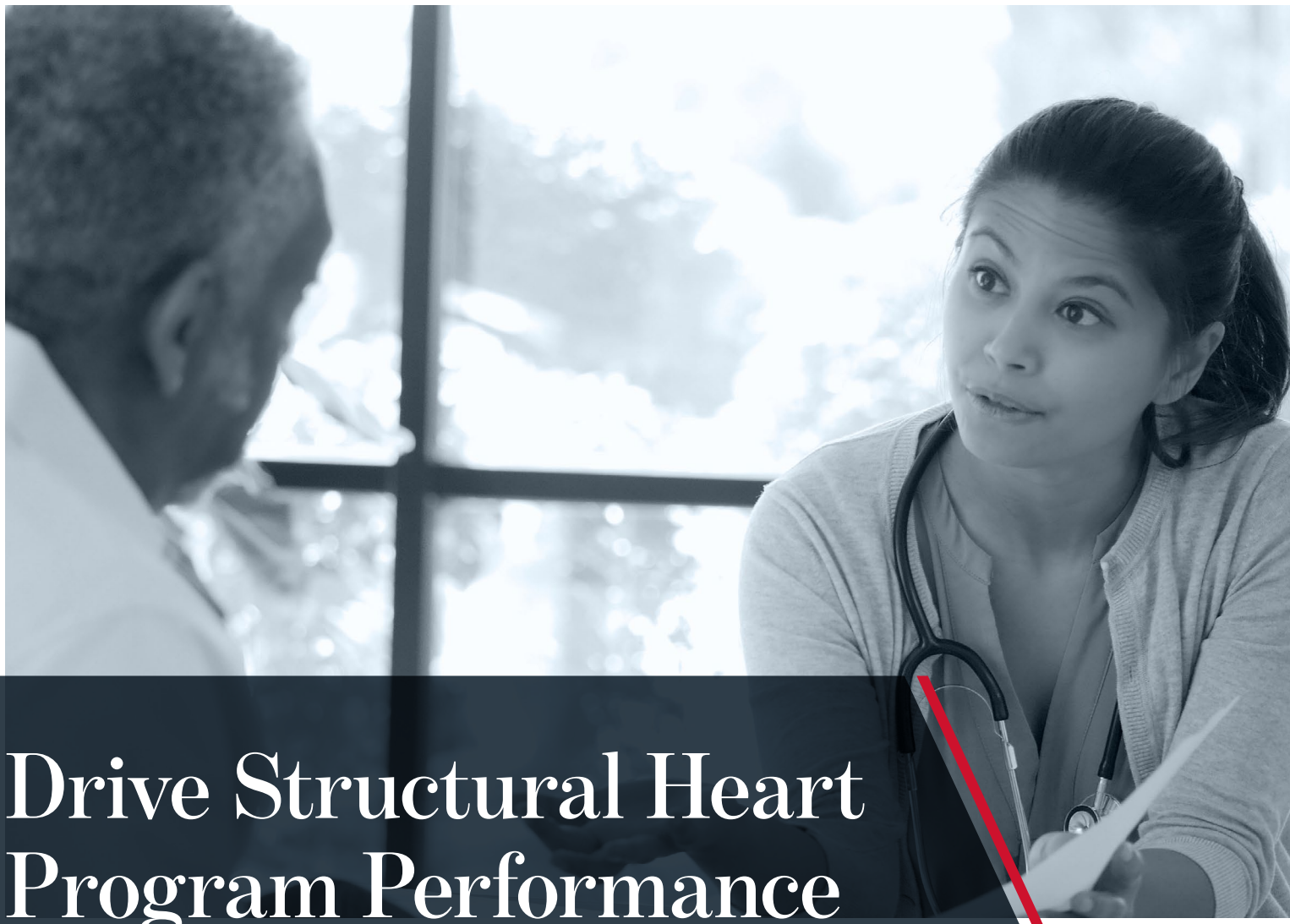

Drive Structural Heart Program Performance

Three strategies to meet market demand and manage capacity

Advisory Board

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The structural heart market is changing rapidly, including expanded reimbursement, new indication approvals, and growing volumes. TAVR (transcatheter aortic valve replacement) is now foundational to cardiovascular service lines, and leaders are looking to strategically expand their structural heart service portfolio to meet today's market demand. Read on for our take on the future of structural heart programs and how to both manage and capture projected demand.

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Market outlook

Why structural heart matters

Historically, structural heart programs have been a strategic investment for progressive, well-resourced cardiovascular service lines. Today, structural heart is an organization-wide priority for hospitals and health systems, given that procedures like TAVR have become a standard of care and essential to serving the community.

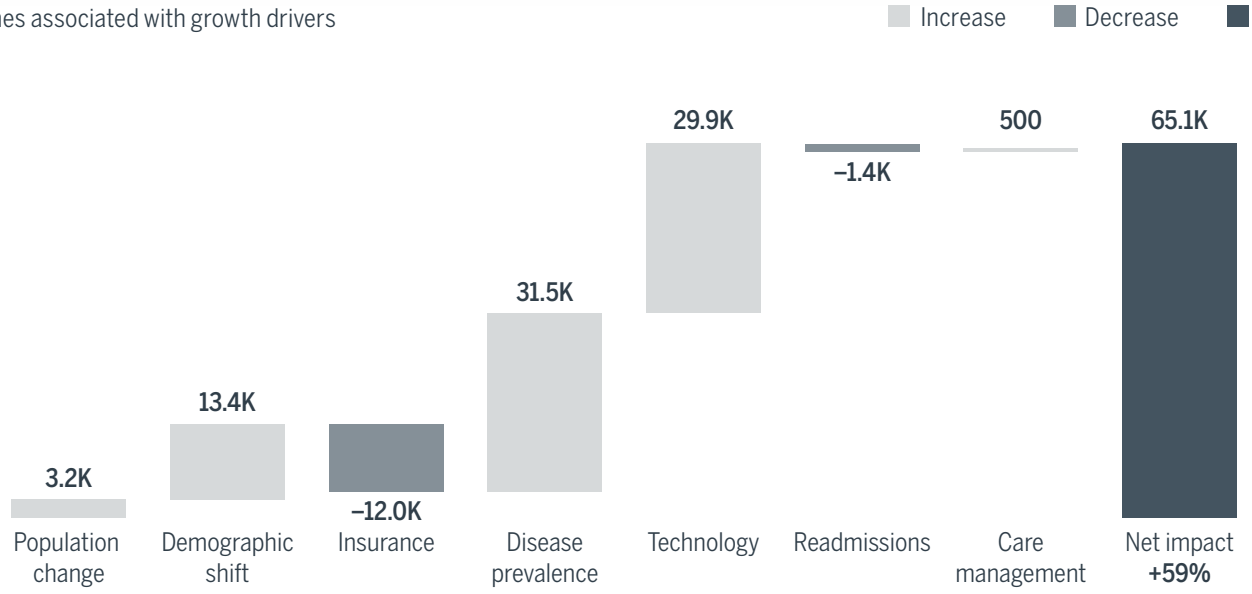
Structural heart continues to capture industry interest because of its anticipated growth, sustained technological innovation, and expansion to new patient populations. With a projected growth rate of 59% from 2020 to 2025, there are few detractors limiting structural heart growth. The minor exception is insurance, due to a few payers not yet adopting new expanded indications and complicating the prior authorization process. Yet these challenges are expected to dissipate with hospital and health system pressure. Given this promising outlook, organizations continue to invest in structural heart to capture a piece of this market growth.

National inpatient growth projections, 2020–2025

Sub-service line[1]	Growth
Structural heart	**59%**
Heart failure	21%
Electrophysiology	10%
Other	4%
Vascular	2%
PCI	-13%

STRUCTURAL HEART FIVE-YEAR MARKET GROWTH DRIVERS[2]

Volumes associated with growth drivers



1. Sub-service line definitions located in the appendix.
2. Definitions of growth drivers located in appendix.

Source: Advisory Board's Market Scenario Planner Tool; Advisory Board interviews and analysis.

Today's focus: Preparing for growth

In an era when many other inpatient cardiovascular sub-service lines are declining, structural heart is poised for significant growth. In particular, TAVR volume growth is expected to surpass many other structural heart procedures—and organizations are doubling down on structural heart investments to prepare.

Today, leaders must overcome capacity and resource constraints to keep pace with TAVR market demand. Especially as programs surpass 250 annual TAVRs, growth will be contingent not just on availability of structural heart resources, but also on capacity of ancillary services, which has increasingly become an obstacle to accommodating demand.

To proactively manage structural heart program capacity, programs should prioritize cross-continuum investments that benefit multiple parts of the structural heart enterprise. For example, leading programs must invest in their imaging capabilities, particularly CTs, and expand their ambulatory capacity for pre- and post-procedure preparation and care.

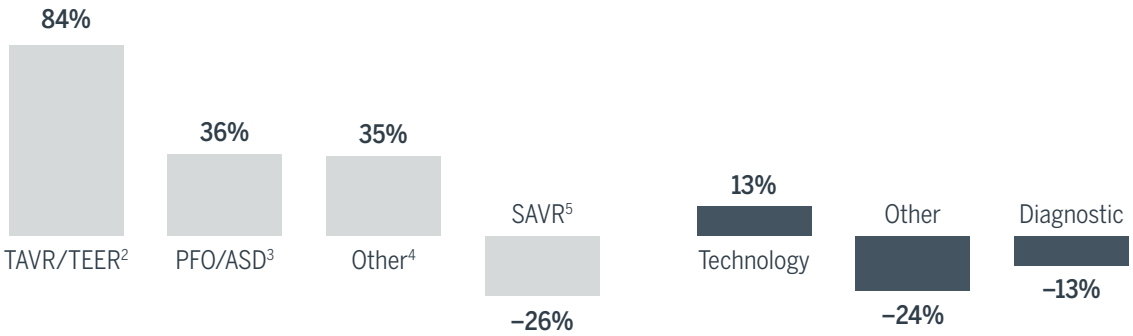
From our interviews

"The public demands access to TAVR and transcatheter procedures. The goal from a strategy perspective is to create capacity and put the resources in place to meet that demand."

Cardiovascular director
Large health system in the Mid-Atlantic

STRUCTURAL HEART FIVE-YEAR GROWTH PROJECTIONS, BY PROCEDURE GROUP[1]

National estimates, 2020–2025



1. Definitions of procedure groups are located in the appendix.
2. Transcatheter edge-to-edge repair (TEER), formerly referenced as TMVR.
3. Patent foramen ovale (PFO)/ Atrial septal defect (ASD).
4. Inpatient "Other" encompasses procedures not included in other groupings and might include some outside of structural heart.
5. Surgical aortic valve replacement (SAVR).

Source: Advisory Board's Market Scenario Planner Tool; Advisory Board interviews and analysis.

Tomorrow's focus: Portfolio expansion

As TAVR becomes baseline for comprehensive cardiac surgery programs, structural heart leaders face a dual-mandate for long-term program success.

First, leaders should recognize that significant underdiagnosis and undertreatment of aortic stenosis still exists today. One recent analysis[1] found that only 35.6% of patients with severe symptomatic aortic stenosis underwent aortic valve replacement (AVR) within a year of diagnosis. Structural heart programs can both better serve their community and expand their growth opportunity by developing strategies to better identify the unmet AVR need and address barriers to patient access (e.g., equitable outreach, improved clinician referrals).

Simultaneously, progressive leaders recognize the need to expand their structural heart portfolio to complement their TAVR offerings and gain a sustainable competitive advantage. Therefore, the second mandate for leaders is to focus on operational and procedural efficiency in TAVR cases to enable capacity to also build and manage other structural heart procedures, such as TEER, tricuspid repair, LAA[2] closure, and PFO/ASD. To incorporate additional case volumes, organizations should repurpose the workflows and lessons learned[3] from TAVR and apply them to these next set of procedures.

The good news is that portfolio expansion has positive spillover effects for the rest of the hospital (e.g., expanded imaging capabilities, increased lab capacity, streamlined inter-department communication, and improved staffing efficiency). Leaders should communicate that an investment in structural heart is an investment in the hospital and the health system as a whole.

From our interviews

"Cardiac services will always have regional competition. As you decrease SAVR volumes and increase TAVRs, structural heart programs are looking to get bigger, faster."

Cardiovascular director
Large health system in the Southeast

"Today, TAVR is a requirement. When I look ahead strategically, I'm not looking at just TAVRs, I'm looking at mitrals and tricuspids."

Cardiovascular director
Large health system on the East Coast

1. The study reviewed contemporary treatment patterns for patients with severe symptomatic aortic stenosis who received AVR (SAVR or TAVR).
2. Left atrial appendage.
3. Examples include, alternating procedures or teams between the cath lab and operating room to conduct procedures in one day or streamlining coordinator workflows.

Source: Brennan J, et al., "Association Between Patient Survival and Clinician Variability in Treatment Rates for Aortic Valve Stenosis," *Journal of the American Heart Association*, 2021; Advisory Board interviews and analysis.

Three strategies to drive structural heart program performance

To keep pace with the evolving structural heart market, programs must capitalize on strategies that both drive program efficiency internally and differentiate their program externally. Leading programs will accomplish this not just for TAVR but also across a diversified structural heart service portfolio. Based on our conversations with structural heart leaders across the country, below are three strategies to stay competitive in the structural heart market.

01 Elevate efficiency across the entirety of your structural heart program

02 Enhance and expand channels to future patients

03 Differentiate your program to compete in tomorrow's market

Strategy 01

Elevate efficiency across the entirety of your structural heart program

To manage growing volumes, structural heart programs often jump to staffing as the primary challenge and solution. But given financial and resource constraints, programs must take a holistic view of efficiency to manage capacity and support long-term growth. Here are lessons from the market.

Strive to be a program that doesn't require additional staff

At a baseline, efficiency starts with streamlining the TAVR procedure[1] and care pathway itself. Below is a list of operational efficiencies to consider.

Starter list of operational efficiencies

- **Optimize use of procedural areas**—e.g., perform procedures in cath labs instead of ORs to decrease staff and overhead costs or refigure space and staffing for procedures, like TEER, that don't require a surgeon
- **Streamline TAVR or other structural heart procedure days by stacking cases and cross-training staff**—e.g., conduct procedures in one day by flipping between the OR and cath lab and leveraging cross-trained teams of OR, EP, and cath lab staff who can alternate conducting procedures as necessary
- **Prioritize certain procedural areas for structural heart**—e.g., one program assessed what procedures should be done at what sites and now prioritizes TAVR, ablations, etc. for the cath lab and moved procedures like peripheral vascular elsewhere
- **Build in additional evaluation steps**—e.g., protocols to proactively identify complications with the goal of streamlining recovery and ensuring efficiency gains are not lost
- **Adjust post-procedure recovery workflows**—e.g., move patients away from surgical workflows and identify patients who can bypass the ICU, moving straight to telemetry unit or progressive care unit
- **Divide patient support between care settings**—e.g., an advanced practice provider (APP) manages the patient in the outpatient setting and the nurse manages the patient in the inpatient setting, or valve clinic coordinator (VCC) handles pre-op and nurse navigator manages post-op
- **Expand outpatient operations**—e.g., where possible, shift staff from inpatient hospital to conduct consults or other services in the outpatient setting to free up inpatient space, expand ambulatory footprint, and increase access

1. Examples include conscious sedation and use of no lines unless necessary.

Source: Advisory Board interviews and analysis.

The next step after addressing procedural and operational efficiency is becoming a lean and agile operation, especially for stand-alone and community hospitals. Programs should act on the imperatives detailed below.

Cross-train staff across structural heart procedures

Both structural heart coordinators and clinical teams should be able to manage different types of structural heart cases as needed. Programs early in the process of growing their structural heart program might have their staff specialize by procedure. But cross-training staff is critical to managing capacity as programs grow and evolve, especially given current challenges with staff turnover.

For example, many programs have trained their cath lab team to do open cases and trained their OR team to handle catheters, wires, etc. Cross-trained staff can switch between procedures and rooms depending on need. For example, they can alternate between the OR and cath lab to complete more procedures in one day and minimize the need for physicians to come for an additional procedure day. An unforeseen benefit is that offering cross-training opportunities to staff has become an engagement driver and has helped to attract and retain staff.

Enable staff to work at top-of-license

Before making the next staffing investment, programs should assess whether existing staff capabilities properly align with tasks and workflows. By first investing in care team redesign to achieve top-of-license care, programs or service lines might uncover FTEs that have additional capacity. For example, some programs have identified nonclinical staff who can support their program. Other programs have identified the need to off-load data registry at the program or organization level or outsource it to a vendor. Care team redesign not only improves efficiency and patient throughput but also increases patient satisfaction and access, improves revenue, and betters communication across the care team.[1]

1. Improved revenue projections result from projected increase in procedures and RVUs as programs capture patients who are currently lost due to lack of access and appointment availability. Increased access, throughput, and satisfaction result from APPs' ability to conduct follow-up visits so physicians can see new patients. Improved communication results from greater structures put in place to delineate roles between care team members.

Source: Advisory Board interviews and analysis.

When approaching care team redesign, consider the specific needs of your program and how to appropriately allocate staff to ensure each team member is working top-of-license. First, work to upskill clinical practice across the team, making nursing staff responsible for practice operations and APPs responsible for appropriate aspects of CV patient care. Second, ensure nonclinical staff have full responsibility for non-clinical tasks.

While each role has its own spectrum of responsibilities, remember that the structural heart care team functions holistically and will rely on inter-role collaboration to provide comprehensive care. To see an example in action, see the Emory Healthcare case detailed on pages 10 and 11.

Sample top-of-license care team roles and responsibilities

The below represents sample top-of-license roles and responsibilities and is not a comprehensive list. Additionally, certain tasks may overlap roles. Programs must also account for state guidelines, staffing ratios, staff buy-in, program and staff member experience, and staff compensation.

Medical assistants	Nurses	APPs	CV specialists
• Patient coordination and pre-visit preparation • Scheduling appointments • Basic phone call triage	• Coordinate cross-continuum care • Prepare patients for examination • Record patient data • Build patient trust	• Assist in procedures • Conduct post-procedure follow-up appointments • Enhance provider-patient communication and relationships	• Perform procedures • Create guidelines, order sets • Supervise APPs, as necessary
• Taking and updating patient medical histories • Collect and prepare labs	• Expand access, increase patient satisfaction • Patient and caregiver education	• Consult on patients • Order diagnostics, review results • Develop and implement treatment plans	

Invest in technology to fill staffing gaps

Before looking to add additional FTEs, programs are looking at technology (e.g., EMR plugins, scheduling software, referral apps) to streamline data mining and registry, physician referrals, and coordinator workflows. Such investments, especially to manage and analyze data, are critical as organizations look to improve tracking and reporting quality outcomes.

Source: Advisory Board interviews and analysis.

Develop scalable workflows to accommodate growth

Organizations are reconfiguring their workflows to reduce the burden on coordinators while also improving patient experience. For example, once patients are referred, they are triaged into standard clinical pathways based on their diagnosis. The pathways specify designated clinic days and imaging slots so patients can receive diagnostic services in a one-stop shop. Coordinators, providers, and the organization benefit from knowing what to expect when, and the institution as a whole benefits from the subsequent inter-department communication and efficiencies that result. To see an example of restructuring workflows to manage growth, see the Atrium Health case on pages 12 and 13.

Decentralize ancillary equipment based on disease state

As structural heart volumes grow, ancillary services that feed multiple programs can act as a bottleneck, constraining capacity. To alleviate this problem, some programs invest in their own ancillary services. For example, programs can run dedicated imaging services that give priority to structural heart patients and then serve other patients as time allows. If such investments are not feasible, programs work with ancillary departments to create dedicated slots and days for structural heart.

> To learn more about how to make the case for your structural heart program, check out the accompanying toolkit, "Build the case for structural heart."

Justify investment across the structural heart enterprise

To successfully secure funding for structural heart program investments, leaders and physicians work hand-in-hand to justify the program to both hospital/system administrators and philanthropy leaders. Here's how:

- **Illustrate growth outlook:** Leaders continuously educate the enterprise about the value and necessity of structural heart (SH) and emphasize the distinctions of what makes SH unique compared to the rest of the cardiovascular service line.
- **Demonstrate current performance:** Leaders tell the story of where their program is, where they need to go, and how to get there. Data includes growth projections, referral volumes, halo effect volumes, quality outcomes, current and projected staff workloads, staff time study data, patient wait times, and patient stories.
- **Articulate the need:** Leaders proactively make the business case for the next investment a year or two in advance of program need and emphasize the projected benefits to patients, the program, and the institution at large. Most importantly, they paint the picture of what will be lost without investment.

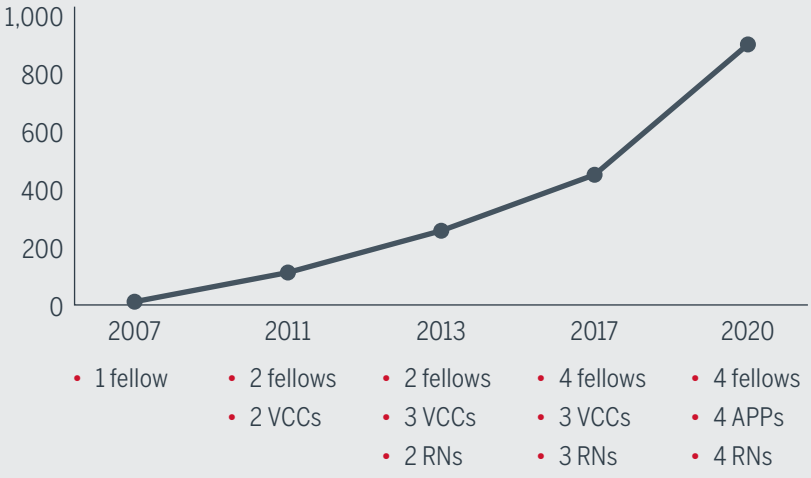
Source: Advisory Board interviews and analysis.

Emory Healthcare holistically assesses capacity

Emory Healthcare in Atlanta divided the patient pathway into its individual components and then timed each step of the process looking for variation. Based on this exercise, they identified a few bottlenecks in their pathway, including staffing levels and anesthesiologist availability. The challenges and solutions they identified as well as some operational details on execution are listed below.

Challenges identified	Solutions implemented
OR capacity: OR time difficult to schedule, shared among multiple programs	Moved to offering TAVR in cath lab as part of minimalist approach
Staffing levels: Number of pre- and peri-procedural staff had not adequately grown with volumes	Adjusted staffing levels and roles to better scale with volumes
Alignment of anesthesiologist skills and tasks: Limited anesthesiologist availability for TAVR operating hours	Adopted nurse-led sedation

EMORY'S STAFF LEVELS OVER TIME[1]



Role of valve clinic coordinator adjusts to accommodate program growth

Traditional model: VCC (RN) follows patients from time of referral through all follow-up care

Changes made with volume growth:

- VCC handles referral to procedure
- Nurse navigator (RN) responsible for patients post-procedure

1. After 2017, Emory moved to an RN based model. Instead of their VCCs being APPs, both VCCs and nurse navigators are now RNs. As of 2019, Emory has four fellows (one CT, two IC, one imaging), four APPs who work both inpatient and outpatient, and four RNs (2 VCCs, 2 nurse navigators).

Source: Emory Healthcare, Atlanta, GA; Advisory Board interviews and analysis.

Emory Healthcare adapts staffing for top-of-license care

Emory adopts nurse-led sedation for additional efficiency gains

To improve upon operational efficiency, Emory implemented nurse-led sedation. They were already practicing "minimal" TAVR, with anesthesiologist-led moderate sedation. Nevertheless, they saw an opportunity to reduce procedure delays by upskilling nurses to lead the sedation process, which meant that they no longer needed to wait for the anesthesiologist to begin a case. While this required adding an additional nurse focused solely on sedation to every procedure, that investment paid off by decreasing procedure time and enabling a full week of TAVR days.

Anesthesiologist-led sedation

- Anesthesiologist and RN present for every TAVR
- Patient receives moderate sedation as part of minimalist TAVR

Nurse-led sedation

- Two RNs with every TAVR, one primarily focused on medication administration
- RN assesses patient response to medication throughout procedure

KEYS TO IMPLEMENTATION

- Utilize algorithm and physician consults to identify eligible patients.
- Provide adequate pre-op assessment.
- Ensure patient's position is comfortable before sedating.
- Ensure legal requirements are met for providing sedation.
- Have anesthesia team present in department.
- Keep emergency equipment in room for every case.

RESULTS

10% decrease in average procedure time

5 days per week that Emory performs TAVR

39% increase in structural heart procedure volumes from FY18 to FY19

Source: Emory Healthcare, Atlanta, GA; Advisory Board interviews and analysis.

Atrium Health adapts workflows to manage growth

Atrium Health's Sanger Heart and Vascular Institute recognized that weekly, two-hour multidisciplinary huddles and coordinators managing 60 TAVR patients at one time was not sustainable to keep pace with their program's growth. Looking to scale their structural heart program, Atrium adapted their referral and workflow processes[1] to better manage growing volumes and ensure timely and high-quality treatment. In Sanger Heart and Vascular Institute's new Valve Center model, referring providers send any patient with valve disease to Atrium's program. An APP then triages the patient into one of three pathways.

Sanger's three patient pathways for valve disease patients

1. "Fast track" patients who simply need tests ordered and are ready to see providers in clinic for Valve Day
2. Mitral and more complex aortic stenosis (AS) patients who first need an interventional cardiologist consult followed by an e-consult from an advanced cardiac imager so testing can be ordered for Valve Day
3. Straight surgical candidates who follow a predetermined CT surgery pathway and do not go to Valve Day

- **Valve Day:** A single day in which patients receive testing and see their cardiologist and surgeon
- **Example:** Pathway 1 patient receives testing in the morning on a designated testing day (Tuesday or Thursday) and then sees the cardiologist and surgeon that afternoon

Benefits of the Valve Center model

Increases ease of referrals for valvular disease by creating a single point of entry and streamlined care pathways for all valve patients regardless of anticipated clinical outcomes.

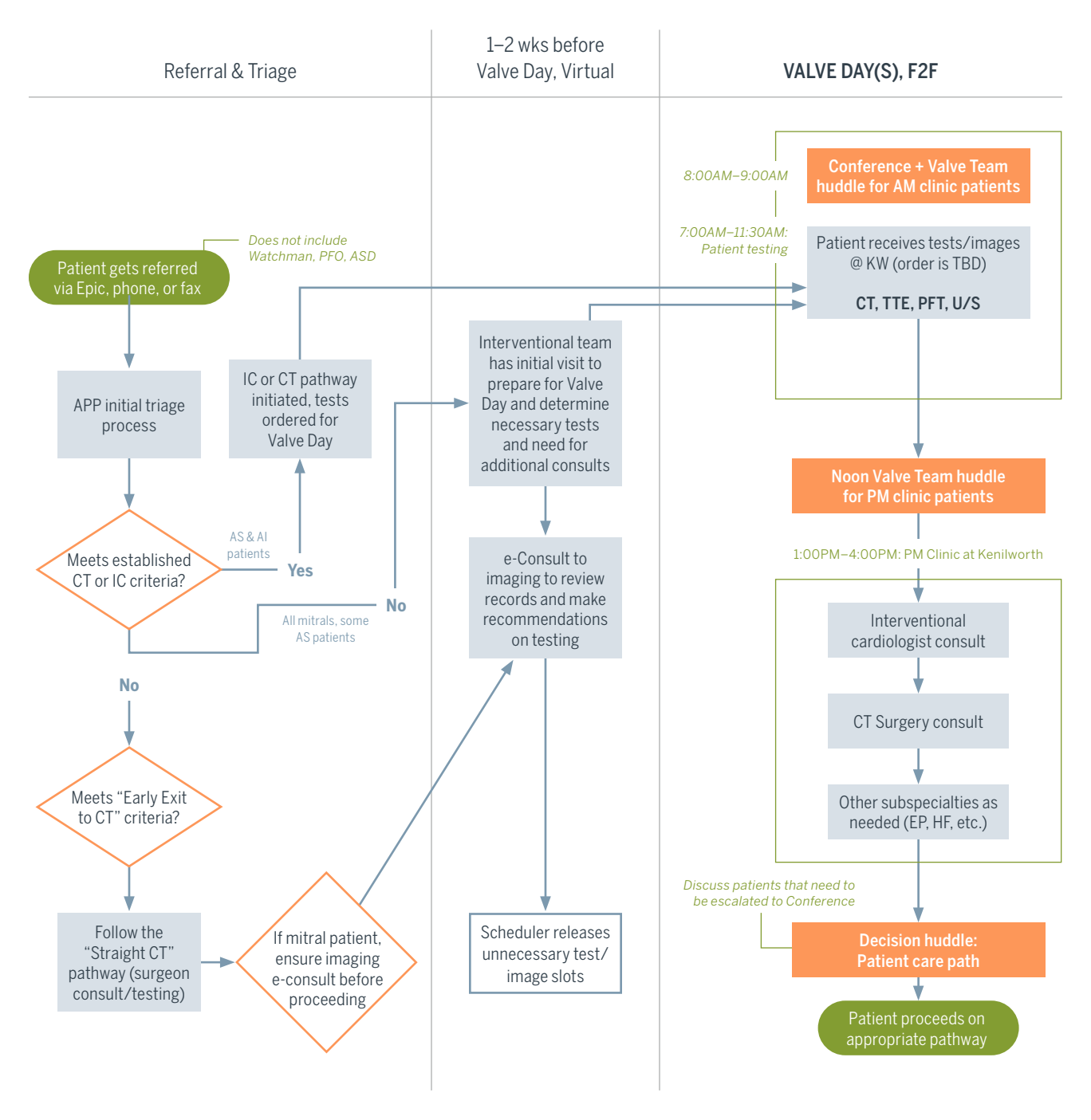
Improves patient experience and access to timely treatment by creating a one-stop shop for patients to receive all their testing, see their providers, and get real-time results.

Alleviates workload and capacity constraints by having designated testing and imaging time slots[2] that staff can anticipate and utilize to manage growing volumes and guarantee patient access.

1. Real-time decision making is facilitated by imagers who read results live and two multidisciplinary conferences (one in the morning and one in afternoon) where surgeons, imagers, interventionalists, structural heart nurse navigators, and surgical navigators review cases and determine the best procedural path forward.
2. If slots are unscheduled a week in advance, the slots are relinquished back to imaging and testing to prevent conflicts with other departments.

Source: Atrium Health, Charlotte, NC; Advisory Board interviews and analysis.

Atrium Health's Sanger Heart and Vascular Institute developed a process flow to accommodate growing demand



Source: Atrium Health, Charlotte, NC.

Strategy 02

Enhance and expand channels to future patients

To date, most structural heart programs have benefited from organic volume growth. However, with the explosive increase of structural heart programs in the market, leaders face increased competition to capture new and latent demand. If programs aren't actively strategizing how to reach untapped patients, they risk falling behind. Here are lessons from the market.

Go to patients, don't wait for them

Direct-to-consumer marketing is becoming baseline for structural heart programs. Leading organizations are going to patients proactively—not waiting for patients to come to them. Social media has become a critical avenue for program marketing, surpassing commercials, mailers, and other traditional advertising channels. Organizations are leveraging social media as a tool to educate and attract patients—and patients are responding. In some cases, these efforts have brought patients directly to the program, bypassing the referring physician and helping to create the right payer mix to financially support the program. Direct-to-consumer marketing is especially critical for community hospitals and those serving rural markets.

Sample direct-to-consumer marketing tactics

- Create a live Twitter exchange where structural heart providers explain how a TAVR procedure is done step-by-step and answer followers' questions.
- Conduct a Facebook Live session to educate followers on heart valve disease, including symptoms, diagnosis, and treatment.
- Celebrate structural heart milestones (such as the 500th or 1,000th TAVR procedure performed) via the social media platforms of the structural heart program, hospital and health system, and individual providers.

Source: Advisory Board interviews and analysis.

Expand your net to capture potential at-risk patients

Referring physicians already have the difficult job of seeing patients across a wide spectrum of diseases. To reduce the burden of testing and treatment recommendation on the part of referring physicians, structural heart programs should have those providers refer patients with any potential form of valve disease rather than referring for specific procedures (e.g., TAVR or surgical intervention). By adopting this valve disease model and casting a wide net for patients, programs start to address the challenges of underdiagnosis and undertreatment on the side of the referring provider.

By assessing a greater number of patients at the point of referral, structural heart programs are hoping to see volume growth across service offerings. In particular, one program is hoping that by having their structural heart APPs triage patients at the onset of referral, they can increase their conversion rate of testing to procedure from 60% to 80%. Smaller hospitals without capacity may not be able to implement this "come all" approach, but can still ensure that referring is as easy as possible for referring providers.

From our interviews

"Our elevator pitch to referrers is, 'Send all patients with valve disease our way, and we will figure it out. We can get an answer in a matter of days.' We want to make it easy for our referring [physicians], whether that's surgical, interventional, or medical management. From a marketing perspective, it's a smart play too."

Cardiovascular director
Large health system in the Southeast

Source: Advisory Board interviews and analysis.

Rethink outreach and access with a health equity lens

Studies show disparities in access to structural heart procedures. For example, research has found that racial minorities are underrepresented among patients undergoing TAVR in the United States. Another study found that with every $10,000 increase in income, the odds of receiving TAVR increased by 10%.

Untreated aortic stenosis varies across race, gender, and socioeconomic status

24%
Less likely for Black patients to receive AVR than white patients

9%
Less likely for women to receive AVR then men

10%
Increase in odds of receiving a TAVR with every $10,000 increase in income

Structural heart leaders are increasingly recognizing that disparities exist between the patients who seek care and the communities they are serving. Consequently, organizations are investing in strategies to reach those patients and close the access gap.

Sample strategies to reduce disparities in CV care

- Analyze hospital data to identify underserved patient populations. Then, conduct outreach and marketing through the appropriate communication channels to reach those patients.
- Consider opening valve clinics in underserved areas and partnering with transportation services to help with access.
- Commit dollars to limiting the effects of nonclinical factors in health by investing in care management and/or hiring diverse staff that can relate to the lived experiences of your patient populations.
- Work with community organizations or look for opportunities for cross-service line collaboration (e.g., sharing resources for screening and outreach).

Source: Alkhouli M, et al., "Racial Disparities in the Utilization and Outcomes of TAVR: TVT Registry Report," *JACC Cardiovascular Interventions*, 2019; Brennan J, et al., "Racial Differences in the Use of Aortic Vale Replacement for Treatment of Symptomatic Severe Aortic Valve Stenosis in the Transcatheter Aortic Valve Replacement Era," *Journal of the American Heart Association*, 2020; Lowenstern A, et al., "Sex disparities in patients with symptomatic severe aortic stenosis," Elsevier, 2021; Sleder A, et al., "Socioeconomic and Racial Disparities: a Case-Control Study of Patients Receiving Transcatheter Aortic Valve Replacement for Severe Aortic Stenosis," *Journal of Racial and Ethnic Health Disparities*, 2017; Advisory Board interviews and analysis.

Strategy 03

Differentiate your program to compete in tomorrow's market

With TAVR becoming a mainstream procedure for cardiovascular service lines, structural heart leaders are making sizable investments to differentiate their programs from their peers in terms of access and patient experience. Here are lessons from the market.

Actively market your structural heart vision

TAVR growth has benefited from industry-wide education and advertising. But given the significant underdiagnosis and treatment of aortic stenosis, there is still a large opportunity to capture latent demand by educating patients and referring providers. To lead in the structural heart market, programs need to leverage TAVR marketing efforts to make the case for their structural heart program as a whole—and capture demand across all structural heart procedures. That's because future competition won't be for just TAVR—there will be competition across structural heart offerings.

Key components of structural heart program marketing

- Educate patients and referring providers about the multidisciplinary approach of your structural heart program.
- Highlight the quality outcomes of your program.
- Illustrate the experience patients will have by receiving care through your program.
- Share patient stories from the community that future patients can relate to.
- Include provider and staff backgrounds to showcase the diversity and experience of your program's staff.
- Provide timely feedback to referring providers on patient decisions and procedure status to encourage future referrals.

Source: Advisory Board interviews and analysis.

Leverage quality as the vehicle for differentiation

A focus on demonstrated quality outcomes can set programs apart for patients, providers, and payers. For example, some programs seek accreditation to signal that they are a center of excellence. As the influence of consumerism grows in structural heart, the importance of quality ratings reports will also increase. In particular, younger patients and patients' families are more likely to "shop" for care and will expect more from programs in terms of data transparency, accreditations, and program and institution rankings. Consequently, many programs are investing in additional staff time and technology solutions to specifically support data registry, or outsourcing the tasks to a vendor.

Moreover, programs who can demonstrate a quality-driven patient experience report using their quality data to renegotiate commercial payer contracts to improve financial margins and prepare for future payer steerage to high-outcome programs. To see an example in action, see the St. Charles case on pages 20.

Distinguish program to attract new, high-quality talent

Staffing is an evergreen challenge for health care, and structural heart is no exception to the effects of turnover and retirement. Organizations are actively selling their structural heart programs to new graduates and are highlighting early career advancement opportunities, access to premier technology, program accolades, and efficiencies that provide improved work-life balance compared to other programs. For example, one structural heart program in a rural area recruited a recently graduated interventional cardiologist (who had done an extra year of fellowship for structural heart) by offering mentorship opportunities with the head of their recently established program. Another program has retained newer staff by scoping the coordinator role and emphasizing work-life balance best practices such as not answering email after hours.

Sample programs and accreditations

- STS/ACC TVT registry
- American College of Cardiology TAVR accreditation
- U.S. News and World Report Procedures & Conditions: TAVR Rating

Source: Advisory Board interviews and analysis.

Differentiate through referring physician experience—not just patient experience

Leading structural heart programs are not just looking at building relationships with referring physicians but creating a referring physician experience to differentiate their program within the community.

Through physician liaisons or structural heart physician roadshow tours, programs paint the vision of their structural heart program and educate referring providers on the experience their program offers to both the patient and provider. Contact with referring physicians should be conducted continuously, emphasize quality outcomes and the most up-to-date industry research, and reiterate the handoff process post-procedure.

From our interviews

"Streamline the process for you and the referrer. Once the patient has been identified with aortic stenosis, they get five things [e.g., standardized lab and imaging orders] and then the patient comes to you. You need to start treating them like a managed care patient so that when they come to you, they already have the tests done."

Cardiovascular Director
Large health system on the East Coast

Examples of how to increase capture of referrals

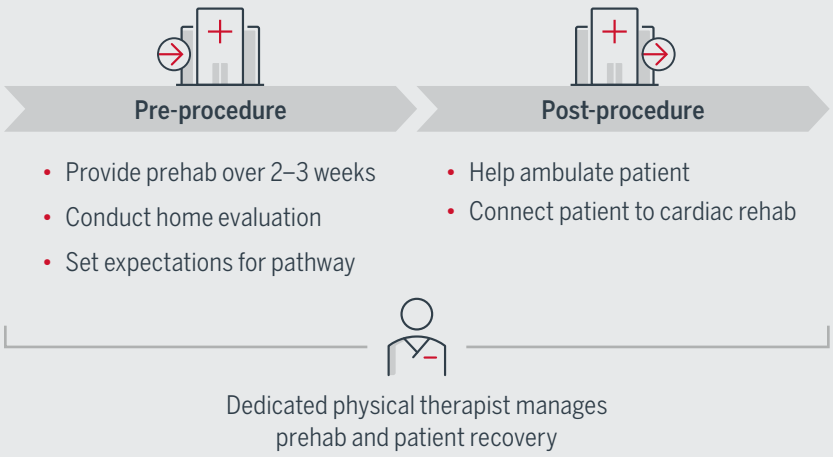
- Target marketing efforts about your structural heart (SH) program to referring physicians through social media, billboards, commercials, direct mailers, and emails (e.g., education about TAVR and its multidisciplinary focus, examples of patient stories).
- Build physician-to-physician and nurse-to-nurse relationships between your structural heart program and referring providers' clinics (e.g., conduct a tour through primary care to highlight the vision of your program and highlight the ease of referral to capture referring physician interest).
- Emphasize your SH program's clinician and staff experience with conducting SH procedures (e.g., number of procedures performed, quality outcomes, training of other physicians on SH procedures) and the subsequent experience patients will receive.
- Supplement physician-to-physician relationship building with outreach coordinators and physician liaisons who can get your organization's brand out to the market and be the main point of contact if and when referring physicians have questions.
- Streamline your message and what you're asking of referring physicians (e.g., "send any patient to our program regardless of whether it's low, moderate, or severe aortic stenosis," "send any patient who has any form of valve disease to our program and we will make a diagnose in [time period]," "our program is a one-stop shop for your patients to receive care").

Source: Advisory Board interviews and analysis.

St. Charles Health System invests in ancillary roles to prepare for an episodic approach

St. Charles offers preoperative preparation for their structural heart patients. This prehab includes fitness and wellness testing, exercise and strength training, nutrition counseling, and patient education, with the goal of optimizing patients for the procedural care they will receive. Prehab extends the continuum of care, which improves the patient experience and outcomes. In just four months, St. Charles saw a 17% increase in cardiac rehab utilization.

Prehab integration into procedure pathway at St. Charles



Keys to implementation

- Stratify patients by frailty to identify ideal candidates for prehab
- Deliver services through physical therapy (PT) staff to enable billing for PT before procedure and cardiac rehab post-procedure
- Combine prehab sessions with pre-procedure clinic visits to reduce burden on patients
- Foster a community of prehab patients to encourage continuity into cardiac rehab
- PT-led model makes prehab reimbursable as PT encounters

St. Charles' focus on prehab signals a future of thinking about efficiency beyond the hospital stay. This shift toward cross-continuum care in structural heart is a result of three factors. First, earlier discharge pushes more episodic spending to readmissions and post-acute care. Meanwhile, a younger patient population will have a higher bar for long-term quality of life, requiring wraparound care beyond the procedural pathway. Lastly, payers are starting to think of structural heart episodically—TAVR is included in Bundled Payments for Care Improvement (BPCI) Advanced program.

Source: St. Charles Health System, Bend, OR; Advisory Board interviews and analysis.

Conversations you should be having

- Analyze current growth constraints and assess opportunities to reasonably extend capacity of current staff and ancillary services to manage demand across structural heart procedures.
- Define a differentiated value proposition to the market across structural heart procedures and reach new patients through unique marketing and communication channels.
- Deepen physician referral networks by consistently connecting with referring physicians and making it easy for them to refer to your program.
- Understand how health equity impacts structural heart programs and invest in addressing upstream and downstream impacts of the social determinants of health in CV care.

These conversations should uncover areas where structural heart leaders will need to promote their program and secure additional investment to capitalize on growing demand and successfully compete in their market.

Appendix

Sub-service line definitions

Sub-service line	DRG
PCI	246, 247, 248, 249, 250, 251
Structural heart	266, 267, 273, 274
Vascular	268, 269, 270, 271, 272, 319, 320
Electrophysiology	242, 243, 244
Heart failure	001, 002, 003, 215
Other	229, 286, 287

Inpatient and outpatient procedure groupings

Inpatient procedure grouping	DRG
TAVR/TEER	266, 267
PFO/ASD	273, 274
SAVR	216–221

Outpatient procedure grouping	DRG
Diagnostic	Other diagnostic cardiac catheterization
Diagnostic	Diagnostic cardiac catheterization
Diagnostic	Intravascular coronary ultrasound
Diagnostic	Concomitant diagnostic coronary and peripheral catheterization
Other	Other transcatheter cardiac procedure
Imaging	Cardiac CT
Imaging	Cardiac CT angiography
Imaging	Chest CT angiography
Imaging	Transthoracic echocardiography
Imaging	Transesophageal echocardiography

Source: Advisory Board interviews and analysis.

Market growth driver definitions

Seven categories of growth drivers	
Population change	Accounts for population growth and transformation, such as population movement patterns, using demographic data from Applied Geographic Solutions (AGS).
Demographic shift	Accounts for aging, which moves people from one demographic group to another, using demographic data from Applied Geographic Solutions (AGS).
Readmissions	A national focus on reducing readmissions is expected to reduce inpatient utilization while increasing demand for outpatient and post-acute services.
Disease prevalence	Accounts for the impact of increasing number of chronic and multi-morbid patients.
Insurance	Accounts for changes in the insurance market. Trends include expanding coverage, increased cost-sharing and increased payer scrutiny of medical necessity.
Care management	Continued investments in care management are expected to reduce inpatient utilization and grow certain outpatient services.
Technology	Accounts for the role of new technologies in changing demand and shifting site of care.

Source: Advisory Board interviews and analysis.

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