



UNIVERSITY OF UTAH
HEALTH CARE

CONVERGENCE

Clinical Neurosciences Center 2009



A Landmark Year For Neurosciences

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It has been quite a year for Clinical Neurosciences. Since opening our collaborative, 13,500 square-foot Neurosciences Clinic in May 2008, we have renovated the other four levels of our Neurosciences Center building, which includes a new 32-channel 3T MRI suite, faculty and administrative offices, our Joint Commission Primary Certified Stroke Center (which again received the American Heart Association's Get with the Guidelines Gold Award), four neurosurgical operating rooms and the Neurosciences Education Center. Add this to opening our new Brain Health Learning Center at our Imaging and Neurosciences facility (Research Park), increasing our inpatient capacity from 11 neuro-critical and 27 semi-private neuro acute care beds to 23 and 34 private beds, respectively, and adding several new faculty in our three academic departments, and one has a truly exciting formula!

We were also pleased this year to obtain Neurosciences Center of Excellence Level 4 Institute status, something afforded to only 10 percent of 150 neurosciences programs analyzed across 41 states. Despite these accomplishments, we continue to work harder to always do better: to enhance care, to break new ground in translational research, and to find new and innovative ways of teaching future neuroscientists. It is as the public intellectual, Harold Taylor, said: "The roots of true achievement lie in the will to become the best that you can become."



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2009 Clinical Neurosciences Center
Report to the Community

Improving the Patient Experience	4
Neuro Nurses Walk the Recovery Path with Patients	6
Technology and Expertise Define Neuroradiology	12
How to Discover the Same Thing More Than Once.....	14
Increasing Neurosurgery's Depth	16
Pioneer Ronald Apfelbaum Retires	18
Backbone of the Department.....	24
Shaping the Future of Neurology	26
Catalyzing Change in Alzheimer's Research	30
Proactive Dementia Care	32
Massive Initiative Accelerates Alzheimer's Research.....	36
Hope in Sight for Alzheimer's Patients.....	38
Outreach Improves with Teleneuropsychology Program..	40
Neurosciences Physicians	42
Residents & Fellows	50

Our Goal: Creating An Exceptional Patient Experience



Last year, in our first community report, we told you that a major goal for FY09 was to work on creating an exceptional patient experience. We also committed that we would continue to share our progress toward that goal. One of our discoveries through in-person patient focus groups was that while we do most things really well, we are not always consistent. We believe that our patient surveys reflect this same thing—that while we are often very good, sometimes we are just “good.” We want people to feel we are very good all of the time.

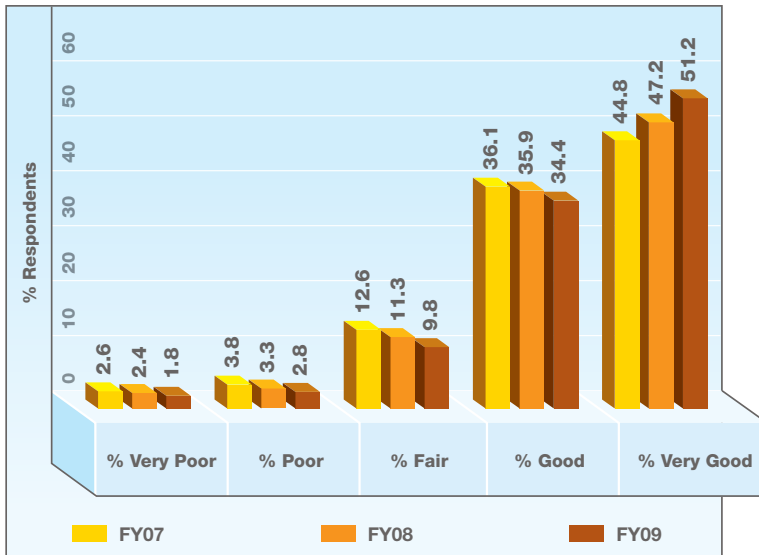
We have also learned from our patient focus groups that we need to significantly improve our response time to telephone calls in our clinics. In the inpatient setting, people told us that sometimes we do not thoroughly explain the discharge medications or any outpatient follow-up requirements. They also want us to explain why we are actually using specific tests and treatments. Overall, that means we need to listen more effectively and explain more clearly. Based on this feedback, we created one telephone number that is answered by a live person and a dedicated call center. The departments also reorganized teaching rounds so that they are more efficient and so that there are more opportunities for the patients/families to ask questions.

This coming year, we have set new and higher goals for our experience scores. In fact, our ultimate goal is to achieve some of the top scores in the nation related to neurosciences patient experience. The sooner we achieve that, the better, since we know that we not only have nationally and internationally recognized clinical and research faculty but also beautiful, state-of-the-art facilities. We cannot imagine a better way to continue to move Clinical Neurosciences at University of Utah Health Care into the future.

“Every person I came in contact with was courteous, professional, and helpful. They were genuinely concerned and interested in how I was feeling. It made me feel I was being cared for by the very best.”

CNC patient

FY07 - FY09 Inpatient Experience



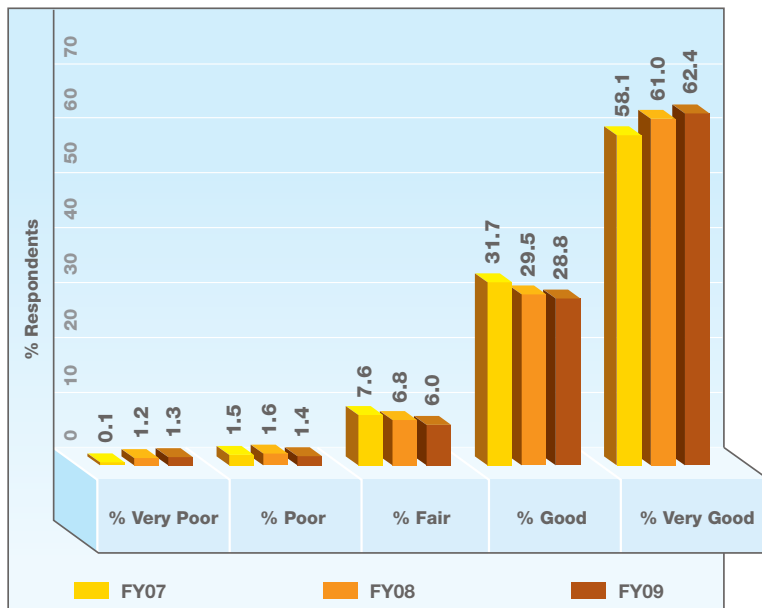
Examining our inpatient survey responses for fiscal year 2007 through fiscal year 2009 (July 1, 2006 – June 30, 2009), we see:

- Respondents rating their experience as “Very Poor” decreasing by 0.6%
- Respondents rating their experience as “Poor” decreasing by 1.0%
- Respondents rating their experience as “Fair” decreasing by 2.9%
- Respondents rating their experience as “Good” decreasing by 1.7%
- Respondents rating their experience as “Very Good” increasing by 6.4%
- If we add all the decreases for the Very Poor through Good categories (6.2%), we see that this is very near the increase of 6.4% in people rating us as Very Good. An encouraging trend, indeed, and one we plan to continue.

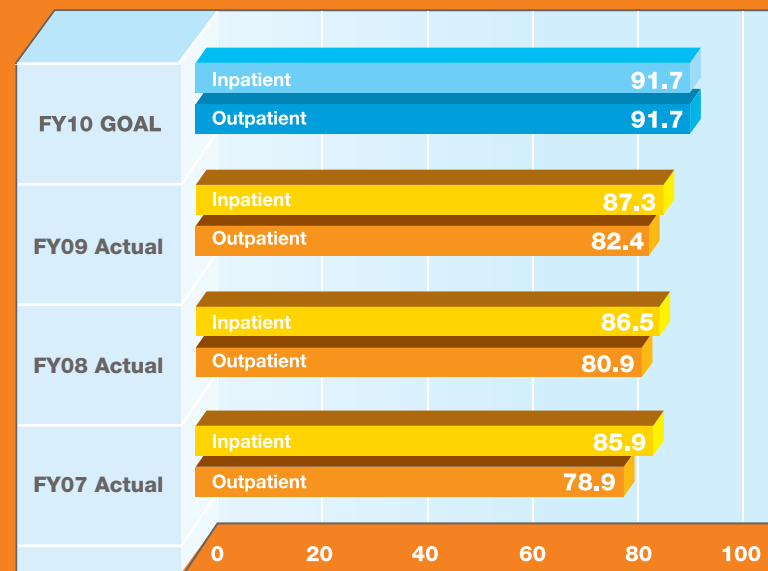
Outpatient survey results reflect the following trends:

- Respondents rating their experience as “Very Good” increasing by 4.3%
- Respondents rating their experience as “Good” decreasing by 2.9%
- Respondents rating their experience as “Fair” decreasing by 1.6%
- Respondents rating their experience as “Poor” decreasing by 0.1%
- Respondents rating their experience as “Very Poor” increasing by 1.2%

FY07 - FY09 Outpatient Experience



FY10 Patient Experience Goal (FY07-FY09 Actual)





Neuro Nurses Walk the Recovery Path with Patients

It is the first nurse in their continuum of care that neurology patients most often remember; the one who first takes their hand and begins the journey with them on the sometimes unpredictable path to recovery.

Nurses, particularly in The University of Utah's Neuro Critical Care (NCC) and Neuro Acute Care (NAC) Units, provide this same support for patients' families as well—helping them navigate the emotional minefield when a loved one suffers from neurologic injury and disease.

While many play an integral role in the care process, including the family, it is the neuro nurses that often spend the most time with patients, becoming their patients' advocates and honing in on each patient's individual response to illness and injury as their condition evolves.

Throughout twelve-hour shifts each nurse has one to two patients in the Critical Care Unit and four patients in the Acute Care Unit. Vital signs, neurological assessments and clinical interventions are done at least hourly in Neuro Critical Care. The frequency of assessments and interventions decreases as the patient transitions to Neuro Acute Care.

A deep well of compassion is necessary to meet the emotions of the family and patients. "This is not an area you go into if you are faint of heart."

“Even if the patient is unable to communicate with us, we try to develop a rapport,” explains Liz Armour-Roth, RN, manager of Neuro Acute Care. Neuro nurses rely on their patient’s individual physical and emotional symptoms to “tell” them how their patient is doing. For example, there are times when a person who has sustained a head injury cannot communicate with their actions or words. Nurses can see how they are responding to their environment and clinical condition by watching for symptoms such as increased blood pressure, increased sweating, levels of agitation, and how the patient is holding his or her body.

“It is easy for a nurse to care just at the hospital, but neuro nurses must put the care they give into the context of family and community,” points out Armour-Roth. “When the patient becomes ill, the whole family becomes ill” is a maxim neuro nurses take to heart.

In order to accommodate the family and allow them proximity to the patient, the Critical and Acute Care units are set up so that each patient has a private room. These rooms have a space designated specifically for family, including a fold-out couch so a family member can stay

“Being a neuro nurse requires strong critical thinking skills and a deep, ongoing knowledge base but at some point it also becomes an art.”

Liz Armour-Roth, RN, Manager, Neuro Acute Care

Nurses observe these clues from their patients’ behavior and intervene, for example, by helping patients change position, giving medications as prescribed by the physician, or decreasing environmental stimulation. “There is a lot of assessing but you must also have an intuitive sense to be a neuro nurse; you’re always listening and looking for subtle changes,” says Armour-Roth.

Good Medicine: A Supportive Family

Neuro nurses are the liaison between the care team and the family. As the most present communicators, they are aware of the medical collaborations and understand why certain decisions have been made regarding the patient’s treatment. “What makes a family most afraid is when they get different answers from the care team,” says Karen Reimherr, RN, Neuro Critical Care manager, who, like the other critical care neuro nurses, attends rounds with the physicians to stay abreast of the rapidly evolving treatment plans for their patients.

the night. Nurses encourage family members to share their loved ones’ likes and dislikes, incorporating their input into the patient’s care plan. Many family members want to be actively engaged in the healing process, so nurses work with the family to show them how they can help the patient at meal times and with personal care tasks.

“Sometimes, you need to humanize the patient for the family as the nurse,” says Reimherr, describing patients who may not even be awake or responsive and might look quite different due to their injuries and all the surrounding medical apparatus. Families are encouraged to talk to their loved ones and let them know that they are being heard. Nurses prompt families to express their love to the patients, ask how they are feeling, tell them what the kids are up to, and to talk about all the typical things. “Let them know you are here for them all the time and hold their hand,” is what we tell families, says Reimherr. “We need to help families keep a hold of the relationship with their loved one and not let them become paralyzed with fear or uncertainty about what to do.”





Studies have proven how essential family support is to the recovery process. While family members can make a patient feel secure, it is the job of the neuro nurses to earn the trust of the family. Assuring a family that their loved one will be vigilantly cared for allows a mom, a son, a sister to take a much-needed break or nap. Many of the patients and families are from out of state, so only a few family members may be carrying the full load of being present and involved.

Neuro nurses expend much of their time and energy attending to the family's needs and concerns. "It is our job to make sure the family knows their loved one is safe and that we will watch over them," emphasizes Reimherr. A deep well of compassion is necessary to meet the emotions of the family as well as deal with the heartache of seeing patients struggle through physical and emotional hardship. "This is not an area you go into if you are faint of heart," remarks Armour-Roth.

"All families deal with it in such an individual manner. Some unravel, some pull together," says Jill Austin, RN, the Clinical Operations Director. "But this is why it is imperative to make sure the family is on board from day one in the care and decision-making—because it will also impact the rest of their lives."

The Continuum— From Critical to Acute to Outpatient

In the summer, the Neuro Critical Care Unit's 23 beds typically fill up with bicycle, long board, and ATV accident victims; in the winter with snowmobile, skiing, and snowboarding accidents. Patients arrive in very critical condition; the main focus of critical care treatment is to prevent further damage to the brain while patients heal. Some of these patients may be in ICU for months.

Stroke patients will spend the first 24 hours in Critical Care and then proceed to the Neuro Acute Care Unit. An average of 21 stroke victims are treated each month in Neuro Critical Care. During their stay, patients are checked primarily for brain swelling, extension of the stroke, and bleeding.

"We've got to always be on our toes because a patient's status can change very quickly—we're always looking for nuances of change," says Neuro Critical Care manager Reimherr. Nuances like noticing a patient no longer can move a pinky finger or a slight slur in their speech. "Every brain responds differently to injury, so every person is going to respond differently," adds Reimherr.

Transitions from one unit to another are handled personally by the nurses to reassure the patient and family about the new care they are receiving. The nurse who has been caring for the patient in Critical Care accompanies the patient to the Acute Care Unit. Once there, the nurse introduces patients to their new nurses and shares personal details they've learned about their patient (e.g. what kind of food the patient likes, where they are from, family members who are important to them). These things help the nurses in the next setting understand the patient and implement care in a more holistic manner.

Through the transition process, it is important to continue keeping the family's trust. "Once in Acute Care, the family's mindset is no longer whether mom is going to live or die, but rather how are we going to get her home and take care of her?" explains Acute Care nurse Armour-Roth. Sometimes when waking up, the patient exhibits behavior that is unusual and can be upsetting to the family. This is more common with frontal head injuries, causing the patients to wake up combative,

uninhibited, and easily agitated. This is another point in which families need a lot of emotional support. Nurses spend time educating the family about the patient's injury and pointing out that the behavior the patient is exhibiting is normal for their injury. They stress that recovering from injury to the brain takes time and that many times the abnormal behavior will improve.

In Acute Care a baseline is established for the patient. Physical and speech therapies are implemented and vital monitoring goes from every one to two hours to every four hours. "We have the opportunity here to work with some of the most complex patient cases in the region and help them progress," expresses Armour-Roth. "We are either getting patients ready for the next stage of their care or helping them accept where they are at now. Sometimes patients' conditions change abruptly and they head back to the NCC. It keeps us on pins and needles."

Through Acute and Outpatient Care, recovery and rehabilitation continue to be a family affair, impacting the lives of the patient's primary caregiver as well as other significant family members and friends. For the patient, it is often a process of learning new ways of performing old tasks; for the caregiver it may involve adapting to and accepting the individual as he or she is now, which may include permanent physical and/or cognitive limitations.

"When the patients come to us, they are at the beginning of the recovery process, which entails re-learning and re-tooling," points out Austin, who works primarily with stroke patients. "Most all neuro patients leave here with some kind of permanent change, either physically and/or emotionally, which they must adapt to."

Because patients are going through such a life-altering experience, the nurses must provide holistic care recognizing the physical, emotional, and spiritual aspects resulting from the trauma. "As a neuro nurse, you are part of everything your patient is working through, and the bigger the impact the more this is true. You may have a young man that has to accept he is in a wheelchair for the rest of his life and has to deal with everything that presents," explains Austin.

Prior to a patient entering Outpatient Care, a discharge nurse will meet the patient, the family, and nursing team on the Neuro Acute Care Unit to review information, answer questions, provide contact info, and help the patient know what to expect in follow-up care. To ensure continuity of care and communication, this same nurse will assume care of the patient in the Outpatient Clinic.

Outpatient neuro nurses equip families with support group and community resource information. Sometimes patients don't retain what they've learned in the hospital because of the intensity of the situation and/or their condition, so nurses help re-educate patients, following up with discharge calls to see how each patient is coping.

Ongoing professional education is part of the job for neuro nurses; it is a rapidly evolving subspecialty, where changes in technology, clinical guidelines, and outcomes as well as new medications require constant learning. "If a nurse chooses to work in a subspecialty, then the nurse has the responsibility to keep current in the field otherwise it is to the detriment of the patient," asserts Reimherr, who routinely reviews case studies with her care team to re-evaluate and improve patient care.



There is Heartache and There is Hope

When a young driver gunned a pickup truck while John* and his brother were standing in the truck's bed, they were both thrown out. His brother died; John lived but with the repercussions of severe head trauma. "It was so sad, but we kept working with him and then he finally woke up," recalls Armour-Roth. John was debilitated and would always need care. A few months after discharge, he and his family returned to visit the nurses. "The joy that John was bringing to those around him and how closely it had pulled his family together gave us all hope," observed Armour-Roth.

"Heartache is familiar in this field; most patients are dealing with loss on some level, but there is hope too," asserts Austin. "With the specialists and technology and interventions available now and how it all continues to evolve, I can see patients who at one time were not expected to live, walk out of the hospital and live a normal life."

One young woman, who was not expected to live, woke up after a month, and then eventually returned to the hospital with her family to share the news with the nurses that she was now teaching history in middle school. "That stuff just keeps you going," says Reimherr.

The continuum of care given by nurses in the neuro units makes their bond a tight knit one, which ensures vigilant patient care and support. While patients often recall the first nurse to take their hand in a crisis, the neuro nurses most often remember and relish the moment they see their patients leave their care to progress on to the next level of recovery and eventually to carry on with their lives. "I know it sounds like a cliché," admits Reimherr, "but we're all here because we can make a difference in someone's life."

**John is not his real name.*







Technology and Expertise Define Neuroradiology

Edwin A. “Steve” Stevens, MD
Department of Radiology

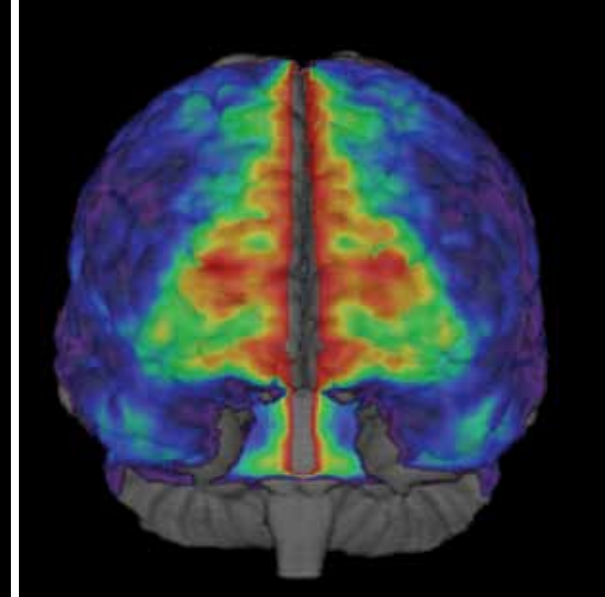
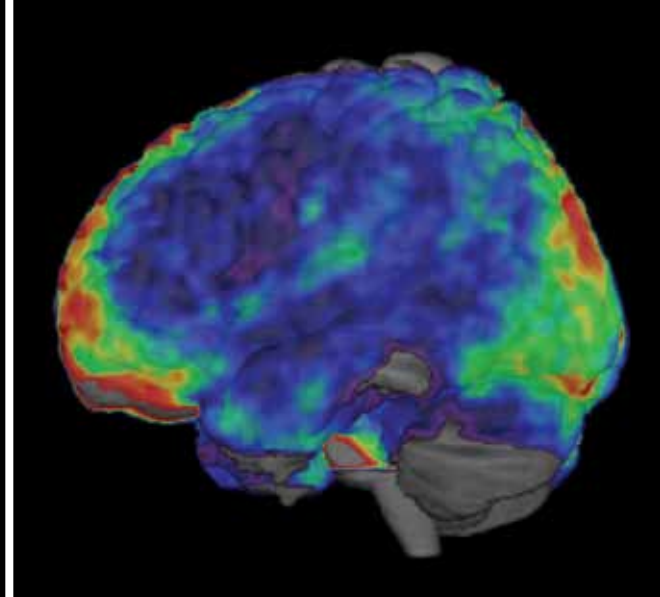
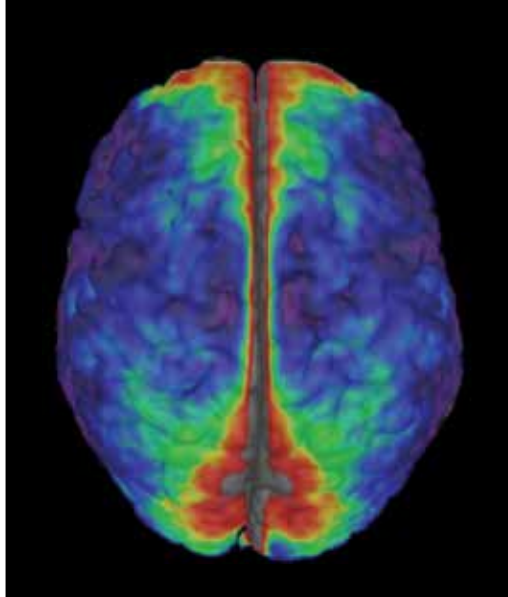
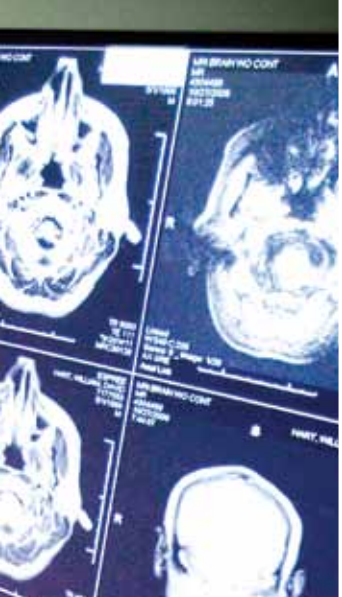
Throughout my 33-year career, I’ve noticed the types of people neuroradiology attracts are extraordinarily inquisitive, meticulous, and enjoy figuring out how things work—particularly in learning how to “drive” the perpetually evolving technology in this field. Working behind the scenes, our neuroradiologists know the importance of what they provide and don’t necessarily need the affirmation from patients and their families to feel good about what they do.

Ranked #1 in the country for our residency program, as we have been for the last decade, means we are skimming the cream of the crop in talent in attracting these types of people. We receive 400 applicants a year to fill six positions. One day, I interviewed ten applicants, and nine of them had scored in the 99th percentile on their boards. This wasn’t always the case, certainly not when I was a resident. As a medical science, radiology has become an extremely specialized field and more integral than ever to the diagnosis and treatment of disease in the neurosciences.

Part of what attracts our fellows and residents is the opportunity to work in academia and improve clinical care with their research. Someone who has followed this path is Jeff Anderson, MD, PhD, who started here as a resident and stayed on as a fellow (with support from departmental grants), and is now an independent investigator. He has made notable inroads with his research in the use of Functional Magnetic Resonance Imaging (fMRI)—a noninvasive technology that measures the haemodynamic response related to neural activity in the brain or spinal cord. This is essential in diagnosing and understanding neurological and psychiatric disorders like Autism, Multiple Sclerosis, Alzheimer’s, and strokes. As with all of our MD/PhD staff, Jeff teaches as well. This means all of our fellows and residents leave with exceptional training and take a deep knowledge base of the most advanced science and technological advances into the communities where they work.

The subspecialty interpretation here is first-rate because we have individuals that focus solely on a specified area. If a patient comes here to get an MRI or CT scan of the brain, it will only be interpreted by those trained in head, neck, and brain interpretation. The same goes for the spine.

We’re always learning and striving. For example, recently we had an interesting case involving a seventy-eight-year-old man who suffered a stroke while working at Walmart. When he came in, we discovered he had an occluded carotid artery. We injected a thrombolytic inside the brain and then opted to stent the artery and open up the blood supply. Within 24 hours, our patient was back to his normal state and left the hospital the next day. Based on our research and clinical experience, the belief was that if you were dealing with an occluded artery, you should not go up through the artery because it will make it worse, but the stenting resulted in a great clinical outcome and has worked well in several other patients.



What's In the Pipeline?

Providing exceptional care for patients in this field relies as much on doctors' experience and training as it does on cutting-edge technology. Rather than waiting for the next technological advances in imaging, we have aligned ourselves with Siemens Medical Solutions to garner insight into what is being developed and in the pipeline. This allows us to plan ahead and ensure that we will be using the latest available technology.

One of the most recent advances is the latest upgrade in MRI equipment, the open 3-Tesla scanner (3T), which offers the highest resolution yet and faster processing than the previous generation. It appeals to more patients because it can accommodate claustrophobic and larger patients more comfortably. The MRI allows us to diagnose the underlying pathophysiology better; rather than looking at just the gross anatomy we are also seeing the functional data as well as the spectroscopy superimposed on the anatomy.

This new MRI allows us to see the white matter pathways—the transmission lines of the brain—more clearly. If these pathways are stretched up and over a tumor, the image can help us navigate around the “lines” to safely remove the tumor. In stroke patients, we are able to extend this

technology to view multiple perspectives in the area the stroke has affected, areas that are at risk and ischemic. We can then treat the stroke with intra-arterial drugs or for blood clot extraction.

The 3T MRI's next technological leap is the 7-Tesla scanner (7T), which is currently available in a few cities around the world. We have an application for funding of the 7T at the University of Utah and plan to have the scanner within the coming year, which will allow us to see sub-layers of the cortex as well as the white matter pathways.

Seeing Into the Future of Radiology

In the near future, we will be using combined modalities, like the fMRI with an interventional suite that will allow for real-time imaging during surgery, real-time navigation during stroke therapy to see effectiveness of procedure, and to view secondary parameters like cardiac output—one factor in a culmination of factors, aside from age, that ultimately helps us predict outcomes.

A natural progression in this field will entail more personalized medicine, in which we'll be relating genetics to imaging. We will also be able to provide more immediate surveillance in the treatment process. Instead of doing the traditional post-

operative scan of a tumor and then a follow up in a few months to see if it has grown, we'll be able to see within days if the treatment is working successfully. This will include viewing the functional, spectroscopic, as well as metabolic activity to determine effectiveness of treatment.

Within three to five years, MRI's will have a robotic arm that will allow for one-millimeter precision in neurosurgeries. I suspect the kids who are growing up these days playing high-tech video games will be naturals at manipulating this evolving technology.

We've basically taken these technological advances from outside of medicine and applied them to our field. This is what has made it possible to empower our patients in pinning down diagnoses and evaluating treatments for them.

If you had told me early on in my career that one day I'd be threading a catheter into one of the small arteries of the brain or embolizing various materials to block off the blood supply to blood vessel malformations, I would have said that's impossible. But every day in this field, I'm reminded of the ever-expanding boundaries of what is possible.