURTHER INFORMATION

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Michael Schulder, MD

Exercise in Futurity

A View From 2050

For centuries, each succeeding generation has had the presumption of modernity. It is easy for us today in 2050 to look back at the neurosurgery of 40 plus years ago and smirk at how primitive many of the procedures from that era now appear. But before doing so, we should consider that our descendants in 2100 might be similarly inclined when they consider how we practice now, at the midpoint of the 21st century.

Changes in the world at large have been reflected in the neurosurgical advances since the first decade of the century. Until not so long ago, the diagnosis of a glioma was viewed as a death sentence, with tumor grade the main factor for determining life expectancy. Younger neurosurgeons may not appreciate the long struggle required to make glioblastoma a manageable disease with an average life expectancy of more than 10 years and a high likelihood of cure for less aggressive tumors. They might smile ruefully at the aggressive surgery done for so long, on so many patients, and with relatively little effect. Forgotten as well are the dire warnings that society would be overwhelmed by exponential increases in elderly patients with Alzheimer's disease. But that was before the availability of the vaccine against the L40 virus and of implanted nanoarrays for the fortunately rare nonresponders who still do develop Alzheimer's.

Beyond these examples specific to neurosurgery, technology has changed the general practice and education of new surgeons for the first time in millennia. The idea of "cutting and sewing" as fundamental surgical skills belongs to a bygone era, one before the advent of biostaplers and surgical glues. And surely training residents by guiding their first halting surgical steps in living persons—patients—now seems terribly barbaric. Only those of a certain age will recall that this was the only possible way to teach surgery before 3-D haptic simulation became routine, or that enforced insomnia was a "rite of passage" for those who would become neurosurgeons.

Much of neurosurgery today might not have been considered "surgical" 40 or 50 years ago. Effective, patient-specific radiosensitizers have made ever larger

tumors of the brain and skull base amenable to stereotactic radiosurgery, performed now in many cases without the involvement of neurosurgeons. This has been the price of progress and technological improvements in the delivery of ionizing radiation and focused ultrasound. But as in many previous instances, any perceived "loss of turf" has been made up by the growth in surgery for Alzheimer's, depression, endovascular procedures for alleviating cerebral ischemia, and minimally invasive spinal reconstruction. For those who miss the days of "big" surgery, there still are patients with head trauma for whom to care.

Preparing this column for the *AANS Neurosurgeon* has been a great exercise in nostalgia. The simple act of typing, as opposed to preparing a holorecord for phonemail, is a reminder of the pleasure that could be had from putting finger to keyboard (itself reminiscent of neurosurgery's hands-on era: the whir of the electric drill, the scent of the Bovie).

As was true back in 2009, surgery of all kinds, including that of the nervous system, will continually be redefined by scientific and technological progress and by its practitioners—ourselves and our descendants. NS

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