Neurohospitalist Section Strategic Plan – Approved April 13, 2010

I. Introduction

Over the past decade, the hospitalist model has become the dominant system for the delivery of internal medicine inpatient care. A neurohospitalist model, in which inpatient neurology specialists deliver high-quality and efficient care to neurology patients, has emerged in some community and academic settings to meet many of the challenges faced by neurologists in the current health care environment. The formation of the Neurohospitalist Section of the American Academy of Neurology (AAN) in 2009 was intended to lend a voice to a diverse set of neurologists who practice inpatient neurology and advocate for advancements in inpatient neurologic care and research.

Neurohospitalists are physicians who have as their primary focus the care of inpatients with, or at risk for, neurologic disease.

Areas of practice typically include the following
- The breadth of traditional inpatient neurology practice
- Quality and process improvement
- Emergency department and inpatient consultation coverage
- Program development and leadership
- Continuity of care – i.e. from inpatient to outpatient

There is significant overlap and expected interaction with neurology subspecialties and other distinct specialties such as
- Vascular Neurology
- Interventional Neurology
- Neuroimaging
- Rehabilitation Medicine
- Critical Care Neurology
- Epileptology
- Child Neurology and Pediatrics
- Hospitalist/Internal Medicine and medical specialties
- General Surgery and surgical specialties
- Emergency Medicine

The mission of neurohospitalists is to improve the inpatient care of patients with and at risk for neurologic disease.

II. Background/History

The neurohospitalist model has developed due to a number of changes in the current practice of medicine in general and neurology in particular. The demand for timely neurologic evaluation and intervention has dramatically increased over time. In addition, financial pressures (direct reimbursement and perceived medicolegal risk) have made it difficult for many neurologists to maintain both an inpatient and an outpatient practice. As a result many neurologists have decided not to cover inpatient consultation and emergency department call coverage. The neurohospitalist model has developed in response to this environment in much the way that the hospitalist model has in internal medicine. Many of the concerns of neurohospitalists are distinct from those of neurologists in other practice settings, including a focus on process improvement (outcomes measures, patient flow/throughput, order set development, systems work), medical education interests, integration into a hospital system (hospitalists, emergency departments, etc), as well as areas inherent in the development of a new model of care. These issues are valid in both the non-academic as well as academic environments, as departments struggle to balance resources while providing increasingly complex care in health systems that value the tracking of quality and safety measures.

The purpose of the strategic plan is to provide the Neurohospitalist section and the AAN with an overview of the current state of the discipline, an assessment of future needs and to establish initial goals for the section.


III. Current State of the Specialty of Neurohospitalist

A. Patient Care
Through increasing age and longevity of the patient population and the resulting complexity of the management of acute neurological care patients the demand for inpatient Neurology has increased. Through the development of new technologies in acute stroke treatment the demand for timely and available Neurological expertise has sharply risen. The level of Neurological expertise required in the hospital setting also has risen with increasing comorbidities of the hospitalized patient populations. With fewer Neurologists to meet the expanding needs of our aging population, clinicians with both outpatient and inpatient responsibilities are increasingly exposed to:

1. Emergency neurologic consultations (e.g., intravenous tPA) in the Emergency Department setting, which is associated with increased litigation risks

2. Fragmentation of continuity of care (e.g., outpatient neurologist is not the admitting physician at the hospital)

3. Inability to meet the demands of both inpatient and outpatients simultaneously (e.g., increasingly complex inpatient 'pay for performance' quality indicators and metrics, and outpatient practice issues)

4. Physician burnout (e.g., doing both "stroke-call" at all hours, and covering outpatients during regular business hours)

5. Difficulty in focusing the appropriate level of expertise in all patient populations.

From this impending crisis, the development of the model of separation of Inpatient based Neurological services and Outpatient based Neurological services rose to meet the needs of the hospitals and the communities. Through this division, Neurohospitalist support focuses and improves patient care by:

1. Providing specialized inpatient Neurological expertise

2. Providing readily accessible and available Neurological expertise to all hospital patients (Emergency department, ward floors for inpatient primaries/consults, and ICU patients)

3. Providing timely Neurological support to promote best practices

4. These models are evolving and must address the following patient care considerations:
   a. Consult vs. Primary Care: In general, there has been an evolution towards consultative only inpatient Neurological service but practice patterns vary across the nation. With the complexity of care increasing, best practice is in focused Neurological consultative care but there may be geographic and demographic considerations that support the continuation of primary inpatient Neurological care.

   b. The role of physician extenders: Currently Neurology is underserved and there is a growing need to define a role for physician extenders that will continue to deliver the quality of care expected of best practice. In addition, approaches may need to address incentives for physician extenders as a large number of physician extenders are driven to either hands-on (surgical specialties) or primary care specialties thus limiting the pool of extenders available to Neurohospitalists. Standardized and specialized Neurological training and certification may be an approach to enable qualified physician extenders.

   c. AAN Practice Guidelines for Hospital Neurological Care: The development of hospital Neurology based guidelines becomes ever more important with the expansion of coverage to include the use of physician extenders and to enable rising performance standards in hospitals: Some of the guidelines exist:
      Determining Brain Death in Adults
      Definition and Evaluation of TIA
      (include the list of pertinent guidelines or place as a referred table.)

Others remain to be developed such as:

The Evaluation of Altered Mental Status

   a. The relationship of Neurohospitalists to Vascular Neurologists: With the end of the grandfathering period for Vascular Neurology, the need for inpatient Neurology hospital practices will not be satisfied by Vascular Neurology alone. In addition, many vascular Neurology specialists roles have defined a more narrow scope of practice to address primarily the stroke and cerebrovascular patient than will meet the needs of all hospitalized Neurology patients. A relationship of the two subspecialties needs to be defined which recognizes patient needs in the hospitals and available expertise on both geographic and demographic considerations.
b. The relationship of Neurohospitalists and Critical Care Neurologists is similar to that of Vascular Neurologists, with the window for the grandfathering period ending in 2012. Neurohospitalists serve the entire hospital, including the ICU whereas neurocritical care physicians only serve the ICU. Significant overlap of roles for consultative capability for neurologic issues within the ICU for both Neurohospitalists and Neurointensivists. However, neurointensivists (especially board certified) and their training programs are in short supply compared to the demand for their expertise. Therefore, Neurohospitalists represent a bridge to provide neurological expertise and consultation to ICU patients where neurointensivists do not exist.

c. Patient Safety and Quality Issues: The development of Neurology-based quality measures for physicians in hospitals and as associated with pay for performance is limited at present predominantly to stroke treatment considerations. Those measures meaningful to be tracked and reported remain to be developed in the field of hospital Neurology.

d. Continuity of Care to the Outpatient Setting: In some cases, care after hospital discharge can be handled by primary care physicians. In other situations, a patient may require follow up with an outpatient Neurologist. Thus the Neurohospitalist models that are employed need to address continuity of care models. Currently, these are being addressed on a case by case basis. Some models, develop a partnered outpatient presence. These are usually hospital administration based practices, or academic based practices. Other models, may integrate a relationship with community based Neurologists either through informal agreements, formal agreements, or employ within a single specialty practice. Some models have no currently existing solution for meeting the outpatient needs of indigent or uninsured patients or in some cases Medicaid and Medicare patients.

B. Research

1. Basic Research

Neurohospitalist medicine represents a relatively new subspecialty. Like other hospitalists, neurohospitalists may not pursue additional subspecialty training though will develop inpatient expertise in specific areas of neurology. Neurohospitalists may conduct research that is specific to the inpatient population. Thus, the majority of research in the field will likely be clinical research. However, there is a considerable overlap with vascular neurology and a portion of neurohospitalists may participate in basic science of cerebrovascular disease.

2. Clinical Research

a. Who funds it in the specialty?:

Sources of funding for neurohospitalists involved in inpatient clinical research includes the institution (intramural), as well as extramural (NIH/NINDS and pharmaceutical industry).

b. Who does the clinical research in the field (MDs, PhDs or both)?:

Since most neurohospitalist research will involve an inpatient population, the majority of research will be performed by MDs. The growth of hospitalists in neurology and other fields has paralleled a shortage in clinical investigators throughout the country. Along with a steady decline in the number of MDs entering NIH-supported research training programs, there has been a divergence of clinical and basic research with the bulk of biomedical research being done by specialized PhD scientists and clinician-scientists becoming a minority (Nature. 2008;453:840-2). The growth of hospitalists may lead to a focus on the clinical aspect of scientific investigation that can lead to improvements in patient care, systems-based practice, comparative effectiveness, quality improvement, and clinical outcomes.

c. Where is it done?:

Most clinical research within the field will be in Neurology departments within academic centers though, with the growth of the field, more research will occur in community-based settings. Potential research interests for neurohospitalists include hospital quality improvement and patient safety, palliative care, resident education, emergency and critical care neurology. A particularly active area of research among neurohospitalists is cerebrovascular disease. A large portion of in-patient neurological care involves stroke neurology and neurohospitalists are often involved in the complex decision making and coordination of care involved with acute stroke interventions. As consultants to other services, neurohospitalists are also in an advantageous position to conduct research in the neurological complications of general medicine and surgical diseases, including ICU delirium, HIV disease, hepatic and renal disease and malignancy.
d. What is the role of private concerns (i.e. drug companies) in research?

Pharmaceutical companies have played an important role in inpatient research with many large clinical trials involving acute inpatient neurological care. This includes funding from device companies (eg. MERCI and PENUMBRA devices) for endovascular thrombectomy in acute stroke. Pharma has also been involved in acute medical management of stroke, including the recent changes in the time window for IV alteplase (Lancet 2008; 372:1303–09). Neurohospitalists represent a valuable resource to pharmaceutical industry trying to conduct multicenter research trials with patients with neurological disease who are hospitalized.

e. How and where are advances in the field conveyed and communicated (e.g. AAN vs other sub-specialty meetings and journals)

Major meetings for neurohospitalists include the AAN meeting as well as the International Stroke Conference by the American Stroke Association. There are also specialized conferences for hospitalists drawing from many medical fields. Additional collaboration exists between neurohospitalists and the Society of Hospital Medicine (SHM), and the Neurocritical Care Society.

C. Education

a. Medical Student

The majority of medical student exposure to neurology occurs within the inpatient setting. Neurohospitalists represent specialists who are “site-specific” and, like intensivists and hospitalists in other specialties that are free of outpatient responsibilities, neurohospitalists can offer better continuity to medical students than attendings who spend only part of their time at the hospital. Along with their greater on-site availability and potential for teaching throughout the day, neurohospitalists within academic centers will likely enter a clinician-educator track and, thus, be focused on formal training of students and residents. The quality of medical student education on neurology rotations may benefit from this directed learning from hospitalists (Acad Med 2001; 76: 324-330).

b. Resident/House Officer education

Neurohospitalists provide the specialization to care for the broad range of problems in the inpatient setting. This may be especially true in urgent cases, including acute stroke interventions such as tPA administration or mechanical thrombectomy or the treatment of acute neurological conditions such status epilepticus and myasthenic crisis. More direct supervision of house-staff from neurohospitalist faculty can lead to more standardized care for such disorders as well as improved quality and patient safety. Furthermore, the internal medicine hospitalist literature suggests that housestaff learn more effectively when on teams led by hospitalists (Arch Intern Med 2004; 164:1866-1871). Neurohospitalists can also ease some of the duty-hour restrictions placed on housestaff by the Accreditation Council for Graduate Medical Education by participating in family meetings, assisting with procedures or by simply providing improved continuity of care.

c. Role of sub-specialty in continuing education programs for non-neurologists?

The field of hospitalist medicine is one of the fastest growing fields in the US medicine. Neurohospitalists are frequently asked to provide CME lectures for non-neurologists. Neurohospitalists can provide expertise in lectures involving emergency room to ICU management. Topics may include the management of delirium, acute management of headaches, diagnosis of stupor and coma, brain death, meningitis and encephalitis, hypoxic-ischemic encephalopathy and neurologic prognosis after cardiac arrest.

d. Role of sub-specialty in continuing education programs for neurologists

Neurohospitalists will likely be involved in AAN meeting course offerings, specifically in diagnosis and management of common inpatient neurological disorders. Within such large conferences and within academic centers, they can also be involved in systems-based practice issues within the inpatient setting that involve quality, safety and efficiency of neurologic care.

e. Fellowship training
Currently there are few neurology hospitalist subspecialty fellowship programs, with the first program starting in 2003 at the University of Washington with many academic institutions developing similar programs, including Duke, Harvard and the Universities of South Carolina, University of California San Francisco (UCSF), New Mexico and others (Ann Neurol 2007; 62: A11-A13).

D. Medical/Economics Issues

With the alignment of physician reimbursement to an SGR algorithm not reflective of accurate changes in medical economics(1), with the dependency of physician reimbursement on Congress and sometimes companion legislation(2), with the recent alignment of primary practice incentives for cognitive work excluding the Neurology consultant(3), and with the current state of a medical care crisis with potentially sweeping changes at a national level(4), revenue income for the general Neurologist is also at a crisis.

This crisis is particularly more poignant for the Neurohospitalist with limited procedure income to sustain his/her practice and with inaccurate reimbursement for the time required and skill level for both in hospital procedures, such as carotid duplex interpretation and spinal tap procedures, and for in-hospital consultations.

Time on quality consultation is extensive and is influenced by inefficiencies and complexities of hospital inpatient care. Factors influencing the neurological consultation include:

- Time spent interpreting MRI/CT or discussing second level considerations with Neuroradiologist and interventional radiologist members.
- Patient access limitations and time management inefficiencies as a result of test scheduling and nursing responsibilities.
- Records access limitations
- Often extensive and time consuming family communications
- Physician communications

Neurohospitalist practices are further compromised by limited ability to manage the economics of their practice with some Neurohospitalists seeing 20 to 25% indigent, uninsured, or nonpaying patients and in some specific demographics even higher numbers of non-reimbursable effort. Other economic factors specific to the inpatient practice of Neurology include the difficulty of integrating PQRI initiatives and reporting into the practice model, hospital and DRG-driven LOS (length of stay) incentives and call coverage requirements.

With increasing demand for quality Neurological hospital care, physician burnout related to the stresses of the factors detailed above, and to the increasing demands by hospital physicians, staff, and administration to stretch an underserved Neurology population to meet these growing demands must be included in any economic model.

Models for the practice of Neurohospitalists currently exist that are:

1. Academic based
2. Salaried or productivity-based by hospital administrations
3. Salaried or productivity-based by multi-specialty groups
4. Productivity based by single Neurological specialty groups
5. Base salaried plus productivity based by single specialty Neurohospitalist groups

These models must be refined to streamline operations to address the above economic considerations.

In summary, key considerations into the economic development of operating and functional Neurohospital practice models should address revenue and reimbursement considerations for:

1. Predominantly cognitive work
2. Hospital inefficiencies (outlined above)
3. RVU inadequacies
4. PQRI implementation strategies
5. Procedures such as carotid duplex interpretation and lumbar spinal procedures
6. Nonpaying populations
7. Call requirements

These models must incorporate a strategy that controls quality of life and avoids physician burnout.
E. Legislative Issues

In health care today, most medical economic issues are influenced by legislative decisions. Representation by Neurohospitalists to address the above issues is necessary to insure adequate and fair reimbursement for the effort and need to provide inpatient Neurological consultation. With reimbursement favoring outpatient care over inpatient care and with the increasing demands and complexity of providing both inpatient and outpatient services, more Neurologists are choosing outpatient practices. Physician burnout has been a real and significant factor for hospitals seeking Neurological services for their patient population. This is particularly important to recognize for the future and will be affected by legislative decisions. Currently, Neurologists are unable to meet the demands for inpatient Neurological care and if this trend continues, hospitals across the nation will be in crisis for providing adequate Neurological care.

Legislation must skillfully recognize this impending crisis through improved reimbursement strategies, recruitment incentives, and legislation outlining hospital support responsibilities to insure their own needs are met. Large scale realignment of work effort, care expectations, and access to hospital care may be required to halt a spiraling medical financial crisis. Neurohospitalists must be involved in these efforts as part of the solution.

Current legislation and CMS reimbursement mechanisms should review the adequacy of LOS requirements, RVU inadequacies, SGR algorithms, PQRI reporting, hospital consultation inefficiencies and demands for extensive family communications.

IV. SWOT Analysis

Patient Care

Strengths
- Reduce Length of Stay
- Streamlined care
- No competing time interests (clinic)
- Ability to track and Improve Quality Metrics Get with the guidelines, joint commission
- Familiarity with acute care diagnoses and protocols

Weaknesses
- Reduced continuity of care
- Outpatient communication

Opportunities
- Research
- Program and field development

Threats
- Turf war for patient ownership (Neurohospitalist vs. stroke neurologist vs. Medicine hospitalist)

Research

Strengths
- New field
- Huge upside

Weaknesses
- Long term outcome measures require clinic follow up

Opportunities
- Tremendous

Threats:
- Funding – not established, no track record.

Education

Strengths
- Similar to Medicine hospitalists
- New field

Weaknesses
- Model change vs. ward attending

Opportunities
- Excellent
- Publications
- conferences

Threats:
- Paradigm shift
- Barriers to change
**Medical/Economics**

**Strengths**
- Reduce LOS
- Huge upside

**Weaknesses**
- Expensive to hire
- Most hospitals are not large enough to justify necessary staffing

**Opportunities**
- Research
- Collaboration with other hospitalist specialties

**Threats:**
- Health care reform
- Global economy
- Political climate

**Legislative Issues**

**Strengths**
- Favorable (legislative climate is fostering hospitalist and neurohospitalist growth)

**Weaknesses**
- Long term outcomes measures require partnership with clinics

**Opportunities**
- AAN advocacy
- Partnership with SHM (Society of Hospital Medicine)
- American Heart Association

**Threats:**
- Repeal of tort reform
- Socialization of medicine

**V. Specific Vision/Goals and Objectives**

1. Over the next 3 years, the section will work to define what constitutes a Neurohospitalist. During this period we aim to be inclusive of neurologists (adult and child neurologists) interested in the field.

2. Defining the field will also lead to detailing specific areas of knowledge needed to function adequately as a Neurohospitalist, setting the stage for training programs.

3. We aim to work with Internal Medicine hospitalists, likely through the Society of Hospital Medicine, in order to form a partnership with common goals that will advocate for Hospitalists and Neurohospitalists nationally.

**VI. Summary/Concluding Statement**

The practice of hospital-based Neurology is an emerging fast growing subspecialty within the field of Neurology. The scope of neurohospitalist practice encompasses both primary neurological conditions that require intermittent hospital-based care and neurological complications of systemic diseases. The continued growth and long-term sustainability of the neurohospitalist model will require addressing challenges on numerous fronts. Practice models that ensure smooth and safe transitions between inpatient and outpatient neurological care are being currently developed. Integration of neurohospitalists will be facilitated by development of a skill set unique to the practice of inpatient neurology. Neurohospitalists practice will likely implement different business models based on available resources and partnerships with hospitals or outpatient-based practices. Systematic research to prove that neurohospitalist care is evidence-based, cost effective, and improves outcomes is desperately needed to justify the model of a dedicated inpatient neurological subspecialist. The AAN and the Neurohospitalist Section will provide an important infrastructure to achieve these goals.

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