MOVING MOUNTAINS

Can We Handle a 48-Hour Resident Work Week?
Extending the Neurosurgical Workforce.
Don’t Miss These Outstanding Lecturers at the 2009 CNS Annual Meeting!

Dr. APJ Abdul Kalam  
Special Lecturer  
Monday, October 26

Dr. Kalam, the former President of India and an aeronautical engineer by training, has made significant lifelong contributions to the Indian Space and Defense Programs and the education field.

Bobby Jindal  
Invited for the 3rd Annual Julian T. Hoff Lecturer  
Tuesday, October 27

Governor Jindal, sworn in as Governor of Louisiana on January 14, 2008, became the youngest current governor in the United States. He has quickly become one of the most recognized names in politics and is considered by many to be on the fast-track to the nation’s highest office.

Walter Isaacson  
10th Annual Walter E. Dandy Orator  
Tuesday, October 27

Mr. Isaacson is the President and CEO of the Aspen Institute. He has been the Chairman and CEO of CNN and the editor of Time Magazine. He is the author of many best-sellers, including his most recent, Einstein: His Life and Universe.

Peter Agre, MD  
4th Annual John Thompson History of Medicine Lecturer  
Wednesday, October 28

Dr. Agre was awarded the Nobel Prize in Chemistry in 2003 for his discovery of aquaporins. Currently Vice Chancellor of Science and Technology at Duke University, Dr. Agre’s research is focused on the structural and functional characterization of aquaporins.

Terry Orlick, PhD  
Michael L. J. Apuzzo Lecturer on Creativity and Innovation  
Wednesday, October 28

Dr. Orlick is a leading author and innovator in his creative approach to focus training and high level performance psychology. His life’s work has centered on creating a culture of excellence and teaching and coaching the key mental skills required to attain and sustain the highest levels of performance.

Registration Now Open at www.cns.org!

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Submit your abstract online at www.cns.org.  
In this issue of the CNSQ, we reflect on some of the numerous changes that the neurosurgery community has endured over the last decade. Depending on the perspective of the individual(s) affected, these changes can either have a positive or negative impact on them as well as society. Thus, the challenge with implementing or adapting to these changes is to unite all members or individuals affected such that they all have a common collective positive and united goal.

Neurosurgery as a community has been founded on the principal of a medical practice focused on simple philosophy of “excellent patient care.” This directive has served our profession well over the years. During this period, physicians have directed medical care and education with internal oversight and little external pressures. The federal government, as the largest provider of health resources in the United States, also has the same ultimate goal and philosophy, but under the auspices of finite health care resources. Recently, the Institute of Medicine provided analysis for policy makers on overall patient care and physician effectiveness specifically directed at the incidence and etiology of medical errors and patient safety. These issues of fatigue and medical errors were correlated to length of work hours and felt to adversely impact patient care. Thus the federal government has initiated an 80-hour work week (increased to 88 hours for several neurosurgery programs).

The medical community, as a result of these changes, had the dilemma of fewer resident patient care hours while still maintaining and improving quality patient care. This conflict has brought forward several initiatives in the neurosurgery community. Institutions have adapted to the work restrictions through reconstructing resident rotations in the form of a night float system, in addition to obtaining further non-resident patient care assistance. Thus the concept of “workforce extenders” was developed in order to maintain and potentially maximize patient care. These “teams” have developed to fill all aspects of neurosurgical practice in terms of the Operating Room (First Assistants, RNFA, Surgical Assistants), hospital care (CRNP, PA) and office settings (CRNP, PA). Further, the goal of improving patient care has fostered the development of multidisciplinary neurosurgical patients’ groups with specialty approaches in terms of ICU teams and hospitalist services.

In this issue, first we have defined individuals affected through these changes with articles from organized national neurosurgery, residents and fellowships. In addition, we are fortunate to have an international perspective of work hour restrictions by Alan Crockard as the European community is presently approaching a 48 hour work week. In addition, individuals from each “workforce extenders” group or team have composed an article detailing a definition of the scope of their field and how their members interact with the Neurosurgery team and patients. While each hospital has implemented an individual system, again the common goal is quality patient care.

The positive effect of these changes in terms of work hour’s restrictions has been resident education in terms of a greater focus and “off-time” to comprehend neurosurgical teachings. However, the corollary is that there is also less time available for direct surgical training in the operating room. The CNS, being committed to the education of neurosurgeons, is putting significant resources to improving quality patient care. This has resulted in new teaching methodologies such as the integrated medical learning (IML) courses at the national meeting and the web-based Congress of Neurological Surgeons University (http://univ.cns.org). We are fortunate to have two articles discussing recent additions to the CNSU educational curricula: Pediatric eHandbooks and the 2009 Webinar Series. This issue is dedicated to all members of the neurosurgery team which promote continued quality patient care and education.

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THE CNSQ BACK PAGE

Images in Neurosurgery
In this issue of the CNS, the editors address important concerns within the neurosurgical community as they relate to workforce and our ability to sufficiently and safely provide care to patients. Due to innumerable pressures both financial and temporal, the practicing neurosurgeon is being forced to do more and more with less and less. Unfortunately, these significant financial and workforce pressures will likely continue to worsen given the economic and political climate, and will impact the neurosurgical delivery of healthcare. Whether due to declining reimbursement, increasing medical liability concerns both real and perceived, impossible requirements for emergency coverage (such that every neurosurgeon would have to cover two trauma centers/emergency rooms 24/7/365), the limited number of board certified/eligible neurosurgeons, residents in training with insufficient hours, or limited neurosurgical physician extenders, these issues have strained our ability to adequately extend the neurosurgical physician workforce and provide care for all who require assessment and management.

As a result, the delivery of high-quality care is being marginalized through the introduction of less educated, less specialized providers. With non-neurosurgical physicians performing neurosurgical procedures, physician extenders or residents as primary deliverers of care, newly trained neurosurgeons lacking the volume and time in training of their predecessors, and less access due to funding cuts that force further reliability and coverage gaps, the practicing neurosurgeon is attempting to keep up with the ever increasing demand for complex neurosurgical care and oversight with reduced resources at his disposal.

For community neurosurgeons, the inability to have adequate backup and to keep up with an elective caseload has forced many to begin to defer emergency coverage and cranial neurosurgery. As well, with the imposition of multiple regulatory and oversight agencies and mandates, we can expect that as more time is pulled away from direct and urgent patient healthcare in the United States other specialties will try and fill the void and practice “neurosurgery.” Unfortunately, many of these regulatory impositions arise from numerous diverse, uneducated and unsophisticated groups which have not studied the impact and result of these mandates. Unlike physicians who see the impact firsthand, these individuals implement “treatment plans” that have resulted in the decrement in physician reimbursement and the expectation and forced unreimbursable time and care of an already strained workforce.

These issues are not solely relegated to community neurosurgeons; they have also changed the expectations of university neurosurgeons in their performance of academic neurosurgery. One prime example is in academic settings, the reduction in resident work hours has forced many to give up time and effort that was previously “protected” for use in moving the field and patient care forward. Activities that were expected as part of the legacy of being an academic neurosurgeon, such as participating and generating research in translational, basic, and clinical sciences; teaching; and advancing our knowledge in the care of patients has been limited.

> As professionals we must continue to provide high-quality care with an eye towards cost efficiency and efficacy. <
> NEUROSURGEONS, AS TRUE PROFESSIONALS AND TRUE ADVOCATES FOR THEIR PATIENTS MUST MAINTAIN CREDIBILITY BY PARTICIPATING AT ALL LEVELS OF THE PROCESS THROUGH LEGISLATIVE ACTION, ADVOCACY, RESEARCH AND DEVELOPMENT, AND EDUCATION. <

Glaringly, resident workforce reductions were imposed without studying how the loss of a professional, knowledgeable workforce would impact patient care, communication and gaps in coverage. Yet these same individuals plan further reductions without study of the potential negative consequences on healthcare delivery by physicians, particularly neurosurgeons. Similarly, financial pressures with regard to reimbursement, medical liability, etc. all have limited the funding for research and development in our university settings, and also our ability to develop clinician scientists who can truly bridge the bench-to-bedside concepts needed to improve the delivery of high quality, state-of-the-art patient care.

While it has become incumbent upon us to accept these new regulatory impositions, often without input or question, we also need to be proactive in developing potential solutions that will not negatively impact the delivery of patient care. As professionals we must continue to provide high-quality care with an eye towards cost efficiency and efficacy. We need to continue to educate the public, our legislators and the regulatory agencies about the negative impact that poorly thought out, unfunded mandates and financial cuts can have on care, access, and future scientific and public health developments. We need to show that continued cuts in reimbursement, continued high medical liability costs, restrictions in workforce, and forced imposition of indicators that are not reflective of quality and have little value to true patient outcome are actually detrimental, interfering and taking further time away from physician-patient interaction and relationships as well as from endeavors that move the field forward.

It is important that we continue to be proactive in developing better and proven solutions. Our strategies may include staying active in our national professional societies and in our communities for education and advocacy; proposing, developing and implementing regionalized neurological emergency care centers; and developing and assessing outcome measures that truly define neurosurgical quality. Neurosurgeons, as true professionals and true advocates for their patients must maintain credibility by participating at all levels of the process through legislative action, advocacy, research and development, and education. As a small but very vocal profession, we can make a difference.
This CNSQ is dedicated to exploring the issues related to the delivery of care for the neurosurgical patient of the future. This particular topic has come under intense scrutiny subsequent to the creation of the federal government resident work hour restrictions. In a previous era, the resident (one who resides in the hospital, hence the name) was the sole provider for in-hospital neurosurgical patient care. However, the safety concerns raised by having fatigued physicians caring for patients while concurrently dedicating their efforts to education was fraught with difficulty. Allowing residents time off in order to concentrate on patient care and education has created a void. The reality is that surgical specialties are unique in that the operating theater serves an essential component or “classroom” for resident education. Unfortunately with the limited resources of resident training hours, the time in the operating room and dedicated to patient care hours has decreased.

Thus, necessity is the mother of all inventions and efforts to fill these needs are illustrated in the recent changes to the neurosurgical workforce. Numerous approaches have been explored to facilitate the delivery of superior patient care while simultaneously educating the next generation of neurosurgeons. This CNSQ has been formatted into three major sections to review these strategies. The first section analyzes resident work hour restrictions as they relate to the delivery of education and discusses potential future workforce restrictions based on already occurring global changes.

- Daniel Barrow, Secretary, American Board of Neurological Surgery (ABNS) discusses the resident work hour restriction on education.
- David G. Piepgras, Secretary of the Committee on Accreditation of Subspecialty Training for The Society of Neurological Surgeons, focuses on the influence of fellows in the future resident education paradigm.
- Krystal Tomei provides the Neurosurgery Resident perspective.
- Alan Crockard analyzes how further work hour restrictions will impact residents and patient care through his insight as Emeritus Professor of Surgical Neurology.

In the second section, the CNSQ was very fortunate to have a number of thought leaders in their respective societies provide insight into the evolution of the neurosurgery patient care team. This section discusses the role of physician work extenders. Specifically articles were obtained through the:

- Association of Neurosurgical Physician Assistants (ANSPA) – President Brenda Hill, MSN, CRNP, RNFA and Ian Jones, PA-C.
- American Academy of Nurse Practitioners (AANP) – Jennifer Malone RN, CRNP.
- National Association of Registered Nurse First Assistants (NARNFA) – Diane L. Ferrara, MSN, CRNP, RNFA and Rita Griffith, RN, MS, CRNFA.
- National Surgical Assistant Association (NSAA) – President Daniel D. Baird, CSA, MSc, MBA.

Lastly, there is a trend towards the development of sub-specialty focus to the delivery of patient care, including the appearance of hospitalist services and dedicated critical care teams.

- AANS/CNS Section on Neurotrauma and Critical Care Section has provided an article on Neurosurgeons and the Intensive Care Unit composed by Alex B. Valadka, Michael Fehlings, Errol Veznedaroglu and P. David Adelson.
- The Society of Hospital Medicine has presented the role of the primary care provider and its evolution. Pat Cawley and Scott Flanders provide their outlook as hospitalists and care for the neurosurgery patient.

We have compiled this issue of the CNSQ to provide a balanced discussion, and have included contributions and insights from physicians, nurses and physician assistants. From evaluating their viewpoints, and yours, we anticipate much future discussion that further highlights these important issues. •

James S. Harrop, MD, FACS

THE NEUROSURGERY WORKFORCE OF THE FUTURE

A COMMUNITY OF LEARNING
THE 80-HOUR WORK WEEK: RESTRICTIONS ON RESIDENT EDUCATION

Does the 80-hour work restriction create a void in patient care?

The services provided by residents prior to the introduction of the work hour restrictions were legitimate and essential to patient care. The need for that care has not been reduced since the institution of the 80-hour work week in 2003. In fact, the acuity of patient care in many academic medical centers has risen over the past five years with increased regionalization for many of the most critically ill neurosurgical patients. The recent proposal by the Institute of Medicine to further restrict work hours to less than 16 hours may exacerbate the problem.

Since patient service needs have not been reduced, other healthcare providers have been utilized to fill the gaps. One of the worrisome voids in patient care has been lack of continuity in resident physician care, resulting in a marked increase in handoffs from one physician to another. Adherence to strict work hours can lead to medical errors attributable to more frequent patient handoffs, fragmentation, and loss of continuity of care. One study demonstrated that compliance with the 80-hour work week resulted in an average of 15 handoffs per patient. Thus, residents are less familiar with their patients’ medical issues.

Some experts have expressed concern that the greatest void in patient care is yet to come in the form of a new generation of physicians with inadequate training. Work hour restrictions may create a generation of surgeons with greatly reduced surgical experience and expertise. Learning episodes in neurosurgery training are often greater than 16 hours. Unless the residency training programs are extended considerably, residents in neurosurgery may receive 25 to 50% less training than residents received prior to 2003. One can reasonably ask whether any patient would choose to be treated by a neurosurgeon who receives half the training of today’s practitioners.

Although the imposition of work hour restrictions on residents may have unintended consequences, it also provides an opportunity to re-evaluate our educational programs. Some of the work previously handled by residents did not contribute to their education and can be adequately performed by others.

What are residency programs doing to fill this void?

Concerns about resident fatigue must be balanced with the need to adequately train neurosurgical residents and ensure quality patient care. The solutions to fill the patient care void created by reduced resident work hours are as diverse as the residency training programs themselves. There is no “one size fits all” solution to this challenge. The solutions depend on such factors as the number of residents in the training program, the presence of fellows, the clinical volume of the program, the number of affiliated hospitals in the training program and the resources of the institution. Potential solutions include use of residents on a night float system, addition of physician extenders (including physician assistants and nurse practitioners) to the healthcare team, use of hospitalist service, development of neurocritical care services and elimination of certain rotations including research opportunities. Some programs have successfully met these demands through increasing the number of residents in the program.

In our own training program, we have addressed the problem through a multifaceted approach that includes the development of a neurocritical care service integrated into the Department of Neurosurgery, with participating neurologists trained in stroke neurology and critical care medicine. This provides an opportunity for increased educational experiences for the resident while providing continuous medical care for our most critically ill patients. We have also been supported by our hospital in the recruitment of additional nurse practitioners and physician assistants as extenders. A night float rotation has been instituted to assure compliance with the ACGME work hour restrictions. These changes have been instituted to ensure that formal educational opportunities and research rotations are protected.

What will be the impact on resident education? Resident match process?

All agree that physician exhaustion is not good for residents or for patient care. An increased emphasis on the importance of sleep is recognized and required of the medical profession. In our attempts to solve one set of problems, however, we may be creating others. Resident duty hours do not stand alone. The hours a resident works are part of a complex matrix of tightly interrelated issues that influence the value of education including the quality of the GME program, supervision of residents’ activities, institutional support and the quality of patient care. The current 80-hour restriction is relatively new
and has yet to be thoroughly examined for impact on education, patient care and resident well-being. Due to the relatively recent institution of the shorter work week, there is little conclusive data on the effects of the current residency duty hour limits. The potential effect of the 16-hour limit recommended by the Institute of Medicine is even more speculative, but also potentially more disquieting.

One study noted that since the 80-hour work week went into effect, 75% of neurosurgical residents and 98% of program directors thought that patient care suffered from a lack of familiarity of residents with their patients. The decreased hours may also lead to an increased length of time needed to receive appropriate training, which in turn likely will have implications for the US physician workforce in years to come. A few case studies have suggested that reduced work hours have negatively impacted residency education. These studies, however, should be interpreted with caution since many residencies with four or five years of training have only had their first cohort emerge. Thus doing a pre-period analysis is possible, but no post-period analysis is available yet.

> One can reasonably ask whether any patient would choose to be treated by a neurosurgeon who receives half the training of today’s practitioners. <
NEUROSURGERY SUBSPECIALIZATION, FELLOWSHIPS AND CAST

The term “fellowship” as applied to medical education has generally referred to additional or supplemental training in a subspecialty or focused area beyond that of the residency; trainees engaged in this supplemental education have commonly been called “fellows.” The Accreditation Council for Graduate Medical Education (ACGME) defines a fellowship (or “subspecialty program”) as a “structured educational experience following completion of a prerequisite specialty program in graduate medical education designed to conform to the Program Requirements of a particular subspecialty.” This ACGME definition appropriately emphasizes requirements for educational structure with defined program requirements occurring post-residency. With few, if any, exceptions, ACGME accredited fellowships are a minimum of one year in duration.

In the past, and to some degree in the present as well, neurosurgical fellowships have been well defined and structured and with the exception of the jointly sponsored (Radiology, Neurosurgery and Neurology) Fellowship in Interventional Neuroradiology, none are ACGME accredited. Neurosurgery's lack of ACGME accredited fellowships is owed largely to deliberate decisions made in 1994 by our specialty's leadership on educational matters, the American Board of Neurological Surgery (ABNS), the Residency Review Committee (RRC) for Neurological Surgery, and The Society of Neurological Surgeons (SNS) with the support of the leadership of the AANS and CNS. In their joint deliberations, these organizations deemed it advisable to encourage subspecialty training opportunities enfolded into the elective time of the neurological residency and to allow flexibility in the duration of these experiences (possibly less than 12 months). Further, it was recognized that these areas of enhanced, focused subspecialty education were not exclusive in content but rather an expansion of the established neurosurgery residency curriculum. As such, neurosurgery's concept of a subspecialty curriculum did not meet the ACGME's expectation of a new distinct body of knowledge for subspecialty accreditation. Therefore, in the U.S. and Canada as well, neurosurgery's recognition, accreditation and certification of subspecialists have been more conservative than that of other specialties.

While the movement towards neurosurgical subspecialization of practice, especially in academic medical centers, gained momentum in the 1970s and 80s (including the development of AANS and eventually the CNS Joint Sections) the ABNS opposed certification for additional subspecialty training and expertise, initially in the area of critical care. In 1990, with growing pressure from those in the field of Pediatric Neurosurgery, the ABNS and RRC for Neurological Surgery proposed ACGME accreditation of subspecialty training in pediatric neurosurgery, but rescinded this decision within two years owing to objections from a broad spectrum of neurosurgeons who included children in their general neurosurgery practices. This reversal was paramount in the decision of the leadership of pediatric neurosurgery to move towards formalization of a curriculum for, and accreditation of, pediatric neurosurgery fellowships under the American Society of Pediatric Neurosurgery and eventual certification of subspecialists by their own American Board of Pediatric Neurologic Surgery. This schism within neurosurgery was regarded by many as an unhealthy splintering of our small specialty with implications for disenfranchisement of non certificate holders and more broadly for the established general neurosurgery residency training. In response, the ABNS in 1994 reaffirmed its opposition to formal accreditation of subspecialty training or subcertification for neurosurgeons who devote their practice to a subspecialty area.

In spite of this position, neurosurgery's educational leadership and most practitioners have been well aware of the laudable forces and motivation for subspecialization, primary among them being:

- An enhanced environment for the development of new technology, focused research and academic pursuits.
- Improved clinical skills of the practitioner and outcomes for patients.
- Our specialty's ability to meet competition from other subspecialties such as orthopedic spine, neuro-otology, and endovascular radiology.
- “Marketability” in clinical practice.

In acknowledging the merits of subspecialization and the growing demand for subspecialty training in multiple areas of neurosurgery, the officers of The Society of Neurological Surgeons in 1998 proposed a strategy for recognition and accreditation of subspecialty training (fellowships) in neurosurgery outside the purview of the ACGME. At a Neurosurgery Summit Meeting in 1999 with representation from the leadership of the SNS, the ABNS, the
RRC for Neurological Surgery, the AANS and the CNS, this proposal was endorsed with the following recommendations:

• “Certification” for supplemental training may be provided by the sponsoring fellowship program but there will be no subspecialty certification by the ABNS.
• The RRC will evaluate fellowships only in regard to their impact on resident training: training of fellows must not adversely affect the residents’ educational experience.
• Flexibility in regard to timing and duration of additional subspecialty training is desirable; enfolding subspecialty training into residency elective time should be preserved and encouraged.

At its annual meeting in May 1999 The Society of Neurological Surgeons (whose membership is comprised of the majority of North American neurosurgical training directors) adopted a resolution for accreditation of subspecialty training and its programs aimed at promoting and assuring quality subspecialty education.

Structure, policies and procedures for provision of oversight and accreditation of subspecialty training in fellowships were subsequently formalized and adopted under the SNS Committee on Accreditation of Subspecialty Training (CAST). As this process has matured and with input from the various joint sections and fellowship training directors, important principles pertaining to neurosurgical subspecialty training have been adopted. These include:

1. Completion of ACGME approved residency training is sufficient to allow practice of neurosurgery. Post-residency fellowship is not needed for either competent practice of or reimbursement for delivery of neurosurgical patient care within the definition of neurosurgery promulgated by the ABNS and the RRC for Neurological Surgery.

2. The development and management of accreditation of neurosurgical fellowships by The Society of Neurological Surgeons through the CAST structure is in the best interest of neurosurgery by helping to ensure the quality of the educational experience.

3. “Fellowships” are a post-graduate subspecialty training experience. Fellowships are usually one year in duration, but in certain instances may be shorter or longer as determined by the qualifications of the trainee, the body of knowledge, and the skills to be learned.

4. “Enfolded subspecialty training” is done during the residency years. This type of training does not constitute a “fellowship,” but it may in itself be of sufficient depth and breadth to provide a higher level of subspecialty expertise than that achieved during the usual residency training.

5. Training requirements for the aforementioned postgraduate fellowship are established by the subspecialty, preferably through its neurosurgical joint section, and will specify duration and components of training, requirements for facilities, faculty, affiliated services and minimum case material at the fellowship site. Fellowship requirements must include a curriculum for knowledge and procedural objectives to be attained in the fellowship. Requirements can stipulate minimum case requirements for each fellow.

Specific information regarding CAST, existing subspecialty educational curricula and accreditation requirements can be found on the SNS website at www.societyns.org.

As of December 2008, there are CAST accredited fellowships in Neurologic Surgery of the Spine, Peripheral Nerve, Cerebrovascular Neurosurgery, Pediatric Neurosurgery, Neurosurgical Oncology, Stereotactic and Functional Neurosurgery, and Endovascular Neurosurgery, with programs in Neurosurgical Critical Care soon to be added.

The primary goals and objectives of SNS accreditation of subspecialty training, as originally conceived, remain:

• To assure quality in training programs through established clinical and didactic as well as institutional and faculty requirements.
• To maintain cohesiveness in neurosurgery.
• To demonstrate neurosurgery’s pre-eminence in defining its subspecialties and required training for competence in general and focused practice.
• To promote the subspecialties within the neurosurgical domain. ■
Neurological surgeons comprise a unique community. With a small complement of physicians, the fact that we assume a great responsibility to our patients is inevitable. I was aware of this when I decided upon neurosurgery as a career, when I interviewed for residency, when I matched. I remained cognizant of it during my neurological surgery residency. I knew I was entering a field where the demands on my time would be significant, where lengthy cases are not a rarity and where emergencies are unpredictable. It is a field where complications carry the potential to be immediately life threatening, and waiting for more convenient opportunities is not always an option. Like any field in medicine, our patients put their lives in our hands, and that is not a responsibility to be taken lightly. I know I am not unique in my stance. Many of my colleagues are aware of these nuances to our profession, and generally we are not shy about sharing these with prospective residency applicants. However, there has been a transformation in medical education that has impacted resident training, and this influence is anything but subtle.

In 2003, the Accreditation Council for Graduate Medical Education (ACGME) established regulations entitled “Resident Duty Hours in the Learning and Working Environment.” These new regulations were the result of an effort to improve patient safety related to resident fatigue. Such stipulations as an 80-hour workweek, maximum 30-hour shifts, and 10 hours off between shifts were intended to improve patient safety and also improve resident safety and well-being. The current medical literature has produced conflicting studies on the outcome of the ACGME regulations in regards to patient safety as well as medical education.

In general, the ACGME regulations have had a positive impact on resident training, allowing for more time for independent reading, personal endeavors and family obligations. Moreover, few would argue that there have been many measures taken by resident training programs to accommodate these regulations. Now in their sixth year since implementation, the shortcomings of these duty hour regulations and their broad approach to resident training are becoming more apparent. The requirements for training of the various subspecialties within medicine are vastly different, yet a single set of recommendations was made to apply to all residents regardless of specialty. From the beginning, certain specialties had to make significantly more changes in their training programs to accommodate these regulations. In theory, the demands of resident training programs should be reflective of the demands of the post-residency practice for those specialties. Yet within certain fields we have created a significant discord between training and practice.

Last November, the Institute of Medicine (IOM) released their report on resident duty hours, “Resident Duty Hours: Enhancing Sleep, Supervision and Safety” with increasingly stringent regulations on resident work hours. Their recommendations include supporting 16-hour shifts (or 30-hour shifts with a guarantee for five hours of uninterrupted sleep during that shift), increasing time off between shifts depending on the time or length of shift, removing the ability to average...
days off and on-call days over four weeks, increasing total days off per month to five, and implementing tighter regulations on moonlighting. Through my involvement in organized medicine, I have had the opportunity to participate in several discussions that involved residents from varying medical specialties regarding these proposed regulations. The IOM report has already raised contention among residents. Not surprisingly, surgical and nonsurgical residents hold different opinions on the IOM recommendations and resident duty hours in general. Residents have raised concerns about how these regulations take away from continuity of patient care. We have concerns about whether we will have to sacrifice educational opportunities that extend our duty hours beyond regulation. And most importantly, we are concerned about external regulatory bodies dictating our training.

As neurosurgical residents, we must advocate for patient safety as well as our own education, understanding the delicate balance between the two. Our duty as resident physicians is to facilitate the care of patients in collaboration with our attendings. Our duty as students in our field is to acquire that knowledge and experience that allows us to understand the fundamentals of peri-operative neurosurgical patient care and to acquire the surgical techniques to treat neurosurgical disorders. Achieving both of these duties within the current confines of resident work hours proves difficult at times. Patient courses are unpredictable, complications occur, surgeries take longer than expected, emergencies are inevitable. Patient care needs can rarely be met within the allowed 80 hours per week. Our attending assumes responsibility when a case runs late, an emergency goes to the OR in the middle of the night, and when they have elective cases scheduled for the following day. Will today’s generation of residents be able to do the same? Unfortunately, we do not have that data yet. Our residency extends beyond the time that duty hour regulations have been in effect, and this new generation of physicians has yet to graduate into practice.

As residents, we are required to work within the confines of these regulations. As advocates for our own education, we must do what we can to make up for the discord between these severe and ubiquitous regulations and the reality that is a neurosurgical residency. I know many of my colleagues, myself included, who have contacted the person on call to see how our patient was doing, who have followed up on a CT from home, and who have spent countless hours at home preparing for cases, reading about neurosurgical pathology, and doing whatever we can to supplement our own education. Such is the duty that we assumed when we accepted the responsibility of becoming a neurological surgeon.

Medical education has entered a new era. Though we must remain cognizant of issues related to patient safety, equal weight should be placed upon resident education and preparedness. Ancillary staff and physician extenders represent a means to increase patient safety and care while allowing residents to focus their time on education. However, increased ancillary staff cannot augment resident educational experiences. The discord between residents’ work hours and those of practicing physicians demands that our specialty work with all interested parties to amend these inconsistencies. Is the best solution an exemption for chief residents, such that their work schedules can mimic that of a typical first year in practice while they still have attending supervision? Or perhaps a graded work hour increase based upon the postgraduate year is possible, to allow for increasing hours and responsibility based on seniority. I look forward to hearing a strong neurosurgical voice as we continue to determine how best to balance all interests and not compromise patient safety or resident education.
THE SHORTENED WORK WEEK ... REQUIRES A MAJOR RESTRUCTURING OF THE NEUROSURGICAL TEAM TO ENSURE CLINICAL SERVICE AND PATIENT SAFETY.
CAN THE NEUROSURGERY WORKFORCE HANDLE A 56-HOUR WEEK?

The short answer is yes, but with difficulty. At the moment, the shortened work week is in place in the UK by law, and something like it has been practiced in Scandinavia for more than a decade. However, it requires a major restructuring of the neurosurgical team to ensure clinical service and patient safety. A fundamental question is whether, in a 56-hour work week, the training programs can produce replicas of the previous generations of neurosurgeons (and furthermore, is this really what the neurosurgical establishment wants?) Will it require longer than six years to adequately train our residents? And even more fundamentally, is the existing system the best way to provide the public with the clinical neurosurgical care it requires in a rapidly changing world? Can the same surgeon, for example, deliver up-to-date care for movement disorders and complex spinal problems?

Historically, the line between healthcare delivery and training has been blurred. Learning “on the job” has produced highly experienced clinicians, but it is unclear just how much of the working day has been actual training and how much a cheap and convenient way of delivering patient care. With the implementation of shorter working hours in their respective professions, airline pilots and nurses have had to confront this dilemma; in both cases, the explicit allocation of service and training hours has allowed these professionals to achieve both goals. But a significant increase in the workforce is required, and not all end up as senior captains or directors of nursing. Indirectly the neurosurgery workforce has been moving in this direction with increasing use of physician extenders. However, the explicit roles have not yet been widely accepted, hampering the redefinition of the neurosurgical curriculum.

As with school and university programs, so with postgraduate curricula: new topics are easily added without a re-evaluation of original topics, and the course expands to unmanageable levels. Something similar occurs with working practices; decisions must be made as to how many patient rounds occur each day, and when and by whom management decisions are made on the rounds. When the same pyramidal team provides 24/7 care there are clear lines of referral and responsibility. With shift systems and compulsory rest periods, new ways of working to ensure continuity of patient care are essential and must be documented.

There are massive changes in society (of which patients and physicians are a part) with counter currents and contradictions. Patients want treatment by fully-trained physicians. Medical school graduates (now 70% female in the UK) want the very best training, but also seek a life outside medicine.

The European Working Time Directive (EWTD) is a “Health and Safety” law passed by the European Union Parliament for the protection of all workers; however, it does not apply to self-employed individuals. It is strictly observed in (mainly) Western Europe, but up to half of the countries have yet to fully comply with the 56-hour rule, particularly in the medical field and in Eastern and Mediterranean countries. In some countries there are “novel” two hospital contracts for juniors, which combined would exceed EWTD limits.
the proposal to reduce the working week to 48 hours by August 2009 is being hotly debated throughout the European Union. The time restrictions currently only apply to trainees, but soon it is proposed that consultants will also be similarly limited. If enforced, it will have profound effect on medical working practices and income.

So how does this rota system work? First, the 56-hour week is averaged over one to three months and time off given in lieu of long shifts. For instance, a 24-hour “on call” shift must have a five-hour rest period, avoidance of all non-urgent operating, and relief of duties by 11:00 am the following morning for a minimum 20 hours off duty. There might be TWO 24-hour “on call” episodes in a month. For the rest of the time, 14-hour shifts allow continuity and adequate handover built in from the day to night shifts. There is one complete week off in 13 weeks (this is not vacation time, but may be added to vacation or study leave). Thus in a six month period the individual junior might be legitimately “off service” (2 + 2 = 4 weeks and agreed study leave for say four days). This is a huge commitment of staff, requiring at least ELEVEN staff to cover a 30-bed unit.

What are the “knock on” implications of these rotas?
1. Shorter exposure times of individual trainees to the individual consultant surgeon’s practices.
2. Fewer opportunities to participate in operative surgery. Thus the “quotas” of indexed operative procedures to be presented at the completion of training are less.
3. Small neurosurgical units may not be able to operate the junior “on call” rotas and must either amalgamate with neighbouring units or close.
4. Currently, (to ensure continuity of care) consultant neurosurgeons are exempt from the 56-hour week. But they too will have to be compliant by 2013.
5. Subspeciality training (i.e., neurovascular, spinal, epilepsy) may have to be acquired by “Fellowship” training, in effect lengthening the residency program for all but the more “general” neurosurgery, whatever that might be.

And the quality of training? According to the Chairman of the UK Specialty Training Committee, Michael Powell, it is still too early to assess the “knock on” effect of EWTD. Those currently coming up for completion of training have had some experience under the old 80-hour system. The reduction in recorded “Log Book” cases reveals less hands-on experience, and with the specialty final exams there is a worryingly low pass rate on the first attempt. All of this might indirectly increase the training time, if the desired end result is to produce a neurosurgeon similar (in experience and knowledge) to those graduating 10 years ago.

Some medical specialities are less adversely affected than neurosurgery. Surgical specialities such as urology and cardiac surgery are doing considerably less open procedures, thus training in them might change considerably.

The current government’s aim is to expand primary healthcare. With a differential increase in remuneration to levels at or above the top of the hospital consultant pay scale coupled with a shorter training period for this speciality, it is likely that there will be a progressive shift from hospital based medicine to physicians in family practice.

What happens if the European Parliament succeeds in reducing the work week to 48 hours for one and all? May the Lord help the sick.
PHYSICIAN ASSISTANTS (PAs)

Physician Assistants are health care professionals licensed, or in the case of those employed by the federal government they are credentialed, to practice medicine with physician supervision. As part of their comprehensive responsibilities, PAs conduct physical exams, diagnose and treat illnesses, order and interpret tests, counsel on preventive health care, assist in surgery, and write prescriptions.

PHYSICIAN ASSISTANTS CONTRIBUTE TO QUALITY OF LIFE FOR NEUROSURGEONS AND PATIENTS

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hysician Assistants (PAs) enhance quality patient care by fostering a team environment that supports neurosurgical patients with their unique problems and comorbidities. Within the physician-PA relationship, Physician Assistants exercise autonomy in medical decision-making and provide a broad range of diagnostic and therapeutic services. They are healthcare professionals licensed to practice medicine with physician supervision.

Physician Assistants manage many details of patients’ pre- and post-surgical care, ensuring personalized clinical attention, continuity of care and shortened hospital stays. This allows surgeons more time to concentrate on surgery, research and managing difficult cases.

On a typical day, the PA rounds on inpatients, including coordinating discharges from the hospital. During clinic he or she conducts initial consultations with new patients, taking detailed medical histories and presenting his or her findings to the Surgeon. The team confers and delineates treatment plans. The PA educates patients both pre- and post-operatively. Many times the Neurosurgeon does not have a lot of time pre-operatively to spend with patients, and the PA helps, by taking a little more time to talk to families, making sure they are calm before surgery. The PA sees patients for their first visit after surgery including suture removal in the office, and also take calls as needed from patients.

Pain management is another area where PAs provides a very necessary service to patients. They make adjustments as needed for patients and provide medication, which are both important time-savers for the supervising physician.

The PA’s key role as a first assistant reflects the neurosurgeon’s trust in him or her, based on years of shared surgical experience. The PA’s highly developed technical abilities and knowledge of anatomy make them effective first assistants in the operating room. In some cases the PA identifies the surgical site and makes the initial incision as the Neurosurgeon reviews the studies in the room. During the procedure the PA helps by being a closely attuned right hand to the surgeon, handling a wide range of surgical tasks. The PA closes most of the surgical wounds from deep to superficial, helps with post-operative orders and checks on patients after their arrival in the recovery room. The American College of Surgeons recognizes Physician Assistants as qualified First Assistants.

> THE PHYSICIAN ASSISTANT IS A TRUE EXTENSION OF THE SURGEON BECAUSE OF HIS OR HER MEDICAL MODEL EDUCATION, AS WELL AS PHILOSOPHY AND COMMITMENT TO PHYSICIAN-DIRECTED, PATIENT-CENTERED CARE. <
In some practices the PA takes first call, and is the first responder to the ER and sees all consults in the hospital. The Neurosurgeon sees all admissions and consults within 24 hours and is able to see such patients with all the information required to make a surgical decision.

The Physician Assistant is a true extension of the surgeon because of his or her medical model education, as well as philosophy and commitment to physician-directed, patient-centered care. PAs maintain their competency by national certification and mandatory continuing medical education. Their generalist medical education provides a solid foundation from which to address the diverse aspects of neurosurgical practice, including performing physical exams, diagnosing conditions and developing treatment plans, prescribing medication and assisting in surgery.

Physician Assistants are hired through hospitals, private practices, managed care organizations and universities where they are employed in research and teaching and are typically credentialed under the medical staff bylaws. Currently all 50 states cover medical services provided by PAs under Medicare and Medicaid. Reimbursement is paid to the PA’s employer. Private insurers generally cover medical services provided by PAs when they are included as part of the physician’s bill or as part of a global fee for surgery.

Twenty-five percent of approximately 70,000 clinical practicing PAs work in surgical specialties or sub-specialties. Approximately 2.4% are Neurosurgical Physician Assistants.

There has been an increase in the utilization of Neurosurgical PAs since the mandate that changed resident hours. One of the most valuable aspects of using PAs is the continuity they provide the patient on a service where medical students rotate every six weeks and residents change yearly. One concern raised by the limits on resident duty hours is the potential for increased numbers of hand-offs of patients between residents. One study showed that the restricted working hours for residents were associated with delayed ordering of tests and increased rates of in-hospital complications. A PA can help to mitigate these errors of miscommunication and the delays that tend to occur with frequent patient hand-offs. If you have a PA, it’s like having a good resident who never leaves.

The team relationship is exemplary; mutual respect fosters a collegial and effective work environment that promotes the sharing of ideas regarding patient care and professional issues.

The abilities of a PA are further developed and enhanced by the nature of the professional physician-PA relationship that is the foundation of the philosophy behind these true Physician Extenders.
NURSE PRACTITIONERS (NPs)

Nurse Practitioners (NPs) are advanced practice nurses who provide comprehensive preventive and acute health care services to individuals across the lifespan. Nurse Practitioners are experienced registered nurses (RNs) who have earned additional education and clinical skills to practice in an advanced capacity. Thus, NPs are also referred to as Advance Practice Nurses or APNs.

THE NURSE PRACTITIONER AND THE NEUROSURGICAL HEALTHCARE TEAM

In the early 1960s, due to limited health care resources for under-served populations and a nationwide physician shortage, the role of NPs evolved. Over time and with a federal initiative to increase greater access to providers of primary care, NP programs flourished. With the inception of healthcare reform in the 1990s, there were an increased number and acuity of patients, demands to shorten lengths of hospital stays, limited resident physician access due to an 80-hour work week initiative, and increasing demands on attending physicians; these factors further expanded the role of the NP.

The first program to successfully prepare NPs for practice was developed by the team of Loretta Ford, a nurse, and Henry Silver, a physician, at the University of Colorado in 1965 (American Academy of Nurse Practitioners, 2008). Neurosurgical NPs practiced in collaboration with the attending neurosurgeon(s) and other members of the team in both the clinic and inpatient settings to provide comprehensive patient care.

Nurse Practitioners’ healthcare roles consist of obtaining health histories, performing complete physical examinations, entering orders, performing and interpreting diagnostic studies, providing diagnosis and treatment of acute and chronic medical conditions, prescribing medications, providing health teaching and counseling, and referring patients to other health care providers.

How are Nurse Practitioners Educated and Credentialed?

Currently, to practice at entry level requires a Master’s degree. Nurse Practitioners must first earn a Bachelor’s degree in nursing and then a graduate degree in an NP program, although some NPs also complete a doctoral degree. NPs then define an area of educational focus, such as neonatal, pediatric, family, adult, gerontologic, oncology, women’s health, mental health and acute care. Presently, half of NPs practice in the primary care setting while the remainder are in sub-specialty areas such as neurosurgery, emergency, cardiovascular, orthopaedics, etc. Typically a NP practicing in a neurosurgery practice, which treats adolescents and adult patients, has earned an Acute Care or Adult Nurse Practitioner degree. In addition to earning a Master’s degree, NPs are encouraged to become board certified by taking a standardized national examination for their chosen specialty. However, board certification is not required by all state licensing boards.

Credentialing is the administrative process by which an individual or institution examines the information about a practitioner’s record of education, clinical training, licensure, DEA and board certifications, liabil-
NURSE PRACTITIONERS WITH A SPECIFIC CLINICAL FOCUS, SUCH AS NEUROSURGERY, MAY ENHANCE THE SCOPE OF THEIR PRACTICE TO MEET THE NEEDS OF THE NEUROSURGICAL PATIENT.

Do Roles Vary Depending on Academic or Private Practice?

Neurosurgical NPs have a similar scope of practice in both academic and private settings. There are, however, variations of roles between the clinic and inpatient settings with the obvious differences of managing outpatient concerns such as new and follow-up evaluations, compared to the acute care needs of the hospitalized patient. Additionally, the neurosurgical NP role can vary by state as each outlines the scope of practice for NPs in their respective Nurse Practice Acts.

Nurse Practitioners with a specific clinical focus, such as neurosurgery, may enhance the scope of their practice to meet the needs of the neurosurgical patient by completing additional training to perform advanced clinical procedures such as management of ventriculostomy and lumbar drains, drain removal, insertion of central lines, arterial lines, shunt reprogramming, spinal cord stimulator and intrathecal pump programming, and application and removal of halo orthoses (Herrmann and Zambrowski, 2005 and Yeager, Dale-Shaw, Casavant, and Burns, 2006). Depending upon the individual state Nurse Practice Acts (Cary and Smolenski, 2008, and Sherwood, Brown, Fay, and Wardell, 1997), NPs can perform these procedures with additional training and proper credentialing.

What is the Impact on Physician Education?

In their 2007 study examining the impact of nurse practitioners on physician education, Bahouth et al. reported resident physicians noted a positive experience when rotating on services with NPs versus those without NPs. The surgical residents reported an "increased ability to concentrate during formal education and operating room time since the NP provides continuity in care during the resident time away from the unit."

In summary, NPs are increasingly in demand and are being utilized in various roles due in part to the increased number and acuity of patients needing primary, tertiary and specialty care; the requirements created by the health care reforms of the 1990s; and the passage of the resident 80-hour work week law. The NP role will continue to evolve and include even more patient care responsibilities in addition to the direct and indirect enhancement of resident physician training, with the overall team goal of improved patient health care.

References
The reduction in resident work hours necessitates a restructuring of the neurosurgical team to ensure the continuity of quality care and patient safety. Registered Nurse First Assistants (RFNAs) are qualified surgical assistants who have helped fill the void in the surgical field. The American College of Surgeons acknowledges the benefit of RFNAs by stating that when co-surgeons or residents are unavailable to serve as assistants-at-surgery, a non-physician health professional should be allowed to perform the role if the practice privileges of such an individual are based upon verified credentials, reviewed and approved by the hospital credentialing committee, and within the defined limits of state law.

The Association of periOperative Registered Nurses (AORN) adopted the first official statement on RFNAs in 1984, and defined the role as a perioperative registered nurse who works in collaboration with the surgeon and healthcare team members to achieve optimal patient outcomes. The RNFA must have acquired the necessary knowledge, judgment and skills specific to the expanded role of RNFA clinical practice. Intraoperatively, the RNFA practices at the direction of the surgeon and does not concurrently function as a scrub nurse.

Registered Nurse First Assistants are Registered Nurses. Most have CNOR (Certified Nurse Operating Room) certification, which requires two years and 2,400 hours of operating room nursing experience to qualify to sit for the certification exam. Alternatively, they may be master-prepared, board-certified Advanced Practice Nurses (APNs). (The term “Advanced Practice Nurse” is used to describe Nurse Practitioners, Certified Registered Nurse Anesthetists, Clinical Nurse Specialists and Certified Nurse Midwives). An approved post graduate RNFA education program, which includes one year with didactic and clinical components, must be completed. An APN or Bachelor’s degree-prepared RNFA may take the CRNFA certification exam through the Competency and Credentialing Institute (CCI) after obtaining 2,000 hours of experience. Although encouraged, this is not required.

The reduction in resident work hours requires resourceful time management and efficient use of the neurosurgical team. As efficiency becomes the focus in healthcare, the value of the RNFA becomes increasingly evident.

REGISTERED NURSE FIRST ASSISTANTS (RNFA)

Registered Nurse First Assistants (RNFA) are experienced operating room registered nurses who have completed an additional specialty education program providing them the necessary skills to first assist with surgery under the direction of a surgeon. Registered Nurse First Assistants promote collaboration, provide stability and facilitate the surgical process to ensure that surgical patients receive consistent and superior care.

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> THE REDUCTION IN RESIDENT WORK HOURS REQUIRES RESOURCEFUL TIME MANAGEMENT AND EFFICIENT USE OF THE NEUROSURGICAL TEAM. AS EFFICIENCY BECOMES THE FOCUS IN HEALTHCARE, THE VALUE OF THE RNFA BECOMES INCREASINGLY EVIDENT. <
comprehensive understanding enables RNFAs to reduce operating time and costs, and also maximize surgeon efficiency. Registered Nurse First Assistants work toward providing optimal care and improving patient outcomes cost-effectively while supporting the surgical team. Their collaboration extends to the surgeon, anesthesia team, additional nursing personnel, the patient and his or her family, from admission through discharge. This holistic compassionate care is the trademark of nurses and the RNFA is in a prime position to offer all of these services to the neurosurgical team.

Registered Nurse First Assistants provide consistency and guidance in the fluctuating operative environment. They are the bridge between surgeons and nurses by learning the routines and preferences of the individual surgeons, communicating them to the surgical team, and enacting them. Registered Nurse First Assistants are the stable element in the OR as the residents, nurses and anesthesia personnel rotate through. Through their experience, they serve as valuable educational resources for medical students, residents, nurses and surgeons.

Examples of RNFA interaction with the neurosurgical team include:

- Evaluating and assessing patients in the preoperative holding area.
- Verifying that preoperative documentation is complete and accurate.
- Marking the surgical site.
- Transferring the patient to the OR.
- Supporting anesthesia personnel and nurses in preparing the patient for surgery.
- Positioning and applying position devices as needed.
- Prepping and draping the surgical site.
- Participating in the time out.
- Exposing the surgical site and assisting with the surgical procedure by handling and cutting tissue, using instruments and medical devices, providing exposure and hemostasis, suturing, closing the incision and applying dressings.
- Assessing the patient’s motor and neuro status after he or she awakens in the OR.
- Writing postoperative orders and notes according to established protocols.
- Transferring the patient to the post-anesthesia unit.
- Participating in postoperative rounds.
- Assisting with discharge planning and identifying appropriate community resources as needed.

Registered Nurse First Assistants behaviors may vary depending on patient populations, practice environments, services provided, accessibility of human and fiscal resources, institutional policy and state nurse practice acts.

Registered Nurse First Assistants can directly support resident education by:

- Evaluating patients in the holding area in the morning, allowing the residents more time to do morning rounds.
- Supporting in facilitating the surgical process.
- Assisting with closure of large incisions.
- Facilitating the turnover of cases in the OR, allowing residents to attend to other patients during that time.
- Freeing up residents in the evening by closing, waking, and transferring the patients, enabling residents to start evening rounds earlier.
- Covering while residents are at educational meetings and conferences.
- Allowing residents to efficiently use their time and potentially decrease their work hours.

Financial reimbursement for RNFAs is dependent on a multitude of factors including experience and region of the country. In general, it is reported that RNFAs are compensated 10-15% more than perioperative nurses, with mean incomes from $60,000-$70,000.

In 2007, the National Association of RN First Assistants (NARNFA) completed a descriptive and demographic survey of 2,500 RNFAs. The survey results showed that 53% of RNFAs are hospital employed and that the hospitals had at least four RNFAs on staff. The remaining RNFAs were self employed (25%) or physician employed (32%). Several states have legislation that enable the RNFA to be an independent contractor, be self-employed, or work in a group of surgical assistants. This allows the RNFA to bill the insurance carrier as a separate healthcare provider, the same as an assistant surgeon would. Whether in an academic setting, physician-based practice, or as an independent contractor, the RNFA is capable of providing detailed care and continuity that is rewarding for the patient, the surgeon and nurse.

References

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There are several organizations that certify and license surgical assistants. Each organization agrees that surgical assisting is a specialty allied health profession that requires specific training and education over and above a degree in science, nursing, physician assisting or other healthcare professions. Minimum educational requirements are university level microbiology, pathophysiology, pharmacology, anatomy and physiology, and medical terminology, in addition to the specific allied health education each profession requires. All recognized certifying bodies require surgical assistants to submit to a board examination that is focused on surgical assisting knowledge and skills. The Certified Surgical Assistant (C.S.A.) is required to sit for a national board exam administered by the National Surgical Assistant Association, and is qualified to sit for this exam only after com-

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WHAT SURGICAL ASSISTANTS DO TO HELP NEUROSURGEONS AS WORKFORCE EXTENDERS
pleting a recognized and accredited surgical assisting program or by holding a certification in another surgery-related allied health profession for three years. These surgical assistant candidates are then only eligible to sit for the CSA exam after completing 2,250 hours of surgical first-assisting. These eligibility requirements are verified by a rigorous process of evaluating education, recommendations from surgeons and then by validating case logs.

There are several pathways of eligibility for entrance into the surgical assisting profession, such as military medical programs, nursing and physician assistant programs, as well as surgical technology programs emphasizing surgical assisting. The most commonly accepted method is graduation from a surgical assisting education program which is accredited by the Commission on Accreditation of Allied Health Education Programs (CAAHEP), the only accrediting body approved by perioperative physician organizations such as the American College of Surgeons, American Academy of Anesthesiologists, American Medical Association and the American Academy of Physicians.

Surgical assisting is a thriving and rapidly growing profession, with an estimated 5,000 practitioners in the United States, a number that could easily double in the next few years. The trend of augmenting surgical teams with surgical assistants will continue to be intensified by the critical shortage of physicians, especially in surgical disciplines such as neurosurgery. The number of neurosurgical-specific surgical assistants is not known.

Surgical assistants are commonly found in private practices, outpatient clinics, private hospitals and teaching hospitals. Surgical assistants are often looked upon to help train surgical residents on such important skills as retraction and suturing, and are found teaching in medical education programs around the country.

Surgical assistants are employed and compensated in many different ways. It is not uncommon to find surgical assistants in hospital surgery departments where they are paid by the hospital; in private practices where they are paid by the surgical group practice; and in partnerships of independent contractors where they are both contracted and paid by the hospital or the surgeon. It is also common practice for surgical assistants to bill a patient’s insurance, either independently or in coordination with a surgeon, for their services.

Surgical assistants are integral members of the surgical team, often aiding the hospital staff with an in-depth understanding of procedures, the specifics of each patient, and consummate knowledge of a surgeon’s preferences and techniques. This unique ability to help the surgeon perform more effectively and to help the surgical staff operate more efficiently is believed to be critical to the optimal outcome for surgical patients.

Regardless of where surgical assistants work or how they are employed, their role remains the same: to work intraoperatively under the direction and supervision of the surgeon to ensure optimal outcomes for the surgical patient.
NEUROSURGEONS, INTENSIVISTS AND THE FUTURE OF NEUROCRITICAL CARE

This series of commentaries explores the adequacy of the neurosurgery workforce, the educational impact of the shortened resident work week, and the role of “physician extenders” and other medical specialties in caring for neurosurgical patients. This particular article discusses the role that neurosurgeons have in neurocritical care and their evolving relationship with critical care physicians.

Our main message is that neurosurgeons are essential to neurocritical care and that the introduction of intensivists to a neurosurgical service must be done in a way that establishes a collaborative relationship that respects the unique knowledge and skills of neurosurgeons. The primary role of the neurosurgeon in directing the management of critically ill neurosurgical patients must be maintained. If this is done well, the resulting “win-win” situation benefits everyone, especially patients. However, a poorly conceived marriage between neurosurgeons and critical care physicians may create confusion, inefficiency, and worst of all, misunderstandings and errors.

Population of Neurocritical Care
Why is interest in neurocritical care undergoing such apparently rapid growth? One answer is the 80-hour work week, which affects neurosurgery residents as much as other residents, if not more so. Neurosurgery residents are spending less time in the ICU because, in order to master surgical technique, they often spend as much of their 80 hours as possible in the operating room.

Another reason is the relentless decline in compensation rates for physicians’ professional services. The corresponding pressure to spend one’s time in high-reimbursing activities means that many neurosurgeons must spend more hours in the operating room and less time taking care of their patients in the ICU setting. For non-surgeons, however, critical care billing is often quite lucrative, especially when procedures are included.

Lifestyle and workforce are other factors. Many younger physicians opt for specialties or practice settings that give them ample free time, whereas some older physicians opt for early retirement. In some regions, the number of neurosurgeons willing to put up with the long and unpredictable hours involved in critical and emergency care has decreased.

The above factors compound an evolving shortage in neurosurgical human resources. Because of society’s focus on primary care and on areas of health care with greater visibility, the shortage of available neurosurgeons who are willing and able to look after critically ill neurosurgical patients has fallen below the radar screen of health policy officials and the public.

These factors may come together to create a void in many ICUs that have traditionally been run by the neurosurgery service. Other providers are stepping forward to fill the void. Note that, in many cases, these physicians entered the neuro ICU not because of any greater knowledge or experience, but merely because of geography and convenience: they are often able to spend more time in the ICU than the neurosurgeons.

Potential Problems
The literature contains many articles reporting the advantages that intensivists bring to a neurosurgery service. These are generally measured in administrative endpoints like length of
stay, number of ventilator days, infection rates, etc. Because of publication bias and authorship bias, the reader would expect such studies to report a benefit. It is harder to demonstrate increases in what most clinicians would consider more clinically relevant endpoints, such as improved management of intracranial pressure, accurate detection of neurological deterioration, judicious use of resources, or other key aspects of neurocritical care.

Some hospitals use a “closed” ICU model, in which only the ICU team can manage and write orders on ICU patients. However, neurosurgeons may still be held accountable by hospital administration for cost, length of stay and other variables that are beyond their control. Families may become confused because they still view the neurosurgeon as the primary physician and the one who bears responsibility for patient care.

A current popular approach to critical care emphasizes “the team,” with attending physicians, fellows, residents, nurses, respiratory therapists, pharmacists, physical therapists and others all having a role to play. Unfortunately, work hour limitations, teaching conferences and shift changes for the many team members may impede continuity of patient care. Subtle changes in neurological exams may be missed, but in other cases, misunderstandings may prompt a mistaken diagnosis of neurological deterioration. The result may be costly and potentially deleterious transport for unnecessary CT scans and other tests that might not have been ordered by the neurosurgeon who knows the patient and has been following him or her throughout the hospital course. Frequent handoffs are necessary, but so many team members changing shifts so frequently means that sign-outs occupy more and more time.

Assuring uniform levels of competence is also difficult when so many individuals from different specialties are represented. For example, a patient who is aphasic from a focal left temporal lesion may be mistaken to be “unresponsive” from a diffuse cerebral process, and thus his extubation may be unnecessarily delayed. We all tend to focus on what we know. Thus, non-neurosurgeons may focus on organ systems other than the brain and spinal cord, perhaps to the extent that important neurologic issues are overlooked.

Another important consideration is that ICU-based physicians may not appreciate the full scope of a patient’s illness, which includes initial presentation, possible surgery, ICU stay, rehabilitation, and long-term follow-up. At the same time, neurosurgery residents miss a critical part of that spectrum if they do not address the critical care portion of a patient’s recovery. A thorough grounding in neurosurgical critical care is essential to understanding the foundations of neurosurgery, including cerebral blood flow and metabolism, spinal cord and peripheral nerve recovery, and the interplay between the nervous system and systemic physiology. Continuity across the spectrum improves patient care, increases a physician’s experience and knowledge, and provides important reassurance and constancy to families.

When one considers all of the above issues, it is clear that neurosurgeons have a key role to play in directing the management of critically ill neurosurgical patients and that models which exclude neurosurgeons from this role are inherently flawed.
Fortunately, there is good news on the horizon. In increasing numbers, neurosurgeons in both private and academic groups are making emergency care the major focus of their practices. In hospitals with a large volume of emergencies, it may be more efficient for one or two members of the neurosurgical service to focus on these cases rather than have every neurosurgeon in the group attempt to juggle emergency cases with an elective schedule. Specialists in emergency work generally play a large role in the ICU management of their patients because this management is often fairly straightforward for those who have completed a neurosurgical residency. Components of successful practices of this type include a supportive hospital administration that recognizes the contribution of trauma and other emergencies to a hospital’s margin; supportive colleagues within neurosurgery and among other specialties; payment of call stipends; and nonparticipation in managed care contracts. Neurosurgeons in these roles are ideally suited to direct the care of the intensivists and other ICU team members.

The satisfactions of an emergency-based neurosurgical practice have not been lost on residents, among whom there seems to be growing interest in this area. Do younger neurosurgeons interested in this field need a critical care fellowship? The answer is “no,” because every ABNS-certified neurosurgeon’s certificate acknowledges his or her expertise in the critical care management of neurosurgical patients. However, it is also true that such a fellowship may make it easier to find a job in this area. A fellowship in spine, cerebrovascular, tumor, functional/stereotactic or pediatric neurosurgery is not a requirement to perform high-quality work in these areas, but such additional training may help boost a residents’ exposure beyond what was available during residency. It might also jump-start a career and serve to shorten the time during which one has to “pay dues” as a young neurosurgeon. Finally, completion of a fellowship may help resolve battles with hospital credentialing committees about adequacy of training and scope of practice. The Society of Neurological Surgeons has outlined program requirements for advanced training in neurocritical care, which can be completed with little (if any) extra time added to residency. (http://www.societyns.org/fellowships/requirements-neurocritical_care.html)

In summary, excluding attending and resident neurosurgeons from clinical decision-making in neurocritical care and replacing them with non-neurosurgical intensivists may have significant drawbacks, including inefficient use of resources, weakened resident education, and potentially compromised patient care. Ideal systems call for other healthcare professionals to assist neurosurgeons in the ICU instead of attempting to replace them. A truly team-based approach, which recognizes the key role of the neurosurgeon in directing the management of the critically ill neurosurgical patient, is the model which achieves the greatest benefits. 

> SOLUTIONS

Fortunately, there is good news on the horizon. In increasing numbers, neurosurgeons in both private and academic groups are making emergency care the major focus of their practices. In hospitals with a large volume of emergencies, it may be more efficient for one or two members of the neurosurgical service to focus on these cases rather than have every neurosurgeon in the group attempt to juggle emergency cases with an elective schedule. Specialists in emergency work generally play a large role in the ICU management of their patients because this management is often fairly straightforward for those who have completed a neurosurgical residency. Components of successful practices of this type include a supportive hospital administration that recognizes the contribution of trauma and other emergencies to a hospital’s margin; supportive colleagues within neurosurgery and among other specialties; payment of call stipends; and nonparticipation in managed care contracts. Neurosurgeons in these roles are ideally suited to direct the care of the intensivists and other ICU team members.

The satisfactions of an emergency-based neurosurgical practice have not been lost on residents, among whom there seems to be growing interest in this area. Do younger neurosurgeons interested in this field need a critical care fellowship? The answer is “no,” because every ABNS-certified neurosurgeon’s certificate acknowledges his or her expertise in the critical care management of neurosurgical patients. However, it is also true that such a fellowship may make it easier to find a job in this area. A fellowship in spine, cerebrovascular, tumor, functional/stereotactic or pediatric neurosurgery is not a requirement to perform high-quality work in these areas, but such additional training may help boost a residents’ exposure beyond what was available during residency. It might also jump-start a career and serve to shorten the time during which one has to “pay dues” as a young neurosurgeon. Finally, completion of a fellowship may help resolve battles with hospital credentialing committees about adequacy of training and scope of practice. The Society of Neurological Surgeons has outlined program requirements for advanced training in neurocritical care, which can be completed with little (if any) extra time added to residency. (http://www.societyns.org/fellowships/requirements-neurocritical_care.html)

In summary, excluding attending and resident neurosurgeons from clinical decision-making in neurocritical care and replacing them with non-neurosurgical intensivists may have significant drawbacks, including inefficient use of resources, weakened resident education, and potentially compromised patient care. Ideal systems call for other healthcare professionals to assist neurosurgeons in the ICU instead of attempting to replace them. A truly team-based approach, which recognizes the key role of the neurosurgeon in directing the management of the critically ill neurosurgical patient, is the model which achieves the greatest benefits.
Hospitalists are physicians whose primary professional focus is the general medical care of hospitalized patients. Many patients are referred to hospitalists by their primary care physicians (PCPs) for treatment during hospitalization and are then returned to the care of their PCPs after discharge. Fueled by documented efficiency gains and quality benefits, hospitalist-based inpatient care has grown rapidly over the past decade. Recent data from the American Hospital Association suggest there are over 20,000 hospitalists in the U.S. practicing at over 50% of the nation’s hospitals. The number of hospitalists is expected to exceed 30,000 by 2010. One of the variables most likely to shift the projected number of hospitalists upward is the increasing role they are playing in the care of surgical patients.

Today’s surgeon caring for hospitalized patients faces the same demands PCPs have experienced over the past decade: 1) an accountability for quality and 2) the need for increased productivity and efficiency. For PCPs who were trying to juggle these demands for both outpatients and inpatients, the involvement of a hospitalist has allowed them to narrow their focus. Now they are able to let the hospitalist worry about quality, safety, and efficiency issues for hospitalized patients. Surgeons in teaching hospitals have faced similar challenges, but have relied heavily on residents and fellows to manage much of patients’ postsurgical hospital care.

General internists and subspecialists were certainly always available for medically complex patients, but most day-to-day management fell to the surgeons. Work-hour restrictions, combined with an increasingly older and more medically complex patient population, have resulted in the need to consider new models of care. Increasingly, models of surgical co-management have been developing in hospitals with robust hospitalist programs.

Surgical co-management differs from traditional consultation in many ways. First, co-management is often arranged prior to the patient being hospitalized. A hospitalist or group of hospitalists may have an arrangement with a group of surgeons to co-manage all of their hospitalized patients, or more often, the subset with complex comorbid illness. The surgeons remain the attending of record in some programs, but in others, it is the hospitalist who assumes the role of attending physician with the surgeon managing exclusively operative issues. In both models it is common for the hospitalist co-managers to write orders and daily progress notes, manage acute issues, communicate with family and referring physicians, and facilitate care transitions.

The literature describing outcomes with such models has been limited to a few programs and most often involves co-manage-
The growth of hospital medicine has been fueled by the recognition that hospitalists improve the efficiency of inpatient care while simultaneously focusing on improving quality and safety.
Importantly, however, the HOT trial did demonstrate increased surgeon and nurse satisfaction. Older literature from the “pre-hospitalist” era has also addressed a variety of co-management models and in several cases has shown co-management by internists and geriatricians to be associated with positive outcomes.

The experience with hospitalist co-management of neurosurgical patients is more limited, but at least one preliminary communication from the University of California, San Francisco (UCSF) suggests successful models do exist. Evaluation of the first year of a hospitalist-led neurosurgery co-management service at UCSF (on which hospitalists actively co-managed the sickest 30% of the patients and were immediately available to consult on the others) led to tremendous increases in perceived quality of care among both neurosurgeons and nurses.

Despite early positive reports, concerns remain about widespread application of the co-management model. Theoretically, in well-designed programs surgeons and hospitalists would work together collaboratively under clear rules of engagement with mutual respect and accountability to the needs of all members of the team. Unfortunately, this is not always the case. Anecdotally, many programs struggle with lopsided power structures where the surgeons dictate the care of the patients and expect the hospitalist to carry out their every wish. Such programs are often viewed by the hospitalists who work in them as being designed by surgeons and hospitals for the sole purpose of making surgeons happy and allowing them to operate on more cases without being “burdened” by the routine day-to-day postoperative care of patients.

Hospitalists in these programs also report significant concerns about accountability and medico-legal issues that arise when patients develop postoperative complications or are admitted to the hospitalist (instead of the neurosurgeon) in the middle of the night with a neurosurgical problem. If the neurosurgeon decides not to see the patients or deal with problems in a timely fashion, patients suffer and the hospitalist is now exposed to liability risk. To avoid these problems, programs must be developed with the primary goal of improving quality of care (including patient and provider satisfaction) while also attempting to maximize efficiency.

Even if they are designed well, co-management programs remain challenged by important external forces including reimbursement shortfalls and workforce shortages. Hospitalist and co-management programs are rarely financially self-sustaining, especially if they provide “unreimbursable” services such as 24/7 availability. They often require financial support from hospitals which see a substantial return on their investment in hospitalist programs (largely through improved efficiency). While some hospitals have directly supported co-management programs (UCSF’s model is one example), others may be reluctant to invest without some support-in-kind from the surgeons. If the hospitalists are managing much of the routine postoperative care, some hospitals have argued that the surgeons should share a portion of the “global fee” from the surgery to support the co-management program. That issue has been a sticking point in several negotiations we are aware of. And finally, hospital medicine faces a severe workforce shortage. Most hospitalists are general internists, and with a growing demand for hospitalists combined with declining interests in general medicine careers among medical students, there now exist over 10 hospitalist job openings for every prospective candidate. Increasing the demand for hospitalists by developing more surgical co-management programs further aggravates the existing workforce shortages and as a result, may not be feasible in the short term.

While the concerns we raise are real, there are many examples of programs which have successfully overcome them. The growth of hospital medicine has been fueled by the recognition that hospitalists improve the efficiency of inpatient care while simultaneously focusing on improving quality and safety. Surgical co-management programs are likely to experience the same benefits from hospitalists that hospitals have seen. If the challenges can be overcome and successful co-management programs developed, hospitalists will likely be viewed as valuable members of the neurosurgical team.
**Parkinson’s Disease**

The first report from the VA cooperative study of deep brain stimulation versus continued medical management in the treatment of Parkinson’s Disease (PD) appeared in January (Weaver et al. JAMA. 2009 Jan 7;301(1):63-73). This study randomized 255 patients to surgery or continued medical management. Within the surgical arm, patients were randomized to bilateral subthalamic nucleus (STN) or pallidal (GPi) deep brain stimulation (DBS). In this initial report, results from the two targets were pooled. Outcomes in the surgical arm were superior to best medical therapy in terms of motor improvements and quality of life at six months. However, the surgical group did have a higher rate of serious adverse events, including falls, dystonia, hardware failures, infections and one death secondary to intracerebral hemorrhage. This study and others confirm that there is a cognitive price to pay for improved motor function and quality of life, with mild changes in verbal fluency and working memory. With this study, there are now five randomized controlled trials that demonstrate superiority of surgical treatment to continued medical management in appropriately chosen patients with PD (Vitek et al. Ann Neurol. 2003 May;53(5):558-69; Esselink et al. Neurology. 2004 Jan 27;62(2):201-7; Deuschl et al. N Engl J Med. 2006 Aug 31;355(9):896-908; Schupbach et al. Neurology. 2007 Jan 23;68(4):267-71). The challenge is determining when a patient has failed medical therapy and should be referred to a surgical center. The Functional community looks forward to subsequent reports from the VA cooperative study with longer outcomes and subgroup analysis, especially the comparison between the two surgical targets.

In addition to DBS, Ceregene completed its Phase II trial of intraputaminal neurturin gene therapy for PD. Although not yet published, Ceregene has issued a press release stating that the trial failed to show efficacy of the vector over placebo. Neurologix has started its Phase II trial of glutamic acid decarboxylase gene therapy delivered to the STN for PD.

**Psychiatric Disease**

A consortium of American and Belgian neurosurgeons published long-term results of open label ventral striatal DBS for Obsessive-Compulsive Disorder (OCD) in 26 patients (Greenberg et al. Mol Psychiatry 2008). Over an eight-year period, they refined their target with decreased current required for therapy and increased efficacy, although the number of patients was small. On the basis of these results, Medtronic received a Human Device Exemption for ventral striatal DBS for medically refractory OCD from the FDA in February 2009. A French consortium published a beautifully designed and executed trial of STN DBS for OCD using a randomized, blinded crossover design (Mallet et al. N Engl J Med. 2008 Nov 13;359(20):2121-34). The target within the STN was more anterior and medial to what is usually used for PD. This trial demonstrated significant benefit in the active therapy arm, both in reduction of OCD symptoms as measured by the Yale-Brown Obsessive Compulsive Score (Y-BOCS) and improvement in Global Assessment of Function. This trial has set the bar quite high for subsequent studies of surgical treatment of psychiatric disease.

Both American and Canadian groups had significant publications on open label trials of DBS for Treatment Resistant Depression (Malone et al. Biol Psychiatry 2008; Lozano et
al. Biol Psychiatry. 2008 Sep 15;64(6):461-7) using different targets. The American group has used a similar target in the ventral striatum to what they are using for OCD. The Toronto group has targeted the subgenual cingulate gyrus (Brodmann Area 25). Both had similar response and remission rates, but the power requirements were much higher with the ventral striatal target. The FDA granted St. Jude Medical, which holds a US patent for Area 25 DBS for TRD, an Investigational Device Exemption (IDE) for a Phase II study. Medtronic is sponsoring a Phase II study of ventral striatal DBS for TRD.

Epilepsy

The efficacy of resective surgery for medically refractory epilepsy is well established. However, new technology is emerging, in addition to vagal nerve stimulation, for patients with medically refractory epilepsy who are not candidates for resective surgery. Although not published, data was presented from the prospective, randomized, blinded SANTE trial of thalamic anterior nucleus stimulation for medically refractory epilepsy at the 2008 American Epilepsy Society meeting. Medtronic is sponsoring a press release stating that there was a significant decrease in seizure frequency as well as an improvement in quality of life. Neuropace has completed enrollment in its pivotal trial of its RNS device for epilepsy. Unlike the device used in SANTE, which delivers continuous stimulation, the RNS device acts as a demand pacemaker or defibrillator, delivering a pulse when an algorithm detects seizure activity. We look forward to the published results of these two trials.

Stroke

Dr. Robert Levy presented the results of the Phase III EVEREST study of short-term motor cortex stimulation for treatment of stroke patients with upper extremity hemiparesis at the 2008 CNS meeting. Unfortunately, in spite of promising open label studies, there was no increased benefit of stimulation versus rehabilitation alone. Although they did not reach statistical significance, subgroup analyses suggested that some patients benefited from stimulation. These analyses may provide a focus for subsequent trials.

It is an exciting time in Functional Neurosurgery. The ability to turn stimulators on and off has given us the ability to perform randomized, controlled, blinded trials much more easily than with other surgical techniques. There has been exceptional refinement of outcomes measure with our Neurology and Psychiatry colleagues.

The quadrennial meeting of the World Society of Stereotactic and Functional Neurosurgery (WSSFN) will take place in Toronto from May 24-27 at the Fairmount Royal York Hotel. The exciting program can be accessed through www.wssfn.org. Members of the ASSFN are automatically members of the WSSFN and can register at a reduced rate.

Let Your Voice Be Heard at the 2009 CNS Annual Meeting.

Consensus Sessions offer attendees a chance to contribute to the advancement of organized neurosurgery by weighing in on critical socioeconomic issues and public policy topics. Available Tuesday and Wednesday, you can participate in one or all!

**Consensus Session I:**
*The Role of Mid-level Health Care Providers in Modern Neurosurgery Practice.*
*Moderator: Edward C. Benzel*

**Consensus Session II:**
*Individual Practice Options for Insurance Plan Participation.*
*Moderators: Joshua M. Rosenow, Richard W. Byrne*

**Consensus Session III:**
*Regionalizing Emergency Cerebrovascular Care.*
*Moderators: Jamie Sue Ullman, Henry H. Woo*

**Consensus Session IV:**
*Defining Quality Measures in Neurosurgery.*
*Moderator: Robert Weil*

These unique workshops allow attendees the opportunity to truly be a part of the CNS Annual Meeting and the future of neurosurgery!

*Registration Now Open at www.cns.org!*
Under the current CNS Bylaws, it is possible for the motivated reader to interpret Article IV, Sections 1 and 4 with contradictions as to the voting membership of the CNS. Article IV, Section 1 states that “only active members shall be entitled to vote” (emphasis added). While Article IV, Section 4 states that both Active International Members and Active International Vista Members shall “have all of the rights, privileges, duties and obligations of an Active Member” with the exception of holding a position of officer in the CNS (both may serve as members or chairpersons of committees however).

The following amendment to Article IV, Section 1 would resolve any ambiguity that may exist between Article IV, Sections 1 and 4 and clarify that Active, Active International Members and Active International Vista Members are all voting members of the CNS. 

Current Language

**ARTICLE IV**

Membership
Section 1. Members. There shall be ten (10) classes of membership in the Congress: Active Membership, Honorary Membership, Senior Membership, Inactive Membership, International Membership, International Vista Membership, Resident Membership, Associate Membership, Medical Student, and Affiliate Membership. Only active members shall be entitled to vote. The membership may be international in scope, and there is no limit to the number of members.

Proposed Language

**ARTICLE IV**

Membership
Section 1. Members. There shall be ten (10) classes of membership in the Congress: Active Membership, Honorary Membership, Senior Membership, Inactive Membership, International Membership, International Vista Membership, Resident Membership, Associate Membership, Medical Student, and Affiliate Membership. Only Active, Active International, and Active International Vista members shall be entitled to vote. The membership may be international in scope, and there is no limit to the number of members.
Introducing the 2009 CNS University of Neurosurgery Webinar Series!

Tuesday, April 21 at 7:00 pm EST
Vascular Webinar

Surgical Management of Brain Arteriovenous Malformations

H. Hunt Batjer, MD (Northwestern University)
Bernard R. Bendok, MD (Northwestern University)

Registration: $25 at www.cns.org!

Plus, look for these other Webinars coming later in 2009!

Socioeconomic
May 19

Tumor
June 16

The Congress of Neurological Surgeons is pleased to introduce a new webinar series, available through the CNS University of Neurosurgery at www.cns.org.

Six webinars are being offered throughout the year, each focusing on a different neurosurgical subspecialty topic.
If you are looking for something to do on the third Tuesday of every month, look no further. The CNS University of Neurosurgery (CNSU) has launched its new CME-generating Webinar series. From the convenience of the office or home, attendees can partake of a live lecture series featuring experts from various disciplines talking about current and practice-relevant topics.

On January 13, 2009, the CNSU presented its first webinar on pediatric neurosurgery, Management of Arachnoid Cysts. Mark Krieger from the University of Southern California expertly moderated this webinar, while Sean McNatt from Denver’s Children’s Hospital and Richard Anderson from New York’s Columbia Presbyterian Hospital, presented Fenestration of Arachnoid Cysts and Shunting of Arachnoid Cysts, respectively. Through interactive audience polling and active discussion, the webinar was well-received by all participants.

Since its inception, the webinar series has included Current Practice in the Treatment of Peripheral Nerve Trauma, with Allen Manik from New York’s Beth Israel Medical Center. This lecture was presented on February 17, 2009 with excellent attendance. On March 17, 2009, Drs. James Harrop, Michael Wang and Allan Levi, presented a three-part discussion of thoracolumbar trauma management. Along with audience polling and case discussions, the session was lively and informative for all.

In April, we look forward to the Surgical Management of Brain Arteriovenous Malformations, with Hunt Batjer and Bernard Bendok. In May, we will discuss how government regulations affect neurosurgical practice with representatives from the Council of State Neurosurgical Societies. To round out the first six months of this series, Drs. Charles Wilson and Philip Theodosopoulos will discuss management of pituitary tumors.

The webinar series is an exciting new offering of the CNSU to advance neurosurgical education and obtain CME credit without having to travel. Signing on is easy and affordable. Each program is $25 and prospective attendees can access registration through the CNSU at http://www.cns.org/university/webinar/index.aspx. We encourage all to go to the CNSU site at http://univ.cns.org/ to take advantage of further University programs. In addition, we are looking forward to presenting a new look to the CNSU site in the Fall, where one will find even more exciting content and course offerings.

Do not delay. Register for CNS University Webinars today!
A Neurosurgical Resident is called to the ER to see a 5-year old with a laundry list of symptoms who just had a CT of the head. There it is...an enhancing mass in the posterior fossa with hydrocephalus (photos at right).

- What could it be?
- What should be done with the hydrocephalus?
- Does this correlate with the symptoms?
- What to do?

The Congress of Neurological Surgeons web site is the next move. Grabbing her smart phone, she accesses the Pediatric eHandbook at the CNS University of Neurosurgery. She clicks on Infratentorial Tumors and reads about the differential diagnosis and current management protocols. She picks up the phone seven minutes later, “Dr. Ritter, I have a 5-year old female that looks to have a posterior fossa tumor. It looks like a medulloblastoma, or less likely an ependymoma. There is hydrocephalus, but she does not need a ventriculostomy at this time. I am going to admit her to the PICU, start steroids and order an MRI of the head and spine for the morning...”

The neurosurgical community is moving swiftly into the future with revolutionary applications of technical practices making their way into the operating room and radiology suites. For example, electrodes are being placed into the subthalamic nucleus to improve the dyskinesia of a Parkinson’s patient and Interventional Neurosurgeons can place coils into a ruptured PCOM aneurysm using biplanar fluoroscopy. The ability to retrieve accurate, up-to-date information needs to meet these same rapidly changing demands.

The use of the internet has left our gold standard textbooks collecting dust on the shelves. Even the Residents’ Neurosurgical Handbook is rarely seen in a white coat pocket anymore. Instead, it rests alone in the call room with the binding barely cracked. It is easier to Google “Medulloblastoma” and read the most recent EMedicine article on the topic than flip through a volume of our most valued textbooks, which are usually locked behind the Attending’s office door or in the neurosurgery library in the next building.

The CNS and Pediatric Section have started the revolution with neurosurgical eHandbooks, which can be accessed from the CNS web site or downloaded onto a smart phone. Pediatric Neurosurgery: On Call, is the first in the series of texts that provide accurate medical information in a timely manner. This resource is now available on the CNS University of Neurosurgery site under Educational Tools, http://univ.cns.org or the direct link http://www.cns.org/university/pediatrics/index.asp. This joint venture between the pediatric neurosurgical population and the CNS makes it a powerful, unique educational tool that is easily accessible from any computer or PDA.
This Pediatric eHandbook is now available to medical students, neurosurgery residents, pediatric subspecialty fellows (pediatric intensive care, pediatric neurosurgical, and pediatric neurology, and emergency room fellows, etc), physician extenders and anyone else attempting to locate data on the web. It provides vital initial information for those in neurosurgical training while in the emergency room, clinic or during a patient’s late night consult. *Pediatric Neurosurgery: On Call* is specifically focused on the management of pediatric head and cervical trauma. The references in each chapter can be a preliminary location for the most recent review of the literature.

There are abundant benefits from an electronic textbook or handbook. This format allows for easy revision of references, new techniques, pictures, tables and/or any content. This information can be uploaded at the time of the handbook update or at any time the authors feel it necessary. There is no waiting time for the revisions or proofs from the publisher, and the lengthy “time to print” is abolished. The use of electronic books provides instantaneous updates!

The way that we acquire information is changing daily – today’s knowledge is received at revolutionary speed via the Internet. The CNS web site is transforming to meet these educational needs. The CNS is getting there early, anticipating new means of communication, meeting that anticipation head on, thereby helping our professionals be as knowledgeable as they can be.

The CNS and the Pediatric Section are proud to be at the forefront of this revolution. We are also happy to report, that the second handbook in this series, Spine eHandbook, is currently underway.
> THIS MEETING WAS AN IMPORTANT EVENT FOR THE CROATIAN NEUROSURGICAL SOCIETY. IT WILL SERVE AS A PLATFORM FOR FURTHER AFFIRMATION OF THE PROFESSIONAL ACTIVITIES IN OUR SOCIETY AS A WHOLE, AS WELL AS OUR INTERNATIONAL PROFILE BOTH REGIONALLY AND GLOBALLY. <

Stradun Street: Night Scene on Stradun Street in Dubrovnik.
The 5th Congress of the Croatian Neurosurgical Society in partnership with the Congress of Neurological Surgeons was held in Dubrovnik on September 2-5, 2008. This joint meeting, the culmination of years of cooperation and friendship between the Croatian Neurosurgical Society and the CNS, was a resounding success and provided further evidence of the increased international focus of the CNS.

Croatia is a small Mediterranean country situated in the southeast of Europe with a population of approximately 4.5 million. The coast of Croatia is 1200 kilometers long and there are more than 1000 islands along the coastline. Croatia borders Italy, Slovenia and Hungary to the north and Serbia, Montenegro and Bosnia and Herzegovina to the east and south, respectively.

The Croatian Neurosurgical Society was officially formed on June 12, 1992 after the disbanding of the Jugoslavian Neurosurgical Society. Croatian neurosurgeons officially withdrew their membership in the Jugoslavian Neurosurgical Society following the start of Jugoslav aggression towards Croatia. Croatia declared independence which was internationally recognized on January 15, 1992.

The beginnings of neurosurgery in Croatia reach as far back as the 19th century. General surgeon Theodor Wickerhauser published a detailed article regarding craniotomy technique in 1894. The article appeared in the publication "Physician News" which is still published today. The first brain tumor removal articles date back to 1901 while the first clinical data concerning the operative treatment of trigeminal neuralgia can be traced to 1904.

Esteemed physicians Sercer, Blasković and Padovan (Otolaryngologists) were the pioneers of transsphenoidal pituitary resections in Croatia with the first operative procedures dating back to 1922.

In the period after World War II (from 1946), the first neurosurgical unit in Croatia was formed in Zagreb. In 1972, neurosurgery was recognized as a specialty and was separated from the educational and clinical program in general surgery by the decision of the Managing Board of Zagreb Medical School. Independent residency in neurosurgery as well as an educational faculty program in neurosurgery were introduced several years later. The first microscope-assisted surgical treatments were performed in the late seventies while the first computed tomography scan was installed in 1975. After Zagreb, neurosurgical wards and units were starting to emerge in Croatia. In Zagreb, there are currently three active neurosurgical units with one unit functioning in Split, Rijeka, Zadar, Pula, Osijek and Slavonski Brod.

Today, the Croatian Neurosurgical Society consists of 78 members with 64 specialists (59 active and five retired) and 14 neurosurgical residents, who cover all aspects of the discipline ranging from neurotraumatology, spinal surgery, neuro-oncology, functional and stereotactic surgery to radiosurgery. Endovascular procedures are being performed in cooperation with interventional radiologists.

The central neurosurgical institution in Croatia is the Clinical Department of
Neurosurgery at the Clinical Medical Centre Zagreb (Head Professor Josip Paladino) which is certified by the European Association of Neurosurgical Societies (EANS) as the Centre of Excellence for education in neurosurgery.

The Current Managerial Board of the Croatian Neurosurgical Society includes:
Professor Josip Paladino, President
Professor Lucijan Negovetic (retired), Vice-President
Professor Pavle Miklic, Secretary
Professor Miroslav Vukic, Treasurer

Members of both the Croatian society and the CNS have helped create and maintain the excellent relationship enjoyed by our two organizations. There are several Active International CNS members in Croatia and professor Miroslav Vukic is a member of the International Committee of the CNS. Every three years since 1999, a National Croatian Neurosurgical Society Congress is held with strong connections and cooperation from the CNS.

Beverly C. Walters (Rhode Island) and Jamshid Ghajar (New York) were the first neurosurgeons from the US to participate in the Croatian Neurosurgical Society Congress in Opatija in 1999. Special gratitude for creating and sustaining the excellent relations between the Croatian Neurosurgical Society and the CNS goes to Dr. Walters who, since her first visit to Croatia in 1998, has visited 24 times and performed complex neurosurgical procedures on many prominent Croats such as an esteemed neurosurgery professor and highly positioned government officials, free of charge. Dr. Walters has donated microsurgical instruments and held many presentations and seminars on cervical spine surgery. She is responsible for several United States fellowships performed by Croatian Neurosurgical Society members in 2000 and 2006.

In the 4th Croatian Neurosurgical Society Congress held in November 2005 (CNS members participating: Beverly C. Walters, Nelson C. Oyesiku, Chandranath Sen, Richard D. Bucholz, Andrew Youkilis), Dr. Walters proposed that the jubilee 5th Congress would be held as a joint meeting with the CNS in Dubrovnik. The idea was met with a warm reception from then CNS International Committee chairs Drs. Gail Rosseau and Ali Rezai and was finally realized in Dubrovnik in September 2008. The success of the meeting resulted from cooperation between the Croatian Neurosurgical Society; the local organizing committee led by Kresimir Rotim; the CNS; Charles Y. Liu; and members of the Executive Committee led by then CNS President, Tony Asher.

The meeting, under the auspices of Croatia’s President and the city of Dubrovnik, was attended by 142 participants from 15 countries and offered a wide range of quality clinical, as well as scientific, topics. Current CNS President David Adelson led the CNS delegation, which also included Past Presidents of the CNS, Nelson C. Oyesiku and Richard Ellenbogen, as well as other prominent members such as Chandranath Sen, Laligham Sekhar, Domagoj Coric, Charles Y. Liu, Daniel K. Resnick, Ashwini Sharan and, of course, Beverly C. Walters. Prominent leaders of neurosurgery worldwide were also central to the success of the meeting, including EANS President Johannes Schramm, Jurgen Tonn, Marcos Tatagiba, Vinko Dolenc, Vedran Deletis, and many others too numerous to mention whose contribution were very much appreciated.

This meeting was an important event for the Croatian Neurosurgical Society. It will serve as a platform for further affirmation of the professional activities in our society as a whole, as well as our international profile both regionally and globally. The City of Dubrovnik, with its tourist and cultural attributes, was, most certainly, delightful, and the cultural experience for all attendees was very memorable. We would like to extend our deepest thanks to all the members of the CNS participating in this event on behalf of the Croatian Neurosurgical Society and we are hoping for further cooperation with our transatlantic colleagues.
The patient, a 48-year-old man, presented to the neurosurgical clinic with complaints of gait instability and increasing word-finding difficulty for four months. MRI of the brain demonstrated ventriculomegaly with transependymal edema. A diagnosis of normal pressure hydrocephalus was made. A ventriculoperitoneal shunt was placed via a right parietal approach. The postoperative images demonstrate that the catheter (which was passed over the stylet to 3cm), deflected off choroid or ependymal tissue, continued through the septum to the left lateral ventricle, deflected again, and continued to the posterior horn of the left lateral ventricle. Postoperatively the patient's gait improved immediately. He reported subjective improvement in word finding and memory. He was discharged home postoperative day one.