

Edwards SAPIEN 3 Ultra RESILIA Transcatheter Aortic Heart Valve

Category:

Best Medical Technology

Company Name:

Edwards Lifesciences

Product/Solution Name:

Edwards SAPIEN 3 Ultra RESILIA Transcatheter Aortic Heart Valve

Compound/Tech Name:

Transcatheter Heart Valve

Trade Name:

Edwards SAPIEN 3 Ultra RESILIA Transcatheter Aortic Heart Valve

Corporate Name:

Edwards SAPIEN 3 Ultra RESILIA Transcatheter Aortic Heart Valve

Date of Approval:

2022-07-28

Indications:

The Edwards SAPIEN 3 Ultra RESILIA Transcatheter Heart Valve system is 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 to be appropriate for the transcatheter heart valve replacement therapy. In April 2025, it received an expanded indication to reduce the risks associated with progression from asymptomatic to symptomatic severe native calcific aortic stenosis in patients who are judged by a heart team to be appropriate for transcatheter heart valve replacement therapy.

The Edwards SAPIEN 3 Ultra RESILIA Transcatheter Heart Valve system is also indicated for patients with symptomatic heart disease due to failing (stenosed, insufficient, or combined) of a surgical or transcatheter bioprosthetic aortic valve, a surgical bioprosthetic mitral valve, or a native mitral valve with an annuloplasty ring who are

judged by a Heart Team to be at high or greater risk for open surgical therapy (i.e., predicted risk of surgical mortality $\geq 8\%$ at 30 days, based on the Society of Thoracic Surgeons (STS) risk score and other clinical comorbidities unmeasured by the STS risk calculator).

Therapeutic Areas:

medical device

General Information File Document upload:

P140031S141 US FDA Approval Letter SAPIEN 3 Ultra RESILIA 2.pdf
P140031S182FDA Approval 2025 Edwards Lifesciences.pdf

Background information and need for drug / device:

Aortic stenosis (AS) is one of the most common and serious forms of heart valve disease, affecting an estimated 2.5 million Americans over 75. Its symptoms can be easily mistaken for aging, yet untreated severe aortic stenosis has a worse prognosis than many common cancers. Timely referral and intervention is critical.

With over 60 years of leadership in heart valve innovation, Edwards Lifesciences continues to pioneer advancements that improve patient outcomes. A major milestone came in 1981 with the Carpentier-Edwards bioprosthetic valve, which reduced the need for life-long blood thinners. However, bioprosthetic valves faced durability challenges, prompting decades of research into valve deterioration - particularly the impact of calcification.

To combat this, Edwards developed RESILIA tissue, the result of 20 years of R&D focused on preventing calcification. RESILIA was first introduced in 2017 on the INSPIRIS RESILIA surgical valve and later incorporated into the transcatheter SAPIEN 3 Ultra RESILIA valve, launched in 2022. Recent studies show freedom from structural valve deterioration at 8 years, a significant improvement in durability.

RESILIA's proprietary technology also enables dry tissue storage, simplifying procedures and streamlining logistics.

And in a historic shift, the SAPIEN 3 Ultra RESILIA valve is now approved for asymptomatic patients - making it the first and only valve indicated for treating severe AS before symptoms emerge.

Before the approval of Edwards' TAVR for asymptomatic severe AS, the risk of interfering with surgery was high due to the operative mortality and potential complications associated with surgical AVR, in comparison to the risks associated with closely monitoring asymptomatic patients. The advent of TAVR has significantly shifted

the landscape, offering a less invasive option for these patients, and trials like EARLY TAVR have demonstrated the benefits of earlier intervention in asymptomatic individuals.

This new indication challenges traditional guidelines recommending \"watchful waiting\" and eliminates a major barrier to early diagnosis and treatment. By enabling timely intervention, it promotes proactive management, better outcomes, higher quality of care, and reduced healthcare costs.

The SAPIEN 3 Ultra RESILIA valve embodies Edwards' commitment to helping patients live longer, healthier lives through relentless innovation in heart valve therapy.

Background File Document upload:

[**1593383233Kodali_nejmoa1200384.pdf**](#)

[**1593382873IR_HR_nejmoa1008232.pdf**](#)

[**Transcatheter Aortic Valve Replacement for Asymptomatic Severe Aortic Stenosis GENEUREUX 2024.pdf**](#)

[**GENEUREUX 2024 sup mat.pdf**](#)

[**HVS 2025 Kaneko RESILIA 8year outcomes.pptx**](#)

History of the development of the solution/product:

Since the introduction of the Carpentier-Edwards bioprosthetic heart valve in 1981, Edwards Lifesciences has consistently pushed the boundaries of innovation to enhance valve durability. The company's journey began with neutralogic fixation, designed primarily for tissue preservation. In 1985, the XenoLogiX treatment added phospholipid extraction and terminal liquid sterilization to advance tissue handling. Addressing calcification, a major challenge in valve longevity, Edwards launched the ThermaFix Process in 2004, incorporating glutaraldehyde stabilization into the existing protocol.

Shortly after ThermaFix's debut, Edwards initiated the development of RESILIA - a next-generation tissue technology aimed at improving anti-calcification performance. Years of rigorous research led to the COMMENCE trial, a prospective, non-randomized multicenter single-arm study conducted at 27 sites across the U.S. and Europe with 689 patients. This pivotal research resulted in the FDA approval of the INSPIRIS RESILIA surgical aortic valve in 2017. Eight-year follow-up data showed a remarkable 99.3% freedom from structural valve deterioration in patients treated with RESILIA tissue, underscoring the breakthrough's clinical impact.

Concurrently, Edwards revolutionized heart valve treatment through its development of the SAPIEN transcatheter heart valve. In 2011, based on findings from the landmark PARTNER Trial published in The New England Journal of Medicine, the SAPIEN valve became the first FDA-approved transcatheter aortic heart valve (TAVR) for inoperable

patients with severe aortic stenosis. Building on that success, Edwards released next-generation models - a SAPIEN XT and SAPIEN 3 - receiving further approvals for mitral, pulmonic and intermediate-risk patients. In 2019, the FDA authorized SAPIEN 3 Ultra for low-risk patients, supported by superior surgical outcomes in the PARTNER 3 Trial.

Merging four decades of tissue expertise with transcatheter innovation, Edwards introduced the SAPIEN 3 Ultra RESILIA valve. This product offers patients with severe AS a minimally invasive option with potentially greater durability. Most notably, the valve was recently approved for use in asymptomatic patients - an extraordinary step forward in proactive care.

This expanded indication stems from findings in the EARLY TAVR trial, the first randomized, controlled study comparing TAVR with guideline-recommended watchful waiting in asymptomatic severe AS patients. Over a median follow-up of 3.8 years, patients treated with Edwards TAVR showed a 50% reduction - 26.8% vs. 45.3% for the surveillance group in terms of death, stroke, or unplanned cardiovascular hospitalization. The study marked Edwards' ninth publication in The New England Journal of Medicine on TAVR.

Edwards' enduring commitment to clinical excellence, substantiated by a robust pipeline of transcatheter trials and landmark research like the PARTNER series, has reshaped the treatment landscape for aortic stenosis.

Through strategic innovation and relentless dedication to patient outcomes, Edwards has not only pioneered the evolution of heart valve therapy, but redefined what is possible in cardiovascular care.

Development File Document upload:

[1593383602Kodali_nejmoa1200384.pdf](#)

[1593383615Leon_nejmoa1514616.pdf](#)

[1593383058Partner_3_Low_Risk_Trial.pdf](#)

[1593383067IR_HR_nejmoa1008232.pdf](#)

[1593383625Makkar_nejmoa1202277.pdf](#)

[1593383149Smith_nejmoa1103510.pdf](#)

[Transcatheter AorticValve Replacement for Asymptomatic Severe Aortic Stenosis GENEREUX 2024.pdf](#)

[GENEREUX 2024 sup mat.pdf](#)

[Transcatheter AorticValve Replacement in LowRisk Patients at Five Years MACK 2023.pdf](#)

[Transcatheter AorticValve Replacement with a BalloonExpandable Valve in LowRisk Patients MACK 2019.pdf](#)

Why this drug or device is innovative, the broad implications for future research, and/or how it will improve the human condition:

The introduction of the SAPIEN transcatheter heart valve marked a seismic shift in the treatment of aortic stenosis, offering patients a life-saving alternative to open-heart surgery. For many with no surgical options, transcatheter aortic valve replacement (TAVR) became a beacon of hope.

Over the past two decades, SAPIEN has become the most extensively studied valve platform in the world, with more than one million patients treated globally. Its clinical results are unmatched, solidifying its status as the preferred choice for physicians and patients alike. Edwards Lifesciences has consistently advanced the platform through successive generations - each delivering improved outcomes that now rival, and in many cases surpass, traditional surgical valve replacement.

Yet one challenge has lingered: long-term durability. Calcification, a leading cause of structural valve deterioration (SVD), has remained the final barrier to making TAVR the universal standard of care. Addressing this, Edwards introduced RESILIA tissue, the result of four decades of tissue engineering expertise. Building upon the ThermaFix process, RESILIA adds a proprietary calcium-blocking technology that targets harmful free aldehydes through a stable capping method. A recent propensity-matched study comparing RESILIA with earlier-generation valves showed a remarkable 99.3% freedom from SVD at eight years.

By integrating RESILIA tissue into the SAPIEN 3 Ultra platform, Edwards created a next-generation valve that blends durability with superior clinical performance. As indications expand and patients live longer, managing lifetime valve performance becomes increasingly critical. SAPIEN 3 Ultra RESILIA not only enables future coronary access, but also provides the potential for a longer-lasting first valve - delaying or even avoiding the need for a second intervention. A recent study published in JACC: Cardiovascular Interventions found S3 Ultra RESILIA to be associated with superior one-year outcomes including lower gradients, less paravalvular leakage and low valve reintervention rates.

The valve's recent FDA approval for use in asymptomatic patients represents a major milestone. It's the first and only valve indicated for treatment before symptom onset - helping overcome diagnostic uncertainty and delays in care. This breakthrough streamlines the treatment pathway, allowing clinicians to act earlier and with greater confidence.

In an era where patient-centered care and clinical precision are paramount, the SAPIEN

3 Ultra RESILIA empowers physicians to deliver transformative outcomes while enabling informed decisions that match therapy to patient need.

With this technology, Edwards isn't just advancing heart valve therapy - it's reshaping the future of cardiovascular care, one patient at a time.

Innovation File Document upload:

1593393984PARTNER_3.pdf

7yr outcomes following AVR with a novel tissue bioprosthesis

Beaver et al. AATS 2023 PPUS8220

7yr outcomes following AVR with a novel tissue bioprosthesis.pdf

SAPIEN 3 Ultra RESILIA.pdf

1593393984PARTNER_3.pdf

jjcin202411 S3UR vs S3 S3U 1y TVTR.pdf

HVS 2025 Kaneko RESILIA 8year outcomes.pptx

Please provide appropriate references (PubMed, Abstract, Website):

Saia F, Gandolfo C, Palmerini T, Berti S, Doshi SN, Laine M, Marcelli C, Piva T, Ribichini F, De Benedictis M, Cardaioli F, Cannata S and Tarantini G. In-hospital and thirty-day outcomes of the SAPIEN 3 Ultra balloon-expandable transcatheter aortic valve: the S3U registry. EuroIntervention. 2020;15:1240-1247.

DOI with Link: 10.4244/EIJ-D-19-00541

Parma R, Hudziak D, Smolka G, Gocol R, Ochala A and Wojakowski W. SAPIEN 3 Ultra - Design and procedural features of a new balloon-expandable valve. Cardiol J. 2019.

DOI with Link: 10.5603/CJ.a2019.0096

Solomonica A, Choudhury T and Bagur R. Newer-generation of Edwards transcatheter aortic valve systems: SAPIEN 3, Centera, and SAPIEN 3 Ultra. Expert Rev Med Devices. 2019;16:81-87.

DOI with Link: 10.1080/17434440.2019.1555465

Pasta S, Cannata S, Gentile G, Di Giuseppe M, Cosentino F, Pasta F, Agnese V, Bellavia D, Raffa GM, Pilato M

6/16/22, 3:38 PM Edwards SAPIEN 3 Ultra Transcatheter Aortic Heart Valve candidates.prix-galien-usa.com/submissions/read/488 4/4

and Gandolfo C. Simulation study of transcatheter heart valve implantation in patients with stenotic bicuspid aortic valve. Med Biol Eng Comput. 2020;58:815-829.

DOI with Link: 10.1007/s11517-020-02138-4

Webb J. A prospective multicenter study of the SAPIEN 3 Ultra System in intermediate-risk patients with severe aortic stenosis. Paper presented at: Annual Meeting of the PCR London Valves; November 18, 2019; London, England.

Mack M. Transcatheter Aortic-Valve Replacement with a Balloon-Expandable Valve in Low-Risk Patients. *N Engl J Med* 2019; 380:1695-1705
DOI: 10.1056/NEJMoa1814052

Wood, D.A.; Lauck, S.B.; Cairns, J.A. et al. The Vancouver 3M (Multidisciplinary, Multimodality, But Minimalist) Clinical Pathway Facilitates Safe Next-Day Discharge Home at Low-, Medium-, and High-volume Transfemoral Transcatheter Aortic Valve Replacement Centers: The 3M TAVI Study. *J Am Coll Cardiol Interv.* 2019.
DOI: 10.1016/j.jcin.2018.12.020

Shi S, et al. Association of Cardiac Injury With Mortality in Hospitalized Patients With COVID-19 in Wuhan, China. *JAMA Cardiol* 2020
DOI: 10.1001/jamacardio.2020.0950

Clark et al. Five-year Clinical and Economic Outcomes Among Patients With Medically Managed Severe Aortic Stenosis: Results From a Medicare Claim Analysis. *Circulation.* 2012.
Originally published 1 Sep 2012
DOI: 10.1161/CIRCOUTCOMES.112.966002

Elbaz-Greener G, et al. Association Between Wait Time for Transcatheter Aortic Valve Replacement and Early Post Procedural Outcomes. *J Am Heart Assoc.* 2019
DOI: 10.1161/JAHA.118.010407

Malaisrie, SC, et al. Mortality while waiting for aortic valve replacement. *Ann Thorac Surg.* 2014
DOI: 10.1016/j.athoracsur.2014.06.040

U.S. Census Bureau, Population Division. June 2019 <https://www.census.gov/quickfacts/fact/table/US/PST045219>

Leon M, Smith C, Mack M, et al. Transcatheter aortic-valve implantation for aortic stenosis in patients who cannot undergo surgery. *N Engl J Med.* 2010;363(17):1597-1607.
DOI: 10.1056/NEJMoa1008232

Bartus, K., Litwinowicz, R. Bilewska, A., et al. Final 5-year outcomes following aortic valve replacement with a RESILIA™ tissue bioprosthesis. *Eur. Journ. Of Cardio-Thoracic Surg.* 2021; 59, 434-441.

Bartus, K., Bavaria, J.E., Thourani, V. H., Xu, K., Keuffel, E.L., Structural hemodynamic

valve deterioration durability of RESILIA-tissue versus contemporary aortic bioprostheses. J. Comp. Eff. Res. 2023;e220180.

Beaver, T., Bavaria, J.E., Griffith, B., et al. Seven-year outcomes following aortic valve replacement with a novel tissue bioprosthesis. Presented at the 103rd Annual Meeting of the American Association for Thoracic Surgery , May 2023.

Bavaria, J.E., Griffith, B., Heimansohn, D., et al. Five-year Outcomes of the COMMENCE Trial Investigating Aortic Valve Replacement with RESILIA Tissue. Ann Thorac Surg. 2022;115(6), 1429-1436.

Flameng, W., Hermans, H., Verbeken, E., Meuris, B. A randomized assessment of an advanced tissue preservation technology in the juvenile sheep model. The Journal of Thoracic and Cardiovascular Surgery. 2015;149(1), 340-345.

Pibarot, P., Borger, M., Clavel, M.A., et al. \"Study Design of the Prospective Non-Randomized Single-Arm Multicenter Evaluation of the Durability of Aortic Bioprosthetic Valves with RESILIA Tissue in Subjects under 65 Years Old (RESILIENCE Trial).\" Structural Heart, 2019;4(1):46-52.

References File Document upload:

[1593381641jamacardiology_shi_2020_oi_200024_1.pdf](#)

[1593381335Wood_3M_JACC_publication.pdf](#)

[1593381641jamacardiology_shi_2020_oi_200024.pdf](#)

[1593381838CIRCOUTCOMES112966002.pdf](#)

[1593382131Malaisrie_PIIIS0003497514013241.pdf](#)

[1593381977JAH38e010407.pdf](#)

[1593382855IR_HR_nejmoa1008232.pdf](#)

[1593380008Newergeneration_of_Edwards_Transcatheter_Aortic_Valve_Systems_SOLOMONICA_2019.pdf](#)

[1593380029SAPIEN_3_Ultra__Design_and_Procedural_Features_PARMA_2019.pdf](#)

[1593379996PCRLV_2019__A_Prospective_Multicenter_Study_of_the_S3_Ultra_System_WEBB.pdf](#)

[1593380065Simulation_study_of_THV_implantation_PASTA_2020.pdf](#)

[1593380017Saia2020Inhospital_and_thirtyday_outcomes.pdf](#)

[1593380498PARTNER_3.pdf](#)

[BARTUS_EJCTS_2021_Final_5_Year_Outcomes_Following_RESILIA_AVR.pdf](#)

[BARTUS_JCER_2023_COMMENCE_vs_PARTNER_IIA_at_5_Years.pdf](#)

BAVARIA_ATS 2022_5 Year Outcomes of COMMENCE Trial.pdf

**FLAMENG_JTCVS 2015_Assessment of an Advanced Tissue
Preservation in Juvenile Sheep.pdf**

**PIBAROT_Structural Heart 2020_Study Design of RESILIENCE
Trial.pdf**

COMMENCE 7 yr outcomes AATS May 2023_Final_572023.pptx