

## Discussion Forum and Cases to Debut on NCS Website

By Jennifer A. Frontera MD  
Website Subcommittee Chair



One of the central tenets of the Neurocritical Care Society is to foster a community of camaraderie and multi-disciplined learning by bringing together health care providers from diverse fields with

an interest in caring for critically ill neurological patients. To advance this cause the NCS is excited to announce the development of an interactive component to the NCS website, which will feature a live discussion forum and a featured case presentation and discussion section.

The discussion forum will be hosted by a group of neuro-intensivists from across the country with varied research interests caring for diverse patient populations. We recognize the breadth of experience of our growing community and hope to facilitate networking to advance patient care and research collaborations. Participants are encouraged to submit questions or comments regarding patient care (respecting

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## Neurocritical Care Exam Set For 2010

The United Council for Neurologic Subspecialties (UCNS) is offering a subspecialty certification examination in for Neurocritical Care (NCC) in 2010. Each subspecialty examination will be a 200-question, multiple-choice, computer examination lasting four hours. Pearson VUE will administer each examination at Pearson Professional Centers across the United States. Candidates will have the option of choosing one of the five days to sit for each examination and be able to select a location so that traveling will be minimized.

The Information for Candidates booklet, which includes the examination requirements, Certification Application can be found on the UCNS Website at: [www.ucns.org/certification](http://www.ucns.org/certification).

To view the exam content outline, please click on the following link:  
<http://www.ucns.org/subspecialty/neurocritical/certification>.

Questions regarding the examinations or certification application should be directed to Todd A. Bulson, UCNS Manager at [tbulson@ucns.org](mailto:tbulson@ucns.org) or (651) 695-2813.

For more information, please contact Michelle Bosacker at [mbosacker@ucns.org](mailto:mbosacker@ucns.org) or (651) 332-8681.

UCNS Neurocritical Care Accreditation Application Deadline: The next accreditation application deadline is December 31, 2009 for spring 2010 review and accreditation for the 2010 academic year. The Program Information Form (PIF) and Appendices may be downloaded from [www.ucns.org](http://www.ucns.org) and submitted via email to UCNS at [applications@ucns.org](mailto:applications@ucns.org). You are invited to consult with UCNS staff as you prepare your application. Contact Tracy King, Accreditation Manager, at 651-695-2816 or [tking@ucns.org](mailto:tking@ucns.org) with questions about applications or review process.



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## President's Corner



By Cherylee W. Chang MD

"What is the future of neurocritical care?"

Decades ago, critically ill neurological patients were being managed by neurosurgeons, anesth-

esiologists, internists and pulmonologists. There was no defined subspecialty in this area, although practitioners for these patients knew the demand for an understanding of the multi-system interplay with the patient's neurological condition. Now years later, there is recognition by other physicians, specialty organizations, hospitals and even quality based organizations such as Leapfrog that this subspecialty expertise exists. Patients and their families are aware. Subsequent studies have also shown that subspecialty neurocritical care can improve outcomes and decrease costs.

The challenges that arise with recognition of this subspecialty expertise now involves how best to integrate its practitioners into best patient care. Each hospital unique to its location and financial situation, has variable resources in terms of specialists, technology and transport. As an organization, the NCS is being asked how we see neurocritical care-certified individuals integrating into medical staffs across the country. These manpower and economic factors impact not only patients, physicians and hospitals, but specialty organizations in deciding how they support this new subspecialty.

ACGME training programs and certification requires a certain critical mass of individuals, training programs and a body of knowledge such as a journal to support it. In the years since its inception, the NCS has worked to build these things. The journal, *Neurocritical Care* has a growing circulation and a rising impact factor that denotes its prominence and use as a reference for others.

The growth of neurocritical care has revitalized an awareness of the fragmentation of the critical care training and certification in the United States. Countries like Canada have a common critical care curriculum and training program for intensivists as a foundation for a physician to build upon even with further subspecialty training. In the United States, specialties such as internal medicine, anesthesia, and general surgery each have separate curricula and training

duration that they define as critical care. Each has its own ABMS critical care certification examination. In neurology there is no defined critical care curriculum, training or certification, and with acknowledgement that many other specialty trained individuals (internists, pulmonologists, anesthesiologists, surgical intensivists and neurosurgeons) practice neurocritical care, the NCS chose the certification mechanism for individuals through the United Council of Neurological Subspecialties to further define the expertise of the individuals of broad disciplines working in the area of neurocritical care. This mechanism continues to raise challenges that we are working to resolve.

This spring, the American Academy of Neurology's Committee of Subspecialties Executive Committee has opened active dialogue with neurological subspecialists and their societies including the NCS in how the AAN can collaborate and support these disciplines and their practitioners. Other organizations such as the Society of Neurosurgical Anesthesia and Critical Care (SNACC) have supported the NCS since it was established. The American Association of Neurological Surgeons and the Congress of Neurological Surgeons have for years supported having a representative from the NCS attend the executive meetings of the Joint Section for Neurotrauma and Critical Care and Joint Cerebrovascular section as we work together toward common patient goals.

The annual meeting with the hard work of the committee lead by Vice-President, Stephan Mayer continues to provide a forum for collaboration. Just as last year's theme was to build bridges and included joint sessions with the Society of Academic Emergency Medicine and the Society of Vascular and Interventional Neurology, this year's theme is on making connections and some of the plenary sessions are jointly endorsed by SNACC and the American Thoracic Society. Topics in pediatric neurocritical care will be presented and continues to be an area of growth in our society.

As neurocritical care units are better established and identified, opportunities exist to create a neurocritical care res-

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# Note From the Editor

## **CURRENTS** Quarterly Newsletter of the Neurocritical Care Society

August 2009  
Volume 4 - Number 3

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By Romergrzyko G. Geocadin, MD



In the August 2009 issue of *Currents*, the development of an interactive component of our website is the lead story. Jen Frontera, the co-chair for this component, discusses the development of the

discussion forum section for members and the "featured neurocritical care case" section of the website. The goal of this project is to enhance the sharing of ideas and strengthen the interactions of the NCS as a community. In addition to this, a new "Get Involved with the NCS" portal is now active on our website. This was added to allow all members to communicate directly with our leadership and facilitate involvement in our activities.

The regular sections continue to provide highly informative materials. Updates from our president Cheryl Chang help us appreciate the growth of the NCS almost in real time and the memo from our journal's editor in chief, Eelco Wijdicks gives us a glimpse of the exciting articles that are yet to come out of *Neurocritical Care*. In the clinical trials monitor section, Matt Koenig writes about the ongoing multicenter clinical trial CONSCIOUS-2 studying clazosentan for reduction of vasospasm-related ischemia in subarachnoid hemorrhage. The advocacy section by Wendy Wright addresses the potential role of the neurointensivists within the Personal Medical

Home concept as part of the ongoing debate on health care reform in the US. It is important that we follow these developments closely so we can participate actively as needed. The pharmacy section continues to educate all of us and this time Karen McAllen provides us with a review of dexmedetomidine use in neurocritical care.

For education and training, Wade Smith and Susanne Muehlschlegel team up to provide us the results and analysis of the survey related to the first neurocritical care fellowship match. We are also assisting the UCNS in disseminating information for the next round of certification and accreditation in 2010.

There are two neurocritical care programs that are featured in this issue. The first featured program is the University of Massachusetts Neurocritical Care Program in Worcester, MA, led by Wiley Hall and Susanne Muehlschlegel and the second is the first Neuro-intensive care unit in Guatemala at the Hospital General San Juan de Dios. I would like to thank Edgar Avalos Herrera for sharing this admirable advancement in his country.

Two major activities of the Neurocritical Care Society are coming up. Right around the corner is the First Neurocritical Care Research Conference slated for September 4-6, 2009 at the Texas Medical Center in Houston. Then from November 11-14, 2009, the NCS will gather in New Orleans for the 7<sup>th</sup> NCS Annual Meeting. I look forward to seeing many of you in Houston and to be with ALL of you in New Orleans!

## "Featured Neurocritical Care Case" and Forum to go Online for NCS

Continued from page 1

HIPAA guidelines), the structure and development of neurocritical care as a field, education and fellowship development, interdisciplinary collaborations, advocacy, community outreach, research brainstorming and networking, ethical/legal discussions, and career options. The site will require registration and will function like most chat-rooms. The site will be monitored in a rotating fashion and volunteers to participate in hosting the site are welcome (please contact Jennifer.frontera@mountsinai.org).

Additionally, the newly developed "Featured Neurocritical Care Case" section of the website will highlight typical cases that demonstrate excellence in diagnostics, therapeutics and innovative uses of technol-



ogy. We are currently soliciting cases which should consist of a brief case overview, review of the topic along with interesting imaging and/or video. We encourage submissions from: attending neurointensivists; members-in-training, multidisciplinary and general intensivists; advanced nurse practitioners and

physician-assistants, residents and fellows. We will also publish a short profile of the lead author and her/his institution. Please email Jennifer.frontera@mountsinai.org for manuscript and formatting details, which can also be found on the neurocritical care website.

## Clinical Trials Monitor

# CONSCIOUS Trials Studying Clazosentan for Reduction of Vasospasm and Ischemia in Subarachnoid Hemorrhage



By Matthew A. Koenig MD

In a phase IIb study published in *Stroke* last year, the endothelin receptor antagonist clazosentan demonstrated

a dose-dependent reduction in the incidence of moderate-to-severe angiographic vasospasm after aneurysmal subarachnoid hemorrhage (aSAH); the study was titled 'Clazosentan to Overcome Neurological Ischemia and Infarction Occurring After Subarachnoid Hemorrhage' (CONSCIOUS-1). Given the encouraging results of this safety and dose-finding study, the same investigators designed two phase III safety and efficacy studies called CONSCIOUS-2 and CONSCIOUS-3.

CONSCIOUS-2 is a randomized, double-blind, placebo-controlled, multi-center, international study to determine whether clazosentan lowers the incidence of vasospasm-related morbidity and all-cause mortality following aSAH in patients undergoing aneurysm clipping. The intervention is continuous infusion of clazosentan at 5 mg/hr for 14 days. The targeted enrollment is 1146 patients, who will be randomized to receive clazosentan or placebo in a 2:1 ratio in addition to standard therapy. Both groups will receive fluid management and nimodipine according to a protocol recommended by the study.

CONSCIOUS-3 is currently recruiting with a similar study design to determine the efficacy of clazosentan in subarachnoid hemorrhage patients treated with coiling, with a target enrollment of 1470 patients.

Endothelin is a potent cerebral vasoconstrictor, and endothelin receptor antagonists block this effect at the receptor level. Preclinical data suggest a number of vasoactive mediators are implicated in vasospasm including oxy-hemoglobin, bilirubin oxidation products, endothelin and depletion of nitric oxide. Of these, endothelin is the most potent vasoconstrictor and – once bound to receptors – produces prof-

**CONSCIOUS-2 is a randomized, double-blind, placebo-controlled, multi-center, international study to determine whether clazosentan lowers the incidence of vasospasm-related morbidity and all-cause mortality following aSAH (aneurysmal subarachnoid hemorrhage) in patients undergoing aneurysm clipping. The intervention is continuous infusion of clazosentan at 5 mg/hr for 14 days.**

***R. Loch Macdonald, MD, PhD, (right) at St. Michael's Hospital in Toronto, is principal investigator of the trial.***



ound and protracted vasoconstriction. Endothelin release from blood clot lysis and upregulation of endothelin production are pathologically linked to cerebral vasospasm. Blockade of endothelin receptors has been shown to reduce the incidence and severity of vasospasm in experimental models of subarachnoid hemorrhage.

Inclusion criteria are adult patients under age 75 with demonstrated aSAH, World Federation of Neurological Surgeons grades I-IV prior to clipping, with thick and diffuse clot on the initial CT. Patients must be able to start the infusion within 56 hours of aSAH to be eligible. Those with non-aneurysmal hemorrhage, isolated intraparenchymal or intraventricular clot, hyperacute vasospasm, stroke or surgical complications prior to drug initiation, hypotension, or significant pulmonary or cardiac comorbidities are not eligible.

The primary endpoint is a composite of 6-week all-cause mortality, new stroke attributable to cerebral vasospasm, delayed ischemic neurological deficits due to cerebral vasospasm, or initiation of rescue therapy for symptomatic vasospasm (including hypertensive hypervolemic therapy and/or catheter-based interventions). Secondary outcome measures include telephone Glasgow Outcome Scale Extended at 12 weeks.

Anticipated side effects of clazosentan in

patients with underlying aSAH include hypotension, pulmonary edema and acute respiratory distress syndrome, anemia, and general effects like headache, dizziness, and nausea. Safety endpoints will include 12-week mortality, change in systolic and mean blood pressure and heart rate from baseline, ECG abnormalities, pulmonary edema, pneumonia, anemia, and cerebral hemorrhage.

Actelion Pharmaceuticals is the sponsor of the CONSCIOUS trials. "They have been excellent and cooperative to work with. I have access to the entire CONSCIOUS-1 database; we have a publication policy and freedom to publish valid, appropriate work from CONSCIOUS-1 that does not contain proprietary information. We look forward to the results of the ongoing studies," says R. Loch Macdonald, MD, PhD, the principal investigator at St. Michael's Hospital in Toronto and lead author of the CONSCIOUS-1 study publication.

"As of August, enrollment [for CONSCIOUS-2] is 743 patients out of a planned 1146 ... Recruitment is going very well," says Dr. Macdonald. The study is expected to conclude in mid-2010 and recruitment of CONSCIOUS-3 is already underway.

# Coming up in Neurocritical Care

## Editor's Memorandum

By *Eelco Wijdicks, MD, PhD*  
 Editor in Chief, *Neurocritical Care*



Look out for four revealing papers.

Why do we even consider sedating acutely ill neurologic patients at risk of deterioration and if we do can we safely wake them up? This is a problem for us. On the one

hand, sedation may be needed to control agitation, allow adequate ventilation and to reduce intracranial pressure (ICP) surges and perhaps even reduce the cerebral energy demands, but we all agree there is no substitute for a good neurological examination and we do not like it if only the pupils are our guiding light.

Some of these concerns have been addressed by Skoglund and associates from Uppsala University in Sweden. In 21 patients with subarachnoid hemorrhage and traumatic head injury a total of 127 awakening trials were undertaken. Cerebral perfusion pressure decreased below 50 mmHg in more than 30% and ICP increased in the majority of the patients, although mostly below 20 mmHg. In some patients immediate ICP correction was needed. Whether these changes had consequences remains to be determined and I refer to an important editorial by Helbok and Badjatia.

Staying on the same subject, the academic neurosurgical group from Addenbrooke's Hospital, University of Cambridge is reporting on plateau waves. These elevations of ICP occurred in about 25% of patients with traumatic head injury but only if they persisted for 30 minutes or longer did they portend poor outcome. Although the authors are cautious in their recommendations – there is no proof aggressive treatment will improve outcome – its early recognition is likely important.

Abnormal platelet activity – for example due to aspirin and clopidogrel – may have an impact on outcome after intracerebral hematoma. There is considerable new interest in this topic and much of the research is coming from Northwestern University. Naidech and his group have investigated platelet activity and found reduced activity in patients without known antiplatelet use. This calls into question the results of the recent analysis of the CHANT investigators who found no relation between antiplatelet use, growth of the hematoma and outcome (*Neurology* 72:1397-1402,

2009). It may not be surprising to the readers that the medical history on platelet use is not reliable, but it raises an important issue. How many patients have poor platelet function when they present with a cerebral hematoma and should we do something about it?

Most NICUs see a fair number of severe Guillain Barré syndrome and many do not seem to respond to plasma exchange or IVIG. We are publishing a paper by Galldiks and co-workers from the University of Köln on selective immune adsorption (SIA) treatment in Guillain Barré syndrome. Selective immune adsorption therapy always made more sense to

me (removal of antibodies and return of plasma) but it is more often used in Europe. A small study of SIA investigated the safety of these treatments and whether SIA followed by IVIG compared to SIA alone would result in an indication of better outcome. SIA was without major side effects but no effect on outcome with this combination therapy was detected. SIA may need further study in the most severe cases. SIA may be less costly because there is no need for albumin replacement and any paper that addresses cost reduction in the NICU deserves attention.

**Reception and Dinner**

This year's NCS Annual Meeting will be better than ever. Join us deep in the heart of the New Orleans French Quarter at the world-famous House of Blues for this year's Annual Banquet and Keynote Address by Dr. Michael DeGeorgia, who will speak on "The Collision of Stroke and World History."

Friday, November 13, 2009 from 8:00 p.m. to 12:00 midnight, with music provided by THE CODES.

**HOUSE OF BLUES**

## Advocacy for the Neurointensivist

# The Personal Medical Home: No Shelter for Neurointensivists?



By Wendy L. Wright MD

The House of Representatives health reform bill (HR 3200, called "America's Affordable Health Choices Act of 2009,") has a concept

worth learning about, and that is the "Personal Medical Home." The medical home is not a physical structure, but rather a framework within which individual patients would receive care. Each American covered under this model would have an ongoing relationship with a personal provider who would coordinate care across the entire health care arena.

The personal medical home was first introduced in the 1960's but has changed significantly since then. The modern iteration is often traced back to the Future of Family Medicine Project (Ann Fam Med 2004; 2(suppl1):S3-32). Based on the idea that medical care is fragmented, the medical home seeks to re-establish integration. Within the medical home, patients would receive a basket of acute, chronic and preventive medical services that are comprehensive, safe, accessible, accountable, and patient-centered. Electronic health records and health IT are necessary components. The medical home is supposed to function on evidence-based guidelines and ideally would save money by providing better quality care and preventing wasteful spending. In this way, the medical home is reportedly designed to be financially self-sustaining.

The personal provider will decide which services are best for the patient and which specialist the patient will see. The medical home would emphasize payment for the coordination of care to save money and improve health. The goal of bundling services and payments would be to improve quality while lowering costs. Certain states such as Colorado and Kansas (largely under the direction of former Governor and now U.S. Health Secretary, Kathleen Sebelius) are piloting medical home models in certain populations. HR 3200

*This section is provided to offer commentaries and discussion of all aspects of advocacy for the practice of neurocritical care. For questions, comments or suggestions for future articles, email Wendy L. Wright MD at [wendy.wright@emoryhealthcare.org](mailto:wendy.wright@emoryhealthcare.org).*

allows for the implementation of the medical home model for Medicare and Medicaid patients. The specifics related to provider payments across all specialties remain unclear. One remaining question of significance is who can act as a personal provider? It does seem that the primary provider does not have to be what we would think of as a primary care doctor. In fact, the primary provider may not

***"AHCs (academic health centers) contribute to many of the failings of the US health care system. The concentration of resources by AHCs on ever narrower areas of inquiry and the proliferation of investigators and clinicians that flow from those areas reflect AHCs priorities that typically value cure rather than prevention, subspecialization rather than generalism, fragmentation of care rather than integration, and career advancement rather than community responsiveness."***

**- Future of Family Medicine Collaborative**

have to be a physician at all - he or she could be a nurse practitioner or physician's assistant. A demonstration fact sheet available on CMS's website states that included physician practices would be family practice, internal medicine, geriatrics, general practice, and that even specialty and subspecialty practices that are not specifically excluded would be

eligible. Excluded specialties listed are radiology, pathology, anesthesiology, dermatology, ophthalmology, emergency medicine, chiropractic, psychiatry and surgery.

This issue was discussed at a health care reform session of the American Academy of Neurology Annual meeting a few months ago, and there will be an effort made by the AAN to ensure that neurology is an included specialty. It was clarified at this same meeting that this would not include the subspecialty of neurocritical care, however - which is intuitive, as we would typically not be coordinating comprehensive care across the entire health care spectrum. AAN members may have noticed a companion effort in an email from the AAN Professional Committee a few weeks ago entitled "Neurology is Primary Care." This is related to Congress considering giving Primary Care Bonuses to offset inequities in the current reimbursement system, which is considered by some to be procedure-biased. Some leaders in other intensivist organizations are hopeful that intensivists could be included on the list of primary providers. Whether or not that is better for patient care, this does seem to defy the definition of the primary provider as it currently exists.

Although HR 3200 is supported by the American Medical Association, some professional societies have significant concerns. The AANS/CNS has issued a statement against this bill. It has several points of disagreement, but the ones pertinent to the medical home model include: 1) that the government is empowered to implement rules that would restrict the patients' choice of physician and limit timely access to quality specialty care; 2) that the bill permits the government to arbitrarily reduce reimbursement for valuable, life-saving specialty care for elderly patients, threatening treatment options; and 3) that HR 3200 inappropriately expands the government's involvement in determining the quality of medical care, and of residency training programs.

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## Neuro-Intensive Care in Latin America

# Hospital General San Juan de Dios

## The First Neuro-Intensive Care Unit in Guatemala



By Edgar Avalos Herrera, MD

The first Neuro-Intensive Care Unit in Guatemala is in the Hospital General San Juan de Dios of Guatemala. The history of the Hospital General San Juan de Dios of Guatemala goes back to 1778. The main facilities are located in the center of Guatemala City and it is one of the most important public hospitals of the country. It is a tertiary teaching hospital with almost 1,000 beds attended by 3,000 employees including 1,300 nurses and 500 physicians, the high demands of referred patients make it function at full capacity all of the time. Two CT scanners are available 24 hours everyday and one MRI scanner is also ready to use within the hospital facilities on weekdays a fMRI scanner is also available for patients but not within the institution and not as a part of hospital administration. Procedures performed at the hospital include kidney transplantation, interventional cardiology, and our program of epilepsy surgery has just been initiated and has started to produce satisfactory outcomes.

Our young Neurology program is 24 years old and it was recognized by the World Federation of Neurology in 2006 for its appropriate fulfillment of training guidelines. It is a joint training program that teaches neurologists and neurophysiologists. In this training program all of the residents work together and are trained almost at the same time by recognized senior neurologists and neurophysiologists, giving each resident a better understanding of neurological sciences by not limiting them to an specific point of view. Medical training in Guatemala exposes young physicians to real patients from the first year of training, and the same can be said for neurology and neurophysiology residents who work with all kinds of neurological patients from the first day of their

training. There is high demand for neurological services at our hospital. The 2008 hospital statistics reported about 3,000 neurological consultations each month. This volume leads the neurology residents and seniors to be on call all of the time.

Since the plan to join the traditionally separate departments of neurology and

was created and became functional in February 2009. Several financial limitations preclude it from being a state-of-the-art NICU, but, technological improvements are planned in the near future. So far, it is a four-bed multidisciplinary unit, with on-floor consulting cardiologists, pneumologists, intensivists, nephrologists, neurosurg-



*NICU staff at the Hospital General San Juan de Dios of Guatemala. Back (left to right): Carlos Pacay MD (Internist, Neurology Resident III), Zonia Guzmán MD (Internist, Intensivist, Chief of Neuro-Intensive Care Unit), Oliver Cobox MD (Pediatrician, Neurology Resident III), Edgar Avalos Herrera MD (Internist, Neurology Resident III). Front (left to right): Marlis Valenzuela MD (Anesthesiology Resident III), Vasti Gil MD (Pediatrician, Neurology Resident I), Wendy Claudio (Intensive Care Nurse).*

neurosurgery has been scheduled, into a new Neurosciences Department, striking changes have occurred. This expected fusion of Neurology and Neurosurgery and the increasing number of patients admitted to the Intensive Care Unit for a primary neurological disease gave rise to the idea of a special division for neurocritical patients. This resulted in the first Neuro-Intensive Care Unit in Guatemala which

eons, anesthesiologists, gastroenterologists, nutritionists, neuropsychologists and physiotherapists among others. Electroencephalograms, electromyograms, evoked potentials, tracheostomies and percutaneous gastrostomies can be done at the bedside of patients. Medical staff includes senior neurolog-

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Fellows Corner

# Back to the Future: Lessons From the NCS Fellowship Match

By Susanne Muehlschlegel, MD and Wade Smith, MD

May 5<sup>th</sup> 2009 was a historic date, with the first NCS fellowship match day. A total of 28 fellowship programs participated, offering 49 fellowship positions to 25 applicants. To recapture: the match was introduced based on overwhelming support by the fellowship program directors at the last NCS meeting, and was favored over an “offer date”. One of the main reasons for a match was to create fairness amongst programs, and allow smaller programs to interview and attract applicants, while reducing time pressure on the applicants to accept a position before they could interview elsewhere. Program participation was voluntary, and most (but not all) programs participated.

Overall the first match happened without much confusion and we were interested in soliciting feedback from applicants and program directors. We conducted an anonymous survey of fellowship program directors as well as applicants via the NCS member email. We sincerely appreciate the participation in the survey. The comments and responses as summarized below will be taken into consideration as we plan for the 2011 match.

**Fellowship Director Survey:** 37 directors participated in the survey, of which 32 (86%) participated in the match. The main reason for not participating of those responding to the survey was the inability to secure funding by the match date - one of the fundamental prerequisites. The majority (34 [94.4%]) report that they will participate in next year’s match. It is notable that the rules of the match, although clear to the majority, were reported unclear to 2 program directors (5.4%). The majority of programs participating in the match and completing the questionnaire was small and offered one or two positions (figure



Wade Smith, MD



Susanne Muehlschlegel, MD

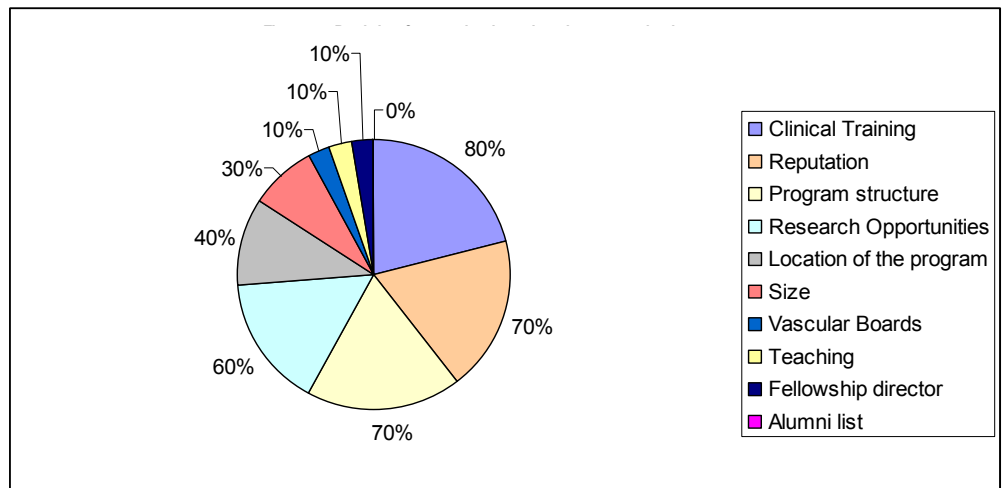
1). The average program interviewed 6-7 applicants, with a wide range between none interviewed and up to 17 interviewed (figure 2).

Based on our data we were not able to correlate the number of available positions per program with the number of interviewed applicants. Particularly interesting was that half of all programs participating

match, or because of vacant positions after the match.

The background specialty of the applicants with overwhelming majority was neurology, but many program directors also listed internal medicine, followed by anesthesia/critical care and emergency medicine, with a few neurosurgery applicants. Fellowship directors were also asked about the process of the match. The vast majority of program directors did not have any difficulties registering, submitting the rank list or getting results. 86% felt that the match was fair, while 14% thought the opposite. The primary reason for the discontent was that unfairness occurred by not all programs participating in the match as well as position offerings outside the match. Many program directors felt strongly

**Figure 4: Decisive factors in choosing the top-ranked program**



in our survey reported that at least one (and for some programs even more) applicant(s) withdrew their application to their program. Reasons listed were that the applicant had accepted a position outside the match or that the applicant had changed his/her mind to do a stroke fellowship. In return, 19% of programs admitted to having offered positions outside the match, mostly because they had already committed spots to local applicants before the institution of the

that it is crucial for the success of the match that no positions are offered outside the match. Special circumstances arise when an internal candidate from within the institution’s resident pool is considered for the position. Many felt that the program should still be able to “reserve” a spot for such as candidate, while making all other open slots only available through the match. Furthermore, some survey

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## Neuro-Intensive Care Featured Program

# University of Massachusetts Neuro-ICU Program

By Darlene Kamel MSN ACNP-BC; Wiley Hall, MD; Susanne Muehlschlegel, MD

The University of Massachusetts (UMASS) Memorial Medical Center (UMMC) in Worcester, MA, 40 miles west of Boston, is the major academic medical center in Central Massachusetts, serving as the tertiary referral center for all neurological/neurosurgical emergencies west of Boston, as well as southern Vermont, southern New Hampshire and northern Connecticut. Affiliated with the University of Massachusetts Medical School, UMMC has a total of ~1,000 licensed beds and is comprised of three academic campuses, all located in Worcester: the University Campus right on Lake Quinisigamond (where the neuro/trauma ICU is located), Memorial Campus and Hahnemann Campus. Additionally, as the hub of an integrated health care system, UMMASS partners with four community member hospitals: Clinton Hospital, HealthAlliance Hospital, Marlborough Hospital and Wing Memorial Hospital. UMMC is an American College of Surgeons (ACS) accredited Level 1 Trauma Center and primary Stroke Center. The new UMMC Duddie Massad Emergency and Trauma Center opened in 2006 and offers the region's only accredited Level One Trauma Center for both children and adults. Associated with the Trauma Center is UMMASS Memorial's own helicopter service "Life-flight", which is an emergency helicopter service providing transport for the critically ill or injured and operates within a 130-mile radius around the medical center 24 hours/day 7 days/week.

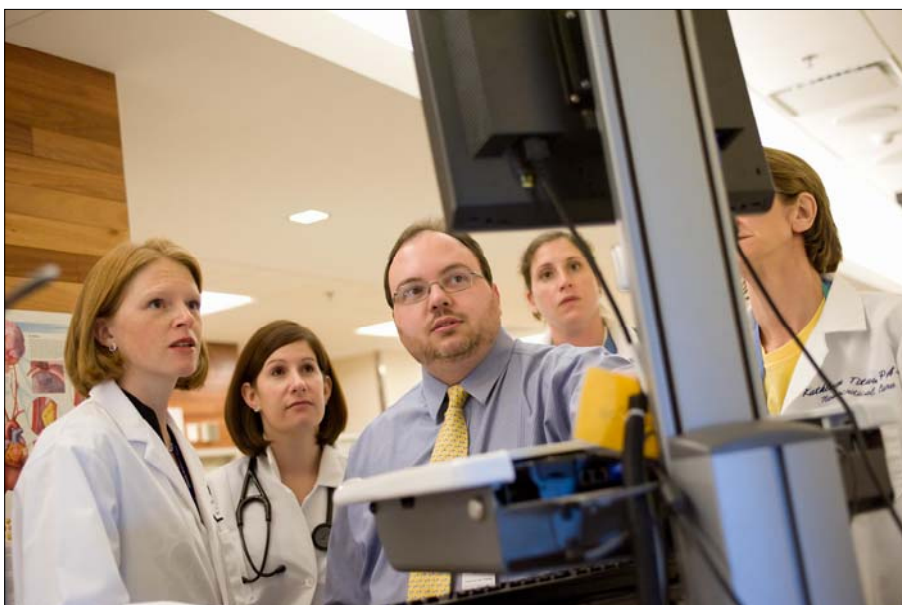
With the new Trauma Center, a specialized combined Neuro- and Trauma ICU (Lakeside 2) opened at the University Campus in 2006. It is strategically located directly adjacent to the operating room, state-of-the-art neurointerventional suite with 3-D reconstruction, X-per™ cone beam computed tomography capabilities, and one floor above the shock/trauma rooms of the emergency room. With the opening of the

trauma center, Dr. Wiley Hall was recruited as medical neuroICU director after his fellowship at WashU (trained under Dr. Michael Diringer) to become the first UMMASS Neurointensivist, while Dr. Tim Emhoff became the new trauma surgery director. Working hand in hand, Drs. Hall and Emhoff diligently built the foundation of what Lakeside 2 is today: a combined Neuro-/Trauma ICU which specializes in ICU care of adult head- and polytrauma patients, vascular neurology and neurosurgical patients, such as SAH, stroke and ICH, spinal cord trauma and other neurological emergencies such as status epilepticus, neuromuscular diseases and neuroinfectious diseases. New nursing staff and midlevel (PA/ARNP) staff was recruited to staff this spacious 16-bed unit with 12 designated ICU beds and 4 neuro/stroke

medications, note writing and nursing care documentation. All radiology imaging is electronically available.

UMMASS considers Critical Care Medicine as a multidisciplinary specialty and therefore has founded a "virtual Department of Critical Care Medicine", aka "Critical Care Operations", headed by Dr. Richard Irwin (editor-in-chief of CHEST) and comprised of anesthesia/critical care, trauma critical care, pulmonary critical care and neurocritical care. The multidisciplinary approach fosters collegiality, cross-departmental critical care education and research, protocolization of all care in ALL ICUs (approved by everyone in biweekly meetings), and combined weekly educational conferences. Because

the closed unit system is beneficial to optimizing patient care, as a rule at UMMASS, all intensive care units, including UMMC's Lakeside-2, are closed, making UMMC's Neuro-/Trauma ICU one of the very few closed neuro-ICUs in the U.S. All NeuroICU patients are admitted to the neuro-critical care service. In the ICU, the patients are managed by the neuro-ICU team in collaboration with the referring service (trauma, neurology, neurosurgery). Orders can only be written by the ICU team which eliminates the potential for confusion that can arise when a multitude of services are writing orders. At the same time, it makes communication paramount



**University of Massachusetts Neuro-ICU. Rounds in Lakeside 2: from left: Dr. Susanne Muehlschlegel, Jennifer Monahan (N.P.), Dr. Wiley Hall, Dr. Karen Got, Kathy Titus (Neurocritical Care PA)**

Photo courtesy of Rob Carlin

step-down beds. Two of the ICU beds are designated burn beds. Continuous EEG monitoring and transcranial Doppler examinations are at hand. Several family meeting rooms, a large family waiting room with wireless internet connection provide support to families. All patient rooms have large floor to ceiling windows with a view of Lake Quinisigamond, are equipped with individual computers for documentation and have wall-mounted cameras for remote *eICU* (tele-ICU located at UMMASS) monitoring (see below). All ICU documentation is done electronically in VISICU, including vital signs, automatic APACHE scoring, ICU drips and

The UMMC Neuro-/Trauma ICU patient population includes (poly-)trauma, TBI, spinal cord injury, ischemic and hemorrhagic stroke, SAH, status epilepticus, burns and cerebral tumors, to name a few. The attendings for the unit rotate weekly and include, two thirds of the time members of the growing group of NeuroCriticalCare (NCC) attendings, and otherwise trauma intensivists and occasional anesthesia critical care. If a NCC attending is not on service, a consult service is in place to assist in the management of complicated neuroICU patients.

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## Neurointensive Care Pharmacy

## Dexmedetomidine Use In Neurocritical Care

By Karen J. McAllen, Pharm.D.



Dexmedetomidine (Precedex®) is a novel agent that has been utilized for sedation in the intensive care and perioperative setting since it was approved in 1999. It is the only

continuously infused sedative that has been approved for sedation in patients who are not mechanically ventilated. Patients sedated with dexmedetomidine have a more cooperative type of sedation and appear to easily transition from sleep to wakefulness when aroused, then return to sleep. Most patients retain the ability to follow commands, which may make it an ideal sedative for patients with neurological illness. Dexmedetomidine also does not cause respiratory depression, therefore, is safe to use in patients who are not mechanically ventilated.

Unlike any currently available continuous infusions approved for sedation, the effects of dexmedetomidine are not mediated through the GABA system. Medications mediated through the GABA system would likely have a pronounced effect on the respiratory system, resulting in the need to be mechanically ventilated as well as an inability to arouse the patient who is receiving high doses, as is typically provided with continuous infusions of sedation. The sedation effects exhibited by dexmedetomidine are mediated by the alpha-2 receptors located in the locus ceruleus. The effect on pre-synaptic alpha-2 receptors results in a reduction of norepinephrine release, while the stimulation of post-synaptic alpha-2 receptors causes hyperpolarization of neural membranes. The net effect is to provide an inhibitory feedback loop resulting in a reduction of sympathetic outflow. Although the exact mechanism is unclear, the effect of stimulating the alpha-2 receptors in the spinal cord may inhibit nociceptive transmission. This may explain the ability of dexmedetomidine to reduce opioid requirements.<sup>1</sup>

The approved dosing for ICU sedation involves a loading dose of 1mcg/kg given over 10 minutes followed by a continuous infusion of 0.2-0.7mcg/kg/hour. Many institutions have chosen to avoid the loading dose as it may be responsible for some of the adverse effects, such as transient hypertension and bradycardia. Also, many of the clinical trials have utilized a higher dose than what is currently approved. The most common side effects of dexmedetomidine are bradycardia and hypotension, both of which may be alleviated by reducing the dose or discontinuing the medication. Dexmedetomidine has an onset of action of approximately 30 minutes when the bolus is not administered and a duration of approximately 2-4 hours.<sup>3</sup>

Dexmedetomidine was initially evaluated for sedation in cardiothoracic patients and ICU sedation. More recently, it has been utilized for intra-operative sedation in patients that may need to be responsive and follow commands such as functional neurosurgery, awake carotid endarterectomy and other intracranial procedures.<sup>1</sup>

Additional potential indications specific to the neurocritical care patient include providing cooperative sedation, treatment of or prevention of shivering as well as paroxysmal autonomic instability with dystonia (PAID).<sup>1, 2</sup>

There have been several large trials evaluating the efficacy and safety of dexmedetomidine in mechanically ventilated critically ill patients. These trials also evaluated the medication's effect on delirium, coma, time on the ventilator and other outcome parameters. The MENDS trial<sup>3</sup> evaluated the effect of dexmedetomidine compared to lorazepam. It was determined that sedation with dexmedetomidine resulted in more days alive without coma ( $p < 0.001$ ) as well as the combined endpoint of days free of delirium and coma ( $p = 0.01$ ). Interestingly, delirium-free days alone was not statistically significant ( $p = 0.09$ ). Dexmedetomidine was also compared with midazolam in the SEDCOM<sup>5</sup> trial, where patients sedated with dexmedetomidine exper-

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### Important Upcoming Dates

3 <sup>rd</sup> International Hypothermia Symposium	Sept. 2-5, 2009	Lund, Sweden
First Neurocritical Care Research Conference	Sept. 4-6, 2009	Houston, TX
Neurotrauma 2009: Second Joint Symposium of the International and National Neurotrauma Societies	Sept. 7-11, 2009	Santa Barbara, CA
Hydrocephalus 2009	Sept. 16-19, 2009	Baltimore, MD
7 <sup>th</sup> Annual Cleveland Neurocritical Care and Stroke Conference	Sept 24-25, 2009	Cleveland, OH
American Neurological Association 134 <sup>th</sup> Annual Meeting	Oct. 11-14, 2009	Baltimore, MD
American Society of Anesthesiologists 2009 Annual Meeting	October 17-21, 2009	New Orleans, LA
Neurocritical Care Society 7 <sup>th</sup> Annual Meeting	Nov. 11-14, 2009	New Orleans, LA
Society of Critical Care Medicine 39 <sup>th</sup> Critical Care Congress	Jan. 9-13, 2010	Miami Beach, FL

# Sedation, Shivering Control Among Dexmedetomidine ICU Uses

Continued from page 10

experienced less time on the ventilator as well as less delirium. In both of these clinical trials, patients with neurological disease were excluded due to the potential that neurological illness would interfere with the ability to diagnose delirium. Therefore, it is unclear whether the results of the MENDS trial or the SEDCOM trial would be applicable to the neurocritical care population.

When choosing an agent for sedation in patients with neurological disease, it is important to evaluate the safety of cerebral hemodynamic parameters. Prielipp and colleagues hypothesized that dexmedetomidine activates alpha-2b receptors, resulting in cerebral vasoconstriction, which would result in a reduction of cerebral blood flow (CBF).<sup>6</sup> Several trials have evaluated CBF in healthy volunteers which appears to be reduced, possibly as much as 30%. Currently, there are no clinical trials which have looked at patients with neurological disease. Although there are trials to evaluate cerebral metabolic rate (CMRO<sub>2</sub>) in animals (which indicate that CMRO<sub>2</sub> was not reduced, despite a reduction in CBF), there is only one human trial that has evaluated this parameter. This trial, which included 6 healthy volunteers, indicated that CBF – CMRO<sub>2</sub> coupling remains intact with dexmedetomidine administration. Therefore, if CBF is reduced, CMRO<sub>2</sub> would also be reduced.<sup>7</sup> To evaluate the safety regarding hemodynamic parameters, it is important that this issue be evaluated in patients with neurological disease such as vascular disease or traumatic brain injury.

Shivering can be a challenging problem in the neurocritical care patient. Whether shivering is due to managing fever, induction of hypothermia or treating post-anaesthetic shivering, it is a challenging complication. Dexmedetomidine has been evaluated as a means to treat patients experiencing shivering. Pekka and colleagues published an evaluation in nine healthy volunteers which indicated

that dexmedetomidine reduced the vasoconstriction threshold by 1.6±0.8 degrees C and the shivering threshold by 2.4±0.9 degrees C.<sup>8</sup> More recently, Lenhardt found that the combination of bupivacaine and dexmedetomidine additively reduced the shivering threshold from 36.1±0.4 degrees C to 34.1± 4 degrees C, which was a greater reduction than either agent alone.<sup>9</sup>

Paroxysmal autonomic instability with dystonia is a syndrome characterized by tachycardia, tachypnea, hypertension, fever and diaphoresis. It is hypothesized that this syndrome results from a disruption of sympathetic feedback and/or loss of GABA inhibition. Dexmedetomidine may be a potentially useful agent due to inhibition of alpha-2 stimulation resulting in a reduction of sympathetic activity. In 2007, Goddeau and colleagues published a case report successfully utilizing dexmedetomidine for the treatment of paroxysmal autonomic instability with dystonia, also commonly referred to as "neuro storms" or "sympathetic storming".<sup>2</sup>

In summary, dexmedetomidine is a promising agent to be used for patients in the neurointensive care unit. Intriguing indications include sedation with the ability to preserve the neurological examination, shivering and potentially complications resulting from increased sympathetic nervous system activity. Although this medication appears to be promising, caution must be exercised due to the unknown effect on cerebral hemodynamics.

## References:

- <sup>1</sup>Bekker A, Sturaitis MK. Dexmedetomidine for neurological surgery. *Neurosurgery* 2005;Supplement1:ONS-1-ONS-10.
- <sup>2</sup>Goddeau RP, Silverman SB, Sims JR. Dexmedetomidine for the treatment of paroxysmal autonomic instability with dystonia. *Neurocritical Care* 2007; 7:217-220.
- <sup>3</sup>Precedex (product information) Lake Forest, IL: Hospira;October, 2008
- <sup>4</sup>Pandharipande PP, Pun BT, et al. Effect of sedation with dexmedetomidine vs lorazepam on acute brain dysfunction in mechanically ventilated patients. *JAMA*. 2007;298(22):2644-2653.
- <sup>5</sup>Riker RR, Shehabi Y, et al. Dexmedetomidine vs midazolam for sedation of critically ill patients (SEDCOM trial). *JAMA*. 2009;301(5):489-499.
- <sup>6</sup>Dexmedetomidine-induced sedation in volunteers decreases regional and global cerebral blood flow. *Anesth Analg* 2002;95:1052-9.
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- <sup>8</sup>Talke P, Tayefeh F, et al. Dexmedetomidine does not alter the sweating threshold, but comparably and linearly decreases the vasoconstriction and shivering thresholds. *Anesthesiology* 1997;87(4):835-841.
- <sup>9</sup>Lenhardt R, Orhan-Sungur M, et al. Suppression of shivering during hypothermia using a novel drug combination in healthy volunteers. *Anesthesiology* 2009;111(1):110-115.

**Karen J. McAllen, Pharm.D. is with Spectrum Health in Grand Rapids, Michigan.**

Disclosure: Karen J. McAllen, and *Currents* Pharmacy Section Editor Denise H. Rhoney, have not received financial support from Hospira, Inc., maker of Precedex®.



## SEE YOU FRIDAY NIGHT!

8:00 - 12:00 p.m. NCS Reception and Dinner

<p style="margin: 0;"><b>9 PM SOCIETY KEYNOTE ADDRESS</b> Struck Down: The Collision of Stroke and World History <i>Michael DeGeorgia, MD</i> <i>Case Western Reserve University</i></p>	<p style="margin: 0;"><b>10 PM Music and Dancing with THE CODES</b> Gary L. Bernardini, MD David Crippen, MD Stephan A Mayer, MD Michael DeGeorgia, MD</p>
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# Prestige, Clinical Teaching Among Leading Factors in Fellowship Choices

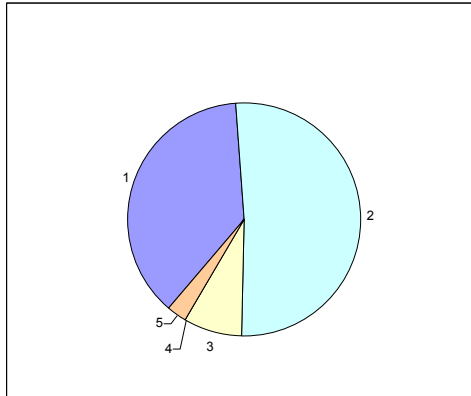
Continued from page 8

participants commented on the lead time for the match and felt that it was too long, hence not leaving any flexibility for late-deciding candidates. When asked about next year's proposed deadline of January 1 for program listing and firm declaration of offered slots, several more commented that funding may not be secured by that date, potentially leading to less slots being offered in the match, because programs may have more spots/funding available later and may decide to offer these spots outside the match.

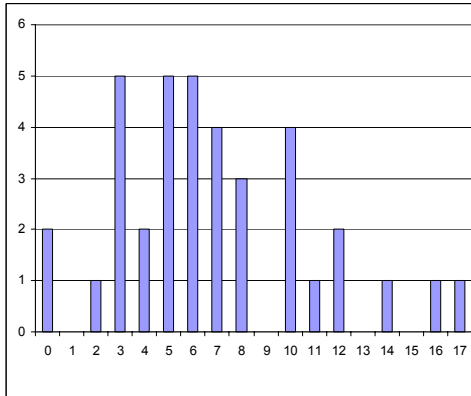
### Applicant Survey:

Only 10 applicants responded to the survey, of which all matched. Keeping this small sample in mind, we report some noteworthy responses. Eight of the 10 respondents participated in the match this year. One reason listed for not participating was "financial reasons" not otherwise specified. Figure 3 shows the number of programs the applicants applied to. After categorization, applicants either applied to 1-2, 5-6 or 10 programs. No technical problems were reported in registering, submitting the list or getting results from the match. In fact, the applicants commented positively on the excellent support from the SFMatch. The majority of applicants were satisfied with the response rate of the programs to the application. Improvement suggestions included a central application processing service instead of having to mail out applications to each program, program booths at the NCS meeting to facilitate communication and pre-selection for applicants and programs. Similar to the program directors, applicants also commented on the fact that some programs committed some of their spots outside the match, downgrading the fairness of the match system. Interestingly, 8/10 survey participants did not have an NCC program in their institution and yet were applying for the NCC fellowship.

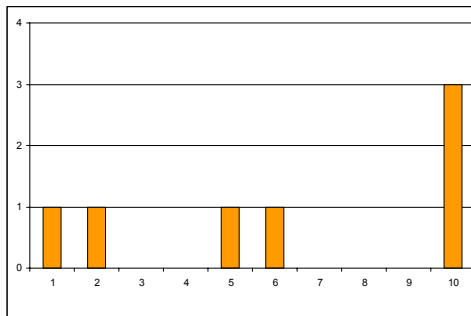
**Figure 1: Number of fellowship offered**



**Figure 2: Number of applicants interviewed**



**Figure 3: Number of programs applied to**



Somewhat surprising, only 2 of these 8 spend any time at an NCC program as a visitor prior to applying for a fellowship position. The decisive factors in choosing the top ranked program were very interesting and highlight that clinical training, program structure and reputation are the key factors (figure 4). As a recurrent theme, 22% admitted to having accepted a position outside the match. One applicant registered for the match, but then accepted a position outside the match.

In summary, the first NCS match was successful in several ways and critical comments are notable. Currently, there are many more fellowship spots available than applicants; prior to the formalization of the interview process afforded by the match, we would not have had any way of knowing this. This is likely to change in the future as the demand for neurointensivists is increasing and our subspecialty is becoming more accepted amongst other critical care specialists. At the NCS meeting this fall, program directors and fellows need to discuss two major issues. (1) Should programs be allowed to offer a slot outside of the match? (2) When should match day occur? Our hope is that all programs will participate for the 2011 match and follow the rules agreed to by the Neurocritical Care Society. This meeting will help to better establish these rules and make the process as fair and equitable as possible.



## Guatemalan NICU Adds Neurocritical Care in Central America

Continued from page 7

ists and intensivists on week-days while during evenings and weekends neurology and neurophysiology residents are in charge along with intensive therapy and internal medicine residents who are on call.

Our goal as the first neuro-intensive care unit in Guatemala is to give the best care to neurocritical patients in the country. Preliminary results of mortality from the last six months (February to July 2009) among neurological patients admitted to non-neurological ICU compared to our NICU shows a lower mortality when neurologists are treating neurocritical patients directly: NICU (25/106) 23.6% vs. non-NICU (42/113)

37.2% , (RR 1.34, 95% CI: 1.0442 – 1.7248; p = 0.010965).

One of the main strengths of our NICU is the focus on the neurological care of the critical patients. Neurologists are only on call for the non-neurological units but are directly responsible for the NICU patients. Our NICU is the only unit with neurologists monitoring neurocritical patients and making critical treatment decisions 24 hours a day and for seven days of the week. International guidelines are always kept in mind for these critical decisions and difficult clinical scenarios are always solved in our daily department meetings. International experts are sometimes consulted via internet or by visiting professors. International visitors are always welcomed with a warm hug of

hospitality because they play a very respected role in our program development and will undoubtedly have an impact in the care of the Guatemalan neurocritical patients.

In closing this article, I want to give special thanks for the opportunity to be part of the NCS International Committee as well. The future of our Neuro-Intensive Care Unit will undoubtedly be influenced by the Neurocritical Care Society, and for that, I also want to thank you in advance.

**Edgar Avalos Herrera, MD is Senior Neurology Resident – Internist at the Neuro-Intensive Care Unit, Intensive Care Department and Neurosciences Department, Hospital General San Juan de Dios, Guatemala, Guatemala**

## Medical Home Possible Gatekeeper for Neuro-ICU Patients

Continued from page 6

Speaking of training programs, what will the impact of the medical home model be on academic medical centers? That is difficult to predict, but I wanted to share this direct excerpt from the Future of Family Medicine Collaborative's thoughts on academic health centers (AHCs) when they originally described the modern concept of medical homes:

*"AHCs contribute to many of the failings of the US health care system. The concentration of resources by AHCs on ever narrower areas of inquiry and the proliferation of investigators and clinicians that flow from those areas reflect AHCs priorities that typically value cure rather than prevention, subspecialization rather than generalism, fragmentation of care rather than integration, and career advancement rather than community responsiveness. The prominence of AHCs and the many physicians they produce have resulted in the values of AHCs dominating the values of U.S.*

*Medicine."*

The manuscript does go on to say that AHCs do deserve some credit for conducting important clinical research, providing a substantial amount of clinical care and training physicians. However, there seems to be some discontent over the fact that the AHC environment "disproportionately disparages family medicine, even when compared with other primary care disciplines." Obviously, academic medical centers are a vital part of the health care system in the United States. Since many neuro-ICUs function within academic health centers, the growth of neurocritical care may be hindered if funding were diverted elsewhere.

The future of U.S. health care remains unwritten. It is difficult to predict what impact the medical home will have on our practice. The most immediate concern is the thought of having a gatekeeper between the patient and the care that needs to be urgently delivered. Ideally, coordination of care would be handed over to us once the patient is in the ICU. On a

positive note, we may benefit from having access to electronic health records and medication information. It remains to be seen how much any of this will infringe upon autonomous practice habits. I am sure some critics would say that this is exactly what is needed to reign in sky-rocketing health care costs. Are we as a society - patient and provider alike - ready to change?

References:

Martin JC, Avant, RF, Bowman MA, et al. The Future of Family Medicine: A Collaborative Project of the Family Medicine Community. *Ann Fam Med* 2004; 2(suppl1):S3-32.



## University of Massachusetts NICU Serves Four-State New England Patient Population

Continued from page 9

Presently the group of NCC attendings is comprised of Wiley Hall, M.D., Susanne Muehlschlegel, M.D. (both NCC board-certified) and newly recruited Raphael Carandang, M.D. Dr. Hall (a graduate of WashU NCC board-eligible fellowship) is the medical director of Lakeside 2, and director of Neurocritical Care at UMASS. He has established multiple clinical protocols, such as the Increased Intracranial Pressure (ICP)/Cerebral Edema and Reversal of Anticoagulation in Life-Threatening Intracranial Hemorrhage protocols. Dr. Hall is also building a UMASS Telestroke system, with a tentative launch date in fall of this year. Dr. Muehlschlegel (a graduate of the MGH/BWH Harvard NCC fellowship) has strong clinical research interests and is the PI for several active ongoing research protocols, such as dantrolene in SAH/vasospasm, TBI outcome, organ donation outcome and the emergency medicine based hypothermia after cardiac arrest outcome study group. She is also developing other NCC based protocols (e.g. induced normothermia). Dr. Carandang (also a graduate of the MGH/BWH Harvard NCC fellowship) has just joined the group this August. Future group endeavors include the establishment of the NCC fellowship.

The ICU team is comprised of the attending, as well as midlevels and residents. A group of five specially trained NeuroICU Nurse Practitioners (N.P.'s) and Physician Assistants (P.A.'s) co-manage the patients of Lakeside-2 with residents from surgery, anesthesia and emergency medicine and a SICU fellow on the ICU team. With their "home base" at Lakeside 2, one NCC N.P. or P.A. is always scheduled in the unit, which assists in providing continuity of care. They are experienced and specially trained to take care of NCC patients, attend critical care lectures, weekly multidisciplinary NCC lectures by the NCC group, neurosurgery and INR/stroke, bi-weekly NCC educational lectures and give various educational NCC talks to other SICU midlevels, nurses, or national general critical care conferences. N.P./P.As are also trained to perform ICU procedures including central lines, arterial lines and lumbar punctures after successful completion of a set number of procedures under direct supervision.



For the ICU team, days in the unit start at 6:00 a.m. when report is given from the night ICU team to the day team. Providers are assigned a group of patients and complete a physical

in physical exam, imaging, labs, and medications are reviewed and a comprehensive plan is determined. Additionally, best practices including analgesia, sedation, HOB position, GI prophylaxis, DVT prophylaxis, mouth care, central line necessity, disposition and skin issues are reviewed. Those patients requiring emergent procedures such as angiography, ventriculostomies, and central lines are determined as early as possible and performed/arranged. Around 5 p.m. the patients are reviewed with the attending and the team for a plan should patients deteriorate during the overnight.

The attending's day after morning rounds includes supervision or performance of ICU procedures, family meetings (to be held by the NCC team or attending), quality rounds, direct communication with trauma, neurosurgery, stroke, and INR and teaching rounds. Overnight, the attending signs out all patients to the *eICU*, UMMC's remote tele-medicine ICU service. The *eICU* is staffed 24/7 by an intensivist from



**University of Massachusetts Neurocritical Care team: Nurses, physician assistants and nurse practitioners. NCC attendings Dr. Susanne Muehlschlegel and Dr. Wiley Hall (Director of Neurocritical Care, Medical Director of Lakeside 2) and Dr. Raphael Carandang (not pictured).**

assessment and preliminary plan for their patients prior to attending the daily critical care lecture at 7:30 a.m. Lectures are given by ICU attendings, residents and N.P.'s/P.A.'s. Following lecture, attending rounds begin. During this time, all data including changes

anesthesia, pulmonary medicine, trauma, or NCC, a critical care N.P. or P.A. as well as a pharmacist. Unit providers are able to call directly to the *eICU* with questions or there are emergency red buttons in

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## UMASS Neurocritical Care Unit Part of Multi-Campus Hospital Complex

Continued from page 14

each room that can be used to directly alert the eICU that immediate help is needed. E-ICU Providers are able to camera into individual rooms, and speak over a microphone to those in the room, as well as review patient records to assist with management. UMMC NCC attendings also rotate through the eICU and are expected to triage and manage medical and surgical critically ill patients with sepsis, infections, shock and other general critical care

issues. The eICU eliminates the majority of general ICU management and admission triaging at night for the NCC attending, who is called at night only with specific NCC questions/concerns.

The University of Massachusetts Medical School is one of the fastest growing academic health centers in the country, has built a reputation as a world-class research institution, consistently producing noteworthy advances in clinical and basic research. The Medical School attr-

acts more than \$174 million in research funding annually, 80 percent of which comes from federal funding sources. In 2006, UMASS Medical School researcher Craig Mello PhD was awarded the Nobel Prize in Medicine toward the discovery of RNA interference. Building on this, UMASS is in the process of building a New Therapies Center, which includes a Gene Therapy Center, iRNA and stem cell Therapy Center. Recently, the Department of Neurology has recruited Dr. Robert Brown as the new chairman to UMASS.

As a world-renowned ALS genetic and clinical researcher, he has been extremely supportive of the growing NCC program at UMass. He also envisions bringing these new therapies to the neurocritical care unit.

In summary, UMASS is a young but fast-growing NCC center with great collegiality, a multidisciplinary critical care medicine approach, and the vision to include modern technology and new therapies into everyday NCC care.

## NCS Grows Amid Fragmented Critical Care Training in U.S.

Continued from page 2

earch network to facilitate collaboration and patient enrollment in neurocritical care focused clinical trials. The First Neurocritical Care Research Conference will be held at the Texas Medical Center, Baylor College of Medicine/St Luke's Episcopal Hospital on September 4 - 6, 2009. This symposium, organized by Jose Suarez, the chair of the Clinical Trials Committee, is funded by NINDS, The Neuroscience Center at the St Luke's Episcopal Hospital in Houston, and the Integra Foundation. The major goal of this symposium is to review the latest advances and help set research priorities in the field of neurocritical care for the future.

On the lobbying front, to increase payment rates for primary care providers, CMS is proposing to stop making payment for consultation codes which were typically billed by specialists and paid at a higher rate than other E/M services. This impacts neurocritical care practitioners variably, since for the most part, we have critical care codes and subsequent care. However, as the country works on an affordable and sustainable health care system, we, as individuals and as a society, must be active and aware of the changes that are being made and take time from our busy schedules to support advocacy efforts.

Due to the nature of the subspecialty and its history, the future of neurocritical care rests not on what one subspecialty provides the care to this unique group of patients, but how we can collaborate closely as practitioners and with our fellow colleagues both nationally and internationally with various specialty interests and their specialty organizations to bring together our respective strengths and expertise not only clinically but in research, training and education. The future of neurocritical care lies in our ability to advocate and work together.



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## Medical Positions Posted\*

<p><b>Neurointensivist - Oregon Health &amp; Science University</b>                  Contact: Anish Bhardwaj, MD, FAHA, FCCM                  Director, Neurosciences Critical Care Program                  Email: <a href="mailto:abhardwaj@ohsu.edu">abhardwaj@ohsu.edu</a></p>	<p><b>Neurointensivist - UTSW</b>                  Contact: Wengui Yu, MD, PhD                  Chief, Division of Neurological Critical Care                  Email: <a href="mailto:wengui.yu@utsouthwestern.edu">wengui.yu@utsouthwestern.edu</a></p>	<p><b>Neurocritical Care Position at Roosevelt Hospital/Manhattan</b>                  Contact: Dr. Chandra Sen (<a href="mailto:csen@chnpnet.org">csen@chnpnet.org</a>)                  Dr. Rup Swarup (<a href="mailto:rswarup@chnpnet.org">rswarup@chnpnet.org</a>)                  and Dr. Alex Berenstein (<a href="mailto:aberenstein@chnpnet.org">aberenstein@chnpnet.org</a>)</p>
<p><b>Neurointensivist/Stroke Neurologist – CA</b>                  Contact: Paul Wever                  Email: <a href="mailto:weverp@sutterhealth.org">weverp@sutterhealth.org</a></p>	<p><b>Neuro-Intensivists - Henry Ford Hospital</b>                  Contact: Panayiotis N. Varelas, MD, PhD, Director NICU                  Email: <a href="mailto:varelas@neuro.hfh.edu">varelas@neuro.hfh.edu</a></p>	<p><b>Neurocritical Care Intensivist - Greater DC Area</b>                  Contact: Valada Goodwin, Dir. Physician Recruitment at (703) 321-2618, by e-mail at <a href="mailto:valada.goodwin@inova.org">valada.goodwin@inova.org</a>, or fax your CV to (703) 321-2914.</p>
<p><b>Neurointensivist, Assistant Professor of Neurology &amp; Neurosurgery – CA</b>                  Contact: <a href="mailto:MANunez@mednet.ucla.edu">MANunez@mednet.ucla.edu</a></p>	<p><b>Stroke Neurologists – The Ohio State Medical Center</b>                  Contact: Larry S. Imely at <a href="mailto:limely@paul.lawrence.com">limely@paul.lawrence.com</a> or Suzanne Conroy at <a href="mailto:sconroy@paul.lawrence.com">sconroy@paul.lawrence.com</a></p>	<p><b>Neurointensivist in Paradise - Queens Medical Center</b>                  Contact: Helen Aldred                  E-mail: <a href="mailto:haldred@queens.org">haldred@queens.org</a></p>
<p><b>Neurointensivist – Philadelphia</b>                  Contact: Robert H. Rosenwasser, M.D., F.A.C.S.                  Thomas Jefferson University                  909 Walnut Street, Third Floor                  Philadelphia PA 19107                  Phone: (215) 503-7008 Fax: (215) 503-2452                  ATTN: Janice Longo                  Email: <a href="mailto:janice.longo@jefferson.edu">janice.longo@jefferson.edu</a></p>	<p><b>Neurointensivist and Stroke Neurologist – CA</b>                  Contact: Kaiser Permanente, Professional Recruitment                  Zoriy Elterman                  393 East Walnut Street                  Pasadena, CA 91188-8013                  Phone: (800) 541-7946                  E-mail: <a href="mailto:Zoriy.Elterman@kp.org">Zoriy.Elterman@kp.org</a></p>	<p><b>Neurointensivist – MN</b>                  Contact: Dr. Tariq Janjua, Neurocritical Care Medical Director                  HealthEast Care System                  Email: <a href="mailto:tjanjua@healtheast.org">tjanjua@healtheast.org</a> or                  Michael J. Griffin, Manager, Physician/Provider Recruitment                  HealthEast Care System                  Tel: 651-232-2227 Toll Free: 866-610-7219 Fax: 651-232-2009                  Email: <a href="mailto:mjgriffin@healtheast.org">mjgriffin@healtheast.org</a> Website: <a href="http://www.healtheast.org">www.healtheast.org</a></p>
<p><b>Neurointensivist - Los Angeles</b>                  Contact: George Rappard MD                  Los Angeles Brain and Spine Institute                  Email: <a href="mailto:info@labrainandspine.com">info@labrainandspine.com</a>                  Fax: (818) 949-7311</p>	<p><b>Stroke Director – WA</b>                  Contact: TRA Medical Imaging                  P.O. Box 1535 Tacoma, WA 98402                  Fax: (253) 383-3553                  Email: <a href="mailto:personnel@tramedicalimaging.com">personnel@tramedicalimaging.com</a></p>	<p><b>Spectrum Health - Grand Rapids, MI</b>                  Contact: Ashley McNeil                  Tel: (800) 678-7858, x64465                  Email: <a href="mailto:amcneil@cejkasearch.com">amcneil@cejkasearch.com</a>                  Website: <a href="http://www.cejkasearch.com">www.cejkasearch.com</a></p>
<p><b>University Town - Neurocritical Care Practice</b>                  Contact: Jennifer Cawfield                  Tel: 866-990-0599 x 1026 Fax: 214-283-8404                  Email: <a href="mailto:jcawfield@goldfishpartners.com">jcawfield@goldfishpartners.com</a></p>	<p><b>Neuro-Intensivists - Bronson Neurological Services</b>                  Contact: Cadace Lee                  Tel: (800) 594-9022                  Email: <a href="mailto:leeca@bronsonhq.org">leeca@bronsonhq.org</a></p>	<p><b>Vascular Neurology Specialist - Cleveland Clinic</b>                  Contact: Joe Vitale, Senior Director Physician Recruitment                  Email: <a href="mailto:vitalej@ccf.org">vitalej@ccf.org</a>                  Or apply online: <a href="http://www.clevelandclinic.org">www.clevelandclinic.org</a></p>
<p><b>Academic Neuro-intensivist – Texas</b>                  Contact: Imoigele Aisiku, M.D.                  The University of Texas Medical School at Houston                  Department of Neurosurgery                  6431 Fannin, MSB 7.129                  Houston, TX 77030                  Fax: (713) 500-7787                  Email: <a href="mailto:Pamela.Gauthier@uth.tmc.edu">Pamela.Gauthier@uth.tmc.edu</a></p>	<p><b>Neurointensivist - Cedars-Sinai</b>                  Contact: Dr. David Palestrant, Director of Neurocritical Care                  Cedars-Sinai Medical Center                  Departments of Neurosurgery and Medicine                  8631 West Third St., Suite 800 E                  Los Angeles, CA 90048                  Tel: (310) 423-0686 Fax: (310) 423-0810                  Email: <a href="mailto:David.Palestrant@cshs.org">David.Palestrant@cshs.org</a></p>	<p><b>Neurointensivists - U of NC Chapel Hill</b>                  Contact: William J. Powers, M.D.                  H. Houston Merritt Distinguished Professor and Chair                  Department of Neurology                  University of North Carolina School of Medicine                  170 Manning Drive-Room 2131, CB #7025                  Chapel Hill, NC 27599-7025                  Tel: (919) 966-8178 Email: <a href="mailto:powersw@neurology.unc.edu">powersw@neurology.unc.edu</a></p>
<p><b>Academic Position – Neurointensivist – Stanford Univ. School of Medicine</b>                  Contact: Christine A.C. Wijman, MD, PhD,                  Director, Stanford Neurocritical Care                  Stanford Stroke Center                  701 Welch Road, Suite 325                  Palo Alto, CA 94304-1705</p>	<p><b>Neurotrauma Critical Care Specialist - Minnesota</b>                  Contact: Gaylan L. Rockswold, MD                  Hennepin County Medical Center, Department of Surgery                  701 Park Avenue                  Minneapolis, MN 55415                  Email: <a href="mailto:gaylan.rockswold@hcmcd.org">gaylan.rockswold@hcmcd.org</a>                  Tel: 612-873-2810 Fax: 612-904-4297</p>	<p><b>Neuro-Hospitalist/Stroke Opportunity – WI</b>                  Contact: Beth Albee, Physician Recruitment, Marshfield Clinic, 1000 N Oak Ave., Marshfield, WI 54449.                  Tel: (800) 782-8581, ext. 19775                  Fax: (715) 221-9779                  Email: <a href="mailto:albee.beth@marshfieldclinic.org">albee.beth@marshfieldclinic.org</a>                  Website: <a href="http://www.marshfieldclinic.org/recruit">www.marshfieldclinic.org/recruit</a></p>
<p><b>Neurointensivist, Academic, UCLA Ronald Reagan</b>                  Contact: Paul M. Vespa, MD, FCCM                  Professor of Neurosurgery and Neurology, Director of Neurocritical Care                  David Geffen School of Medicine at UCLA                  757 Westwood Blvd., Room 6236 A                  Los Angeles, CA 90095                  Tel: (310) 267-9448</p>	<p><b>Neurointensivist - University of Maryland School of Medicine</b>                  Contact: Kevin N. Sheth, MD, Steven J. Kittner, MD, MPH or Barney J. Stern, MD                  Stroke and Critical Care Division, Department of Neurology                  University of Maryland Medical Center                  110 South Paca Street – 3<sup>rd</sup> floor, Baltimore MD 21201                  Tel: (410) 328-1982</p>	

## Neurocritical Care Fellowship Positions Posted\*

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<p><b>Stroke &amp; Neuro-Intensive Care Fellowship - California Pacific Medical Center</b>                  Contact: Jack C. Rose, MD                  Director, Neuro-intensive Care and Vascular Neurology Fellowships                  Email: <a href="mailto:rosejc@sutterhealth.org">rosejc@sutterhealth.org</a></p>	<p><b>NNICU Fellowship Availability - Wash. University</b>                  Contact: Yekaterina Axelrod, MD                  NNICU Fellowship Director                  Or Contact: Michael N. Diring, MD                  Email: <a href="mailto:diringerm@neuro.wustl.edu">diringerm@neuro.wustl.edu</a></p>	<p><b>Neurocritical Care Fellowship – University of Colorado, Denver</b>                  Contact: Dr. Robert Neumann                  12631 E. 17<sup>th</sup> Avenue, C307                  Aurora, CO 80045                  Email: <a href="mailto:Robert.Neumann@ucdenver.edu">Robert.Neumann@ucdenver.edu</a></p>
<p><b>Neurocritical Care - Thomas Jefferson University</b>                  Contact: Monisha Kumar MD                  Assistant Professor of Neurology                  Director of the Neurocritical Care Fellowship Program                  Thomas Jefferson University; Philadelphia, Pennsylvania                  Tel: (215) 955-6488 Fax: (215) 923-6792                  Email: <a href="mailto:Monisha.Kumar@jefferson.edu">Monisha.Kumar@jefferson.edu</a></p>	<p><b>Neurosciences Critical Care Fellowship - Johns Hopkins University</b>                  Contact: J. Ricardo Carhuapoma, MD                  Assistant Professor of Neurology, Neurosurgery and Anesthesiology &amp; Critical Care Medicine; Director, Neurosciences Critical Care Fellowship Program                  The Johns Hopkins Hospital                  Phone: (410) 955-7581 Fax: (410) 614-7903                  E-mail: <a href="mailto:jcarhua1@jhmi.edu">jcarhua1@jhmi.edu</a>                  Website: <a href="http://hopkinsmedicine.org/NCCUFellowship">http://hopkinsmedicine.org/NCCUFellowship</a></p>	<p><b>Cedars-Sinai Medical Center</b>                  Contact: Chad M Miller, MD                  Associate Director of Neurocritical Care                  Program Training Director, Neurocritical Care                  Email: <a href="mailto:millercm@cshs.org">millercm@cshs.org</a>                  Tel: (310) 423-0686                  Fax: (310) 423-0810</p>
<p><b>University of Virginia</b>                  Contact: Bart Nathan, MD., Fellowship Director, NeuroIntensive Care                  Department of Neurology, Box 800394                  Charlottesville, Virginia, 22908                  434-924-8371 Email: <a href="mailto:brn3a@virginia.edu">brn3a@virginia.edu</a></p>	<p><b>Neurocritical Care Fellowship - Oregon University</b>                  Contact: Neeraj Naval, MD                  Director, Neurosciences Critical Care Program                  Email: <a href="mailto:naval@ohsu.edu">naval@ohsu.edu</a></p>	<p><b>Duke University Medical Center</b>                  Contact: David L. McDonagh, MD  <a href="mailto:david.mcdonagh@duke.edu">david.mcdonagh@duke.edu</a>                  Fax: 919-681-4698 Tel: 919-681-6472</p>
<p><b>Fellowships - Rush University</b>                  Contact: Sayona John, MD, Assistant Professor of Neurology and Neurosurgery; Neurocritical Care Fellowship Director                  Department of Neurological Sciences                  1725 West Harrison, Suite 1121                  Chicago, IL 60612                  Tel: (312) 942-4500 Fax: (312) 563-2206                  Email: <a href="mailto:sayona_john@rush.edu">sayona_john@rush.edu</a></p>	<p><b>Neurocritical Care Fellowship - Mayo Clinic</b>                  Contact: Felco F.M. Wijdicks, MD, PhD                  Chair Division of Critical Care Neurology, Mayo Clinic                  Email: <a href="mailto:wjide@mayo.edu">wjide@mayo.edu</a></p>	<p><b>Washington University Fellowship – Neurology</b>                  Contact: Michael N. Diring, MD                  Email: <a href="mailto:diringerm@neuro.wustl.edu">diringerm@neuro.wustl.edu</a></p>
<p><b>2009 Neurocritical Care Fellowship – University of Pennsylvania</b>                  Contact: Joshua M. Levine, MD                  Program Director                  Email: <a href="mailto:Joshua.Levine@uphs.upenn.edu">Joshua.Levine@uphs.upenn.edu</a></p>	<p><b>2010 Stanford Neurocritical Care Fellowship</b>                  Contact: Haihong Nguyen, Administrative Assistant, Stanford Stroke Center,                  701 Welch Road, B325, Palo Alto, CA 94304.                  Email: <a href="mailto:haihongn@stanford.edu">haihongn@stanford.edu</a></p>	<p><b>Mount Sinai NYC Neuro-Critical Care Fellowship</b>                  Contact: Jennifer Frontera, MD                  Neuro-Critical Care, Departments of Neurosurgery and Neurology                  Email: <a href="mailto:Jennifer.Frontera@mounsinai.org">Jennifer.Frontera@mounsinai.org</a></p>