

## Treating Aortic Valve Stenosis in Elderly and/or Fragile Patients

In late 2011 the U.S. Food and Drug Administration (FDA) approved the Edwards SAPIEN transcatheter heart valve for the treatment of patients with severe, symptomatic native aortic valve stenosis who are at prohibitive risk for open-heart surgery. The Swedish Heart & Vascular Institute (SHVI) offers transcatheter aortic valve replacement (TAVR) using this newly approved valve. The Centers for Medicare & Medicaid Services issued a Medicare National Coverage Determination earlier this year allowing coverage of TAVR under its Coverage with Evidence Development.

The primary cause of aortic stenosis is calcification and narrowing of the valve, thereby limiting cardiac output. It affects an estimated 5 percent of people age 75 and older. Valve replacement is the only cure for aortic stenosis; without it, 50 percent of these patients will not survive more than two years after symptom onset.

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## Endoscopic Management of Central Airway Obstruction

*Jed A. Gorden, M.D., director of Interventional Pulmonology; and Joelle Thirsk Fathi, M.N., ARNP, Division of Interventional Pulmonology, Department of Swedish Thoracic Surgery, Swedish Medical Center*

Central airway obstruction can be a significant contributor to patient symptoms in both malignant and, more rarely, benign disease. Suspicion for central airway obstruction can lead to rapid identification and disease management. The Division of Interventional Pulmonology at Swedish Medical Center possesses specific interest and expertise in the diagnosis and management of central airway obstruction and is able to provide the complement of multidisciplinary services in case of need.

In cases of malignant central airway obstruction, management should be safe, rapid and effective, with low morbidity and mortality, and minimal follow up, while providing enhanced quality of life.

Central airway obstruction presents as one of several broad categories. An understanding of each category is critical to procedure planning.

- 1. Intrinsic airway obstruction where the airway lumen is compromised by benign granulation or malignant tissue.** The normal lumen is obscured by exophytic tissue. To manage intrinsic airway occlusion, the endoscopist requires tools for both the mechanical removal of tumor and for hemostasis due

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# Treating Aortic Valve Stenosis

(continued from A1)

## An alternative for some patients

Although the majority of patients with severe aortic stenosis will be treated with conventional surgical aortic valve replacement (SAVR), TAVR represents the first significant advancement in treating patients who are not candidates for open-heart surgery due to age, frailty or other co-morbidities.

“For patients who cannot have surgery, the two-year published results of the PARTNER study showed that TAVR has a 46 percent relative risk reduction in mortality and statistically significant improvements in morbidity and quality of life,” says **Mark Reisman, M.D.**, an SHVI interventional cardiologist and a principal investigator in the clinical trial. “TAVR allows us to offer previously untreatable patients with aortic stenosis a better and longer life.”



Figure 1. Edwards SAPIEN transcatheter heart valve.

The TAVR device comprises a balloon-expandable stainless steel frame with bovine pericardial tissue leaflets forming the valve. (Figure 1)



Figure 2. Edwards RetroFlex3 transfemoral delivery system.

It is delivered via a catheter-based approach through a small incision in the femoral artery in the groin. (Figure 2) The procedure typically takes two to

three hours, and the hospital stay ranges from four to seven days. Postprocedure follow-up appointments are scheduled at one to two weeks, and one, three, six and 12 months, then annually.

## Evaluating candidates

Evaluations for SAVR and TAVR are similar. Studies include echocardiogram, cardiac catheterization, CT scan, pulmonary function testing and carotid artery ultrasound. Frailty, a formal diagnosis encompassing strength, mobility, nutrition and tissue integrity, is evaluated using objective measures.

The assessment also includes the use of the Society for Thoracic Surgeons (STS) risk calculator, a tool to help quantify mortality and morbidity risk due to major adverse events. In the absence of criteria that preclude open-heart surgery, patients with an STS risk score of 8 percent or greater are at increased risk for SAVR and may be considered for TAVR.

The echocardiogram and CT scan of the chest, abdomen and pelvis are critical in determining whether TAVR using the SAPIEN device and a transcatheter approach is a viable option.

## Dedicated resources

At the SHVI, the TAVR program is an example of how catheter-based skills of interventional cardiologists and surgical skills of cardiothoracic surgeons have come together to provide treatment alternatives where none may have existed previously. In addition to cardiologists and cardiothoracic surgeons, the TAVR team includes an echocardiographer, a cardiac anesthesiologist, a radiologist, a cardiology nurse practitioner who is also the TAVR program director, and numerous ancillary staff. Together, this team

initiates testing, evaluates the results and determines the best treatment option.

“Collaboration among medical, surgical, nursing and ancillary specialties has been instrumental in the success of this program,” says **Glenn R. Barnhart, M.D.**, chief of Cardiac Surgical Services at SHVI. “Bringing together the complementary skills of this dedicated team benefits patients who previously had little hope.”

For more information about surgical or transcatheter aortic valve replacement, please call **Elizabeth M. Perpetua, DNP, ARNP-BC, CCRN**, director of the Structural Heart/TAVR Program, at **(206) 320-8100**. 

Illustrations courtesy of Edwards Lifesciences.

## When to Refer to Swedish

Structural Heart/TAVR Program  
Swedish Heart & Vascular Institute  
550 17th Ave., Ste. 680  
Seattle, WA 98122  
Contact: Elizabeth Perpetua,  
DNP, ARNP-BC, CCRN  
Phone: (206) 320-8100

The Swedish Heart & Vascular Institute (SHVI) is one of the few medical centers in the United States that offers both traditional and transcatheter aortic valve replacement. Physicians may refer or request a consult anytime they suspect valvular heart disease or have a concern for a heart murmur. Referrals may include patients with:

- Suspected severe aortic stenosis
- Diagnosed aortic stenosis or exam finding of systolic murmur
- Related symptoms, such as the triad of symptoms in aortic stenosis: chest pain, syncope or congestive heart failure

SHVI works closely with referring providers to facilitate consultations, and with patients – especially those traveling great distances – to coordinate appointment and evaluation scheduling.

[www.swedish.org/heart](http://www.swedish.org/heart)

## Case Study: Transcatheter Aortic Valve Replacement

Elizabeth M. Perpetua, DNP, ARNP-BC, CCRN, Director, Structural Heart/TAVR Program, The Swedish Heart & Vascular Institute

Mr. S is an 88-year-old who has enjoyed an active lifestyle. He played tennis until arthritis, worsening dyspnea and fatigue triggered a visit to his primary-care physician in the fall of 2011. His physician referred him to an orthopedic surgeon, who recommended knee replacement. Due to a remote history of coronary artery disease with single vessel coronary artery bypass grafting (CABG), as well as permanent atrial fibrillation on anti-coagulation, the surgeon required pre-surgical clearance from a cardiologist.

The cardiology evaluation revealed severe aortic stenosis. Further testing showed considerable calcification of the ascending aorta and significant narrowing of the right carotid artery, which increased his risk of stroke with surgical aortic valve replacement (SAVR). The STS risk score for mortality was 11 percent. Due to age, comorbidities and high STS risk score, two cardiothoracic surgeons deemed morbidity and mortality probability with SAVR at greater than 50 percent. He was subsequently referred for transcatheter aortic valve replacement (TAVR).

Screening for TAVR confirmed the size and characteristics of the aortic valve and peripheral arterial system were suitable for transcatheter delivery and implant of a SAPIEN prosthetic aortic valve. (Figures 1, 2 and 3)

The SHVI Heart Team successfully placed the new valve using a percutaneous, transfemoral approach. (Figure 4) The procedure was completed in 119 minutes (average procedure time of the PARTNER clinical study was 133 minutes). There were no periprocedural complications.

Mr. S was extubated in the cardiac catheterization lab immediately postprocedure and transferred to the intensive care unit. He did not require intravenous medications for hemodynamic support and was completely alert one hour postprocedure. Shortly thereafter, invasive lines were discontinued. Because arterial access was achieved percutaneously, rather than via femoral cutdown, Mr. S was able to sit in a chair at two hours and ambulate within four hours postprocedure.

Mr. S transferred to the telemetry floor the next morning. He was eating well and walking on the unit. Physical therapy evaluated and cleared him for discharge home the following



Figure 1. Echocardiographic measurement of the left ventricular outflow tract (LVOT) diameter in millimeters is used to determine the size of the annulus of the aortic valve. This image shows an LVOT diameter of 21 mm, appropriate for the 23-mm SAPIEN valve.

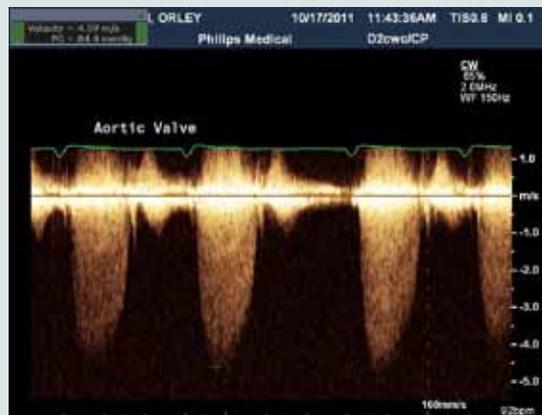


Figure 2. Measurement of the velocity of the gradient across the aortic valve in meters per second. Severe aortic stenosis is indicated by an area less than 1.0 cm<sup>2</sup> and a mean gradient of 40 mmHg or maximum velocity of 4.0 m/sec.

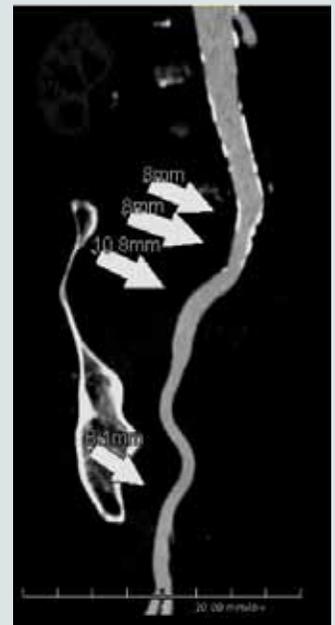


Figure 3. A CT angiography longitudinal view of the right iliac and femoral arteries shows an internal lumen diameter at least 8 mm throughout, adequate for the delivery system of either the 23-mm or 26-mm SAPIEN valve.

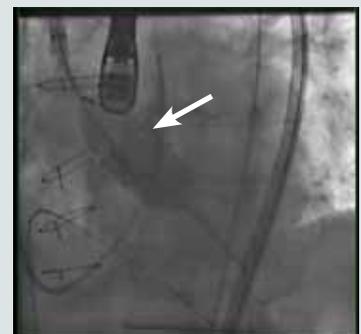
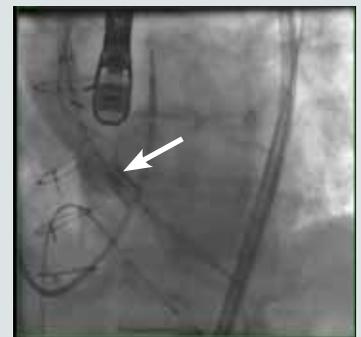


Figure 4. Aortography facilitates review of the valve placement prior to deployment (top). Balloon inflation and valve deployment is shown on the bottom.

day, just 48 hours postprocedure (average post-TAVR hospital stay of the PARTNER clinical study was eight days). Mr. S did not require home health or additional assistance upon discharge.

At his one-week follow-up appointment, Mr. S expressed appreciation for getting his life back and asked when he could return to the tennis court. The SHVI Heart Team will see Mr. S at one, three, six and 12 months as follow-up to TAVR. His primary-care provider and primary cardiologist remain the cornerstone of his care.

This case study is presented for educational purposes with the patient's permission. 

## Endoscopic Management

(continued from A1)

to bleeding risk associated with tissue disruption.

**2. Extrinsic compression or submucosal infiltration of the central airway.** The wall or mucosal lining of the airway is intact and the lumen is narrowed by extrinsic forces. Because the mucosa is intact, techniques that excise tissue cannot be used; rather, tools that re-establish normal or near normal airway caliber are required, including stent placement.

**3. Dynamic collapse of the airway where the mucosa is normal, but changes in intrathoracic pressure result in variable obstruction.**

Dynamic obstruction confronts the clinician with normal airways with variable collapse through the respiratory cycle. This requires techniques that result in airway stabilization.

The end result of these conditions is the same, airway compromise and patient morbidity. The innate differences in these pathologies, however, drive decision making and therapeutic options. Management of central airway obstruction requires a broad

multidisciplinary approach, including radiology, pathology, thoracic surgery and interventional pulmonology.

Even as more technology becomes available for flexible bronchoscopy, rigid bronchoscopy remains the therapeutic instrument of choice for the management of central airway obstruction. The rigid bronchoscope allows the airway to be a safe tool for oxygenation and ventilation, as well as a direct therapeutic tool. With a rigid bronchoscope in place there is direct access to the airway for tumor de-bulking, delivery of energy sources for tumor destruction, management of bleeding and stenting, and all tools and techniques that are required for comprehensive central airway management. Extensive experience in central airway obstruction and rigid bronchoscopy is a critical component of the Interventional Pulmonology program at Swedish.

For more information, or to request an inpatient, outpatient or telephone consult, please call **Jed Gorden, M.D.**, director of Interventional Pulmonology, at **206-215-6800**. ☎

### When to Refer to Swedish

#### Swedish Interventional Pulmonology

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Fax: 206-215-6801

Swedish Interventional Pulmonology welcomes all patients, including complex patients with co-morbidities and those with advanced malignancy in need of palliation. Our core palliative principles include the delivery of:

1. Safe, rapid and effective interventions
2. Procedures that have low-associated morbidity and mortality
3. A procedure that requires minimal follow up
4. Procedures that maximize quality of life

For more information about central airway obstruction management, see "Endoscopic Management of Central Airway Obstruction," written by Dr. Gorden and published in *Seminars in Thoracic and Cardiovascular Surgery* (Semin Thorac Cardiovasc Surg. 2009 Fall;21(3):263-73.).

To consult on or refer a patient, please call **Jed Gorden, M.D.**, director of Interventional Pulmonology, at **206-215-6800** (24-hour number).

## NWABR Recognizes Swedish Neurosurgeon



Gregory Foltz, M.D.

The Northwest Association for Biomedical Research has honored **Greg Foltz, M.D.**, a neurosurgeon and director of the Ben and Catherine Ivy Center for Advanced Brain Tumor Treatment at the Swedish Neuroscience Institute, with its Al Thompson Award. The award recognizes individual efforts

to foster public trust in biomedical research through education and dialogue.

Along with caring for patients, Foltz maintains an active research program with a focus on developing novel treatments for malignant brain tumors. He has received funding from the National Cancer Institute, Accelerate Brain Cancer Cure, the Ben and Catherine Ivy Foundation, the Elliott Foundation and the U.S. Department of Defense.

He co-founded Partners in Personal Oncology and the Seattle Brain Cancer Walk, and enjoys building collaborations and raising brain cancer awareness in the Seattle community.

The Ivy Center is considered one of the top brain cancer programs in the country, attracting thousands of patients with complex, difficult-to-treat brain tumors. To consult with Dr. Foltz, call 206-320-2300. ☎

## Case Study: Management of Central Airway Obstruction (Subglottic Stenosis)

A 52-year-old, lifetime-nonsmoking female presents with a two-to-three-year onset of shortness of breath and cough. She reports

that her symptoms were initially very mild, but have insidiously progressed over the last couple of years. She has been clinically diagnosed with

asthma and prescribed a variety of inhalers without any symptom improvement. Over the last six months she has noticed worsening shortness of breath, and has had to curtail her physical activity. More recently, her friends have commented she gets short of breath while talking.

Physical exam was most notable for an audible wheeze on inspiration and expiration. Diagnostic bronchoscopy revealed a circumferential subglottic stenosis with a 5-6-mm airway diameter. She underwent sequential balloon dilation of the airway in a single procedure, restoring her airway to a 15-mm diameter.

On follow up she is off inhaled medication and has been symptom free for the past three years. ☺

*This case study is presented for educational purposes.*



Figure 1. A benign subglottic stricture.



Figure 2. Subglottic stenosis upon dilation.

## Case Study: Management of a Central Airway Obstruction (Main Stem Tumor)

A 78-year-old male presents with a complaint of increasing dyspnea, which has rapidly escalated during the last seven to 10 days. He reports:

- Onset of symptomatic cough 2-3 months prior to his appointment
- An inability to walk half a city block or climb the single flight of stairs in his home
- Some hemoptysis with his cough

Physical exam revealed absent breath sounds on the right side. A CT of the chest confirmed central tumor obstructing the right main stem bronchus.

He underwent rigid bronchoscopy, which demonstrated a right main stem tumor with secondary intrinsic airway obstruction. Tumor origin was the right upper lobe orifice with tumor growing out and obstructing the main stem.

We performed a tumor excision using a combination of tools through the rigid bronchoscope, including the micro-debrider to extract tissue, and argon plasma coagulation to ensure hemostasis. These interventional procedures resulted in a patent right main stem airway with patent distal airways and only a single occluded right upper lobe segment, which was the tumor origin.

During the same procedure, we performed an endobronchial ultrasound and needle biopsy of mediastinal lymph nodes to complete diagnosis and lymph node staging. The patient was treated as an outpatient and discharged following recovery.

On follow up, the patient is now undergoing treatment for adenocarcinoma, but reports minimal dyspnea. He has returned to walking and exercising, and his cough has nearly completely resolved. ☺

*This case study is presented for educational purposes.*



Figure 1. CT scan illustrating central airway obstruction.



Figure 2. Main stem tumor creating the central airway obstruction.



Figure 3. Tumor excision.

# New Efforts to Control Diabetes Before and During Pregnancy

*Brigit V. Brock, M.D., maternal fetal medicine specialist and perinatal diabetologist, Swedish Maternal and Fetal Specialty Center*

The Centers for Disease Control and Prevention (CDC) projects that by 2050 the number of people diagnosed with diabetes will more than double from 11 million to 29 million. Today an estimated 1.3 million women of reproductive age (18-44 years) have diabetes, with more than a third of them undiagnosed.

## Diabetes education

Recognizing the significant and long-lasting detrimental effects of diabetes on both the mother and her baby, the Swedish Maternal and Fetal Specialty Center has added certified diabetes nurse educators to its team of high-risk



pregnancy specialists. Our team is focusing its efforts on the broadest continuum of care in order to have the greatest impact on outcomes, including before a woman becomes pregnant, at the first maternal/fetal consult and at each prenatal visit.

## Diagnosing before pregnancy

Pregestational diagnosis and/or control of diabetes is ideal. These women have the best opportunity to gain control of their diabetes through nutrition, exercise, oral agents and insulin. If diabetes is well controlled prior to conception, the risk for miscar-

riage and fetal congenital abnormalities is significantly decreased. Unfortunately, 90 percent of our patients are already pregnant when they first present, and some of them don't know they have diabetes until we discuss their prenatal blood work.

Our perinatologists and diabetes nurse educators are available to see women with diabetes who are considering pregnancy, as well as those who are already pregnant. For women with diabetes, the nurse educator is part of each prenatal visit, providing blood-sugar tracking, and nutrition and exercise counseling. Although diet and exercise often control diabetes, our perinatal diabetologist also can initiate insulin treatment if indicated.

## Partnering with referring physicians

This one-stop-shopping approach to diabetes and pregnancy offers convenience for patients and expanded opportunities for us to partner with primary-care physicians. We work closely with referring physicians to customize our service in order to meet their partnership preferences.

Some physicians prefer we assume responsibility for their patients' obstetrical care because of the increased risks involved with the pregnancy and the time commitment required to monitor and manage diabetes during pregnancy and while the patient is in labor. In these cases, our service continues through the first six weeks postpartum before we transition a patient back to her primary-care physician. For others, we provide diagnostics and periodic consultative services throughout the patient's preg-

## When to Refer to Swedish Maternal Fetal Medicine

### Maternal and Fetal Specialty Center

1229 Madison, Suite 750  
Seattle, WA 98104  
Phone: 206-386-2101

### The Obstetrix Medical Group at Issaquah

751 N.E. Blakely Dr.  
Issaquah, WA 98029  
Phone: 425-394-5021

- Pre-pregnancy consultation for patients with pre-existing diabetes (type 1 or type 2) who are planning a pregnancy
- Maternal fetal pregnancy consultation and assistance with management of oral medications and insulin during pregnancy
- Consultation, recommendations and blood glucose surveillance and management for patients who are diagnosed with gestational diabetes in the third trimester
- Diabetes education and counseling by certified diabetes nurse educators, who are a part of our pregnancy management team at both Swedish/First Hill and Swedish/Issaquah locations
- Comprehensive care of high-risk diabetes patients at the Maternal and Fetal Specialty Center at Swedish/First Hill

nancy. This can include fetal ultrasound screening for congenital anomalies, as well as antenatal testing for pregnant diabetics in the third trimester, both of which are recommended in pregnancies complicated by diabetes.

Rather than discouraging women with diabetes from having children, as was typical a generation ago, we now know that women who learn to manage their diabetes before or during pregnancy can give birth to healthy babies. 

## Cherry Hill and First Hill Recognized for Hospital Safety

The Leapfrog Group, an independent national nonprofit run by employers and other large purchasers of health benefits, has honored Swedish's Cherry Hill and First Hill campuses with an 'A' Hospital Safety Score. The Hospital Safety Score was calculated under the guidance of The Leapfrog Group's Blue Ribbon Expert Panel using publicly available data on patient injuries, medical and medication errors, and infections.

The Hospital Safety Score represents a hospital's overall capacity to keep patients safe from infections, injuries, and medical and medication errors. It also is a direct reflection of Swedish's two-year journey into a 'Culture of Safety,' which includes campus safety huddles, safety pauses and Culture of Safety training, encouraging staff in all roles to speak up and advocate for patient and staff well-being. 

## CME Course Listing

### September – November 2012

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](http://www.swedish.org/cme) or call 206-386-2755.

#### 9th Biennial Ovarian Cancer Research Symposium

Jointly sponsored by The Marsha Rivkin Center and Swedish Medical Center  
Thursday-Friday, Sept. 6-7

#### Physician Well-Being: Who Do You Want to Be?

Friday, Sept. 7

#### Intensive Update in Neurology

Thursday-Friday, Sept. 13-14

#### Pacific Northwest Urology Robotics Symposium

Friday-Saturday, Sept. 14-15

#### 16th Annual Pain Management Symposium: The "Rocky Horror" Pain Show

Friday, Sept. 28

#### Second Annual "A Case for Cases" Symposium: Updating Interventional Cardiology from the Cath Lab

Friday, Oct. 5

#### Update on Liver Disease and Liver Transplant: Risk. Intervention. Recovery.

Friday, Oct. 12

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#### Update on Kidney Transplant

Friday, Oct. 19

#### 10th Annual West Coast Colorectal Cancer Symposium

Friday, Oct. 26

#### The Transradial Approach: A Case-based and Hands-on Training Course

Friday-Saturday, Nov. 2-3

#### Advances in Neuromodulation 2012: State-of-the-Art and Emerging Indications

Friday, Nov. 9

#### Orthopedics for Primary Care

Friday, Nov. 9

#### 26th Annual Roland D. Pinkham, M.D. Basic Science Lectureship

Friday, Nov. 16

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21601 76th Ave. W.  
Edmonds, WA 98026  
425-640-4000

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Seattle, WA 98122-4307  
206-386-6000

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Issaquah, WA 98029  
425-313-4000

#### Lakeside

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Issaquah, WA 98027  
425-427-8450

#### Mill Creek

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Everett, WA 98208  
425-357-3900

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18100 N.E. Union Hill Road  
Redmond, WA 98052  
425-498-2200

#### Swedish Medical Group

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 Aaron Bryant  
Manager, Provider Services  
Swedish Medical Group  
206-320-5925 (office)  
[aaron.bryant@swedish.org](mailto:aaron.bryant@swedish.org)