

# SYNAPSE

Volume one | Issue two

Register to receive Synapse electronically at [mercyneuro.org](http://mercyneuro.org).

## A Life-Saving Example of How Mercy's Neurological Network Can Help Northern California Hospitals

When 56-year-old patient Diane Bouge left Mercy Medical Center Redding with a subarachnoid hemorrhage from a cerebral aneurysm on Valentine's Day, Emergency Department physician Jesse Wells, MD, didn't hold high hopes.

"I didn't think she was going to make it through the transport," he said.

Dr. Wells had been on the phone, seeking the specialized care Diane Bouge needed. In the past, he had referred such patients to University of California in San Francisco. This time, he found the help he needed at the Mercy Neurological Institute of Greater Sacramento.

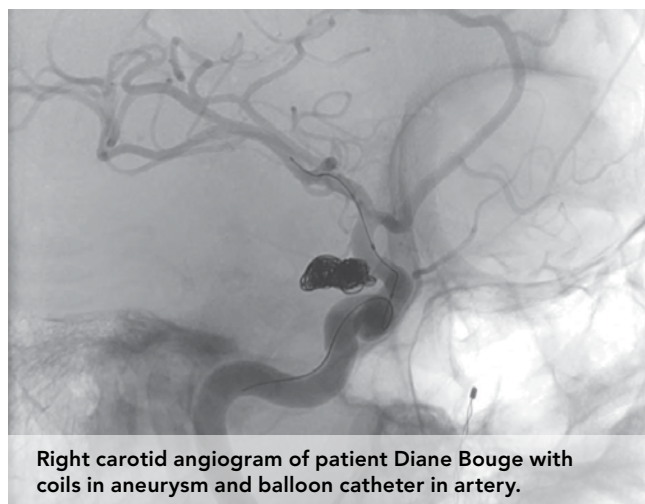
Dr. Wells connected with George Luh, MD, an interventional neuroradiologist. Dr. Luh's specialty is one that rarely exists in rural communities. A jet ride and an ambulance later, Dr. Luh performed a coil embolization in Mercy General Hospital's biplane suite that saved Bouge's life and started her on the road to recovery.

"That's amazing," Dr. Wells said, learning for the first time that his patient had survived. "This is a success story and I want to continue and strengthen this relationship."


Dr. Luh and Mercy Neurological Institute are equally anxious to get better acquainted with hospitals in surrounding areas. "This is a good example of the importance of networking with other hospitals," he said.

"We use the analogy of the wheel, spoke and hub, with Mercy San Juan and Mercy General being the hub and outlying hospitals being the spokes. We can provide the access to the next level of care when they need it."

Needless to say, Diane Bouge and Don Eaken, her partner of eight years, are thrilled with the collaboration. "I'm sure she would not have survived a more invasive procedure," Eaken said. Bouge has stopped smoking as a result of her near-death experience. She still faces outpatient physical therapy as part of her recovery. Preparing for her March 23 discharge home to Platina (a small town near Redding), she said she looked forward to more familiar surroundings and making organic soap as a thank you for her caregivers at Mercy General.



**Right carotid angiogram of patient Diane Bouge with coils in aneurysm and balloon catheter in artery.**

If you have a patient who would benefit from the varied specialties of the Mercy Neurological Institute of Greater Sacramento, call the 24-hour toll-free number of 1.888.Mercy41 (1.888.637.2941). 

## Letter from the Editor

**John Schafer, MD**

Welcome to the second issue of *Synapse*, the clinical resource of the Mercy Neurological Institute of Greater Sacramento. *Synapse* is a quarterly publication which is mailed and available electronically to physicians throughout Northern California for the purpose of providing credible, thought-provoking and high-level communication about neurological and neurosurgical patient care. We were happy to receive a very positive response to the first issue, which was published in January.

The Mercy Neurological Institute of Greater Sacramento is a consortium of healthcare providers affiliated with the Mercy Healthcare system in the Sacramento area. Included in the institute are longstanding and highly regarded programs, such as our stroke centers and services in neurosurgery, neuroimaging and neuro-rehabilitation, as well as blossoming services, such as the Mercy Multiple Sclerosis Center and services in epilepsy, headache and other neurological disorders.

But mostly, the Mercy Neurological Institute is people—individuals with a passion for their role in patient care. This issue of *Synapse* focuses on some of those partners. Dr. John Winn talks about the importance of radiological imaging advances in speeding up the diagnosis and

treatment of stroke patients. Dr. Edwin Cruz discusses the usefulness of EEG's, specifically Digital Video EEG monitoring in our Epilepsy Monitoring Unit to confirm diagnosis, localize seizure onset and refine treatment plans to improve patient outcomes. Dr. George Luh provides us with a review of carotid stenting and discusses the results just released from NIH-sponsored Carotid Revascularization Endarterectomy vs. Carotid Stenting Trial (CREST). Dr. Albert Hwang describes Mercy's rehabilitation program and we introduce Clinic Trials Coordinator Caroline Lenaerts, and Edie Happs, our dedicated multiple sclerosis nurse.

I encourage you to join us for Insights & Innovations 2010, a neuro-focused CME opportunity on May 6 at Arden Hills Country Club. You can reserve your space at [mercyneuro.org/cme](http://mercyneuro.org/cme) or by calling 916.851.2582.

The page one story provides an excellent example of the value that the Mercy Neurological Institute can bring to patients in more rural communities. In this case, Dr. Luh's coiling procedure saved a Mercy Redding patient.

Enjoy this issue, and your comments and contributions will be gladly accepted. Send them to [mercyneuro@chw.edu](mailto:mercyneuro@chw.edu). 🏥



**John Schafer, MD**

### Mercy Neurological Institute *Synapse* Editorial Board

**John Schafer, MD**  
*Neurologist and Editor in Chief*  
Mercy Neurological Institute

**Brian Ivie, Executive Sponsor**  
*President/CEO*  
Mercy San Juan Medical Center

**Robynn Gough-Smith, RN**  
*Regional Director*  
Mercy Neurological Institute

**Tracy Adams,**  
**MSN, RN, CNRN, FNP**  
*Neuroscience Nurse Practitioner*  
Mercy San Juan Medical Center

**Richard Beyer, MD**  
*Neurologist*  
Woodland Healthcare

**Judy Crouch,**  
**MSN, RN, CNS, CCRN**  
*Clinical Nurse Specialist*  
Sierra Nevada Memorial Hospital

**Veronica Knudson**  
*Chief Operating Officer*  
Methodist Hospital of Sacramento

**George Luh, MD**  
*Medical Director, Interventional*  
*Neuroradiology*

**M. Asim Mahmood, MD**  
*Medical Director, Neurology*  
*and Neurovascular Medicine*

**Rosemary Parker, RN**  
*Supervisor, ICU/CCU*  
Mercy Hospital of Folsom

**Pete Ramirez**  
*Imaging Director*  
Woodland Healthcare

**Kavian Shahi, MD, PhD**  
*Medical Director, Neurosurgery*

**Alan J. Shatzel, DO**  
*Neurologist*  
Mercy Neurological Institute



Methodist Hospital of Sacramento's newly redesigned Emergency Department

## Joint Commission Certifies Methodist Hospital as Primary Stroke Center

Receiving treatment within the first hours after a stroke is critical and now the residents of Elk Grove, South Sacramento, Galt and Lodi have access to the best level of care close to home.

Methodist Hospital of Sacramento has been certified as a Primary Stroke Center by the Joint Commission, the leading healthcare accreditation organization in the nation. The certification is based on a rigorous on-site review by the Joint Commission as well as an examination of months of patient information.

Methodist joins sister hospitals Mercy General, Mercy San Juan, Woodland Healthcare and Sierra Nevada Memorial as Primary Stroke Centers. Mercy Folsom is also applying for this designation.

"Developing a thorough and evidence-based approach to stroke is an important step in our commitment to providing the highest quality of care for our community," says Hospital President and Service Area President Tim Moran.

Stroke is the third-leading cause of death in the United States. On average, someone suffers a stroke every 45 seconds and someone dies of a stroke every 3.1 minutes. Stroke is a leading cause of serious, long-term disability in the United States, with about 6.4 million stroke survivors alive today.

"Methodist Hospital demonstrated that its stroke care program follows national standards and guidelines that can

significantly improve outcomes for stroke patients," says Jean E. Range, MS, RN, CPHQ, Executive Director, Disease-Specific Care Certification, Joint Commission.


Becoming a Joint Commission-certified Primary Stroke Center means that a hospital has demonstrated the ability to provide the complete continuum of care, from prevention education to time-sensitive treatment to follow-up care for those who have had a stroke.

### Primary Stroke Centers:

- Utilize a standardized method of delivering or facilitating integrated and coordinated clinical care based on the Brain Attack Coalition recommendations for establishment of Primary Stroke Centers
- Tailor treatment and intervention to individual needs
- Promote the flow of participant information across settings and providers, while protecting participant rights, security, and privacy
- Analyze and use data to continually improve treatment plans
- Evaluate ways to improve performance and clinical practice, thereby improving participant care



The Joint Commission's Primary Stroke Center Certification is based on the recommendations for Primary Stroke Centers published by the Brain Attack

Coalition and the American Stroke Association's statements/guidelines for stroke care. The Joint Commission launched the program—the nation's first—in 2003. A list of programs certified by the Joint Commission is available at [jointcommission.org](http://jointcommission.org). 

## Physician Profile: John Yen, MD

### OVER DECADES, NEUROSURGEON HAS SEEN TECHNOLOGY ADVANCE HIS CRAFT



For more than 30 years, John Yen, MD, Mercy neurosurgeon, has been a witness to the technological revolution that has changed his field in countless ways. Dr. Yen has seen the impact of evolving technologies not only in the operating room, but in the faces of the lives changed by modern medical technology.

For more than a generation, Dr. Yen has been an integral part of the region's neurosurgery community and of the Mercy Neurological Institute, working in both Sacramento and Yolo counties. Over the years, Dr. Yen has proven himself to be not only a renowned surgeon, but also a mentor to new physicians as they joined the Mercy team. "For me, Dr. Yen has always been a good sounding board," says Richard Byer, MD, neurologist with Woodland Healthcare. "He is someone who has always been honest with his patients and has shown a good balance between being conservative and aggressive." An important part of that balance has been identifying and using new technology to the benefit of each individual patient.

Dr. Yen has seen emerging technologies and equipment refined and perfected, allowing him to be more precise and deliberate as a surgeon. "By far the development that has had the greatest impact on neurosurgery has been the evolution of the operating microscope," says Dr. Yen. While the operating microscope was available when he first began practicing, he says it was still not widely used and was quite rudimentary. "The quality of the microscope itself is so remarkable now. It has really changed how we as surgeons work."

Dr. Yen also points to CT and MRI scans as changing how patients with neurological conditions are treated. "These precise scans provide such clarity on each particular patient's lesion or tumor or injury—it allows us to know exactly what treatment is best suited to that patient, and the tests are non-invasive," explains Dr. Yen. He says that these scans, including the now readily available 64-slice

CT scanner, have enabled our team to better follow and manage patients, and sometimes avoid invasive treatments entirely. Dr. Yen also cites the use of navigational tools as drastically changing how he and other neurosurgical experts approach patient care. "When I began practicing

---

*Despite the breath-taking advances technology has provided, Dr. Yen says the heart of how he practices medicine has not changed. He still evaluates his patients as he did 30 years ago.*

30 years ago, I had limited options to treat patients who I suspected had a lesion or a tumor or even a movement disorder. But new technology has presented us with options." Those options, Dr. Yen points out, have had a dramatic impact on patients' quality of life.

Despite the breath-taking advances technology has provided, Dr. Yen says the heart of how he practices medicine has not changed. He still evaluates his patients as he did 30 years ago—he simply has better tools with which to treat them. And that, he believes, is the core of what the Mercy Neurological Institute offers the Sacramento region—cutting edge technology, used by world-class neurologists and neurosurgeons whose primary concern is their patients, their families and their quality of life. Dr. Yen says practicing neurosurgery, like any specialty in medicine, still comes down to a physician's philosophy and his interaction with patients. "Technology has changed neurosurgery, without a doubt," explains Dr. Yen. "But at the end of the day, my approach to my patients is the same as it was 30 years ago." 🏥



**Interested in receiving Synapse electronically? Register today at [mercyneuro.org](http://mercyneuro.org).**



## Imaging Advances Save Time... and Brain

John Winn, MD

"Time is brain" is the mantra of stroke medicine. At the Mercy Neurological Institute of Greater Sacramento, neuroscience clinicians are at the forefront of stroke management: minimizing time and maximizing brain.

More than 600,000 cases of ischemic stroke occur annually with less than 10% receiving emergent reperfusion treatment. Thrombolytic therapy is constrained by time. Currently, intravenous thrombolytics must be initiated within 3 hours, although recent data suggest an expanded window up to 4.5 hours from symptom onset. Intra-arterial thrombolytics and mechanical thrombectomy have time limits of 6 hours and 8 hours respectively.

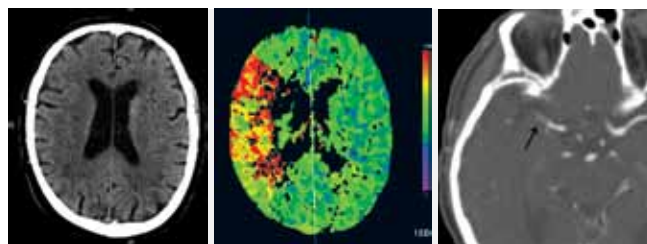
One of the major factors that prevents many stroke patients from being treated is that the window for treatment closes with time lost when the symptoms of stroke are not recognized and acted upon urgently by the patient or family.

Advances in radiological imaging have streamlined part of the process by providing important and necessary information for the diagnosis and treatment of stroke in a rapid manner with only one trip to the imaging department.

With the Mercy Neurological Institute stroke imaging protocol, three separate computed tomography (CT) examinations are performed in succession: noncontrast CT of the brain, CT angiogram of the head and neck, and CT perfusion. Utilizing our 64-slice scanners (Siemen Somatom Sensation 64), all three studies can be performed within 10 minutes. Each study provides key pieces of information that allows clinicians to decide if and how a stroke patient is treated.

The standard noncontrast CT is used to evaluate the presence of hemorrhage, exclude non-stroke causes of symptoms such as tumors, and assess the extent of the infarction.

The CT angiogram helps identify a thrombus in a proximal vessel of the middle cerebral artery, which is necessary for treatment by intra-arterial means. In addition, it provides anatomic evaluation of the carotid arterial system which may contribute to or be the etiology of impaired cerebral blood flow.



72-year-old patient acute left-sided weakness and left facial droop. Noncontrast CT (a) shows no findings of an acute stroke. CT perfusion (b) demonstrates a large area of abnormal blood flow to the right cerebral hemisphere. CTA (c) demonstrates a clot in the right middle cerebral artery (arrow) accounting for the perfusion abnormality.

CT perfusion is a relatively new imaging technique that helps characterize blood flow dynamics of the brain tissue itself. Using intravenous contrast as a surrogate for blood, perfusion imaging obtains serial images of the contrast injection into and out of a section of brain tissue.

Perfusion imaging can not only help define areas of ischemia, but also differentiate between areas of dead tissue (infarct core) and tissue at risk of dying (penumbra). The penumbra is theorized to progress to infarct if no intervention to reperfuse the ischemic area is taken. However, unlike the infarct core, if blood flow is restored to this area, then the tissue may be saved. This information can potentially help clinicians select patients that may benefit most from thrombolytic therapy (i.e. those that demonstrate penumbral tissue) versus those that benefit less and are at greater risk of adverse consequences from therapy.

Only 30% of patients with an acute stroke demonstrate findings on a noncontrast CT, CT perfusion also improves diagnostic confidence. The perfusion images are more sensitive in identifying an area of abnormal blood flow dynamics. In many instances, an abnormality is seen on perfusion images, which was not evident on the standard CT.

In the treatment of stroke, every minute is crucial. With the stroke protocol in place, all the radiological diagnostic information for both intravenous and intra-arterial thrombolysis can be obtained all at once enabling decisions to be made and treatment plans initiated as expeditiously as possible, saving both time and brain. 🏥



John Winn, MD

## Inpatient Rehab Unit Meets the Needs of Mercy's Neuro Patients

**Albert Hwang, MD**

The American Heart Association estimates that there are currently 6.4 million Americans who are stroke survivors. There are about 800,000 new stroke patients annually. Although stroke is still the third-leading cause of death, there have been several breakthroughs in medical technology, such as the use of tissue plasminogen activator (tPa), that have greatly increased stroke survivorship. Unfortunately, stroke survivors are often faced with functional impairments that if left untreated, can lead to long-term medical complications.

Mercy General Hospital is equipped with a 24-bed dedicated inpatient Rehabilitation unit designed to treat patients with stroke, spinal cord injury, brain injury and other neurologic diseases that create functional impairments. The unit has been in operation for 25 years and is currently in the process of seeking certification by the Committee on Accreditation of Rehabilitation Facilities (CARF), which will make it the only accredited inpatient rehabilitation unit in the Sacramento area. The Rehabilitation unit works closely with hospital medicine, neurology, neurosurgery and interventional neuro-radiology to provide seamless healthcare for stroke patients.

Patients admitted to the inpatient Rehabilitation unit generally stay two to three weeks. During that time, they receive physical therapy and occupational therapy treatments. If needed, a speech therapist can also see the patient for cognition or swallowing difficulties. The therapy staff is trained in the latest stroke rehabilitation techniques, such-as constrained-induced movement therapy (CIMT), and neuro-developmental treatment (NDT). In addition to these modalities, Mercy's Rehabilitation unit has a full-time neuropsychologist who can perform in-depth cognitive testing, a necessity for patients planning on returning to work or school. The rehabilitation program has also recently partnered with a

neuro-optometrist, who can provide specialized eyewear for those patients with visual deficits. The team is rounded out by a case manager, social worker and rehabilitation nurses. A physiatrist coordinates the interdisciplinary care and examines the patient every day.

Inpatient rehabilitation patients receive at least three hours of therapy per day, which makes it a more aggressive level of care than a skilled nursing facility (SNF), where a patient may only receive up to an hour of therapy a day. Full-time therapy is offered six days a week, and limited therapy is available on Sundays. A community outing to a local business is scheduled every week for patients to attempt to navigate in the "real world." The treatment goal for these patients is to have them discharged to home, often with the help of family members, so that they can return to productive living. Patients will often continue with outpatient therapy treatments after discharge.

Because the inpatient Rehabilitation unit is hospital-based, patients have access to advanced imaging such as MRI or CT scan, and full-time laboratory services. In addition, should medical complications arise, hospitalists and intensivists are on-call 24 hours a day and specialists can be consulted to provide additional care.

The Mercy General Rehabilitation unit works closely with educational institutions in the Sacramento area to foster learning in several different knowledge areas. A partnership has been established with UC Davis Physical Medicine & Rehabilitation to make Mercy inpatient Rehabilitation one of the required resident rotations. In addition, the unit frequently hosts nursing students and therapy students who have an interest in rehabilitation. Continuing medical education lectures are offered on a regular basis, and area healthcare providers from all modalities are invited to participate. ✚



**Albert Hwang, MD**

## Epilepsy: Advancements in Recognizing Non-Epileptic Seizures

Edwin Cruz, MD

EPILEPSIA is Greek for “seizing.” A SEIZURE is a symptom, a clinical manifestation of an abnormal neuronal discharge. EPILEPSY is a disease, characterized by unprovoked and recurrent seizures. Accurate diagnosis and classification is the first step in the treatment of this condition.

In most patients, a routine EEG gives sufficient information about seizure type to guide in initiation of treatment. In patients with recurrent seizures or unconfirmed seizure diagnosis, further testing is needed to exclude non-epileptic spells (NES). Misdiagnosis of epilepsy is common, and 20–30% of patients with intractable epilepsy who are referred to an epilepsy center are found to have NES.

Non-epileptic spells may mimic epileptic seizures but are not due to abnormal brain activity. They can be classified into two types: PSYCHOGENIC (malingering, somatization, or conversion disorders), or ORGANIC (sleep disorder such as cataplexy, movement disorders such as dystonia, migraine, TIAs, syncope or breath-holding spells).

“Red flags” for NES include continuing seizures despite being on multiple or high-dose AED (antiepileptic drugs) and specific triggers such as stress or getting upset, or occurring only in the presence of an audience. NES also tend to be gradual in onset with asynchronous limb movements, in contrast to true epileptic seizures, which tend to have

more abrupt onset and termination. NES occur when awake, while real seizures can occur while awake or asleep. Pelvic thrusting is seen in NES, but is uncommonly seen in true epileptic seizure which emanate from the frontal lobes. While tongue biting is occasionally seen in patients with NES, they tend to bite the tip of the tongue, while epileptics bite the side.

On examination, NES is associated with active resistance to eyelid opening. Persistent eyelid closure during the seizure is more common with NES, while eyes are usually open in patients with epileptic seizures. This is a helpful feature that the clinician can discuss with family members.

The definite diagnosis of non-epileptic seizures is possible with VEEG, monitoring in which video analysis of the abnormal behavior is performed along with the EEG. VEEG is used not only to differentiate epileptic from non-epileptic seizures but also to localize seizure onset and to evaluate whether the patient is a candidate for other therapy, such as the Vagal Nerve Stimulator or resective epilepsy surgery.

**WHEN TO REFER:** Patients with intractable seizures, spells of uncertain cause and those having multiple seizure types should be referred for Video EEG.

VEEG monitoring is available at Mercy General Hospital. For details, please call the Neurodiagnostic Lab at 916.453.4471 or fax 916.453.4040. 🏥



Edwin Cruz, MD

## New Study Finds Wii-hab May Help Stroke Patients

New research presented at the American Stroke Association’s International Stroke Conference in San Antonio found virtual reality game technology using Wii may help recovering stroke patients improve their motor function.

The study found the virtual reality gaming system was a safe and feasible strategy to improve motor function after stroke. The pilot study focused on movements with survivors’ impaired arms to help both fine and gross motor function.

“It’s a very simple game, but yet it gets patients involved and gets them going and very excited about activity,” says David Ferneau, Director of Mercy General Hospital’s Acute Rehabilitation Department, which routinely uses Wii-hab therapy with its stroke patients.

Shortly after the study report came out on Feb. 25, KXTV News10 and KCRA Channel 3 ran stories of stroke patients using Wii as part of their physical therapy at Mercy General. 🏥



## Brain Waves: Updates from the Mercy Neurological Institute

### ONYX HD500

The Mercy Neurological Institute is constantly seeking the latest information on treating brain aneurysms. One of those methods was singled out in the February/March issue of *Sactown Magazine*. Interventional neuroradiologist George Luh, MD, is one of few physicians across the country using a liquid glue called Onyx HD500 to treat brain aneurysms. The glue is injected through a microcatheter to fill the aneurysm. Onyx received federal approval in 2007. Mercy General Hospital joins approximately 15 other hospitals across the country in utilizing this life-saving therapy.

### MERCY LEADS WAY IN NEUROSCIENCE NURSING

Mercy Neurological Institute of Greater Sacramento is leading the way in raising the level of nursing care for neuro patients in Sacramento. The institute hosted the Sacramento area's first test site for the certified neuroscience registered nurse (CNRN) credential last fall, and we are excited to share that 90% of Mercy nurses who took the test passed and achieved their CNRN credential.

Congratulations to our newly certified nurses from the Mercy Neurological Institute: Tracy Adams, NP, CNRN; Susan Croopnick, RN, CNRN; and Kathleen Cabe, RN, CNRN, who provide patient oversight at multiple Mercy campuses; as well as Jennifer Deveza, RN, CNRN, MSJ; Carol Gantuangco, RN, CNRN, MSJ; Patty Garrity-Jasper, RN, CNRN, MGH; Manuel Melendres, RN, CNRN, MHF; and Susan Riordan, RN, CNRN, MSJ.

The CNRN credential represents specialized experience and knowledge in the care of patients with neurological trauma and illness. Nurses who have CNRN certification demonstrate a unique body of knowledge and are dedicated to the highest standards of neuroscience nursing care and excellence in clinical practice. The institute is planning to host another CNRN exam on Oct. 29 and looks forward to more nurses obtaining this certification. To sign up for the October test, nurses can contact Patty Thomas, Mercy Neurological Institute, at 962.8711, by Aug. 6.

For more information about CNRN, go to the American Association of Neuroscience Nurses at [aann.org/credential/](http://aann.org/credential/).

### THE PEOPLE BEHIND MERCY'S FOCUS ON CLINICAL RESEARCH

The Mercy Medical Group welcomes Caroline Lenaerts, RN, MPH, CCRP, as a new clinical research coordinator. Lenaerts, who joined Mercy in January, is a registered nurse with a master's degree in Public Health, with eight years of experience in clinical research. She has led clinical trials in internal medicine, mainly cardiology (patients with cardiac arrhythmias, CHF, HTN, CAD, diabetes, etc...) and in drug and device studies. Research allows her to use a variety of her skills, from regulatory responsibilities to patient care and patient education. She is certified through the Society of Clinical Research Associates (SOCRA). With a vast interest in other disciplines and a belief in a holistic approach to patient care, Lenaerts says she is excited to join the research team at Mercy Medical Group. She looks forward to further developing Mercy's research department and research activities.

Her office is located in Mercy's Midtown location at 3000 Q Street. To contact Lenaerts about research activities, e-mail her at [caroline.lenaerts@chw.edu](mailto:caroline.lenaerts@chw.edu) or call by phone at 916.733.5782. 🏥



## Update on Carotid Stenting

George Luh, MD

The results of the largest prospective randomized carotid revascularization trial ever conducted, Carotid Revascularization Endarterectomy vs Stenting Trial (CREST), were recently released at the International Stroke Conference Feb. 26. This NIH-sponsored study was a prospective randomized trial involving 117 centers across the United States and Canada over a nine-year period. CREST compared the safety and effectiveness of carotid endarterectomy (CEA) and carotid artery stenting (CAS) in both symptomatic and asymptomatic patients. The study randomized 2,502 patients into roughly equal arms, 37% female and 9% minorities, with a mean age of 69. Most patients had >70% carotid stenosis. Mean follow-up was four years. Importantly, this study had the most rigorous operator training and credentialing requirements of any previous carotid revascularization trial, which helps explain why the outcomes were so good.

Overall both procedures proved safe and effective at preventing strokes, however there were some significant differences.

**CREST results and Mercy Neurological Institute (MNI) one-year CAS experience**

|  | CEA<br>CREST<br>n=1240 | CAS<br>CREST<br>n=1262 | p       | CAS<br>MNI<br>n=12 (stents) |
|--|------------------------|------------------------|---------|-----------------------------|
| Death, MI, stroke at 30 days + ipsilateral stroke thereafter | 6.8%                   | 7.2%                   | 0.51    | 0%                          |
| All strokes within 30 days                                   | 2.3%                   | 4.1%                   | 0.01    | 0%                          |
| Minor stroke within 30 days                                  | 1.5%                   | 2.7%                   | <0.05   | 0%                          |
| Major stroke within 30 days                                  | 0.7%                   | 0.9%                   | 0.52    | 0%                          |
| Stroke > 30 days   | 2.4%                   | 2.0%                   | 0.85    | 0%                          |
| Myocardial infarction  | 2.3%                   | 1.1%                   | 0.03    | 0%                          |
| Cranial nerve palsy  | 4.8%                   | 0.3%                   | <0.0001 | 0%                          |
| Approx. age to benefit                                       | >70                    | <70                    |         |                             |

The rate of stroke and death is the lowest ever reported in a randomized trial comparing these procedures. Nevertheless, the stroke rate was higher in the CAS patients. However, CAS is a technology-based procedure. Advancements were made over the study's nine-year period and future advancements will hopefully make the procedure even safer. The CREST CAS results may better represent 2000 to 2008 outcomes than 2010 to 2018 outcomes.

The results of CREST should be balanced with the International Carotid Stenting Study (ICSS), which was just published in *The Lancet*, February 2010. ICSS randomly assigned 1713 patients symptomatic carotid stenosis patients to CEA or CAS. The stroke rate for CEA was 4.1% versus 7.7% for CAS. In addition, in a subset of 231 patients, new MRI lesions were found in 50% of CAS patients compared to 17% of CEA patients. This study may not be as applicable to patients in the United States because both surgical techniques and the carotid stents are different in Europe. In addition, the ICSS only studied symptomatic patients whereas CREST studied both asymptomatic and symptomatic patients. Perhaps the most notable difference between the ICSS and the CREST was the relative inexperience of the interventionalists in the ICSS. This underscores the importance of operator expertise in performing carotid stents.

Overall, this is encouraging news for carotid stenting. The SAPHIRE trial demonstrated the benefit of carotid stenting in high-risk surgical patients, and now CREST supports carotid stenting for low-risk surgical patients as well. Clearly improvements in CAS still need to happen, but importantly, both CEA and CAS are safe and effective procedures in the United States. The decision on which procedure to choose can now be tailored to the individual patient. 🏥



George Luh, MD



# INSIGHTS & INNOVATIONS 2010

*An accredited CME opportunity for primary and specialty physicians about important advancements in neurological care*



The Mercy Neurological Institute of Greater Sacramento is producing amazing results. Join some of the top minds from Mercy's interdisciplinary team for a special evening of insight and discussion on epilepsy, multiple sclerosis, interventional neuroradiology, intraoperative monitoring and neuroradiology.

## OBJECTIVES

At the end of this presentation participants will be able to:

- Discuss the role of neuroradiology in the diagnosis and management of neurovascular disease
- Appreciate the efficacy of intraoperative monitoring relative to optimal decision making and patient outcomes
- Compare and contrast outcomes as a result of interventional neuroradiology
- Define the role of interventional neuroradiology in the treatment of hemorrhagic and ischemic stroke

**May 6, 2010 5:30 to 8:30 p.m.**

Arden Hills Country Club  
1220 Arden Hills Lane, Sacramento, CA 95864

**RSVP BY APRIL 30**

To reserve your space,  
visit [mercyneuro.org/cme](http://mercyneuro.org/cme) or call 916.851.2582.

## PRE-DINNER ROUNDTABLE CASE STUDIES 5:30 TO 6 P.M.



### Epilepsy with Edwin Cruz, MD

Edwin Cruz, MD, provides leadership for the Mercy Epilepsy Monitoring Unit. He is involved in new epilepsy drug trials to evaluate therapies in treating patients with intractable seizures.



### Multiple Sclerosis with John Schafer, MD

John Schafer, MD, is certified by both the American Board of Psychiatry and Neurology and the American Board of Internal Medicine. Sharing Mercy's commitment to the diagnosis and treatment of MS, Dr. Schafer is the director of the Mercy MS Center.

## RECEPTION 6 TO 6:30 P.M.

Enjoy beverages, hors d'oeuvres and the opportunity to connect with your colleagues.

## DINNER & FEATURED PRESENTATIONS 6:30 TO 8:30 P.M.



### George Luh, MD, Interventional Neuroradiology

George Luh, MD, leads Mercy's interventional neuroradiology team. Fellowship-trained at the Barrow Neurological Institute with 10 years of experience in interventional neuroradiology, Dr. Luh is one of the few physicians in the country using Onyx HD500 to treat brain aneurysms.



### El-Hadi Mouderrès, MD, Intraoperative Monitoring

El-Hadi Mouderrès, MD, joins Mercy Neurological Institute as a board-certified neurologist, leading the development of the institute's intraoperative monitoring capabilities.



### John Winn, MD, Neuroradiology

John Winn, MD, is board certified in radiology and fellowship-trained in diagnostic neuroradiology. His field of interest is in advanced neuroimaging techniques including perfusion and functional MRI.

## Mercy MS Center Welcomes MS Nurse, Edie Happs



Edie Happs, RN, joined the Mercy MS Center staff in August 2009. She has a master's degree in nursing and is a certified rehabilitation nurse, and her more than 30 years of experience as a floor nurse, a quality assurance/risk management nurse and a discharge planner give her the critical tools she needs to provide much-needed services to the MS Center's patients. In addition, she has had extensive experience providing patient and family education and moderating both stroke and MS support groups. Speaking of these activities, Happs says, "During the process, I truly learned what the patient and family deal with and got first-hand knowledge of how they live with chronic neurological conditions. I learned how to help others through these real-life examples of what patients have done in similar situations."

Additionally, through her work with the National Multiple Sclerosis Society, Happs was able to read and attend meetings to gain expertise in the medical management of MS.

Happs retired in 2008, thinking that she was ready for a new stage in her life, but she soon found that retirement wasn't for her. She missed helping people with problem solving and dealing with their day-to-day issues, and she missed teaching. "I do believe that things happen for a reason and I needed the time off to realize that I still could make a difference," Happs says. "One day, out of the blue, I got an e-mail message from Dr. Schafer, who I had known from MS Society meetings, letting me know that he was going to be starting a MS Clinic at Mercy and asking if I would apply for the job as MS nurse. I was very flattered and happy for the opportunity to return to working with people who had MS. I knew that Dr. Schafer had a passion for expanding MS care, and Dr. Dengel, who completed a fellowship in MS, was an added bonus. I knew that I would be working with people who really understand MS and I felt that we as a team could make a difference in our patients' lives."

Happs sees patients either with the doctor or after the doctor has seen them, and she provides greatly expanded symptom management, including dealing with fatigue, problems with mobility and cognitive difficulties. She also counsels patients about use of their medications, some

---

*During the process, Happs truly learned what the patient and family deal with and got first-hand knowledge of how they live with chronic neurological conditions.*

of which are injectable. Happs has played a key role in establishing shared visits, in which a group of a dozen patients are seen at the same time, thus providing not only the medical aspects of a visit but also elements similar to those of a support group. These visits last for 90 minutes rather than the 20- or 25-minute standard follow-up visits. "It's a great opportunity to teach patients and learn from them at the same time, and the patients learn from each other." Group visits also help reduce repetition, because important topics can be addressed just once with the group.

"I know it sounds cliché," says Happs, "but I really believe that knowledge is power and the more you understand your disease the better you can deal with it."

Referrals to the Mercy MS Center may be made by calling 916.536.3670. 🏥

## Join Us for Bike MS: Waves to Wine Ride

Join the Mercy Neurological Institute and Team Captain M. Karsten Dengel, MD, for an unforgettable two-day bike ride from San Francisco to Healdsburg in Sonoma County on Sept. 25-26. Register online now at the MS Society Northern California Chapter Web site ([msconnection.org](http://msconnection.org)) or call 916.962.8751 for more information.



PRSR  
FIRST-CLASS  
US POSTAGE  
PAID  
SACRAMENTO CA  
PERMIT NO 333

**MERCY NEUROLOGICAL INSTITUTE**  
OF GREATER SACRAMENTO

3400 Data Drive  
Rancho Cordova, CA 95670

MERCY GENERAL HOSPITAL  
MERCY HOSPITAL OF FOLSOM  
MERCY SAN JUAN MEDICAL CENTER  
METHODIST HOSPITAL OF SACRAMENTO  
SIERRA NEVADA MEMORIAL HOSPITAL  
WOODLAND HEALTHCARE

Interested in receiving Synapse electronically?  
Register today at [mercyneuro.org](http://mercyneuro.org).

**MERCY NEUROLOGICAL INSTITUTE** OF GREATER SACRAMENTO

## UPCOMING EVENTS

### Insights & Innovations 2010

Mercy's annual evening CME event, Insights & Innovations, is scheduled for May 6 at Arden Hills Country Club. Register today at [mercyneuro.org/cme](http://mercyneuro.org/cme) or 916.851.2582.

### Join Us Monthly for Neuro Grand Rounds

**Mercy General Hospital** (first Thursday each month)

May 6: Common Intracranial Tumors, Kavian Shahi, MD

June 3: MS Center Update, M. Karsten Dengel, MD

**Mercy San Juan Medical Center** (first Friday each month)

May 7: Intracerebral Hemorrhage, M. Asim Mahmood, MD

June 4: MS Center Update, M. Karsten Dengel, MD

*Questions or program suggestions can be directed to  
Candy Collins in Mercy's CME office at 916.733.6334.*