MEDICAL POLICY – 7.01.132
Transcatheter Aortic Valve Implantation for Aortic Stenosis

Introduction

The aortic valve is a valve that separates the main pumping chamber of the heart (the left ventricle) from the large artery that takes oxygen rich blood away from the heart and out to the body (the aorta). If the valve doesn’t completely open, it is called aortic stenosis. Aortic stenosis decreases the amount of oxygenated blood getting out to the body. Open surgery is one method of replacing a damaged aortic valve. A newer procedure — known as transcatheter aortic valve replacement or transcatheter aortic valve implantation — has been developed. It allows a replacement valve to be threaded through an artery and into the heart without open heart surgery. A catheter (a long thin, tube) is threaded through an artery, either in the leg or in the chest, and into the heart. The replacement valve is then lodged into the defective aortic valve. The new valve is then expanded, pushing aside parts of the old valve. This policy describes when transcatheter aortic valve replacement may be considered medically necessary.

Note: The Introduction section is for your general knowledge and is not to be taken as policy coverage criteria. The rest of the policy uses specific words and concepts familiar to medical professionals. It is intended for providers. A provider can be a person, such as a doctor, nurse, psychologist, or dentist. A provider also can be a place where medical care is given, like a hospital, clinic, or lab. This policy informs them about when a service may be covered.
<table>
<thead>
<tr>
<th>Procedure</th>
<th>Medical Necessity</th>
</tr>
</thead>
</table>
| Transcatheter aortic valve replacement | Transcatheter aortic valve replacement with a U.S. Food and Drug Administration (FDA)–approved transcatheter heart valve system, performed via an approach consistent with the device’s FDA-approved labeling, may be considered medically necessary as a treatment for native valve aortic stenosis when ALL of the following conditions are present:
  - Severe aortic stenosis (see the Definition of Terms section) with a calcified aortic annulus
  AND
  - New York Heart Association (NYHA) heart failure class II, III, or IV symptoms
  AND
  - Left ventricular ejection fraction greater than 20%
  AND
  - Patient does not have unicuspid or bicuspid aortic valves |
| Transcatheter aortic valve replacement with a transcatheter heart valve system for use for repair of a degenerated bioprosthetic valve (valve-in-valve) may be considered medically necessary when ALL of the following conditions are present:
  - Failure (stenosed, insufficient, or combined) of a surgical bioprosthetic aortic valve
  AND
  - New York Heart Association heart failure class II, III, or IV symptoms
  AND
  - Left ventricular ejection fraction greater than 20%
  AND
  - Patient is not an operable candidate for open surgery, as judged by at least 2 cardiovascular specialists (cardiologist and/or cardiac surgeon); or patient is an operable candidate |
Procedure

<table>
<thead>
<tr>
<th>Medical Necessity</th>
</tr>
</thead>
<tbody>
<tr>
<td>but is at high risk for open surgery (see the Definition of Terms section)</td>
</tr>
<tr>
<td>Transcatheter aortic valve replacement is considered investigational for all other indications and when above criteria are not met.</td>
</tr>
</tbody>
</table>

Documentation Requirements

The patient’s medical records submitted for review should document that medical necessity criteria are met. The record should include clinical documentation of:

- Diagnosis/condition
- History and physical examination documenting the severity of the condition
- NYHA heart failure class symptoms
- Left ventricular ejection fraction
- Patient is at high risk for open surgery or is not an operable candidate for open surgery (see Definition of Terms below)
- Whether transcatheter heart valve system is FDA approved and will be used in a manner consistent with FDA labeling

Coding

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPT</td>
<td></td>
</tr>
<tr>
<td>33361</td>
<td>Transcatheter aortic valve replacement (TAVR/TAVI) with prosthetic valve; percutaneous femoral artery approach</td>
</tr>
<tr>
<td>33362</td>
<td>Transcatheter aortic valve replacement (TAVR/TAVI) with prosthetic valve; open femoral artery approach</td>
</tr>
<tr>
<td>33363</td>
<td>Transcatheter aortic valve replacement (TAVR/TAVI) with prosthetic valve; open axillary artery approach</td>
</tr>
<tr>
<td>33364</td>
<td>Transcatheter aortic valve replacement (TAVR/TAVI) with prosthetic valve; open iliac artery approach</td>
</tr>
<tr>
<td>33365</td>
<td>Transcatheter aortic valve replacement (TAVR/TAVI) with prosthetic valve; transaortic approach (eg, median sternotomy, mediastinotomy)</td>
</tr>
<tr>
<td>Code</td>
<td>Description</td>
</tr>
<tr>
<td>-------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>33366</td>
<td>Transcatheter aortic valve replacement (TAVR/TAVI) with prosthetic valve; transapical exposure (eg, left thoracotomy)</td>
</tr>
<tr>
<td>33367</td>
<td>Transcatheter aortic valve replacement (TAVR/TAVI) with prosthetic valve; cardiopulmonary bypass support with percutaneous peripheral arterial and venous cannulation (eg, femoral vessels) (List separately in addition to code for primary procedure)</td>
</tr>
<tr>
<td>33368</td>
<td>Transcatheter aortic valve replacement (TAVR/TAVI) with prosthetic valve; cardiopulmonary bypass support with open peripheral arterial and venous cannulation (eg, femoral, iliac, axillary vessels) (List separately in addition to code for primary procedure)</td>
</tr>
<tr>
<td>33369</td>
<td>Transcatheter aortic valve replacement (TAVR/TAVI) with prosthetic valve; cardiopulmonary bypass support with central arterial and venous cannulation (eg, aorta, right atrium, pulmonary artery) (List separately in addition to code for primary procedure)</td>
</tr>
</tbody>
</table>

**Note:** CPT codes, descriptions and materials are copyrighted by the American Medical Association (AMA). HCPCS codes, descriptions and materials are copyrighted by Centers for Medicare Services (CMS).

**Related Information**

**Definition of Terms**

**Extreme risk or inoperable for open heart surgery:** FDA definition of extreme risk or inoperable for open surgery:

- Predicted risk of operative mortality and/or serious irreversible morbidity 50% or higher for open surgery

**High Risk for open heart surgery:** FDA definition of high risk for open surgery:

- Society of Thoracic Surgeons predicted operative risk score of 8% or higher; or
- Judged by a heart team, which includes an experienced cardiac surgeon and a cardiologist, to have an expected mortality risk of 15% or higher for open surgery

**Intermediate risk:** FDA definition of intermediate risk is:

- Society of Thoracic Surgeons predicted operative risk score of 3% to 7%

Patients with Society of Thoracic Surgeons predicted operative risk score of less than 3% or 4% are considered at low risk for open surgery.
**Severe aortic stenosis:** For the use of the SAPIEN or CoreValve devices, severe aortic stenosis is defined by the presence of one or more of the following criteria:

- An aortic valve area of less than or equal to 1 cm$^2$
- An aortic valve area index of less than or equal to 0.6 cm$^2$/m$^2$
- A mean aortic valve gradient greater than or equal to 40 mm Hg
- A peak aortic-jet velocity greater than or equal to 4.0 m/s

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**Evidence Review**

**Description**

Patients with untreated, symptomatic severe aortic stenosis have a poor prognosis. Valve replacement is an effective treatment for severe aortic stenosis. Transcatheter aortic valve implantation (also known as transcatheter aortic valve replacement) is being evaluated as an alternative to open surgery, for patients with aortic stenosis and to nonsurgical therapy for patients with a prohibitive risk for surgery.

**Background**

**Aortic Stenosis**

Aortic stenosis is defined as narrowing of the aortic valve opening, resulting in obstruction of blood flow from the left ventricle into the ascending aorta. Progressive calcification of the aortic valve is the most common etiology in North America and Europe, while rheumatic fever is the most common etiology in developing countries. Congenital abnormalities of the aortic valve, most commonly a bicuspid or unicuspid valve, increase the risk of aortic stenosis, but aortic stenosis can also occur in a normal aortic valve. Risk factors for calcification of a congenitally normal valve mirror those for atherosclerotic vascular disease, including advanced age, male gender, smoking, hypertension, and hyperlipidemia. Thus, the pathogenesis of calcific aortic stenosis is thought to be similar to that of atherosclerosis, ie, deposition of atherogenic lipids and infiltration of inflammatory cells, followed by progressive calcification.
The natural history of aortic stenosis involves a long asymptomatic period, with slowly progressive narrowing of the valve until the stenosis reaches the severe stage. At this time, symptoms of dyspnea, chest pain, and/or dizziness and syncope often occur, and the disorder progresses rapidly. Treatment of aortic stenosis is replacement of the diseased valve with a bioprosthetic or mechanical valve.

**Disease Burden**

Aortic stenosis is a relatively common disorder in elderly patients and is the most common acquired valve disorder in the United States. Approximately 2% to 4% of people older than 65 years of age have evidence of significant aortic stenosis, increasing up to 8% of people by age 85 years. In the Helsinki Aging Study (1993), a population-based study of 501 patients ages 75 to 86 years, the prevalence of severe aortic stenosis by echocardiography was estimated to be 2.9%. In the United States, more than 50,000 aortic valve replacements are performed annually due to severe aortic stenosis.

Aortic stenosis does not cause substantial morbidity or mortality when the disease is mild or moderate in severity. By the time it becomes severe, there is an untreated mortality rate of approximately 50% within 2 years. Open surgical repair is an effective treatment for reversing aortic stenosis, and artificial valves have demonstrated good durability for up to 20 years. However, these benefits are accompanied by a perioperative mortality of approximately 3% to 4% and substantial morbidity, both of which increase with advancing age.

**Unmet Needs**

Many patients with severe, symptomatic aortic stenosis are poor operative candidates. Approximately 30% of patients presenting with severe aortic stenosis do not undergo open surgery due to factors such as advanced age, advanced left ventricular dysfunction, or multiple medical comorbidities. For patients who are not surgical candidates, medical therapy can partially alleviate the symptoms of aortic stenosis but does not affect the underlying disease progression. Percutaneous balloon valvuloplasty can be performed, but this procedure has less than optimal outcomes. Balloon valvuloplasty can improve symptoms and increase flow across the stenotic valve but is associated with high rates of complications such as stroke, myocardial infarction, and aortic regurgitation. Also, restenosis can occur rapidly, and there is no improvement in mortality. As a result, there is a large unmet need for less invasive treatments for aortic stenosis in patients who are at increased risk for open surgery.
Treatment

Transcatheter aortic valve implantation, also known as transcatheter aortic valve replacement, has been developed in response to this unmet need and was originally intended as an alternative for patients for whom surgery was not an option due to prohibitive surgical risk or for patients at high risk for open surgery. The procedure is performed percutaneously, most often through the transfemoral artery approach. It can also be done through the subclavian artery approach and transapically using mediastinoscopy. Balloon valvuloplasty is first performed to open up the stenotic area. This is followed by passage of a bioprosthetic artificial valve across the native aortic valve. The valve is initially compressed to allow passage across the native valve and is then expanded and secured to the underlying aortic valve annulus. The procedure is performed on the beating heart without cardiopulmonary bypass.

Summary of Evidence

For individuals who have severe symptomatic aortic stenosis who are at prohibitive risk for open surgery who receive TAVI, the evidence includes a randomized controlled trial (RCT) comparing TAVI with medical management in individuals at prohibitive risk of surgery, a single-arm prospective trial, multiple case series, and multiple systematic reviews. Relevant outcomes are overall survival, symptoms, morbid events, and treatment-related mortality and morbidity. For patients who are not surgical candidates due to excessive surgical risk, the PARTNER B trial reported on results for patients treated with TAVI by the transfemoral approach compared with continued medical care with or without balloon valvuloplasty. There was a large decrease in mortality for the TAVI patients at 1 year compared with medical care. This trial also reported improvements in other relevant clinical outcomes for the TAVI group. There was an increased risk of stroke and vascular complications in the TAVI group. Despite these concerns, the overall balance of benefits and risks from this trial indicate that health outcomes are improved. For patients who are not surgical candidates, no randomized trials have compared the self-expandable valve with best medical therapy. However, results from the single-arm CoreValve Extreme Risk Pivotal Trial met trialists’ pre-specified objective performance goal. The evidence is sufficient to determine that the technology results in a meaningful improvement in the net health outcome.

For individuals with severe symptomatic aortic stenosis who are at high risk for open surgery who receive TAVI, the evidence includes two RCTs comparing TAVI with surgical repair in individuals at high risk for surgery and one RCT comparing two types of valves, multiple
nonrandomized comparative studies, and systematic reviews of these studies. Relevant outcomes are overall survival, symptoms, morbid events, and treatment-related mortality and morbidity. For patients who are high risk for open surgery and are surgical candidates, the PARTNER A trial reported noninferiority for survival at 1 year for the balloon-expandable valve compared with open surgery. In this trial, TAVI patients also had higher risks for stroke and vascular complications. Nonrandomized comparative studies of TAVI versus open surgery in high-risk patients have reported no major differences in rates of mortality or stroke between the two procedures. Since the publication of the PARTNER A trial, the CoreValve High Risk Trial demonstrated noninferiority for survival at 1 and 2 years for the self-expanding prosthesis. This trial reported no significant differences in stroke rates between groups. In an RCT directly comparing the self-expandable with the balloon-expandable valve among surgically high-risk patients, the devices had similar 30-day mortality outcomes, although the self-expandable valve was associated with higher rates of residual aortic regurgitation and need for a new permanent pacemaker. Evidence from RCT and nonrandomized studies has suggested that TAVI with a self-expanding device is associated with higher rates for permanent pacemakers postprocedure. However, survival rates appear to be similar between device types, and the evidence does not support the superiority of one device over another in all patients. Two sex-specific studies were also identified in a literature search with the objective of observing mortality rates in women undergoing TAVI or SAVR. Results were varied, and further study is needed. The evidence is sufficient to determine that the technology results in a meaningful improvement in the net health outcome.

For individuals who have severe symptomatic aortic stenosis who are at intermediate risk for open surgery who receive TAVI, the evidence includes three RCTs comparing TAVI with surgical repair including individuals at intermediate surgical risk, two RCTs only in patients with intermediate risk, and multiple systematic reviews and nonrandomized cohort studies. Relevant outcomes are overall survival, symptoms, morbid events, and treatment-related mortality and morbidity. Five RCTs have evaluated TAVI in patients with intermediate risk for open surgery. Three of them, which included over 4,000 patients combined, reported noninferiority of TAVI versus SAVR for their composite outcome measures (generally including death and stroke). A subset analysis of patients (n=383) with low and intermediate surgical risk from a fourth trial reported higher rates of death at 2 years for TAVI vs SAVR. The final study (N=70) had an unclear hypothesis and reported 30-day mortality rates favoring SAVR (15% vs 2%, p=0.07) but used a transthoracic approach. The rates of adverse events differed between groups, with bleeding, cardiogenic shock, and acute kidney injury higher in patients randomized to open surgery and permanent pacemaker requirement higher in patients randomized to TAVI. Subgroup analyses of meta-analyses and the transthoracic arm of the Leon et al (2010) RCT have suggested that the benefit of TAVI may be limited to patients who are candidates for
transfemoral access. Although several RCTs have 2 years of follow-up postprocedure, it is uncertain how many individuals require reoperation. The evidence is sufficient to determine that the technology results in a meaningful improvement in the net health outcome.

For individuals who have severe symptomatic aortic stenosis who are at low risk for open surgery who receive TAVI, the evidence includes RCTs comparing TAVI with surgical repair in individuals selected without specific surgical risk criteria but including patients at low surgical risk and RCTS enrolling only low surgical risk patients, systematic reviews, and nonrandomized cohort studies. Relevant outcomes are overall survival, symptoms, morbid events, and treatment-related mortality and morbidity. Two RCTs (Evolut Low Risk Trial and PARTNER 3) have been conducted exclusively in patients at low surgical risk and one RCT, NOTION, included predominantly patients at low surgical risk. In the Evolut Low Risk Trial, TAVR was noninferior to SAVR with respect to the composite outcome of death or disabling stroke at 24 months. In the PARTNER 3 trial, the rate of the composite of death, stroke, or rehospitalization at 1 year was significantly lower with TAVI than SAVR. In the NOTION trial, the risk of the composite outcome of death from any cause, stroke, or MI at 5 years was similar for TAVI and SAVR and TAVR showed less structural valve deterioration than SAVR at 6 years. The evidence is sufficient to determine that the technology results in a meaningful improvement in the net health outcome.

For individuals who have valve dysfunction and aortic stenosis or regurgitation after open surgical aortic valve repair who receive transcatheter aortic “valve-in-valve” implantation, the evidence includes observational studies including registry data with follow-up ranging from 1 month to 3 years and systematic reviews. Relevant outcomes are overall survival, symptoms, morbid events, and treatment-related mortality and morbidity. Systematic reviews of observational studies have compared valve-in-valve TAVI to redo SAVR and have reported similar mortality, stroke, and survival rates for the 2 procedures. However, selection bias cannot be ruled out given that no RCTs are available. The evidence is insufficient to determine the effects of the technology on health outcomes.

**Ongoing and Unpublished Clinical Trials**

Some currently ongoing and unpublished trials that might influence this policy are listed in Table 1.
### Table 1. Summary of Key Trials

<table>
<thead>
<tr>
<th>NCT No.</th>
<th>Trial Name</th>
<th>Planned Enrollment</th>
<th>Completion Date</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Ongoing</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NCT01586910</td>
<td>Surgical Replacement and Transcatheter Aortic Valve Implantation (SURTAVI)</td>
<td>1746 (actual enrollment)</td>
<td>Nov 2026</td>
</tr>
<tr>
<td>NCT01057173</td>
<td>Transcatheter Versus Surgical Aortic Valve Implantation in Patients With Severe Aortic Valve Stenosis (NOTION)</td>
<td>280</td>
<td>Apr 2023</td>
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<tr>
<td>NCT01240902</td>
<td>Medtronic CoreValve® U.S. Pivotal Trial</td>
<td>1453</td>
<td>May 2020</td>
</tr>
<tr>
<td>NCT02661451</td>
<td>Transcatheter Aortic Valve Replacement to UNload the Left Ventricle in Patients With ADvanced Heart Failure: A Randomized Trial (TAVR UNLOAD)</td>
<td>300</td>
<td>Mar 2020</td>
</tr>
<tr>
<td>NCT02436655</td>
<td>Aortic Valve Replacement Versus Conservative Treatment in Asymptomatic Severe Aortic Stenosis: (AVATAR Trial): A Multicentre Randomized Controlled Trial</td>
<td>312</td>
<td>Sep 2022</td>
</tr>
<tr>
<td>NCT01314313</td>
<td>The PARTNER II Trial “Placement of AoRTic TranScathetER Valves Trial” (US) [Edwards Study 2010-12]</td>
<td>2032</td>
<td>Nov 2024</td>
</tr>
<tr>
<td>NCT02163850</td>
<td>SALUS Trial: TranScatheter Aortic Valve Replacement System Pivotal Trial The Safety and Effectiveness of the Direct Flow Medical Transcatheter Aortic Valve System</td>
<td>878</td>
<td>Dec 2021</td>
</tr>
<tr>
<td>NCT01737528</td>
<td>Society of Thoracic Surgeons and American College of Cardiology Transcatheter Valve Therapy Registry (STS/ACC TVT Registry)</td>
<td>16,000</td>
<td>Jun 2022</td>
</tr>
<tr>
<td>NCT02249000</td>
<td>Safety and Clinical Performance of the Self-expanding Transcatheter BIOVALVE Prosthesis in Subjects With Severe Symptomatic Aortic Stenosis Suitable for Transfemoral Transcatheter Aortic Valve Implantation</td>
<td>86</td>
<td>Dec 2022</td>
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<tr>
<td>NCT02628899</td>
<td>Feasibility of Transcatheter Aortic Valve Replacement in Low-Risk Patients With Symptomatic, Severe Aortic Stenosis</td>
<td>300</td>
<td>Jan 2023</td>
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<tr>
<td>NCT02000115</td>
<td>Portico Re-sheathable Transcatheter Aortic Valve System US IDE Trial</td>
<td>750</td>
<td>Jul 2025</td>
</tr>
<tr>
<td>NCT02825134</td>
<td>Nordic Aortic Valve Intervention Trial 2 - A Randomized Multicenter Comparison of Transcatheter Versus Surgical Aortic Valve Replacement in Younger Low Surgical Risk Patients With Severe Aortic Stenosis (NOTION-2)</td>
<td>992</td>
<td>Jun 2029</td>
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<tr>
<td>NCT No.</td>
<td>Trial Name</td>
<td>Planned Enrollment</td>
<td>Completion Date</td>
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<td>-----------------------------------------------------------------------------</td>
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<tr>
<td>NCT01645202</td>
<td>A Randomized Comparison of Transcatheter Heart Valves in High Risk Patients With Severe Aortic Stenosis: Medtronic CoreValve Versus Edwards SAPIEN XT (The CHOICE Trial)</td>
<td>240</td>
<td>Dec 2018 (completed)</td>
</tr>
</tbody>
</table>

NCT: national clinical trial.

* Denotes industry-sponsored or cosponsored trial.

Clinical Input Received from Physician Specialty Societies and Academic Medical Centers

While the various physician specialty societies and academic medical centers may collaborate with and make recommendations during this process, through the provision of appropriate reviewers, input received does not represent an endorsement or position statement by the physician specialty societies or academic medical centers, unless otherwise noted.

2016 Input

In response to requests, clinical input was received from two specialty societies (one of which provided two responses) and two academic medical centers (one of which provided three responses) while this policy was under review in 2016. Although there was no support for the use of valve-in-valve transcatheter aortic valve implantation (TAVI) to replace a failed bioprosthetic valve in general use, there was general support for the use of valve-in-valve TAVI for patients at high and prohibitive risk for surgery.

2014 Input

In response to requests, clinical input was received from two specialty societies (one of which provided two responses) and six academic medical centers while this policy was under review in 2014. All reviewers who responded considered TAVI medically necessary for patients with severe aortic stenosis with a calcified aortic annulus and New York Heart Association functional class II, III, or IV symptoms, and who are not candidates for open surgery or who are operable candidates but are at high risk for open surgery. Most reviewers would require a patient to have a left ventricular ejection fraction greater than 20% for the procedure to be medically necessary.
All reviewers indicated support for limiting the use of TAVI to patients who are not candidates for open surgery, and most supported using the (FDA) definition of high risk and extreme risk for surgery. Most reviewers noted that self-expanding valves have been associated with higher rates of postprocedural pacemaker requirements but that neither type of valve was clearly superior to the other.

2011 Input

In response to requests, clinical input was received from one specialty society and ix academic medical centers while this policy was under review in 2011. At the time of vetting, FDA approval had not yet been granted for any TAVI device. Reviewers were mixed in support for a medically necessary indication for patients who are not surgical candidates. However, all reviewers indicated that they would consider this procedure medically necessary if FDA granted approval. No reviewer expressed support for medical necessity in other patient populations, including patients who were at high risk for surgery, but were surgical candidates. Concerning patient selection criteria, most reviewers referred to the study selection criteria in the PARTNER trial and did not offer further options for objective patient selection.

Practice Guidelines and Position Statements

American College of Cardiology and the American Heart Association

In 2014, the American College of Cardiology and the American Heart Association published joint guidelines on the management of valvular heart disease. Both groups issued a joint focused update in 2017. These guidelines make the following recommendations on the choice of surgical or transcatheter intervention for treatment of aortic stenosis (see Table 2).

Table 2. Recommendations on Surgical or Transcatheter Intervention for Aortic Stenosis

<table>
<thead>
<tr>
<th>Recommendation</th>
<th>COR</th>
<th>LOE</th>
</tr>
</thead>
<tbody>
<tr>
<td>“Surgical AVR is recommended in patients who meet an indication for AVR with low or intermediate surgical risk.”</td>
<td>I</td>
<td>A</td>
</tr>
</tbody>
</table>
Recommendation | COR | LOE
--- | --- | ---
“For patients in whom TAVR or high-risk surgical AVR is being considered, members of a Heart Valve Team should collaborate to provide optimal patient care” | I | C

“TAVR is recommended for symptomatic patients with severe AS and high risk for SAVR, depending on patient-specific procedural risks, values and preferences.” | I | A

“TAVR is recommended for symptomatic patients with severe AS, prohibitive risk for SAVR and a predicted post-TAVR survival >12 mo.” | I | A

“TAVR is a reasonable alternative to SAVR for symptomatic patients with severe AS and intermediate surgical risk, depending on patient-specific procedural risks, values and preferences” | IIa | B

“For severely symptomatic patients with bioprosthetic stenosis or regurgitation at high or prohibitive risk for reoperation, and in whom improvement in hemodynamics is anticipated, valve-in-valve TAVR is reasonable” | IIa | B

“Percutaneous aortic balloon dilation may be considered as a bridge to surgical or transcatheter AVR in severely symptomatic patients with severe AS.” | IIb | C

“TAVR is not recommended in patients in whom existing comorbidities would preclude the expected benefit from correction of AS.” | III | B


National Institute for Health and Care Excellence

In June 2019, the National Institute For Health And Care Excellence published interventional procedures guidance [IPG653] regarding valve-in-valve TAVI for aortic bioprosthetic valve dysfunction. The guidance was informed by an Interventional procedure overview described previously. The guidance recommendation is that “Current evidence on the safety and efficacy of valve-in-valve transcatheter aortic valve implantation (ViV-TAVI) for aortic bioprosthetic dysfunction is adequate to support the use of this procedure provided that standard arrangements are in place for clinical governance, consent and audit.”

Medicare National Coverage

The Centers for Medicare & Medicaid Services published a decision memo on the use of TAVR in 2012 and 2019. The 2019 memo indicated that Centers for Medicare & Medicaid Services covers TAVI when used according to FDA indications when the following conditions are met:

- Device has FDA approval.
• The patient (preoperatively and postoperatively) is under the care of a heart team including experienced cardiac surgeon and interventional cardiologist, who have independently examined the patient, as well as providers from other physician groups, advanced patient practitioners, nurses, research personnel and administrators

• The interventional cardiologist(s) and cardiac surgeon(s) jointly participate in the intra-operative technical aspects of TAVR

• The hospital meets qualifications for performing TAVR

• The heart team and hospital are participating in a prospective, national, audited registry that follows patients for at least 1 year and collects specific patient, practitioner and facility level outcomes

• The registry collects necessary data and has an analysis plan to address specific questions and results are reported publicly

The memo also stated that TAVR could be covered for non-FDA-approved indications under the Coverage with Evidence Development program. The following is a summary of the main conditions required for Coverage with Evidence Development:

• The interventional cardiologist(s) and cardiac surgeon(s) jointly participate in the intra-operative technical aspects of TAVR

• TAVI is performed within a clinical study that has the following characteristics:
  o “The clinical study must adhere to the... standards of scientific integrity and relevance to the Medicare population.”
  o The study must address quality of life and adverse events at follow-up periods of 1 year or longer.

**Regulatory Status**

Multiple manufacturers have transcatheter aortic valve devices with Food and Drug Administration (FDA) approval. Regulatory status data for these devices are listed in Table 3.
### Table 3. FDA-Approved Transcatheter Aortic Valve Device Systems

<table>
<thead>
<tr>
<th>Device and Indication</th>
<th>Manufacturer</th>
<th>Date Cleared</th>
<th>PMA</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Edwards SAPIEN Transcatheter Heart Valve System™</strong>&lt;br&gt;Severe native aortic valve stenosis determined to be inoperable for open aortic valve replacement (transfemoral approach)</td>
<td>Edwards Lifesciences</td>
<td>11/11</td>
<td>P100041</td>
</tr>
<tr>
<td><strong>Edwards SAPIEN™ Transcatheter Heart Valve, Model 9000TFX</strong>&lt;br&gt;Expanded to include high-risk aortic stenosis (transapical approach)</td>
<td></td>
<td>10/12</td>
<td>P110021</td>
</tr>
<tr>
<td><strong>Edwards SAPIEN XT Transcatheter Heart Valve (model 9300TFX) and accessories</strong>&lt;br&gt;Severe native aortic valve stenosis at high or greater risk for open surgical therapy&lt;br&gt;Expanded to include failure of bioprosthetic valve in high or greater risk for open surgical therapy&lt;br&gt;Expanded to include severe aortic stenosis with intermediate surgical risk</td>
<td></td>
<td>07/14</td>
<td>P130009</td>
</tr>
<tr>
<td><strong>SAPIEN 3 Ultra THV System, a design iteration</strong>&lt;br&gt;Note: In August 2019, FDA issued a recall for the Edwards SAPIEN 3 Ultra Transcatheter Heart Valve System (Recall event ID: 83293) due to “reports of burst balloons which have resulted in significant difficulty retrieving the device into the sheath and withdrawing the system from the patient during procedures”&lt;br&gt;Expanded to include severe aortic stenosis with low surgical risk</td>
<td></td>
<td>08/19</td>
<td>P140031/S085</td>
</tr>
<tr>
<td><strong>Medtronic CoreValve System™</strong>&lt;br&gt;Severe native aortic stenosis at extreme risk or inoperable for open surgical therapy&lt;br&gt;Expanded to include high risk for open surgical therapy&lt;br&gt;Expanded to include intermediate risk for open surgical therapy</td>
<td>Medtronic CoreValve</td>
<td>06/16</td>
<td>P130021/S002</td>
</tr>
</tbody>
</table>
Device and Indication | Manufacturer | Date Cleared | PMA
--- | --- | --- | ---
**Medtronic CoreValve Evolut PRO System™**
Design iteration for valve and accessories, includes porcine pericardial tissue wrap | | 03/17 | P130021/S029
Expanded to include intermediate risk for open surgical therapy | | 07/17 | P130021/S033
Expanded to include severe aortic stenosis with low surgical risk | | 08/19 | P130021/S058
**Medtronic CoreValve Evolut PRO+ System™ (design iteration)** | | 08/19 | P130021/S059
**LOTUS Edge™ Valve System**
Severe native aortic stenosis at high or greater risk for open surgical therapy | Boston Scientific Corporation | 04/19 | P180029

FDA: Food and Drug Administration; PMA: premarket approval.

Other transcatheter aortic valve systems are under development. The following repositionable valves are under investigation:

- Portico™ Transcatheter Aortic Valve (Abbott)
- JenaValve™ (JenaValve Technology); designed for transapical placement

References


History

<table>
<thead>
<tr>
<th>Date</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>02/27/12</td>
<td>New Policy – Add to Surgery section. Policy created with literature search through October 2011; considered medically necessary for patients who are not surgical candidates; investigational for all other indications.</td>
</tr>
<tr>
<td>09/27/12</td>
<td>Update Coding Section – ICD-10 codes are now effective 10/01/2014.</td>
</tr>
<tr>
<td>02/11/13</td>
<td>Replace policy. Policy updated with literature review, references 7, 15, 16, 18, 20, 23-28, 30 added. Medically necessary indications added for patients who are at high risk for open surgery using the transfemoral approach, and patients who are at high risk for open surgery using the transapical approach. Investigational statement added for treatment of degenerated bio-prosthetic valve or failed TAVI (Valve-in-Valve approach), and for vascular approaches other than transfemoral or transapical. Codes updated.</td>
</tr>
<tr>
<td>12/23/13</td>
<td>Coding Update. Add new CPT 33366, effective 01/01/14; 0318T discontinued effective 12/31/13; deleted codes 0256T – 0259T removed.</td>
</tr>
<tr>
<td>02/10/14</td>
<td>Replace policy. Policy updated with literature review through November 15, 2013. Policy statement revised to include medically necessary indication for TAVI by the transapical approach for patients who are not suitable candidates for open surgery. ICD-10 Procedure codes 35.05 and 35.22 removed from the policy; they were provided for informational purposes only.</td>
</tr>
<tr>
<td>12/17/14</td>
<td>Annual Review. Policy statement revised to remove statement that “procedures performed via the transaxillary, transiliac, transaortic, or other approaches” are investigational, to reflect the approval of the CoreValve device that is labeled for use via transaxillary, transfemoral, and transaortic approaches. Policy statement added stating that devices should be used according to their FDA approved indication. Clinical input supported proposed policy statements. Policy updated with literature review through September 1, 2014, and the results of clinical input. References 9-10, 15-17, 23, 28-34, 36, 41-43, 45, 47, 49-52, 57-59 added; others renumbered/removed. Policy statements changed as noted. ICD-9 and ICD-10 diagnosis and procedure codes removed; these do not relate to policy adjudication.</td>
</tr>
<tr>
<td>02/01/16</td>
<td>Coding update. Added 93799.</td>
</tr>
<tr>
<td>Date</td>
<td>Comments</td>
</tr>
<tr>
<td>------------</td>
<td>----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>05/01/17</td>
<td>Annual Review, changes approved April 11, 2017. Policy updated with literature review through December 22, 2016; references 20, 31-34, 45, 48-55, and 85 added. Policy statements unchanged.</td>
</tr>
<tr>
<td>10/24/17</td>
<td>Policy moved to new format; no change to policy statements.</td>
</tr>
<tr>
<td>07/01/18</td>
<td>Annual Review, approved June 22, 2018. Policy updated with literature review through February 2018; references 19, 26, 37, 42-50, 58-60, 68, and 82-83 added. Policy statements changed to add patients at intermediate surgical risk to first medically necessary statement.</td>
</tr>
<tr>
<td>04/01/19</td>
<td>Minor update, added Documentation Requirements section.</td>
</tr>
<tr>
<td>05/01/19</td>
<td>Annual Review, approved April 2, 2019. Policy updated with literature review through February 2019; references 73-76 added. Policy statements unchanged.</td>
</tr>
<tr>
<td>04/01/20</td>
<td>Delete policy, approved March 10, 2020. This policy will be deleted effective July 2, 2020, and replaced with InterQual criteria for dates of service on or after July 2, 2020. Policy updated with literature review through November 2019; references added. Medically Necessary policy statement related to patients with native valve aortic stenosis changed to add an exclusion for patients with unicuspid or bicuspid aortic valve and to add an inclusion for patients at low risk for open surgery, Policy statement changes are effective April 1, 2020.</td>
</tr>
</tbody>
</table>

**Disclaimer:** This medical policy is a guide in evaluating the medical necessity of a particular service or treatment. The Company adopts policies after careful review of published peer-reviewed scientific literature, national guidelines and local standards of practice. Since medical technology is constantly changing, the Company reserves the right to review and update policies as appropriate. Member contracts differ in their benefits. Always consult the member benefit booklet or contact a member service representative to determine coverage for a specific medical service or supply. CPT codes, descriptions and materials are copyrighted by the American Medical Association (AMA). ©2020 Premera All Rights Reserved.

**Scope:** Medical policies are systematically developed guidelines that serve as a resource for Company staff when determining coverage for specific medical procedures, drugs or devices. Coverage for medical services is subject to the limits and conditions of the member benefit plan. Members and their providers should consult the member benefit booklet or contact a customer service representative to determine whether there are any benefit limitations applicable to this service or supply. This medical policy does not apply to Medicare Advantage.
Discrimination is Against the Law

Premera Blue Cross complies with applicable Federal civil rights laws and does not discriminate on the basis of race, color, national origin, age, disability, or sex. Premera does not exclude people or treat them differently because of race, color, national origin, age, disability or sex.

Premera:
• Provides free aids and services to people with disabilities to communicate effectively with us, such as:
  • Qualified sign language interpreters
  • Written information in other formats (large print, audio, accessible electronic formats, other formats)
• Provides free language services to people whose primary language is not English, such as:
  • Qualified interpreters
  • Information written in other languages

If you need these services, contact the Civil Rights Coordinator.

If you believe that Premera has failed to provide these services or discriminated in another way on the basis of race, color, national origin, age, disability, or sex, you can file a grievance with:
Civil Rights Coordinator - Complaints and Appeals
PO Box 91102, Seattle, WA 98111
Toll free 855-332-4535, Fax 425-918-5592, TTY 800-842-5357
Email AppealsDepartmentInquiries@Premera.com

You can file a grievance in person or by mail, fax, or email. If you need help filing a grievance, the Civil Rights Coordinator is available to help you.

You can also file a civil rights complaint with the U.S. Department of Health and Human Services, Office for Civil Rights, electronically through the Office for Civil Rights Complaint Portal, available at https://ocrportal.hhs.gov/ocr/portal/lobby.jsf, or by mail or phone at:
U.S. Department of Health and Human Services
200 Independence Avenue SW, Room 509F, HHH Building
Washington, D.C. 20201, 1-800-368-1019, 800-537-7697 (TDD)

Getting Help in Other Languages

This Notice has Important Information. This notice may have important information about your application or coverage through Premera Blue Cross. There may be key dates in this notice. You may need to take action by certain deadlines to keep your health coverage or help with costs. You have the right to get this information and help in your language at no cost. Call 800-722-1471 (TTY: 800-842-5357).

عربية (Arabic):
يحيى هذا الإشعار المعلوماتية. قد يحتوي هذا الإشعار المعلوماتية المهمة بخصوص تلخيص أو نظام. تعليمات التي يدعي الحصول عليها من خلال مجموعة Premera Blue Cross. يحتوي هذا الإشعار المعلوماتية على تلخيص تعليمات الصحة أو السعادة في هذا الإشعار. قد تحتاج لإدارة في توزيع المعلوماتية على تعليمات الصحة أو السعادة في هذه النشرة. يتجه إلى تحديد الحصول على هذه المعلوماتية والمساعدة بكلمات تدون كلياً، إصلاح 800-722-1471 (TTY: 800-842-5357) للمساعدة.

中文 (Chinese):
本通知有重要訊息。本通知可能會有關於您透過 Premera Blue Cross 提交的申請或保險的重要訊息。本通知內可能有重要日期，您可能需要在截止日期之前採取行動，以保留您的健康保險或費用補貼。您有權利免費以您的母語得到本訊息和幫助。請撥電話 800-722-1471 (TTY: 800-842-5357)。

Oromoo (Cushite):

Français (French):

Kreyòl ayisyen (Creole):
Ayi sila a gen Enfòmasyon Enpòtan Ladan. Ayi sila a kapab genyen enfòmasyon enpòtan konsènan aplikasyon w lan oswa konpò fokalitèyou asrisan lan atrav sa Premera Blue Cross. Kapab genyen dat ki enpòtan nan avit sila a. Ou ka gen pou pran kék aksyon avan sèten dat limit pou ka fenbe kouvèti asrisan sante w la osa pou yo ka ede w ayèk depans yo. Se dwa w pou resewa enfòmasyon sa a ak asistans nan lang ou pale a, san ou pa gen pou peye pou sa. Rate nan 800-722-1471 (TTY: 800-842-5357).

Deutsche (German):

Hmoob (Hmong):
Tsab ntawv tshaj xo no muaj cov ntsiab lus tseem ceeb. Tej zaum tsab ntawv tshaj xo no muaj cov ntsiab lus tseem ceb bengko daw dawm no dawm tshov khev pab los yoy koy chov kev pab cuam los ntawm Premera Blue Cross. Tej zaum muaj cov hnuv tseem ceb cuam sas rau hauv dawm ntawm no. Tej zaum koy jjuv yao ta u ooy yam upek keb kooy jja uas tib pu dhuav cov cajj yoo rag tseeg rau hauv dawm ntawm no. Tej zaum koy jjuv yao ta u ooy yam upek keb kooy jja uas tib pu dawm ntawm no. Tej zaum dawm no dawm tshov khev pab los yoy koy chov kev pab cuam los ntawm Premera Blue Cross. Tej zaum muaj cov hnuv tseem ceb cuam sas rau hauv dawm ntawm no.

Illoko (Illocano):
Daytoy a Pakdaar ket naglaon iti Napateg nga Impormasion. Daytoy a pakdaar mabalini nga adda ket naglaon iti napateg nga impormasion maipanggep iti aplikasyononyo wenno coverage babaen iti Premera Blue Cross. Daytoy ket mabalini dagiti importante a pelsa iti daytoy a pakdaar. Mabalini nga adda rumbeng nga aramidenaryo nga addang sakbay dagiti particular a naituding nga aldaw tapno mapagalatnediayyo ti coverage ti salun-atyo wenno tulong kadagiti gastos. Adda karbenganyo a mangala iti daytoy nga impormasion ken tulong ti bukodyo a pagsasao nga awan ti bayadanyo. Tumawag ti numero nga 800-722-1471 (TTY: 800-842-5357).

Italiano (Italian):
Premera Blue Cross. Es posible que haya fechas clave en este aviso. Asegúrese de consultar la fecha en el aviso antes de tomar cualquier decisión.

Inglés (English):
May be possible that you have to take some measures before certain dates. Please check the dates listed in the notice before making any decisions.

Español (Spanish):
Es posible que deba tomar alguna medida antes de ciertas fechas. Asegúrese de verificar las fechas clave antes de tomar cualquier decisión.

日本語 (Japanese):
この通知には重要な情報を含まれています。Premera Blue Crossとの申請または補償に関する重要な情報を含まれている場合があります。この通知に記載されている情報が重要であることをご確認ください。健康保険や請求サポートを維持するには、特定の時期までに行動を取りなければなりません。ご希望の言語による情報とサポートが無料で提供されます。800-722-1471 (TTY: 800-842-5357)までお電話ください。

한국어 (Korean):
본 통지서에는 중요한 정보가 들어 있습니다. 즉 이 통지서는 귀하의 신청에 관하여 그리고 Premera Blue Cross를 통한 커버리지에 관한 정보를 포함하고 있을 수 있습니다. 귀하의 신청과 커버리지를 계속 유지하거나 비용을 절감하기 위해서 일정한 마감일을 조기에 취해야 할 필요가 있을 것입니다.

Русский (Russian):
Настоящее уведомление содержит важную информацию. Это уведомление может содержать важную информацию о вашем заявлении или страховом покрытии через Premera Blue Cross. В настоящем уведомлении могут быть указаны ключевые даты. Вам, возможно, потребуется принять меры к определенным предельным срокам для сохранения страхового покрытия или помощи с расходами.

信息全部以英文表示，未做其他语言翻译。