

Deep brain stimulation for patients with Parkinson's disease

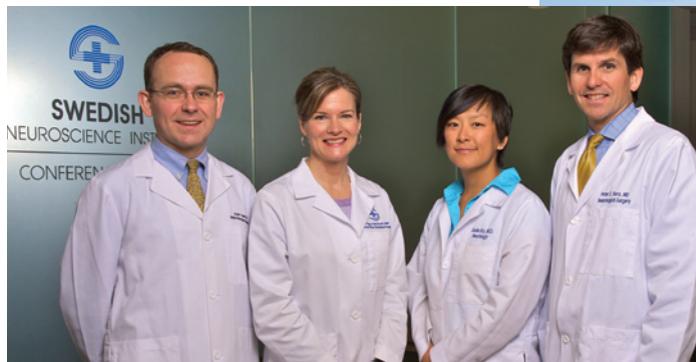
Deep brain stimulation (DBS) functions like a pacemaker for the brain, restoring neurological function by delivering electrical impulses to precise, tiny regions of the brains of patients with Parkinson's disease (PD). The DBS program at the Swedish Neuroscience Institute treats dozens of PD patients each year. In the following Q&A, three of the leaders of the SNI program describe several promising new indications for this remarkable technique.

Susie Ro, M.D., is a movement disorders specialist who determines patient eligibility for DBS. SNI neurosurgeon **Pete Nora, M.D.**, performs the exacting neurosurgical procedure in which electrodes are introduced into a targeted region deep within the brain. **Peggy Shortt, M.N., ARNP**, and her nurse practitioner colleagues, perform microelectrode recording and intra-operative testing during the DBS electrode implantation, and direct the programming of the fully implanted neurostimulation system in the weeks following surgery.

Q: How would you describe the ideal DBS candidate with PD?

Ro: A clear diagnosis of PD is the foremost criterion for the DBS candidate. Patients with parkinsonism due to causes other than Parkinson's disease, such as progressive supranuclear palsy (PSP) or multiple system atrophy, for example, do not do well with DBS. Ideal candidates should have a robust response to levodopa, because symptoms that improve with levodopa (i.e., tremors, stiffness and slowness) also tend to improve with DBS. In addition, patients who have severe dyskinesias (abnormal movements caused by levodopa) or "wearing-off" phenomenon (needing doses more often than every three to four hours) can have less severe ups and downs, and more "on" time with DBS. Some patients who cannot tolerate the side effects of high doses of medication are also potential candidates.

(continued on A2)



Deep brain stimulation is a highly specialized treatment that can improve the symptoms of Parkinson's disease, and also shows great promise with many other disorders. The leaders of the Swedish DBS team include, from left to right, Ryder Gwinn, M.D., Peggy Shortt, M.N., ARNP, Susie Ro, M.D., and Peter Nora, M.D.

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If you have any questions or comments about articles found in these pages, or would like to suggest future topics about Swedish Medical Center, please e-mail physicians.practice@swedish.org.

Deep brain stimulation Q&A

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The best candidates are usually in the middle stage of their disease (5-15 years) and are functioning well when their medications are working. Realistic expectations, a good social support system and access to expert programming are also crucial. We are cautious about patients approaching 80 years of age. Although there is no set age cutoff, younger patients do better in general.

Q: Which symptoms do not improve with DBS?

Ro: Symptoms that do not improve with levodopa, including some types of balance, speech and memory problems, do not improve with DBS. If a patient cannot walk on their best “on-medicine” day, DBS will not fix that problem. DBS is not a last-resort treatment for end-stage PD.

Patients with uncontrolled depression, anxiety, memory loss or severe medical problems are at high risk for complications following surgery.

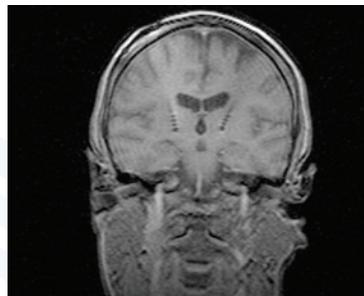
Q: What percentage of PD patients are good candidates for DBS?

Ro: Even though only 10-15 percent of PD patients eventually become good DBS candidates, it is a markedly underutilized treatment. Many patients are never referred for screening at all, or are referred too late. As a surgical referral center, we get a fairly high percentage of DBS referrals who turn out to be good candidates for surgery. Our selection guidelines are fairly strict, but they are only guidelines. We consider each patient individually. Because we

are very selective, the patients who have surgery in our program tend to have excellent outcomes.

Q: Are there conditions other than PD for which DBS is emerging as an accepted therapy? Do you treat patients with these conditions at SNI?

Ro: DBS is a well-established treatment for essential tremor and primary generalized dystonia. We also treat other forms of cerebellar



A coronal T1-weighted image demonstrates the presence of bilateral DBS electrodes in a patient with Parkinson's disease.

outflow tremor following stroke, trauma and multiple sclerosis, as well as certain types of dystonia. We are expanding into other movement disorders, including severe Tourette's syndrome. Neuropsychiatric disorders, such as obsessive-compulsive disorder and depression, is an exciting new area for DBS.

Q: The target area for the electrode tip is very deep in the brain. How do you place the electrode with a high degree of accuracy?

Nora: Several days before surgery we obtain a high resolution MRI scan of the brain, which we use for targeting and to confirm the absence of structural abnormalities. We use these MRI images and a stereotactic CT scan just

prior to surgery to select the appropriate target for the electrode tip. During the procedure we perform microelectrode recordings of the selected target nuclei. Then the electrode is temporarily activated during surgery to ensure the patient obtains expected benefits without unwanted side effects.

Q: What is the structure of the electrically active tip of the electrode?

Nora: There are four electrical contacts along the axis of each electrode. This allows for the safest and simplest surgical placement while providing the maximum programming options for our patients.

Q: Is there a significant complication rate?

Nora: Nationally, the complication rate for DBS is approximately 5 percent and includes hemorrhage, infection and neurological injury. The most concerning of these are hemorrhage and neurological injury, which makes up only about 1 percent of all complications. Thus, the rate of significant complications is very low.

Q: What is the microlesion effect?

Nora: The microlesion effect refers to transient clinical improvement seen in patients after their electrodes have been placed but not yet activated. It is a sign the electrode is in excellent position, although it is not seen in every patient that does well.

Q: What is the programming process following electrode implantation?

Shortt: The DBS system is

programmed during the patient's "medication-off" state without the influence of medications usually taken to suppress the same symptoms we are planning to treat with stimulation. We can change many parameters using a radio-frequency device we hold over the patient's implant, including electrical polarity, voltage, frequency, pulse width and rate. We select the field of stimulation by choosing the best symptom improvement for the patient's needs.

Q: What is the waiting time between electrode implantation and programming?

Shortt: In general, the patient has an appointment with the DBS clinic about two weeks after surgery. We

perform initial programming with stimulation mapping to determine the best benefit for the patient with the least side effects.

Q: Do you see immediate changes in neurological function during the programming process?

Shortt: Immediate improvement is often noted. It may take weeks or months of follow-up programming, however, to maximize motor benefits through reduced tremor, rigidity, bradykinesia, dyskinesia or dystonia. Patients with essential tremor may have the most immediate improvement with fewer programming sessions. In patients with PD, the brain stimulation titration is gradual because of the importance of

balancing the dosing of medicines and stimulation. The patient will notice optimal improvement in three to six months. In dystonia patients, programming visits are monthly and the full benefit of stimulation may take up to a year following DBS implantation. 

*Q&A by John W. Henson, M.D., FAAN
Editor, "BrainWaves"
Swedish Neuroscience Institute*

To consult or refer a patient to the Deep Brain Stimulation program, call 206-320-2847.

Case Reports: Deep Brain Stimulation for Parkinson's and Essential Tremor

Parkinson's Disease

A 53-year-old woman first noticed decreased left arm swing in 2001. A year later she was diagnosed with Parkinson's disease (PD). She did well initially on the dopamine agonist pramipexole (Mirapex®). Levodopa was added in 2004. By 2007 she had to be tapered off pramipexole due to excessive sleepiness, nausea and impulse control disorder, including sexual addiction and obsessive e-mailing. A combination of carbidopa, levodopa and entacapone (Stalevo®) caused hypomania. She developed worsening motor fluctuations to the point that she had to go on medical disability. Moderately severe dyskinesias (involuntary wiggling movements) occurred after each dose of medications and dystonic muscle spasms caused painful curling of her feet when her medications wore off about 2.5 hours after doses. She was losing weight and sleeping poorly due to waking up feeling stiff. Sometimes her medications would take more than an hour to begin working or would not work at all.

She underwent bilateral subthalamic deep brain stimulator (STN-DBS) surgeries 15 months ago. During the first few post-operative months she had programming visits and medication adjustments every two to four weeks. By six months she no longer had medication wearing off despite taking 50 percent less medication spread out four hours apart. She had minimal dyskinesias, no dystonia and her medication-related side effects had been resolved. She is now back to work full time and also is able to play tennis.

Essential Tremor

A 67-year-old woman first noted bilateral hand tremor with actions when she was a child. She remembers the tremors were worse on her dominant right side. She had a very strong family history of tremor in her mother and two sisters. She received an initial diagnosis of essential tremor and had been treated with primidone and propranolol for 30 to 40 years. Although both medications helped for awhile,

the tremors gradually worsened over time. Higher doses of medications made her dizzy and drowsy. For the last three years she had to use two hands to write or drink, never filling a cup more than half full unless covered with a lid. She ate by bringing her mouth down to her fork, rather than vice versa. Cooking was difficult because she risked cutting herself with a knife, and she also had difficulty putting on jewelry and makeup. An avid painter, she found it increasingly difficult to control the brush. Her younger sister had undergone an unsuccessful gamma knife radiosurgery procedure, so she was concerned about potential side effects.

She underwent left thalamic deep brain stimulator surgery (VIM DBS) this spring, and now has 90 percent control of tremor in her right hand and is tapering off her medications. She has chosen to have only one side treated with DBS. 

*Susie Ro, M.D.
Swedish Neuroscience Institute DBS Program*

Expanding use of robotics to preserve kidneys

The benefits of using some form of minimally invasive procedure for both radical and partial nephrectomies, rather than the more traditional open surgery, have been well documented. With minimally invasive techniques, patients have less post-operative pain, shorter recovery times, fewer complications and quicker returns to normal activities.

Laparoscopy, rather than open surgery, is considered the standard for radical nephrectomy. Recently, however, urologic surgeons have

found multiple benefits to adopting the daVinci Surgical System® for kidney surgery, particularly for partial nephrectomies that require dissection and excision of renal masses, followed by reconstruction.

With daVinci computer and robotic technology, surgeons have an enhanced field of vision and can more efficiently identify target anatomy. The system also allows for more exact excision, as well as more precise intracorporeal suturing during renal reconstruction. Most importantly,

however, daVinci robotics allows the surgeon to remove the clamps that provided a bloodless surgical field in less than 30 minutes, thus limiting warm ischemia time and reducing the potential risk to renal function.

Swedish surgeons have also successfully used daVinci robotics for robot-assisted pyeloplasty to correct ureteropelvic obstruction. ∞

For more information about partial nephrectomies and urologic surgery at Swedish Medical Center, please call 206-386-6266.

Case Report: Partial nephrectomy using robotic surgery

A 54-year-old female underwent open resection of a large liver cyst. A follow-up CT scan six years later showed a four-by-four centimeter enhancing mass on the posterior aspect of the upper pole of the right kidney. (See figures 1 and 2) Metastatic evaluation was negative and the patient had normal renal function with serum creatinine of 1.0.



Figure 1. Axial image of upper pole enhancing mass on posterior aspect of right kidney.

Given the location of the tumor on the upper pole, nephron-sparing surgery was offered as the preferred treatment option. Because of the patient's previous liver resection and the posterior location of the mass, a minimally invasive approach using the retroperitoneal technique and the daVinci robot was employed.

During this procedure the patient is placed in the 90-degree flank position opening the

space between the right 12th rib and iliac crest. Access to the retroperitoneal space is obtained with a balloon dilator, and a four-port configuration is utilized with three robotic ports and an assistant port. (See figure 3) The artery and vein are exposed and the tumor identified leaving the perinephric fat on the surface of the tumor. Laparoscopic ultrasound is used to visualize the tumor and plan the depth of resection in real time. The artery and vein are then clamped with laparoscopic bulldog clamps – beginning warm ischemia time. The tumor is excised with robotic curved scissors without the use of cautery, maintaining a three-to-five millimeter margin of normal



Figure 2. Coronal image of upper pole right renal mass.

renal tissue around the tumor. The 3-D view provided by the robotic laparoscope gives an unparalleled view of the renal tissues and guides the surgeon during resection of the tumor. The tumor is placed in an extraction sac for later removal. The collecting system and individual vessels are closed and the edges of the renal defect are closed over a bolster. The

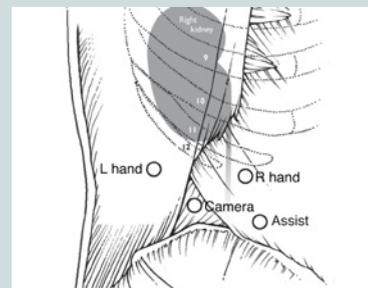


Figure 3. Port configuration for right retroperitoneal partial nephrectomy.

bulldog clamps are removed to end warm ischemia time and hemostasis is achieved with additional sutures if necessary. The dexterity of the robotic instruments provides more precision and speeds suturing over conventional laparoscopic suturing, therefore decreasing warm ischemia time.

For this patient, operative time was 100 minutes and estimated blood loss was 50 cc. Warm ischemia time for excision and repair of the renal defect was 16 minutes. The patient was discharged on postoperative day number two and returned to full-time work 12 days after discharge. Final pathology on the renal mass revealed a 3.5-centimeter Type I papillary renal cell carcinoma with negative margins. ∞

James R. Porter, M.D.

Swedish Diabetes Education Center arms patients with self-management tools



Patient education and self-management are important, cost-effective components of diabetes care. For more than 12 years the Swedish Diabetes Education Center, previously known as the Joslin Diabetes Center at Swedish, has offered people with diabetes a comprehensive education program.

“Managing diabetes takes a team effort,” says Nancy Sievers, who travels more than 125 miles from Port Angeles, Wash., to receive her diabetes care and education at Swedish Medical Center. “I’m the captain of the team. The diabetes educators at the Swedish Diabetes Education Center make up the rest of the team, and my endocrinologist is my coach. I’m not on the all-stars team yet—but, every day I get closer to living better with diabetes.”

The center offers a variety of classes at Swedish/First Hill and Swedish/Issaquah for patients ages 16 years or older who are newly diagnosed or have been living with diabetes for many years. Some patients may not have received formal self-management education when first diagnosed, while others may need a refresher class. Other patients who benefit from education

may have recently added insulin to their treatment routine or want to begin using an insulin pump or blood glucose sensor.

“Once patients with diabetes realize the value of ongoing self-management education, they are eager to learn and it just takes a referral from their physicians to make it happen,” says **Sara Rigel**, MPH, CHES, manager of the Swedish Diabetes Education Center.

The center’s Steps Program provides 10 hours of education over three weeks and meets Medicaid, Medicare and most insurance reimbursement criteria. Patients who have completed the Steps Program also have an opportunity to participate in a monthly support group.

The center also offers group and one-on-one classes that cover gestational diabetes, insulin start, pump start and pump assessment, pre-diabetes, continuous glucose monitoring, and an introduction to other injectable diabetes medications.

“Our patients gain such confidence from the knowledge they receive during our classes,” says **Kathy Magee**, R.N., CDE, diabetes education coordinator. “It is very rewarding to see patients learn how to take control of their diabetes, so it doesn’t control their lives.”

The center’s eight clinical staff members, all registered nurses or registered dietitians who are certified diabetes educators, have more than 175 years of combined diabetes education experience. The center has been recognized by the American Diabetes Association for meeting the national standards for diabetes self-management education. ☞

Diabetes By The Numbers

Nationwide

- **23.6 million** people (all ages) or 7.8% of the U.S. population have diabetes (5.7 million are undiagnosed)¹
- Nearly **25 percent** of adults age 60 years or older have diabetes¹
- Total estimated direct and indirect diabetes costs: **\$174 billion**¹
- **Risk of death** among people with diabetes is about twice that of people without diabetes of similar age¹

In Washington state

- Percentage of adults in Washington with diagnosed diabetes **nearly doubled** from 1994 (3.6 percent) to 2007 (7.0 percent)²
- In 29 out of 39 counties **more than 7.0 percent** of adults age 20 or older have diagnosed diabetes²
- No Washington county has less than 5.5 percent of its **adult population diagnosed with diabetes**
- In King County, more than **87,500 adults age 20 or older** have diagnosed diabetes. Pierce, Snohomish and Spokane counties have the second, third and fourth greatest number of adults with diagnosed diabetes²

¹ Centers for Disease Control and Prevention. National diabetes fact sheet: general information and national estimates on diabetes in the United States, 2007. Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, 2008.

² Centers for Disease Control and Prevention: National Diabetes Surveillance System. Available online at: www.cdc.gov/diabetes/statistics/index.htm. Retrieved 6/25/2009.

For more information about referring a patient to the Swedish Diabetes Education Center, please call 206-215-2440 or go to www.swedish.org/diabetes.

Growing the Swedish Acute Telestroke Network helps patients beat the clock

The window of opportunity to evaluate, diagnose and treat a stroke victim with FDA-approved intravenous thrombolytics is brief — just a few hours. For patients living close to a major medical center where stroke expertise is readily available, a narrow window of opportunity may not be an issue. For people who live in urban and rural areas underserved by neurological expertise, however, thrombolytic treatment may be an unattainable goal that could result in disabilities that otherwise could be minimized or avoided.

In October 2007, the Swedish Neuroscience Institute (SNI) began developing an acute telestroke network to level the playing field so stroke patients could quickly receive the best care, regardless of where they live. Beginning with two emergency departments (Swedish/Ballard and Swedish/Issaquah), this first-of-a-kind network in the Pacific Northwest has grown to include three non-Swedish hospitals in western and central Washington, with a fourth site scheduled to join the network in October.

Skagit Valley Hospital in Mount Vernon came on line in November 2008, followed by Jefferson Healthcare in Port Townsend and Lake Chelan Community Hospital in Lake Chelan Valley. Central Washington Hospital in Wenatchee has begun the implementation process with Swedish with a goal for services to begin in October. These

hospitals have made commitments to their communities to improve access to stroke care by becoming partners in the Swedish Acute Telestroke Program. Each hospital has telestroke technology that links their emergency department physicians

nel 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."

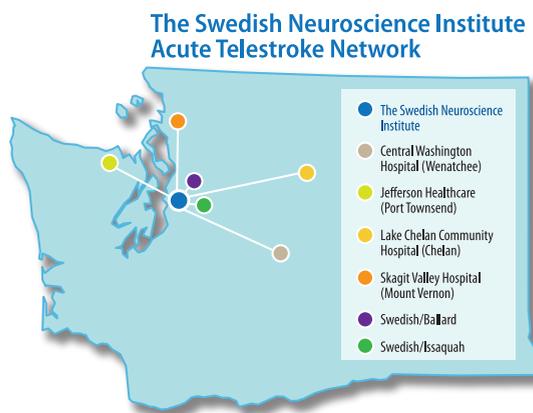
The SNI team, which is on call 24 hours a day and seven days a week, includes a neurologist, and a physician assistant, nurse practitioner or registered nurse. With video conferencing equipment at both locations, the neurologist

conducts a "virtual" real-time bedside neurological exam in collaboration with the requesting ER physician. Together they decide on treatment.

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.

The emergency department physicians are able to administer treatments, such as the thrombolytic agent tissue plasminogen activator (tPA), to help minimize or reverse a stroke's impact.

"The Joint Commission has certified each Swedish campus — First Hill, Cherry Hill, Ballard (continued on A7)



and nurses directly with the SNI Acute Stroke Telemedicine Team.

The SNI Acute Telestroke program allows physicians in local emergency departments to consult with the neurologists at Swedish in a more interactive mode than is available during a phone consult. This technology, along with the stroke protocols and training provided by the Swedish telestroke team as part of the program implementation, also means treatment does not need to be delayed while transporting the patient to the medical center.

"We have such a short time to make treatment decisions," says **William Likosky, M.D.**, a neurologist and medical director of the stroke program at Swedish/Cherry Hill. "Having EMS begin the assessment during transport reduces ER response time. Training ER person-

Telestroke Network

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and Issaquah—as a Primary Stroke Center,” says **Tam Cress**, R.N., MSN, FAHA, director of telehealth at Swedish Medical Center. “Our acute telestroke program is bringing together hospitals throughout Washington to combat the third leading cause of death in the United States and the number-one cause of adult disability.”

As more sites are added to the Swedish Acute Telestroke Network, people in more communities throughout Washington will have an equal opportunity to beat the clock. ∞

For more information about the SNI Telestroke Program or becoming a partner hospital, call 206-320-3112.

CME Course Listings

September – November 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 and locations, go to www.swedish.org/cme or call 206-386-2755.

13th Annual Pain Management Symposium – The West is Still Wild ... But Painful

Friday, Sept. 25

Practitioners will gain the skills to motivate their patients, discuss intervention techniques and improve their doctor-patient relationships at this full-day symposium. Sessions will focus on goal setting, sleep, measuring function, the opioid pendulum and complementary medicine. The afternoon smaller group workshops are designed to practice techniques taught during the morning didactic lectures.

Shaping Circuits and Molding Minds – NeuroPsychiatry 2009

Friday, Oct. 9

This course will address recent advances in our understanding of functional neuroanatomy as it relates to cognitive and emotional development, with special attention to clinical applications. Dr. Peterson will review studies of CNS development and how they shed light on childhood and adult psychopathology. Dr. Cozolino will speak to the role of neuroplasticity and regional specialization relevant to psychotherapy.

7th Annual West Coast Colorectal Cancer Symposium – A Case-Based Approach

Friday, Oct. 16

Case based-educational sessions will focus on

advances in adjuvant therapy, colorectal cancer screening, laparoscopic approach to rectal cancer, new developments in the treatment of advanced disease, as well as cancer survivorship issues related to diet, exercise and lifestyle changes post adjuvant therapy.

23rd Annual Roland D. Pinkham Basic Science Lectureship – Normal Neurobiology of Memory and Cognition

Friday, Nov. 13

Local and national experts will discuss the molecular biology of learning and memory, the aging brain, PTSD and Alzheimer’s disease, cell biology of long-term memory formation, memory reconsolidation, as well as the function of sleep in relation to memory.

Diabetes Management Update 2009

Friday, Nov. 20

This conference will provide attendees an update on diabetes management, including insulin and medication management, screening for prediabetes, and treatment of underinsured, unemployed and homeless patients. Other discussions will focus on renal disease, depression, nutrition, immunizations and foot care as they relate to the diabetic patient.

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 Visiting Nurse 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, pediatrics, organ transplantation and clinical research. For more information, visit www.swedish.org or call 800-SWEDISH (800-793-3474).

Ballard

5300 Tallman Ave. N.W.
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 Visiting Nurse Services

6100 219th St. S.W., Ste. 400
Mountlake Terrace, WA 98043
425-778-2400

Swedish Physician Division

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

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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)
mike.waters@swedish.org