

DESIGNED **FOR** **DURABILITY**

Medtronic TAVR platform



Medtronic

TAVR DURABILITY DATA

Durability is of increasing concern as low risk patients are treated who may have several decades of life left. These patients need a valve that will not only accommodate their activity levels, but will also remain hemodynamically stable for years to come.

HOW IS DURABILITY DEFINED?

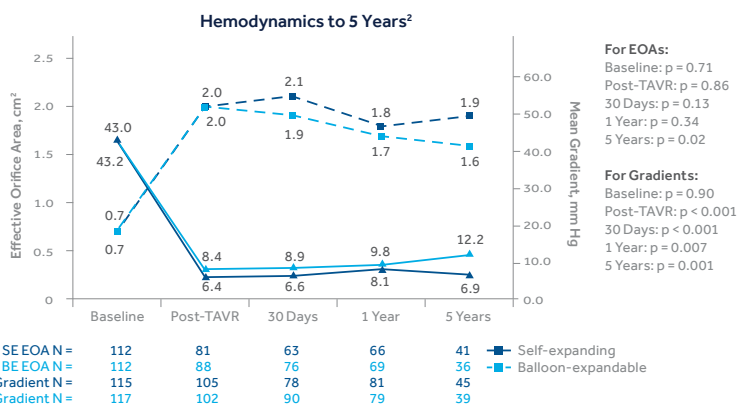
- As the treatment modalities for aortic stenosis have changed, so too have the definitions of failure.
- Whereas with surgical valves the structural failure was confirmed on explant during the redo surgery, TAVR relies on echographic interrogation of the valve to determine whether the hemodynamics remain stable, signaling the valve's durability.

Structural valve deterioration (SVD)¹

- Moderate or greater hemodynamic SVD
- Mean gradient ≥ 20 mm Hg or
- Mean gradient ≥ 10 mm Hg change from baseline or
- Moderate/severe intra-prosthetic aortic regurgitation (AR) (new or worsening from baseline)

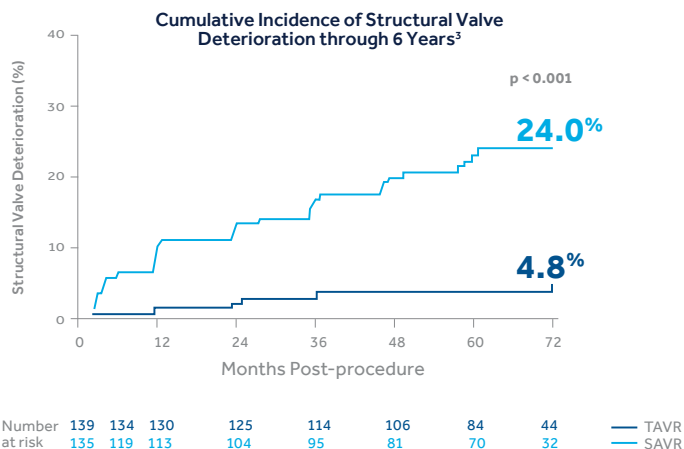
CHOICE² 5 YEARS

- In this prospective, randomized study, CoreValve™ TAV remained hemodynamically stable at **5 years** whereas the SAPIEN™* TAV had a 20% decline in EOA and a 30% increase in gradient.
- CoreValve also had a statistically significant advantage in terms of freedom from SVD over SAPIEN (0.0% vs. 6.6%; p = 0.018).



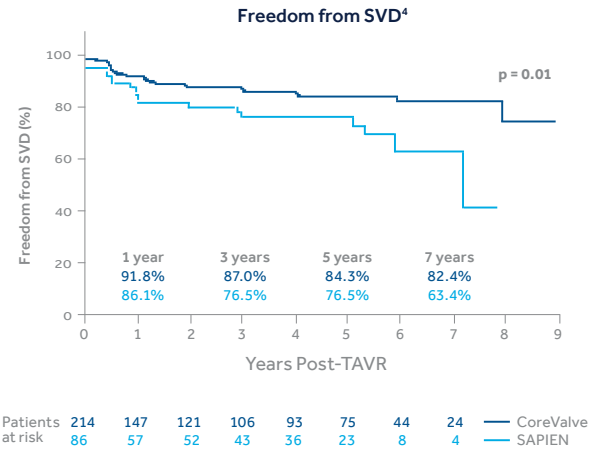
NOTION³ 6 YEARS

- The NOTION trial is a single-center, randomized, head-to-head comparison of CoreValve TAVR versus SAVR followed out to **6 years** in lower risk patients > 70 years of age that are eligible for surgery. TAVR had significantly less hemodynamic SVD out to **6 years**.
- The NOTION 6-year data demonstrates great longer-term outcomes in a lower risk patient population. Perhaps most importantly, the data provides a signal of durability for the CoreValve platform versus SAVR.



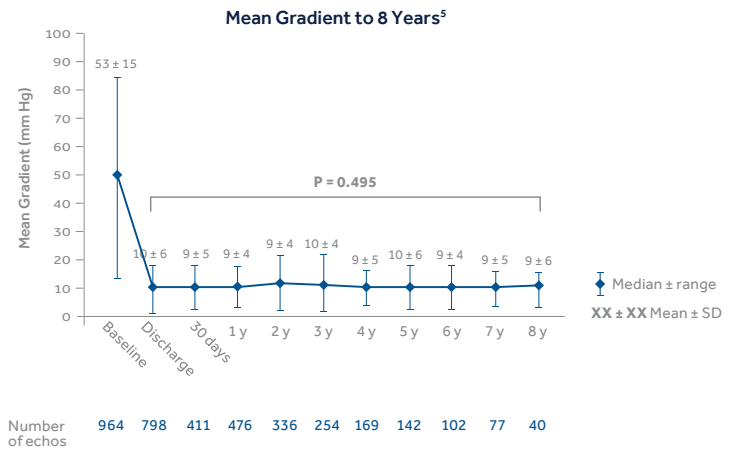
DEUTSCH⁴ 7 YEARS

- Prospective single-center registry
- This chart clearly demonstrates significantly less SVD for CoreValve than SAPIEN out to **7 years**. Freedom from SVD: 82.4% for CoreValve; 63.4% for SAPIEN.
- When looking at freedom from SVD, at every timepoint (**1, 3, 5, and 7 years**), there was less SVD with CoreValve than with SAPIEN.



ITALIAN REGISTRY⁵ 8 YEARS

- Multicenter registry
- The longest-term data on the self-expanding, supra-annular CoreValve platform demonstrates very low rates of moderate and severe hemodynamic SVD. The cumulative incidence of moderate and severe SVD at **8 years** are 3.0% and 1.6%, respectively.
- Additionally, the bioprosthetic valve failure (BVF) was also very low at 7.3% (includes any valve intervention, severe SVD, and any valve-related deaths), signaling durability for the CoreValve platform. The mean gradients remained low through **8 years**.



DESIGNED FOR DURABILITY

Evolut TAVR is built on the CoreValve supra-annular, self-expanding platform, which has consistently sustained large EOAs and low mean gradients over time — all of which lead to low rates of SVD.

REFERENCES

- ¹Capodanno D, Petronio AS, Prendergast B, et al. Standardized definitions of structural deterioration and valve failure in assessing long-term durability of transcatheter and surgical aortic bioprosthetic valves: a consensus statement from the European Association of Percutaneous Cardiovascular Interventions (EAPCI) endorsed by the European Society of Cardiology (ESC) and the European Association for Cardio-Thoracic Surgery (EACTS). *Eur Heart J*. December 1, 2017;38(45):3382-3390.
- ²Abdel-Wahab M, et al. Five-year outcomes after TAVI with balloon-expandable vs. self-expanding valves: Results from the CHOICE randomised clinical trial. Presented at EuroPCR 2019; Paris, France.

³Søndergaard L, Ihlemann N, Capodanno D, et al. Durability of Transcatheter and Surgical Bioprosthetic Aortic Valves in Patients at Lower Surgical Risk. *J Am Coll Cardiol*. February 12, 2019;73(5):546-553.

⁴Deutsch MA, Erlebach M, Burri M, et al. Beyond the five-year horizon: long-term outcome of high-risk and inoperable patients undergoing TAVR with first-generation devices. *EuroIntervention*. May 20, 2018;14(1):41-49.

⁵Testa L, Fiorina C, Giannini C, et al. Valve performance and echocardiographic data throughout 8 years follow up after TAVR. Presented at EuroPCR 2019; Paris, France.

The Medtronic Evolut Low Risk Study data included here is based on the primary analysis, as published in the *New England Journal of Medicine*. Subsequently, a supplemental analysis was performed, which included additional follow-up data on the same cohort. These data are summarized in the Instructions for Use and support the findings of the primary analysis.

INDICATIONS The Medtronic CoreValve™ Evolut™ R, CoreValve™ Evolut™ PRO, and Evolut™ PRO+ systems are indicated for relief of aortic stenosis in patients with symptomatic heart disease due to severe native calcific aortic stenosis who are judged by a heart team, including a cardiac surgeon, to be appropriate for the transcatheter heart valve replacement therapy.

The Medtronic CoreValve Evolut R, CoreValve Evolut PRO, and Evolut PRO+ systems are indicated for use in patients with symptomatic heart disease due to failure (stenosed, insufficient, or combined) of a surgical bioprosthetic aortic valve who are judged by a heart team, including a cardiac surgeon, to be at high or greater risk for open surgical therapy (e.g., STS predicted risk of operative mortality score $\geq 8\%$ or at a $\geq 15\%$ risk of mortality at 30 days).

CONTRAINDICATIONS The CoreValve Evolut R, CoreValve Evolut PRO, and Evolut PRO+ systems are contraindicated in patients who cannot tolerate Nitinol (Titanium or Nickel), an anticoagulation/antiplatelet regimen, or who have active bacterial endocarditis or other active infections.

WARNINGS *General* Implantation of the CoreValve Evolut R, PRO, and PRO+ systems should be performed only by physicians who have received Medtronic CoreValve Evolut R, PRO, or PRO+ training. This procedure should only be performed where emergency aortic valve surgery can be performed promptly. Mechanical failure of the delivery catheter system and/or accessories may result in patient complications. *Transcatheter aortic valve (bioprostheses)* Accelerated deterioration due to calcific degeneration of the bioprostheses may occur in: children, adolescents, or young adults; patients with altered calcium metabolism (e.g., chronic renal failure or hyperthyroidism).

PRECAUTIONS *General* Clinical long-term durability has not been established for the bioprostheses. Evaluate bioprostheses performance as needed during patient follow-up. The safety and effectiveness of the CoreValve Evolut R, PRO, and PRO+ systems have not been evaluated in the pediatric population. The safety and effectiveness of the bioprostheses for aortic valve replacement have not been evaluated in the following patient populations: Patients who do not meet the criteria for symptomatic severe native aortic stenosis as defined: (1) symptomatic severe high-gradient aortic stenosis — aortic valve area $\leq 1.0 \text{ cm}^2$ or aortic valve area index $\leq 0.6 \text{ cm}^2/\text{m}^2$, a mean aortic valve gradient $\geq 40 \text{ mm Hg}$, or a peak aortic-jet velocity $\geq 4.0 \text{ m/s}$; (2) symptomatic severe low-flow, low-gradient aortic stenosis — aortic valve area $\leq 1.0 \text{ cm}^2$ or aortic valve area index $\leq 0.6 \text{ cm}^2/\text{m}^2$, a mean aortic valve gradient $< 40 \text{ mm Hg}$, and a peak aortic-jet velocity $< 4.0 \text{ m/s}$; congenital bicuspid valve patients who are at low surgical risk (predicted perioperative mortality risk of $< 3\%$); with untreated, clinically significant coronary artery disease requiring revascularization; with a preexisting prosthetic heart valve with a rigid support structure in either the mitral or pulmonic position if either the preexisting prosthetic heart valve could affect the implantation or function of the bioprostheses or the implantation of the bioprostheses could affect the function of the preexisting prosthetic heart valve; patients with liver failure (Child-Pugh Class C); with cardiogenic shock manifested by low cardiac output, vasopressor dependence, or mechanical hemodynamic support; patients who are pregnant or breastfeeding. The safety and effectiveness of a CoreValve Evolut R, Evolut PRO, or Evolut PRO+ bioprostheses implanted within a failed preexisting transcatheter bioprostheses has not been demonstrated. Implanting a CoreValve Evolut R, Evolut PRO, or Evolut PRO+ bioprostheses in a degenerated surgical bioprosthetic valve (transcatheter aortic valve in surgical aortic valve [TAV-in-SAV]) should be avoided in the following conditions: The degenerated surgical bioprosthetic valve presents with: a significant concomitant paravalvular leak (between the prosthesis and the native annulus), is not securely fixed in the native annulus, or is not structurally intact (e.g., wire form fracture); partially detached leaflet that in the aortic position may obstruct a coronary ostium; stent frame with a manufacturer-labeled inner diameter $< 17 \text{ mm}$. The safety and effectiveness of the bioprostheses for aortic valve replacement have not been evaluated in patient populations presenting with the following: Blood dyscrasias as defined as leukopenia (WBC $< 1,000 \text{ cells/mm}^3$), thrombocytopenia (platelet count $< 50,000 \text{ cells/mm}^3$), history of bleeding diathesis or coagulopathy, or hypercoagulable states; congenital unicuspid valve; mixed aortic valve disease (aortic stenosis and aortic regurgitation with predominant aortic regurgitation [3-4]); moderate to severe (3-4+) or severe (4+) mitral or severe (4+) tricuspid regurgitation; hypertrophic obstructive cardiomyopathy; new or untreated echocardiographic evidence of intracardiac mass, thrombus, or vegetation; native aortic annulus size $< 18 \text{ mm}$ or $> 30 \text{ mm}$ for Evolut R/ Evolut PRO+ and $< 18 \text{ mm}$ or $> 26 \text{ mm}$ for CoreValve Evolut PRO per the baseline diagnostic imaging or surgical bioprosthetic aortic annulus size $< 17 \text{ mm}$ or $> 30 \text{ mm}$ for CoreValve Evolut R/ Evolut PRO+ and $< 17 \text{ mm}$ or $> 26 \text{ mm}$ for Evolut PRO; transarterial access unable to accommodate a 18 Fr sheath or the 14 Fr equivalent EnVeo InLine™ sheath when using Model ENVEOR-US/ENVPRO-14-US/D-EVPROP2329US or transarterial access unable to accommodate a 20 Fr introducer sheath or the 16 Fr equivalent EnVeo InLine sheath when using Model ENVEOR-N-US/ENVPRO-16-US or transarterial access unable to accommodate a 22 Fr introducer sheath or the 18 Fr equivalent Evolut PRO+ InLine sheath when using Model D-EVPROP34US; prohibitive left ventricular outflow tract calcification; sinus of Valsalva anatomy that would prevent adequate coronary perfusion; significant aortopathy requiring ascending aortic replacement; moderate to severe mitral stenosis; severe ventricular dysfunction with left ventricular ejection fraction (LVEF) $< 20\%$; symptomatic carotid or vertebral artery disease; and severe basal septal hypertrophy with an outflow gradient.

Prior to Use Exposure to glutaraldehyde may cause irritation of the skin, eyes, nose, and throat. Avoid prolonged or repeated exposure to the vapors. Damage may result from forceful handling of the catheter. Prevent kinking of the catheter when removing it from the packaging. The bioprostheses size must be appropriate to fit the patient's anatomy. Proper sizing of the devices is the responsibility of the physician. Refer to the Instructions for Use for available sizes. Failure to implant a device within the sizing matrix could lead to adverse effects such as those listed below. Patients must present with transarterial access vessel diameters of $\geq 5 \text{ mm}$ when using Model ENVEOR-US/ENVPRO-14-US/D-EVPROP2329US or $\geq 5.5 \text{ mm}$ when using Model ENVEOR-N-US/ENVPRO-16-US or $\geq 6 \text{ mm}$ when using Model D-EVPROP34US, or patients must present with an ascending aortic (direct aortic) access site $\geq 60 \text{ mm}$ from the basal plane for both systems. Implantation of the bioprostheses should be avoided in patients with aortic root angulation (angle between plane of aortic valve annulus and horizontal plane/vertebrae) of $> 30^\circ$ for right subclavian/axillary access or $> 70^\circ$ for femoral and left subclavian/axillary access. For subclavian access, patients with a patent left internal mammary artery (LIMA) graft must present with access vessel diameters that are either $\geq 5.5 \text{ mm}$ when using Models ENVPRO-14-US/ENVEOR-L-US/D-EVPROP2329US or $\geq 6 \text{ mm}$ when using Models ENVPRO-16-US and ENVEOR-N-US or $\geq 6.5 \text{ mm}$ when using Model D-EVPROP34US. Use caution when using the subclavian/axillary approach in patients with a patent LIMA graft or patent RIMA graft. For direct aortic access, ensure the access site and trajectory are free of patent RIMA or a preexisting patent RIMA graft. For transfemoral access, use caution in patients who present with multiplanar curvature of the aorta, acute angulation of the aortic arch, an ascending aortic aneurysm, or severe calcification in the aorta and/or vasculature. If ≥ 2 of these factors are present, consider an alternative access route to prevent vascular complications. If the patient presents with a bicuspid aortic valve, the heart team should consider the patient's age and the need for ascending aorta intervention when determining the appropriate treatment option for the patient.

During Use After the procedure, administer appropriate antibiotic prophylaxis as needed for patients at risk for prosthetic valve infection and endocarditis. After the procedure, administer anticoagulation and/or antiplatelet therapy per physician/clinical judgment. Excessive contrast media may cause renal failure. Prior to the procedure, measure the patient's creatinine level. During the procedure, monitor contrast media usage. Conduct the procedure under fluoroscopy. Fluoroscopic procedures are associated with the risk of radiation damage to the skin, which may be painful, disfiguring, and long-term. The safety and efficacy of a CoreValve Evolut R, Evolut PRO, or Evolut PRO+ bioprostheses implanted within a transcatheter bioprostheses have not been demonstrated.

POTENTIAL ADVERSE EVENTS Potential risks associated with the implantation of the CoreValve Evolut R, CoreValve Evolut PRO, or Evolut PRO+ transcatheter aortic valve may include, but are not limited to, the following: • death • myocardial infarction, cardiac arrest, cardiogenic shock, or cardiac tamponade • coronary occlusion, obstruction, or vessel spasm (including acute coronary closure) • cardiovascular injury (including rupture, perforation, tissue erosion, or dissection of vessels, ascending aorta trauma, ventricle, myocardium, or valvular structures that may require intervention) • emergent surgical or transcatheter intervention (e.g., coronary artery bypass, heart valve replacement, valve explant, percutaneous coronary intervention [PCI], balloon valvuloplasty) • prosthetic valve dysfunction (regurgitation or stenosis) due to fracture, bending (out-of-round configuration) of the valve frame; underexpansion of the valve frame; calcification; pannus; leaflet wear, tear, prolapse, or retraction; poor valve coaptation; suture breaks or disruption; leaks; mal-sizing (prosthesis-patient mismatch); malposition (either too high or too low)/malplacement • prosthetic valve migration/embolization • prosthetic valve endocarditis • prosthetic valve thrombosis • delivery catheter system malfunction resulting in the need for additional recrossing of the aortic valve and prolonged procedural time • delivery catheter system component migration/embolization • stroke (ischemic or hemorrhagic), transient ischemic attack (TIA), or other neurological deficits • individual organ (e.g., cardiac, respiratory, renal [including acute kidney failure]) or multi-organ insufficiency or failure • major or minor bleeding that may require transfusion or intervention (including life-threatening or disabling bleeding) • vascular access-related complications (e.g., dissection, perforation, pain, bleeding, hematoma, pseudoaneurysm, irreversible nerve injury, compartment syndrome, arteriovenous fistula, or stenosis) • mitral valve regurgitation or injury • conduction system disturbances (e.g., atrioventricular node block, left bundle-branch block, asystole), which may require a permanent pacemaker • infection (including septicemia) • hypotension or hypertension • hemolysis • peripheral ischemia • bowel ischemia • abnormal lab values (including electrolyte imbalance) • allergic reaction to antiplatelet agents, contrast medium, or anesthesia • exposure to radiation through fluoroscopy and angiography • permanent disability.

Please reference the CoreValve Evolut R, CoreValve Evolut PRO, and Evolut PRO+ Instructions for Use for more information regarding indications, warnings, precautions, and potential adverse events.

Caution: Federal Law (USA) restricts these devices to the sale by or on the order of a physician.

The commercial name of the Evolut™ R device is Medtronic CoreValve™ Evolut™ R System, the commercial name of the Evolut™ PRO device is Medtronic CoreValve™ Evolut™ PRO System, and the commercial name of the Evolut™ PRO+ device is Medtronic Evolut™ PRO+ System.

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