

A breakthrough for Pacific NW stroke patients

It was a simple question from a woman attending a Swedish Medical Center educational meeting about advancements in stroke treatment. She simply wanted to know whether she and her neighbors, who live on a beautiful island in Puget Sound, were destined to be at greater risk of disability or death because of the distance they lived from neurological expertise. That one question foreshadowed a breakthrough in diagnosing and treating stroke patients in the Pacific Northwest.

Time is brain

The window of opportunity to evaluate, diagnose and treat a stroke victim with FDA-approved intravenous thrombolytics is just three hours. As each minute passes, more brain cells die, potential complications from treatment increase and the chance of good outcomes diminishes. People who live in underserved urban and rural areas may miss that critical window because of transportation delays and limited distribution of neurologists. The Washington State Department of Health and the American Heart Association, as well as physicians throughout the state, agree it is imperative to level the playing field so stroke patients can quickly receive the very best care, regardless of where they live.

“Nationwide physician shortages mean subspecialists are typically located at urban medical centers where they can maintain their proficiencies through high volumes,” says **William Likosky, M.D.**, a neurologist and medical director of the stroke program at Swedish Medical Center/Cherry Hill. “Because retirees often choose to live in rural areas where community hospitals cannot support full-time neurologists, and emergency rooms and ICUs infrequently see stroke patients, we decided to look for creative

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Swedish/Issaquah Emergency Department staff (**Brenna Born, M.D.**, and **Kathryn Fischer, R.N.**) assist a patient as he responds to one of the tasks requested by the Swedish Stroke Telemedicine team (**Todd Czartosky, M.D.**, neurohospitalist, and **Sherene Schlegel, R.N.**, Stroke Program supervisor). This bi-location neurological evaluation is made possible by the video conferencing capabilities of the Swedish Stroke Telemedicine Program.

Stroke Telemedicine

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ways to share Swedish expertise while best utilizing our stroke team neurologists.”

With widespread support from Swedish leadership and philanthropic support from the Swedish Foundation, the stroke team began focusing their continued improvement efforts on transitioning the care support model at the more distant emergency rooms within the Swedish system. Transitioning from telephone support to video consultation allows the subspecialty stroke team to provide real-time, physician-patient interactions despite the barrier of being in different geographic locations.

“We have such a short time to make treatment decisions,” says Likosky. “Having EMS begin the assessment during transport reduces ER response time. Training ER personnel to quickly perform diagnostic tests and initial level-of-care assessments also saves time. Extending Swedish stroke expertise via video conferencing with the ER allows us to personally witness the patient performing diagnostic tasks, and allows the patient to ask questions as if we are in the same room. Together it’s the best utilization of resources.”

The program, a first in the Pacific Northwest, is modeled after the country’s first and leading program at Massachusetts General Hospital.

Either the ER physician or neurologist can initiate a secure video conference. The technology enhances the more traditional telephone consult by allowing a Swedish Stroke Telemedicine Team, which is on call 24 hours a day and seven days a week, to work closely with ER staff to evaluate stroke patients, and determine treatment protocols and transportation options. The Swedish neurologist on the team conducts a “virtual” bedside neurological exam with the assistance of the ER physician. The physician assistant, nurse practitioner or registered nurse team member participates in the treatment evaluation and supports the ER staff in responding to an event with which they may be less familiar due to low volume of stroke cases.

In recent years, new diagnostic tests and new treatments, such as the thrombolytic agent tissue plasminogen activator (tPA), have helped minimize or reverse a stroke’s impact. The treatments, however, are time dependent. With the right training and a reliable connection to a stroke expert, these treatments can be administered in a local ER setting, rather than delaying treatment during transport to a stroke center. Stroke telemedicine gives everyone an equal opportunity to beat the clock. 

BUILDING A HEALTH-CARE BRIDGE ACROSS WASHINGTON

It was a typical August day for 44-year-old Holley Carlson. She completed her five-mile run early in the morning, downed a protein shake and headed into her real estate office in Port Townsend. Although she didn’t feel quite right and worried she might be getting a migraine, she showed a client a few houses. Late in the afternoon, while reading a listing to another client, she realized her words weren’t making sense. When she got home and told her husband about the incident, he urged her to go to the hospital. She agreed to do so if she wasn’t feeling better in the morning. Just a few hours later her body went limp and she collapsed. At the emergency room at Jefferson General Hospital, Holley underwent a battery of tests. The initial determination, based on test results and the absence of any atherosclerosis risk factors (e.g., diabetes, hypertension, smoking), was at least a 70 percent blockage of the carotid artery and a possible dissection. Holley was transported to Swedish/Cherry Hill, where the neurologist discovered a two-inch dissection causing a 95-percent-blocked carotid artery. Her condition required a lengthy angiogram to place four stents.

Although she has had to give up running and swimming, Holley was lucky. Jefferson and the Swedish Stroke Center had recently launched an enhanced partnership to better manage stroke patients in her small community. After two years of discussions, key players from Swedish, representatives from Port Townsend’s EMS, personnel from Jefferson’s emergency, acute care and ICU, lab and radiology departments, and Pacific Vascular (Jefferson’s ultrasound provider) came together in January 2008 for a

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PATIENT STORY

JUDITH BETTEN

“I needed my arms and legs to take care of my clients.”

Something wasn't quite right as she drove home from the store, but 58-year-old Judith Betten couldn't put her finger on what was wrong. She always drove with two hands on the steering wheel, especially when driving up the winding road she and her neighbors nicknamed snake road. Why, then, was her left hand resting limply on her thigh? Why did she hit the curb when she turned onto her street? And, why did she fall when she got out of her car? Nothing was registering, except for the vague knowledge that various parts of her body weren't working.

Instead of lying down, which is what Judith really wanted to do, she called Maria, a good friend and registered nurse. Without hesitation, Maria told Judith to hang up and call a neighbor to come over immediately. Judith lives in a closely knit neighborhood in Sammamish, Wash. Within minutes, three of Judith's neighbors arrived, took her blood pressure and called 9-1-1.

The fog in Judith's brain kept her from understanding she was having a stroke and that people were urgently trying to save her life. Dr. **Joel Wassermann** and the emergency room staff at the Swedish/Issaquah Emergency Department knew Judith immediately needed a neurologic evaluation to determine if she was a good candidate for tissue plasminogen activator (tPA), the clot-buster medication that can lead to significant improvement in some people if given within three hours of stroke onset.

The treatment window was closing rapidly. Even a transfer to Swedish/Cherry Hill, home of Swedish's nationally recognized stroke program, would delay treatment. Instead, the ER staff enlisted the aid of the newest state-of-the-art technology. They rolled a TV screen in front of Judith and introduced her to two members of the stroke team at Cherry Hill — Dr. **Will Berg**, a neurologist, and **Dennis O'Brien**, a physician assistant.

“It was kind of strange to begin with,” says Judith. “But, Dr. Berg was very calm. I told him I didn't have a headache and didn't feel any pain. He asked me to move my arms. It was like talking with someone who was standing next to me.”

On the other side of the technology link, Berg evaluated Judith with the help of data provided by the Issaquah ER team.



Progress Notes: Judith responded very well to tPA and did not require ongoing physical therapy after discharge. Her medications include simvastatin, lisinopril and Aspirin. Berg also prescribed Chantix to help her stop tobacco use and endorsed her efforts to lose weight.

According to Berg, it is not unusual to see patients lose weight and stop smoking after a stroke. Unfortunately, after a few months many fall back into their same bad habits. To reduce risk of future strokes and heart disease these lifestyle changes must be permanent.

“If I had only listened to a description of her exam findings,” says Berg. “I probably would not have given her tPA. The initial report was mild weakness without other significant findings. Seeing the difficulty she was having using her hand led to my decision to use tPA. Despite the relatively mild weakness, I didn't think she would be able to continue her occupation with that degree of hand dysfunction.”

For 38 years Judith has provided hair replacement services to cancer and alopecia patients, and to men and women who have lost their hair due to severe burns, scars or male-pattern baldness. Dr. Berg explained she had only 10 minutes left to make a decision about treatment. For someone who had never had any heart problems, but knew friends and family members who had strokes, Dr. Berg's words were chilling.

“It wasn't a difficult decision,” says Judith. “I needed my arms and legs to take care of my clients.”

Her dedication to her clients, her overall feisty nature and the anticipation of bringing home her new Bernese Mountain puppy, was the kind of supplementary “medicine” medical personnel often hope for.

“I was so fortunate,” says Judith. “I received excellent care at Issaquah and had the added benefit of being diagnosed by experts at Cherry Hill. When Dr. Berg and Dennis first visited me in the Cherry Hill ICU, I felt as if I already knew them because I had talked with them through the TV monitor.”

Judith was indeed fortunate. Every passing minute for a stroke victim means greater risk, less success and a higher complication rate. Through the technology of stroke telemedicine, Judith had immediate access to a subspecialist who could quickly evaluate her condition and recommend the best treatment, even though they were physically separated. In Issaquah, Dr. Wassermann was able to collaborate with Cherry Hill stroke team specialists and administer the life-saving clot-buster medication.

The three-hour window didn't close for Judith. Today she is as strong as ever and continues to care for the clients who depend on her. [↻](#)

Stroke Telemedicine Partnerships

All four Swedish campuses — First Hill, Cherry Hill, Ballard and Issaquah — are certified as Primary Stroke Centers by The Joint Commission. In addition to the partnership with Jefferson Healthcare, the Swedish stroke telemedicine program has also formed a partnership with Skagit Valley Hospital in Mount Vernon, Wash.

For more information about the Swedish Stroke Program and stroke telemedicine partnership opportunities, please call **Tammy Cress**, R.N., MSN, FAHA, Stroke Program manager, at 206-320-3112.

Building a health-care bridge

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four-day work session. This team developed new, streamlined protocols for handling stroke patients and launched a two-month education and awareness program.

“We are closely monitoring how well the new protocol is working,” says Terri Camp, R.N., MHL, chief quality officer and chief nursing executive at Jefferson Healthcare. “I am pleased we have been able to get the decision-making information we need (CT, labs, etc.) within our established 45-minute-from-arrival goal. We recently implemented a huddle immediately after a Code Stroke, so the team can evaluate how things went and identify improvement opportunities.”

The first phase of the relationship relied on telephone consults while information technology and radiology personnel from Jefferson and Swedish built the infrastructure and tested the video-conferencing and brain imaging transfer equipment to ensure a consistent and reliable connection. Following two dry runs with simulated patients, the Swedish stroke telemedicine program at Jefferson launched in mid-December.

“The relationship and video-conferencing capability with Swedish,” says Gunther Muens, M.D., emergency room medical director at Jefferson, “allows us to evaluate patients in our emergency room, determine what we can do here, and ensure only appropriate patients are transported to Swedish. We also benefit from access to educational resources, shared guidelines and protocols, and improved access to beds in Seattle, which had been a challenge that sometimes delayed treatment for our patients.” This conscientious use of limited

resources is beneficial for Jefferson and Swedish, and for the patients.

“Our demographics suggest we will see increased numbers of patients who fit the risk criteria for stroke,” says Vic Dirksen, CEO of Jefferson Healthcare. “With the old model, we often transported patients who didn’t really need to go to Swedish. This wasn’t a good use of Swedish resources, nor was it good for the patient’s family who incurred a hefty bill for the helicopter ride and faced personal challenges trying to be near their hospitalized loved one.”

Telemedicine possibilities extend far beyond this one specialty. With new protocols, staff training and a reliable connection to subspecialists, emergency room personnel can be more comfortable determining which patients do or do not need the added level of care available only at medical centers, such as Swedish. Dirksen believes this type of partnership is the future of medicine.

“Originally, I thought health-care reform would come about only because of increasing costs,” says Dirksen. “Now I believe reform will come as a response to the nationwide physician-workforce shortage and the imperative to find creative solutions that bring subspecialty expertise to communities such as Port Townsend. I am thrilled we were able to work with Swedish in a constructive way that met all regulatory requirements because it makes so much sense for communities across the state.”

Both Muens and Dirksen see the Swedish Stroke Telemedicine Program as the first step in building a health-care bridge not only across Puget Sound, but across the state. 

CyberKnife®

3-D image-guided radiosurgery extends lives

The diagnosis of a tumor and the fear associated with a changed lifestyle following surgery can be overwhelming for a patient. At the Seattle CyberKnife® Center at Swedish Medical Center, physicians use technology to extend patients’ lives without the lingering pain or residual effects normally associated with surgery.

CyberKnife, a stereotactic radiosurgery system manufactured by Accuray®, uses 3-D image-guidance technology and computer-controlled robotics to target and track tumors, and deliver multiple beams of radiation with sub-millimetric accuracy. Because the system uses non-isocentric beams, it can avoid critical structures and reduce damage to surrounding tissue, even with irregular-shaped tumors. The system has proven beneficial in treating tumors and conditions that cannot be treated with traditional radiation therapy or conventional surgery.

The center is one of only two facilities in the world with third-generation CyberKnife technology that employs the Synchrony® Respiratory Tracking System, which synchronizes beam delivery to the motion of the tumor. This enhancement eliminates the need for breath-holding techniques, or head or body frames, to stabilize patient movement. It also eliminates the need for adding margins



With CyberKnife's advanced robotics and image guidance, stereotactic radiosurgery is no longer limited to tumors and lesions of the head; rather, it can be used to treat abnormalities anywhere in the body, including hard-to-reach tumors in the neck, spine, lung, prostate, pancreas, liver and kidneys.

to compensate for movement during radiotherapy. As the patient breathes or moves, the system detects, tracks and corrects for associated tumor movement.

The center's team of CyberKnife-credentialed physicians is led by co-directors **Mark Mayberg, M.D.**, and **Sandra Vermeulen, M.D.** Mayberg, who is board certified in neurological surgery, also is executive director of the Swedish Neuroscience Institute. His clinical interests include microsurgery and stereotactic radiosurgery for cerebrovascular diseases such as aneurysm, skull-base tumors, and stroke and stroke-related conditions. Vermeulen is a board-certified radiation oncologist affiliated with the Swedish Cancer Institute. She is a board member of both the International Stereotactic Radiosurgical Association and the International Stereotactic Radiosurgical Society.

The CyberKnife treatment team includes surgeons, radiation oncologists, radiologists, physicists, radiation therapists and oncology nurses. The procedure involves six steps: consultation (including the patient's physician and the center's

treatment team), treatment set up, CyberKnife imaging, treatment planning, treatment delivery and follow-up.

Treatment set up and CyberKnife imaging occur during one appointment. Prior to imaging, the patient may have small fiducials (metal or gold markers) implanted to accurately target radiation or may be fitted for a Synchrony tracking vest, which will monitor movement during treatment. A CT scan with contrast and/or MRI are used to visualize the tumor. The center's physicians and physicists use these images and the CyberKnife treatment-planning system to develop the optimal treatment plan.

During the 30-90 minute treatment a linear accelerator, which is mounted on a robotic arm, moves around the patient delivering multiple beams of radiation at the most effective angles. Because the treatment is non-invasive and does not require anesthesia, the patient is able to leave the center and resume normal activities immediately following treatment.

CyberKnife joins IGRT and Image-Guided Radiation Therapy (IGRT), which are also available at Swedish Medical Center, to provide a suite of advanced radiation therapy options for patients in the Pacific Northwest. For more information about CyberKnife, or other radiation therapies, call 206-320-7130. [»](#)

CyberKnife® Case Report

When I met the patient in consultation Aug. 6, 2006, she was 51 years old, in excellent health and asymptomatic. Her medical history included a craniotomy in 1999, with subtotal removal of a large posterior fossa meningioma. At that time, she had presented with headaches, ataxia and dizziness. Appropriate imaging studies had included an MRI, which revealed a large posterior fossa mass with distortion of the fourth ventricle causing mild hydrocephalus. Postoperatively she recovered nicely and her pre-op symptoms resolved.

After recovery, she was closely followed by her surgeon for recurrence. In 2005, an MRI documented local disease progression. She elected to be followed conservatively. One year later, a repeat imaging study revealed the tumor to be 5-10 percent larger; and it had overall measurements of 2.0 x 1.5 x 6 millimeters along the left tentorium. Although some meningiomas do not grow in a linear fashion, it was assumed this tumor would likely continue to grow and eventually become symptomatic. One treatment option was to re-excise the tumor. It was felt, however, the risk of cranial nerve injury would be substantially lower with radiosurgery. The patient researched different radiosurgery platforms, comparing Gamma Knife and CyberKnife. Although the radiosurgical results are the same with 80 percent control rates between 5-10 years, she elected to proceed with CyberKnife in an effort to avoid the immobilization frame placement with Gamma Knife.

On Oct. 23, 2006, The patient underwent a 45-minute CyberKnife treatment without side effects. A radiosurgical dose of 16 Gy was delivered to the 80% isodose to encompass a tumor volume of 20.1 cubic centimeters. There was no immobilization frame and no pretreatment medication regimen. The patient arrived in street clothes, was treated, and left without disrobing. She was told she was capable of

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Swedish assembles liver treatment team

Swedish Medical Center has long treated patients with liver disease, even performing highly complex liver resections. Now it has put together a well-trained collection of specialists and subspecialists unique to this region

Previously, the University of Washington was the only liver transplant program in the state designated to serve adults in Washington, Wyoming, Alaska, Montana and Idaho.

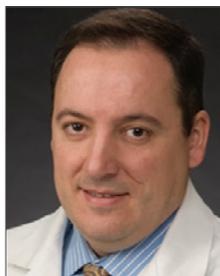
“Swedish recognized a decade ago there is a fast-growing segment

who encounter patients with liver problems.”

Swedish also has developed a handbook for liver patients, and is working on a new Web site for patients and their primary-care physicians.

“We would like to be able to treat any patient with any liver disease – both pre- and post-transplant – plus those who are never going to be candidates for transplantation,” says **Andrew Precht**, M.D., director of the Liver and Pancreas Transplant Program.

Medical and surgical research is at the core of the new Center for Liver Disease and Transplantation. Among other things, Swedish will study Hepatitis B and C, and evaluate creative ways to use transplantation in the treatment of various types of tumors.



*Luis Arrazola, M.D.
Surgical Director
Center for Liver Disease
and Transplantation*



*Jeffrey Kahn, M.D.
Medical Director
Center for Liver Disease
and Transplantation*



*Andrew Precht, M.D.
Director
Liver and Pancreas
Transplant Program*

in the new Center for Liver Disease and Transplantation.

Liver problems often involve multiple specialties and require attention from skilled surgeons, hepatologists, oncologists, and diagnostic and interventional radiologists. The new center is designed to advance the secondary to quaternary care of adults with nearly any type of liver disease. That may include conditions categorized as viral, alcoholic, metabolic, genetic and/or autoimmune. The staff also has expertise in diagnosing and treating primary and metastatic hepatobiliary malignancies.

Last July the Washington State Supreme Court upheld a Department of Health decision to allow Swedish to establish a new adult liver transplant program on its First Hill campus. The first procedures could start in mid- to late 2009.

of Northwest patients with serious liver disease,” says **William Marks**, M.D., chief of the Organ Transplant Program and the Laboratory for Transplantation Biology. “In part, that’s because of a steady rise in Hepatitis B and C cases, and our fairly large population of Asians and Asia-Pacific Islanders.”

The center’s goal is comprehensive and coordinated care. That includes fast-track workup for patients and uniform protocols, integration of medical records, and appropriate psycho-social evaluation.

“PCPs see many patients with increasingly complex liver issues, but they don’t always know where to send them,” says **Jeffrey Kahn**, M.D., Liver Center medical director. “We have a wealth of expertise concentrated in one site, so Swedish can provide easy access for physicians from around the region

For more information on the Center for Liver Disease and Transplantation, call 206-386-3660.

GI and Liver Conference

The Emil Jobb Gastroenterology Symposium, “Update on Gastrointestinal and Liver Disease,” is scheduled Feb. 27 in the Glaser Auditorium on the Swedish/First Hill campus. Local and national experts will present updates related to liver disease, liver transplantation, long-term management of gastroesophageal reflux disease, and inflammatory bowel disease. The session is designed for all health-care practitioners who treat patients suffering from GI and liver diseases. For information, contact jeffrey.kahn@swedish.org.

CyberKnife® Case Report

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driving herself home or back to work. A follow-up appointment was set for one month and a first follow-up MRI was scheduled for six months.

It has been a little more than 24 months since treatment. The patient continues to be symptom free. Her last scan (Oct. 2008) continues to show the tumor to be stable without growth. Although she recalls having come through her operation

in 1999 without complication, she was appreciative to have an alternative to surgical treatment that did not expose her to the risk of infection, bleeding or a recovery time. As one patient with a similar experience has commented, the procedure can be summed up as “band-aid free.”

*Sandra Vermeulen, M.D.
Co-director
Seattle CyberKnife Center at Swedish*

CME Course Listings

January – June 2009

Physicians from across the region and around the world come to Swedish Medical Center’s Continuing Medical Education (CME) courses to learn about new research and innovative treatment techniques.

For times, locations and course details, please visit www.swedish.org/cme

SIS 2009 Cardiology Nurse/Tech Symposium

Friday, Jan. 23, 2009

5th Annual Pediatric Specialty Update for the Primary-Care Physician

Friday, Jan. 30, 2009

Emil Jobb Gastroenterology Symposium: Update on Gastrointestinal and Liver Disease

Friday, Feb. 27, 2009

High-Risk Obstetrics: Tools for the Family Physician

Friday, March 6, 2009

SIS 2009 Coronary Artery Disease Symposium

Friday, March 13, 2009

Pressure Performance – A New Paradigm in Treating and Preventing Disability in Low Back Pain Patients

Friday, April 3, 2009

Immunization Update: Emerging Issues and New Directions

Friday, April 17, 2009

7th Annual John L. Locke, Jr., Preventative Cardiology Symposium

Friday, April 24, 2009

Annual Oncology Symposium

Friday, May 8, 2009

Neuromodulation 2009: A Comprehensive Review of Non-Ablative Therapies for Neurological Diseases

Friday, May 15, 2009

Cardiovascular Imaging Symposium

Friday, June 5, 2009

For more information about CME courses at Swedish, call 206-386-2755.

Swedish Medical Center is accredited by the Accreditation Council for Continuing Medical Education to provide continuing medical education for physicians.

Swedish Medical Center

Founded in 1910, Swedish Medical Center is the largest, most comprehensive, nonprofit health-care provider in the Seattle area. Based in Seattle, Swedish is comprised of four medical facility campuses (Ballard, Cherry Hill, First Hill and Issaquah), Swedish Home Care Services and Swedish Physicians — a network of 12 primary-care clinics. In addition to general medical and surgical care, Swedish is known as a regional referral center, providing specialized treatment in areas such as cardiac care, oncology, orthopedics, high-risk obstetrics, neurological care, sleep medicine, pediatrics, organ transplantation and clinical research. For more information, visit www.swedish.org or call 800-SWEDISH (800-793-3474).

Ballard

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Seattle, WA 98107-3985
206-782-2700

Cherry Hill

500 17th Ave.
Seattle, WA 98122-5711
206-320-2000

First Hill

747 Broadway
Seattle, WA 98122-4307
206-386-6000

Issaquah

2005 N.W. Sammamish Rd.
Issaquah, WA 98027-5364
425-394-0600

Swedish Home Care Services

Seattle Design Center
5701 6th Ave. S.
Seattle, WA 98108-9808
206-386-6602

Swedish Physician Division

600 University St., Ste. 1200
Seattle, WA 98101-1169
206-320-2700

Physician Opportunities

Are you a physician who would like to join a team-oriented, patient-focused practice?

Contact **Mike Waters**

Swedish Physician Recruiter
206-320-5962 (office)
206-327-2790 (cell)
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