Evolving Patterns of Neurosurgical Education

Congress Quarterly

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CNSQ is the Official News Magazine of the Congress of Neurological Surgeons
EDITOR'S NOTE

Dear Colleague,

In this issue of CNSQ, we focus on the evolution of neurosurgical education. We are seeing rapid changes in all areas of neurosurgery and whether we are in training or currently practicing, we need to adapt.

Upholding the highest standards of education is fundamentally important to the advancement of our field. Educational initiatives will maintain competence, keep us updated, and allow us to stay ahead of the changing curve of medicine. In this issue we examine the emerging patterns of neurosurgical education as it pertains to residency training and Maintenance of Certification (MOC).

Residency education affects us all. We need to sustain and cultivate the training and mentoring of residents. They are the future generation to whom we will hand over the neurosurgery baton. Shifting cultural forces, changes in the younger generation’s points of view and expectations are transforming medical school education and residency training. Additional variables such as work hour restrictions, changing curriculum, and core competency requirements are among the forces that are re-shaping neurosurgical education. This issue of the CNSQ examines the various facets of resident education from the perspectives of the practitioner, program directors and chief residents.

Neurosurgical education is a lifelong process that continues beyond residency. In this context, Maintenance of Certification is a topic that impacts us all. Featured in this issue is an article by the MOC Committee Chair, H. Hunt Batjer. Dr. Batjer reviews the MOC process and discusses its significance.

Also in this issue, we launch a new segment that highlights each joint AANS/CNSQ section and its pertinence. Trauma is the current featured section.

The images in this issue were selected to reflect education of the past and the present. Recurrent themes are curiosity, innovation, commitment, discipline, and providing care for the sick; these are tools of the neurosurgeon-explorer striving to discover new solutions for helping patients. Our cover design is a photographic collection of the CNS honored guests. They are the remarkable educators who impacted our specialty and provided a strong foundation for the future.

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Developments in neurosurgery are ongoing, but the essence of our practice has not changed. Now, more than ever, it is a great time to be a neurosurgeon.

I look forward to hearing your comments and topic suggestions on this and future issues of CNSQ.

Sincerely,

Ali R. Rezai, MD

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## CONTENTS

### EVOLVING PATTERNS

<table>
<thead>
<tr>
<th>Page</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>04</td>
<td>Editor’s Note</td>
<td>Ali R. Rezai</td>
</tr>
<tr>
<td>06</td>
<td>What is Neurosurgery?</td>
<td>Douglas Kondziolka</td>
</tr>
<tr>
<td>10</td>
<td>Evolving Patterns of Neurosurgical Education</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Neurosurgery Residency Curriculum</td>
<td>James Harrop</td>
</tr>
<tr>
<td>15</td>
<td>Shorten the Residency</td>
<td>Edward C. Benzel</td>
</tr>
<tr>
<td>17</td>
<td>One Size Does Not Fit All</td>
<td>Richard G. Ellenbogen</td>
</tr>
<tr>
<td>19</td>
<td>Don’t Abandon Professional Neurosurgical Education</td>
<td>Nathan R. Selden and Kim J. Burchiel</td>
</tr>
<tr>
<td>23</td>
<td>A Half-Decade of Change</td>
<td>Shaye Moskowitz</td>
</tr>
<tr>
<td>23</td>
<td>Formal Teaching Curriculum Would Be Beneficial</td>
<td>Alexander Mason</td>
</tr>
<tr>
<td>24</td>
<td>Reduction in Hours Improves Overall Learning Experience</td>
<td>Michael Sharts</td>
</tr>
<tr>
<td>24</td>
<td>The Eighty Hour Work Week</td>
<td>Hooman Azmi</td>
</tr>
<tr>
<td>25</td>
<td>A Chief Resident’s Perspective on Changes in Residency Programs</td>
<td>Matthew A. Hunt</td>
</tr>
<tr>
<td>27</td>
<td>Neurosurgical Residency Programs: Surviving in a New Accreditation Era</td>
<td>Nathan R. Selden</td>
</tr>
<tr>
<td>30</td>
<td>The Evolving Neurosurgery Resident Portfolio: Setting Standards and Optimizing Self Reflection</td>
<td>Edward C. Benzel and Richard Schlenk</td>
</tr>
<tr>
<td>34</td>
<td>Neurosurgical Maintenance of Certification</td>
<td>H. Hunt Batjer</td>
</tr>
<tr>
<td>38</td>
<td>The CNS University of Neurosurgery</td>
<td>Daniel K. Resnick and Ashwini Sharan</td>
</tr>
<tr>
<td>39</td>
<td>CNS Website’s Educational Resources</td>
<td>Ashwini Sharan and Michael Steinmetz</td>
</tr>
</tbody>
</table>

### AANS/CNS SECTION ON NEUROTRAUMA AND CRITICAL CARE

<table>
<thead>
<tr>
<th>Page</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>40</td>
<td>Neurosurgeons Must Lead and Secure the Future for Emergency Neurosurgical Care</td>
<td>Richard G. Ellenbogen</td>
</tr>
<tr>
<td>43</td>
<td>Trauma Section Feature</td>
<td>P. David Adelson</td>
</tr>
</tbody>
</table>

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**SPRING 2007**
Recently I wondered if the definition of surgery, or of a surgeon, would hold true over the upcoming decades. Would surgery in 2050 or 2100 mean the same thing it did in 2007? For those of us who are surgeons and who chose a career based upon our understanding of the job description, will our expectations be maintained? And are they contemporary?

Next I consulted the dictionary. On MedicineNet.com, “surgery,” has multiple meanings. It can mean the branch of medicine concerned with diseases and conditions which require operative procedures. It could be the work done by a surgeon. In other countries, a “surgery” is a place where a procedure may be performed. Another dictionary entry may be the one most familiar to neurosurgeons: “Surgery can involve cutting, abrading, suturing, lasering or otherwise physically changing body tissues and organs.”

The word may have derived from the Greek “cheirourgia” which combines “cheir” (hand) and “ergon” (work) and thus mean “handwork.” The word was later used by the Romans and further transformed in France during the 12th century. When I made up my own definition for a lecture I gave several years ago (why use someone else’s dictionary when we can create our own?) I described surgery as “single-session, definitive, manipulation of a tissue or organ system using energy, to achieve a specific purpose.” Our “energy” could be the mechanical movement of our hand wielding an instrument. The energy source could also be light from laser energy, thermal energy created using radiofrequency techniques, chemical energy used in the delivery of chymopapain or glycerol injection for trigeminal neuralgia, or radiation energy (as in radiosurgery).

Clearly, the present and future of neurosurgery look remarkably different than they did when I was considering and entering the field in the early 1980s. Arguably, the “crown jewel of neurosurgery,” the operative clipping of an intracranial aneurysm, has largely moved toward endovascular coiling. Not too long ago, performing an angiogram would not have been considered surgery. Until recently radiosurgery was uncommon and not considered “real” surgery; now it is likely that more patients with vestibular schwannomas undergo radiosurgery than a resection. Once the exception, radiosurgery is offered by virtually every neurosurgical program in North America, and in most other countries as well.

Our neurosurgical meetings present the latest in neurobiological research where new concepts for drug delivery, cell delivery, viral vector delivery, and
We will need to continue to redefine our specialty and our individual practices through continuing education and a willingness to keep our minds open to the new “children” within the family of neurosurgery.

Convection-enhanced delivery of agents for brain tumor management will represent a new kind of neurosurgery. We will be deliverers as well as removers. Addition, and not just subtraction, is the new neurosurgical mathematics.

Rapid change within neurosurgery also mandates periodic evaluation of our own education and practice interests. Throughout the 1950s, 60s, and 70s, it was likely that the operations a surgeon offered over a 25-year career might remain static. However, those days are gone. Just a decade ago, who would envision that radiosurgery would be widespread, kyphoplasty and vertebroplasty would become common, endovascular surgery would be the norm for many indications, the microscope would be replaced by the endoscope in many instances, and that functional neurosurgery would tackle many of the problems considered unsolvable and provide new approaches to neuropsychiatric illness?

Finally, neurosurgery is on the brink of tackling the most common disorders of the nervous system, rather than focusing on the uncommon. Other than lumbar disc disease, spinal stenosis, and carotid stenosis, neurosurgery has long focused on problems that few members of the general public actually have. We all know that the incidence of meningiomas, pituitary tumors, and arteriovenous malformation are low—these are not the diseases of dinner table conversations.

While we should be proud that our specialty has made tremendous strides in the care of a myriad of uncommon pathologies, I believe that soon we will be offering care to patients with more common neurological problems such as Alzheimer’s disease (placement of intraparenchymal or intraventricular pumps and delivery of effective drugs), major depressive disorder, and other anxiety illnesses. The common problems of brain metastasis will be ameliorated by using radiosurgery, rather than the old and questionably effective standard of whole brain irradiation. We are already seeing and performing procedures that increasingly take into account the function of the spine and its nervous system components. Neurosurgery is entering perhaps its most exciting and creative phase.

A surgeon defining the term “surgery” may have a specific image in mind, while the ideas a patient conjures up may be very different. When patients come to a neurosurgeon they expect that a procedure will have definitive and meaningful goals and will improve the quality and length of their life. What we actually do to that patient may be less important than how we do it: whether we treat through a traditional open surgical route, or use less invasive means.

We will need to continue to redefine our specialty and our individual practices through continuing education and a willingness to keep our minds open to the new “children” within the family of neurosurgery. These children, the radiosurgeries and endovascular procedures amongst us, soon mature (with proven clinical outcomes and real data) into contributing adults. Some of the less effective procedures from an older generation may be relegated to memory.

In summary, perpetual change, most notably the constant evolution of treatment paradigms, is an inherent quality of the practice of medicine. This is particularly true in the practice of surgery, and is why the Congress of Neurological Surgeons has developed the “CNS University of Neurosurgery,” a set of educational tools and concepts that will allow our members to stay abreast of the changes that occur within a career.

The theme of the 2007 CNS meeting, “Navigating Change: Incorporating Discovery and Innovation Into Practice,” will address the need to stay current and open to new developments. Neurobiologist Robert Sapolsky will speak on the concept of “The Open Mind” and discuss why some of us may have an easier time than others accepting new concepts. Whether you are a medical student considering a neurosurgeon career, a resident in training, or a neurosurgeon at the beginning, in the middle or nearing the end of practice, there is rapid change ahead. So from time to time, we all must ask ourselves, “What is neurosurgery?” CNSQ
Join us in San Diego, California, for the Congress of Neurological Surgeons most influential Annual Meeting yet. The scientific program at the 2007 CNS Annual Meeting is designed to help you navigate the dynamic field of neurosurgery and incorporate the latest technological breakthroughs into your practice.

L. Dade Lunsford, M.D.  
CNS HONORED GUEST

Douglas Kondziolka, M.D.  
CNS PRESIDENT

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**IML Sessions Sponsored by the Integra Foundation, CNS Neurosurgical Education Partner.**

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**Online Registration Opens April 2007!**

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Since the founding of the Congress of Neurological Surgeons, the selection of the Honored Guest has been one of the highest honors a neurosurgeon can receive. These respected individuals share the distinction of contributing to all facets of the neurosurgical discipline: the art of surgery, practice of neurosurgery, neuroscience, teaching and scholarship.
Neurology is an evolving field of medicine. Since the field began as an outgrowth of general surgery, the way procedures are performed on the nervous system has been clearly defined as distinct from surgery on other organ systems. Education of neurosurgeons through a structured curriculum has also evolved.

Historically, physicians in training were designated resident or house officer because they spent the majority of their time on the job—they literally resided in the hospital. Statistics for the 2006 academic year show 866 residents in 95 neurosurgery training programs, with 146 graduating. These residency training programs are accredited by the Residency Review Committee (RRC) under the guidance of the Accreditation Council for Graduate Medical Education (ACGME). The American Board of Neurosurgical Surgeons (ABNS) in conjunction with the RRC guides and fosters the education and curriculum for neurosurgical residents. The ACGME has adopted and fostered the use of six core competencies for training to promote optimal patient care and medical staff education (see Table 1). These core competencies promote education along the continuum of medical education, from medical student, residency, practice, and board accreditation and the merit certificate (MOC) process.

The neurosurgery residency curriculum is evolving to meet the challenges posed by new developments in our field. Like our forefathers in general surgery, neurosurgeons...
are adapting to sub-specialization that creates fractionation of the specialty (see Table 2). This ultra-specialization has diluted residents’ exposure to a general neurosurgical curriculum.

In addition, a multi-specialty approach within these ultra-specialties has increased the exposure of residents in other services, sometimes limiting neurosurgery residents’ involvement. Furthermore, this system-based approach creates an environment where neurosurgeons have less in common with members of their own specialty than they do with colleagues in associated disciplines. Should curricula be redefined so that residents have a broad-based exposure to these ultra-specialties during the beginning of their residencies, such to aid in the choice of a specific specialty or “general” career path? Or is the continued exposure to numerous subspecialties more beneficial, because it facilitates an understanding of the complex nervous system and its relation to other disease processes? A related question becomes: how many complex spinal cases or deep brain stimulation cases does a future cranial or endovascular neurosurgeon need to perform? These questions are becoming more relevant as residents are asked to decide and plan post-residency fellowships earlier during residency.

Residency curriculums must also clarify the number and diversity of procedures and operative case performed. The CNS Education Committee has defined and outlined expected resident understanding for common neurosurgical procedures at http://www.neurosurgeon.org/education/resCur/index.asp. This outline may also function as an outcome assessment when residents review their goals and expectations.

The 80-hour work week regulation has been successfully incorporated into neurosurgery residencies. Many did not believe this restriction of hours was practical due to the complexity of neurosurgical residency and the extensive knowledge residents had to absorb. But the system appears to be adapting well. In fact, this development may be beneficial for resident curriculums in that it limited the time available for education in the training program, reinforcing the need for dedicated didactic lectures and educational programs during this finite period. In addition, nurse practitioners and physician assistants have been accepted as workforce extenders. Overall, the reduced time residents are available for educational and operative experiences has required the neurosurgery community to concentrate and organize curriculum to maximize resources.

Another area of curriculum which may need to be modified is the role and need for dedicated bench-top research. Most programs endorse and foster time away from the clinical rotations. However, Cusimano et al. reported that 61% of 77 academically trained neurosurgeons spent less than 10% of their time in research and 42% spent no time doing any research despite dedicated bench reach rotations during their residencies. Therefore, a curriculum where only the talented individuals who wish to pursue translational approaches to medicine would be fostered in a bench-top setting could enhance their experience as well as maximize resources.

The utilization of the ABNS NeuroLog database system through internet technology has provided residents and program directors with broad access to program and individual evaluations. The use of outcome measurements for resident education, as in clinical medicine, through these dedicated case logs, as well as multiple evaluations and in-training exams, has fostered further understanding of residents’ educational needs. However, to adequately understand these measures, there must be continued follow-up and outcome measurements during future clinical practice. This system is presently in process by the ABNS through the merit certificate (MOC) program. Defining accepted outcomes measurements through the MOC and then referring back to clinician’s residency curriculum would provide for changes in the allocation of resources in order to maximize residents’ education.

The curriculum for future neurosurgery residents must be further modified to concentrate on the individual resident’s goals and strengths. Optimally it would first establish a solid foundation in the neurosciences and neurosurgery field, then, in their senior year, individuals could be directed to clinical pathways of their choosing. With the recent changes in the medical field, the neurosurgical community is facing exciting and challenging developments. And the rededication and commitment to resident education through the goals of improving patient care make the future look bright.

References:
The Anatomy Lesson of Dr. Tulp (detail), by Rembrandt Harmenszoon van Rijn 1632.
The training process for neurosurgery residents has evolved in the last half century. During the past several years, these changes have been exponential, influenced by resident duty hour regulations and the emergence and incorporation of the six core competencies into the resident education process.

The most recent trend has been to increase the length of neurosurgery training. Individual resident and programmatic involvement with the academic process in the form of research has followed.

Simultaneously, the multiple subspecialties within the domain of neurosurgery have emerged as specialties in and of themselves. Vascular, pediatrics, tumor, spine, epilepsy, and functional neurosurgery have each developed and matured within the domain of the parent discipline.

More graduating residents are entering postgraduate specialty fellowship training programs. Considering this trend, it seems that the traditional neurosurgery paradigm is not optimally addressing specialty training in each of the sub-disciplines associated with neurosurgery. The current education paradigm, in fact, may not be adequately positioned to accommodate the needs of the emerging neurosurgery graduate, who may benefit from a new and perhaps retooled educational structure.

In order to serve our graduates more effectively, we may want to examine the experiences of our colleagues. Consider the evolution of general surgery into its current sub-specialties. These include vascular surgery, colorectal surgery, endocrinological surgery, minimally invasive surgery, etc. Each of these disciplines has evolved from a subspecialty into a specialty. The same may be occurring in the neurosurgical field.

However, our current system may not be able to accommodate the needs of both the super-specialized resident and the resident who does not desire to become an academician. Many neurosurgery trainees are not committed to, nor are particularly interested in, research. Perhaps the lengthy training process optimally benefits some, but certainly not all.

For years, organized neurosurgery has appropriately clung to the position that the global multi-specialty training of the resident be sacrosanct. But many general neurosurgeons do not perform selected specialty procedures, while many specialists significantly restrict their scope of practice. While certification by the American Board of Neurological Surgeons (ABNS) mandates a knowledge base in all the components within the domain, there clearly exists a gap between the ABNS requirements of a young neuro-
surgeon and his or her actual practice experience. This gap was non-existent 40 years ago and small 20 years ago, but today it is widening rapidly.

In fact, very few surgeons of today actually practice all aspects and disciplines of neurosurgery. At some point, we must face the fact that a neurosurgeon cannot reasonably master and practice in all spheres within the domain as defined by the ABNS.

Complicating matters, we have about 3000 neurosurgeons in the U.S. covering approximately 6000 emergency rooms (4000 of which expect neurosurgery coverage on a day-to-day basis). This huge mismatch in demand and supply clearly indicates a need for an infusion of general neurosurgeons into the marketplace. And the need for specialists is continually rising as well.

If a surgeon is to focus his or her career on a particular subspecialty of neurosurgery, say spine, then his or her need for advanced training in functional neurosurgery, for example, is minimal. Why, then, shouldn’t he or she be trained in a basic core curriculum and then on the specialty of interest? This could be accomplished by shortening residency to 4 years (including a year of internship) with the emphasis on the core curriculum and the attainment of general and appropriate specialty knowledge base and clinical acumen.

Such a residency, including three years of clinical plus internship, would not differ substantially from the existing training. Research and other true academic endeavors, however, would be left for postgraduate training. Those wishing subspecialty training could then do a two- or three-year fellowship with the research component of training incorporated into their fellowship years.

No longer would every program be expected to provide specialty experience in all domains of neurosurgery. Only those programs with the breadth, depth, and quality of training experience in a given subspecialty would provide fellowships, and then only in the subspecialties in which they excel. No longer would training programs need to act as if they were “covering all the bases” when they are not. (The role of the ABNS in this potential new order would not significantly change.)

We are most likely heading in the direction of training residents in shortened core programs. With such a system, we could increase the number of trainees, many of whom may choose to practice general neurosurgery. Others may choose a fellowship in which research and other academic endeavors would be pursued, along with the development of clinical excellence. Some neurosurgery training programs might have no fellowship offerings; others might have several.

Mandatory research time would be relegated to the specialty fellowship experience. Enfolded fellowships would diminish, be eliminated, or become a postgraduate experience. This overall process would facilitate the tailoring of training to the trainee, increase the workforce, and more accurately position neurosurgery to meet the many demands of the new millennium. CNSQ

At some point, we must face the fact that a neurosurgeon cannot reasonably master and practice in all spheres within the domain as defined by the ABNS.
It was not by accident that the editor of the “Q” asked me to address whether or not the training of a neurological surgery resident should be shortened. As chairman of a large residency program with one of the longest training periods (8 years, including internship), I have often been asked that question.

In fact, my partners and I have frequently reflected upon this issue since the ACGME duty hour restrictions were imposed. Should we cut the program to 5 years after internship and offer postgraduate fellowships to each resident? Should we get rid of the year of International Neurosurgery in England? Should we trim the 2 years of intensive research, now infused with “night float” call and other clinical duties?

I suspect this important subject has been under debate at many faculty meetings throughout the country. Our faculty and residents’ answers change depending on the day you ask them. This results from what I call “surgical parallax,” simply meaning that the definitive answer changes depending on the perspective, i.e., where the provocateur is standing (as mentor or student) and who is doing the talking (super subspecialty surgeon or basic scientist/surgeon).

However, in all these discussions, two points inevitably surface. The first is that our field and our practices are changing rapidly due to a large number of intersecting external pressures beyond our control. Thus, we must significantly change our approach to residency training in order for that education to be pertinent to both an academic and private practice model, now and in the future. The second is that, obviously, one size does not fit all residents, all programs, and all future society needs. So how do we prepare?

It is clear we need to approach neurosurgery as a profession, as well as a trade school. We must not forgo our role as mentors in the operating room and at the bedside. Imparting the essential elements of surgical judgment and professional behavior requires graded education over time, and covering all the evolving clinical aspects of neurosurgery is daunting. Five years is a minimum in a busy clinical program to accomplish that goal; 7 years is better for most students who want to cover all subspecialties in detail within the confines of an 80 hour work week.

Furthermore, we must ensure that future neurosurgeons maintain their ability to ask and analyze hypothesis-driven questions and come up with reasonable solutions. We are nowhere
near addressing even a tiny portion of the scientific problems that face neurosurgeons today. However, some of the neurosurgeons of the future must be prepared to collaborate with the nanotechnology engineer, biostatistician, or molecular biologist so that we may arrive at translational solutions to our clinical problems.

Admittedly, few residents will pursue basic science careers, and an emphasis on sound and thorough clinical training is essential. Our field has grown large and covers a wide variety of highly technically demanding subspecialties. To forget that we should also incorporate a trade school discipline, in which anatomy must be mastered and psychomotor skills must be honed, is to slight the “neuro” portion of our specialty and ultimately fail our students and their patients.

Finally, not all residents and programs are the same. Everyone recognizes the differences and limitations inherent to each successful program. We realize that residents and programs will attempt to “self-select” on match day for the sweetest harmony of resident aspirations with faculty talents and institutional assets. And we recognize that the ACGME and RRC are doing a good job of reviewing our training programs for curriculum consistency and training deficiencies, but not necessarily for the perfect resident/faculty match.

So, let us recognize and rejoice in the wide spectrum of excellent residents and programs. We must tailor neurosurgery training to some degree for each resident after the core curriculum is mastered. Let us redefine the residency core curriculum every 5 years in order to keep pace with our rapidly changing field, which requires an evolving set of surgical skills.

We need short and long residencies to fulfill the future clinical needs of our patient population. Some programs will offer intensive clinical training over 5 years that can be supplemented with post-graduate clinical fellowships replete with a modicum of research training. Other residencies will offer a more academic tilt with an emphasis on basic or translational research and an opportunity to master a wide range of disciplines over the space of 7 years.

The beauty and strength of our country is based on intellectual and cultural diversity. So, why does one size have to fit all in residency training? CNSQ
The methods we use to train physicians and surgeons in the United States are changing. New regulations, such as duty hour limitations and the competency-based measures of the Accreditation Council for Graduate Medical Education (ACGME) Outcome Project, have the potential to redesign residency education. While we cannot yet assess the impact of these developments (some predict a profound effect on training comparable to the visions of Halsted or Flexner, while others see them as superficial modifications with only regulatory significance) the new ACGME requirements should not cause us to compromise the professional mission or fundamental structure of residency education.

A professional model of training (as opposed to a vocational one) provides neurosurgery residents with opportunities to acquire practical skills, assimilate sophisticated knowledge, and develop analytical ability. Learning systematic, applied skills allows future neurosurgeons to practice in the manner of their mentors. Absorbing information and wisdom from experienced role models, as well as observing them analyze and evaluate, gives the next generation of neurosurgeons the skills to foster and refine their profession as they practice.

Those who question the makeup of the professional system may criticize aspects such as the time allotted to research rotations within neurosurgery residency. Pressures including increased demand for clinical productivity, reduced federal research funding, and reduced decanal support for the surgical “triple threat” may minimize the chances that an individual trainee will participate in basic research during subsequent practice.

Nevertheless, basic research training provides an irreplaceable opportunity for young neurosurgeons to learn the intellectual discipline associated with hypothesis formulation and testing, experimental design, literature analysis, and peer-reviewed writing. These skills are vital for a professional neurosurgeon faced with challenges of clinical and practice administration, institutional leadership, analysis of the evolving clinical literature, and lifelong learning. Professionally trained neurosurgeons are more likely to promote the intellectual vitality and clinical flexibility of our specialty and serve as effective leaders.

We may need to be more flexible in the ways we define and evaluate research areas and methods, however. The redesign of resi-
We suggest maximizing the involvement of residents in meaningful educational experiences by limiting non-educational “service” activities.

Residency means fewer opportunities for today’s young neurosurgeons to participate in traditional research. We should encourage residents to pursue formal research training, not only in bench science but also in clinical trial design, outcomes methodology, public policy, ethics, religion, or related disciplines. As long as their research incorporates formal written proposals or grants, organized creative and original investigation, and peer review of a written or digital research product the experience may fulfill the mission of professional neurosurgical education.

Residency training should not be shortened by eliminating research or replacing it with an enfolded, practical fellowship. Because duty hour restrictions may limit residents’ opportunities for clinical experience, maintaining the current overall length of training is especially important. But to make sure that the levels of clinical and operative experience are comparable to those before duty hour restrictions, changes to residency education are necessary.

We suggest maximizing the involvement of residents in meaningful educational experiences by limiting non-educational “service” activities. It will be necessary to hire additional physician extenders to take up service duties, so this change may pose financial and organizational challenges.

However, it is vital that we invest in the long-term health of our specialty by providing optimum professional training to those who will succeed us. Helping neurosurgery residents develop into leaders is the best investment we can make in our future. CNSQ
The Agnew Clinic (detail), 1889, by Thomas Eakins.
A Half-Decade of Change
Shaye Moskowitz, MD
Cleveland Clinic

After spending my residency developing technical and clinical neurosurgical skills, I will soon be putting them into practice. And I, along with all chief residents, wonder whether those skills will be enough. Since I began my program six years ago, residency training has changed. I expected to work beyond the point of collapse, with clinical neurosurgery as the only component of training. But what I encountered was a program striving to remodel the training of clinical neurosurgery, driven by the new duty hour regulations, a renewed focus on core competencies, and an enhanced appreciation for the complex political and medico-legal environment in which we work. Led by a forward-thinking director, the program proactively combined the ethical, political, financial, and legal nuances of neurosurgery.

Initially unsettled and resistant to these changes, I wasn’t sure if the new rules were appropriate for me or for neurosurgical training in general. In retrospect, I am fortunate that my training at the Cleveland Clinic didn’t just pay lip service to these non-clinical elements, but actively embraced them. Although traditional, service-oriented training has been a success for decades, it has evolved to accommodate the changing face of medical education.

Whether changes in neurosurgery education have resulted in compromised clinical exposure remains unclear. I hope that the changes will create future generations of well rounded and complete neurosurgeons, able to succeed in a medical environment that is becoming increasingly complicated. And I hope the changes give me an advantage as I confront the new life ahead.

Formal Teaching Curriculum Would Be Beneficial
Alexander Mason, MD
Cleveland Clinic

For those of us fortunate enough to complete our neurosurgery residency this summer, graduation looms. This transition represents a challenging time when we decide whether to try to secure a job or choose even more training. Some of us may feel ill prepared to tackle these challenges; in fact, if one doesn’t feel humbled at the potential obstacles ahead, one may be unpleasantly surprised.

Certainly my residency at the Cleveland Clinic has prepared me well for what I thought residency was about—the clinical and surgical care of patients with diseases of the neural axis. Although formal and informal didactic teaching is an important part of our residency training program, I have found that the subject matter is often focused around the written boards and tends to revolve around an annual schedule. This is separate from the formal, structured, tiered clinical expectations and evaluations that are also in place at our program.

There is no question that as a graduating chief resident, I can see that a more formal, multi-year didactic teaching curriculum would benefit most of us. It certainly seems that although board preparation is very important, and allows all of us a certain structure, there are often subjects that are simply not covered, or more often, not covered in enough detail. Trying to compress such teaching objectives into an annual cycle seems to limit the depth of subject matter we can address.

A single curriculum designed to span several years would allow residents to study the ever-enlarging body of neurosurgical knowledge. The curriculum could then be augmented by subject matter that residents need to fulfill unique educational objectives. Whether such a curriculum would be required, or more likely suggested, it would allow a more organized and structured approach to formal neurosurgery education.
Soon, I will graduate from residency. I have spent seven wonderfully challenging years at the University of Pittsburgh. During this time, I have matured into a surgeon, a neurosurgeon. It is difficult to put in perspective everything I have experienced and learned. When I started my training in 2000, there were no work hour restrictions, and life was rough. The 120 hour work week with little to no sleep was difficult, forget about personal time or studying. It was purely survival of the fittest. Now I have experienced a more sensible work schedule, I can see how important rest and time to study can be. I do believe I am better educated by having time to read about the patients I treat.

The ideal setting for resident training should involve a multimodality approach. This should come from not only inpatient care, but from cadaver dissection, lectures, clinic time, journal clubs, and book readings. This system allows attendings and residents to have an open dialogue that fosters a collegial learning environment.

Neurosurgery has changed significantly in my short 7-year career, and I am excited to be a part of the coming decades of discovery in this field.

**Reduction in Hours Improves Overall Learning Experience**

*Michael Sharts, MD*

University of Pittsburgh

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**The Eighty Hour Work Week**

*Hooman Azmi, MD*

Residency at University of Medicine & Dentistry New Jersey

I finished my residency in June of 2006. In the midst of my training, the new curriculum and the eighty hour work week were put into practice. While the addition of the core competencies has been a great leap forward in an effort to standardize training, I wonder what the future holds for residents training in neurosurgery, and also for patients needing neurosurgical treatment in an era shaped by the “80 hour work-week.”

One of the things I learned to cherish about my training program was a culture that fostered a great sense of “ownership” of patients. I saw my chiefs caring for our patients as they would care for their own family members. Their attitude toward patients and their constant availability, cultivated by the attending staff, in turn affected the way the rest of us approached each and every patient. Ultimately, it was a culture that trained good physicians. The old system was not perfect. One of the advantages of the 80 hour work week is the restoration of some time for time for personal and family life.

But if the 80 hour mandate’s ultimate goal is to ensure patient safety and foster better patient care, a major concern is that forcing a change in the current culture of training will ultimately change how we deliver that care. Over time, our work ethic may be eroded by the vices of shift work. We will “punch in” in the morning, and “punch out” at the end of our shifts. At the end of the day, no matter what work remains, it is for the next shift to deal with. I don’t see how this improves patient care. I think in the end, no matter what the market forces and the medico-legal pressures bring upon us, we should guard against any change that would degrade the fundamental basis of our profession as physicians—the vital, ongoing relationship with our patients.
During the 6 1/2 years I have been a resident, major changes have occurred in our training and education. Like other chief residents, I have observed them from more than one perspective. I and my contemporaries trained before the new curriculum, revised core competencies, and the 80-hour week.

While the framework for residency training has evolved, much of what I do remains the same. But there are additional administrative tasks and decreased time for direct teaching of other residents, which reduces my educational experience supervising the resident team. Curricular changes have increased didactic teaching of topics, such as ethics or communication skills, that were previously only learned through direct interactions with colleagues and patients. These formal sessions have only a limited value compared with direct observation and mentorship by clinical faculty.

Duty hour restrictions have had the biggest impact, reducing the long hours that characterized residency when I began. Now, I spend my time making sure that residents do not exceed the restrictions, often curtailing their educational opportunities, interrupting continuity of care, and reducing job satisfaction. I have fewer opportunities to be directly involved in the surgical education of other residents, because more often I operate alone or with the attending only.

These changes have impacted how I have been trained and how I have trained junior residents. Fortunately, the dedication of neurosurgery residents has not changed. I am constantly impressed by the desire of the younger residents to live up to the demand to learn what they need to achieve excellence—just differently, and in less time.
Join us in San Diego, California, for the Congress of Neurological Surgeons most influential Annual Meeting yet. The scientific program at the 2007 CNS Annual Meeting is designed to help you navigate the dynamic field of neurosurgery and incorporate the latest technological breakthroughs into your practice.

Michael Tilson Thomas

Grammy Award Winning Musical Director

Michael Tilson Thomas assumed his post as the San Francisco Symphony's 11th Music Director in September 1995, consolidating a strong relationship with the Orchestra that began some two decades earlier. It was January of 1974 when he made his San Francisco Symphony conducting debut at the age of 29, leading the Orchestra in Mahler's Symphony No. 9. Tilson Thomas's twelve seasons as Music Director of the San Francisco Symphony have been praised by critics for innovative programming and for bringing the works of American composers to the fore, and have brought new audiences into Davies Symphony Hall. He was named 1995 Conductor of the Year by Musical America, and in 2005 was inducted into the Classical Music Hall of Fame. Tilson Thomas' acclaimed recordings have won numerous international awards including two 2006 Grammy Awards for Best Classical Album and Best Performance by an Orchestra, as well as six prior Grammys throughout the span of his career.

Noted for his commitment to music education, Tilson Thomas regularly leads the Orchestra in education concerts. He led the television broadcasts of the New York Philharmonic's famed Young People's Concerts from 1971 to 1977, and in February of 1987 he founded the New World Symphony, a national training orchestra for the most gifted graduates of America's conservatories, and continues to serve as its Artistic Director.

In fall 2006, Tilson Thomas and the SFS launched the national Keeping Score PBS television series and multimedia project. Keeping Score is the San Francisco Symphony's five-year program designed to make classical music more accessible to people of all ages and musical backgrounds through television, the web, radio, DVDs, and in the classroom.

Meeting Highlights

- Live 3-D Cadaveric Demonstration.
- Neurosurgical Forum.
- New and Improved Digital Poster Format.
- More Interactive Sessions!
- Opportunities for pre- and post-meeting feedback on the scientific content.

NEW! Integrated Medical Learning (IML) – New learning process, designed to enhance individual learning experiences and improve the overall process of medical education.

Free Housing and Registration to the first 100 Residents!
In an era of intense public scrutiny of patient safety and medical education, the Accreditation Council for Graduate Medical Education (ACGME) has imposed significant pressure on residency training programs by demanding both new teaching methodologies and greatly expanded educational documentation as part of the Outcome Project. The ACGME has simultaneously mandated strict duty hour limitations on residents with the intent of enhancing both patient safety and education. Each of these changes requires major commitments of faculty effort and institutional resources. And despite an ongoing decline in medical reimbursement (which previously served as an indirect educational subsidy) no new funding for residency education is available to support these requirements.

The Outcome Project shifts the focus of residency program accreditation away from the quality of the learning environment (faculty, physical facilities, conferences, clinical caseload, etc.) and towards assessing the competence of trainees to safely care for patients and achieve excellent clinical outcomes. To this end, the ACGME has defined competency goals for all residents in 6 areas: Patient care, Medical knowledge, Systems-based practice, Practice-based learning, Professionalism, and Communications.

The first two competencies evaluate mastery of information that has long been part of traditional neurosurgical residency education. Examples include skull base anatomy, management of raised intracranial pressure, and positioning for posterior fossa craniotomy. The final four competencies evaluate material typically not systematically taught in surgical residency programs. Examples include communicating bad news to family members, coding and billing ethics, and statistical design of clinical trials.

Thus, the Outcome Project requires residency curriculae to meet two new demands. Programs must cover extensive material pertinent to the non-traditional competencies. They must also develop new methods to measure the effectiveness of their educational programs and to evaluate the competence of their trainees.

Each of these requirements is challenging. First, didactic teaching of the non-clinical competencies is difficult for neurosurgical faculty, who themselves are not explicitly trained in this information. Professional experts in these areas (lawyers, psychologists, coders, educational specialists, and other consultants) often command significant honoraria for even educational presentations. Ideally, graduate medical education offices can provide experts to cover these topics. Nevertheless, it may be necessary to supplement institutional resources with gratis presentations by physicians from other departments who have dual training and by friends and acquaintances outside of medicine.

Fortunately, new resources are rapidly becoming available. The Congress of Neurological Surgeons (CNS) recently launched its online University of Neurosurgery, which includes a series of non-clinical core competency lectures in digital format. Learning objectives from these lectures are evaluated by a short series of online questions. Similarly, the Self-Assessment in Neurological Surgery (SANS Lifelong Learning) uses a self-directed online format to teach and evaluate non-clinical competency material and also incorporates hyperlinked references to external learning resources on the web. A heavily discounted multi-user license makes SANS more easily available to training programs, and an expanded module comprised entirely of non-traditional competency material will be released in 2007. Non-specialty specific competencies lectures and other content are also available on the web. In addition, the CNS, American Association of Neurological Surgeons (AANS), and other surgical and medical societies now cover the non-clinical competencies to various degrees at their annual meetings.

Objective measurement of educational outcomes and clinical competence may present an even larger challenge. Extensive resources and faculty time are needed for the development and ongoing use of validated evaluation scales and forms, the addition of formative (‘on-the-fly’) evaluations for clinical and surgical patient encounters, and the creation of competency-based educational exercises. For surgical disciplines, in particular, controlled teaching and evaluation of mechanical surgical skills depend on very expensive and time-con-
suming dissection laboratory experience. Computer surgical simulation is in its infancy and remains very expensive. More realistic haptic simulation is not commercially available and its price is likely to be prohibitive even when it is, except perhaps at regional or national, at multi-institutional simulation facilities (akin to the United Airlines and NASA flight simulation centers).

Fortunately, neurosurgical societies with an interest in education and residency training are making concerted efforts to help with these challenges. The Society of Neurological Surgeons has undertaken an effort to share competency-based evaluation instruments, forms, educational initiatives and curricular developments on a web site hosted by the Society. This initiative should reduce the degree to which Program Directors are required to duplicate the effort of shifting to and complying with competency-based education and evaluation. The CNS recently introduced a very successful cranial dissection course for senior neurosurgical residents free of charge, providing a valuable opportunity for mechanical skills teaching and evaluation. The AANS provides a similar opportunity for spinal surgery dissections.

The second major new requirement imposed by the ACGME is duty hour limitations for residents in training. Trainees are limited to 30 hours of consecutive hospital duty (24 hours plus 6 hours for hand over and transition activities), to 80 hours per week average total duty, and to no more than one call day in three on average. Trainees must also have an average of one full day off per week and should have breaks between duty shifts of at least 10 hours. Although individual programs may apply for an increase to 88-hour duty weeks, the success of such applications is not guaranteed and the other requirements are not flexible.

These duty hour regulations have profound and wide-ranging impact. First, faculty members are inevitably taxed by spillover of effort previously covered by residents, making academic careers less attractive to skilled surgical educators. The new rules generally necessitate altering resident call schedules and shortening duty shifts, requiring the addition of expensive mid-level providers (nurse practitioners and physician’s assistants). Ironically, the duty limitations may also curtail resident participation in conferences and other clinical and non-clinical competency teaching activities, as well as research training (lab rotations may be sacrificed to provide more post-call coverage of the clinical service). Ultimately, an improved balance between practical clinical care and other educational activities may benefit trainees, and reduced fatigue is highly likely to benefit both trainees and patients.

The intensive recordkeeping required to comply with the duty hour regulations and the administrative and teaching burdens associated with the competencies do require a much greater time commitment from both Program Directors and Program Administrators. Recognizing this, the ACGME recommends that Departments provide fractional salaries for the educational efforts of neurosurgical Program Directors and increased administrative support. Provision of these resources is likely to be one factor considered during program accreditation reviews. Both are costly changes without new sources of external funding. Furthermore, few medical school deans are able to compensate departments for these increased burdens.

Here, Program Directors and Departmental Chairs may face their most difficult challenge. For now, we are forced to do more with less and to advocate for enhanced external support for residency programs that increasingly focus more on education and less on comprehensive clinical service. Meanwhile, we must creatively develop novel methods to evaluate the impact of these educational changes on the welfare of our patients, and perhaps also on the long-term welfare of our colleagues and trainees. CNSQ

The Congress of Neurological Surgeons (CNS) recently launched its online University of Neurosurgery, which includes a series of non-clinical core competency lectures in digital format.
The Accreditation Council for Graduate Medical Education (ACGME) mandated an educational paradigm shift to an assessment process with a focus on six general competencies: patient care; medical knowledge; practice-based learning and improvement; professionalism; interpersonal skills and communication; and systems-based practice. When the ACGME adopted the general competencies, it was mindful that each specialty must engage in individualizing the task. Each specialty was given the assignment of establishing general outcomes and defining competency regarding patient care and medical knowledge. The process of refining how neurosurgery defines this mandate continues to evolve.

Cleveland Clinic Portfolio 2003-2006
Portfolios in training programs provide necessary documentation to demonstrate individual resident competence to the Residency Review Committee (RRC). The Cleveland Clinic has developed, employed, and modified strategies and methodologies taken from the ACGME resident assessment toolbox. The program centers around a biannual summary. The resident accumulates information to be contained in each individual's portfolio and presented at each biannual evaluation.

The currently employed portfolio contains current operative case logs, an ethical summary report (a report describing an ethical dilemma encountered in the prior semester and measures taken to address it), an evidence based methodology report, 360-degree evaluations, goals and objectives summary, and other global resident assessment information (letters, awards, rotation schedules, etc). The portfolio also contains clinical and surgical (biopsy) rating instruments and the situation-specific performance reports that permit faculty assessment of a resident’s performance during a single encounter, either surgical or clinical.

The biannual summary, a report card of sorts, constitutes a compilation of the aforementioned data for the prior semester. Average scores from the clinical and surgical biopsies, as well as the remainder of the performance evaluation data, are automatically calculated and recorded to create a printable biannual summary. This includes all relevant comments by the evaluators from three distinct sources—biopsies, 360-degree evaluations, and comments from the biannual interview.

A summative performance score is generated for each resident from the biopsies and other portfolio-derived scores. This is reviewed at biannual review sessions. Information regarding the performance in all of the six core ACGME competencies is specifically documented. Each resident’s score is compared to the mean and presented as anonymously collated data sent to the faculty and residents. Residents are allowed to view their score and the portions of the evaluation that were not yet accessible at the time of the biannual review, allowing them to see their ranking as compared to their peers.

Taking a Step Forward with Competency Assessment
The development of the portfolio has represented an objective quantum step for
ward in providing neurosurgical residency programs with a tool which complies with the ACGME competency-based assessment mandate. The developed competency assessment tools, however, have fallen somewhat short in comprehensively addressing the specific needs of some program directors, and the specific feedback they provide to residents is inadequate. Essential questions we asked when critiquing the prior portfolio assessment tool were:

1) Are the faculty and residents objectively assessing resident strengths and weaknesses?
2) Are the current tools optimally stimulating the residents to self reflect and improve?
3) Are the 6 ACGME competencies being fully incorporated into the process?
4) Is critical resident assessment information being assessed in a meaningful and accessible manner?
5) Are meaningful goals and objectives linked to the 6 core competencies
6) Are programmatic educational outcomes optimally assessed?

The answers to these questions, in general, were no.

The process perhaps is in need of further revision. The chief goals of such a revision should be consistent with portfolio principles: lay the groundwork for reflective learning; assess to promote learning; provide useful feedback for improving performance; inform rather than just measure; and document longitudinal progress. Essential to the core of such a revision is that the resident must take responsibility for creating his/her own portfolio – hence the motivation to create a model process for continuous professional development and life long learning (See Table 1).

Numeric and global rating assessment tools have well-documented strengths and weaknesses. One argument for numeric scoring summaries is that they may indeed provide some useful data, assisting the program director to objectively assess residents and the program as a whole. On the other hand, there may be greater value in providing highly meaningful detailed feedback to individual neurosurgeons in training. Indices that fail to provide useful specific feedback have limited value. In addition, it is difficult to accept that overall competency can be reduced to a single score. When measuring across multiple competencies, it is quite likely that there will be some residents who achieve an overall satisfactory score but who perform poorly in a single competency. However, it is necessary to document that a trainee has reached competency in every category.

In 2000, the ACGME published a “toolbox” of assessment methods. A number of problems with global scores were noted. Global ratings have been shown to be highly subjective when graders are not well trained. At times, some raters may rate all competencies equally, regardless of performance (halo effect). Scores may be biased when raters inappropriately make severe or lenient judgments or avoid using the extreme ends of a rating scale. Research reports are mixed regarding reproducibility (reliability) of ratings. Reproducibility appears easier to achieve for ratings of knowledge and more difficult to achieve for patient care and interpersonal and communication skills. Perhaps the greatest criticism against the use of global rating tools is that a numeric score provides little specific useful feedback to the individual resident attempting to learn from the evaluation process. As such, we have asked the question, “Is there practical value for residents who receive a numeric value based upon performance?”

The Emergence of a New System
It was through the consensus of the Cleveland Clinic neurosurgery faculty that the most specific and useful information to cre-
ate a summary of an individual resident’s performance has come from the commentary section of our current assessment tools. This is consistent with the ACGME guidelines and recommendations. With this in mind, a new system is under development. With the new system, numeric scoring is eliminated and specific competency-based narrative is requested. No grades or rankings are given. We place importance on documenting whether residents are meeting set expectations, and de-emphasize comparisons with peers. Evaluators describe individual performance using suggested verbiage so that assessments have a common language. Self, peer, and faculty, as well as 360-degree assessments, compromise a collective formative database. Strengths and weaknesses can be specifically and immediately queried by the resident, mentor, and program director. The resident and designated mentor are both responsible for keeping track of the resident’s formative database.

A summative document, representing a “rundown” per competency of strengths, targeted areas of improvement, goals, and objectives is created by the resident and reviewed by the mentor every 6 months. Then, the resident gives a formal verbal presentation to the Biannual Review Committee. The document represents a collection of all the resident’s work of the past 6 months and is included in the resident’s permanent electronic portfolio along with other collective work (i.e., publications, ethical summary report, evidence based methodology report, etc). The creation of the summative portfolio is intended to engage residents in the learning process of assessment and instill an appropriate level of ownership on professional development. Inclusion of the resident in the process enforces self reflection, a critical component of adult learning.

These initiatives have focused attention and faculty effort, helping residents understand specific expectations by setting distinct standards. We initiated the changes in the assessment process by first defining standards for the domains of competence in each of the individual 6 ACGME categories per resident year. The standards for each training year were built upon expectations met during the prior year. A research competency was added to encompass our practical need to “set the bar” for resident expectations for the planning and execution of research endeavors in neurosurgery years 4 and 5.

We have designed a web-based portfolio to meet the individual needs of each physician involved in graduate medical education. There is significant value in providing the resident and program director immediate access to competency profiles. The potential advantages and positive attributes of developing an e-portfolio are as follows: the advanced ability to provide “real-time” performance feedback to residents based upon set standards for each of the competencies; the opportunity to make readily available clearly defined resident expectations; a reduction of duplicative efforts and efficiency improvements in the information collection process; providing access for residents to take part in the creation of his/her own portfolio; and the construction of a database that meets the needs of program directors to effectively document compliance with the ACGME mandate.

The ultimate goal over the next several years is to test the reliability and validity of this assessment method. A web-based infrastructure is in development, which could lead to the development of an infrastructure for a national database to study the assessment tools and the impact on educational intervention. This has potential to be a major step forward for evidence-based neurosurgical education.
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Salman Rushdie
World Renowned Author

Salman Rushdie is a writer like no other. One of the greatest literary figures of our age, his stunning career encompasses 14 novels which bridge cultures and characters steeped in modern historical reference. His prolific best-selling novels have enchanted and incensed readers, cultural observers, and even political leaders.

An established author of Midnight’s Children, Rushdie reached new level of recognition and controversy with his third novel, The Satanic Verses, when Ayatollah Khomeini issued a fatwa, calling for the death of Rushdie. With a price on his head Rushdie went into hiding for nine years, but he never stopped writing. When the fatwa was lifted, he emerged, his fertile gift for storytelling undaunted. A brilliant conversationalist, Rushdie would not be silenced by religious censorship. A fervent supporter of free speech, he writes and speaks eloquently, easily juxtaposing the craft of writing, social commentary, and a clever wit. He believes that a writer should be able to speak out on the big issues of the day, saying that writers should “push open the universe a little bit more.”

Rushdie and his vast talent fully illuminate the essential place of storytelling in our world. His new novel, The New York Times best-selling Shalimar the Clown, delves deep into the roots of terrorism and explores the turmoil generated by different faiths and cultures attempting to coexist. Rushdie’s lecture, Navigating Change Across Cultures, will offer unique insights into the current cultural landscape and how it impacts Neurosurgery.

Meeting Highlights

- Live 3-D Cadaveric Demonstration.
- Neurosurgical Forum.
- New and Improved Digital Poster Format.
- More Interactive Sessions!
- Opportunities for pre- and post-meeting feedback on the scientific content.

- NEW! Integrated Medical Learning (IML) – New learning process, designed to enhance individual learning experiences and improve the overall process of medical education.
- Free Housing and Registration to the first 100 Residents!

For More Information
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Maintenance of Certification (MOC) for Neurological Surgeons

Is a Certificate awarded by a member board of the American Board of Medical Specialties (ABMS) a Diploma or a License? The Diplomates of the American Board of Neurological Surgery (ABNS) are debating this question. The medical profession has come to recognize that periodic board certification does not necessarily ensure continuously high standards and performance. Developments such as patient safety initiatives, the AMA initiative (AMAP) in 1997, and the Institute of Medicine (IOM) report (suggesting that medical errors account for up to 98,000 deaths per year) challenge the assumption that a test administered every ten years is adequate.

Extensive public awareness of the IOM Report, heavy media coverage, a Presidential Executive Order, Congressional Hearings, and the LEAPFROG initiative create momentum for an entirely new concept of certification: Maintenance of Certification (MOC), adopted in March 2000 by all member Boards of the ABMS. All Diplomates certified during or after 1999 have time limited certificates and must participate in MOC, and future participation by all specialists will likely be required by the Center for Medicare and Medicaid Services, Third Party Payors, State Licensing Boards, Hospital Credentialing Committees, and perhaps Malpractice Insurers.

The ABNS (assisted by first MOC Chair Dr. Volker Sonntag and its Board of Directors) regards ABMS as the leader of the surgical disciplines. Currently 337 ABNS Diplomates have enrolled in the MOC process and approximately 73 Diplomates will take the Cognitive Examination in Spring 2007.

Makeup of MOC
MOC is based on six general competencies: Medical Knowledge, Patient Care, Interpersonal and Communication Skills, Professionalism, Practice Based Learning and Self-Improvement, and Systems-Based Practice.

Part I – Evidence of Professional Standing
1) Full unrestricted license to practice medicine in all jurisdictions in which the Diplomate is licensed.
2) Unrestricted hospital admitting privileges to practice neurosurgery.
3) Recommendation from the Chief of Staff of the Diplomate’s primary hospital.

Part II – Evidence of Commitment to Lifelong Learning and Periodic Self Assessment
1) 150 credits of CME coordinated through the AANS.
2) Self-Assessment in Neurological Surgery (SANS) examination (developed and administered by the CNS) which provides feedback to participants and serves as preparation for the Part III Cognitive Examination.

Part III – Evidence of Cognitive Expertise
is evaluated through a comprehensive computer-based examination. The National Board of Medical Examiners (NBME) will administer and statistically score the examination, which consists of 200 questions on general neurosurgery and three subspecialty modules.

Part IV – Evidence of Evaluation of Performance in Practice
1) Key Cases – Diplomates will select cases from a list containing 15 procedures. Ten
consecutive procedures of a single type will be documented, and questionnaires reflecting risk stratification for the individual’s practice as well as outcome measures will be submitted online. Feedback demonstrates where each Diplomate ranks according to national benchmarks.

2) The Chief of Staff Questionnaire assesses the Diplomate’s professionalism and identifies whether he or she participates in systems-based practice.

3) A Communication Assessment Tool consisting of patient questionnaires will assess communication skills and other aspects of professionalism.

4) SANS will be used to assess competencies in interpersonal skills, professionalism, practice-based learning and self improvement, and systems-based practice.

**Current Issues**

Important and controversial issues surround MOC. The first concerns Categories of Certification. Approximately 35% of practicing Diplomates have time limited certificates, and by 2030 most of them will. Directors of the ABNS want to provide flexibility in the way Diplomates structure their professional life. However, questions arise for contingencies such as practitioners seeking a sabbatical or CEO position, neurosurgeons who have only an outpatient practice, or those requiring family leave or experiencing temporary disability from injury or illness. Strategies for re-entry must also be considered for those resuming the active practice of neurological surgery.

ABNS Bylaws, Rules, and Regulations currently list four categories of certification:

1. Certified – Participating in MOC
2. Certified – Not participating in MOC
3. Certified – Retired from Operative Practice
4. Not Certified

Included is a non-operative key case (Management of Low Back Pain), allowing a neurosurgeon who no longer operates to continue to participate in MOC and maintain his or her certificate. Another possibility is a “Certified – Clinically Inactive” designation; these issues will be further addressed at the May 2007 ABNS meeting.

The second issue concerns the level of clinical activity required for a practitioner to assure proper delivery of care. While states incline to a policy of “Maintenance of Licensure – MOL” and state licensing agencies appear willing to abdicate to the ABMS Boards regarding the minimum requirements, hospital credentialing committees may not agree. They are under significant pressure to raise standards be more specific about what types of privileges each individual is entitled to.

Key case reporting from Part IV requires documentation of 10 consecutive cases of a single type. Does that mean a neurosurgeon may treat only 10 patients every three years? States have adopted a general policy that an individual can be out of active practice for a maximum of two years, so should surgical specialties be considered differently from the medical cohort? The ABNS will have to decide these issues.

The third (and possibly most divisive) issue concerns Subspecialty Recognition. The Chairman of ABNS, Dr. Robert Solomon, devoted the entire winter meeting to this vital topic. One proposal was that MOC could potentially be a vehicle for neurosurgical subspecialty recognition, and discussion is ongoing.

Nearly half of neurosurgical residents pursue postgraduate fellowship training. At the time of primary certification, designation as a general neurosurgeon has declined from 61% to 39% over the past three years.” But fellowship does not equal subspecialization; it is defined by special expertise and proficiency which requires core training, advanced training, mentorship, focused practice, and continued education. Subspecialty designation could be conferred during the MOC process. To explore this further, discussions amongst the Directors of the ABNS as well as the leadership of the American Board of Medical Specialties are necessary. Plus the MOC Cognitive Examination may need to be modified; for example, scores were not homogenously distributed amongst the three groups of general neurosurgeons, spine neurosurgeons, and pediatric neurosurgeons in the pilot exams. With increasing subspecialization, core knowledge drifts away from general neurosurgery.

The Board is diligently working to address these and many other areas involving our Diplomates, our patients, and our regulatory agencies. Strategic partnerships with professional societies including the AANS, CNS, Subspecialty Sections of the AANS/CNS, The Society of Neurological Surgeons, ABMS, and the Washington Committee for Neurosurgery has streamlined this process. Through these collaborations we aim to maintain the preeminence of Neurological Surgery, delivering cutting-edge healthcare along with the highest levels of professionalism and commitment. CNSQ
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Outstanding Speakers...

Robert D. Ballard, PhD*
Throughout his career Robert D. Ballard has conducted more than one hundred deep-sea expeditions, using both manned and unmanned vehicles. In 1982 Ballard organized the Deep Submergence Laboratory (DSL) at the Woods Hole Oceanographic Institute to begin developing the sophisticated remotely operated vehicle system known as Argo-Jason. Ballard would use this system for his best-known expedition, the discovery of the RMS Titanic.

In 1989, Dr. Ballard created the JASON Project, an educational program designed to inspire in students a lifelong passion to pursue learning in science, math and technology through exploration and discovery. The “telepresence” for his JASON Project allows hundreds of thousands of school children to accompany him from afar on undersea explorations around the globe. Dr. Ballard tackles the complex problems of oceanography that many thought unsolvable.

*Photography Credit Chris T. Anderson, 2006

Robert Sapolsky, PhD*
As a boy in New York City, Robert M. Sapolsky dreamed of living inside the African dioramas in the Museum of Natural History. By the age of twenty-one, he made it to Africa where he lived with and studied a troop of baboons to learn about stress and stress-related diseases in humans. Just like stressed-out people, stressed-out baboons have high blood pressure, high cholesterol, and hardened arteries.

Recipient of a MacArthur Foundation Genius Grant, Dr. Sapolsky's unique perspective on human creativity comes from the ease with which he combines his insights from the field with his findings as a neuroscientist. For more than twenty-five years, Sapolsky has divided his time between field work with baboons and highly technical neurological research in the laboratory. As a result, he can effortlessly move from a discussion of pecking orders in primate societies (human and baboon) to an explanation of how neurotransmitters work during stress—and get laughs doing it.

*Photography Credit Linda A. Cicero, Stanford News Service

Steve Squyres, PhD
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Platforms for the delivery of educational products and CMEs have changed as well. The Internet has become a powerful tool for the dissemination of information because of its accessibility and convenience. Interactive live and online formats allow learners and educators to provide immediate feedback about the efficacy of educational programs, and also make continued development and refinement of content possible.

The CNS has responded to this changing climate in several ways. Many innovations have occurred at the national meeting, which now features digital posters as well as sessions that are interactive, smaller, and more focused. In addition, the CNS has developed online educational resources, the best-known of which is SANS (Self Assessment in Neurological Surgery). While SANS provides an excellent mechanism to review material and to assess an individual’s knowledge base, it is not really designed to introduce new material. The CNS education committee has been working over the last two years to develop an educational tool that allows for the presentation of new educational material in an online format. This project is called the CNS University of Neurosurgery.

The CNS University is designed to be exactly that. Once you enter the site, you are part of a virtual learning environment where you can interact with fellow students and professors and discuss topics and issues relevant to modern neurosurgical practice. You have the option of taking various courses. Attending the “lectures” and passing an examination results in the rewarding of CNS-sponsored CME credit. Course topics will eventually cover the entire spectrum of neurosurgical practice as well as the non-clinical core competencies. Chat rooms and bulletin boards allow for the discussion of case material or other topics brought up by practicing neurosurgeons in an open forum, and may provide inspiration for new course offerings.

Some of these sites will be based on content offered elsewhere, overseen by faculty who will provide information and insight from the “Ivory Tower” (an online small group session) whereas other sites will be more open (like the online “Rathskellar”). Web-based seminars will be offered periodically to allow direct online interaction between participants and faculty. There will be an online library in addition to incorporation of the already very popular CNS image database.

A key component to the University is the ability to offer and track CME credits for participation. When a participant registers for the University, an identifying number is assigned that will allow for the assignment and reporting of CME credits, as well as for archiving purposes and communication with the ABNS.

Currently, we have constructed what several on the committee have referred to as the “CNS Online Community College.” Next we roll out the first module of the CNS University, which focuses on

The CNS University of Neurosurgery

The educational needs of neurosurgeons have changed over the last several years. Now neurosurgeons are required to accrue CME credits on a variety of topics in order to maintain certification at the local and state levels. They are also required to document similar CME activity for maintenance of certification by the ABNS. CME credits for board certification must be endorsed by either the CNS or the AANS as being relevant to neurosurgical practice. Based on state and national trends and goals, non-neurosurgical-specific issues such as patient safety, professionalism, and systems-based practice have become part of the educational requirements for neurosurgeons.
the non-clinical core competencies and currently contains approximately 18 hours of content that has been approved for the awarding of CME credit. The topics included are relevant for lifelong learning (such as the use of evidence-based medicine techniques in neurosurgical practice), patient advocacy, systems-based practice, professionalism, and practice-based learning.

Participants will enter the University through a link in the CNS home page, www.neurosurgeon.org. This link brings the surgeon to the University, where he or she will be asked to register to allow for identification and for eventual assignment of CME credit. The surgeon then chooses which activities and which seminar he or she wishes to participate in. The structured courses consist of a pre-participation quiz, a lecture available in video or a narrated PowerPoint program, and a post-participation online test (Figure 1).

Finally, participants will be asked to critique the learning experience to allow for continual improvement of our educational product. Educational activities can be accessed free of charge, but there will be a nominal cost for CME credits. The University will be developed in a modular fashion and plans expanded offerings to include the entire range of neurosurgical practice within the next 18 months.

The CNS University will be a university in evolution. Because of the online format, we will be able to incorporate new material quickly. New topics and improvements on existing products will be introduced based on feedback from participants as well as suggestions and contributions from the individual sections and the CNS. We anticipate a close relationship with the national meeting in order to allow for a continuum of educational opportunities in a variety of formats, covering a range of relevant topics, and available when the surgeon needs them. We invite you to visit the University and experience this innovative and valuable addition to CNS.

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**CNS Website’s Educational Resources**

The CNS web site www.neurosurgeon.org is the Congress of Neurological Surgeon’s central repository of data. Listed below are several featured Educational Resources available on the Web.

**PUBLICATIONS**

http://www.neurosurgery-online.com
Neurosurgery and Operative Neurosurgery are the official publications of the CNS. Both provide the most recent updates on neurosurgical issues and operative techniques.

Neurosurgery news is now replaced by the Congress Quarterly CNSQ magazine.

http://book2.neurosurgeon.org/
Clinical Neurosurgery is published yearly. It contains manuscripts from the top neurosurgeons presenting at the annual CNS national meeting.

**CONTINUING MEDICAL EDUCATION**

www.sanswired.com
SANS provides continued education in all aspects of neurosurgery. It may be used for practice enhancement, board preparation (oral and written) and maintenance of certification.

http://univ.cns.org/
The CNS University of Neurosurgery is debuting with courses on non-core clinical competencies but will rapidly grow into the first on-line UNIVERSITY of Neurosurgery.

**RESIDENT RESOURCES AND RESEARCH**

Resident On-call
http://neurosurgeon.org/residentOnCall/index.asp
The resident on-call site provides valuable resources to the neurosurgical resident. It is a resource for the CNS educational offerings as well as the case of the month and trivia.

Case of the Month
http://neurosurgeon.org/education/caseOfTheMonth/index.asp
The case of the month provides a bi-monthly challenge for any taker. Past cases are archived in this section.

Abstract Archive
http://abstracts.neurosurgeon.org/cgi-bin/search.cgi
Abstract archives permit a search of abstracts presented at past annual meetings.

Grantsmanship
http://neurosurgeon.org/education/cenr.asp
The grantsmanship section is located under the education tab. It provides the reader information on how to prepare a research grant. An important aspect of this section is examples of grants that may be reviewed during preparation.

Digital Posters
http://posters.cns.org/
Digital Posters are now archived on the web site as well.
AANS/CNS SECTION ON NEUROTRAUMA AND CRITICAL CARE
Neurosurgeons are stepping up to advocate for our emergency neurosurgical patients. We are disputing the assumption that emergency neurosurgical care involves only neurotrauma. Although we know that not all emergency neurosurgical care is neurotrauma and not all neurotrauma is operative, there are health systems that seek to replace us with general surgeons trained in acute care surgery. This concept has gained support in hospital administrations and conference rooms, despite the fact that this type of care is actually general neurosurgery, not general surgery.

Lost in all the discussion is a possible dilemma: if the acute care surgeon is taking call for neurotrauma and there are no neurosurgeons on call, who is available to effectively treat shunt malfunction, intracranial bleeds from subarachnoid to epidural, strokes, spine fractures, disc herniations, CSF leaks, brain tumors, and post-operative sequelae, to name but a few of our typical neurosurgical emergencies and emergent consultations? Is the care of this broad spectrum of patients best performed by an acute care surgeon with a superficial knowledge of these issues? Our answer is a resounding “No!”

In addition, neurotrauma specialists require years of experience and knowledge in order to make sound judgments on what is operative and what is not (as both the AANS and the CNS have stated). The patient with a neurosurgical injury or disease is best cared for by a neurosurgeon.

Is there a role for the acute care surgeon? Absolutely. As partners to neurosurgeons, these colleagues are invaluable to help care for patients with multiple system injuries with associated intracranial issues. But it remains our obligation as neurosurgeons to direct this neurosurgical care at the hospital as well as at local and state levels. We cannot afford to relegate this vital responsibility to those who do not have the neurosurgical patient’s outcome as their primary interest.

Neurosurgeons in the ER

There are many fallacies and inaccurate perceptions about the failure of neurosurgeons to cover the ER. Fortunately, the 2006 online AANS manpower survey refutes these misconceptions. The survey of a statistically significant 770 neurosurgeons reported that over 93% took ER call, approximately 43% provided ER coverage in 1 hospital, and 30% took ER call at two hospitals. The majority (57%) indicated that on average they personally covered the ER a very substantial 2-3 days per week. The majority (51%) also said that their groups had not been involved in developing a plan for their hospital’s ER going off-line. Only 43% had been involved in their hospital’s plan for transfer of patients. And about 76% perceived ER call coverage as a problem in their geographic area. Only 38% of neurosurgeons said that they limited their practice and the majority of those (57%) said that they did so simply because they no longer performed pediatric neurosurgery. Only 13% of those surveyed had eliminated trauma neurosurgery.

It is evident that neurosurgeons are fulfilling their obligations to participate in neu-
It has been marginal.

tive financial support for emergency care has to be lack of ICU beds, not lack of neurosurgery or even emergency trauma. In fact, the major cause of patient diversion seems not in place to support emergency neurosurgical systems at these hospitals are simply significantly overcrowded and that emergency care is highly fragmented. Critical specialists including neurosurgeons are often unavailable, especially in rural areas. There are approximately 3200 practicing board-certified neurosurgeons in the United States, while there are about 5,759 hospitals accepting trauma recognized by the American Hospital Association. This translates into a whopping 2,102,035 hospital days of ER call for neurosurgeons or 657 days of call per year to cover all the ERs. These numbers represent an overwhelming amount of potential coverage for neurosurgical care.

Yet the shortage of neurosurgeons is clearly only a small part of the problem identified by the IOM. Also significant are the lack of other specialists (i.e. orthopedics, plastics, etc.), a crippling projected 29% nursing shortage by 2020, and the fact that adequate trauma systems and operating room systems at these hospitals are simply not in place to support emergency neurosurgery or even emergency trauma. In fact, the major cause of patient diversion seems to be lack of ICU beds, not lack of neurosurgeons. In addition, hospital and administrative financial support for emergency care has been marginal.

One other area addressed in the IOM report on emergency care was medical liability. Surprisingly, in the AANS survey 97% of neurosurgeons who were not taking ER call had not experienced any cost reduction or discount on malpractice insurance. In an informal review by the Washington Committee of the most common malpractice claims and Medicare CPT billings, neurotrauma was not even in the top 10 of malpractice claims despite having a number of top 10 billing codes, both spine and head. Despite the fear that neurosurgeons’ malpractice rates would be deleteriously affected by their taking emergency call, this appears not to be true.

Further information as to the calculation of medical liability premiums and true impact of medical liability and emergency coverage needs to be obtained and studied.

What are the Solutions?

One of the recommendations of the IOM was to explore further the concept of “regionalization,” centralizing emergency care at major regional centers, with support from the outerlying suburban and rural hospitals for triage, stabilization, and transport.

As part of the efforts of neurosurgery to inform officials of the difficulties faced by our specialty in emergency care, the Washington Committee of the AANS/CNS asked a few of its leaders to participate in 4 public forums and nationwide investigations into this issue, held in cities from Salt Lake to Washington, DC. It was clear that neurosurgeons have been and remain committed to fulfilling their part in emergency coverage, but faced with daunting malpractice and geographic distribution challenges, the only reasonable answer at this time is regionalization.

Regionalization with significant hospital support for an emergency system armed with ancillary staff is essential and must be guided by practical concerns such as neurosurgical manpower and topography, as well as location. It must make financial as well as geographic sense. It must offer high level, high quality neurosurgery care.

Departments of Health in counties and states, as well as the American College of Surgeons, have been trying for years to establish and support improved trauma systems in each region. While the concept of regionalization has already occurred in many parts of the country, the trauma systems and patient transfer protocols are inconsistent at best. Some regions, like the Northwest (Washington, Wyoming, Alaska, Montana and Idaho) seem to possess model systems. However, even the most organized have large holes in their coverage, especially in rural areas. Each region’s needs have to be studied and systems developed that meet those needs. As well, underlying reimbursement and malpractice issues need to be successfully addressed at the state and local level in order to truly fix the problem.

Lastly, the public needs to be reminded that the best person to care for their neurosurgical emergency is a neurosurgeon in a well-supported emergency system.

Neurosurgeons can become part of a bigger solution to challenges such as lack of oversight, funding for emergency care, medical liability, inadequate manpower for emergency coverage, or regionalization, despite the small size of our specialty. We can also help ensure that the patient gets optimal care from the optimal person available.

We as neurosurgeons aim to be part of the solution and will provide leadership through our national organizations and manpower at the local level. Participation in the Neurotrauma Section, State Neurosurgical Society, the CSNS, the Neurosurgery PAC, the Washington Committee, and numerous other efforts can all have an impact in ensuring and improving delivery of emergency neurosurgical care to our patients. CNSQ
Trauma Section Update

The Section on Neurotrauma and Critical Care of the AANS/ CNS has always been a strong vocal supporter of the need for neurosurgeons to be primarily involved with neurotrauma care. With increasing awareness that optimal patient care for traumatic injury comes from being treated by a neurosurgeon, the Section has become even more active at the national level through both the parent organizations and the Washington Committee.

Efforts by trauma surgeons to take over the role of neurosurgeons in the care of neurotrauma patients resulted in a strong and vocal effort by the Section and Past Section Chair Dr. Alex Valadka, as well as the AANS and CNS. Through their leadership, Drs. Phil Wirth and Richard Ellenbogen have temporarily removed craniotomies, ICP monitors, and orthopedic injuries from the curriculum of the new acute care specialty.

To be successful, the Section needs to continue to be at the forefront of providing education to neurosurgeons and other physicians and allied health workers in the areas of neurotrauma and neurocritical care, emphasizing the role of the neurosurgeon in that care. Education has been the priority of the Section, which has traditionally been directly responsible for the multiple course offerings at each of the national meetings including the practical courses, luncheon seminars, and multiple educational fellowships. These have been generously supported by corporate sponsorships from Codman/ Johnson and Johnson, Synthes, and DePuy Acromed. Additionally, Integra has supported the Integra Lecturer at the CNS Annual Meeting over the past 2 years with the goal of bringing in internationally recognized experts in neurotrauma to give their perspective on neurosurgery from the past, present, and future.

Recognizing the need to involve young neurosurgeons early in their careers and neurotrauma education in order to fulfill neurosurgery’s need for knowledgeable practitioners, the Section has been active along with Synthes in holding twice-a-year Resident Courses in Neurotrauma and Critical Care. These courses expose resident neurosurgeons to the state-of-the-art of neurotrauma care, both didactically and through hands-on experience.

The success of this program has led to further collaborations with the National Neurotrauma Society and the International Neurotrauma Societies. The collaborators are working to develop a combined neurotrauma and critical care meeting to bring further opportunities of education to neurosurgeons and neuroscientists. Facilitating an understanding between the basic scientists and the clinicians in the development of novel therapeutic interventions will ultimately translate into improved care of our patients. CNSQ
Join us in San Diego, California, for the Congress of Neurological Surgeons most influential Annual Meeting yet. The scientific program at the 2007 CNS Annual Meeting is designed to help you navigate the dynamic field of neurosurgery and incorporate the latest technological breakthroughs into your practice.

Joining the Congress of Neurological Surgeons is the introduction of Integrated Medical Learning (IML). The IML Sessions will be offered during the Monday, Tuesday and Wednesday General Scientific Sessions, with each session focusing on a different subspecialty area of neurosurgery.

Be a part of this dynamic and novel learning paradigm for the first time!

- **You drive the agenda.**
- **Experts debate the issues of the day.**
- **Evidence competes with practice.**
- **Learners interact with teachers.**
- **Neurosurgery advances with your participation.**

The IML Experience at the 2007 CNS Annual Meeting!

**Before** - Pre-meeting surveys will be sent out along with online resources pertaining to each of the three subspecialty topics. Survey results drive the agenda of the day.

**During** - Attendees will participate in daily IML Sessions via handheld interactive technology, allowing learners to interact with teachers.

**After** - Threaded discussion will follow the annual meeting and participants will earn additional CME credit for taking part in all phases.

*Watch your e-mail or visit www.cns.org to learn more.*