

**CARDIOVASCULAR AND SURGICAL**  
**OUTCOMES 2020**



[BayCareHeart.org](https://www.BayCareHeart.org)

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# Dear Colleague,

The physicians and team members of the BayCare cardiovascular service line are pleased to present the annual clinical outcomes for 2020. Though the emergence of COVID-19 presented significant challenges, these outstanding clinical results for patients within BayCare are a direct result of dedicated teams of caregivers who took those challenges in stride and were able to continue to provide extraordinary care. Our cardiovascular service line is structured to allow multidisciplinary teams to manage the vast range of cardiovascular disease conditions, while using the latest technology to address cardiovascular disease at every level and rigorously benchmarking our progress against top IBM Watson Health metrics. The following pages will highlight volume and select clinical outcomes within BayCare. We hope you can utilize the information in this outcomes book to help with patient care and treatment decisions. For more information or to refer a patient to any of our programs, call (844) 344-1990.

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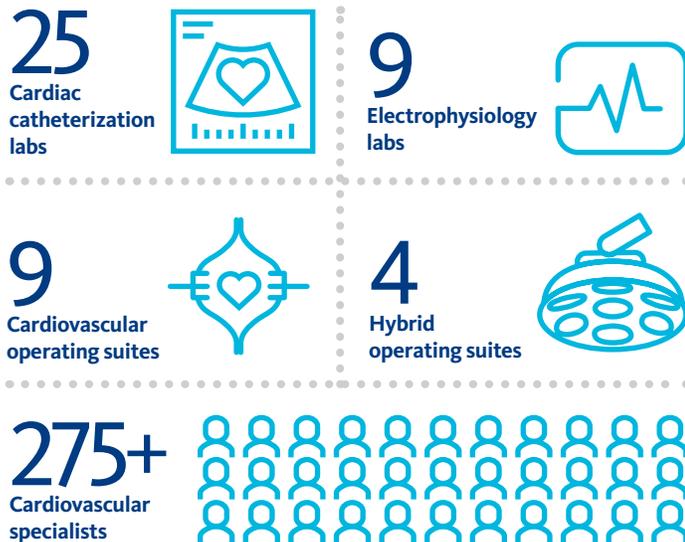
# Why Choose Us?

The combination of BayCare's comprehensive cardiovascular offerings and high-quality outcomes with our clinically integrated network that has an expansive geographic footprint, makes us an excellent choice for area clinicians and patients who need cardiovascular care. Patients are able to move easily within the system to get the care and clinical expertise they need, regardless of their location.

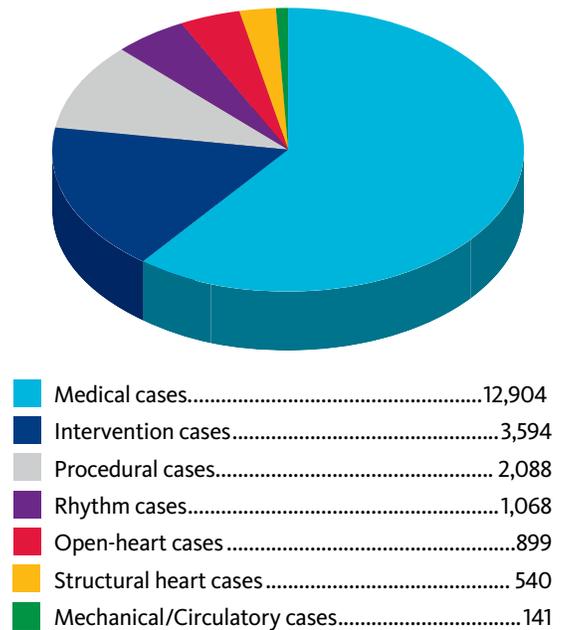
As the largest not-for-profit health care system in West Central Florida, and with the support of nearly 29,000 team members, BayCare fosters a forward-thinking culture that's advancing superior health care and creating an environment that allows quality to flourish.

**To refer a patient to any of our cardiovascular programs or facilities: (844) 344-1990**

## BayCare's cardiovascular and thoracic programs offer:



### Inpatient Cardiovascular Cases



Inpatient state data 4Q2019-3Q2020 for the four-county area (Hillsborough, Pasco, Pinellas and Polk), cardiovascular cases using DRGs and procedure codes, excluding heart transplants, IP rehab, pediatrics and specialty hospital

*Due to COVID-19, we showed a loss in cardiovascular volume.*

# Cardiovascular Surgery

The cardiovascular surgeons at BayCare recognize that when it comes to your patients' care, quality and outcomes are of the utmost importance. BayCare's cardiovascular and cardiothoracic surgeons are all members of the Society of Thoracic Surgeons (STS), whose mission is to enhance the ability to provide the highest quality patient care. BayCare participates in the STS National Adult Cardiac Surgery Database, which includes over 1,200 participating institutions throughout the country. Participation in this database allows the surgeons and teams to utilize a powerful computer model that defines a patient's surgical risk based on the planned procedure and the patient's overall health characteristics. This allows well-informed discussions with your patients and their families as they make important decisions about their cardiovascular health.

Cardiovascular surgery is currently performed at three BayCare facilities: Morton Plant Hospital, St. Joseph's Hospital and Winter Haven Hospital. Cardiothoracic surgeons Dr. David Evans, Dr. John Ofenloch and Dr. Andrew Sherman acknowledge that "Cardiac surgery is one of the most scrutinized and data-driven specialties, with data collection on nearly every aspect of patient care. The BayCare cardiovascular surgeons remain committed to utilizing the extensive information provided to us via the Society of Thoracic Surgeons database in order to implement meaningful changes in the treatment of our patients throughout West Central Florida. Through frequent collaborative meetings and constant evaluation of data-driven best practices, we have impacted countless patients' lives. We strive to provide the highest quality of care from the moment we meet our patients, during their operative procedures, continuing into the postoperative period and well into their recovery." For information on BayCare's management and treatment of pediatric and adult congenital heart disease, see the Pediatric and Adult Congenital Heart section of this book on [page 19](#).



## BayCare's cardiovascular surgical procedures include:

- Aortic aneurysm repair
- Aortic valve repair and replacement
- Carotid endarterectomy and stenting
- Coronary artery bypass grafting (CABG)
- Endovascular aneurysm repair (EVAR)
- Extracorporeal mechanical circulatory support (ECMO)
- Implantable defibrillator insertion and lead extraction
- Intracardiac mechanical circulatory support devices (ex: Impella)
- Minimally invasive valve replacement/repair
- Mitral valve repair and replacement
- Redo cardiac surgery
- Surgical treatment of advanced heart failure: ventricular assist device (VAD)
- Surgical treatment for atrial fibrillation (Maze, Convergent, AtriClip)
- Surgical treatment for infected and failed heart valves

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*“Through frequent collaborative meetings and constant evaluation of data-driven best practices, we have impacted countless patients' lives.*

~ Dr. David Evans  
*Director, Cardiac Surgery at the Bostick Heart Center at Winter Haven Hospital*

~ Dr. John Ofenloch  
*Chief of Cardiothoracic Surgery and Medical Director, Morgan CVICU/OR at Morton Plant Hospital*

~ Dr. Andrew Sherman  
*Chief, Department of Cardiac, Vascular and Thoracic Surgery at St. Joseph's Hospital*

## A Look at Volume

2020 Open-Heart Surgery Breakdown	
	BayCare
Isolated CABG	732
Surgical Valve	444
Other Cardiac Surgery	165

**Surgical valve** = Represents total number of valves, not patients

**Other Cardiac surgery** = Includes all procedures that fall outside any STS procedure identification category

### Surgical Treatment for Cardiac Arrhythmias

Surgical treatment for cardiac arrhythmias, typically atrial fibrillation (AFib), has become increasingly important within advanced cardiovascular surgery programs. Often these patients are treated in a comprehensive manner incorporating cardiovascular surgeons and cardiac electrophysiologists. Intraoperatively, surgeons have an ideal opportunity to treat AFib with a Maze procedure or other type of ablation. Additionally, the left atrial appendage may be closed or occluded at the time of surgery to potentially reduce the patient's stroke risk secondary to AFib.

Arrhythmia surgery is commonly performed in conjunction with mitral valve surgery, but can also be performed concomitantly with other valve surgery or CABG. Untreated atrial fibrillation not only affects patient's quality of life but also their longevity. AFib is a major cause of morbidity and stroke in patients with cardiovascular disease. "BayCare cardiovascular surgeons have made treatment of AFib a high priority in alignment with the recommendations of the major societies," according to Dr. Andrew Sherman, chief of the department cardiac, vascular and thoracic surgery at St. Joseph's Hospital. "A multidisciplinary team provides patients with AFib an individualized treatment approach that has been proven in recent literature to positively impact their quality of life and life expectancy. A significant point of emphasis in the management of our shared patients with AFib involves closure of their left atrial appendage (LAA) for stroke prevention. BayCare has one of the highest volumes of minimally invasive approaches to LAA exclusion in the country."

BayCare's cardiovascular surgeons also perform a unique hybrid approach for the treatment of AFib called the convergent procedure. Recently, convergent hybrid AFib therapy became the only FDA-approved minimally invasive ablation procedure to treat patients who have been in continuous AFib.

2020 Surgical and Transcatheter Valve Volume	
	BayCare
Aortic Valve	238
Mitral Valve	162
Tricuspid Valve	44
Transcatheter Valve ( <i>aortic and mitral</i> )	397

Represents total number of valves, not patients

2020 Surgical Treatment of Arrhythmias	
	BayCare
Maze	36
PVI	44
Convergent	26
<b>Total</b>	<b>106</b>

*"Every patient with a history of AFib who is evaluated by BayCare cardiovascular surgeons will also be considered for appropriate arrhythmia therapy."*

- ~ Dr. David Evans  
*Director, Cardiac Surgery at the Bostick Heart Center at Winter Haven Hospital*
- ~ Dr. John Ofenloch  
*Chief of Cardiothoracic Surgery and Medical Director, Morgan CVICU/OR at Morton Plant Hospital*
- ~ Dr. Andrew Sherman  
*Chief, Department of Cardiac, Vascular and Thoracic Surgery at St. Joseph's Hospital*

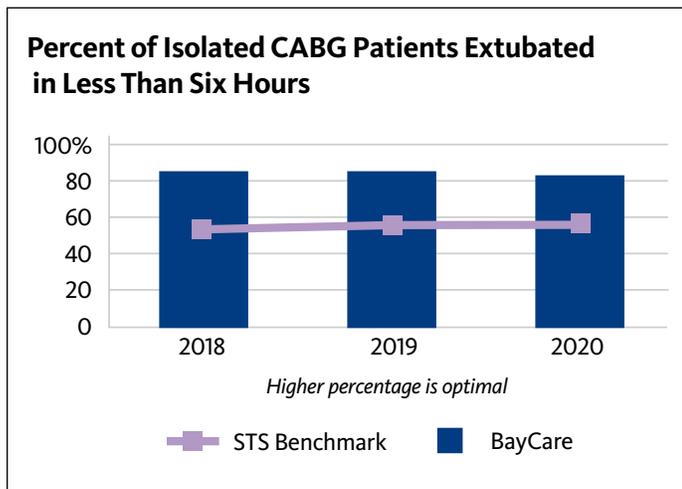
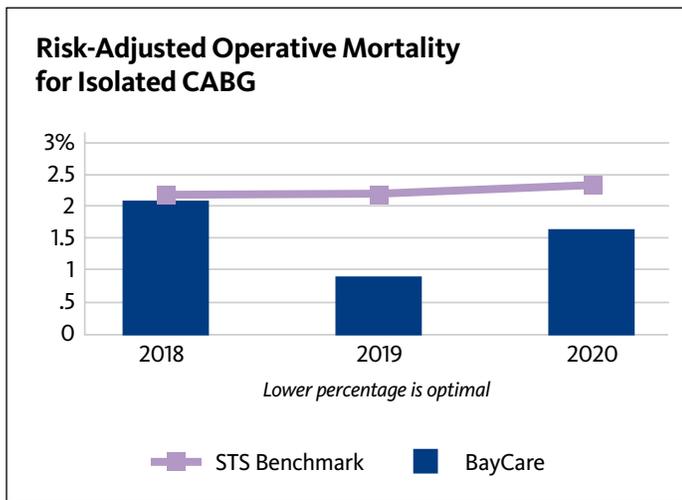
## A Look at Quality

Due to delayed STS reporting, composite scores for BayCare as a health system in 2019 were not available in all previously-reported categories. We have included the risk-adjusted composite scores when available below.

Composite Overall Star Ratings 2020	
Isolated CABG	★ ★ ★
Mitral Valve Repair/Replacement (MVRR)	★ ★ ★

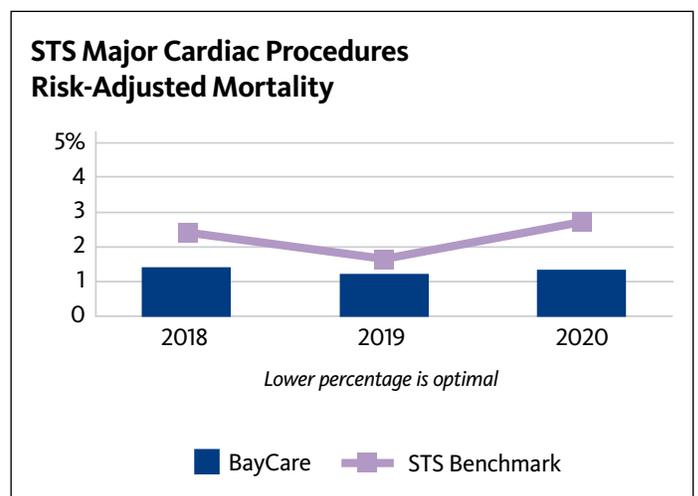
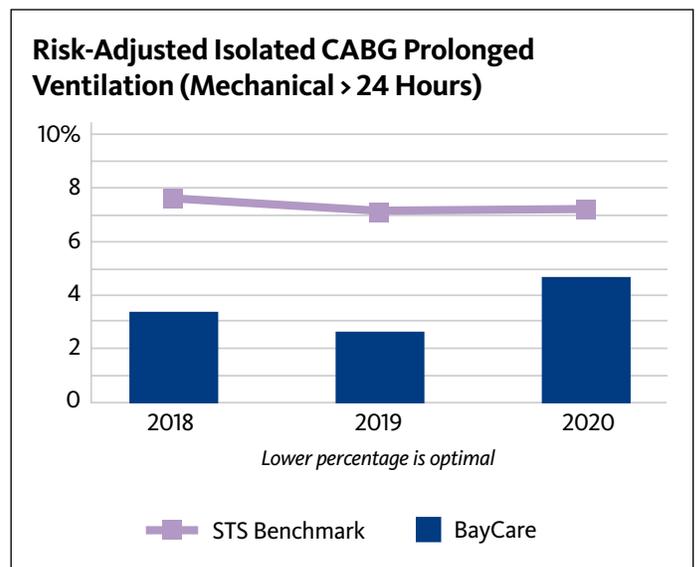
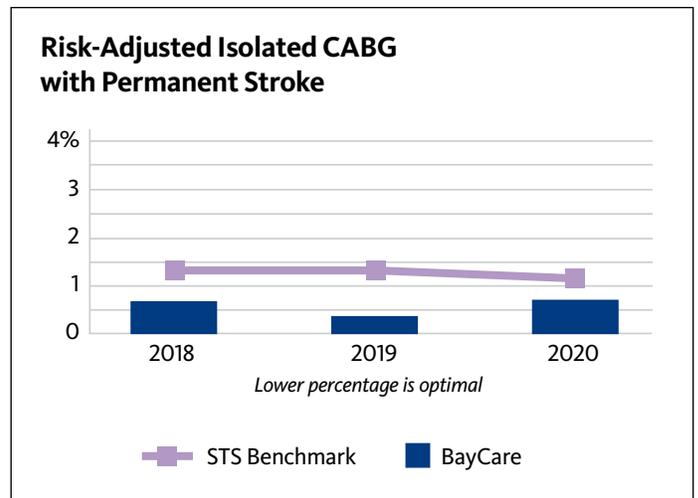
Three-star designation represents the highest possible quality rating.

### Composite Quality Metrics for Isolated CABG at BayCare | 2018–2020



Deep Sternal Wound Infection for Isolated CABG		
	STS Benchmark	BayCare
2018	0.3%	0.0%
2019	0.3%	0.1%
2020	0.3%	0.14%

Lower percentage is optimal



## Importance of Blood Conservation

Multiple strategies are utilized within BayCare cardiovascular surgical programs to limit operative blood loss and patient exposure to blood products. Techniques to limit bleeding and return shed blood to the patient include:

- Optimization of the patient’s own clotting mechanism prior to operation, which includes discontinuation of blood thinners and antiplatelet medications prior to surgery
- Treating anemia and supplementing deficiencies
- Cell saver technology which scavenges blood from the surgical field
- Cardiotomy suction to return all blood lost in the OR to the patient
- Meticulous surgical technique to minimize bleeding
- Medication administration during surgery to enhance the patient’s own clotting mechanism
- Specialized medications utilized to address specific deficiencies in coagulation

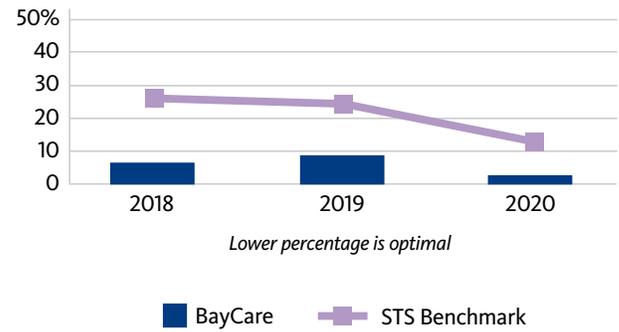
## Emphasis on Arterial Grafting for CABG

“Arterial bypass grafts have been proven to provide superior long-term outcomes and, as such, our utilization of multiple arterial grafts, including radial artery and bilateral internal mammary artery grafts, is significantly higher than regional and national averages,” according to chief of cardiothoracic surgery and medical director of the Morgan Heart Hospital CVICU/OR at Morton Plant Hospital, Dr. John Ofenloch.

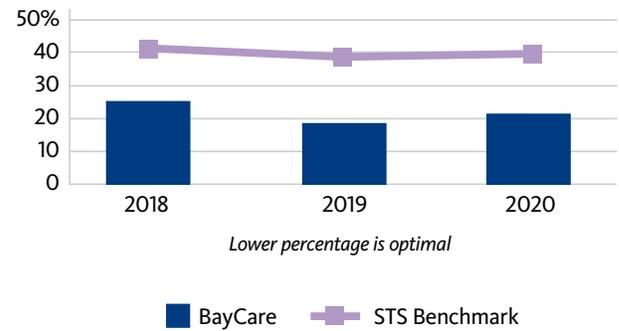
“BayCare cardiovascular surgeons are committed to providing the highest quality surgical care. Not only are in hospital and 30-day mortality rates important, but also long-term freedom from further cardiovascular events.”

BayCare cardiovascular surgeons have utilized the internal mammary artery for CABG surgery in 100 percent of appropriate cases over the past several years. Use of a second arterial graft, either an additional internal mammary artery or a radial artery graft, is increasingly employed as a strategy by BayCare cardiovascular surgeons to enhance long-term freedom from repeat intervention and cardiovascular events.

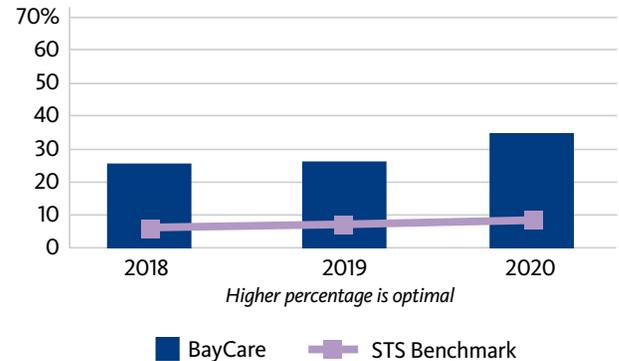
**Blood Utilization for CABG Surgeries: Represents Intraoperative Blood Use**

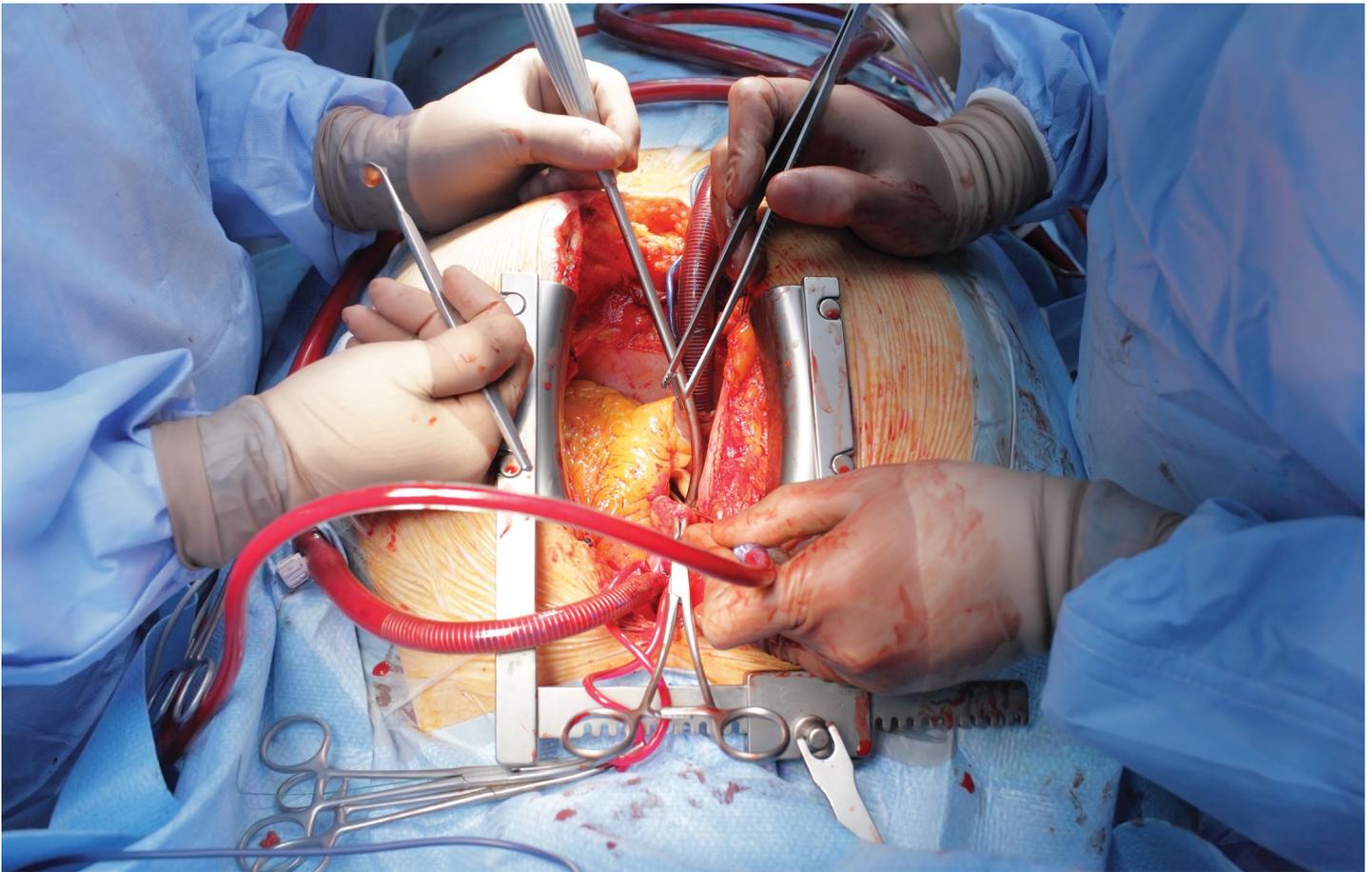


**Blood Utilization for CABG Surgeries: Represents Intraoperative and Postoperative Blood Use**



**Radial Artery Usage**





### Isolated Mitral Valve Repair

The gold standard for mitral valve regurgitation in reasonable-risk patients remains an open surgical mitral valve repair, in which the BayCare surgeons utilize a variety of techniques. Some of these techniques include mitral leaflet resection, chordal replacement, leaflet augmentation and annular reconstruction. It's imperative that these procedures are performed with very low complications. As noted in the adjacent table on Isolated Mitral Valve Repair, BayCare's surgeons and surgery teams have reported no major complications over the last two years.

While the three BayCare cardiovascular surgery programs are actively involved in transcatheter mitral valve repair procedures, these procedures are reserved for patients otherwise felt to be at high risk for open-heart surgery.

### Isolated Surgical Aortic Valve Replacement (SAVR)

Isolated open surgical aortic valve replacements (SAVR), in the era of transcatheter aortic valve replacement (TAVR), must continue to be performed with excellent outcomes, especially with respect to risk-adjusted mortality, stroke and infection rates. Younger patients and patients with anatomy more suitable for SAVR or not suitable for TAVR continue to benefit from these excellent results. We're extremely proud of our results for this group of patients, as depicted in the corresponding chart.

#### Composite Quality Metrics for Isolated Mitral Repair

Isolated Mitral Valve Repair (2019–2020)	
Volume	91
Mortality	0%
Stroke	0%
Deep Sternal Wound Infection	0%

#### Composite Quality Metrics for Isolated Surgical Aortic Valve Replacement (SAVR)

Isolated SAVR (2018–2020)	
Volume	275
Mortality	1%
Stroke	0.36%
Deep Sternal Wound Infection	0%

# Advanced Structural Heart and Valve

## Structural Heart and Valve Disease Treatment

Team-based advanced treatment for structural heart and valve disease is available within BayCare. Our facilities in Hillsborough, Pinellas and Polk counties have developed dedicated structural heart teams that specialize in the medical and surgical care of these cardiac problems. BayCare's structural heart and valve teams are comprised of physicians and health care providers from multiple specialties who have interest and expertise in the treatment of complex cardiac conditions.

According to Dr. Joshua Rovin, medical director of the Center for Advanced Valve and Structural Heart Care at Morton Plant Hospital, "Our program's success has been built upon the foundation of our experienced multidisciplinary heart team. We always strive to provide the right care at the right time for our patients, following the latest guidelines developed by our collective professional cardiology and cardiovascular surgical societies. Our teamwork and outcomes have allowed us to participate in multiple national research trials. Such trials provide us the opportunity to treat our patients with heart valve disease using the latest minimally invasive technologies."

Our specialists from the divisions of cardiovascular surgery, interventional cardiology, cardiac imaging and cardiac anesthesia work together to provide innovative heart treatment solutions and the best possible outcomes for patients with structural heart abnormalities. Many affiliated health care providers participate on the dedicated heart team as well, including nurses, physician assistants, advanced nurse practitioners and cardiac imaging specialists. Structural heart disease may affect the heart muscle as well as the valves that regulate blood flow within the heart. Some structural heart abnormalities are congenital and others are the result of acquired heart disease. Many of these abnormalities ultimately result in congestive heart failure (CHF). Some of the most common conditions and their treatments are described in the Medical Terminology and Procedure Review section on [page 24](#).

For information on BayCare's management and treatment of pediatric and adult congenital heart disease, see the Pediatric and Adult Congenital Heart section of this book on [page 19](#).



BayCare's advanced structural heart and valve procedures include:

- Balloon aortic and mitral valvuloplasty
- Left atrial appendage closure
- Transcatheter patent foramen ovale (PFO) closure and atrial septal defect (ASD) closure
- Transcatheter aortic valve replacement (TAVR)
- Transcatheter mitral valve edge-to-edge repair (MitraClip™)
- Transcatheter mitral valve replacement (TMVR)
- Valve-in-valve and ring procedure for the aortic and mitral valves
- Transcatheter paravalvular leak closure
- Surgical aortic and mitral valve repair and replacement
- Tricuspid valve repair and replacement
- Surgical treatment of atrial fibrillation
- Complex repeat heart valve surgery
- Aortic surgery and surgery for aneurysms of the aorta

**To refer a patient to any of our cardiovascular programs or facilities: (844) 344-1990**

## Surgical Innovation

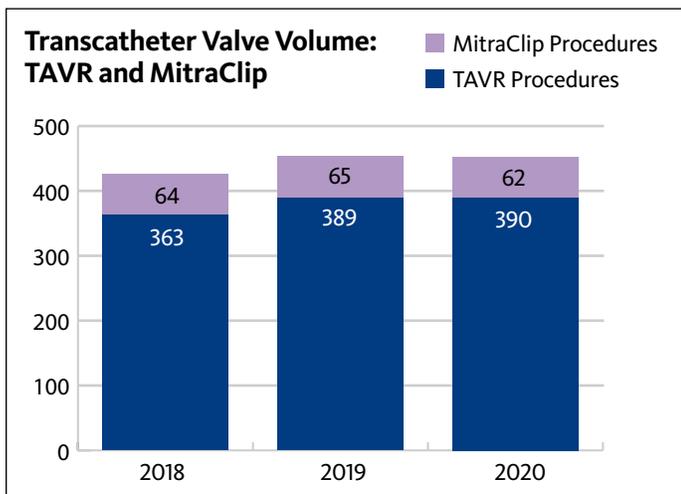
Surgical innovation and advances in cardiovascular surgical care are paramount to the success of the BayCare cardiovascular program. Over the past decade, BayCare hospitals, with the collaboration between cardiovascular surgeons and cardiologists, have implemented many new programs, which have benefited many BayCare patients. Valve surgery, in particular, has been an area of rapid progression and growth. As an example, transcatheter valve surgery avoids a sternal incision, and most patients can be discharged home the day after their procedure.

- Greater than 50 percent of all BayCare cardiovascular surgical and transcatheter cases involve valve surgery.
- One-quarter of all BayCare cardiovascular cases are transcatheter-based.
- Nearly half of all BayCare valve procedures are currently performed by transcatheter approach.

2020 TAVR 30-Day Outcomes (In hospital)		
	BayCare (in hospital)	BayCare (30-day outcomes)
	*N=390 (%)	
Observed mortality	0.00%	1.32%
Stroke (any)	1.31%	1.32%
Access site vascular complications	1.57%	1.58%

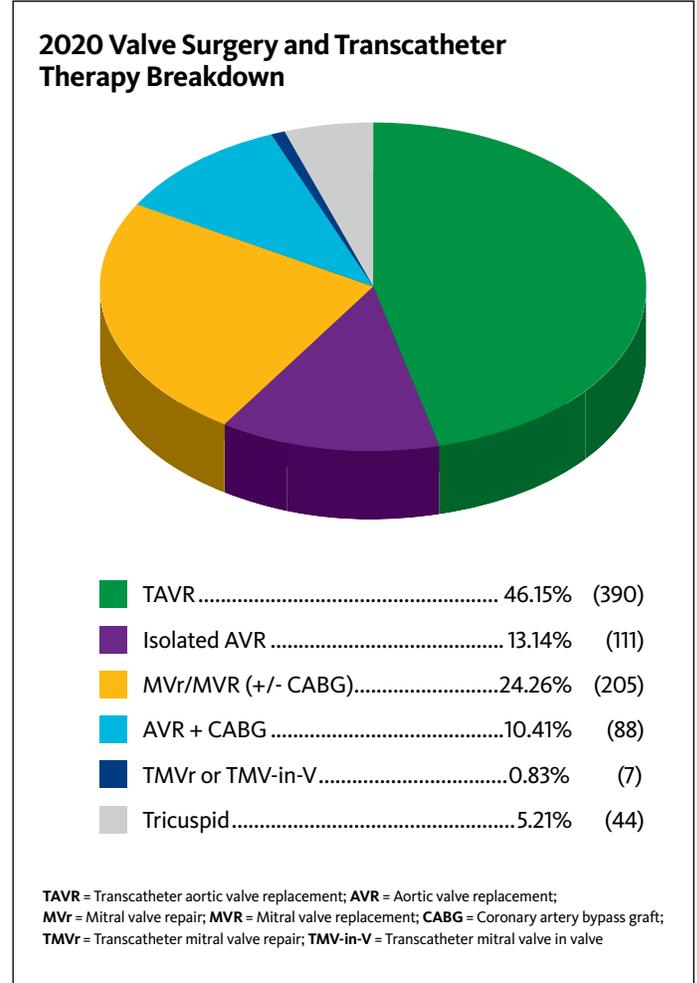
\*Includes research cases

## A Look at Volume



*“BayCare structural heart programs treat valvular heart disease in new and less invasive ways. We’re often able to treat patients whose age and other health problems make them poor candidates for open-heart surgery. BayCare structural heart programs achieve excellent outcomes and are industry leaders in new innovative techniques.”*

~ Dr. Phillips Harrington  
Director, Structural Heart Program  
at St. Joseph’s Hospital





## Case Study

An 88-year-old male presented with severe fatigue and shortness of breath with dyspnea on exertion, including being unable to take a walk without stopping. After a variety of diagnostic tests, the patient was diagnosed with severe aortic stenosis, critical coronary artery disease and peripheral artery disease. The patient was evaluated by a multidisciplinary team and determined not to be a surgical candidate for his valve disease due to multiple coexisting medical problems. The treatment path included a complex intervention of his left anterior descending artery to treat his critical coronary artery disease, followed by a TAVR procedure. The patient underwent the TAVR procedure for his aortic stenosis, receiving a transcatheter aortic valve. At follow up, the patient's new valve now has the measurements of a normal aortic valve, and the patient has gained quality of life.

# Arrhythmia

Arrhythmias, rhythm disorders of the heart, affect a wide variety of patients with and without underlying heart disease. Rhythm abnormalities can affect people of all ages, from the unborn to those of advanced age. Symptoms of rhythm disorders can range from the most obvious, which include syncope, chest pain, dizziness, symptoms of stroke and palpitations, to more subtle ones like exertion fatigue. In some cases, it might be a rhythm disorder has no symptoms at all.

For more than 25 years, arrhythmia specialists at BayCare helped further the discipline of treating rhythm disorders by participating in clinical research trials, supporting the development of procedures and catheter design, and actively collaborating with other rhythm specialists as well as other cardiac specialists across the spectrum of cardiac care. This unique combination enhances the ability of our expert rhythm disorder teams to provide high-quality outcomes for patients while maximizing patient safety. Our network throughout West Central Florida also contains one of the only facilities to provide management of arrhythmia for both adults and pediatric patients.

Our comprehensive programs offer a multitude of diagnoses and treatments, utilizing the latest technologies as well as patient support opportunities, such as implantable device support groups. “The treatment of cardiac arrhythmias is continuously evolving. At BayCare, our rhythm specialists collaborate in ways not often seen in today’s health care environment.” All aspects of patient care are periodically reviewed including how to deliver the best care in the most efficient and cost-effective manner for our patients.

Through sharing of ideas, techniques and the latest research, BayCare physicians provide cutting-edge treatments and evidence-based care for patients,” according to Dr. Rodrigo Bolaños, clinical leader of arrhythmia management for BayCare’s cardiovascular service line and medical director of electrophysiology at Winter Haven Hospital.

Common arrhythmia disorders and the procedures that manage them are listed in the Medical Terminology and Procedure Review section of this book on [page 24](#). For volume related to surgical management of arrhythmias, see the Cardiovascular Surgery section of this book on [page 5](#).

**To refer a patient to any of our cardiovascular programs or facilities: (844) 344-1990**



## BayCare’s arrhythmia programs include:

- Management of complex arrhythmia using ultrasensitive 3-D mapping
- Atrial fibrillation (AFib) ablation using radiofrequency, cryoablation, and electroporation (on trial)
- Hybrid AFib ablation for advanced AFib
- Ventricular tachycardia and ventricular fibrillation ablation with and without hemodynamic assist
- Left atrial occlusion and ligations, both catheter-based as well as surgical techniques
- Surgical Maze procedure
- Convergent hybrid Maze

## Cardiac rhythm management (CRM) device implants include:

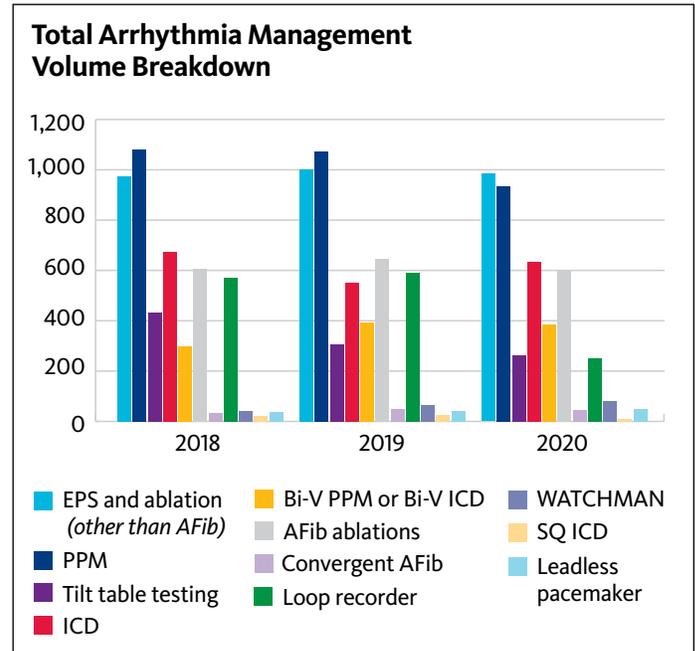
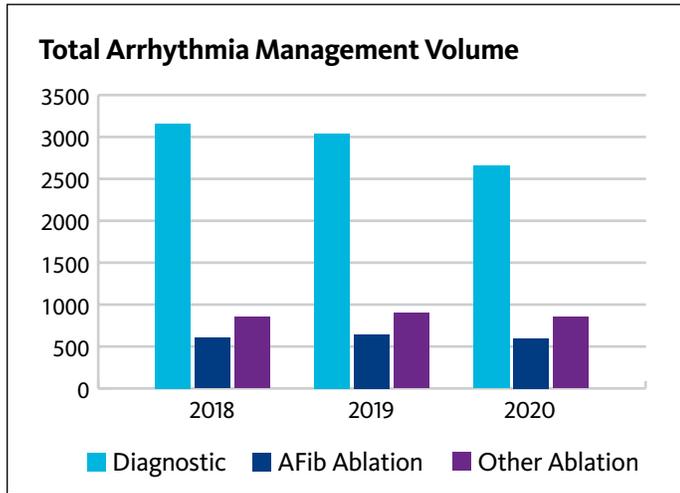
- Transvenous and subcutaneous implantable cardioverter defibrillators (ICD)
- Biventricular pacing, left bundle pacing and His bundle pacing
- Injectable loop recorders
- Permanent and leadless pacemakers (PPM)
- Device/Lead extraction and venoplasty

## Cardiac rhythm management (CRM) diagnostic testing including:

- Tilt table testing
- Ambulatory monitoring
- Cardiac imaging using sophisticated equipment such as 3-D reformatting of MRI, CT and ultrasound
- Diagnostic electrophysiology studies as part of decision-making tool for device implantation

Information on BayCare’s management and treatment of pediatric and adult congenital heart disease can be found in the Pediatric and Adult Congenital Heart section of this book on [page 19](#).

## A Look at Volume



## A Closer Look: Same Day Discharge for AFib Ablation Patients

In 2020, COVID-19 presented unique challenges and additional opportunities to review various clinical processes across many areas of health care. Within the area of heart rhythm management, it's historical standard of care to observe AFib ablation patients overnight in the hospital after a procedure, primarily due to concerns regarding procedure-related complications within 24 hours of treatment. With the onset of COVID-19, BayCare's rhythm division of the cardiovascular service line intensified efforts and processes to safely discharge AFib ablation patients home the same day as their procedure.

For all AFib ablations, processes were put in place to support physicians' review of each patient individually for candidacy for safe same-day discharge. In addition, processes for scheduling procedures, communication plans within the practice environment, as well as discharge instructions from the hospital after the procedures were updated, allowed our patients to be safely discharged home the same day, with the help of a loved one.

Now, more than 50 percent of patients receiving AFib ablation are discharged on the same day as their procedure. Since implementing new processes, quality outcomes are similar to those patients who stay overnight, and no serious complications have been recorded.



# Percutaneous Coronary Intervention

The landscape of coronary disease treatment is changing and evolving rapidly with, more complex diseases being treated with percutaneous techniques. Examples of innovative procedures and technologies include the use of long, drug-eluting stents that provide excellent long-term patency rates, the ability to open arteries that have been occluded chronically and the ability to support the failing heart muscle with different percutaneous devices (i.e. Impella). Coronary artery disease continues to be one of the main causes of mortality in the world. It's recommended that all patients receive optimal medical therapy to prevent progression of disease and reduce the ischemic burden. Patients who remain symptomatic despite medical therapy, have extensive ischemia based on cardiac testing or develop unstable coronary syndromes greatly benefit from prompt cardiac catheterization and referral for percutaneous coronary intervention. This can result in improvement in quality of life and preservation of myocardial function.

Angioplasty, or percutaneous coronary intervention (PCI), is performed at Bartow Regional Medical Center, Mease Countryside Hospital, Morton Plant Hospital, Morton Plant North Bay Hospital, St. Anthony's Hospital, St. Joseph's Hospital, St. Joseph's Hospital-North, St. Joseph's Hospital-South, South Florida Baptist Hospital and Winter Haven Hospital. All of these locations are also STEMI receiving facilities.

Cardiac catheterization procedures can be done by advancing catheters through the radial artery in the wrist as well as the femoral artery in the peripheral groin area. Radial procedures have been linked to a decrease in length-of-stay and bleeding risks, and a shorter duration of bed rest after a catheterization procedure. Many of the physicians within these hospitals are able to perform radial procedures when appropriate.

## BayCare's PCI procedures include:

- Diagnostic coronary angiography
- Diagnostic peripheral angiography
- Mechanical support in cardiogenic shock
- Percutaneous coronary intervention (PCI)
- Peripheral vascular intervention (PVI)

The cardiac catheterization, percutaneous coronary intervention (PCI) and peripheral intervention volumes included in this year's outcomes book reflect cases performed in the cardiac catheterization labs throughout BayCare. These volumes include a variety of procedures that address a multitude of diseases both chronic and acute in nature.



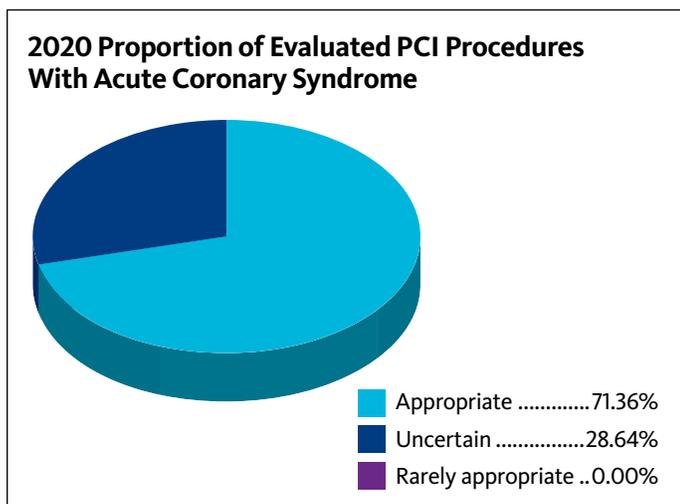
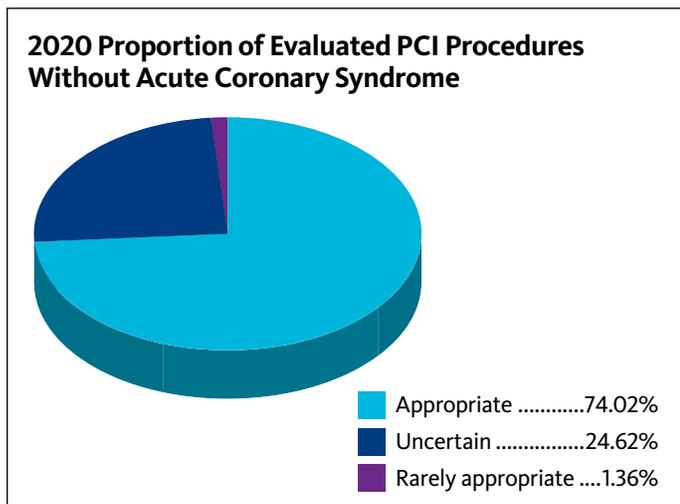
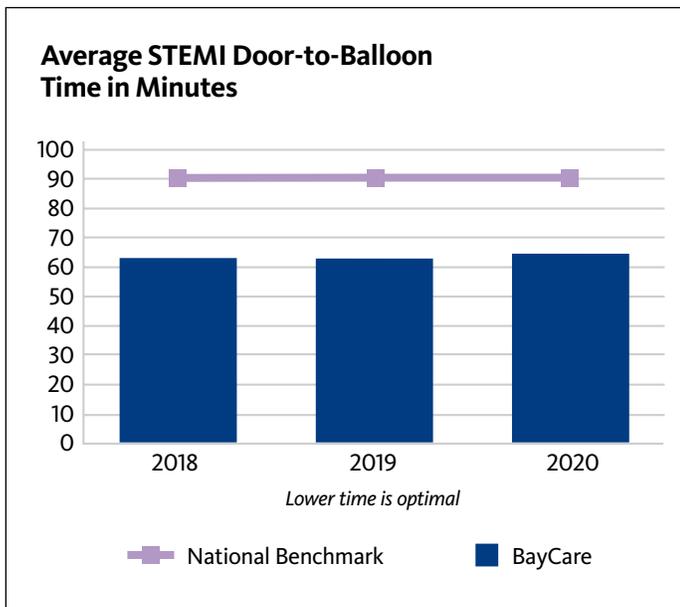
The PCI procedures include the treatment of coronary artery disease by angioplasty, stenting, lithotripsy and atherectomy. Many of the peripheral intervention procedures include the treatment of peripheral vascular disease by thrombectomy, angioplasty, stenting, lithotripsy and/or catheter-directed thrombolysis to improve quality of life, relieve pain, and in more advanced cases, for limb salvage. These procedures can be performed using a variety of access points including femoral, popliteal and pedal vessels, depending on the lesion being addressed.

## A Look at Volume

PCI Volume			
	2018	2019	2020
PCI volume	4,689	4,698	4,479
Total peripheral vascular intervention volume	3,315	4,868	4,372
Diagnostic cath lab volume	12,201	12,237	11,056

*Our previous volumes were counted by each procedure or unit of service; this means one patient can have more than one procedure code per encounter. We've changed this to only count each patient procedure encounter as one, which reflects how we look at our registry data. However, this reduces the total volume by counting patients and not units of service for each patient.*

## A Look at Quality



**Appropriate:** Meets ACC/NCDR guidelines for performing PCI  
**Uncertain:** Currently insufficient evidence  
**Rarely Appropriate:** Not generally acceptable

## A Closer Look: Chronic Total Occlusions (CTOs)

Chronic total occlusions (CTOs) are blockages in coronary arteries that have typically been present for more than three months. These patients often present with angina, shortness of breath or fatigue. The presence of a CTO can impact a patient's quality of life, heart function and the presence of abnormal heart rhythms. They're found in approximately 20 percent of all patients undergoing coronary angiography, and are the number one reason why patients are referred for coronary artery bypass graft (CABG). CTOs are also more prevalent in patients with previous CABG. Unfortunately, approximately one-third couldn't be revascularized during bypass, and an even greater number aren't revascularized percutaneously.

Treatment has often been controversial due to prior study design, patient selection and various other issues. Prior recommended treatment was either CABG or medical therapy, as it was felt the blockage couldn't get any worse. In addition, historical success with percutaneous treatment was around 50 percent and was felt to have a higher rate of complications compared to routine coronary intervention.

New technologies and advanced training have enabled physicians to achieve a higher degree of success with percutaneous intervention without a significant increase in risk of the procedure. The procedure can vary in duration from two to five hours, depending on the complexity of the blockage. A combination of antegrade (forward moving) and retrograde (backward moving) techniques are utilized to cross the blockage and deliver stents. BayCare has multiple programs across West Central Florida that can successfully treat CTOs using percutaneous intervention.

**To refer a patient to any of our cardiovascular programs or facilities: (844) 344-1990**

# Heart Failure

Heart failure is any condition in which the heart is unable to supply the body with the necessary amount of blood flow and oxygen. Heart failure is the fastest-growing form of cardiovascular disease and is expected to increase by nearly 50 percent by 2030. It's estimated that roughly 7 million people are currently affected by heart failure. The rate of heart failure increases with age as well, and there are an estimated 900,000 new cases of heart failure diagnosed each year in the United States. Many patients with heart failure also have other conditions such as coronary disease, chronic obstructive pulmonary disease (COPD), diabetes, kidney disease and arrhythmia, which further complicate management. BayCare offers comprehensive care for patients with all types, causes, and severity of heart failure, whether they're admitted to one of our hospitals, at home, or at a skilled nursing facility.

The Heart Function Clinics specialize in the management of heart failure at all stages and from all causes. The clinics serve the needs of patients with secondary heart failure due to other medical conditions as well as heart failure from primary heart muscle diseases (cardiomyopathy). The Heart Function Clinic network allows BayCare to offer optimal and consistent care to heart failure patients across our entire system. BayCare Heart Function Clinics are located on the campuses of Mease Countryside Hospital, Morton Plant Hospital, St. Anthony's Hospital, St. Joseph's Hospital and Winter Haven Hospital.

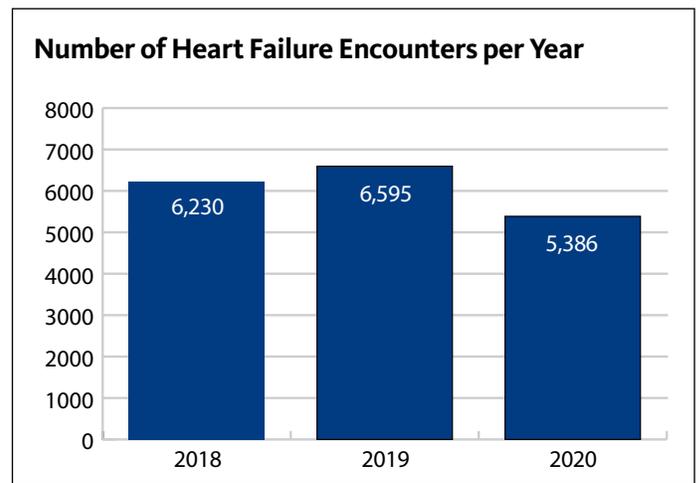
## Additional services offered are:

- Comprehensive evaluation for cause of cardiomyopathy
- Emergency room care follow up
- Inpatient continuity of care and transition management
- Team-based longitudinal outpatient care
- Coordination of home-based care and monitoring
- Coordination of multiple chronic condition care
- Home infusion therapy
- Device therapy management
- Hospital readmission risk management
- Opportunity to participate in clinical research trials
- Access to support groups for patients and caregivers

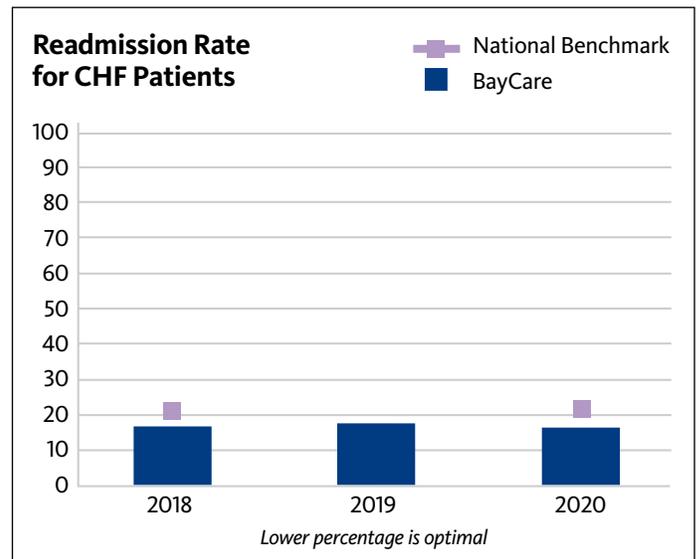
**To refer a patient to any of our cardiovascular programs or facilities: (844) 344-1990**



## A Look at Volume



## A Look at Quality



## A Closer Look: BayCare's Left Ventricular Assist Device (LVAD) Program

Advanced heart failure occurs when patients with heart failure experience persistent severe symptoms that interfere with daily life despite maximal medical treatment. A left ventricular assist device (LVAD) is an implantable mechanical pump that works with the heart to deliver adequate blood flow to the body.

BayCare's Advanced Heart Failure Program provides destination therapy for heart failure patients. Destination therapy is defined as those patients who require mechanical support but who aren't transplant candidates. Currently, the Heartmate III is the LVAD that we implant at BayCare hospitals. BayCare's LVAD program at St. Joseph's Hospital currently manages patients who have both Heartmate II and III devices.

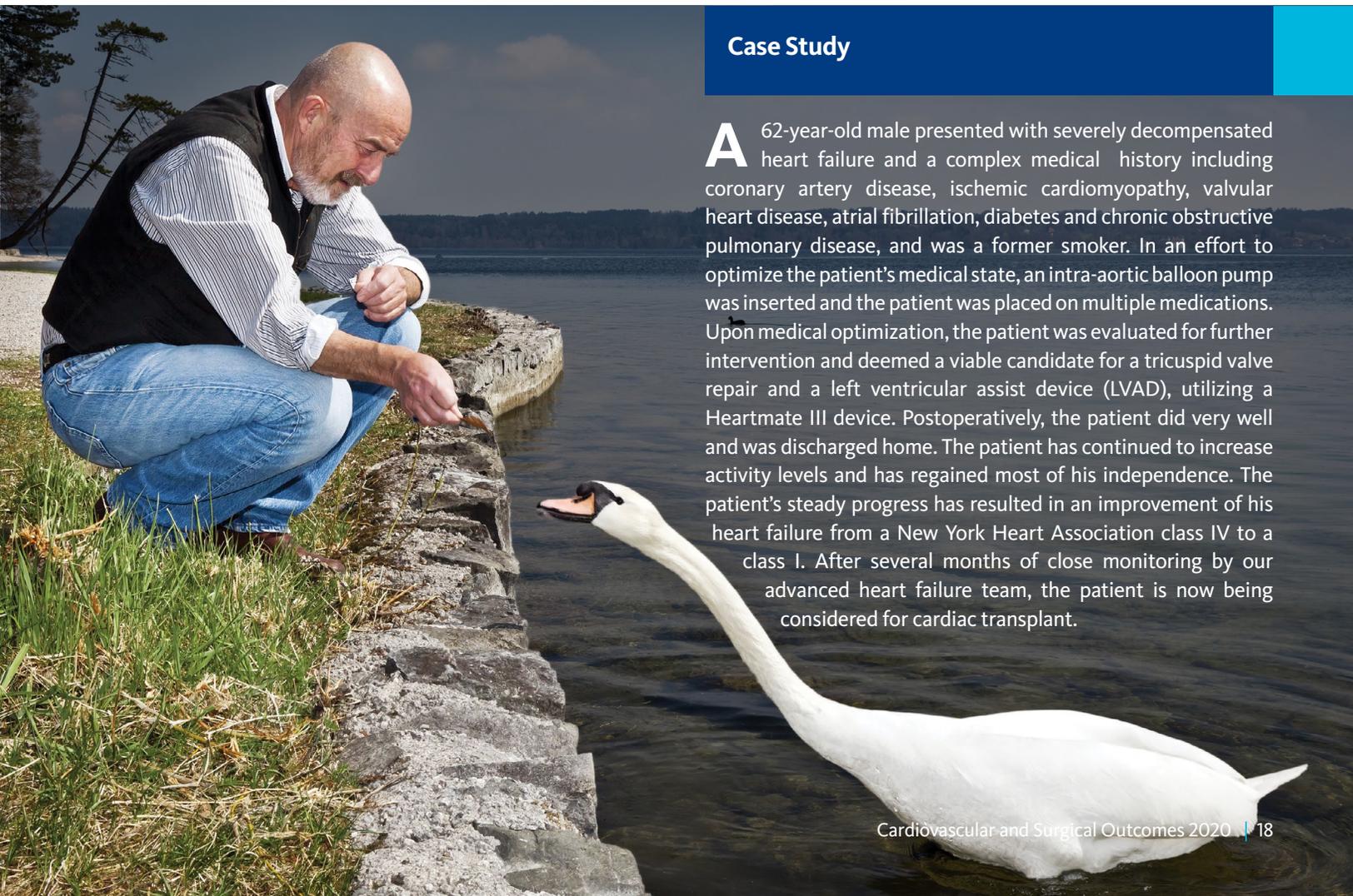
Our experience has reflected that of the national experience with increased survival and improved quality of life. Patients are able to go from being essentially in the hospital with cardiogenic shock back to their lives and homes, participating in their communities. With LVAD therapy, we've given these patients new life and allowed them to remain active members of society.

### Guidelines for LVAD referral:

- I IV inotropes
- N NYHA IIIB/IV or persistently elevated natriuretic peptides
- E End-organ dysfunction (Cr>1.8 mg/dL or BUN >43 mg/dL)
- E EF ≤ 35%
- D Defibrillator shocks
- H Hospitalizations >1 with heart failure
- E Edema (or elevated PA pressure) despite escalating diuretics
- L Low blood pressure, high heart rate
- P Prognostic medication—progressive intolerance or down-titration GDMT

### Case Study

**A** 62-year-old male presented with severely decompensated heart failure and a complex medical history including coronary artery disease, ischemic cardiomyopathy, valvular heart disease, atrial fibrillation, diabetes and chronic obstructive pulmonary disease, and was a former smoker. In an effort to optimize the patient's medical state, an intra-aortic balloon pump was inserted and the patient was placed on multiple medications. Upon medical optimization, the patient was evaluated for further intervention and deemed a viable candidate for a tricuspid valve repair and a left ventricular assist device (LVAD), utilizing a Heartmate III device. Postoperatively, the patient did very well and was discharged home. The patient has continued to increase activity levels and has regained most of his independence. The patient's steady progress has resulted in an improvement of his heart failure from a New York Heart Association class IV to a class I. After several months of close monitoring by our advanced heart failure team, the patient is now being considered for cardiac transplant.



# Pediatric and Adult Congenital Heart

BayCare is home to Tampa Bay's only comprehensive congenital heart disease (CHD) center capable of delivering full-spectrum care for the CHD patient from fetal diagnosis to late adulthood. This unique program is located on the campus of St. Joseph's Children's Hospital in Tampa. In 2018, the Adult Congenital Heart Association awarded the Tampa Bay Adult Congenital Heart Center at St. Joseph's Hospital the status of ACHD Accredited Comprehensive Care Center.

Developed in collaboration with the Children's Hospital of Pittsburgh, the center's congenital heart surgical program is a leader in patient volume, surgical outcomes, early extubation and short length of stay. Surgical planning often begins at fetal diagnosis, allaying family anxiety and ensuring that parents know what to expect when their child is born. Throughout the CHD center and programs, there's a strong belief in quality, excellence and transparency. The CHD center actively participates in various National Databases for Quality Improvement and Benchmarking, including Society of Thoracic Surgeons Congenital Heart Surgery Database (STS CHSD), Improving Pediatric and Adult Congenital Treatment (IMPACT), Pediatric Cardiac Critical Care Consortium (PC4) and Extracorporeal Life Support Organization (ELSO).

The physicians at the CHD center specialize in the care of patients with congenital heart disease at all ages, including but not limited to the following conditions:

- Aortic stenosis, mitral stenosis
- Atrioventricular septal defect
- Coarctation of the aorta
- Complex single ventricle
- Ebstein's anomaly
- Hypoplastic left heart syndrome
- Pulmonary and tricuspid valve atresia
- Pulmonary stenosis
- Shone's syndrome
- Tetralogy of Fallot
- Transposition of great arteries

## Services and procedures include:

- Specialized pediatric/congenital cardiology services treating a wide range of patients with mild to complex heart conditions
- Cardiac catheterization designed especially for children and adults utilizing a less invasive alternative for some heart conditions. The catheterization laboratory is one of the most widely used congenital laboratories in Florida, performing over 540 procedures annually, most of which are interventions. Some procedures include:
  - Angioplasty
  - Atrial septal defect (ASD) device closure
  - Atrial septostomy
  - Balloon valvotomy
  - Coil embolization
  - Electrophysiology studies with/without ablation
  - Implantable cardioverter defibrillators (ICD) and pacemakers
  - Patent ductus arteriosus (PDA) device closure, including newborns weighing less than 2kg
  - Pulmonary valve insertion (*Melody® valve, Sapien valve*)
  - Radiofrequency and cryoablation (*often without fluoroscopy*)
  - Stent implantation
  - Ventricular septal defect (VSD) device closure
- Pediatric and adult congenital cardiac imaging including:
  - Echocardiology laboratory: The first accredited center for transthoracic, transesophageal and fetal echocardiography in West Central Florida by the Intersocietal Accreditation Commission (IAC)
  - Fetal echocardiology
  - 3-D echo
  - Cardiac MRI available in collaboration with pediatric cardiologist

## A Closer Look: Adult Congenital Heart Disease Subspecialty Certification

In the United States, over one million adults live with congenital heart disease (CHD). Since the earliest surgical procedures to palliate and repair congenital heart defects, most children would grow into adulthood with few options for receiving the specialized care they had received in the pediatric cardiology clinic.

In 2015 the American Board of Internal Medicine (ABIM) certified cardiologists in its newest internal medicine subspecialty, adult congenital heart disease (ACHD). ACHD is open only to ABIM-certified cardiovascular medicine cardiologists or American Board of Pediatrics-certified pediatric cardiologists who have also completed an accredited two-year ACHD fellowship program.

Now, with ACHD certified cardiologists, the outlook for children nearing adulthood is much better. Pediatric cardiologists begin the formal transition education for teenage patients at age 12 and hope by age 18, young adults with CHD will have met their new ACHD cardiologist.

Advocacy efforts on behalf of ACHD patients aren't new. They date to the formal inception of the national Adult Congenital Heart Association (ACHA) in 1998. This organization now accredits the nation's finest ACHD clinical programs through rigorous application and site visit criteria.

BayCare's St. Joseph's Hospital is the first in the region and second facility in Florida to earn this accreditation. Our board-certified ACHD cardiologists are on-call 24/7 for ACHD patients hospitalized not only at St. Joseph's Hospital but also at every other BayCare hospital as well as several other acute care hospitals in the region.

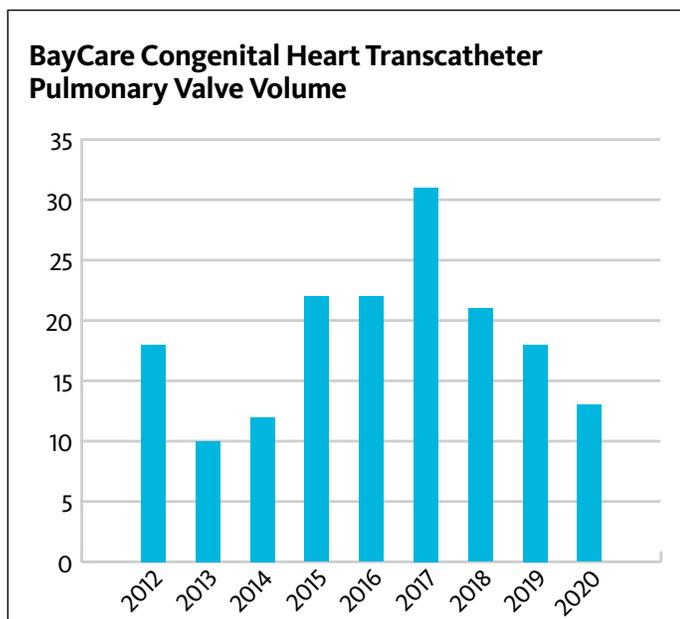
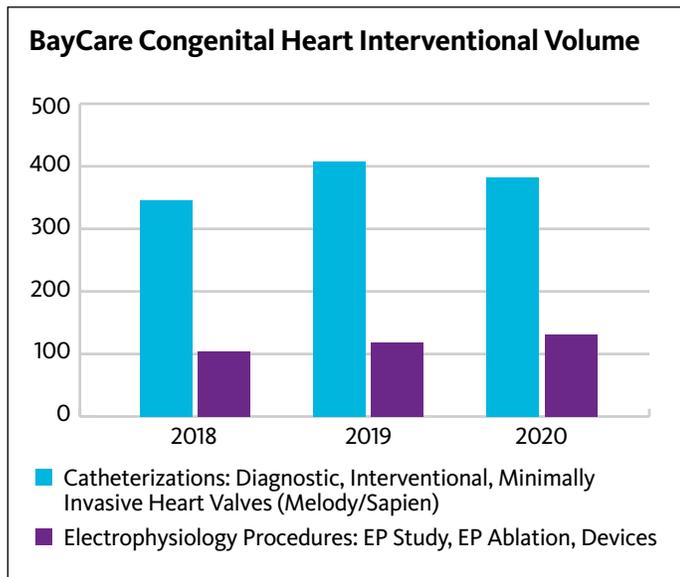
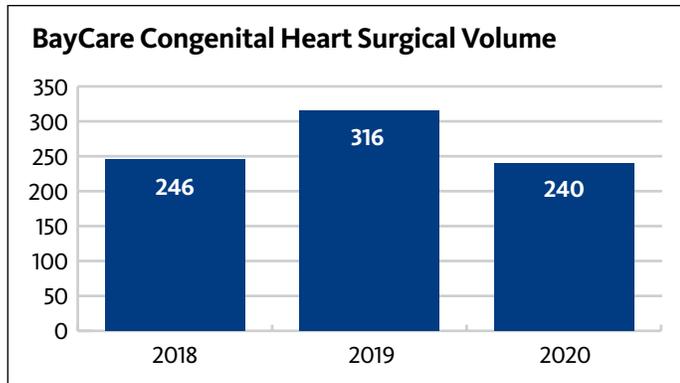
- Pediatric and adult congenital cardiovascular surgery serving children and adult congenital heart patients. Some offered procedures include:
  - Arterial switch
  - Atrioventricular septal defect repair
  - Complex valve repair and valve conduits
  - Fontan procedure and Fontan conversion
  - Hybrid, palliation and repair of hypoplastic left heart syndrome (HLHS) and single ventricle heart disease
  - Tetralogy of Fallot (TOF) and TOF with pulmonary atresia repair
  - Various hybrid procedures
  - Pacemakers
- Pediatric and adult congenital cardiac anesthesiology serving the particular needs of congenital heart patients including early extubation and pain management that may include more favorable cardiac performance, reduced length of ICU and hospital stay, and a lower rate of ventilator associated respiratory infections. Greater than 60 percent of our congenital heart patients leave the operating room without a breathing tube.
- A state-of-the-art cardiac intensive care unit staffed with specialized cardiac critical care physicians and advanced practice professionals. Cardiac ICU physicians are in-house 24 hours a day. The unit cares for the entire spectrum of congenital heart patients ranging from newborns requiring complex surgical repairs to adults undergoing procedures for congenital heart disease.

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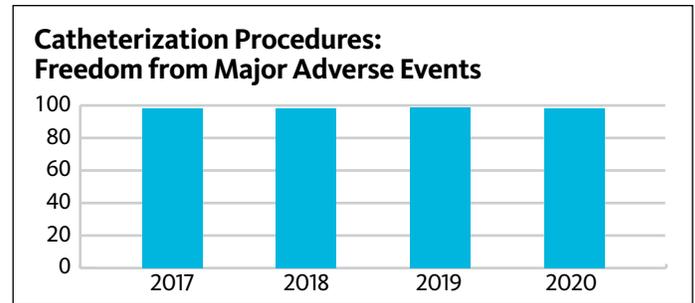
*“We’re so fortunate to have such a comprehensive team within our children’s heart center. Due to aggressive physician recruitment efforts, we’re now able to provide 24-hour, in-house cardiac critical care physician coverage. This keeps us in step with emerging interventional and surgical strategies that continue to drive up the complexity in the care we deliver. We’re ready for tomorrow!”*

~ Dr. Jarrod Knudson  
Director, Pediatric Cardiac Intensive Care  
at St. Joseph's Children's Hospital;  
Clinical Professor, University of Pittsburgh  
Medical Center

## A Look at Volume



## A Look at Quality for 2017–2020



Major adverse events as defined by IMPACT

### Percent of Operative Mortality by Patient Group (2017–2020)

Patient Group	BayCare	STS Benchmark
STAT 1	0.0%	0.4%
STAT 2	0.4%	1.4%
STAT 3	0.0%	2.2%
STAT 4	3.4%	6.1%
STAT 5	27.6%	13.4%

Based on discharged patients. Lower percentage is optimal.

STS benchmark based on Fall 2019 report. Due to delayed reporting from the Society of Thoracic Surgeons (STS), national data was taken from the STS Spring 2019 Report which represents data from January 2015 through December 2018. SJCH numbers represent internal data from January 2017 through December 2020 that's been calculated based on STS definitions.

**What is a STAT group?** Data is subdivided into five different groups depending on the level of risk. STAT Category 1 is associated with the lowest and STAT Category 5 is associated with the highest risk of mortality.

### Length of Stay (LOS) by Patient Group (2017–2020)

Patient Group	BayCare	STS Benchmark
STAT 1	3	7
STAT 2	4.5	20
STAT 3	8	15
STAT 4	12	28
STAT 5	38	46

LOS is expressed as a median in days. Fewer days is optimal.

### Operative Mortality

BayCare	STS Benchmark
2.0%	2.8%

Lower percentage is optimal

### Percent of Patients Extubated in Operating Room

Extubated in the OR	BayCare	STS Benchmark
All Patients	50.0%	26.4%
Neonates	6.0%	3.4%
Infants	42.0%	18.3%

Higher percentage is optimal

## Case Study

**T**his premature now 11-month-old baby boy was prenatally diagnosed with transposition of the great arteries (TGA) with intact ventricular septum. He arrived four weeks early, was delivered at St. Joseph's Women's Hospital with a short stay in the NICU for postnatal echocardiogram, and was given PGE therapy to help better oxygenate. He was transferred within 24 hours of life to St. Joseph's Children's Hospital PCICU for further preoperative surgical care. Due to being premature, on his second day of life, he successfully underwent balloon atrial septostomy (BAS) in the cardiac cath lab, allowing the PGE therapy to be discontinued, and removal of the breathing tube; he started feeding while awaiting full surgical repair. At 2 weeks old, he underwent an arterial switch operation with closure of atrial septal defect (ASD). After a big operation, his chest remained opened with delayed closure on postoperative day four; his breathing tube was removed two days later. He quickly got back to taking full nutrition and was discharged home on the 17th day after full surgical repair of his complex heart defect.



# Cardiac Rehabilitation

Cardiac rehabilitation programs are comprehensive inpatient and outpatient services involving supervised exercise, cardiac risk factor modification, nutritional planning, education and counseling. The goal is to limit the physiological and psychological effects of coronary artery disease, reduce the risk of sudden death and stabilize or reverse the atherosclerotic process. Each patient is assessed, and an individual treatment plan is developed to help the patients reach their goals.

Cardiac rehabilitation is a Class 1 recommendation from the AHA and ACC for patients who have experienced a cardiac event. It's recognized as an integral component of the continuum of care for patients with cardiovascular disease.

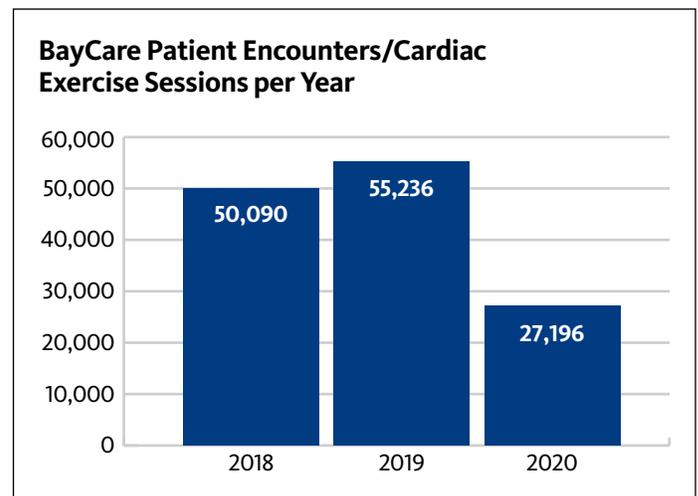
Diagnosis indicated for enrollment include:

- Myocardial infarction (MI)
- Percutaneous coronary intervention (PCI)
- Peripheral vascular disease (PVD)
- Coronary artery bypass grafting (CABG)
- Valve repair/replacement
- Stable angina
- Heart transplant
- Heart failure

BayCare's cardiac rehabilitation programs are some of the largest in the country, offering seven locations covering a four-county area. All of our programs are nationally certified by the American Association of Cardiovascular Pulmonary Rehab (AACVPR) and the staff are certified cardiac rehab professionals (CCRP). They have experience working with the patients who have internal cardiac defibrillator (ICD), LifeVest, sudden death syndrome (SDS), postural orthostatic syndrome (POTS) and heart failure (HF).



## A Look at Volume



*“In dealing with COVID-19, we had to put extra safety measures in place to protect our patients and team members. We then reopened with reduced volumes to allow for social distancing. All our cardiac rehabilitation programs were closed from March 6 through May 11, 2020. Thus, our 2020 volumes were lower than previous years.”*

~ Dr. Mohan S. Reddy  
*Clinical Leader, Heart Failure; Clinical Leader,  
General Cardiology/Circulatory Support  
BayCare Cardiovascular Services*

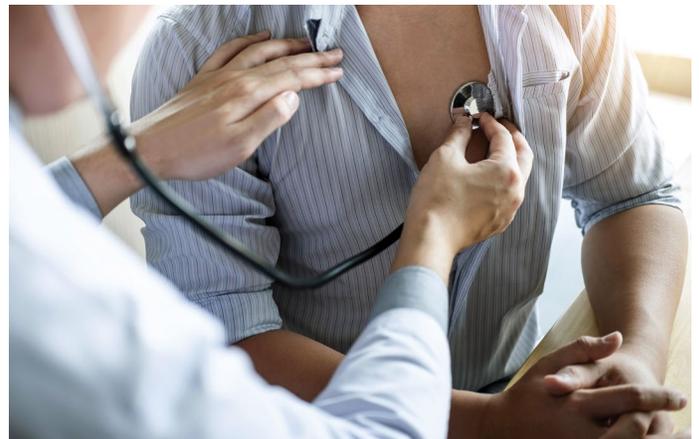
# Research and Clinical Trials: Currently Enrolling

Within the BayCare network, we recognize that clinical research makes the latest scientific discoveries available to the community long before they become accessible to the general public. Thus, we're committed to participation in clinical research with the goal of helping improve the health of our community. For some patients, current treatments might not be working, or they might be having bad side effects. BayCare takes part in numerous clinical research trials to learn about cardiovascular disease and its effects on patients, help find effective treatments to improve quality of life and health outcomes, and find out if a medication used for one condition could also help with another condition. For a full list of active cardiovascular BayCare clinical trials, go to our [Clinical Research and Trials](#) page.



# Medical Terminology Review

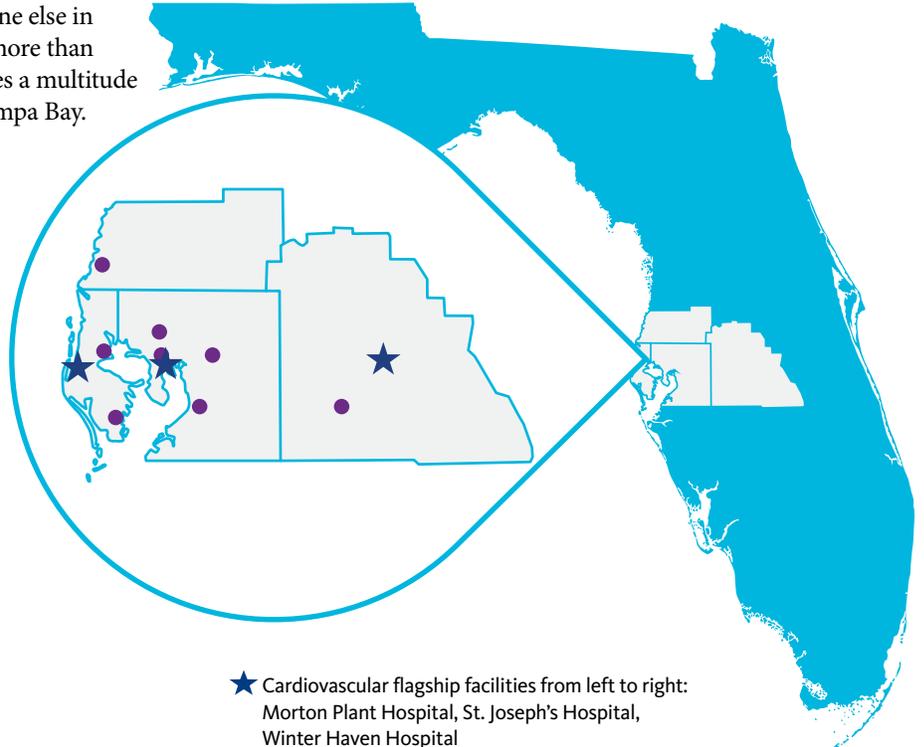
There are lots of different common conditions and important terminology to help you understand cardiovascular diseases and conditions discussed throughout this book. For supportive information on these conditions, visit our [Common Heart Diseases and Conditions](#) page.



# Our Facilities

At BayCare, we take care of more hearts than anyone else in Tampa Bay. In the last year alone, we helped heal more than 24,000 hearts—that's a lot of lives. BayCare provides a multitude of cardiac services at 11 facilities located across Tampa Bay.

“As technology advances, physicians have more options available to them to manage patients with complex illnesses. BayCare facilities have embraced the ‘heart team’ concept to provide optimal care to these patients to achieve the best possible outcomes,” according to Dr. Mahesh Amin, medical director, BayCare Cardiovascular Services.



★ Cardiovascular flagship facilities from left to right: Morton Plant Hospital, St. Joseph's Hospital, Winter Haven Hospital

● Clockwise from top: Morton Plant North Bay Hospital, St. Joseph's Hospital-North, South Florida Baptist Hospital, Bartow Regional Medical Center, St. Joseph's Hospital-South, St. Joseph's Children's Hospital, St. Anthony's Hospital, Mease Countryside Hospital

## Hillsborough County

**St. Joseph's Hospital**  
Heart and Vascular Institute

**St. Joseph's Children's Hospital**

**St. Joseph's Hospital-North**

**St. Joseph's Hospital-South**

**South Florida Baptist Hospital**  
Steve and Krista Howard Heart and Vascular Center

## Pasco County

**Morton Plant North Bay Hospital**

## Pinellas County

**Mease Countryside Hospital**

**Morton Plant Hospital**  
Morgan Heart Hospital

**St. Anthony's Hospital**

## Polk County

**Bartow Regional Medical Center**

**Winter Haven Hospital**  
Bostick Heart Center

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[BayCareHeart.org](http://BayCareHeart.org)