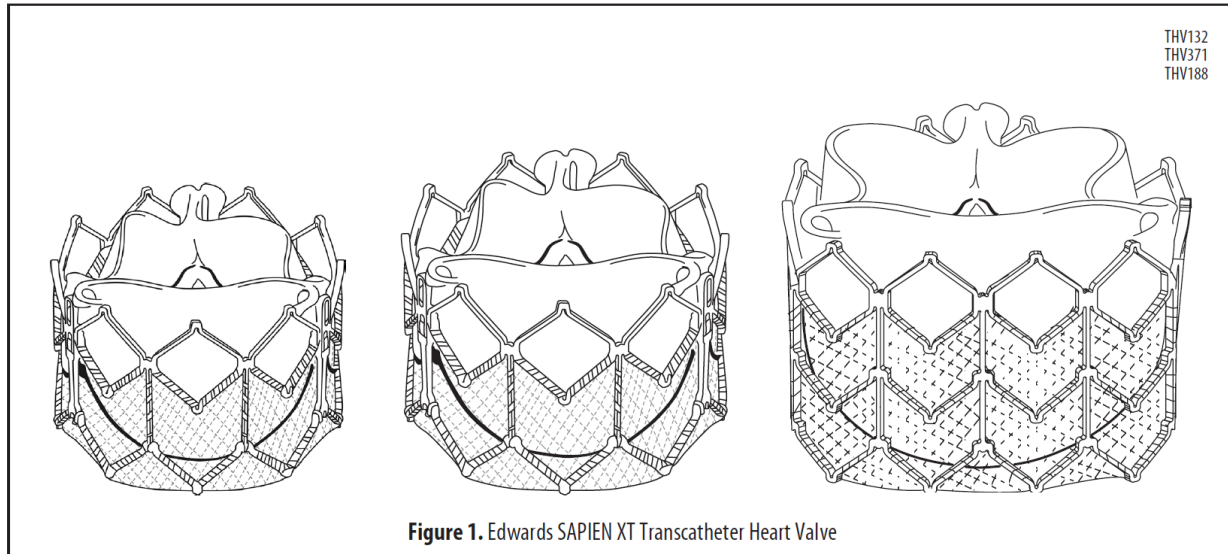




Edwards Lifesciences

Edwards SAPIEN XT

Transcatheter Heart Valve with the NovaFlex+ Delivery System



Instructions for Use

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

Implantation of the transcatheter heart valve should be performed only by physicians who have received Edwards Lifesciences training. The implanting physician should be experienced in balloon aortic valvuloplasty.

Please verify that you have the latest version of the instructions for use prior to using the device by visiting <http://THVIFU.edwards.com> or by calling 1.800.822.9837. In order to access the instructions for use, an IFU Code will be required.

STERILE: The valve is supplied sterilized with glutaraldehyde solution. The delivery system is supplied sterilized with ethylene oxide gas.

Edwards, Edwards Lifesciences, the stylized E logo, Carpentier-Edwards, Edwards SAPIEN, Edwards SAPIEN XT, NovaFlex, NovaFlex+, PARTNER, PARTNER II, Qualcrimp, RetroFlex, RetroFlex 3, SAPIEN, SAPIEN XT, TFX, and ThermoFix are trademarks of Edwards Lifesciences Corporation. All other trademarks are the property of their respective owners.

1.0 Device Description

- **Edwards SAPIEN XT Transcatheter Heart Valve – Model 9300TFX (Figure 1)**

The Edwards SAPIEN XT Transcatheter Heart Valve is comprised of a balloon-expandable, radiopaque, cobalt-chromium frame, trileaflet bovine pericardial tissue valve, and polyethylene terephthalate (PET) fabric skirt. The leaflets are treated according to the Carpentier-Edwards ThermaFix process.

Table 1	
Valve Size	Height
23 mm	14.3 mm
26 mm	17.2 mm
29 mm	19.1 mm

Table 2			
Native Valve Annulus Size (TEE)	Native Valve Annulus Size (CT)		Valve Size
	Area	Area Derived Diameter	
18-22 mm	314-415 mm ²	20-23 mm	23 mm
21-25 mm	415-530 mm ²	23-26 mm	26 mm
24-27 mm	530-660 mm ²	26-29 mm	29 mm

Valve size recommendations are based on native valve annulus size, as measured by transesophageal echocardiography (TEE) or computed tomography (CT). Patient anatomical factors and multiple imaging modalities should be considered during valve size selection. Note: Risks associated with undersizing and oversizing should be considered.

For transcatheter valve-in-surgical valve procedures, size recommendations for surgical bioprostheses with **internal orifice diameters** are shown in Table 3.

Table 3	
Bioprosthesis Internal Orifice Diameter	SAPIEN XT Valve Size
18-21 mm	23 mm
21-23.5 mm	26 mm
23.5-27 mm	29 mm

NOTE: The internal orifice diameter of the surgical bioprosthesis must be determined so that the appropriate valve size can be implanted. The bioprosthesis internal diameter of the primary implanted device is best determined by using computed tomography, magnetic resonance imaging, and/or transesophageal echocardiography to perform the necessary measurements. The internal orifice diameter is a directly measured or area derived diameter measurement of the internal opening of the failed surgical valve.

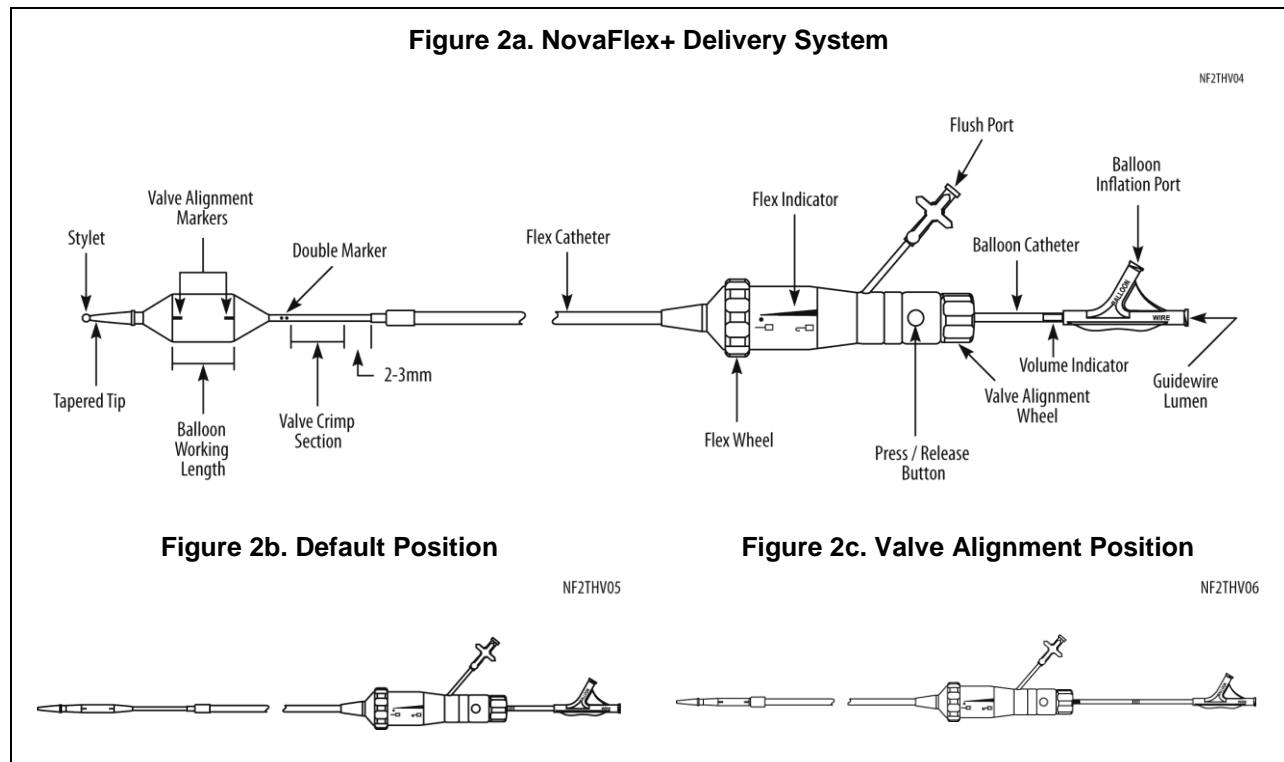
NOTE: Exact volume required to deploy the valve may vary depending on the bioprosthesis internal orifice diameter. Do not exceed the rated burst pressure. See Table 4 for inflation parameters.

- **NovaFlex+ Delivery System (Figures 2a, 2b, 2c)**

The NovaFlex+ delivery system (usable length 105 cm) is used for delivery of the Edwards SAPIEN XT transcatheter heart valve. The delivery system includes a flex wheel for articulation of the flex catheter, a tapered tip at the distal end of the delivery system to facilitate crossing the valve, and a balloon catheter for deployment of the valve. The flex tip (distal portion of the flex shaft) is hydrophilically coated. The handle also contains a flex indicator depicting articulation of the flex catheter, a valve alignment wheel for fine adjustment of the valve during valve alignment, a button that enables movement between handle positions, and a flush port to flush the flex catheter. The balloon catheter has radiopaque markers

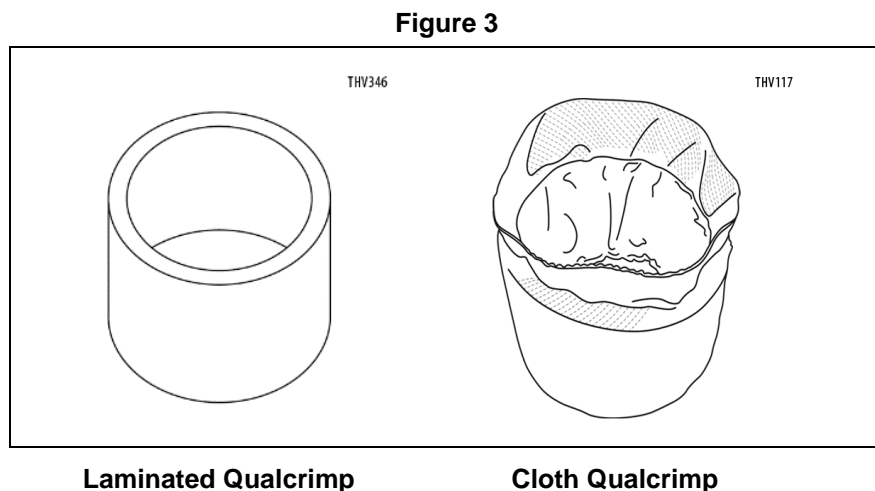
defining the valve alignment position and the working length of the balloon. A radiopaque double marker proximal to the balloon indicates flex catheter position during deployment. The inflation parameters for valve deployment are:

Table 4			
Model	Nominal Balloon Diameter	Nominal Inflation Volume	Rated Burst Pressure (RBP)
9355FS23	23 mm	17 mL	7 atm
9355FS26	26 mm	22 mL	7 atm
9355FS29	29 mm	33 mL	7 atm



- **Qualcrimp Crimping Accessory (Figure 3)**

The Qualcrimp crimping accessory (packaged with the NovaFlex+ delivery system and manufactured in laminated or cloth covered foam) is used during crimping of the valve.



2.0 Indications

The Edwards SAPIEN XT transcatheter heart valve, model 9300TFX, and accessories 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 at intermediate or greater risk for open surgical therapy (i.e., predicted risk of surgical mortality $\geq 3\%$ at 30 days, based on the Society of Thoracic Surgeons (STS) risk score and other clinical co-morbidities unmeasured by the STS risk calculator).

The Edwards SAPIEN XT transcatheter heart valve and accessories are also indicated for 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 (i.e., STS operative risk score $\geq 8\%$ or at a $\geq 15\%$ risk of mortality at 30 days).

3.0 Contraindications

The valve and delivery systems are contraindicated in patients who cannot tolerate an anticoagulation/antiplatelet regimen or who have active bacterial endocarditis or other active infections.

4.0 Warnings

- Observation of the pacing lead throughout the procedure is essential to avoid the potential risk of pacing lead perforation.
- There may be an increased risk of stroke in transcatheter aortic valve replacement procedures, as compared to balloon aortic valvuloplasty or other standard treatments in high or greater risk patients.
- The devices are designed, intended, and distributed for single use only. **Do not resterilize or reuse the devices.** There are no data to support the sterility, nonpyrogenicity, and functionality of the devices after reprocessing.
- Care should be exercised when sizing the native annulus or surgical valve; implanting a valve that is too small may lead to paravalvular leak, migration or embolization, whereas implanting a valve that is too large may lead to residual gradient (patient-prosthesis mismatch) or annular rupture.
- Accelerated deterioration of the valve may occur in patients with an altered calcium metabolism.
- Prior to delivery, the valve must remain hydrated at all times and cannot be exposed to solutions other than its shipping storage solution and sterile physiologic rinsing solution. Valve leaflets mishandled or damaged during any part of the procedure will require replacement of the valve.
- Caution should be exercised in implanting a valve in patients with clinically significant coronary artery disease.
- Patients with pre-existing mitral valve devices should be carefully assessed prior to implantation of the valve to ensure proper valve positioning and deployment.
- Do not use the valve if the tamper evident seal is broken, the storage solution does not completely cover the valve, the temperature indicator has been activated, the valve is damaged, or the expiration date has elapsed.
- Do not mishandle the NovaFlex+ delivery system or use it if the packaging or any components are not sterile, have been opened or are damaged (e.g. kinked or stretched), or the expiration date has elapsed.
- Use of excessive contrast media may lead to renal failure. Measure the patient's creatinine level prior to the procedure. Contrast media usage should be monitored.
- Patient injury could occur if the delivery system is not un-flexed prior to removal.
- Care should be exercised in patients with hypersensitivities to cobalt, nickel, chromium, molybdenum, titanium, manganese, silicon, and/or polymeric materials.
- The procedure should be conducted under fluoroscopic guidance. Some fluoroscopically guided procedures are associated with a risk of radiation injury to the skin. These injuries may be painful, disfiguring, and long-lasting.

- Valve recipients should be maintained on anticoagulant/antiplatelet therapy, except when contraindicated, as determined by their physician. This device has not been tested for use without anticoagulation.
- Do not add or apply antibiotics to the storage solution, rinse solutions, or to the valve.

5.0 Precautions

- Long-term durability has not been established for the valve. Regular medical follow-up is advised to evaluate valve performance.
- Glutaraldehyde may cause irritation of the skin, eyes, nose and throat. Avoid prolonged or repeated exposure to, or breathing of, the solution. Use only with adequate ventilation. If skin contact occurs, immediately flush the affected area with water; in the event of contact with eyes, seek immediate medical attention. For more information about glutaraldehyde exposure, refer to the Material Safety Data Sheet available from Edwards Lifesciences.
- To maintain proper valve leaflet coaptation, do not overinflate the deployment balloon.
- Appropriate antibiotic prophylaxis is recommended post-procedure in patients at risk for prosthetic valve infection and endocarditis.
- Safety, effectiveness, and durability have not been established for transcatheter valve in transcatheter valve procedures.
- Safety and effectiveness have not been established for patients with the following characteristics/comorbidities:
 - Non-calcified aortic annulus
 - Severe ventricular dysfunction with ejection fraction < 20%
 - Congenital unicuspid or congenital bicuspid aortic valve
 - Mixed aortic valve disease (aortic stenosis and aortic regurgitation with predominant aortic regurgitation > 3+)
 - Pre-existing prosthetic ring in any position
 - Severe mitral annular calcification (MAC), severe (> 3+) mitral insufficiency, or Gorlin syndrome
 - Blood dyscrasias defined as: leukopenia (WBC < 3000 cells/mL), acute anemia (Hb < 9 g/dL), thrombocytopenia (platelet count < 50,000 cells/mL), or history of bleeding diathesis or coagulopathy
 - Hypertrophic cardiomyopathy with or without obstruction (HOCM)
 - Echocardiographic evidence of intracardiac mass, thrombus, or vegetation
 - A known hypersensitivity or contraindication to aspirin, heparin, ticlopidine (Ticlid™), or clopidogrel (Plavix™), or sensitivity to contrast media, which cannot be adequately premedicated
 - Significant aortic disease, including abdominal aortic or thoracic aneurysm defined as maximal luminal diameter 5 cm or greater; marked tortuosity (hyperacute bend), aortic arch atheroma (especially if thick [> 5 mm], protruding, or ulcerated) or narrowing (especially with calcification and surface irregularities) of the abdominal or thoracic aorta, severe “unfolding” and tortuosity of the thoracic aorta
 - Access characteristics that would preclude safe placement of 16F, 18F, or 20F Edwards Expandable Introducer Sheath Set, such as severe obstructive calcification, severe tortuosity or diameter less than 6 mm, 6.5 mm, or 7 mm, respectively
 - Bulky calcified aortic valve leaflets in close proximity to coronary ostia
 - A concomitant paravalvular leak where the surgical bioprosthesis is not securely fixed in the native annulus or is not structurally intact (e.g. wireform frame fracture)
 - A partially detached leaflet of the surgical bioprosthesis that in the aortic position may obstruct a coronary ostium
- The safety and effectiveness have not been established for implanting the transcatheter valve inside a stented bioprosthetic valve < 21 mm (labeled size) or an unstented bioprosthetic aortic valve.

- Residual mean gradient may be higher in a “TAV-in-SAV” configuration than that observed following implantation of the valve inside a native aortic annulus using the same size device. Patients with elevated mean gradient post procedure should be carefully followed. It is important that the manufacturer, model and size of the preexisting surgical bioprosthetic aortic valve be determined, so that the appropriate valve can be implanted and a prosthesis-patient mismatch be avoided. Additionally, pre-procedure imaging modalities must be employed to make as accurate a determination of the internal orifice as possible.

6.0 Potential Adverse Events

Potential risks associated with the overall procedure including potential access complications associated with standard cardiac catheterization, balloon valvuloplasty, the potential risks of conscious sedation and/or general anesthesia, and the use of angiography:

- Death
- Stroke/transient ischemic attack, clusters or neurological deficit
- Paralysis
- Permanent disability
- Respiratory insufficiency or respiratory failure
- Hemorrhage requiring transfusion or intervention
- Cardiovascular injury including perforation or dissection of vessels, ventricle, myocardium or valvular structures that may require intervention
- Pericardial effusion or cardiac tamponade
- Embolization including air, calcific valve material or thrombus
- Infection including septicemia and endocarditis
- Heart failure
- Myocardial infarction
- Renal insufficiency or renal failure
- Conduction system defect which may require a permanent pacemaker
- Arrhythmia
- Retroperitoneal bleed
- Arteriovenous (AV) fistula or pseudoaneurysm
- Reoperation
- Ischemia or nerve injury
- Restenosis
- Pulmonary edema
- Pleural effusion
- Bleeding
- Anemia
- Abnormal lab values (including electrolyte imbalance)
- Hypertension or hypotension
- Allergic reaction to anesthesia, contrast media, or device materials
- Hematoma
- Syncope
- Pain or changes at the access site
- Exercise intolerance or weakness
- Inflammation

- Angina
- Heart murmur
- Fever

Additional potential risks associated with the use of the valve, delivery system, and/or accessories include:

- Cardiac arrest
- Cardiogenic shock
- Emergency cardiac surgery
- Cardiac failure or low cardiac output
- Coronary flow obstruction/transvalvular flow disturbance
- Device thrombosis requiring intervention
- Valve thrombosis
- Device embolization
- Device migration or malposition requiring intervention
- Valve deployment in unintended location
- Valve stenosis
- Structural valve deterioration (wear, fracture, calcification, leaflet tear/tearing from the stent posts, leaflet retraction, suture line disruption of components of a prosthetic valve, thickening, stenosis)
- Device degeneration
- Paravalvular or transvalvular leak
- Valve regurgitation
- Hemolysis
- Device explants
- Nonstructural dysfunction
- Mechanical failure of delivery system, and/or accessories
- Non-emergent reoperation

7.0 Directions for Use

7.1 Required Equipment

Table 5			
Product Name	23 mm System (9355NF23A)	26 mm System (9355NF26A)	29 mm System (9355NF29A)
	Model		
Edwards SAPIEN XT Transcatheter Heart Valve	9300TFX (23 mm)	9300TFX (26 mm)	9300TFX (29 mm)
NovaFlex+ Delivery System*	9355FS23	9355FS26	9355FS29
Edwards Expandable Introducer Sheath Set**	916ES23	918ES26	920ES29
Edwards Dilator Kit	9100DKS		
Edwards Balloon Catheter	9350BC20	9350BC23	9350BC25
Inflation devices provided by Edwards Lifesciences			
Edwards Crimper	9350CR		
* Includes the Qualcrimp Crimping Accessory and 2-piece Crimp Stopper			
** Or other compatible sheath provided by Edwards Lifesciences			

Additional Equipment:

- 20 cc syringe or larger (x2)
- 50 cc syringe or larger
- High-pressure 3-way stopcock (x2)
- Standard cardiac catheterization lab equipment
- Fluoroscopy (fixed, mobile or semi-mobile fluoroscopy systems appropriate for use in percutaneous coronary interventions)
- Transesophageal or transthoracic echocardiography capabilities
- Exchange length 0.035 inch (0.89 mm) extra-stiff guidewire
- Temporary pacemaker (PM) and pacing lead
- Sterile rinsing basins, physiological saline, heparinized saline, 15% diluted radiopaque contrast medium
- Sterile table for valve and device preparation

7.2 Valve Handling and Preparation

Follow sterile technique during device preparation and implantation.

7.2.1 Valve Rinsing Procedure

Before opening the valve jar, carefully examine for evidence of damage (e.g. a cracked jar or lid, leakage, or broken or missing seals).

CAUTION: Valves from containers found to be damaged, leaking, without adequate sterilant, or missing intact seals must not be used for implantation.

Step	Procedure
1	Set up two (2) sterile bowls with at least 500 mL of sterile physiological saline to thoroughly rinse the glutaraldehyde sterilant from the valve.
2	Carefully remove the valve/holder assembly from the jar without touching the tissue. Verify the valve serial identification number with the number on the jar lid and record in the patient information documents. Inspect the valve for any signs of damage to the frame or tissue.
3	Rinse the valve as follows: Place the valve in the first bowl of sterile, physiological saline. Be sure the saline solution completely covers the valve and holder. With the valve and holder submerged, slowly agitate (to gently swirl the valve and holder) back and forth for a minimum of 1 minute. Transfer the valve and holder to the second rinsing bowl of physiological saline and gently agitate for at least one more minute. Ensure the rinse solution in the first bowl is not used. The valve should be left in the final rinse solution until needed to prevent the tissue from drying. CAUTION: Do not allow the valve to come into contact with the bottom or sides of the rinse bowl during agitation or swirling in the rinse solution. Direct contact between the identification tag and valve is also to be avoided during the rinse procedure. No other objects should be placed in the rinse bowls. The valve should be kept hydrated to prevent the tissue from drying.

7.2.2 Prepare the Components

Refer to the Edwards Dilator Kit, Edwards Expandable Introducer Sheath Set, Edwards Crimper and Edwards Balloon Catheter instructions for use for device preparation.

Step	Procedure
1	Visually inspect all components for damage. Ensure the NovaFlex+ delivery system is fully unflexed and the valve alignment wheel is adjacent to the handle.
2	Flush the flex catheter.
3	Carefully remove the distal balloon cover from the delivery system.

Step	Procedure												
4	<p>Remove the stylet from the distal end of the guidewire lumen and set aside. Flush the guidewire lumen with heparinized saline and insert the stylet back into the distal end of the guidewire lumen.</p> <p>Note: Failure to insert the stylet back into the guidewire lumen may result in damage to the lumen during crimping process.</p>												
5	<p>Place the delivery system into the default position and make sure that the flex catheter tip is covered by the proximal balloon cover. Unscrew the loader cap from the loader tube and flush the loader cap. Place the loader cap over the proximal balloon cover and onto the flex catheter with the inside of the cap oriented towards the distal tip.</p>												
6	<p>Press button on handle and bring the device handle adjacent to the Y-connector.</p> <p>Peel off the proximal balloon cover over the blue section of the balloon shaft.</p>												
7	<p>Attach a 3-way stopcock to the balloon inflation port. Partially fill a 50 cc or larger syringe with 15-20 mL diluted contrast medium and attach to the 3-way stopcock.</p>												
8	<p>Fill the inflation device provided by Edwards Lifesciences with excess volume relative to the indicated inflation volume. Lock the inflation device and attach to the 3-way stopcock.</p>												
9	<p>Close the 3-way stopcock to the Inflation device provided by Edwards Lifesciences and de-air the system using the 50 cc or larger syringe. Slowly release the plunger and leave zero-pressure in the system.</p>												
10	<p>Close the stopcock to the delivery system. By rotating the knob of the inflation device provided by Edwards Lifesciences, transfer the contrast medium into the syringe to achieve the appropriate volume required to deploy the valve, per the following:</p> <table><thead><tr><th>Delivery System</th><th>Valve Size</th><th>Inflation Volume</th></tr></thead><tbody><tr><td>Model 9355FS23</td><td>23 mm</td><td>17 mL</td></tr><tr><td>Model 9355FS26</td><td>26 mm</td><td>22 mL</td></tr><tr><td>Model 9355FS29</td><td>29 mm</td><td>33 mL</td></tr></tbody></table>	Delivery System	Valve Size	Inflation Volume	Model 9355FS23	23 mm	17 mL	Model 9355FS26	26 mm	22 mL	Model 9355FS29	29 mm	33 mL
Delivery System	Valve Size	Inflation Volume											
Model 9355FS23	23 mm	17 mL											
Model 9355FS26	26 mm	22 mL											
Model 9355FS29	29 mm	33 mL											
11	<p>Close the stopcock to the 50 cc or larger syringe. Remove the syringe. Verify that the inflation volume is correct and lock the Inflation device provided by Edwards Lifesciences.</p> <p>CAUTION: Maintain the Inflation device provided by Edwards Lifesciences in the locked position until valve deployment.</p>												

7.2.3 Mount and Crimp the Valve on the Delivery System

Step	Procedure
1	Set up two (2) additional sterile bowls with at least 100 mL of sterile physiological saline to thoroughly rinse the Qualcrimp crimping accessory.
2	Completely submerge the Qualcrimp crimping accessory in the first bowl and gently compress it to ensure complete saline absorption. Slowly swirl the Qualcrimp crimping accessory for a minimum of 1 minute. Repeat this process in the second bowl.
3	Remove the valve from the holder and remove the ID tag.
4	Attach the 2-piece crimp stopper to the base of the crimper and click into place.
5	With the crimper in the open position, gently place the valve into the crimper aperture. Gradually crimp the valve until it fits into the Qualcrimp crimping accessory.
6	Place the Qualcrimp crimping accessory over the valve making sure the valve is parallel to the edge of the Qualcrimp crimping accessory.
7	Place the valve and Qualcrimp crimping accessory in crimper aperture. Insert the delivery system coaxially within the valve on the Valve Crimp Section (2-3 mm distal to the balloon shaft) with the inflow (fabric cuff end) of the valve towards the distal end of the delivery system.
8	Crimp the valve until it reaches the Qualcrimp stop located on the 2-piece Crimp Stopper.
9	Gently remove the Qualcrimp crimping accessory from the valve. Remove the Qualcrimp stop from the Final Stop, leaving the Final Stop in place.

Step	Procedure
10	Fully crimp the valve until it reaches the Final Stop. NOTE: Ensure that the Valve Crimp Section remains coaxial within the valve.
11	Repeat the full crimp of the valve for a total of two full crimps.
12	Pull the balloon shaft until it is locked in the default position.
13	Flush the loader with heparinized saline. Immediately advance the valve into the loader until the tapered tip of the delivery system is exposed. CAUTION: To prevent possible leaflet damage, the valve should not remain fully crimped and/or in the loader for over 15 minutes.
14	Attach the loader cap to the loader, re-flush the delivery system through the flush port and close the stopcock to the delivery system. Remove the stylet and flush the guidewire lumen of the delivery system. CAUTION: Keep the valve hydrated until ready for implantation. CAUTION: The physician must verify correct orientation of the valve prior to its implantation; its inflow (fabric cuff end) should be oriented distally towards the tapered tip.

7.3 Valvuloplasty and Valve Delivery

Valvuloplasty and valve delivery should be performed under conscious sedation and/or general anesthesia with hemodynamic monitoring in a catheterization lab/hybrid operating room with fluoroscopic and echocardiographic imaging capabilities.

Administer heparin to maintain the ACT at ≥ 250 sec during the procedure.

CAUTION: Use of excessive contrast media may lead to renal failure. Measure the patient's creatinine level prior to the procedure. Contrast media usage should be monitored.

CAUTION: Procedure may require an arterial cut-down with surgical closure of the puncture site due to the size of the arteriotomy.

7.3.1 Baseline Parameters

Step	Procedure
1	Perform an angiogram with fluoroscopic view perpendicular to the valve.
2	Evaluate the distance of the left and right coronary ostia from the aortic annulus in relation to the valve frame height.
3	Introduce a pacemaker (PM) lead until its distal end is positioned in the right ventricle.
4	Set the stimulation parameters to obtain 1:1 capture, and test pacing.

7.3.2 Valvuloplasty

Refer to Edwards Balloon Catheter Instructions for Use (IFU) for information on device preparation and handling.

Note: Rapid ventricular pacing should be performed when using the Edwards Balloon Catheter for valvuloplasty prior to aortic transcatheter valve implantation.

After placement of the balloon at the intended site, begin rapid ventricular pacing. Once the systolic blood pressure has decreased to 50 mmHg or below, balloon inflation can commence.

CAUTION: Valve implantation should not be carried out if the balloon cannot be fully inflated during valvuloplasty.

7.3.3 Valve Delivery

Step	Procedure
1	Dilate the access site using the Edwards Dilator Kit, if needed. Refer to the Edwards Dilator Kit IFU for information on device preparation and handling.

Step	Procedure
2	Prepare and insert the Edwards Expandable Introducer Sheath Set. Refer to the Edwards Expandable Introducer Sheath Set IFU for information on device preparation and handling.
3	Insert the loader into the sheath until the loader stops.
4	<p>Advance the NovaFlex+ delivery system, with the Edwards logo facing up, through the sheath until the valve exits the sheath. Retract the loader to the proximal end of the delivery system.</p> <p>NOTE: Maintain the proper orientation of the flex catheter (with the Edwards logo facing up) throughout the procedure.</p> <p>CAUTION: If accessing femorally or via the iliac, the valve should not be advanced through the sheath if the sheath tip is not past the aortic bifurcation.</p> <p>CAUTION: To prevent possible leaflet damage, the valve should not remain in the sheath for over 2 minutes.</p>
5	<p>In a straight section of the aorta, initiate valve alignment by pressing the button, begin pull back of the balloon catheter, and release the button.</p> <p>Continue pulling back the balloon catheter until the delivery system locks into the valve alignment position (Refer to Figure 2c).</p> <p>Use the Valve Alignment Wheel to position the valve between the valve alignment markers.</p> <p>CAUTION: Do not turn the Valve Alignment Wheel if the delivery system is not locked in the Valve Alignment Position.</p> <p>WARNING: Do not position the valve past the distal Valve Alignment Marker. This will prevent proper valve deployment.</p> <p>CAUTION: Maintain guidewire position in the left ventricle during valve alignment.</p>
6	<p>Advance the catheter and use the flex wheel, if needed, and cross the aortic valve.</p> <p>NOTE: Verify the Edwards logo is facing up. The delivery system articulates in a direction opposite from the flush port.</p>
7	If additional working length is needed, remove the loader by unscrewing the loader cap and peeling the loader tubing from the delivery system.
8	Press the button and retract the Flex Catheter to the Double Marker and position the valve within the aortic annulus.
9	Verify the correct position of the valve with respect to the valve.
10	<p>Begin valve deployment:</p> <ul style="list-style-type: none"> • Unlock the Inflation device provided by Edwards Lifesciences. • Begin rapid pacing; once systolic blood pressure has decreased to 50 mmHg or below, balloon inflation can commence. • Deploy the valve by inflating the balloon with the entire volume in the Inflation device provided by Edwards Lifesciences, hold for 3 seconds and confirm that the barrel of the inflation device is empty to ensure complete inflation of the balloon. Deflate the balloon. When the balloon catheter has been completely deflated, turn off the pacemaker.

7.3.4 System Removal

Step	Procedure
1	<p>Unflex the delivery system while retracting the device, if needed. Retract the flex catheter until it locks in the default position and remove it from the sheath.</p> <p>CAUTION: Patient injury could occur if the delivery system is not unflexed prior to removal.</p>
2	Remove all devices when the ACT level is appropriate. Refer to the Edwards Expandable Introducer Sheath Set instructions for use for device removal.
3	Close the access site.

8.0 How Supplied

STERILE: The valve is supplied sterilized with glutaraldehyde solution. The delivery system is supplied sterilized with ethylene oxide gas.

8.1 Storage

The valve must be stored at 10 °C to 25 °C (50 °F to 77 °F). Each jar is shipped in an enclosure containing a temperature indicator to detect exposure of the valve to extreme temperature.

The delivery system should be stored in a cool, dry place.

9.0 MR Safety



MR Conditional

Non-clinical testing has demonstrated that the Edwards SAPIEN XT transcatheter heart valve is MR Conditional. A patient with this device, when implanted in the native valve or a failed surgical bioprosthesis, can be scanned safely, immediately after placement of this device under the following conditions:

- Static magnetic field of 1.5 tesla or 3 tesla
- Maximum spatial gradient field of 2500 gauss/cm (25 T/m) or less
- Maximum MR system reported, whole body averaged specific absorption rate (SAR) of 2 W/kg (Normal Operating Mode)

Under the scan conditions defined above, the SAPIEN XT transcatheter heart valve is expected to produce a maximum temperature rise of 2.6 °C after 15 minutes of continuous scanning.

In non-clinical testing, the image artifact caused by the device extends as far as 14.5 mm from the implant for spin echo images and 30 mm for gradient echo images when scanned in a 3.0 T MRI system. The artifact obscures the device lumen in gradient echo images.

The implant has not been evaluated in MR systems other than 1.5 or 3.0 T.

For valve-in-surgical valve implantation or in the presence of other implants, please refer to MRI safety information for the surgical valve or other devices prior to MR imaging.

10.0 Patient Information

Patient education brochures are provided to each site and should be given to the patient to inform them of the risks and benefits of the procedure and alternatives in adequate time before the procedure to be read and discussed with their physician. A copy of this brochure may also be obtained from Edwards Lifesciences by calling 1.800.822.9837. A patient implant card request form is provided with each transcatheter heart valve. After implantation, all requested information should be completed on this form. The serial number may be found on the package and on the identification tag attached to the transcatheter heart valve. The original form should be returned to the Edwards Lifesciences address indicated on the form and upon receipt, Edwards Lifesciences will provide an identification card to the patient.

11.0 Recovered Valve and Device Disposal

The explanted valve should be placed into a suitable histological fixative such as 10% formalin or 2% glutaraldehyde and returned to the company. Refrigeration is not necessary under these circumstances. Contact Edwards Lifesciences to request an Explant Kit.

Used delivery system may be disposed of in the same manner that hospital waste and biohazardous materials are handled. There are no special risks related to the disposal of these devices.

12.0 Clinical Studies

The PARTNER II Trial Overview

Cohort B of The Placement of Aortic Transcatheter Valves Trial II (PARTNER II) was a 1:1 randomized, controlled study independently powered to compare transcatheter valve therapy with the first generation (SAPIEN valve) system to transcatheter valve therapy with the second generation (Edwards SAPIEN XT valve) system in patients who cannot undergo surgery (inoperable). Patients in the control cohort of Cohort B received an Edwards SAPIEN valve with the RetroFlex 3 delivery system (transfemoral

approach). Patients in the treatment cohort of Cohort B received an Edwards SAPIEN XT valve with the NovaFlex+ delivery system (transfemoral). The randomized sample size was set to 500 patients. Enrollment is complete and patients have reached at least 1 year of follow-up.

Cohort B of The Placement of Aortic Transcatheter Valves Trial II (PARTNER II) included registries for the transfemoral delivery of the SAPIEN XT valve. These registries include the following:

- NR3: Registry for Transcatheter Heart Valve in Aortic Surgical Valve Implantation (THV-SV). Patients with failing aortic bioprosthetic surgical valve with a surgical mortality or major morbidity $\geq 50\%$ and meeting the sizing requirements for 23 mm or 26 mm SAPIEN XT valve.
- NR5 (29 mm / Transfemoral / Inoperable) is an Inoperable Transfemoral Registry for the delivery of 29 mm SAPIEN XT valve in ≥ 7 mm femoral arteries.

Following completion of enrollment in the nested registries, the FDA approved continued access enrollment in the nested registries (CANRs).

SOURCE Registry XT

The SOURCE Registry XT is an international multi-center prospective, consecutively enrolled, observational registry. Consecutive patient data have been collected at discharge, 30 days, and 12 months post-implant, and will be collected annually thereafter up to 5 years post-implant.

Results of Cohort B

The primary endpoint of Cohort B of the PARTNER II trial was met. At 1 year the non-hierarchical composite of all-cause mortality, disabling strokes, and re-hospitalizations was similar (p non-inferiority=0.0037). At 30 days, all-cause mortality and major strokes were similar (mortality: SAPIEN valve 5.1% vs. SAPIEN XT valve 3.5%; major strokes: SAPIEN valve 3.0% vs. SAPIEN XT valve 3.2%, $p > 0.9999$).

The Edwards SAPIEN XT cohort was associated with a reduction in anesthesia time ($p=0.0196$), cath lab time ($p=0.0094$), multiple valve implants ($p=0.1534$), aborted procedures ($p=0.0585$), and the need for hemodynamic support ($p=0.0637$).

The trial showed that there was a reduction in the Edwards SAPIEN XT cohort as compared to Edwards SAPIEN cohort for the following complications: major vascular complications involving dissection (from 9.2% to 4.3%, $p=0.0195$), perforation (from 4.8% to 0.7%, $p=0.0031$), and infection (from 5.5% to 1.8%, $p=0.0163$).

Secondary endpoints for the study included days alive and out of the hospital (DAOH), NYHA, 6MWT, valve area (EOA), and total aortic regurgitation at one year as well as 6MWT improvement from baseline to 1 year and device success.

Mean adjusted days alive and out of the hospital (DAOH) at 1 year: In the ITT population, the mean adjusted days alive and out of the hospital (DAOH) was 299.2 ± 111.4 days for the SAPIEN cohort and 302.7 ± 108.7 days for the SAPIEN XT cohort at 1 year. The difference between cohorts was 3.5 days (two sided 95% CI 1.8, 5.2), $p < 0.0001$.

NYHA at 1 year: In the SAPIEN cohort, mean NYHA was 3.5 ± 0.6 at baseline and 1.8 ± 0.8 at 1 year which constituted a reduction of 1.7 ± 0.9 . In the SAPIEN XT cohort, mean NYHA was 3.4 ± 0.6 at baseline and 1.7 ± 0.7 at 1 year which was a mean decrease of 1.8 ± 0.9 . The difference between cohorts was -0.13, (two sided 95% CI -0.32, 0.06), $p < 0.0001$. Figure 14 illustrates the NYHA classification by visit for the ITT population.

6MWT at 1 year: Hypothesis testing was based on a difference of 70 meters which is considered clinically relevant. The mean 6 minute walk distance (6MWD) at 1 year was 132.3 ± 136.3 meters in the SAPIEN cohort, and 159.0 ± 138.5 meters in the SAPIEN XT cohort. The difference between cohorts was 26.7 meters (95% CI 24.2, 29.2), $p < 0.0001$.

EOA at 1 year (hypothesis testing was based on a difference of 0.2 cm^2): In the SAPIEN cohort, mean EOA was $0.6 \pm 0.17 \text{ cm}^2$ at baseline and $1.5 \pm 0.40 \text{ cm}^2$ at 1 year, which was an improvement of $0.9 \pm 0.38 \text{ cm}^2$. In the SAPIEN XT cohort, mean EOA was $0.6 \pm 0.18 \text{ cm}^2$ at baseline and $1.5 \pm 0.43 \text{ cm}^2$ at 1 year, a mean increase of $0.9 \pm 0.41 \text{ cm}^2$. The difference between cohorts in change from baseline to 1 year was -0.01 (95% CI -0.15, 0.13), $p=0.0038$.

Device success: Device success was defined as successful vascular access, delivery and deployment and retrieval of delivery system; correct positioning, intended performance (aortic valve area $> 1.2 \text{ cm}^2$

and mean aortic valve gradient < 20 mmHg or peak velocity < 3 m/s, without moderate or severe prosthetic valve AR), and only one valve implanted. The proportion of device success was 45.3% in the SAPIEN cohort and 58.5% in the SAPIEN XT cohort. The relative risk ratio of SAPIEN XT cohort vs. SAPIEN cohort was 0.759 (95% CI 0.582, 0.990), $p < 0.0001$.

6MWT improvement in the SAPIEN XT cohort from baseline to 1 year was assessed as a superiority comparison. The improvement for each subject was computed, and the superiority comparison was evaluated by a two-sided paired sample t-test. In the SAPIEN XT cohort, the mean improvement in 6MWD from baseline to 1 year was 52.7 ± 111.5 meters, which was statistically significant ($p < 0.0001$).

Total regurgitation at 1 year was analyzed in the valve implant population. Total aortic regurgitation was assessed by the core lab as 0 = None, 1+ = Trace, 2+ = Mild, 3+ = Moderate, and 4+ = Severe. The change in mean total aortic regurgitation from baseline to 1 year was 0.1 ± 1.23 in the SAPIEN cohort, and 0.2 ± 1.38 in the SAPIEN XT cohort. The difference between cohorts in change from baseline to 1 year was 0.09 (95% CI -0.16, 0.34), $p=0.1027$.

In conclusion, there were significant improvements from baseline in NYHA class, echo valve performance (EOA and gradients), and Quality of Life (QOL) for patients in both the Edwards SAPIEN cohort and Edwards SAPIEN XT cohort.

In the inoperable cohort of the PARTNER II trial, the new lower profile Edwards SAPIEN XT valve system was associated with improved procedural outcomes, similar low 30-day mortality and strokes, reduced vascular complications, and similar 1-year major clinical events and valve performance.

The Edwards SAPIEN XT valve has demonstrated objective evidence of safety, efficacy and clinical utility for patients in whom transcatheter heart valve therapy is indicated and represents an advance with incremental clinical value.

Results of NR5 (29 mm / Transfemoral / Inoperable)

A total of 61 patients were enrolled. The primary safety and effectiveness endpoint was freedom from all-cause mortality at 1 year. The KM estimate at 30 days involving freedom from all-cause mortality was $94.9 \pm 2.8\%$.

There were no reported major strokes or incidence of renal failure, cardiac intervention or endocarditis, 1.6% myocardial infarction, 8.2% major vascular complications, 11.5% disabling bleeding events, 2.7% new atrial fibrillation and 4.9% new pacemaker.

The mean change (negative value = improvement) in NYHA from baseline at 30 days was -1.6 ± 0.9 . Device success was observed in 82.5%. The mean hospitalization stay was 6.1 ± 6.3 days which included 2.4 ± 3.4 days in the ICU.

The mean EOA was $0.8 \pm 0.16 \text{ cm}^2$ at baseline and $2.2 \pm 0.53 \text{ cm}^2$ at 30 days, and the average mean gradient decreased from $40.3 \pm 11.8 \text{ mmHg}$ at baseline to $7.7 \pm 2.8 \text{ mmHg}$ at 30 days. The mean peak gradient decreased from $71.7 \pm 20.8 \text{ mmHg}$ at baseline to $15.5 \pm 5.7 \text{ mmHg}$ at 30 days.

Results of SOURCE XT

A total of 2688 patients were enrolled. The vast majority of patients (96%) were treated with either the transapical (TA) or transfemoral (TF) approach. Only a small proportion of patients were treated with transaortic (TAo) or subclavian approaches. The implant approach was 62.7% for TF, 33.3% for TA, 3.76% for TAo and 0.3% for subclavian. The results only include the TF, TA and TAo approaches (n=2680).

Using K-M event rates at 30 days post implant for the TF, TA/TAo population, 6.2% of patients had died, 3% due to a cardiac death, 3.6% of patients had suffered a stroke, and 6.6% had a major vascular complication. Major/life threatening bleeding had occurred in 14.9% of patients, major bleeding in 10.2%, and renal failure or AKI in 17.8%. Permanent pacemakers were implanted in 9.5% of patients. Using K-M event rates at 1 year post implant for the TF, TA/TAo population, 19.5% of patients had died, 9.5% of these from cardiac death, and 6.3% of patients had suffered a stroke. Major/life-threatening bleeding had occurred in 17.3% of patients, major bleeding in 12%, major vascular complications in 7.2%, renal failure or AKI in 20.5% and 11% of patients had a new pacemaker implanted.

Of the 2688 patients that were enrolled, fifty-seven (57) of these patients had the SAPIEN XT valve implanted into a failing surgical prosthesis. The TF approach was used in 23 patients, and the TA/TAo

approach was used in 34 patients. The implanted valve size was 23 mm in 38 patients (66.7%), 26 mm in 14 patients (24.6%), and 29 mm in 5 patients (8.8%).

No deaths, no strokes, no major vascular complications, no life threatening bleedings, one (1) renal failure, and no new permanent pacemakers were reported at 30 days post implant for the TF population. At 1 year post implant, 3 deaths were reported for the TF population.

In the TA/TAo population, 3 deaths, 1 (major) stroke, 2 major vascular complications, 3 life threatening bleedings, and 4 new permanent pacemakers were reported at 30 days. At 1 year post implant, 4 additional deaths, 1 additional (minor) stroke, 1 additional major vascular complication, and 1 additional new permanent pacemaker were reported for the TA/TAo population.

The PARTNER II Cohort B Aortic Valve-in-Valve Registry (NR3/CANR3)

A clinical study was performed to establish a reasonable assurance of safety and effectiveness of transcatheter aortic valve replacement with the Edwards SAPIEN XT valve in patients with a failing surgical bioprosthetic aortic valve (i.e., “TAV-in-SAV”). The study was carried out as a single-arm registry nested (i.e., the PARTNER II trial), which was designated as “NR3.” NR3 was originally approved for 100 patients and later expanded under a Continued Access Protocol (CAP). Data from the original NR3 cohort and the NR3 CAP (CANR3) cohort were pooled at 30 days and 1 year data was available for the NR3 cohort only.

Patients were treated at 40 investigational sites between June 12, 2012 and December 10, 2013. The database for this PMA supplement reflected data collected through February 26, 2015 and included 199 patients (2 patients withdrew prior to treatment). By the last database extract performed on February 26, 2015, all of these patients were included in the 30-day data analysis, and 97 patients were included in the 1-year analysis.

The NR3 study was a single arm, prospective, observational, descriptive study without formal hypothesis testing. The patients were limited to those who were deemed by a heart team to have a mortality or major morbidity rate of $\geq 50\%$ for replacement of a failing surgical aortic valve and met the sizing requirements for the 23 mm or 26 mm SAPIEN XT valve. The specific sizing requirements were imposed because the 29 mm SAPIEN XT valve was not available when the study was initiated.

Contractors were utilized for analysis and interpretation of the clinical data, including an independent Data Safety Monitoring Board (DSMB) that was instructed to notify the applicant of any safety or compliance issues, a Clinical Event Committee (CEC) that was responsible for adjudicating endpoint-related events reported during the trial per definitions established *a priori*, an Electrocardiography (ECG) Core Lab for independent analysis of rhythm and occurrence of myocardial infarction, and an Echocardiography Core Lab for independent analysis of all echocardiograms.

Results of PARTNER II Cohort B Aortic Valve-in-Valve Registry (NR3/CANR3)

Since identical protocols were used in the pivotal and CAP cohort investigations, data from the two cohorts were pooled.

The “Attempted Implant” population consisted of all screen success patients for whom the index procedure was started. The “Valve Implant” population consisted of those patients for whom the valve implant process was completed. A total of 199 patients were screened for study participation. Two patients withdrew consent prior to treatment; therefore, there were 197 “Attempted Implant” patients. Two “Attempted Implant” patients were excluded from the “Valve Implant” population, because in one patient, intra-procedural TEE demonstrated a low transvalvular jet velocity (2.6 m/s) and gradient of 24 mmHg which did not meet the inclusion criteria, and in the other patient, the procedure was aborted due to inability to place the purse string sutures for transapical access. The patient disposition is summarized in Table 14.

The demographics of the pooled study population are summarized in Table 15. The mean age was 78.5 years, and 60.4% were male. A high proportion of patients had significant comorbidities, frailty, and prior cardiac interventions. The mean STS score was 9.7, and 95.4% of all patients were in NYHA classes III or IV.

Table 16 provides a summary of the failed surgical valves treated, which consisted of 94.4% bioprosthesis, 4.6% homografts, and 1.0% other valve types. Aortic stenosis was the predominant cause of prosthetic failure (54.2%), followed by mixed lesion (23.4%) and insufficiency/regurgitation (22.4%).

The primary endpoint of all-cause mortality, all stroke, moderate or severe obstruction, or moderate or severe paravalvular leak was 16.9% at 30 days and 38.0% at 1 year, as shown in Table 17.

No unanticipated adverse device effects (UADEs) were reported throughout the trial. Three explants have been reported to date; one explant occurred at autopsy, and two during surgical aortic valve replacement due to severe aortic insufficiency on postoperative day 5 and day 18, respectively. No CEC adjudicated endocarditis was reported.

The key safety outcomes adjudicated by the CEC for this study are presented in Table 18 through Table 20.

Valve hemodynamics as assessed by echocardiography is summarized in Table 21 and Figure 18 through Figure 22. The mean DVI increased from 0.27 ± 0.10 at baseline to 0.37 ± 0.09 at 30 days and 0.39 ± 0.11 at 1 year. The mean gradient decreased from 36.1 ± 16.38 mmHg at baseline to 17.4 ± 7.37 mmHg at 30 days, which was maintained at 1 year. The mean peak gradient decreased from 65.0 ± 26.76 mmHg at baseline to 32.7 ± 12.90 mmHg at 30 days, which was maintained at 1 year. Moderate/severe aortic regurgitation was present in 43.7% of subjects at baseline, which decreased to 2.5% at 30 days and 1.9% at 1 year. Moderate/severe paravalvular leak was present in 6.8% of subjects at baseline, 2.5% at 30 days, and 1.9% at 1 year.

It is important to note that although mean and peak gradients were significantly reduced as compared to baseline for the “TAV-in-SAV” procedure, the residual mean and peak gradients were numerically higher than those observed for TAVR procedures performed for native valve stenosis.

The NYHA class by visit is shown in Figure 23. About 89% of subjects were in NYHA I/II at 30 days and 84% at 1 year as compared to 5% at baseline.

The mean improvement in 6MWD among the Attempted Implant population was 49.8 ± 169.9 meters from baseline to 30 days and 86.1 ± 142.0 meters from baseline to 1 year.

The mean hospitalization stay among the Attempted Implant population was 7.9 ± 7.0 days, which included 2.9 ± 5.0 days in the ICU.

The QoL at different time points as measured by the Kansas City Cardiomyopathy Questionnaire (KCCQ) clinical summary score is shown in Figure 24. The mean KCCQ summary score among the Attempted Implant population improved from 45.5 ± 21.8 at baseline to 68.0 ± 22.0 at 30 days and 70.4 at 1 year.

Device success was defined as successful vascular access, delivery and deployment and retrieval of delivery system; correct positioning, intended performance (aortic valve area $> 1.2 \text{ cm}^2$ and mean aortic valve gradient < 20 mmHg or peak velocity < 3 m/s, without moderate or severe prosthetic valve aortic regurgitation). It was achieved in 61.5 % of patients. In the vast majority of device failure subjects, the failure was due to unintended performance of the valve; specifically, mean gradient ≥ 20 mmHg or peak velocity ≥ 3 m/s was observed in 62 cases and moderate/severe aortic regurgitation in 5 cases.

PARTNER II Cohort B Clinical Data

Table 6:
Cohort B (Inoperable) Baseline Characteristics of the Patients and Echocardiographic Findings
(AT Population)*

Characteristic	SAPIEN XT Valve	SAPIEN Valve
	(N = 282)	(N = 271)
Age - yr	84.0 ± 8.68	84.5 ± 8.65
Male sex — no./total no. (%)	140/282 (49.6%)	138/271 (50.9%)
STS score†	10.3 ± 5.40	11.0 ± 5.72
Logistic EuroSCORE‡	18.8 ± 14.66	21.0 ± 16.78
NYHA class		
I/II — no./total no. (%)	9/282 (3.2%)	11/271 (4.1%)
III/IV — no./total no. (%)	273/282 (96.8%)	260/271 (95.9%)
Coronary artery disease — no./total no. (%)	184/282 (65.2%)	183/271 (67.5%)
Previous myocardial infarction — no./total no. (%)	55/282 (19.5%)	57/271 (21.0%)
Previous intervention		
CABG — no./total no. (%)	76/282 (27.0%)	72/271 (26.6%)
PCI — no./total no. (%)	89/282 (31.6%)	98/271 (36.2%)
Balloon aortic valvuloplasty — no./total no. (%)	51/282 (18.1%)	53/271 (19.6%)
Cerebral vascular disease — no./total no. (%)	31/282 (11.0%)	35/271 (12.9%)
Peripheral vascular disease — no./total no. (%)	88/282 (31.2%)	73/271 (26.9%)
COPD		
Any — no./total no. (%)	83/282 (29.4%)	71/271 (26.2%)
Oxygen-dependent — no./total no. (%)	38/282 (13.5%)	43/271 (15.9%)
Creatinine > 2 mg/dL (177 µmol/liter) — no./total no. (%)	31/282 (11.0%)	30/271 (11.1%)
Atrial fibrillation — no./total no. (%)	102/282 (36.2%)	108/271 (39.9%)
Permanent pacemaker — no./total no. (%)	57/282 (20.2%)	47/271 (17.3%)
Pulmonary hypertension — no./total no. (%)	72/282 (25.5%)	56/271 (20.7%)
Frailty§ — no./total no. (%)	168/282 (59.6%)	162/271 (59.8%)
Extensively calcified aorta — no./total no. (%)	19/282 (6.7%)	11/271 (4.1%)
Chest-wall deformity — no./total no. (%)	10/282 (3.5%)	10/271 (3.7%)
Liver disease — no./total no. (%)	12/282 (4.3%)	13/271 (4.8%)
Echocardiographic findings		
Aortic-valve area — cm ²	0.6 ± 0.18	0.6 ± 0.17
Mean aortic-valve gradient — mmHg	45.1 ± 13.67	45.2 ± 14.36
Mean LVEF — %	52.5 ± 13.39	52.9 ± 13.61
Moderate or severe mitral regurgitation** — no./total no. (%)	71/264 (26.9%)	77/251 (30.7%)

* Plus-minus values are means ± SD. To convert the value for creatinine to micromoles per liter, multiply by 88.4. AT denotes as treated population, CABG denotes coronary-artery bypass grafting, COPD chronic obstructive pulmonary disease, LVEF left ventricular ejection fraction, NYHA New York Heart Association, PCI percutaneous coronary intervention, and TAVR transcatheter aortic-valve implantation.

† The Society of Thoracic Surgeons (STS) score measures patient risk at the time of cardiovascular surgery on a scale that ranges from 0% to 100%, with higher numbers indicating greater risk. An STS score higher than 10% indicates very high surgical risk.

‡ The logistic European System for Cardiac Operative Risk Evaluation (EuroSCORE), which measures patient risk at the time of cardiovascular surgery, is calculated with the use of a logistic-regression equation. Scores range from 0% to 100%, with higher scores indicating greater risk. A logistic EuroSCORE higher than 20% indicates very high surgical risk.

§ Frailty was determined by the surgeons according to prespecified criteria.

** Moderate or severe mitral regurgitation was defined as regurgitation of grade 3+ or higher.

Table 7: Cohort B (Inoperable) Clinical Outcomes at 30 days and 1 year (AT Population)*				
Outcome ^a	30 Days		1 Year	
	SAPIEN XT Valve	SAPIEN Valve	SAPIEN XT Valve	SAPIEN Valve
	(N = 282)	(N = 271)	(N = 282)	(N = 271)
Death ^b				
From any cause	10/282 (3.5%)	12/271 (4.42%)	63/282 (22.34%)	61/271 (22.50%)
From cardiovascular cause	9/282 (3.2%)	10/271 (3.69%)	46/282 (16.31%)	46/271 (16.97%)
Major Stroke	9/282 (3.2%)	8/271 (2.95%)	13/282 (4.61%)	14/271 (5.17%)
Repeat hospitalization ^c	32/282 (11.3%)	28/271 (10.33%)	61/282 (21.63%)	61/271 (22.51%)
Death from any cause or major stroke or repeat hospitalization	48/282 (17.0%)	43/271 (15.87%)	105/282 (37.23%)	100/271 (36.90%)
Myocardial Infarction				
All	5/282 (1.8%)	2/271 (0.74%)	19/282 (6.74%)	8/271 (2.95%)
Peri-procedural	4/282 (1.4%)	1/271 (0.37%)	NA	NA
Major Vascular Complications	32/282 (11.3%)	43/271 (15.87%)	35/282 (12.41%)	47/271 (17.34%)
Renal Failure ^d	10/282 (3.5%)	5/271 (1.85%)	16/282 (5.67%)	10/271 (3.69%)
Disabling Bleeding Event ^e	22/282 (7.8%)	34/271 (12.55%)	38/282 (13.48%)	52/271 (19.19%)
Cardiac Reintervention ^f	9/282 (3.2%)	13/271 (4.80%)	10/282 (3.55%)	13/271 (4.80%)
Endocarditis	0/282 (0.00%)	0/271 (0.00%)	1/282 (0.35%)	2/271 (0.74%)
New Atrial Fibrillation	6/186 (3.2%)	7/190 (3.68%)	10/154 (6.49%)	9/144 (6.25%)
New pacemaker ^g	19/282 (6.7%)	16/271 (5.90%)	22/282 (7.80%)	21/271 (7.75%)
<p>* AT=As Treated, NA=not applicable, TAVR=transcatheter aortic valve replacement. Data presented as n/N (%) of patients.</p> <p>a. CEC adjudicated</p> <p>b. Deaths from unknown causes were assumed to be deaths from cardiovascular causes.</p> <p>c. Repeat hospitalizations were included if they were due to aortic stenosis or complications of the valve procedure (e.g. TAVR).</p> <p>d. Renal failure is defined as stage III acute kidney injury: Increase in serum creatinine to $\geq 300\%$ (3 x increase compared with baseline) or serum creatinine of ≥ 4 mg/dL (≥ 354 μmol/L) with an acute increase of at least 0.5 mg/dL (44 μmol/L)</p> <p>e. Disabling bleeding: Fatal bleeding OR bleeding in a critical area or organ, such as intracranial, intraspinal, intraocular, or pericardial necessitating pericardiocentesis, or intramuscular with compartment syndrome OR bleeding causing hypovolemic shock or severe hypotension requiring vasopressors or surgery OR overt source of bleeding with drop in hemoglobin of ≥ 5 g/dL or whole blood of packed red blood cells (RBC) transfusion ≥ 4 units</p> <p>f. Cardiac reintervention includes any intervention that repairs, alters or replaces a previously operated valve OR balloon aortic valvuloplasty OR Surgical aortic valve replacement OR valve in valve</p> <p>g. Refer to Table 8 for breakdown of subjects with and without pacemaker or ICD at baseline.</p>				

Table 8: Conduction Disturbance Requiring Pacemaker (CEC Adjudicated) Pooled AT Population)				
Event	SAPIEN Valve (N = 271)		SAPIEN XT Valve (N = 282)	
	Events	Patients with Event	Events	Patients with Event
New Permanent Pacemaker – All Patients ¹				
0-30 Days	16	16/271 (5.9%)	19	19/282 (6.7%)
0-12 Months	21	21/271 (7.7%)	22	22/282 (7.8%)
New Permanent Pacemaker – Patients without pre-procedural pacemaker ²				
0-30 Days	16	16/224 (7.1%)	19	19/225 (8.4%)
0-12 Months	21	21/224 (9.4%)	22	22/225 (9.8%)
¹ Subjects with pacemaker or ICD at baseline are included (all patients included in denominator). ² Subjects with pacemaker or ICD at baseline are excluded (patients with baseline pacemaker/ICD subtracted from denominator). Note: The patients who received a new pacemaker in both rows are the same patients. The only difference is the denominators				

Figure 4:
All-Cause Mortality or Major Stroke or Re-Hospitalization at One Year
(AT Population)

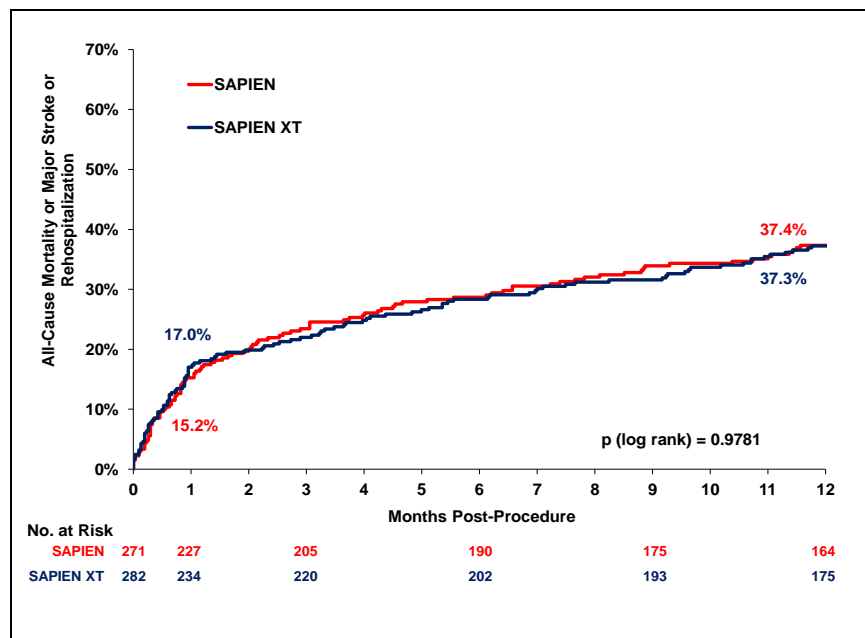
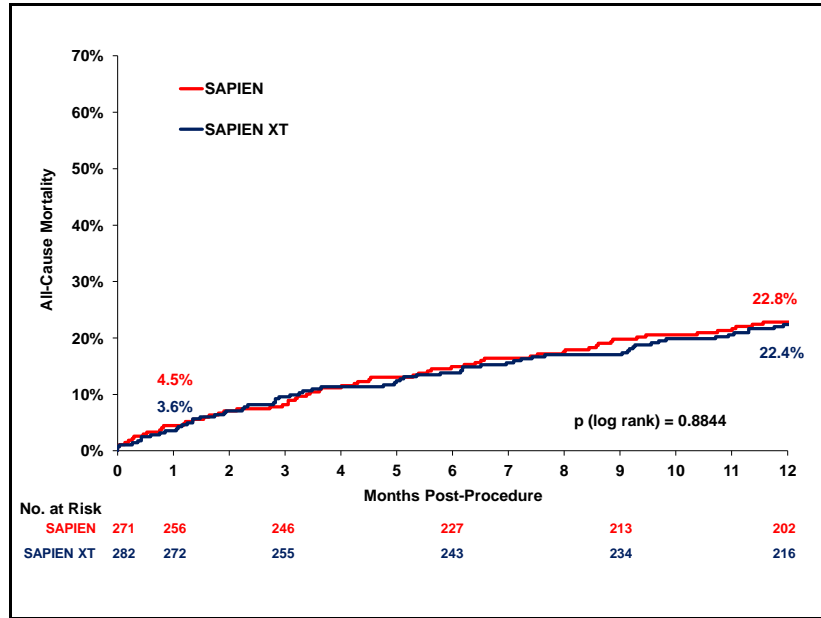
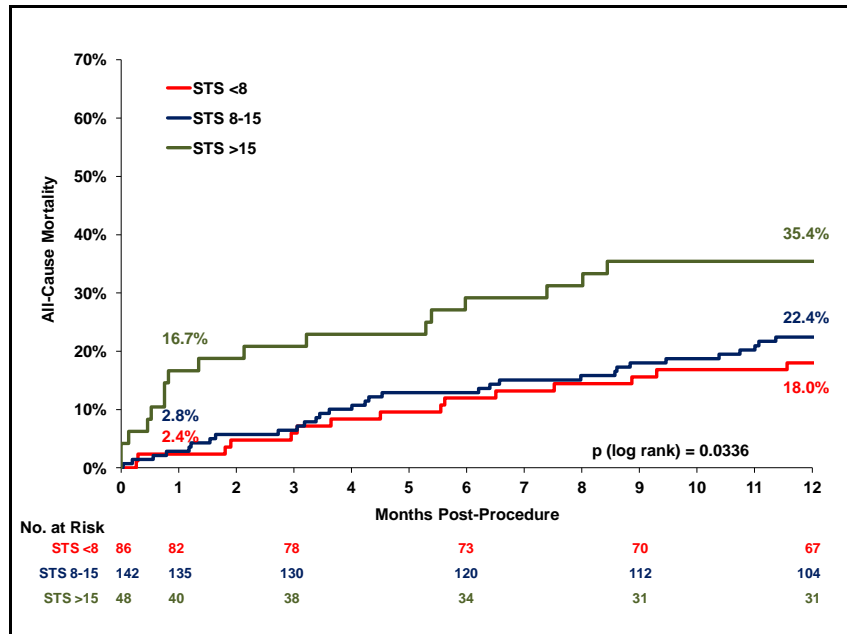


Figure 5:
All-Cause Mortality at One Year
(AT Population)



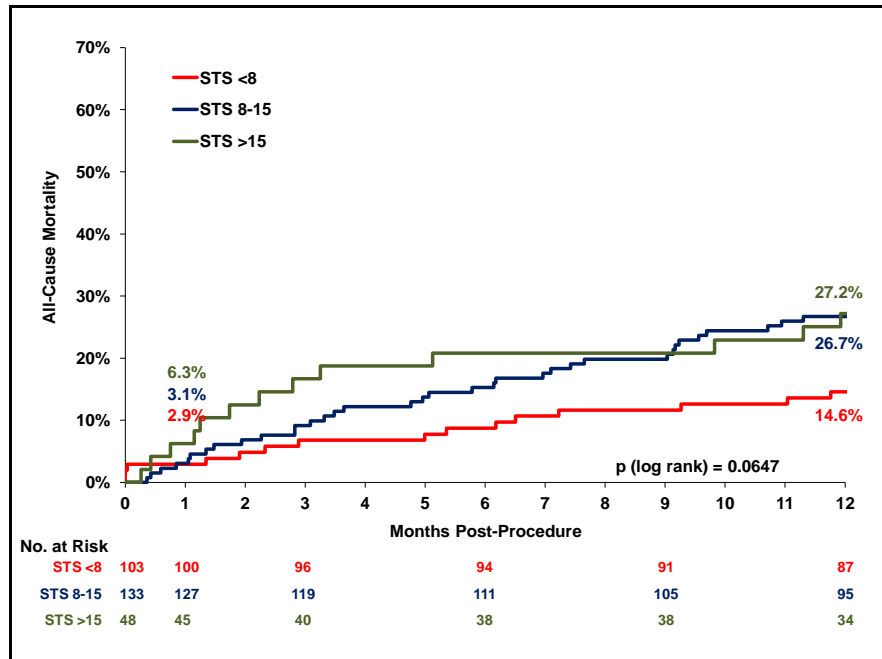
K-M curves for all-cause mortality by STS scores up to 1-Year for the pooled valve implant populations for the SAPIEN cohort and the SAPIEN XT cohort are presented in Figures 6 and 7 respectively. The p-value for each log-rank test for the SAPIEN cohort shows a statistically significant difference among the 3 STS score groups (p-value=0.0336).

Figure 6:
All-Cause Mortality by STS Score to One Year - SAPIEN Valve
(Intent-to-Treat Population)



This difference between STS risk groups was not present in the SAPIEN XT valve (p-value=0.0647).

Figure 7:
All-Cause Mortality by STS Score to One Year – SAPIEN XT Valve
(Intent-to-Treat Population)



Figures 8 and 9 show the results of a landmark analysis of all-cause mortality by STS scores for SAPIEN cohort and SAPIEN XT cohort respectively. In this analysis the overall mortality at day 30 was reset to 0 for patients still at risk at day 30 and day 30 was relabeled as day 0. The Kaplan-Meier plots were produced based on the re-zeroed data, and all-cause mortality was analyzed to one year from the new day 0. Any events that occurred before day 30 were not included in this analysis. There were no statistically significant differences in overall mortality among the STS score groups in either cohorts.

Figure 8:
All-Cause Mortality by STS Score Rezeroing at 30-Days – SAPIEN Valve
(Intent-to-Treat Population)

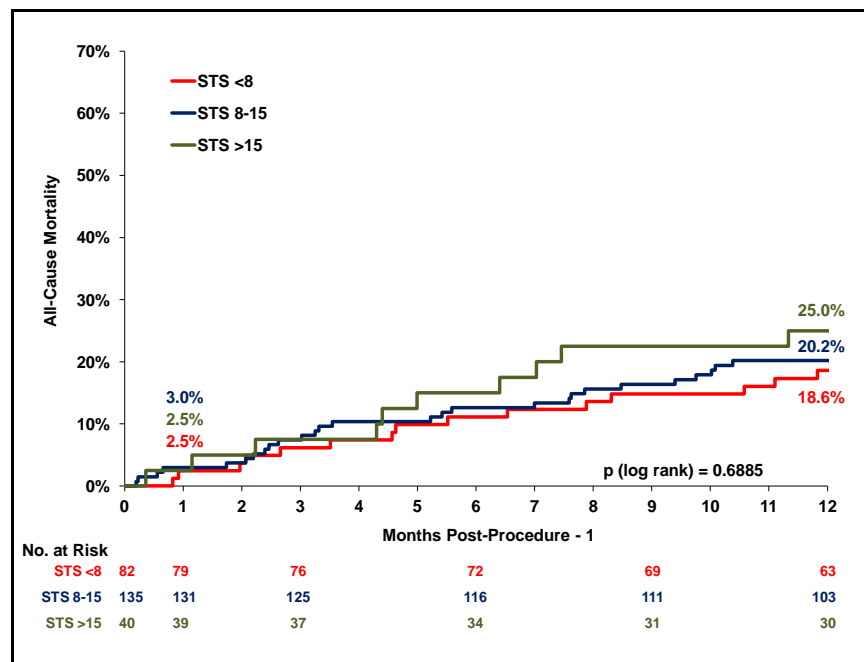


Figure 9:
All-Cause Mortality by STS Score Rezeroing at 30-Days – SAPIEN XT Valve
(Intent to Treat Population)

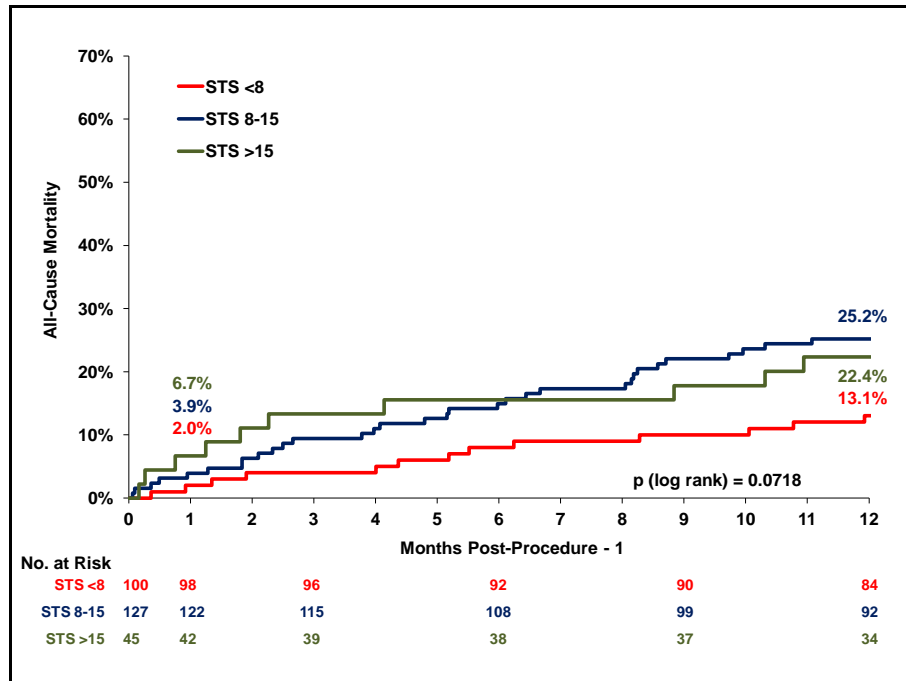


Figure 10:
Major Stroke to One Year
(AT Population)

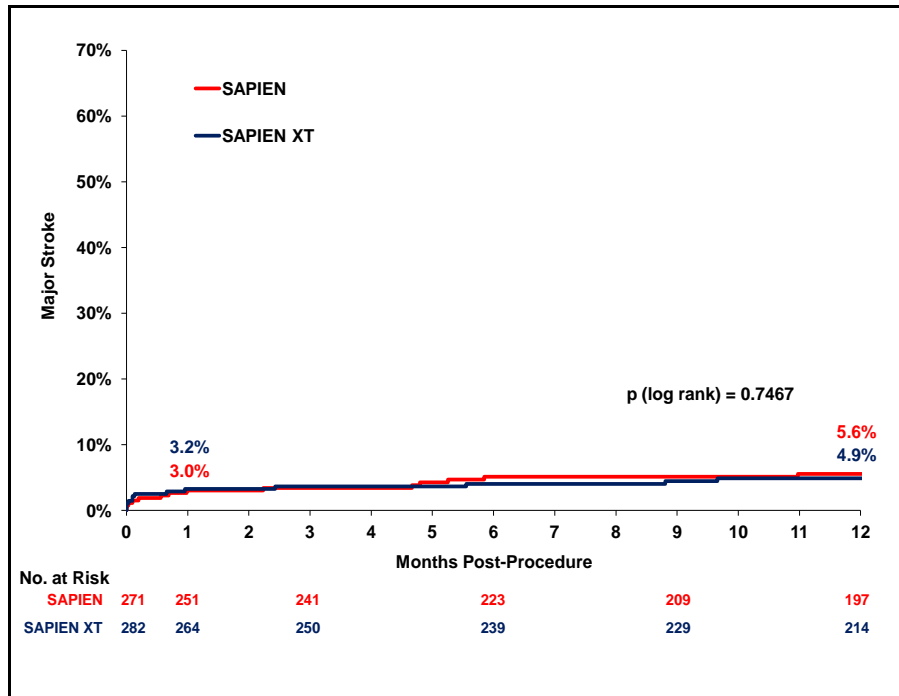


Figure 11:
Rehospitalization to One Year
(AT Population)

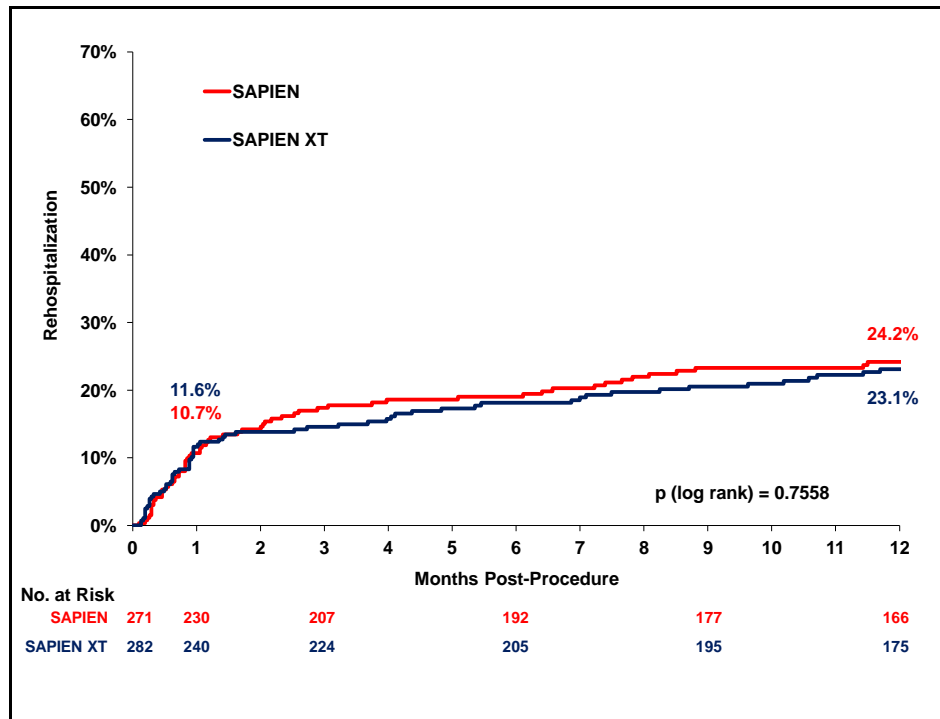


Figure 12:
Effective Orifice Area
(Valve Implant Population)

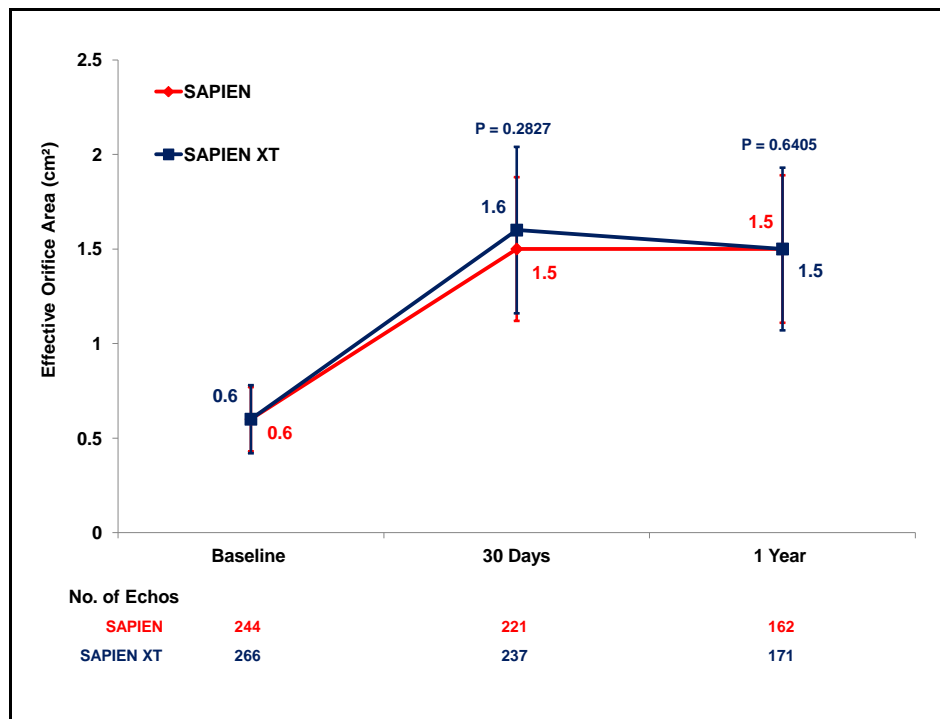


Figure 13:
Mean Gradient
(Valve Implant Population)

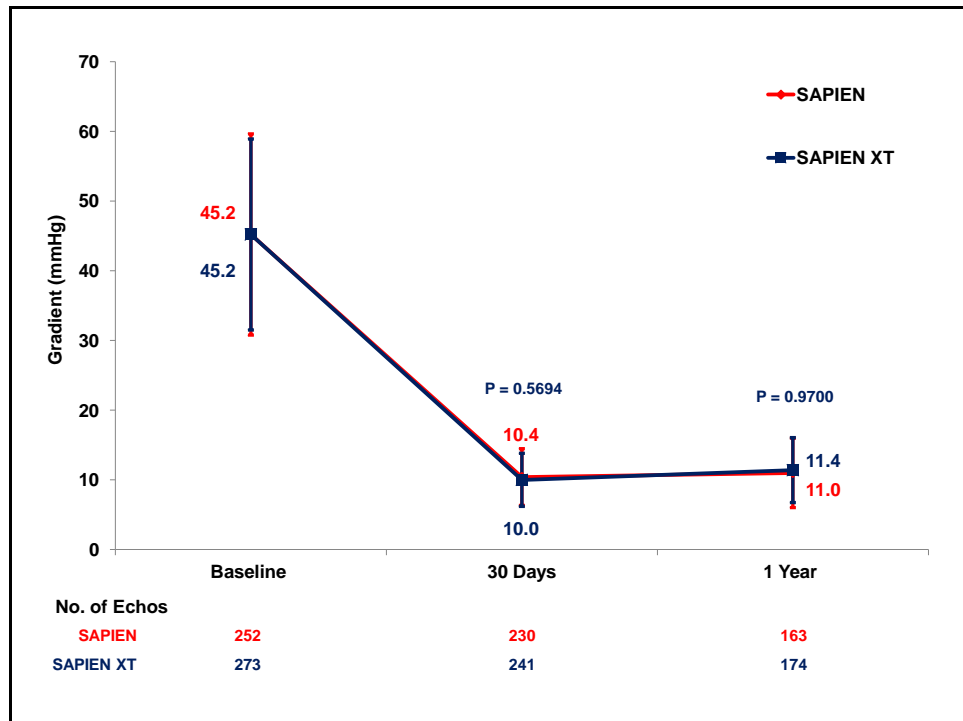


Table 9:
NYHA Functional Class by Visit
AT Population

Visit	SAPIEN Valve (N = 271)					SAPIEN XT Valve (N = 282)				
	I	II	III	IV	Total	I	II	III	IV	Total
Baseline	0	11	129	131	271	0	9	137	136	282
30 Days	90	99	55	5	249	97	107	51	8	263
6 Months	90	86	27	4	207	111	80	21	5	217
1 Year	80	82	26	4	192	99	81	20	4	204

Figure 14:
NYHA Class by Visit
(Intent-to-Treat Population)

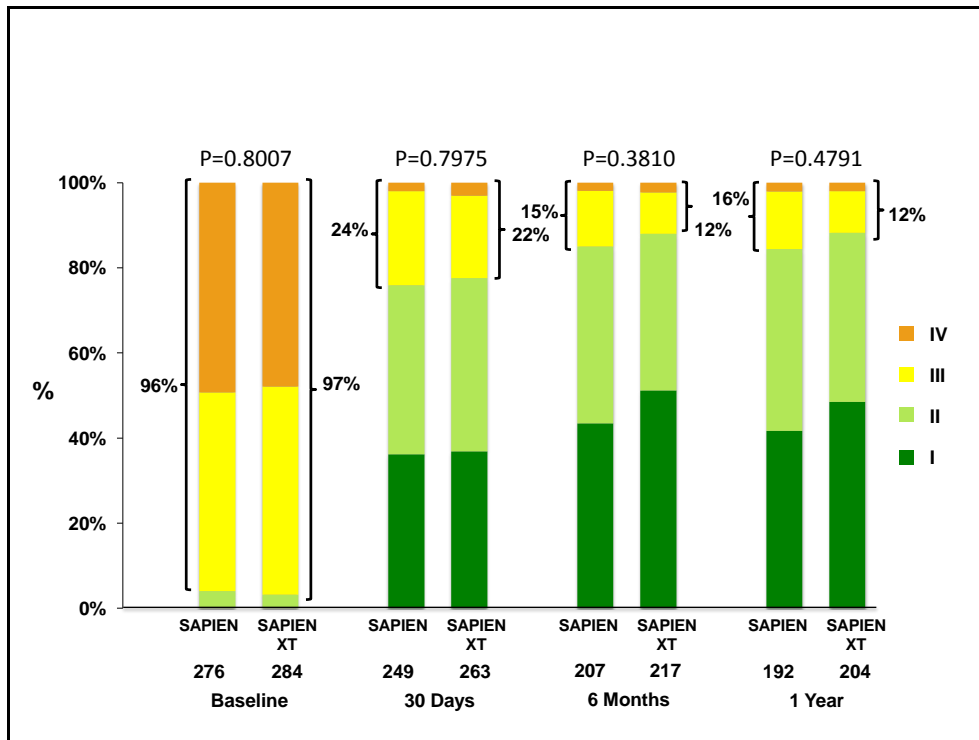


Figure 15:
KCCQ Clinical Summary Score
(AT Population)

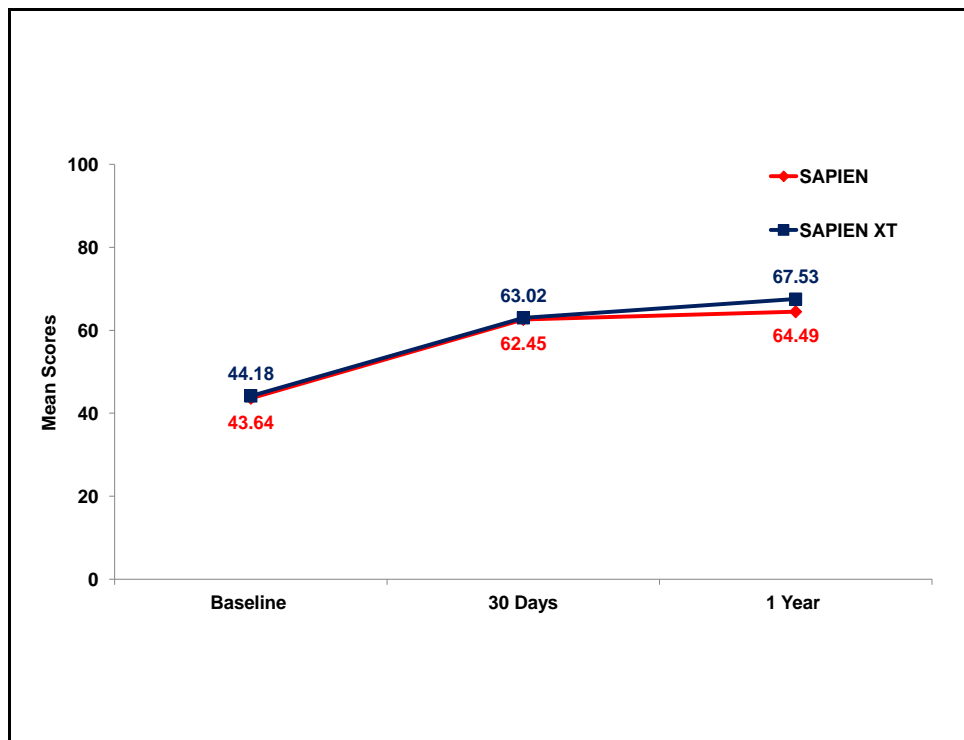


Table 10:
Cohort B (29 mm / Transfemoral / Inoperable)
Baseline Characteristics of the Patients and Echocardiographic Findings
(Intent to Treat Population)

Characteristic	SAPIEN XT Valve
	(N = 61)
Age - yr	83.3 ± 7.89
Male sex — no. (%)	61 (100.0%)
STS score†	8.3 ± 4.39
Logistic EuroSCORE‡	11.3 ± 13.75
NYHA class — no. (%)	
I/II	6 (9.8%)
III/IV	55 (90.2%)
Coronary artery disease — no. (%)	48 (78.7%)
Previous myocardial infarction — no./total no. (%)	14/61 (23.0%)
Previous intervention — no./total no. (%)	
CABG	34/61 (55.7%)
PCI	19/61 (31.1%)
Balloon aortic valvuloplasty	20/61 (32.8%)
Cerebral vascular disease — no./total no. (%)	10/61 (16.4%)
Peripheral vascular disease — no./total no. (%)	16/61 (26.2%)
COPD — no. (%)	
Any	19 (31.1%)
Oxygen-dependent	6 (9.8%)
Creatinine > 2 mg/dL (177 µmol/liter) — no./total no. (%)	8/61 (13.1%)
Atrial fibrillation — no./total no. (%)	30/61 (49.2%)
Permanent pacemaker — no./total no. (%)	18/61 (29.5%)
Pulmonary hypertension — no./total no. (%)	13/61 (21.3%)
Frailty§ — no./total no. (%)	30/61 (49.2%)
Extensively calcified aorta — no. (%)	3 (4.9%)
Chest-wall deformity — no. (%)	5 (8.2%)
Liver disease — no./total no. (%)	2/61 (3.3%)
Echocardiographic findings	
Aortic-valve area — cm ²	0.8 ± 0.16
Mean aortic-valve gradient — mmHg	40.3 ± 11.67
Mean LVEF — %	46.1 ± 14.52
Moderate or severe mitral regurgitation** — no./total no. (%)	15/56 (26.8%)

Note: Plus-minus values are means ± SD. To convert the value for creatinine to micromoles per liter, multiply by 88.4. ITT denotes intent to treat population, CABG denotes coronary-artery bypass grafting, COPD chronic obstructive pulmonary disease, LVEF left ventricular ejection fraction, NYHA New York Heart Association, PCI percutaneous coronary intervention, and TAVR transcatheter aortic-valve implantation.

† The Society of Thoracic Surgeons (STS) score measures patient risk at the time of cardiovascular surgery on a scale that ranges from 0% to 100%, with higher numbers indicating greater risk. An STS score higher than 10% indicates very high surgical risk.

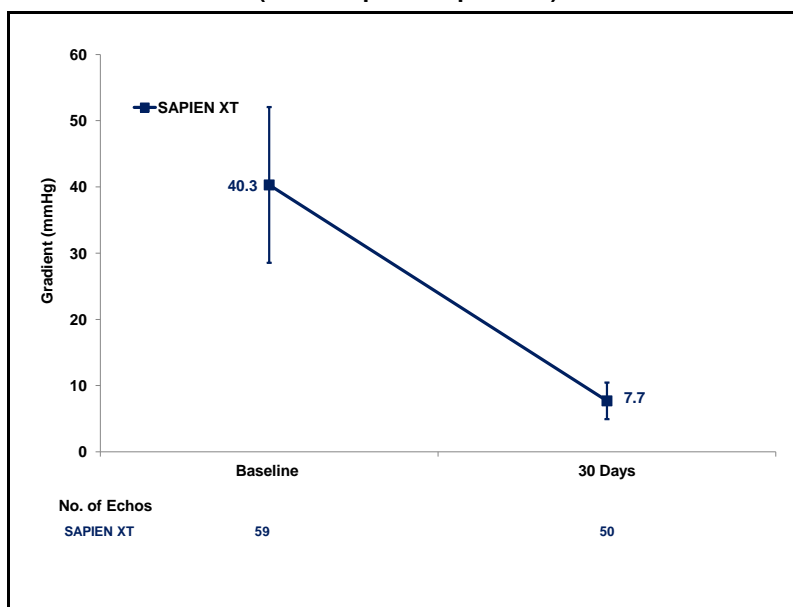
‡ The logistic European System for Cardiac Operative Risk Evaluation (EuroSCORE), which measures patient risk at the time of cardiovascular surgery, is calculated with the use of a logistic-regression equation. Scores range from 0% to 100%, with higher scores indicating greater risk. A logistic EuroSCORE higher than 20% indicates very high surgical risk.

§ Frailty was determined by the surgeons according to prespecified criteria.

** Moderate or severe mitral regurgitation was defined as regurgitation of grade 3+ or higher.

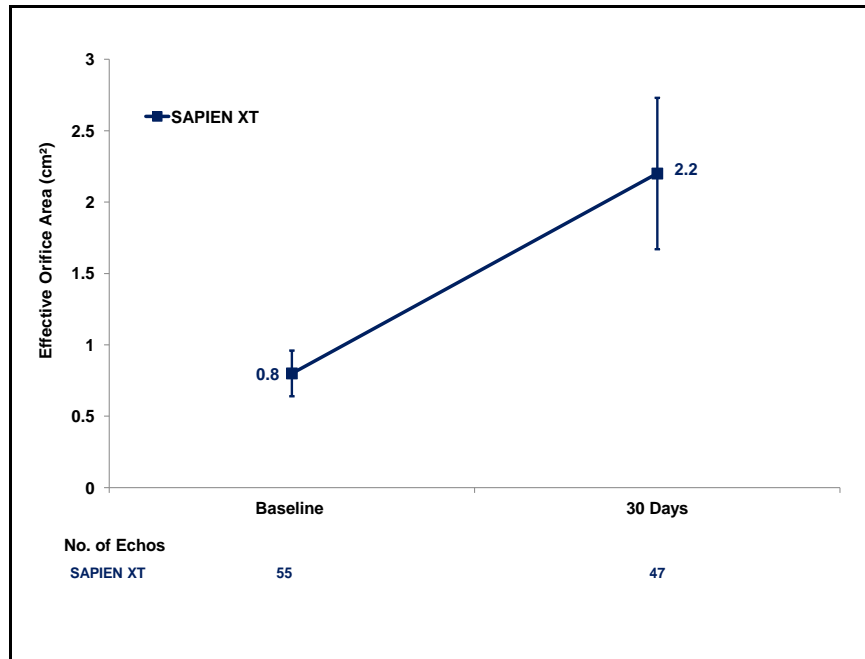
Table 11: Cohort B (29 mm / Transfemoral / Inoperable) – CEC Adjudicated Adverse Events at 30 days (AT Population)*	
Outcome^a	SAPIEN XT Valve N = 61
Death ^b	
From any cause	3/61 (4.9%)
From cardiovascular cause	3/61 (4.9%)
Major Stroke	0/61 (0.0%)
Myocardial Infarction	1/61 (1.6%)
Major Vascular Complications	5/61 (8.2%)
Renal Failure ^c	0/61 (0.0%)
Disabling Bleeding Event ^d	7/61 (11.5%)
Cardiac Reintervention ^e	0/61 (0.0%)
Endocarditis	0/61 (0.0%)
New Atrial Fibrillation	1/37 (2.7%)
New pacemaker	3/61 (4.9%)
<p>* AT=As Treated. Data presented as n/N (%) of patients.</p> <p>a. CEC adjudicated</p> <p>b. Deaths from unknown causes were assumed to be deaths from cardiovascular causes.</p> <p>c. Renal failure is defined as stage III acute kidney injury: Increase in serum creatinine to $\geq 300\%$ (3 x increase compared with baseline) or serum creatinine of ≥ 4 mg/dL (≥ 354 $\mu\text{mol/L}$) with an acute increase of at least 0.5 mg/dL (44 $\mu\text{mol/L}$)</p> <p>d. Disabling bleeding: Fatal bleeding OR bleeding in a critical area or organ, such as intracranial, intraspinal, intraocular, or pericardial necessitating pericardiocentesis, or intramuscular with compartment syndrome OR bleeding causing hypovolemic shock or severe hypotension requiring vasopressors or surgery OR overt source of bleeding with drop in hemoglobin of ≥ 5 g/dL or whole blood of packed red blood cells (RBC) transfusion ≥ 4 units</p> <p>e. Cardiac reintervention includes any intervention that repairs, alters or replaces a previously operated valve OR balloon aortic valvuloplasty OR Surgical aortic valve replacement OR valve in valve</p>	

Figure 16:
Cohort B (29 mm / Transfemoral / Inoperable) – Mean Gradient (Valve Implant Population)



Gradient data for this figure only contains data from 29 mm valve sizes and does not include 23 or 26 mm.

Figure 17:
Cohort B (29 mm / Transfemoral / Inoperable) – Effective Orifice Area
(Valve Implant Population)



Effective orifice area data for this figure only contains data from 29 mm valve sizes and does not include 23 or 26 mm.

SOURCE XT Clinical Data

Table 12: SOURCE XT (High Risk) Baseline Characteristics of the Patients and Echocardiographic Findings (AT Population)		
Characteristic	Transfemoral	TA/TAo Pooled
	(N = 1685)	(N = 995)
Age - yr	82.0 ± 6.5	80.3 ± 6.5
Male sex — no./total no. (%)	600/1685 (35.6%)	536/995 (53.9%)
STS score†	8.0 ± 6.8	7.9 ± 6.2
Logistic EuroSCORE‡	19.8 ± 11.6	21.6 ± 13.7
NYHA class — no./total no. (%)		
I/II	377/1676 (22.5%)	242/992 (24.4%)
III/IV	1299/1676 (77.5%)	750/992 (75.6%)
Coronary artery disease — no./total no. (%)	667/1685 (39.6%)	518/995 (52.1%)
Previous myocardial infarction — no./total no. (%)	205/1685 (12.2%)	197/995 (19.8%)
Previous intervention — no./total no. (%)		
CABG	204/1685 (12.1%)	226/995 (22.7%)
PCI	460/1685 (27.3%)	355/995 (35.7%)
Balloon aortic valvuloplasty	128/1685 (7.6%)	66/995 (6.6%)
Cerebral vascular disease — no./total no. (%)	191/1685 (11.3%)	143/995 (14.4%)
Peripheral vascular disease — no./total no. (%)	248/1684 (14.7%)	320/995 (32.2%)
COPD — no./total no. (%)		
Any — no./total no. (%)	327/1684 (19.4%)	218/995 (21.9%)
Oxygen-Dependent — no./total no. (%)	31/1684 (1.8%)	11/995 (1.1%)
Creatinine > 2 mg/dL (177 µmol/liter) — no./total no. (%)	104/1681 (6.2%)	114/994 (11.5%)
Atrial fibrillation — no./total no. (%)	395/1678 (23.5%)	289/990 (29.2%)
Permanent pacemaker — no./total no. (%)	170/1685 (10.1%)	134/995 (13.5%)
Pulmonary hypertension — no./total no. (%)	440/1684 (26.1%)	204/995 (20.5%)
Frailty§ — no./total no. (%)	896/932 (96.1%)	548/579 (94.6%)
Extensively calcified aorta — no./total no. (%)	71/1684 (4.2%)	103/995 (10.4%)
Chest-wall deformity — no./total no. (%)	18/1684 (1.1%)	6/995 (0.6%)
Liver disease — no./total no. (%)	52/1685 (3.1%)	27/995 (2.7%)
Echocardiographic findings		
Aortic-valve area — cm ²	0.7 ± 0.21	0.7 ± 0.21
Mean aortic-valve gradient — mmHg	49.2 ± 16.54	45.0 ± 15.43
Mean LVEF — %	55.1 ± 12.48	53.2 ± 12.50
Moderate or severe mitral regurgitation** — no./total no. (%)	345/1633 (21.1%)	174/976 (17.8%)
Note: Plus-minus values are means ± SD. To convert the value for creatinine to micromoles per liter, multiply by 88.4. AT denotes as treated population, CABG denotes coronary-artery bypass grafting, COPD chronic obstructive pulmonary disease, LVEF left ventricular ejection fraction, NYHA New York Heart Association, PCI percutaneous coronary intervention, and TAVR transcatheter aortic-valve implantation. † The Society of Thoracic Surgeons (STS) score measures patient risk at the time of cardiovascular surgery on a scale that ranges from 0% to 100%, with higher numbers indicating greater risk. An STS score higher than 10% indicates very high surgical risk. ‡ The logistic European System for Cardiac Operative Risk Evaluation (EuroSCORE), which measures patient risk at the time of cardiovascular surgery, is calculated with the use of a logistic-regression equation. Scores range from 0% to 100%, with higher scores indicating greater risk. A logistic EuroSCORE higher than 20% indicates very high surgical risk. § Frailty was determined by the surgeons according to prespecified criteria. ** Moderate or severe mitral regurgitation was defined as regurgitation of grade 3+ or higher.		

Table 13: SOURCE XT (High Risk) Clinical Outcomes^a at 30 days and 1 year (AT Population)*				
Outcome	30 Days		1-Year	
	Transfemoral	TA/TAo	Transfemoral	TA/TAo
	(N = 1685)	(N = 995)	(N = 1685)	(N = 995)
All Cause Death	71 (4.2%)	96 (9.7%)	248 (15.0%)	266 (27.0%)
Cardiac Death	28 (1.7%)	51 (5.2%)	106 (6.7%)	132 (14.4%)
Stroke				
All Stroke	56 (3.4%)	39 (4.1%)	90 (5.6%)	66 (7.6%)
Major Stroke	34 (2.0%)	27 (2.8%)	55 (3.5%)	44 (5.0%)
Repeat hospitalization ^b	80 (4.9%)	83 (9.0%)	396 (25.5%)	314 (36.7%)
Myocardial Infarction	7 (0.4%)	9 (0.9%)	23 (1.5%)	21 (2.5%)
Major Vascular Complications	132 (7.9%)	43 (4.4%)	139 (8.3%)	52 (5.5%)
Renal Failure ^d /AKI	197 (11.9%)	270 (28.0%)	240 (14.7%)	292 (30.6%)
Life-threatening bleeding ^c	63 (3.8%)	84 (8.6%)	74 (4.5%)	101 (10.6%)
Endocarditis	2 (0.1%)	2 (0.2%)	15 (1.0%)	10 (1.2%)
New Atrial Fibrillation	54 (3.3%)	83 (8.8%)	89 (5.6%)	109 (12.0%)
New pacemaker	145 (8.7%)	105 (10.8%)	165 (10.0%)	120 (12.7%)
<p>* AT=As Treated, TAVR=transcatheter aortic valve replacement. Data presented as n (%) of patients where % is the Kaplan-Meier event rate at 30-days and 1-year respectively.</p> <p>a. CEC adjudicated</p> <p>b. Repeat hospitalizations were included if they were due to aortic stenosis or complications of the valve procedure (e.g. TAVR).</p> <p>c. Disabling bleeding: Fatal bleeding OR bleeding in a critical area or organ, such as intracranial, intraspinal, intraocular, or pericardial necessitating pericardiocentesis, or intramuscular with compartment syndrome OR bleeding causing hypovolemic shock or severe hypotension requiring vasopressors or surgery OR overt source of bleeding with drop in hemoglobin of ≥ 5 g/dL or whole blood of packed red blood cells (RBC) transfusion ≥ 4 units</p> <p>d. Renal failure is defined as stage III acute kidney injury: Increase in serum creatinine to $\geq 300\%$ (3 x increase compared with baseline) or serum creatinine of ≥ 4 mg/dL (≥ 354 μmol/L) with an acute increase of at least 0.5 mg/dL (44 μmol/L)</p>				

PARTNER II Nested Registry 3/ Continued Access Nested Registry 3 (NR3/CANR3) (Aortic Valve-in-Valve)

Table 14: Patient Disposition		
	Attempted Implant ¹	Valve Implant ²
Number of Patients	197	195
¹ Attempted Implant: All screen success patients for whom the Index Procedure was started. Patients were analyzed according to the valve used in the initial implant attempt. ² Valve Implant: This population was a subset of the Attempted Implant group, consisting of those patients for whom the valve implant process was completed.		

Table 15: Demographic and Baseline Characteristics Attempted Implant Population	
Characteristic	Results¹ (N = 197)
Age – yr	78.5 ± 11.00 ¹
Male sex	119/197 (60.4%)
STS score	9.7 ± 5.09
New York Heart Association (NYHA) class	
I/II	9/197 (4.6%)
III/IV	188/197 (95.4%)
Coronary artery disease	139/197 (70.6%)
Previous myocardial infarction	25/197 (12.7%)
Previous intervention	
Coronary artery bypass grafting (CABG)	97/197 (49.2%)
Percutaneous coronary intervention (PCI)	39/197 (19.8%)
Prior aortic valvuloplasty	17/197 (8.6%)
Cerebral vascular accident (CVA)	29/197 (14.7%)
Peripheral vascular disease	49/197 (24.9%)
Chronic obstructive pulmonary disease (COPD)	
Any	65/197 (33.0%)
Oxygen-dependent	14/197 (7.1%)
Creatinine > 2 mg/dL (177 µmol/liter) ²	25/197 (12.7%)
Atrial fibrillation	98/197 (49.7%)
Permanent pacemaker	51/197 (25.9%)
Pulmonary hypertension	26/197 (13.2%)
Frailty ³	65/197 (33.0%)
Extensively calcified aorta	12/197 (6.1%)
Chest-wall deformity	4/197 (2.0%)
Liver disease	14/197 (7.1%)
Reason for Valve Replacement	
Mixed Lesion	45/192 (23.4%)
Insufficiency/regurgitation Only	43/192 (22.4%)
Stenosis Only	104/192 (54.2%)
Echocardiographic findings	
Doppler Velocity Index (DVI) ⁴	0.27 ± 0.10
Mean aortic-valve gradient — mmHg	35.9 ± 16.42
Mean left ventricular ejection fraction (LVEF) — %	49.8 ± 13.87
Moderate or severe mitral regurgitation ⁵	62/171 (36.3%)
¹ Quantitative data are expressed as mean ± SD (n). Categorical data are expressed as no./total no. (%). ² To convert the value for creatinine to micromoles per liter, multiply by 88.4. ³ Frailty was determined by the surgeons according to pre-specified criteria. ⁴ DVI is a flow-dependent measure of orifice stenosis. A DVI < 0.25 suggests significant stenosis. ⁵ Moderate or severe mitral regurgitation was defined as regurgitation of grade 3+ or higher.	

Table 16: Summary of Failed Bioprosthetic Surgical Valves Attempted Implant Population	
	Results¹ (N = 197)
Type of Failed Surgical Valve	
Bioprosthesis	184/195 (94.4%)
Homograft	9/195 (4.6%)
Other ²	2/195 (1.0%)
Reason for Valve Replacement	
Mixed Lesion	45/192 (23.4%)
Insufficiency/regurgitation Only	43/192 (22.4%)
Stenosis Only	104/192 (54.2%)
¹ Categorical data are expressed as no./total no. (%). ² Other includes an unidentified manufactured tissue valve and a St. Jude mechanical composite	

Table 17: All-Cause Mortality, All Stroke, Moderate or Severe Obstruction, or Moderate or Severe Paravalvular Leak Valve Implant Population				
	30 Days (N = 195)		1 Year (N = 96)	
Events	Patients with Event	95% Confidence Interval³	Patients with Event	95% Confidence Interval
Composite Event ¹	28/166 (16.9%)	[11.5%, 23.4%]	27/71 (38.0%)	[26.8%, 50.3%]
All-Cause Mortality	8/195 (4.1%)	[1.8%, 7.9%]	19/96 (19.8%)	[12.4%, 29.2%]
All Stroke	5/195 (2.6%)	[0.8%, 5.9%]	3/96 (3.1%)	[0.6%, 8.9%]
Moderate or Severe Obstruction ²	12/169 (7.1%)	[3.7%, 12.1%]	6/54 (11.1%)	[4.2%, 22.6%]
Moderate or Severe PV Leak	4/162 (2.5%)	[0.7%, 6.2%]	1/53 (1.9%)	[0.0%, 10.1%]
¹ Composite of all-cause mortality, all stroke, moderate or severe obstruction, moderate or severe paravalvular leak. Mortality and stroke are calculated at 30 days. The moderate or severe obstruction and paravalvular leak use the Echo core lab's determination at the 30-day follow-up visit. ² Doppler velocity index (DVI) < 0.25 per the echo core lab read. ³ Confidence intervals calculated using exact binomial calculations. The confidence intervals are calculated without multiplicity adjustment. The adjusted confidence intervals could be wider than presented here. As such, confidence intervals are provided to illustrate the variability only and should not be used to draw any statistical conclusion.				

Table 18: CEC Adjudicated Adverse Events Attempted Implant Population		
Adverse Events	Rate (no./total no. (%))	
	30 Days (N = 197)	1 Year (N = 97)
Death ¹		
From any cause	8/197 (4.1%)	19/97 (19.6%)
From cardiovascular cause	7/197 (3.6%)	15/97 (15.5%)
Major Stroke	5/197 (2.5%)	3/97 (3.1%)
Myocardial Infarction	5/197 (2.5%)	3/97 (3.1%)
Major Vascular Complications	8/197 (4.1%)	6/97 (6.2%)
Acute Kidney Injury, Stage III ²	2/197 (1.0%)	N/A
Disabling Bleeding ³	19/197 (9.6%)	16/97 (16.5%)

Adverse Events	Rate (no./total no. (%))	
	30 Days (N = 197)	1 Year (N = 97)
Cardiac Reintervention ⁴	4/197 (2.0%)	2/97 (2.1%)
Endocarditis	0/197 (0.0%)	0/97 (0.0%)
New Atrial Fibrillation	4/135 (3.0%)	2/45 (4.4%)
New Pacemaker	3/197 (1.5%)	1/97 (1.0%)
¹ Deaths from unknown causes were assumed to be deaths from cardiovascular causes. ² Acute kidney injury, stage III is defined as an increase in serum creatinine to $\geq 300\%$ (3 x increase compared with baseline) or serum creatinine of ≥ 4 mg/dL (≥ 354 $\mu\text{mol/L}$) with an acute increase of at least 0.5 mg/dL (44 $\mu\text{mol/L}$) within 72 hours of the procedure (per the VARC-1 definition). ³ Disabling bleeding: Fatal bleeding OR bleeding in a critical area or organ, such as intracranial, intraspinal, intraocular, or pericardial necessitating pericardiocentesis, or intramuscular with compartment syndrome OR bleeding causing hypovolemic shock or severe hypotension requiring vasopressors or surgery OR overt source of bleeding with drop in hemoglobin of ≥ 5 g/dL or whole blood of packed red blood cells (RBC) transfusion ≥ 4 units (Life-threatening per VARC-1 definitions). ⁴ Cardiac reintervention includes any intervention that repairs, alters or replaces a previously operated valve OR balloon aortic valvuloplasty OR Surgical aortic valve replacement OR valve in valve.		

Table 19: Kaplan-Meier (KM) Event Rate for CEC Adjudicated Major Vascular Complications, Major Stroke, Minor Stroke, TIA, and Acute Kidney Injury Attempted Implant Population								
	30 Days (N = 197)				1 Year (N = 97)			
VARC Event ¹	Events	Patients with Event	KM Estimate ²	95% CI ³	Events	Patients with Event	KM Estimate	95% CI
Major Vascular Complications and/or Major Stroke and/or Minor Stroke and/or TIA and/or Acute Kidney Injury, Stage III	15	14	0.071	(0.043, 0.117)	14	12	0.127	(0.074, 0.213)
Major Vascular Complications	8	8	0.041	(0.021, 0.080)	6	6	0.062	(0.029, 0.134)
Major Stroke	5	5	0.025	(0.011, 0.060)	5	3	0.032	(0.010, 0.096)
Minor Stroke	0	0	0.000	N/A	0	0	0.000	N/A
TIA	0	0	0.000	N/A	1	1	0.013	(0.002, 0.089)
Acute Kidney Injury, Stage III	2	2	0.010	(0.003, 0.040)				
¹ Standardized endpoint definitions for transcatheter aortic valve implantation clinical trials consensus from the Valve Academic Research Consortium (VARC). Events with missing or incomplete onset dates were excluded from the analysis. ² Kaplan-Meier estimates used the first event per patient. Events occurring after day 30 and day 365 were not included in the analysis of the 30-day and 1-year results, respectively. ³ Confidence intervals calculated using Greenwood's formula. The confidence intervals are calculated without multiplicity adjustment. The adjusted confidence intervals could be wider than presented here. As such, confidence intervals are provided to illustrate the variability only and should not be used to draw any statistical conclusion.								

Table 20: Conduction Disturbance Requiring New Permanent Pacemaker Attempted Implant Population				
	30 Days (N = 197)		1 Year (N = 97)	
	Events	Patients with Event	Events	Patients with Event
New Permanent Pacemaker- All Patients ¹	3	3/197 (1.5%)	1	1/97 (1.0%)
New Permanent Pacemaker – Patients without preexisting pacemaker ²	3	3/146 (2.1%)	1	1/70 (1.4%)
¹ Subjects with pacemaker or ICD at baseline were included (all patients included in denominator). ² Subjects with pacemaker or ICD at baseline were excluded (patients with baseline pacemaker/ICD subtracted from denominator). Note: The patient who received a new pacemaker in both rows is the same patient. The only difference is the denominators.				

Table 21: Valve Hemodynamics Measured by Echocardiography Valve Implant Population				
	Baseline (N = 195)	Discharge (N = 195)	30 Days (N = 195)	1 Year (N = 96)
Doppler Velocity Index - mean ± SD (n)				
All Valve Sizes	0.27 ± 0.10 (173)	0.37 ± 0.09 (161)	0.37 ± 0.09 (169)	0.39 ± 0.11 (54)
23 mm (N = 140)	0.26 ± 0.09 (123)	0.36 ± 0.10 (114)	0.36 ± 0.09 (118)	0.38 ± 0.11 (38)
26 mm (N = 55)	0.29 ± 0.13 (50)	0.40 ± 0.08 (47)	0.41 ± 0.11 (51)	0.44 ± 0.11 (16)
Mean Gradient (mmHg) - mean ± SD (n)				
All Valve Sizes	36.1 ± 16.38 (179)	18.2 ± 7.79 (168)	17.4 ± 7.37 (176)	17.3 ± 8.76 (56)
23 mm (N = 140)	37.2 ± 16.86 (129)	19.5 ± 8.19 (120)	19.0 ± 7.64 (125)	18.8 ± 9.32 (40)
26 mm (N = 55)	33.2 ± 14.84 (50)	15.0 ± 5.51 (48)	13.4 ± 4.79 (51)	13.7 ± 5.91 (16)
Peak Gradient (mmHg) - mean ± SD (n)				
All Valve Sizes	65.0 ± 26.76 (179)	34.3 ± 13.67 (168)	32.7 ± 12.90 (176)	32.8 ± 15.58 (56)
23 mm (N = 140)	66.9 ± 27.49 (129)	36.5 ± 14.36 (120)	35.4 ± 13.30 (125)	35.2 ± 16.80 (40)
26 mm (N = 55)	60.1 ± 24.34 (50)	29.0 ± 10.05 (48)	26.2 ± 9.09 (51)	26.7 ± 10.04 (16)
Total Aortic Regurgitation - no./total no. (%)				
All Valve Sizes				
None	22/174 (12.6%)	74/164 (45.1%)	86/163 (52.8%)	34/53 (64.2%)
Trace	34/174 (19.5%)	64/164 (39.0%)	58/163 (35.6%)	15/53 (28.3%)
Mild	42/174 (24.1%)	21/164 (12.8%)	15/163 (9.2%)	3/53 (5.7%)
Moderate	47/174 (27.0%)	4/164 (2.4%)	3/163 (1.8%)	1/53 (1.9%)
Severe	29/174 (16.7%)	1/164 (0.6%)	1/163 (0.6%)	0/53 (0.0%)
23 mm				
None	21/124 (16.9%)	55/116 (47.4%)	63/115 (54.8%)	23/37 (62.2%)
Trace	29/124 (23.4%)	43/116 (37.1%)	39/115 (33.9%)	12/37 (32.4%)
Mild	32/124 (25.8%)	14/116 (12.1%)	10/115 (8.7%)	2/37 (5.4%)
Moderate	29/124 (23.4%)	3/116 (2.6%)	2/115 (1.7%)	0/37 (0.0%)
Severe	13/124 (10.5%)	1/116 (0.9%)	1/115 (0.9%)	0/37 (0.0%)

	Baseline (N = 195)	Discharge (N = 195)	30 Days (N = 195)	1 Year (N = 96)
26 mm				
None	1/50 (2.0%)	19/48 (39.6%)	23/48 (47.9%)	11/16 (68.8%)
Trace	5/50 (10.0%)	21/48 (43.8%)	19/48 (39.6%)	3/16 (18.8%)
Mild	10/50 (20.0%)	7/48 (14.6%)	5/48 (10.4%)	1/16 (6.3%)
Moderate	18/50 (36.0%)	1/48 (2.1%)	1/48 (2.1%)	1/16 (6.3%)
Severe	16/50 (32.0%)	0/48 (0.0%)	0/48 (0.0%)	0/16 (0.0%)
Paravalvular Leak - no./total no. (%)				
All Valve Sizes				
None	121/162 (74.7%)	76/164 (46.3%)	91/162 (56.2%)	35/53 (66.0%)
Trace	18/162 (11.1%)	66/164 (40.2%)	56/162 (34.6%)	15/53 (28.3%)
Mild	12/162 (7.4%)	17/164 (10.4%)	11/162 (6.8%)	2/53 (3.8%)
Moderate	8/162 (4.9%)	4/164 (2.4%)	3/162 (1.9%)	1/53 (1.9%)
Severe	3/162 (1.9%)	1/164 (0.6%)	1/162 (0.6%)	0/53 (0.0%)
23 mm				
None	92/121 (76.0%)	55/116 (47.4%)	68/114 (59.6%)	24/37 (64.9%)
Trace	15/121 (12.4%)	47/116 (40.5%)	36/114 (31.6%)	11/37 (29.7%)
Mild	10/121 (8.3%)	10/116 (8.6%)	7/114 (6.1%)	2/37 (5.4%)
Moderate	2/121 (1.7%)	3/116 (2.6%)	2/114 (1.8%)	0/37 (0.0%)
Severe	2/121 (1.7%)	1/116 (0.9%)	1/114 (0.9%)	0/37 (0.0%)
26 mm				
None	29/41 (70.7%)	21/48 (43.8%)	23/48 (47.9%)	11/16 (68.8%)
Trace	3/41 (7.3%)	19/48 (39.6%)	20/48 (41.7%)	4/16 (25.0%)
Mild	2/41 (4.9%)	7/48 (14.6%)	4/48 (8.3%)	0/16 (0.0%)
Moderate	6/41 (14.6%)	1/48 (2.1%)	1/48 (2.1%)	1/16 (6.3%)
Severe	1/41 (2.4%)	0/48 (0.0%)	0/48 (0.0%)	0/16 (0.0%)

Figure 18:
Doppler Velocity Index by Visit
Valve Implant Population

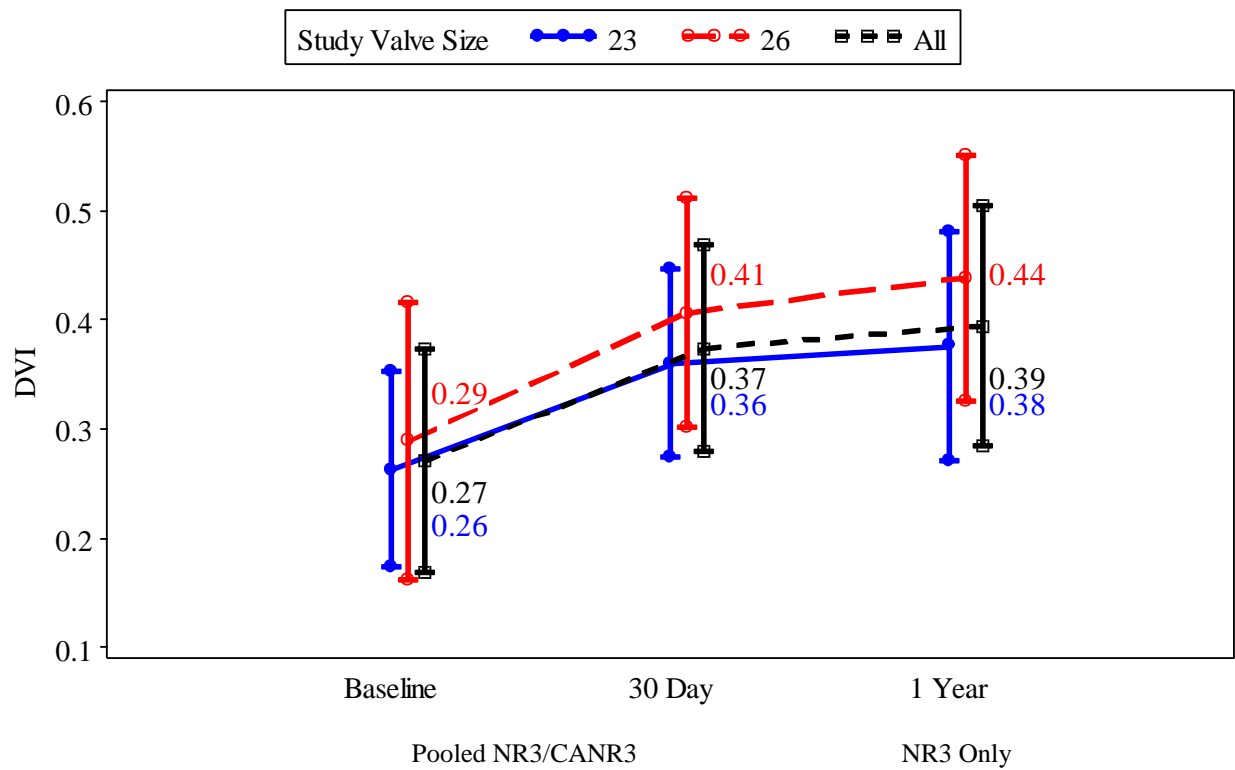


Figure 19:
Mean Gradient by Visit
Valve Implant Population

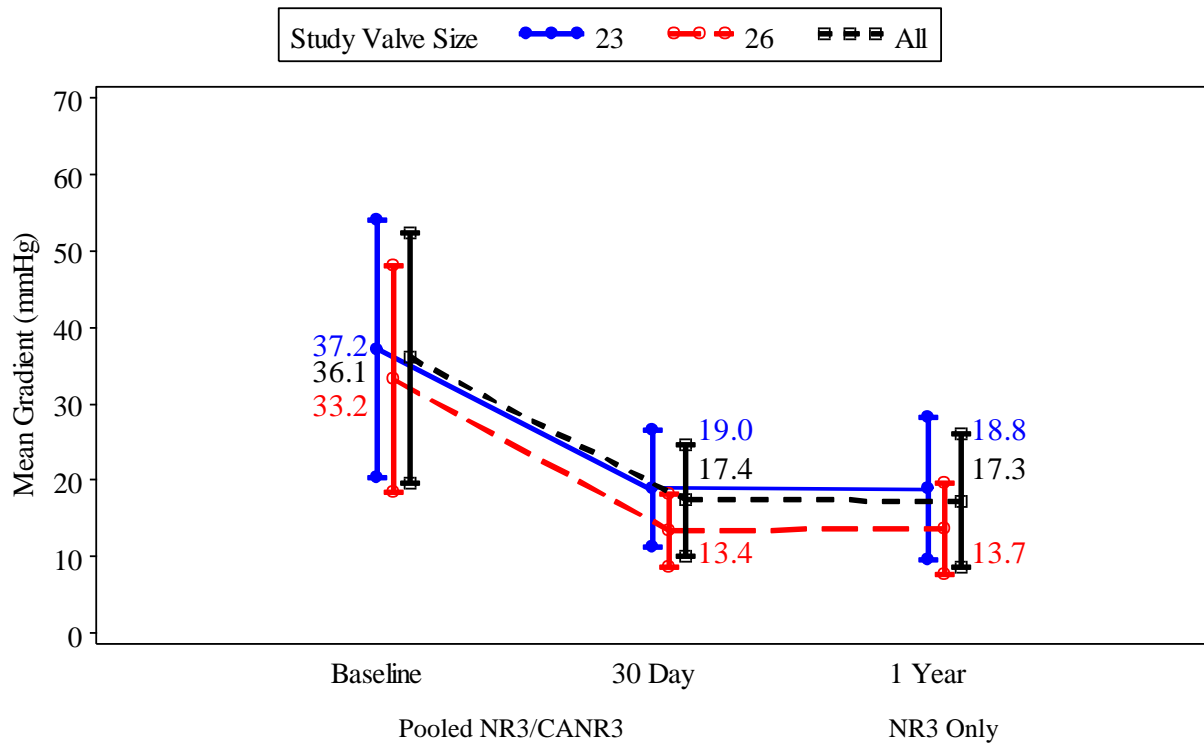


Figure 20:
Peak Gradient by Visit
Valve Implant Population

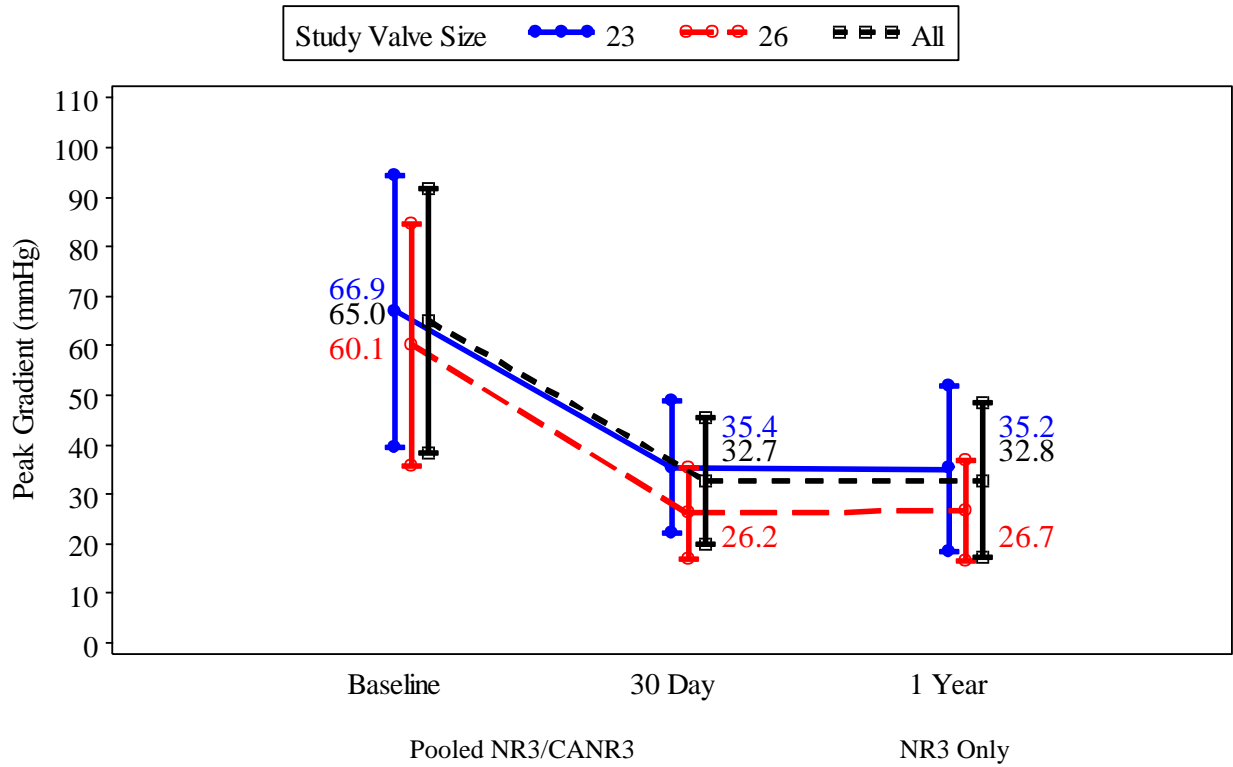


Figure 21:
Total Aortic Regurgitation by Visit
Valve Implant Population

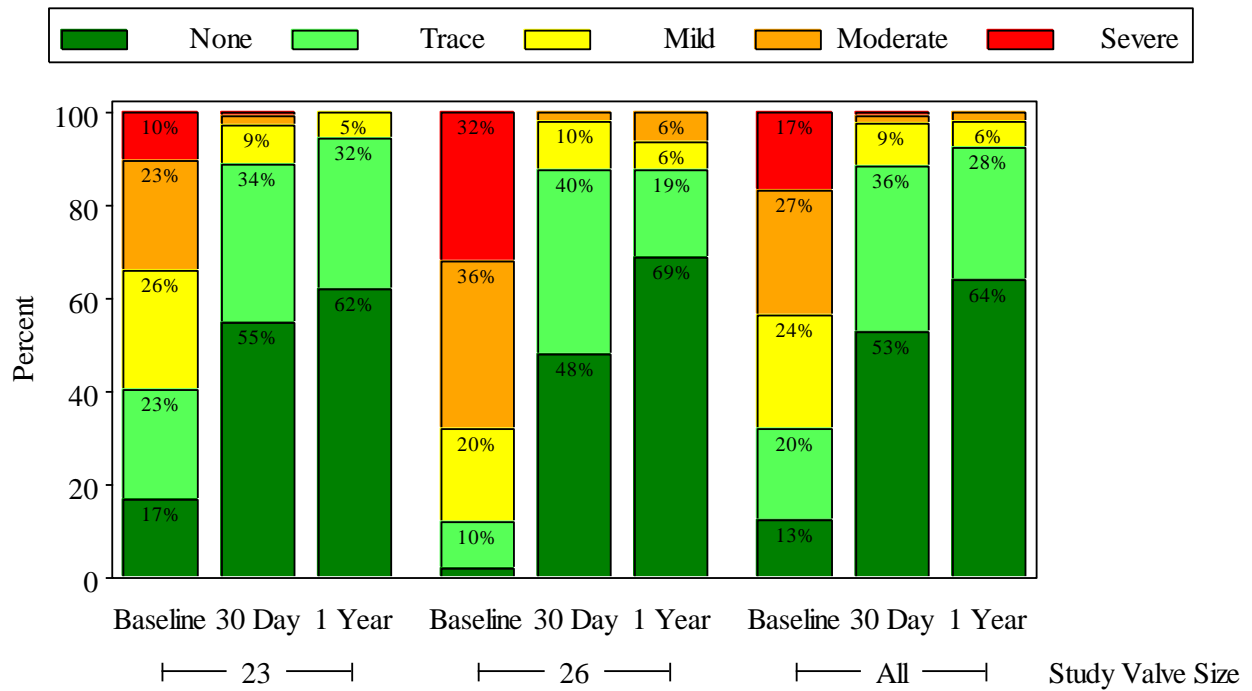


Figure 22:
Paravalvular Leak by Visit
Valve Implant Population

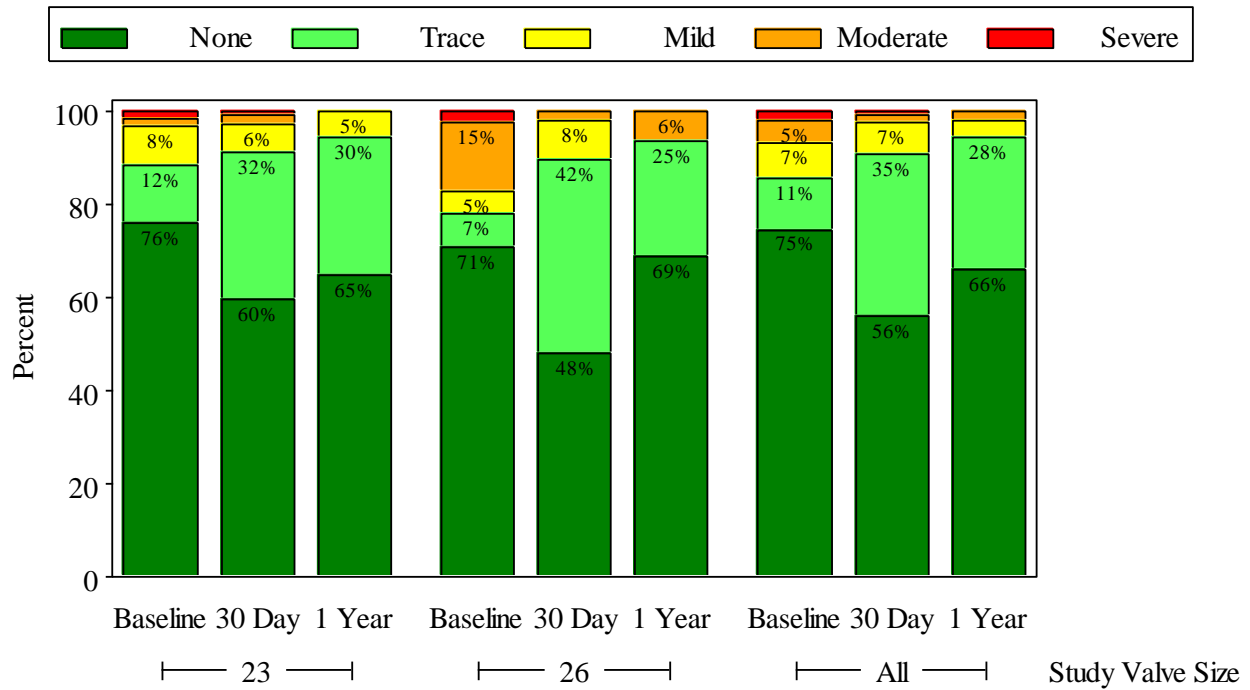


Figure 23:
NYHA Class by Visit
Attempted Implant Population

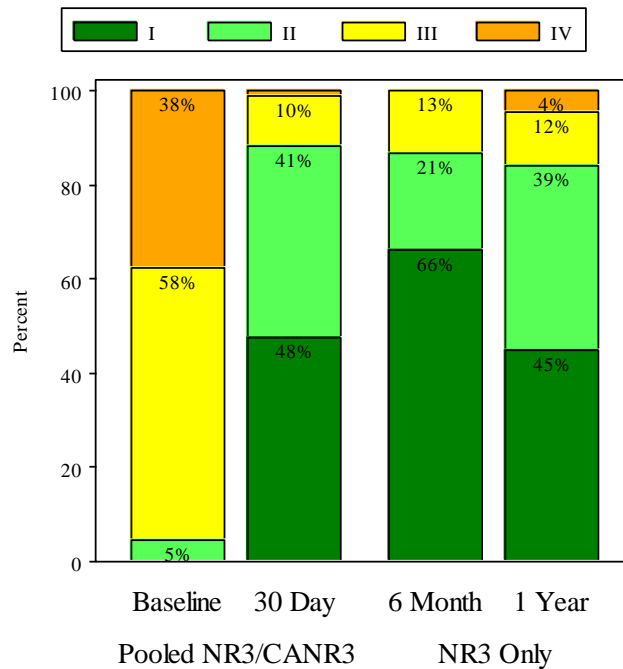


Figure 24:
KCCQ Clinical Summary Score
Attempted Implant Population

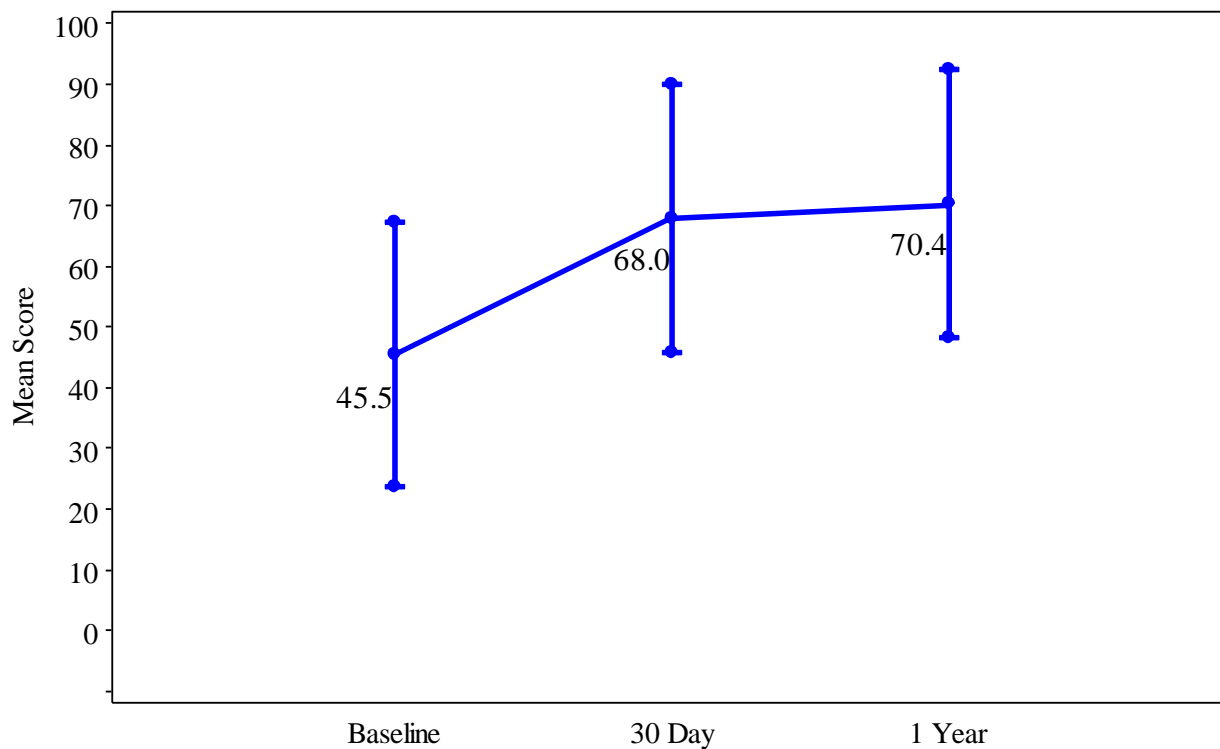


Table 22:
Device Success and Reason for Device Failure
Valve Implant Population

Device Success ¹	Rate ²
Success	115/187 (61.5%)
Failure	72/187 (38.5%)
Factor 1: Unsuccessful access, delivery, deployment, or retrieval of delivery system	11/72 (15.3%)
Factor 2: Position - Too Aortic or Too Ventricular	2/72 (2.8%)
Factor 3a: mean gradient \geq 20 mmHg or peak velocity \geq 3 m/s	62/70 (88.6%)
Factor 3b: Moderate/ Severe Aortic Regurgitation	5/71 (7.0%)
Factor 4: More than 1 valve implanted	3/72 (4.2%)

¹ Device success was defined as successful vascular access, delivery and deployment and retrieval of delivery system; correct positioning of the valve, intended performance (mean aortic valve gradient < 20 mmHg or peak velocity < 3 m/s, without moderate or severe prosthetic valve AR), only one valve implanted. Each participant who failed could experience a failure in more than one factor. If a patient failed one factor, the device was considered a failure even if other factors were undetermined due to missing data.

² The results are expressed as no. / total no. (%). The denominator for each factor was equal to the patients with an overall failure and non-missing data for that factor.

The PARTNER IIA Study Design

PIIA was a 1:1 randomized, controlled study independently powered to compare the results of TAVR with the SAPIEN XT valve to traditional, open-heart aortic valve surgery (i.e., surgical aortic valve replacement or SAVR). The SAPIEN XT valve was available in sizes 23 mm, 26 mm, and 29 mm.

Patients were treated from December 2011 to November 2013. The database reflected data collected through February 1, 2016 and included 1,011 patients in the SAPIEN XT arm and 1,021 patients in the SAVR arm at 57 investigational sites in the U.S. and Canada.

The study used an independent Data Safety Monitoring Board (DSMB) that was instructed to notify Edwards Lifesciences of any safety or compliance issues and a Clinical Events Committee (CEC) that was responsible for adjudicating endpoint related events reported during the trial. The CEC adjudicated the events per definitions established *a priori*, which were primarily VARC-1 definitions with the following exceptions:

- AKI was adjudicated with a modified VARC-1 definition in which the CEC identified the peak creatinine within 30 days of the index procedure, 30 days to 1 year, and 1 year to 2 years to determine if it met the definition of AKI.
- Aortic valve reintervention, hemolysis, and pericarditis were adjudicated per Protocol definition.
- Rehospitalization for symptoms of AS and/or complications of the valve procedure were adjudicated using the Protocol and VARC-1 as guidelines.
- Bleeding events were adjudicated irrespective of whether there was an identifiable, overt source of bleeding and could be adjudicated based on transfusion or hemoglobin drop alone.

Also, an ECG core laboratory was used for independent analysis of rhythm, and an echocardiographic core laboratory for independently analyzing all echocardiograms.

A. Accountability of the PMA Cohort

At the time of database lock, of the 2032 patients enrolled in the PMA study, 73.5% (1494) patients are available for analysis at the completion of the study, the 2 year post-operative visit. Table 23 presents patient accountability in the PIIA trial. The SAPIEN XT valve patients had either a transfemoral (TF) or non-transfemoral (non-TF) access.

Table 23: Patient Accountability			
	Intent to Treat Population^a	As Treated Population^b	Valve Implant Population^c
SAPIEN XT Valve	1011	994	974
Transfemoral	775	762	749
Non-Transfemoral	236	232	225
SAVR	1021	944	936
a. Intent to Treat (ITT): All randomized patients b. As Treated (AT): All enrolled/randomized patients for whom the Index Procedure is started. Patients were analyzed according to the valve used in the initial implant attempt. c. Valve Implant (VI): All As Treated patients whose valve implant process is completed.			

In the SAPIEN XT valve ITT population, 187 patients exited the study prior to the 2-year visit. Of the remaining 824 patients who were due for the 2-year visit, 784 patients (95.1%) completed the 2-year visit, and 40 patients (4.9%) missed the 2-year visit.

In the SAVR ITT population, 216 patients exited the study prior to the 2-year visit. Of the remaining 805 patients who were due for the 2-year visit, 710 patients (88.2%) completed the 2-year visit, and 95 patients (11.8%) missed the 2-year visit.

B. Study Population Demographics and Baseline Parameters

The demographics of the study population are typical for an aortic stenosis valve replacement study performed in the US. The demographics and baseline characteristics of the ITT population are

presented in Table 24. Among the SAPIEN XT valve population, 775 patients were implanted via the transfemoral (TF) access route and 236 patients via the non-TF access route, including transapical (TA) or transaortic (TAo) access.

Table 24: Demographics and Baseline Characteristics (ITT Population)				
Demographics & Characteristic*	SAPIEN XT Valve			SAVR (N = 1021)
	All (N = 1011)	TF only (N = 775)	Non-TF Only (N = 236)	
Age (years)	81.5 ± 6.7	81.8 ± 6.7	80.6 ± 6.6	81.7 ± 6.7
Male Sex	548/1011 (54.2%)	426/775 (55.0%)	122/236 (51.7%)	560/1021 (54.8%)
Society of Thoracic Surgeons (STS) score	5.8 ± 2.1	5.8 ± 2.1	6.0 ± 2.1	5.8 ± 1.9
New York Heart Association (NYHA) class				
I/II	229/1011 (22.7%)	174/775 (22.5%)	55/236 (23.3%)	244/1020 (23.9%)
III/IV	782/1011 (77.3%)	601/775 (77.5%)	181/236 (76.7%)	776/1020 (76.1%)
Coronary Artery Disease	700/1011 (69.2%)	531/775 (68.5%)	169/236 (71.6%)	679/1021 (66.5%)
Previous Myocardial Infarction	185/1011 (18.3%)	137/775 (17.7%)	48/236 (20.3%)	179/1021 (17.5%)
Previous Reintervention				
Coronary Artery Bypass Grafting	239/1011 (23.6%)	179/775 (23.1%)	60/236 (25.4%)	261/1021 (25.6%)
Percutaneous coronary intervention	274/1011 (27.1%)	202/775 (26.1%)	72/236 (30.5%)	282/1021 (27.6%)
Prior aortic valvuloplasty	51/1011 (5.0%)	35/775 (4.5%)	16/236 (6.8%)	50/1021 (4.9%)
Cerebral vascular accident	103/1011 (10.2%)	67/775 (8.6%)	36/236 (15.3%)	104/1021 (10.2%)
Peripheral vascular disease	282/1011 (27.9%)	167/775 (21.5%)	115/236 (48.7%)	336/1021 (32.9%)
Chronic obstructive pulmonary disease				
Any	321/1011 (31.8%)	228/775 (29.4%)	93/236 (39.4%)	306/1021 (30.0%)
Oxygen-dependent	34/1011 (3.4%)	20/775 (2.6%)	14/236 (5.9%)	32/1021 (3.1%)
Atrial fibrillation	313/1011 (31.0%)	245/775 (31.6%)	68/236 (28.8%)	359/1021 (35.2%)
Permanent pacemaker	118/1011 (11.7%)	91/775 (11.7%)	27/236 (11.4%)	123/1021 (12.0%)
Pulmonary hypertension	29/1011 (2.9%)	25/775 (3.2%)	4/236 (1.7%)	25/1019 (2.5%)
Frailty	12/1011 (1.2%)	11/775 (1.4%)	1/236 (0.4%)	15/1019 (1.5%)

Table 24: Demographics and Baseline Characteristics (ITT Population)				
Demographics & Characteristic*	SAPIEN XT Valve			SAVR (N = 1021)
	All (N = 1011)	TF only (N = 775)	Non-TF Only (N = 236)	
Porcelain aorta	0/1011 (0.0%)	0/775 (0.0%)	0/236 (0.0%)	1/1019 (0.1%)
Chest deformities that preclude an open chest procedure	0/1011 (0.0%)	0/775 (0.0%)	0/236 (0.0%)	0/1019 (0.0%)
Cirrhosis	0/1011 (0.0%)	0/775 (0.0%)	0/236 (0.0%)	5/1019 (0.5%)
Echocardiographic findings (VI Population)				
Effective orifice area (EOA) - cm ²	0.7 ± 0.2	0.7 ± 0.2	0.7 ± 0.2	0.7 ± 0.2
Mean aortic valve gradient - mmHg	45.0 ± 13.3	45.0 ± 13.6	44.7 ± 12.3	44.7 ± 12.6
Moderate or severe mitral regurgitation	146/875 (16.7%)	116/677 (17.1%)	30/198 (15.2%)	153/841 (18.2%)
*Continuous measures – Mean ± SD; Categorical measures – n/Total no. (%)				

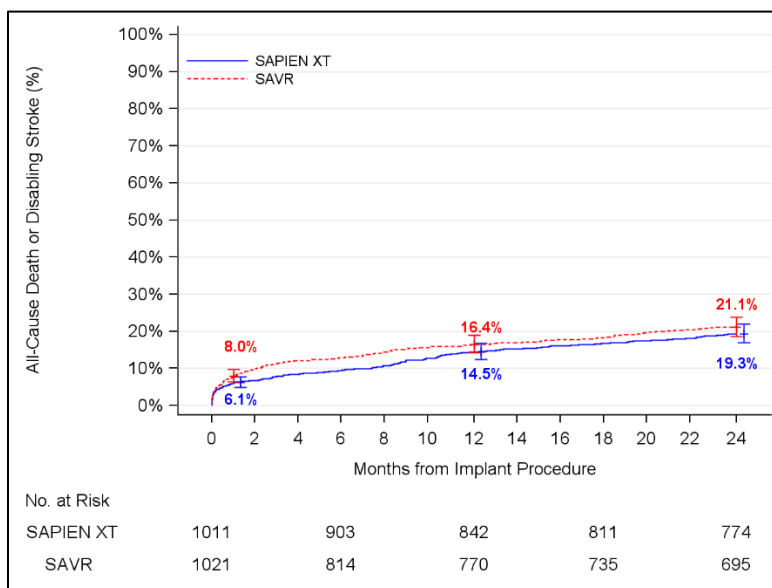
C. Safety and Effectiveness Result

a. Primary Endpoint

The results of the composite primary endpoint of all-cause death or disabling (major) stroke at 2 years and each component are presented for the ITT population in Table 25 and Figures 25-27. The K-M estimate of the composite event for SAPIEN XT cohort was found to be non-inferior to that for SAVR (19.3% vs. 21.1%; p=0.0014).

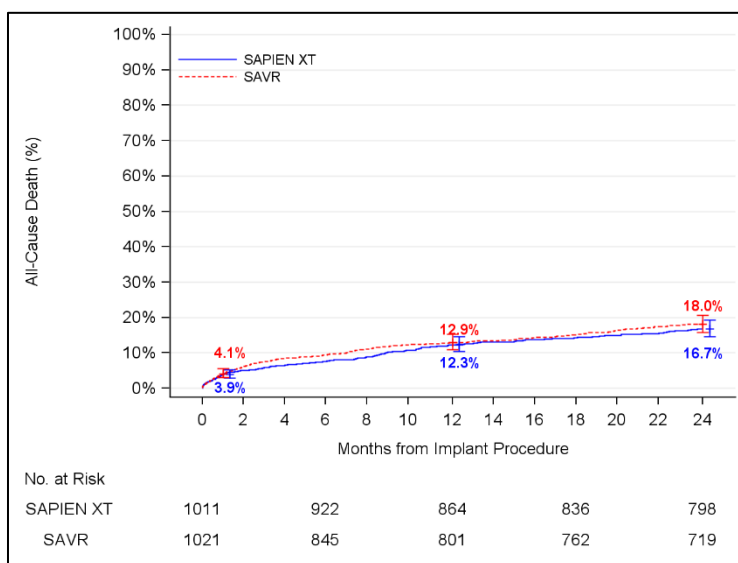
Table 25: All-Cause Death or Disabling (Major) Stroke at 2 Years (ITT Population)										
Event	SAPIEN XT Valve (N = 1011)					SAVR (N = 1021)				
	No. of Events*	Patients with Event	No. Patients at Risk	K-M Estimate [†]		No. of Events*	Patients with Event	No. Patients at Risk	K-M Estimate [†]	
				Point Estimate	Standard Error				Point Estimate	Standard Error
All-cause death or disabling stroke at 2 years	229	192	774	19.3%	1.3%	235	202	695	21.1%	1.3%
All-cause death at 2 years	166	166	798	16.7%	1.2%	170	170	719	18.0%	1.3%
Disabling stroke at 2 years	63	59	774	6.2%	0.8%	65	61	695	6.4%	0.8%
*Events with missing or incomplete onset dates are excluded from the analysis.										
†K-M estimates are provided at 2 years (day 730) and use the first event per patient. Events occurring after 730 days are not included in the analysis.										

Figure 25:
All-Cause Death or Disabling (Major) Stroke through 2 Years
(ITT Population)



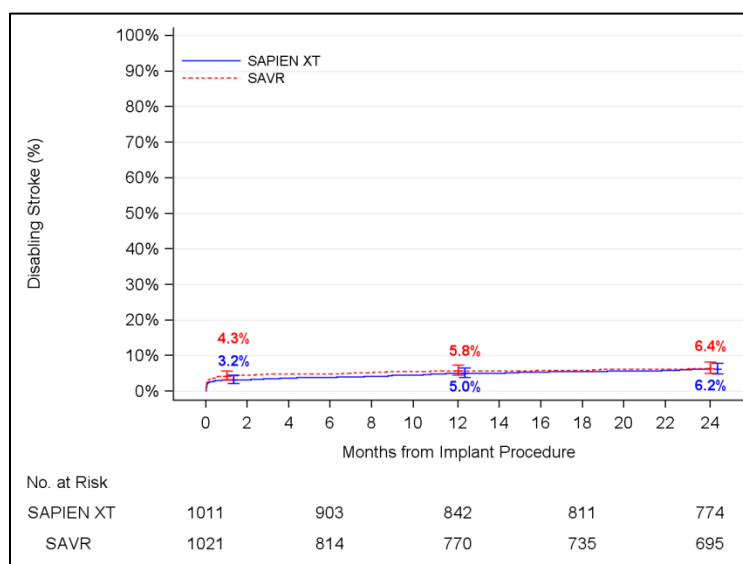
Note: The confidence intervals at 30 days and 12 months were calculated without multiplicity adjustment. The adjusted confidence intervals could be wider than presented here. As such, confidence intervals are provided to illustrate the variability only and should not be used to draw any statistical conclusion.

Figure 26:
All-Cause Death through 2 Years
(ITT Population)



Note: The confidence intervals were calculated without multiplicity adjustment. The adjusted confidence intervals could be wider than presented here. As such, confidence intervals are provided to illustrate the variability only and should not be used to draw any statistical conclusion.

**Figure 27:
Disabling (Major) Stroke through 2 Years
(ITT Population)**



Note: The confidence intervals were calculated without multiplicity adjustment. The adjusted confidence intervals could be wider than presented here. As such, confidence intervals are provided to illustrate the variability only and should not be used to draw any statistical conclusion.

The results for the primary endpoint and its components for the SAPIEN XT valve ITT population by access approach are presented in Table 26. The TF access had clinically lower all-cause death and disabling (major) stroke rates than did the non-TF access.

Table 26: All-Cause Death or Disabling (Major) Stroke to 2 Years by Access Approach (SAPIEN XT Valve ITT Population)										
Event	TF (N = 775)					Non-TF (N = 236)				
	No. of Events*	Patients with Event	No. Patients at Risk	K-M Estimate [†]		No. of Events*	Patients with Event	No. Patients at Risk	K-M Estimate [†]	
				Point Estimate	Standard Error				Point Estimate	Standard Error
All-cause death or disabling stroke at 2 years	151	128	612	16.8%	1.4%	78	64	162	27.7%	3.0%
All-cause death at 2 year	108	108	630	14.2%	1.3%	58	58	168	25.2%	2.9%
Disabling stroke at 2 years	43	39	612	5.3%	0.8%	20	20	162	9.1%	1.9%
*Events with missing or incomplete onset dates are excluded from the analysis.										
†Kaplan-Meier estimates are provided at 2 years (day 730) and use the first event per patient. Events occurring after 730 days are not included in the analysis.										

b. Key Secondary Endpoints

The results for the six (6) key secondary endpoints using the Hochberg's step-up method for multiple tests are presented for the ITT population in Table 27 and for the as-treated (AT) population in Table 28. SAPIEN XT valve was found to be non-inferior to SAVR in NYHA class at 2 years, DAOH to 2 years, 6MWT distance at 2 years, and EOA at 2 years. The 6MWT distance at 2 years was superior to that at baseline in the SAPIEN XT valve patients. However, the result failed to reject the null hypothesis that the mean total AR in the SAPIEN XT arm was worse than that in the SAVR arm by a margin of 0.25.

Table 27: Key Secondary Endpoints Comparisons Using the Hochberg Method (ITT/VI Population)						
Endpoint	Summary Statistics*		Difference [†]	p-value	Reference α	Statistical Inference
	SAPIEN XT Valve	SAVR				
Total AR at 2 years [§] (VI)	1.2 ± 1.0 (606)	0.5 ± 0.7 (520)	0.8 (0.67, 0.86)	> 0.9999	0.05	Fail to reject null hypothesis and move on to next line
Change in 6MWT distance from baseline to 2 years (SAPIEN XT valve only; ITT)	14.5 ± 128.7 (604)	NA	NA	0.0057	0.025	Reject null hypothesis and conclude non-inferiority for the rest of endpoints
NYHA class at 2 years (ITT)	1.5 ± 0.7 (737)	1.4 ± 0.6 (649)	0.1 (0.0, 0.2)	< 0.0001		
DAOH to 2 years (ITT)	637.5 ± 203.2 (960)	619.0 ± 223.1 (885)	18.6 (-1.0, 38.1)	< 0.0001		
6MWT distance at 2 years (ITT)	203.2 ± 132.4 (615)	209.8 ± 153.5 (513)	-6.6 (-23.5, 10.3)	< 0.0001		
EOA at 2 years (VI)	1.5 ± 0.4 (567)	1.4 ± 0.4 (488)	0.1 (0.09, 0.19)	< 0.0001		
*Mean ± SD (n) †Difference (95% CI) §Total AR was graded as: none=0, trace=1, mild and mild-moderate=2, moderate and moderate-severe=3, and severe=4. It was treated as a continuous variable and compared using the t-test.						

Table 28: Key Secondary Endpoints Comparisons Using the Hochberg Method (AT/VI Population)						
Endpoint	Summary Statistics*		Difference [†]	p-value	Reference α	Statistical Inference
	SAPIEN XT Valve	SAVR				
Total AR at 2 years [§] (VI)	1.2 ± 1.0 (606)	0.5 ± 0.7 (520)	0.8 (0.7, 0.9)	> 0.9999	0.05	Fail to reject null hypothesis and move on to next line
Change in 6MWT distance from baseline to 2 years (SAPIEN XT valve only; AT)	14.5 ± 128.7 (604)	NA	NA	0.0057	0.025	Reject null hypothesis and conclude non-inferiority for the rest of endpoints
NYHA at the 2-year visit (AT)	1.5 ± 0.7 (737)	1.4 ± 0.6 (649)	0.1 (0.0, 0.2)	< 0.0001		
DAOH to 2 years (AT)	638.8 ± 201.5 (958)	619.5 ± 222.4 (883)	19.2 (-0.2, 38.7)	< 0.0001		
6MWT distance at the 2-year visit (AT)	203.2 ± 132.4 (615)	209.8 ± 153.5 (513)	-6.6 (-23.5, 10.3)	< 0.0001		

Table 28: Key Secondary Endpoints Comparisons Using the Hochberg Method (AT/VI Population)						
Endpoint	Summary Statistics*		Difference†	p-value	Reference α	Statistical Inference
	SAPIEN XT Valve	SAVR				
EOA at 2 years (VI)	1.5 ± 0.4 (567)	1.4 ± 0.4 (488)	0.14 (0.09, 0.20)	< 0.0001		
*Mean ± SD (n) †Difference (95% CI) §Total AR was graded as: none=0, trace=1, mild and mild-moderate=2, moderate and moderate-severe=3, and severe=4. It was treated as a continuous variable and compared using the t-test.						

Adjunctive Secondary Endpoints

The results for the first adjunctive secondary composite endpoint of 14 pre-specified site-reported events are presented in Tables 29 and 30.

Table 29: Composite Endpoint of 14 Pre-specified Site-Reported Events to 30 Days or Discharge (AT Population)					
Adverse Event	SAPIEN XT Valve (N = 994)		SAVR (N = 944)		Relative Risk SAPIEN XT Valve versus SAVR
	Events*	Patients with Event	Events*	Patients with Event	
Composite event to 30 days or discharge†	573	378/994 (38.0%)	714	493/944 (52.2%)	0.73
†Imputed dates are used for events with incomplete onset dates. ‡The composite event consists of all stroke and TIA; myocardial infarction; vascular complications; life-threatening bleeding; reoperation for catheter-based intervention for valve thrombosis, valve displacement, or other valve- or procedure-related complication; pericarditis; hemolysis; mediastinitis; endocarditis; aortic insufficiency; aortic stenosis; permanent pacemaker implantation; mitral valve injury or insufficiency; or renal insufficiency.					

Table 30: Composite Endpoint of 14 Pre-specified Site-Reported Events from Day 31 to 2 Years (AT Population)					
Adverse Event	SAPIEN XT Valve (N = 994)		SAVR (N = 944)		Relative Risk SAPIEN XT Valve versus SAVR
	Events/Patients with Event/No. at Risk*	K-M Estimate (Standard Error)	Events/Patients with Event/No. at Risk*	K-M Estimate (Standard Error)	
Composite event from day 31 to 2 years†	428/284/594	31.0% (1.53%)	344/225/568	26.5% (1.52%)	1.17
*Events with missing or incomplete onset dates and those occurring before day 31 or after day 730 are excluded from the analysis. †The composite event consists of all stroke and TIA; myocardial infarction; vascular complications; life-threatening bleeding; reoperation for catheter-based intervention for valve thrombosis, valve displacement, or other valve- or procedure-related complication; pericarditis; hemolysis; mediastinitis; endocarditis; aortic insufficiency; aortic stenosis; permanent pacemaker implantation; mitral valve injury or insufficiency; or renal insufficiency.					

The result for the second adjunctive secondary composite endpoint of CEC-adjudicated all stroke, major vascular complications, or aortic valve reinterventions at 2 years is presented in Table 31 for the AT population.

Table 31: All Stroke, Major Vascular Complications, or Aortic Valve Reintervention to 2 Years (AT Population)					
Event	SAPIEN XT Valve (N = 994)		SAVR (N = 944)		Relative Risk SAPIEN XT Valve vs SAVR
	Events/Patients with Event/No. at Risk*	K-M Estimate (Standard Error)	Events/Patients with Event/No. at Risk*	K-M Estimate (Standard Error)	
All stroke, major vascular complications, or reinterventions at 2 years	210/176/684	18.1% (1.24%)	156/132/644	14.4% (1.16%)	1.26
*Events with missing or incomplete onset dates and those occurring before day 31 or after day 730 are excluded from the analysis.					

The result for the third adjunctive secondary composite endpoint of all-cause mortality, disabling stroke, or rehospitalization at 2 years is presented in Table 32 for the AT population.

Table 32: All-Cause Death, Disabling (Major) Stroke, or Rehospitalization to 2 Years (AT Population)					
Event	SAPIEN XT Valve (N = 994)		SAVR (N = 944)		Relative Risk SAPIEN XT Valve vs SAVR
	Events/Patients with Event/No. at Risk*	K-M Estimate (Standard Error)	Events/Patients with Event/No. at Risk*	K-M Estimate (Standard Error)	
All-cause death, disabling stroke, or rehospitalization at 2 years	486/313/655	31.7% (1.48%)	428/298/600	32.0% (1.53%)	0.99
*Events with missing or incomplete onset dates and those occurring before day 31 or after day 730 are excluded from the analysis.					

c. Adverse Events

Results for some key CEC-adjudicated adverse events through 2 years are presented in Table 33 for the ITT population.

Table 33: Key CEC-Adjudicated Adverse Events (ITT Population)				
Event*	SAPIEN XT Valve			SAVR (N = 1021)
	Overall (N = 1011)	TF Access (N = 775)	Non-TF Access (N = 236)	
30 Days				
Acute kidney injury	192 (19.0)	106 (13.7)	86 (36.4)	327 (32.0)
Stage III	13 (1.3)	4 (0.5)	9 (3.8)	31 (3.0)
Death	39 (3.9)	23 (3.0)	16 (6.8)	41 (4.0)
Cardiac death	33 (3.3)	21 (2.7)	12 (5.1)	32 (3.1)
Non-cardiac death	6 (0.6)	2 (0.3)	4 (1.7)	9 (0.9)
Stroke	55 (5.4)	32 (4.1)	23 (9.7)	61 (6.0)
Disabling stroke	32 (3.2)	18 (2.3)	14 (5.9)	43 (4.2)
Non-disabling stroke	23 (2.3)	14 (1.8)	9 (3.8)	18 (1.8)
Myocardial infarction	12 (1.2)	5 (0.6)	7 (3.0)	19 (1.9)
Major vascular complication	80 (7.9)	66 (8.5)	14 (5.9)	51 (5.0)
Life threatening/disabling bleeding	105 (10.4)	52 (6.7)	53 (22.5)	442 (43.3)
Aortic valve reintervention	4 (0.4)	3 (0.4)	1 (0.4)	0 (0.0)
Endocarditis	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Rhythm disturbance requiring permanent pacemaker	85 (8.4)	62 (8.0)	23 (9.7)	68 (6.7)
2 Years				
Acute kidney injury	326 (32.2)	206 (26.6)	120 (50.8)	404 (39.6)
Stage III	36 (3.6)	18 (2.3)	18 (7.6)	57 (5.6)
Death	166 (16.4)	108 (13.9)	58 (24.6)	170 (16.7)
Cardiac death	97 (9.6)	67 (8.6)	30 (12.7)	105 (10.3)
Non-cardiac death	69 (6.8)	41 (5.3)	28 (11.9)	65 (6.4)
Stroke	91 (9.0)	62 (8.0)	29 (12.3)	85 (8.3)
Disabling stroke	59 (5.8)	39 (5.0)	20 (8.5)	61 (6.0)
Non-disabling stroke	33 (3.3)	24 (3.1)	9 (3.8)	27 (2.6)
Myocardial infarction	33 (3.3)	21 (2.7)	12 (5.1)	37 (3.6)
Major vascular complication	86 (8.5)	69 (8.9)	17 (7.2)	55 (5.4)
Life threatening/disabling bleeding	169 (16.7)	101 (13.0)	68 (28.8)	471 (46.1)
Aortic valve reintervention	13 (1.3)	9 (1.2)	4 (1.7)	5 (0.5)
Endocarditis	11 (1.1)	10 (1.3)	1 (0.4)	6 (0.6)
Rhythm disturbance requiring permanent pacemaker	114 (11.3)	85 (11.0)	29 (12.3)	96 (9.4)
*Categorical measures - n/Total no. (%);Events with missing or incomplete onset dates are excluded from the analysis.				

d. Other Results

Procedural Information

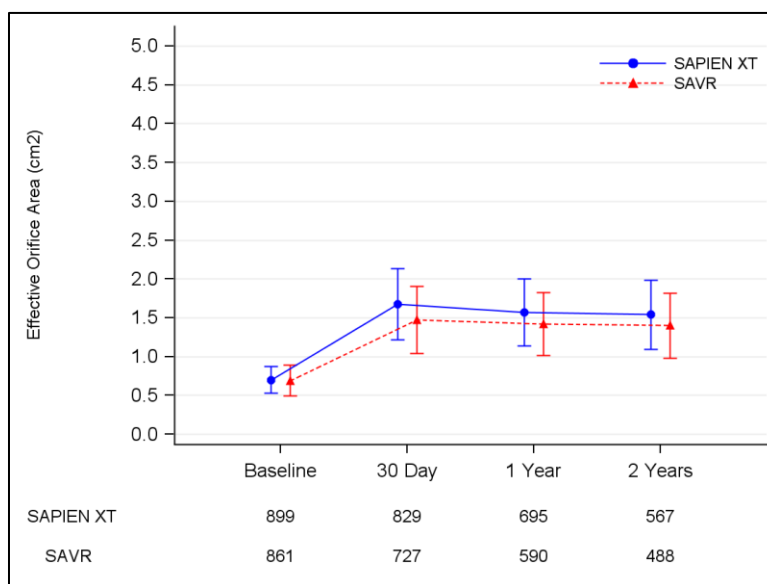
Overall, in the SAPIEN XT valve AT population the mean duration in the catheterization laboratory was 209.0 ± 59.5 min, the mean total procedure time was 102.7 ± 51.4 min, and the mean total anesthesia time was 207.1 ± 64.7 min. These duration times were slightly shorter in the TF group. General anesthesia was used in the vast majority of cases; 7.8% of the TF patients had conscious sedation. Correct positioning of the valve was achieved in 98.5% of the patients. Nineteen (19) patients (1.7% of TF patients and 2.6% of non-TF patients) were implanted with a second valve. Two (2) patients (0.5%) experienced valve dislodgement. Three (3) patients (0.3%) experienced annular rupture.

In the SAVR AT population, the mean duration in the operating room was 332.3 ± 96.9 min, the mean total procedure time was 236.8 ± 86.9 min, and the mean anesthesia time was 333.0 ± 108.6 min. General anesthesia was used in all patients. It was difficult to wean 26 patients (2.8%) from cardiopulmonary bypass, which was terminated in the majority of cases with intra-aortic balloon pump and/or inotropes.

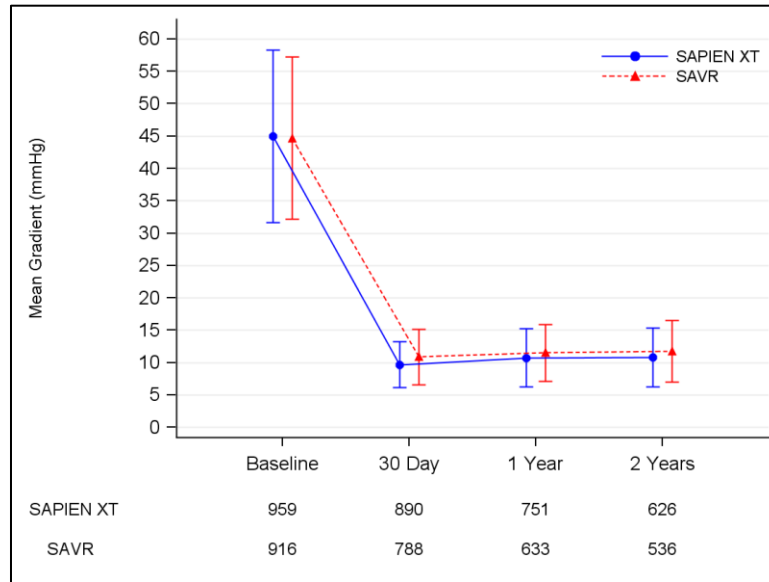
Valve Performance

The measurements of EOA, mean gradient, peak gradient, total aortic regurgitation (AR), and aortic paravalvular leak (PVL) are presented in Figures 28-32. The increase in EOA and decrease in gradient were sustained at 2 years. In the SAPIEN XT arm, the proportion of patients with total AR \geq moderate was 11.0% at baseline, 3.8% at 30 days, 4.0% at 1 year, and 9.4% at 2 years, while in the SAVR arm, the proportion of patients with total AR \geq moderate was 12.0% at baseline, 0.7% at 30 days, 0.3% at 1 year, and 0.8% at 2 years. The proportion of patients with aortic PVL \geq moderate was 3.8% at 30 days, 3.4% at 1 year, and 8.0% at 2 years in the SAPIEN XT arm, as compared to 0.5% at 30 days, 0.3% at 1 year, and 0.6% at 2 years in the SAVR arm.

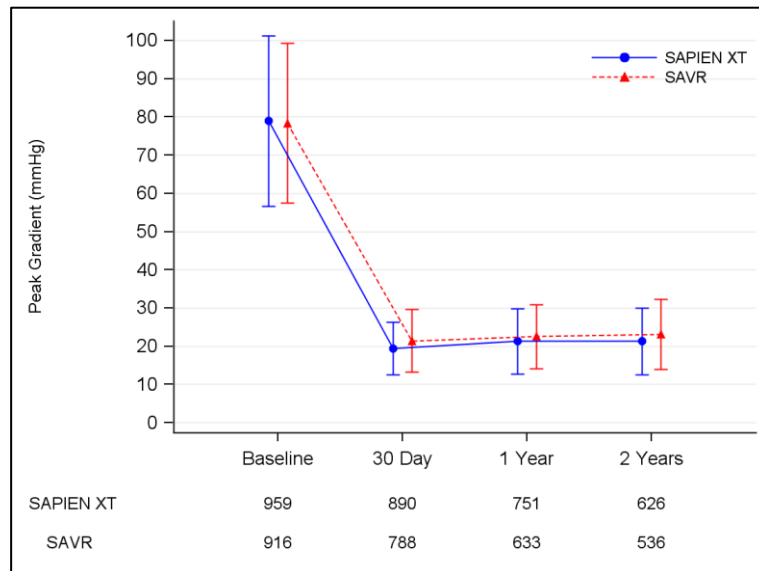
Figure 28:
Effective Orifice Area
(VI Population)



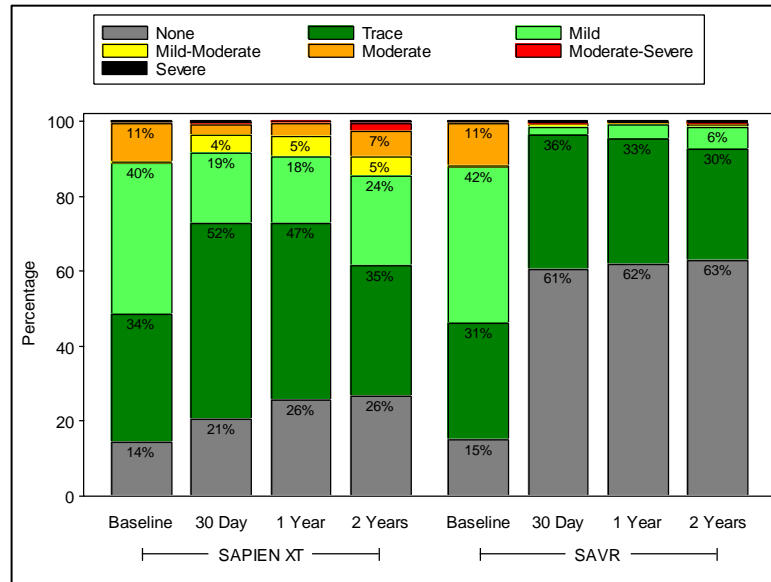
**Figure 29:
Mean Gradient
(VI Population)**



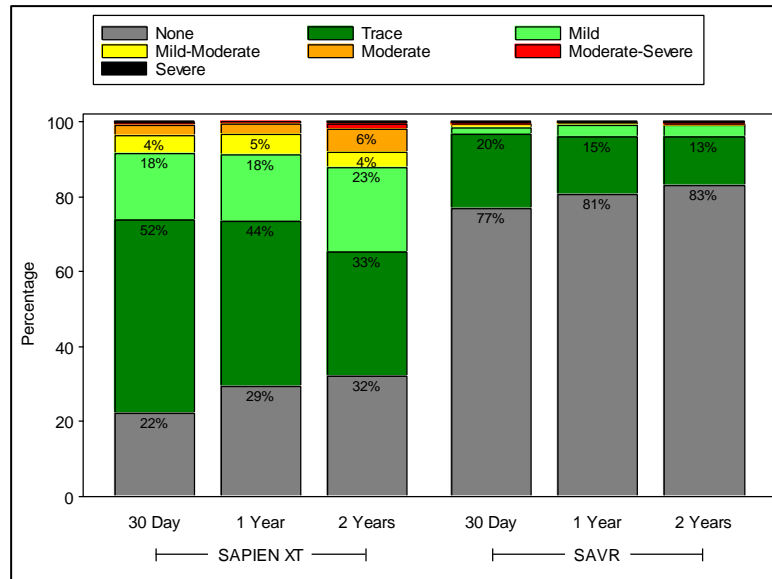
**Figure 30:
Peak Gradient
(VI Population)**



**Figure 31:
Total Aortic Regurgitation
(VI Population)**



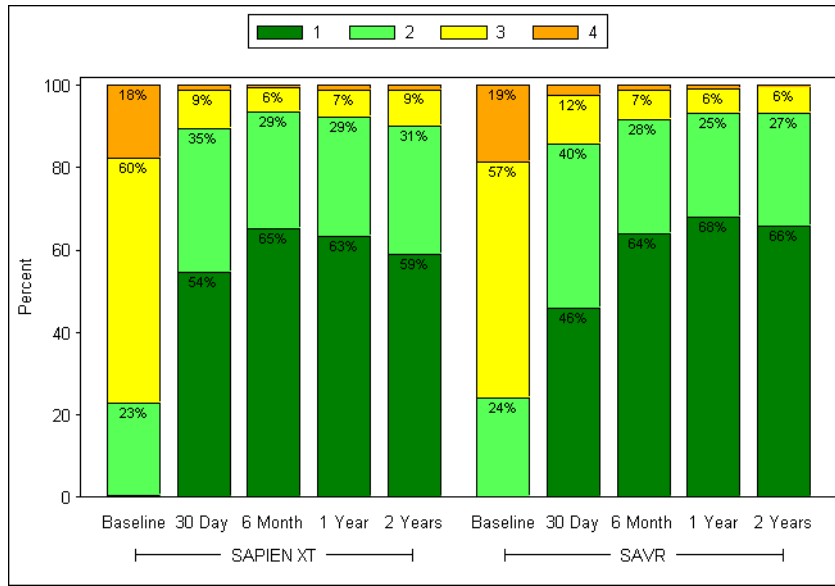
**Figure 32:
Aortic Paravalvular Leak
(VI Population)**



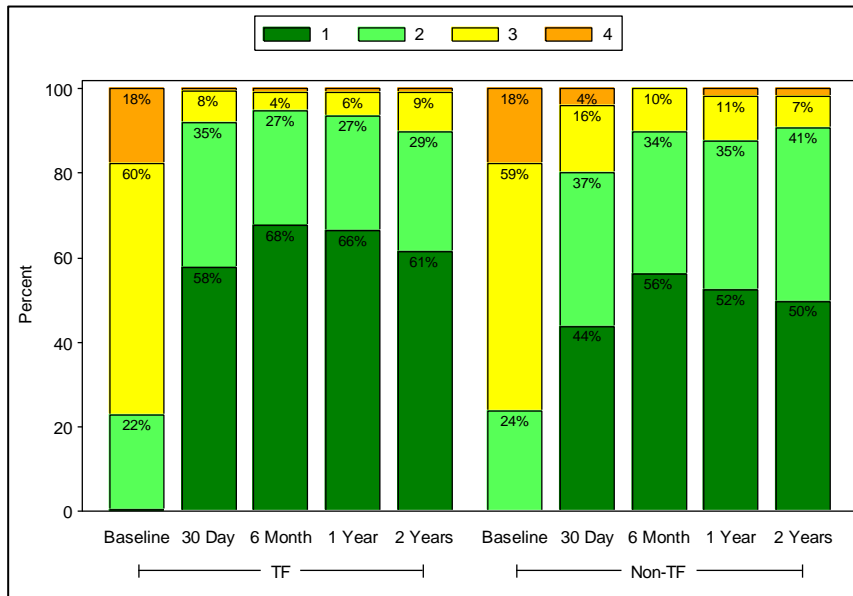
NYHA

The NYHA classifications by visit are presented in Figure 33. In the SAPIEN XT valve AT population, 78% of the patients were in NYHA Class III or IV at baseline, which reduced to 11% at 30 days, 8% at 1 year, and 10% at 2 years, while in the SAVR AT population, the percentage of patients in NYHA Class III or IV was 76% at baseline, 14% at 30 days, 7% at 1 year, and 7% at 2 years. A side-by-side comparison of the results by access approach is presented in Figure 34.

**Figure 33:
NYHA Class
(AT Population)**



**Figure 34:
NYHA Class- TF versus non-TF Access
(AT Population)**



Length of Stay (LoS)

The results for LoS are presented in Table 34. Overall, the SAPIEN XT valve patients had shorter LoS than the SAVR patients.

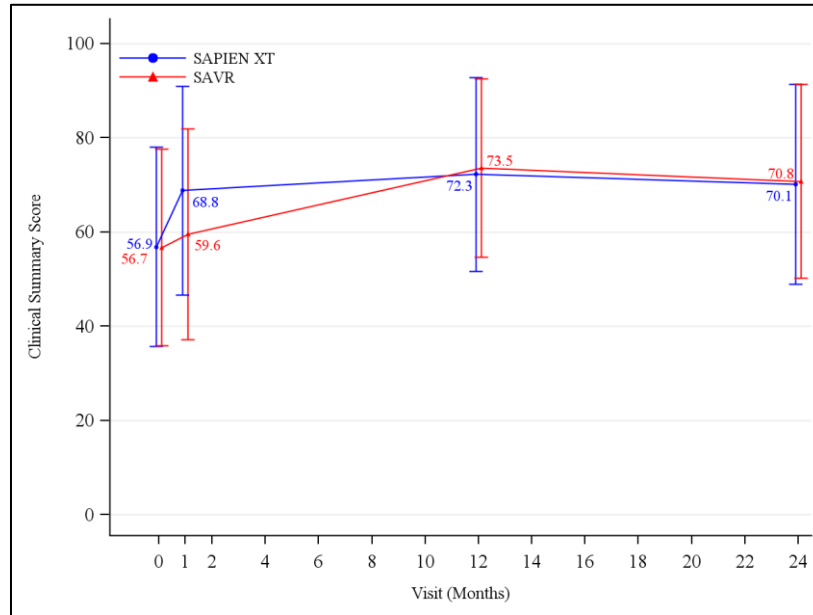
Table 34: Length of Stay (AT Population)				
Length of Stay (days)*	SAPIEN XT Valve			SAVR
	All	TF	Non-TF	
Overall	7.4 ± 5.6	6.5 ± 4.6	10.3 ± 7.3	11.9 ± 7.6
ICU	3.4 ± 3.5	2.9 ± 2.4	4.9 ± 5.5	5.6 ± 6.1

*Plus-minus values are means ± SD.

QoL

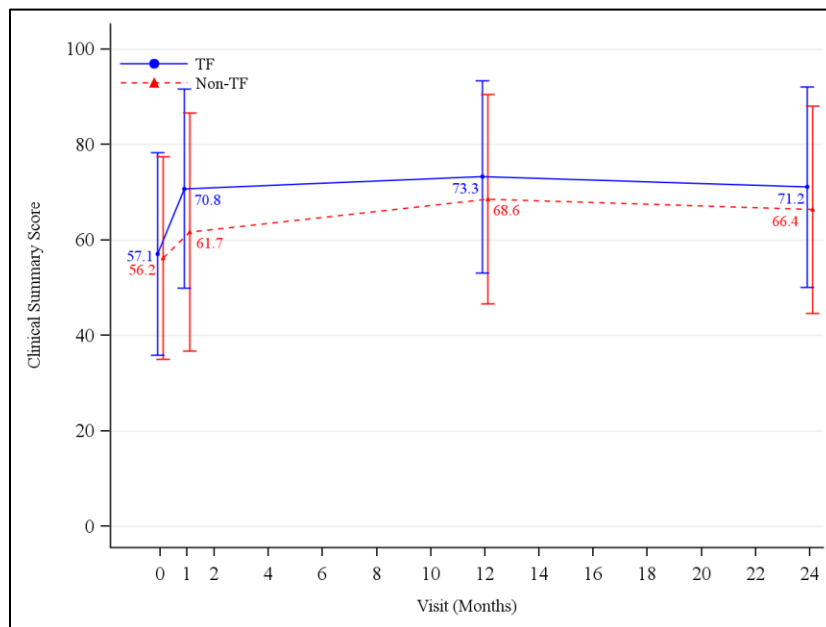
The QoL measurements using the Kansas City Cardiomyopathy Questionnaire (KCCQ) clinical summary score are presented in Figure 35. Improvements were observed in all sub-scores at 30 days and were sustained at 1 and 2 years in the SAPIEN XT valve AT population. A side-by-side comparison of the results by access approach is presented in Figure 36. In general, improvements in the TF group were slightly larger compared to those observed in the non-TF group. Among the SAVR patients, improvements were observed in most sub-scores at 30 days and were sustained at 1 and 2 years, except decreases from baseline to 30 days in KCCQ physical limitations and social limitations.

Figure 35:
KCCQ Clinical Summary Score
(AT Population)



Note: Line Plot with mean and standard deviation

Figure 36:
KCCQ Clinical Summary Score – TF versus non-TF Access
(AT Population)



Additional QoL instruments

QoL was also measured using the utility score of the EuroQoL (EQ-5D) measure and the SF-36 Health Status Questionnaire. The EQ-5D is a measure of self-reported health outcomes that is applicable to a wide range of health conditions and treatments. It consists of 2 parts: a descriptive system and a visual analogue scale (Part II). Part I of the scale consists of 5 single-item dimensions including: mobility, self care, usual activities, pain/discomfort, and anxiety/depression. Each dimension has a 3 point response scale designed to indicate the level of the problem. The overall EQ-5D score from Part I may be converted into a single index value (also known as utilities score) between 0.0 (i.e., death) and 1.0 (perfect health). SF-36 uses 36 questions to measure functional health and well-being from the patient's point of view and is generally reported in two (2) summary scores on a scale from 0 to 100 which evaluate physical (the Physical Summary Score) and mental (the Mental Summary Score) health, with higher scores representing better functional health and well-being. The results of the VAS and SF-36 measures are presented in Tables 35 and 36, respectively.

Table 35: EQ-5D Utilities Score (AT Population)				
EQ-5D Utilities Score*	SAPIEN XT Valve			SAVR
	All	TF	Non-TF	
Baseline	0.7 ± 0.2	0.7 ± 0.2	0.7 ± 0.2	0.7 ± 0.2
30 days	0.8 ± 0.2	0.8 ± 0.2	0.7 ± 0.2	0.7 ± 0.2
1 year	0.8 ± 0.2	0.8 ± 0.2	0.8 ± 0.2	0.8 ± 0.2
2 years	0.8 ± 0.2	0.8 ± 0.2	0.8 ± 0.2	0.8 ± 0.2

*Plus-minus values are means ± SD.

Table 36: SF-36 Health Status Questionnaire Score (AT Population)				
SF-36 Health Status Questionnaire Score*	SAPIEN XT Valve			SAVR
	All	TF	Non-TF	
Physical Component Score				
Baseline	36.1 ± 8.9	36.3 ± 9.0	35.6 ± 8.7	35.9 ± 8.7
30 days	40.0 ± 9.3	41.0 ± 9.2	36.5 ± 8.6	36.1 ± 8.0
1 year	40.6 ± 9.8	40.8 ± 9.9	39.8 ± 9.2	41.0 ± 9.9
2 years	39.4 ± 9.8	39.8 ± 9.8	37.8 ± 9.4	39.1 ± 10.0
Mental Component Score				
Baseline	48.8 ± 11.3	48.7 ± 11.2	49.0 ± 11.7	47.7 ± 11.8
30 days	50.4 ± 11.7	51.4 ± 11.2	46.7 ± 12.6	45.5 ± 12.8
1 year	52.2 ± 10.9	52.4 ± 10.5	51.4 ± 11.9	51.6 ± 10.8
2 years	51.5 ± 10.9	51.5 ± 10.8	51.7 ± 11.3	51.6 ± 10.8

*Plus-minus values are means ± SD.

13.0 References

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These products are manufactured and sold under one or more of the following US patent(s): US Patent No. 6,214,054; 6,547,827; 6,908,481; 7,214,344; 7,510,575; 7,530,253; 7,585,321; 7,780,723; 7,846,203; 7,895,876; 7,993,394; 8,057,540; 8,382,826; 8,591,575; 8,690,936; 8,790,387; 9,301,840; and 9,301,841; and corresponding foreign patents. Additional patents are pending.



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Manufacturer 
Edwards Lifesciences LLC

One Edwards Way
Irvine, CA 92614 USA

Made in USA

Telephone	949.250.250
	800.424.327
FAX	949.250.252

Web IFU
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