

DATA OUTCOMES

FALL 2023

THE VALLEY HEART AND VASCULAR INSTITUTE

EVERYTHING MEDICINE CAN DO.
A FEW THINGS MEDICINE CAN'T.



In alliance with

 **Cleveland Clinic**
Heart, Vascular and Thoracic Institute

THE VALLEY HEART AND VASCULAR INSTITUTE

**EVERYTHING MEDICINE CAN DO.
A FEW THINGS MEDICINE CAN'T.**

The Valley Heart and Vascular Institute is known for its depth of experience, high-quality care, and its alliance with the nationally ranked Cleveland Clinic Heart, Vascular & Thoracic Institute. Valley's multidisciplinary team approach to care represents a forward-thinking and integrated strategy for the treatment of cardiovascular pathologies that is centered on each individual patient's needs.

We are pleased to present a snapshot of data outcomes for our cardiovascular programs, including cardiovascular imaging, cardiovascular surgery, electrophysiology, heart failure, and structural heart.

We are pleased to announce The Valley Hospital has been rated as a high performing hospital for abdominal aortic aneurysm repair, heart attack, heart bypass surgery, heart failure, and transcatheter aortic valve replacement (TAVR) by *U.S. News & World Report* (2023–24).



ABDOMINAL AORTIC
ANEURYSM REPAIR



HEART ATTACK



HEART BYPASS
SURGERY




HEART FAILURE



TRANSCATHETER AORTIC
VALVE REPLACEMENT

RECENT PUBLICATIONS

Valley's physicians have been recently published in notable journals. Browse a sample of their recent publications below. A full list of publications is available at ValleyHealth.com/CardiologyPublications or by scanning the QR code. 

Musat, D., & Mittal, S. (2023). **Left atrial appendage closure device embolization — you may not know if you do not look.** *HeartRhythm Case Reports*. <https://doi.org/10.1016/j.hrcr.2023.07.001>

Jabagi, H., Levine, D., Gharibeh, L., Camillo, C., Castillero, E., Ferrari, G., Takayama, H., & **Grau, J.B.** (2023). **Implications of bicuspid aortic valve disease and aortic stenosis/insufficiency as risk factors for thoracic aortic aneurysm.** *Reviews in Cardiovascular Medicine*, 24(6), 178. <https://doi.org/10.31083/j.rcm2406178>

Rahim, H., Rahim, M.A., & **Tayal, R.** (2023). **Large-bore access and closure: Optimizing vascular access and management of complications.** *Current Treatment Options in Cardiovascular Medicine*. <https://doi.org/10.1007/s11936-023-00990-9>

Sharifov, O.F., Denney, T.S., Jr, Girard, A.A., **Gupta, H.,** & Lloyd, S.G. (2023). **Coronary artery disease is associated with impaired atrial function regardless of left ventricular filling pressure.** *International Journal of Cardiology*, 387. <https://doi.org/10.1016/j.ijcard.2023.05.052>

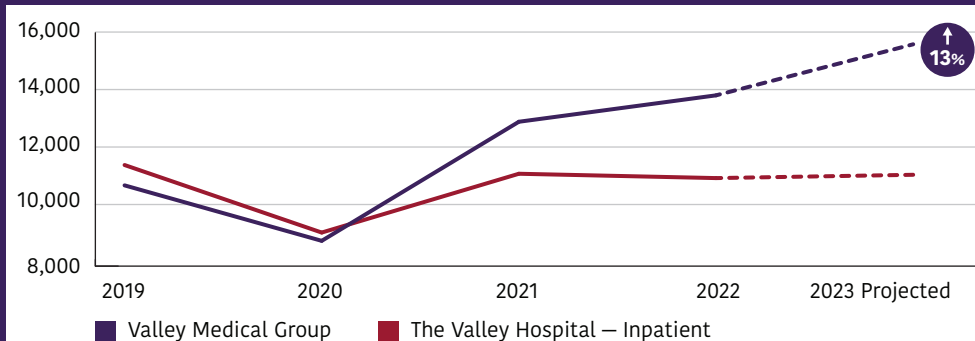
Park, L.S., Milstein, N., Limberg, K., Musat, A., Les, O., **Bhatt, A., Habibi, M., Preminger, M., Sichrovsky, T., Musat, D., & Mittal, S.** (2023). **Using remote monitoring of CPAP use and compliance to manage patients with obstructive sleep apnea and atrial fibrillation.** [Abstract]. *Heart Rhythm Society*.

GROWTH IN TRANSTHORACIC ECHOCARDIOGRAM VOLUME

Valley's Advanced Cardiovascular Imaging Program, led by Himanshu Gupta, MD, Director of Cardiac Imaging, offers a full suite of echocardiographic imaging, including transthoracic and transesophageal echocardiograms along with 3D imaging and ultrasound-enhancing agents, to achieve the clearest picture of the heart.

The graph to the right highlights transthoracic echocardiogram volume between 2019 – 2023 projected for both Valley Medical Group and The Valley Hospital. Our team is pleased to report an uptick in transthoracic echocardiogram growth and forecasts that 2023 volume will surpass 2019 – 2022 volume.

Transthoracic Echocardiogram Volume (2019 – Projected 2023)



This growth in echocardiogram volume is a direct result of the following:

EASE OF ACCESS FOR PATIENTS: Valley's network of imaging locations has expanded to now introduce echocardiogram imaging capabilities, using state-of-the-art Philips machines, at our Valley Medical Group – Cardiac Imaging practice, located at 1200 East Ridgewood Avenue in Ridgewood, New Jersey. Six sites now house cardiac imaging capabilities, allowing for cardiovascular imaging to be completed for a large subset of patients in their provider's practice. This ease of access creates a one-stop-shop type of experience for our patients, reducing their need to travel between buildings. Saturday hours are available, offering additional scheduling flexibility.



Image courtesy of Philips.

LEVERAGING THE LATEST TECHNOLOGY AND SOFTWARE:

Valley's cardiac imaging program offers all new, state-of-the-art echocardiogram machines with enhanced capabilities for strain and 3D imaging. Concurrently, the team uses advanced echo technologies, such as 3D ultrasound, color doppler ultrasound, ultrasound-enhancing agent, and myocardial strain imaging, which help provide the most accurate cardiac imaging and diagnoses. Leveraging the power of artificial intelligence (AI) to also improve

imaging and diagnostic accuracy, the team has integrated AI-assisted 3D heart modeling and TomTec software suite for AI-assisted quantitative assessment of echocardiograms for valvular heart disease and heart failure. Through multidisciplinary collaboration, Valley's cardiac imaging team works with the cardiac surgery and structural heart teams to provide preprocedural imaging and measurement to help guide procedures.

EXPERTISE IN THE FIELD OF CARDIOVASCULAR IMAGING:

Valley's cardiac imaging team, led by Dr. Gupta, who has subspecialty training in echocardiology, nuclear cardiology, cardiac CT, and cardiac MRI, includes expert imagers and technicians who work side-by-side with other heart specialists to accurately detect and diagnose underlying conditions.

A DEDICATION TO ADVANCING THE FIELD OF CARDIAC IMAGING:

Cardiac imaging specialists at Valley actively lead research to help improve echocardiograms and overall diagnostic capabilities. The team also participates in clinical trials that incorporate advanced cardiac imaging to improve treatment for a wide range of heart diseases.

COMMITMENT TO QUALITY:

The program prides itself on having robust quality control measures. The team continually reviews imaging studies for consistency of imaging and reporting, and these efforts have been recognized for excellence by the Cleveland Clinic Heart, Vascular & Thoracic Institute. This level of quality control provides patients with the highest-quality images, allowing our patients' care teams to determine a treatment plan tailored to their specific needs.

CLINICAL EXPERTISE IN AORTIC AND CARDIOTHORACIC SURGERY

The cardiovascular surgery team at The Valley Hospital has experienced a transformative year. After several years of targeted recruitment and focused work, our team has been able to offer a more complex set of procedures to higher risk patients in our community, yielding excellent results.

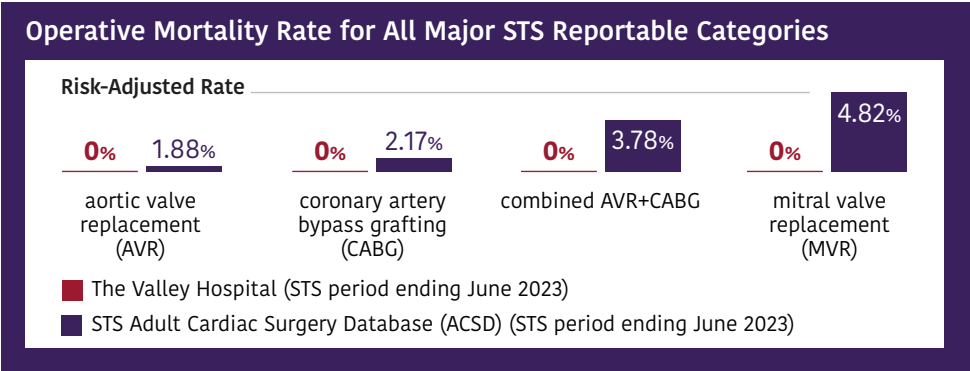
The STS risk adjusted rates as measured in The Society of Thoracic Surgeons (STS) Adult Cardiac Surgery Database (ACSD)

— the world's premier clinical outcomes registry for adult cardiac surgery — for our patients presenting for almost every type of cardiothoracic surgery increased 21% between 2021 and 2022, and 41% between 2022 and 2023. Despite this, we maintained mortality rates well below those expected based on the STS risk adjusted rate of our patients, as seen in the chart below. These results were achieved through our commitment to quality of care and patient outcomes.

In addition to our service line success, three of our notable programs have experienced expansion and achievement, including:

INTEGRATED AORTIC PROGRAM: Valley's Integrated Aortic Program is the largest diagnostic, surgical, and surveillance program in the metropolitan area that is dedicated to restoring health and enhancing lives for patients with aortic diseases. Currently, more than **2,000 patients**, ranging from ages 12 to 95 are enrolled.

We offer a full range of aortic aneurysm repair procedures to address aortic conditions. Our program is one of few in the area that offers the Ross procedure, which replaces damaged aortic valves with a patient's own pulmonary valve, and the David procedure, which provides a personalized solution to aortic root reconstruction preserving the patient's native aortic valve.



ADVANCED HEART FAILURE PROGRAM:

Advanced heart failure has a five-year survival of only 50%, as noted by Jones et al¹ (2019) in a recent meta-analysis, but, with optimal care, survival rates and quality of life improve dramatically.

At The Valley Hospital, we have established a multidisciplinary team to provide medical therapy, lifestyle modification, and heart rhythm management, as well as endovascular and surgical procedures for coronary and valvular issues. For acute or chronic heart failure, short term device therapy such as extracorporeal membrane oxygenation (ECMO) and Impella support are available. Our team's close affiliation with transplant programs ensure that the entire spectrum of care is readily available.

HYPERTROPHIC CARDIOMYOPATHY PROGRAM:

Hypertrophic cardiomyopathy (HCM) is one of the most common inherited heart diseases, according to the American Heart Association². Diagnosis for this condition can be a challenge and surgical management has been limited to a small number of centers.

Over the past two years, we have established a dedicated team responsible for the diagnosis and surgical management of patients with HCM. This integrated approach has evolved towards the routine use of 3D cine CT scanning for the surgical planning of patients with HCM with associated malformations such as ectopic papillary muscles (see figure).



CINE CT 3D Reconstruction HCM patient. Anomalous papillary muscle (arrow) and septum (star) causing obstruction.

This new diagnostic algorithm has allowed us to provide patients with excellent outcomes, a result of very predictable procedural planning prior to operation.

In addition, The Valley Hospital has supported the development of several other HOCM centers in the world by leading an international consortium, through which complex HCM cases are discussed.

- 1 Jones, N.R., Roalfe, A.K., Adoki, I., Hobbs, F.D.R., & Taylor, C.J. (2019). Survival of patients with chronic heart failure in the community: A systematic review and meta-analysis. *European Journal of Heart Failure*, 21(11), 1306–1325. <https://doi.org/10.1002/ehjhf.1594>
- 2 Writing Committee Members, et. al (2021). 2020 AHA/ACC guideline for the diagnosis and treatment of patients with hypertrophic cardiomyopathy: A report of the American College of Cardiology/American Heart Association Joint Committee on Clinical Practice Guidelines. *The Journal of Thoracic and Cardiovascular Surgery*, 162(1), e23–e106. <https://doi.org/10.1016/j.jtcvs.2021.04.001>

To learn more about Valley's cardiovascular surgery program, please visit ValleyHealth.com/CardiacSurgery.

ACHIEVING OPTIMAL CATHETER ABLATION OUTCOMES

ABLATION POST-PROCEDURAL COMPLICATIONS (2020 – 2022)

The electrophysiology team at The Snyder Center for Comprehensive Atrial Fibrillation, led by Suneet Mittal, MD, Director of Electrophysiology at The Valley Hospital and Medical Director of The Snyder Center for Comprehensive Atrial Fibrillation, uses a multispecialty approach to identify, treat, and manage atrial fibrillation (AFib).

Not all arrhythmias require treatment, but patients need to manage arrhythmias that cause significant symptoms, increase risk for a more serious condition, or impair

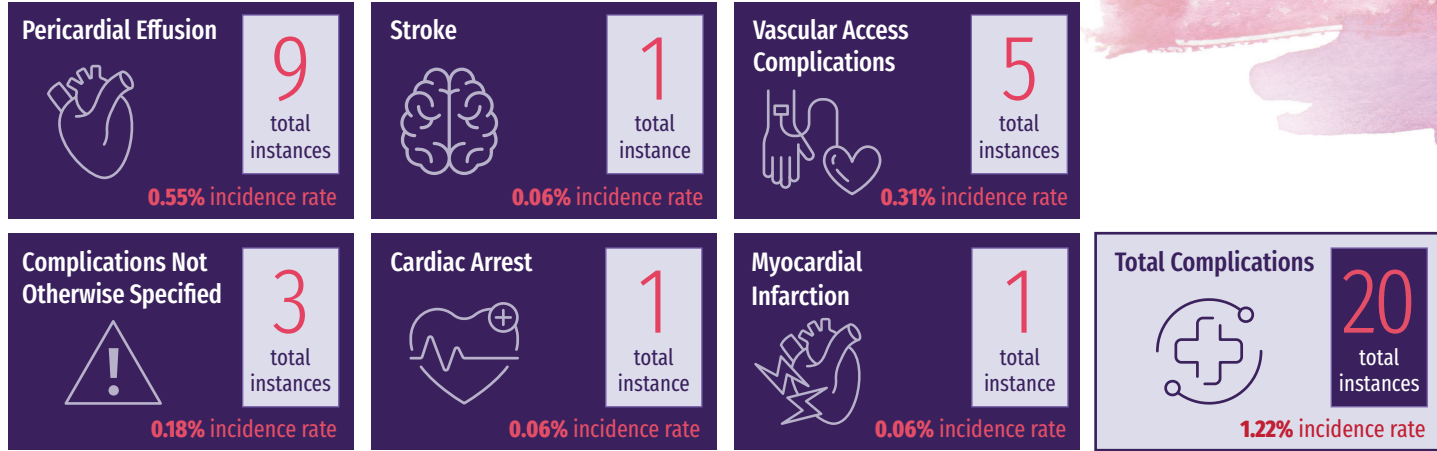
the heart's efficiency and circulation. Treatment depends on the type and degree of the arrhythmia and may include lifestyle changes, medications, or catheter ablation.

When antiarrhythmic medication fails to control arrhythmia, our team may recommend a catheter ablation procedure as a subsequent treatment option. Ablation may also be recommended in conjunction with antiarrhythmic medication. During the past three years (2020 – 2022), our electrophysiologists at The Snyder Center have completed a total of **1,637 ablation procedures**.

To evaluate the success of ablations performed at Valley, post-procedural complications were examined. Our team is pleased to report that of the 1,637 procedures, only 20 post-procedural complications were experienced, resulting in a 1.22% post-procedure complication rate throughout the three-year reporting period. The figure to the right highlights all complications experienced during the reporting period and the associated incidence rate.

All cause 30-day mortality rates were also examined as a measure of procedural success. As seen in the second chart to the right, out of the 1,637 ablation procedures performed between 2020 – 2022, Valley's Snyder Center experienced one mortality as a direct result of the ablation procedure. Additionally, only seven all cause mortalities were reported, yielding a total 0.43% mortality rate over the three-year reporting period.

The Snyder Center team is proud of the outcomes achieved over the past three years. As leaders in the treatment of arrhythmia, the team will continue to expand their expertise through research to ensure Valley's patients have access to the latest therapies and technologies available.



Ablation Post-Procedural Mortality (2020 – 2022)

	Total Instances	Mortality Rate
Mortality (30-day all cause)	7	0.43%
Mortality (Related to procedure, as determined by Internal Quality Review)	1	0.06%
Total	8	0.49%



The Snyder Center physician team.

To learn more about The Snyder Center for Comprehensive Atrial Fibrillation, please visit ValleyHealth.com/SnyderCenter.

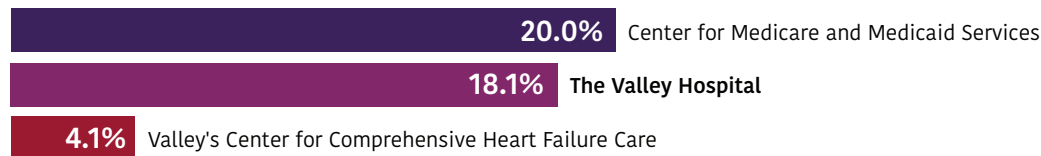
MANAGING HEART FAILURE TO REDUCE RE-HOSPITALIZATION



Heart failure affects approximately six million Americans and is the leading cause of hospitalization in older adults aged 65 years and over, as noted by Roger¹ (2021). According to the Center for Medicare and Medicaid Services, across the country, 20% of patients admitted to a hospital for heart failure are re-hospitalized within 30 days. Repeated hospitalizations can cause significant physical, mental, and financial burdens for patients and their families.

At The Valley Hospital, our heart failure care team understands the challenges that patients and families face during heart failure hospitalizations. That is why Valley's Center for Comprehensive Heart Failure Care uses evidence-based technology to monitor patients in their homes to prevent hospital re-admissions. Such technology includes the use of biventricular pacemakers, also known as cardiac resynchronization therapy (CRT) devices, which pace both the left and right ventricles to help them pump together

30-Day Hospital Re-admission Rates for Heart Failure (2022)



¹ Roger, V.L. (2021). Epidemiology of heart failure. *Circulation Research*, 128(10), 1421-1434. <https://doi.org/10.1161/CIRCRESAHA.121.318172>

in rhythm and improve cardiac output. Using fluid sensing algorithms, the care team can monitor the patient's rhythm and intervene when necessary. If the algorithm numbers run high, our team will contact the patient over the phone to evaluate how they are feeling and make any recommended changes to their medication. Other special fluid sensors are placed in the pulmonary artery and are monitored weekly for changes that would indicate worsening heart failure.

In 2022, while the national average – provided by the Center for Medicare and Medicaid Services' (CMS) Hospital Readmission Reduction Program (HRRP) administrative reports, the standard of heart failure admission quantification – remained at 20% for 30-day hospital re-admissions for heart failure,

The Valley Hospital saw a re-admission rate of 18.1%. Of this 18.1%, only 4.1% of patients who are managed by the Center for Comprehensive Heart Failure Care were readmitted.

The success of Valley's low re-admission rate is a direct result of the careful management and attention provided by the heart failure team led by heart failure specialist Kariann Abbate, MD, Director of the Center for Comprehensive Heart Failure Care. The team – consisting of certified heart failure registered nurses, advanced practice providers, and office and care support staff – help provide the nursing care, clinical and medical management,

EVIDENCE-BASED TECHNOLOGY MONITORING PATIENTS IN THEIR HOMES



Kariann Abbate, MD, Director, (pictured left) and the Center for Comprehensive Heart Failure Care team.

specialist referrals, and collaborative care coordination for heart failure patients and their families.

With over **2,000 patient visits annually**, the heart failure care team's goal for each individual patient is to provide personalized, evidence-based, high-quality heart failure care in an outpatient setting to reduce the risk of heart failure hospitalizations and keep patients feeling and functioning well in their homes and communities.

To learn more about the Center for Comprehensive Heart Failure Care, please visit ValleyHealth.com/HeartFailure.

REINVIGORATING THE FUTURE OF STRUCTURAL HEART CARE

Valley's Structural Heart Program led by Rajiv Tayal, MD, Director of the Structural Heart Program and Director of the Cardiac Catheterization Laboratory at The Valley Hospital, has experienced a tremendous period of growth and innovation, with one notable area being the transcatheter aortic valve replacement (TAVR) program. When reviewing (TAVR) volume, year over year, the team is pleased to report a **14.2% increase seen from 2021 to 2022 alone.**

Of the 193 TAVR procedures performed in 2022, our team is thrilled to report that in reviewing the STS/ACC TVT Registry™, we saw 12.5% of these cases were performed on high-risk patients, which resulted in 2.7% better performance when compared to the national average. This 12.5% demonstrates our team's ability to care for the broad spectrum of patients diagnosed with aortic stenosis,

including the sickest patients, all while yielding superior outcomes.

To evaluate the success of this increased volume of TAVR procedures at The Valley Hospital, Valley's outcomes data was compared to outcomes data from the STS/ACC TVT Registry™, created to monitor patient safety and real-world outcomes related to transcatheter valve replacement and repair procedures. As depicted in the chart to the right (at the bottom), Valley's outcomes for the rolling four quarters ending in 2023 Q1 (2022 Q2 – 2023 Q1) are significantly better than the national average across all cardiac events.

Taking a closer look at the TAVR outcomes data, our team is pleased to report a post TAVR permanent pacemaker requirement rate of 6.7% between 2022 Q2 – 2023 Q1, compared to 11.3% between 2021 Q2 – 2022 Q1. Similarly, a 1.1% vascular complication rate was observed between 2022 Q2 – 2023

Q1, compared to 3.6% between 2021 Q2 – 2022 Q1. Overall, pacemaker rates decreased by 41% and vascular complications decreased by 69%. Both areas have shown marked improvement.

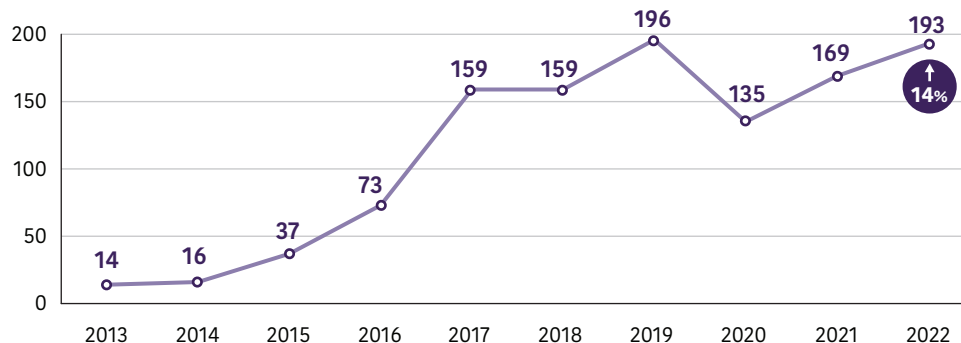
As a direct result of our notable outcomes, the team is also pleased to report that 74.1% of our 2022 TAVR patients had a next-day discharge, compared to 62.4% in 2021. This change represents a 19% increase in next-day discharge.



In recognition of this demonstrated expertise and commitment to treating patients receiving transcatheter valve repair and replacement procedures,

The Valley Hospital has been awarded Transcatheter Valve Certification from The American College of Cardiology (ACC).

STS/ACC TVT Registry™ TAVR Procedural Volume

STS/ACC TVT Registry™
Percentage of High-Risk Patients – TAVR

12.5%

The Valley Hospital

9.8%

STS/ACC TVT Registry™
National Average - 2022

STS/ACC TVT Registry™ Transcatheter Aortic Valve Replacement (TAVR) Outcomes

	The Valley Hospital 2021 Q2 – 2022 Q1	The Valley Hospital 2022 Q2 – 2023 Q1	STS/ACC TVT Registry™ Rolling Four Quarters (2022 Q2 – 2023 Q1)
Permanent Pacemaker Rate	11.3%	6.7%	6.7%
Vascular Complication Rate (Minor)	3.6%	1.1%	2.7%
Device Complication	0.0%	0.5%	0.5%
Acute Kidney Injury	0.0%	0.0%	0.4%
Myocardial Infarction	0.0%	0.0%	0.1%

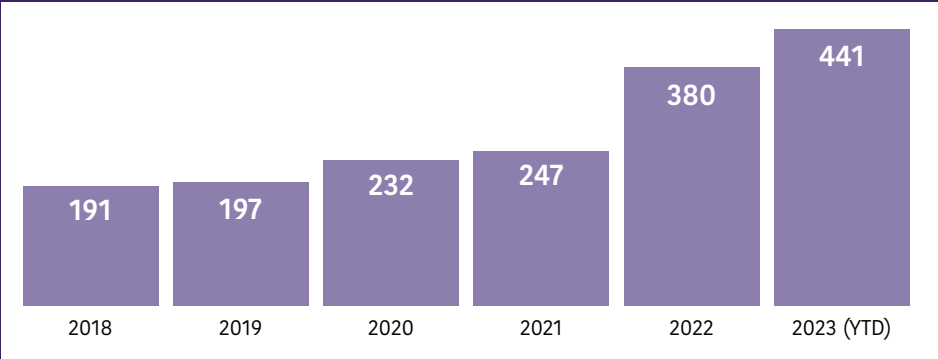
To learn more about Valley's Structural Heart Program, please visit ValleyHealth.com/StructuralHeart.

ADVANCING CARDIAC CARE THROUGH RESEARCH AND CLINICAL TRIALS

Tomorrow's advances in medicine come from today's research — and world-class cardiac research is being conducted every day under the leadership of Suneet Mittal, MD, at Valley's Okonite Research Center. This state-of-the-art facility offers all of the resources needed to test and evaluate innovative approaches to diagnosing and treating cardiovascular diseases.



Participants Enrolled in Cardiac Clinical Trials (2018 – 2023 YTD)



When reviewing participants enrolled in cardiac clinical trials, from 2018 – 2023 (YTD), the team is pleased to report a considerable increase in enrollment year-over-year. Since 2018, more than **1,600 patients** have been enrolled in clinical trials in cardiology, cardiac surgery, electrophysiology, and heart failure at Valley.

The subspecialties of structural heart and interventional cardiology have experienced significant growth in clinical trials brought to Valley, with principal investigator Rajiv Tayal, MD, Director of the Structural Heart Program and Director of the

12 To refer a patient to The Valley Heart and Vascular Institute, please call 1-800-VALLEY 1 (1-800-825-5391).

Cardiac Catheterization Laboratory at The Valley Hospital, at the forefront of this expansion. Clinical trials currently enrolling under Dr. Tayal's purview include:

- 1. IMPELLA ECP:** To evaluate the rate of major adverse cardiovascular and cerebrovascular events (MACCE) with the Impella ECP™ device in adult patients undergoing elective or urgent high-risk percutaneous coronary intervention.
- 2. PROTECT IV:** To evaluate the use of Impella®-supported percutaneous coronary intervention (PCI) in high-risk patients with complex coronary artery disease and reduced left ventricular function.
- 3. PATCH:** To evaluate the safety and efficacy of the Vivasure PerQseal® Closure Device System when used to achieve haemostasis of common femoral arteriotomies created by 12 to 22 F sheaths in patients

undergoing percutaneous catheter-based interventional procedures.

- 4. COMPLETE TAVR:** To evaluate staged complete revascularization with percutaneous coronary intervention to treat coronary artery disease versus medical management alone in patients with symptomatic aortic valve stenosis undergoing elective transfemoral transcatheter aortic valve replacement (TAVR).

- 5. PROGRESS:** To assess the management of moderate aortic stenosis by clinical surveillance of TAVR.

- 6. ALLIANCE:** To evaluate the safety and effectiveness of balloon-expandable bioprosthetic SAPIEN X4 Transcatheter Heart Valve.

Valley's cardiovascular team
is currently participating in

MORE THAN

40

**— ACTIVE —
CLINICAL TRIALS**

To learn more about clinical trials and research at Valley, please visit ValleyHealth.com/Research.



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