



Building a Leading Neurosurgery and Spine Program

May 17, 2012

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DISPUTES & INVESTIGATIONS • ECONOMICS • FINANCIAL ADVISORY • MANAGEMENT CONSULTING

Today's Discussion



Section 1 » Current State



Section 2 » Key Program Elements



Section 3 » Critical Success Factors



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Section 1 Current State



Neuroscience Overview

- » **The Neuroscience market is large and growing. As such, it has attracted increased planning focus and investment by health systems nationally. Reasons why include:**
 - » Up to one third of Americans suffer from a neurological, functional or spinal disorder
 - » Neuroscience services contribute significantly to health system revenues and profits
 - » Other clinical services have been stagnant, declining and/or migrating to other settings
 - » Neuroscience programs are capital intensive
 - » There are critical physician issues related to neuro clinicians
 - » Last major scientific frontier
 - » Possibility that the National Institute of Neurological Disorders and Stroke (NINDS) may create a designation for Comprehensive Neuroscience Centers
 - » Growing philanthropic interest

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Neuroscience Overview (continued)

- » **In many major markets, the leading Neuroscience program is the academic medical center (which is often not the case for other major clinical areas)**
- » **Although multiple models exists, no "gold standard" has emerged for Neuroscience Centers – the preferred model varies according to local institutional and market realities**

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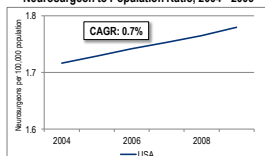
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Supply of Neurosurgeons

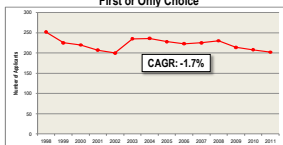
Neurosurgeon Supply in the US (2009)

	Patient Care			
	Total Patient Care	Office Based	Hospital Based Resid. / Fellows	Phys. Staff
Number of Neurosurgeons	5,456	3,931	1,036	489
Neurosurgeons per 100,000 population	1.78	1.28	0.34	0.16

Neurosurgeon to Population Ratio, 2004 - 2009



US Residency Applicants Ranking Neurosurgery as their First or Only Choice



Observations

- Supply of neurosurgeons relative to population has been increasing recently, but projected increases in neurosurgery demand due to the aging population, and a decrease in the number of medical students interested in the specialty could result in a future imbalance between supply and demand

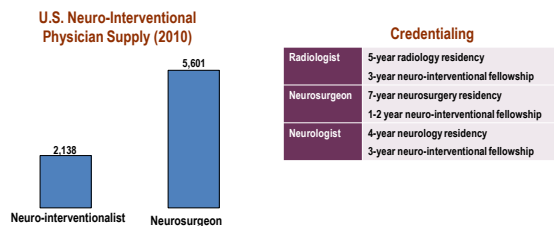
Source: Physician Characteristics and Distribution in the US (2011 based on 2009 data), "Retracting Top Medical Students to Neurosurgery", JAMA Neurosurgery, 2010; National Residency Matching Program Results and Data 2010 and 2011.

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Physician Recruitment Challenges

Due to length of training time, there are few trained neuro-interventionalists. As a result, salary requirements can range from \$400,000-\$900,000 per year and physicians are primarily interested in organizations that have established programs with technology requirements in place.



Source: Advisory Board, American Medical Association "Physician Characteristics and Distribution"
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Shortages Lead to a "Blurring" of Specialty Lines

- › Society for Cardiovascular Angiography and Interventions (SCAI) launched a neuro rescue training program that teaches its members to perform endovascular stroke procedures
 - Goal is to expand access to mechanical clot removal; eventually cardiologists with this training could staff community based stroke centers, given national shortage of neuro-interventionalists
- › Former president of the Society of Neurointerventional Surgery says the problem is not physician shortages, but inadequate patient awareness of stroke symptoms and delays in transferring patients to stroke centers
 - Additionally, endovascular therapy is only one component of a stroke program; stroke centers must also have a stroke unit, a neurosurgeon and advanced imaging services
- › Debate exists over whether interventional cardiologists can safely perform intra-cranial procedures, even with additional training
- › Interventional radiologists are another specialty poised to learn endovascular stroke treatment; may be even better positioned than cardiologists, given their experience with leg and liver vessels
- › "We're starting to blur the arbitrary designation of specialties and move toward a more general, multi-disciplinary category of stroke care," the director of the SCAI neuro-rescue program says. "This discipline could eventually be ingrained into interventional fellowships across multiple specialties"

Source: Advisory Board Horizon Scan 7/9/2009
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US News Top Neuroscience Programs

Of the top 10 neurology/neurosciences programs as identified by US News, nearly all have designated Neuroscience "centers" of some kind

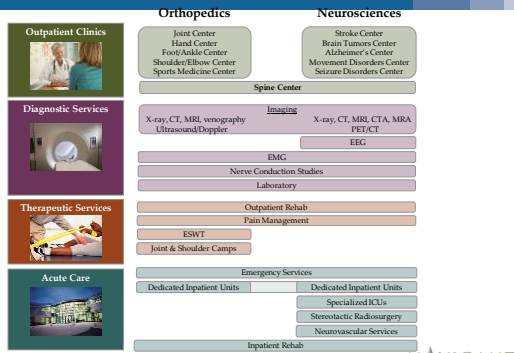


Source: U.S. News Best Hospitals July 2012

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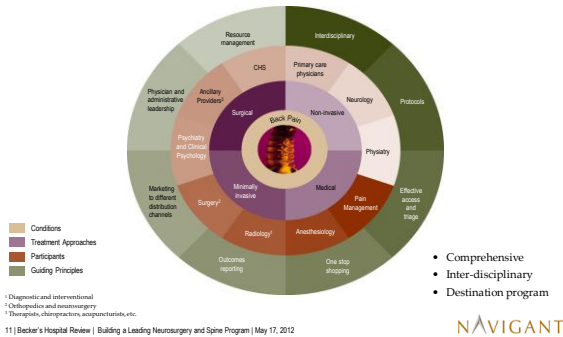
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Where Is The Overlap?



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Comprehensive Spine Care Program Model



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Section 2 Key Program Elements



Example Neuroscience Scope: *Clinical Programs*

The Neuroscience Center of Excellence will include patient care / clinical research and educational activities. In terms of clinical programs, it will offer multi-disciplinary, patient-focused care on a wide range of adult and pediatric Neuroscience diseases and disorders (of the brain, spine and nerves) including but not limited to:

- Amyotrophic lateral sclerosis (ALS), Huntington's Disease and other neurodegenerative disorders
- Alzheimer's disease, dementia and memory disorders
- Brain, spine and peripheral nerve tumors
- Dizziness and vertigo
- Epilepsy and seizure
- Headache and migraine
- Meningitis, encephalitis and other brain and spinal cord infections
- Multiple sclerosis and neuroinflammation / demyelinating disorders
- Neurobehavioral disorders, including autism, mood disorders and impulse disorders / addictions
- Neurodevelopmental disorders, including spina bifida and hydrocephalus
- Neuromuscular disorders, including neuropathy, muscular dystrophy and myasthenia gravis
- Pain
- Parkinson's disease, tremor and movement disorders
- Pituitary tumors (endocrine)
- Sleep disorders
- Spine disorders
- Stroke and cerebrovascular disorders (including arteriovenous malformations - AVMs)
- Trauma, including concussion, traumatic brain injury (TBI) and spinal cord injury (SCI)
- Trigeminal neuralgia

Note: This list of Neuroscience Center clinical programs is intended primarily for marketing purposes and therefore is intentionally comprehensive and inclusive. Our patients may access these services through other channels -- e.g., the Musculoskeletal Center, the Cancer Center, the Children's Hospital, etc. -- in addition to the Neuroscience Center.
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Example Neuroscience Scope: *Research*

The Neuroscience Center of Excellence will include patient care / clinical, research and educational activities. The Neuroscience Center will coordinate with Neuroscience researchers across the organization to leverage basic research strengths (e.g., genetics, epigenetics, ALS, Huntington's and other neurodegenerative diseases) to distinguish its clinical programs and expand clinical and outcomes research. These Neuroscience researchers exist in multiple places including:

- Neuropsychiatric Research Institute
- Neurotherapeutics Institute (NTI)
- Center for Comparative Neuroimaging
- Center for Mental Health Services Research
- Center for Outcomes Research
- Departments of Neurology, Neurosurgery, Psychiatry and Radiology
- Department of Neurobiology
- Neuroscience Program within Graduate School of Biomedical Sciences
- Center for Stroke Research

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Example Neuroscience Scope: *Education*

The Neuroscience Center of Excellence will include patient care / clinical, research and educational activities. The Neuroscience Center will coordinate with and look to advance Neuroscience related medical education activities, including:

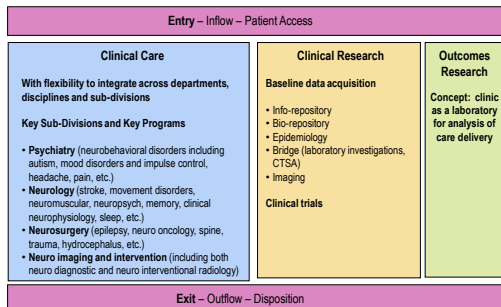
- **Residency Programs, including...**
 - Neurology
 - Neurology / Psychiatry
 - Neurosurgery
 - Psychiatry
 - Radiology
- **Fellowship Programs, including...**
 - Neurology: neurovascular, epilepsy/neuro muscular, MS, etc.
 - Neurosurgery: cerebrovascular, epilepsy, movement disorders, neuro-oncology, spine, pediatrics
 - Psychiatry: behavioral neurology, neuropsychiatry, etc.
 - Radiology: neuroradiology, endovascular surgical neuroradiology, etc.

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Example Neuroscience Center of Excellence Model

"A Three Pillar Model for Cost-Effective Care Delivery in a Medical School Context"

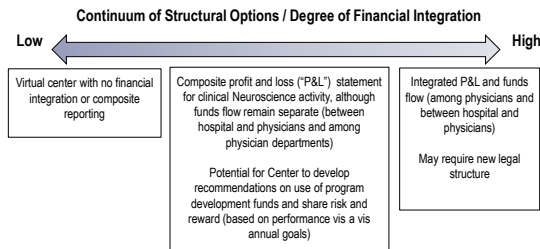


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Neuroscience Center of Excellence: Structural Options

Multiple structural options for the Neuroscience Center of Excellence exist. The structural model at the majority of academic Neuroscience Centers / Institutes is in the middle of the continuum below.



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Neuroscience Center of Excellence: Management

- A Neuroscience Center of Excellence requires focused management, including at least:
 - Physician leader – part-time position, responsible for overall leadership of Neuroscience Center
 - Administrative leader – part- or full-time position, responsible for partnering with Physician leader, implementing the Neuroscience Plan, including growth and operations
 - Research director – part-time position, charged with inventorying, integrating with and leveraging research strengths)
 - Outcomes research director – full-time position, responsible for developing and managing outcomes research division
 - Program / medical directors – part-time positions for selected priorities (e.g., stroke, neuro diagnostics, quality, other TBD)

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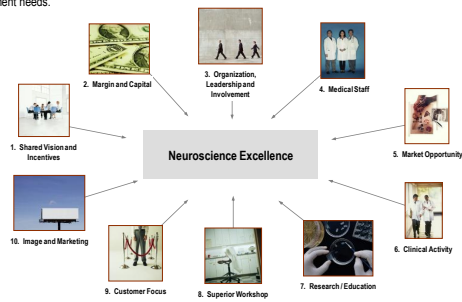
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Section 3 Critical Success Factors



Ten Critical Success Factors

The following ten factors are critical to developing Neuroscience Programs and are used to help identify and prioritize development needs.



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Critical Success Factor: Shared Vision and Incentives

- » Well defined vision of the future, easily articulated among all constituents
- » Program-specific strategic plan developed by senior leadership, and supported throughout the department
- » Physicians, administrators, clinical staff all working together toward the same long term goals
- » Alignment of incentives and strategic plan goals with the program's future vision



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Critical Success Factor: Margin and Capital

- » Strong financial performance
- » Programs that are able to fund capital expansion
- » Grant funded programs
- » Ongoing philanthropic support
- » Prioritization of the program at the system level



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Critical Success Factor: Organization, Leadership and Involvement

- » Dedicated clinical and administrative leadership, including both a dedicated physician leader and an administrative leader with a good working relationship
- » Strong collaboration among and between neuro clinicians and researchers
- » Governance structure that encourages broad based participation and autonomous decision-making
- » Program-specific management reports detailing the economics and clinical performance of the program overall as well as key sub-programs



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Critical Success Factor: Market Opportunity

- » Market leader in most or all disciplines
- » Large and well-populated service area and/or
- » Programs that draw significant numbers of patients from outside a traditional "service area"
- » Low outmigration from service area for neuro and spine-related services



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Critical Success Factor: Medical Staff

- » Subspecialty interest and expertise in a wide range of disciplines
- » Nationally recognized clinicians
- » Spirit of multi-disciplinary collaboration among all disciplines
- » Ability to recruit and retain necessary specialties and high-quality physicians



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Critical Success Factor: Clinical Programs

- » Well-coordinated continuum of care
- » Defined interdisciplinary programs, rather than services, with strong physician leadership
- » Strong, demonstrable outcomes
- » Value placed on advancing clinical knowledge and skill sets (i.e. dedicated Clinical Nurse Specialist)
- » Strong referral relationships both within the system and the community; physician interest in maintaining those relationships



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Critical Success Factor: Research and Education

- » Research and education are an integral part of day to day clinical activities
- » Breadth of research efforts span the realms of basic, translational, clinical, and outcomes research
- » Significant and reputable funding sources (NIH, etc)
- » Adequate infrastructure in place to support research and education, including physical space to support research needs, and administrative personnel needed to effectively manage educational programs
- » History of highly regarded publications
- » Strong residency program and presence of fellowships, particularly in key program areas



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Critical Success Factor: Superior Workshop

- » Dedicated inpatient and outpatient program space – co-located and convenient for patients
- » Investments are made in the latest advances in technology to foster new treatment methods
- » Strong clinical support staff
- » Highly efficient and organized operations
- » Sufficient capacity (inpatient beds, ORs, etc.) to treat desired program volumes



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Critical Success Factor: Customer Focus

- » "One stop shopping" neuro destination for patients
- » Easily accessible programs
 - › Short wait times for appointments
 - › No barriers to entry or bottlenecks – i.e. lack of neurologists available for initial screening
 - › Easy and transparent referral process
- » Patients perceive that they receive the best quality of care in a caring and aesthetically pleasing environment
- » Patient support groups
- » Differentiated outcomes within the marketplace in publicly available data sources (HealthGrades, etc.)



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Critical Success Factor: Image and Marketing

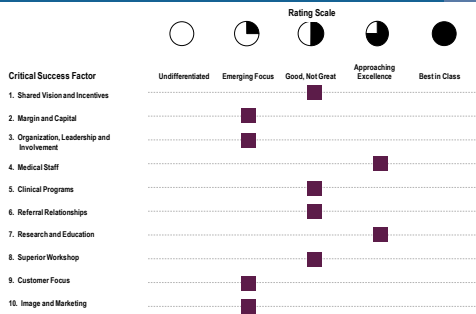
- » Programs recognized nationally as a destination Neuroscience center
- » Reputable affiliations and partnerships
- » Host of Neurosciences symposia
- » Program-specific website and marketing materials
- » Programs serve as a conduit for attracting the best physicians, nursing and other clinical staff
- » Entrepreneurial and marketing expertise and focus within the program administration
- » Defined giving opportunities specific to the program (i.e. naming opportunities – building, endowed chairs, etc.)



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Sample Critical Success Factors Assessment Overview



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