



VIRGINIA HEART

Excellence in Cardiovascular Care

## Virginia Heart **Quality Report 2018**



Trust Your Heart to the Very Best

*In affiliation with*







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## MESSAGE FROM VIRGINIA HEART LEADERS

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### Quality Assurance Chairman

For more than 30 years, our mission at Virginia Heart has remained the same — *deliver outstanding cardiovascular care to people within our communities*. This is our second, semi-annual Quality Report. Foundational to our ongoing efforts is the collection and analysis of our clinical data. This data has been assembled through leveraging our electronic health records and relying on relationships with our partner health systems. Our sources are both internal from hospital sources and national outpatient registries. We have compared our data to national benchmark statistics in order to help guide our continuous quality improvement projects. What follows in this report is a summary of our continued efforts to achieve excellence in patient care underscored by our commitment to the “triple aim” of improved quality, cost, and patient access.

While we celebrate our successes, we recognize this as an ongoing process to pursue excellence and deliver the highest quality, cost effective, and patient-centered care.

**Robert A. Shor, MD, FACC**  
Chairman, Quality Assurance Committee



### President & Chief Medical Officer

Virginia Heart continues to expand geographically across Northern Virginia and advance technologically in terms of cutting-edge cardiovascular breakthroughs. Working in affiliation with Inova Heart & Vascular Institute, we remain the gold standard for cardiovascular care and patient experience. Based upon published national data, Virginia Heart once again has been shown to have achieved the highest clinical quality results at a lower than average cost of care. We have succeeded by partnering with our patients proactively to improve their health and reduce risk, and by providing the right care, at the right time, and in the right place to achieve desired outcomes. Our 46 physicians and 20 advanced practice providers work as a team to be where and when we are needed. We are honored to be entrusted with the care of so many across Northern Virginia. It is again with great pride that we present this 2018 Quality Report for Virginia Heart as we strive every day to exceed expectations and provide excellence in cardiovascular care.

**Warren S. Levy, MD, FACC**  
President & Chief Medical Officer



### Chief Executive Officer

Our commitment to clinical quality for each one of our patients is the foundation of everything we do at Virginia Heart. With more than 40 physicians and specialists, we continue to provide comprehensive premier cardiovascular care, and our team-based model ensures the best possible outcomes.

Whether it is a routine office visit or a complex interventional procedure in the hospital, our cardiologists provide the most advanced treatments available, ensuring the best possible outcome and a healthy quality of life for our patients.

Expertise and technology are but two pillars in the success and growth of Virginia Heart. What differentiates us among other cardiovascular care providers is the individualized care our physicians dedicate to each of their patients. Through charted surveys and unsolicited patient reviews, our team continually hits the highest marks for their personal touch. We believe this not only enhances the patient experience, but also benefits their physical health and wellness.

This report summarizes the results achieved through that commitment.

**Gregory P. Corbett**  
Chief Executive Officer



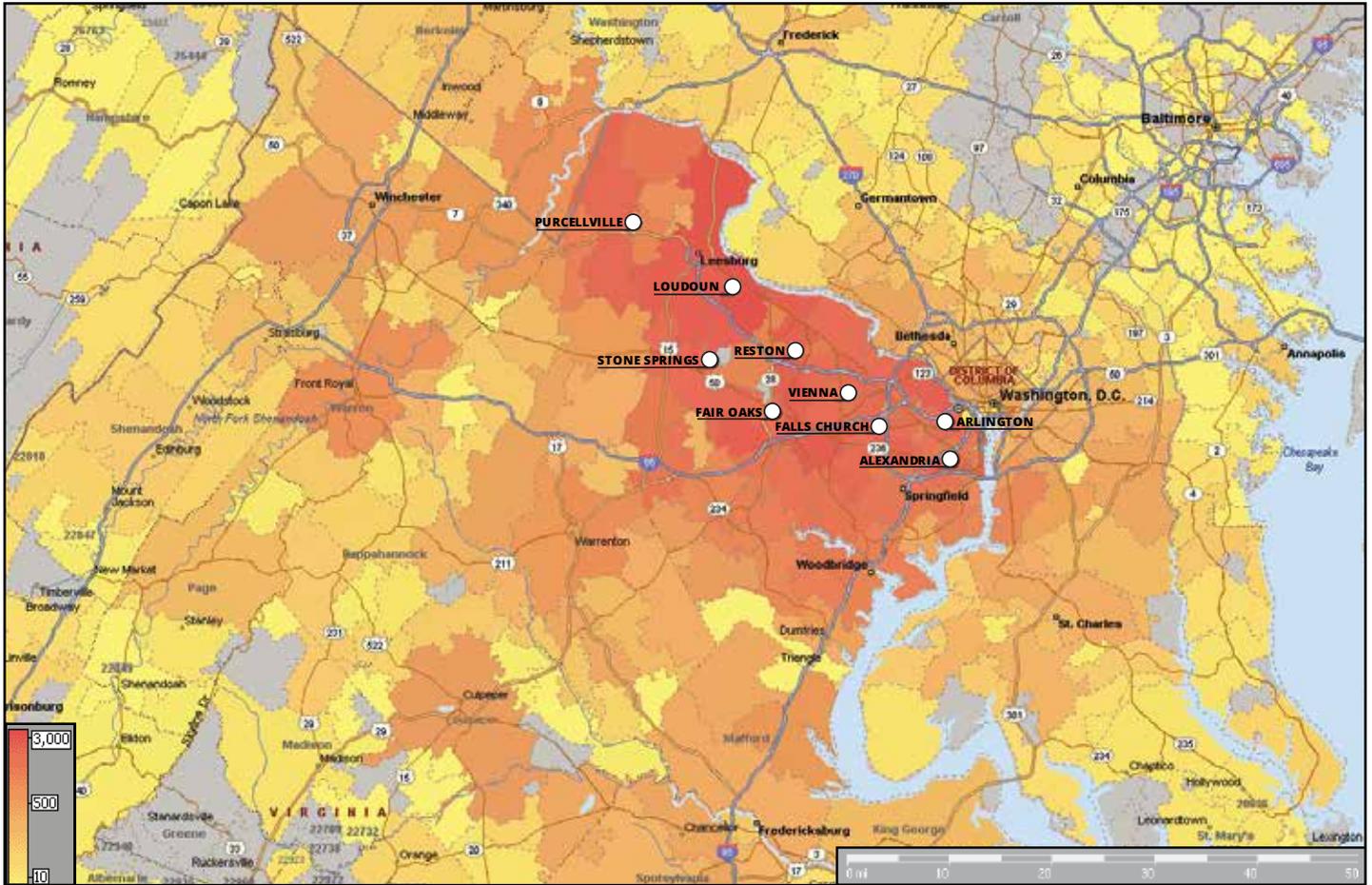
At the Inova Heart & Vascular Institute, we are proud to partner with Virginia Heart in providing exemplary cardiovascular care. Inova is recognized as one of the nation's leading health systems in cardiovascular healthcare delivery with cutting-edge technologies and outstanding quality metrics. Virginia Heart physicians, advanced practice professionals, and its entire care team have been an integral part of the growth and success of IHVI and have initiated and led quality efforts at Inova, which are highlighted in this report. The Virginia Heart physicians hold many important leadership positions throughout the Inova system providing care and leadership at four of our five hospitals. Their leadership, as you will see detailed in this report, extends both regionally and nationally. Their research program, together with IHVI, is one of the finest in the nation among cardiovascular practices. It has been a pleasure and honor to work alongside the outstanding professionals of Virginia Heart, and I congratulate them on this report and the success that it demonstrates.

**Christopher M. O'Connor, MD, MACC**  
President, Inova Heart and Vascular  
Institute





# VIRGINIA HEART LOCATIONS AND HOSPITAL AFFILIATIONS



Virginia Heart’s patients come from a wide area across the tri-state region, shown here by zip code. The darker orange and red indicate the greatest concentration of patients. Our 10 offices located throughout Northern Virginia are indicated on the map with white circles.

### Alexandria Office

4660 Kenmore Avenue, Suite 1200  
Alexandria, VA 22304

### Arlington Office

1005 N. Glebe Road, Suite 750  
Arlington, VA 22201

### Fair Oaks Office

3580 Joseph Siewick Drive, Suite 305  
Fairfax, VA 22033

### Fairfax (Falls Church) Office

2901 Telestar Court, Suite 200  
Falls Church, VA 22042

### Loudoun Office

44035 Riverside Parkway, Suite 400  
Leesburg, VA 20176

### Purcellville Office

205 East Hirst Road, Suite 101  
Purcellville, VA 20132

### Reston Office

1850 Town Center Drive  
Pavilion 2 - Suite 550  
Reston, VA 20190

### StoneSprings (Dulles) Office

24430 Stone Springs Blvd, Suite 425  
Dulles, VA 20166

### Telestar (Falls Church) Office

2901 Telestar Court, Suite 100  
Falls Church, VA 22042

### Vienna Office

130 Park Street SE, Suite 100  
Vienna, VA 22180

## Hospital Affiliations

Virginia Heart cares for patients at seven major hospitals in Northern Virginia:

- Inova Fairfax Hospital
- Inova Alexandria Hospital
- Inova Loudoun Hospital
- Inova Fair Oaks Hospital
- Virginia Hospital Center
- Stone Springs Hospital (HCA)
- Reston Hospital (HCA)

## INPATIENT Volumes

Virginia Heart providers are available 24 hours a day, 365 days a year in each of the seven area hospitals we support, meeting the needs of our patients and providing the rapid response necessary in urgent or emergent situations. Our interventional cardiologists work alongside teams of surgical and hospital experts in order to provide our patients with the best life-saving treatment of acute heart conditions.

Hospital Services	2018	2018 vs 2016 % Change
Patient Encounters/Visits	37,980	.8% ↑
Catheterizations	2,722	3% ↑
Stents	1,034	18% ↑
Pacers/ICDs/Ablations	1,184	-2%
Electrophysiology Studies	251	10% ↑

## OUTPATIENT Volumes

With our 46 physicians and 20 advanced practice providers (APP), Virginia Heart documented more than 98,000 patient office visits in 2018, making us the largest provider of cardiovascular services in the Washington, D.C. Metropolitan area. Patient access and convenience remains paramount, and our 10 convenient offices are dedicated to the growing needs of our communities.

Office Services	2018	2018 vs 2016 % Change
New Patients	15,693	9% ↑
Follow-Ups	83,268	15% ↑
Echocardiograms	20,440	3% ↑
Sleep Studies	2,304	37% ↑
Myocardial Perfusion Imaging	5,837	-8%



Mark C. Vives, MD, FACC; Eve Mogadam, MSN, M.Ed., ANP-BC

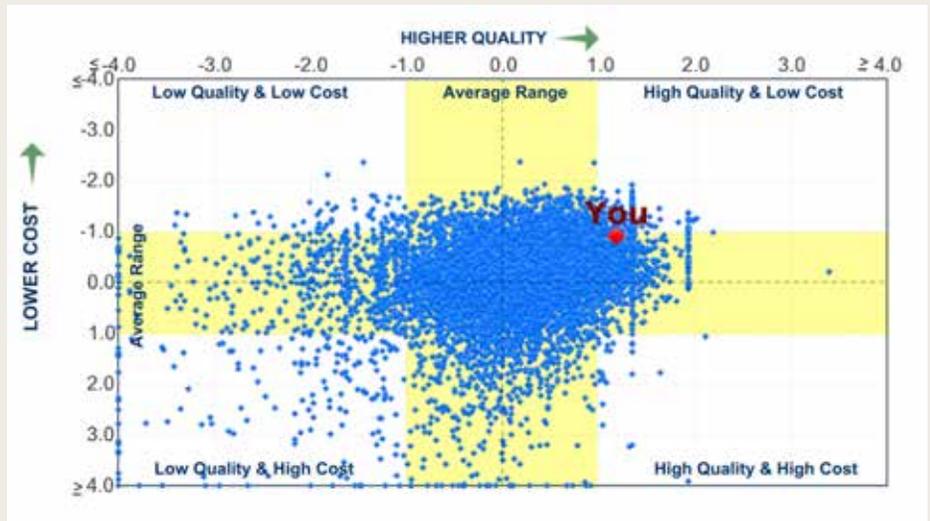
At Virginia Heart, we are committed to providing the highest quality care to our patients in a compassionate and efficient manner. In partnership with our patients, we achieve the best possible outcomes and improve overall quality of life. Our patients receive the most innovative treatments by using cutting-edge technology. All Virginia Heart diagnostic labs are accredited by the International Accreditation Commission.

We measure our quality of care and benchmark our success in that care through comparative analysis with national statistics.

What follows are 2018 quality metrics compared with the published national data. Our goal is to provide the highest quality, most cost-efficient cardiovascular care from diagnosis to treatment.

**Quality and Cost Data from CMS: The QR/UR Report 2017**

The *Quality and Resource Use Report* is an annual quality report provided by the Centers for Medicare and Medicaid Services (CMS). The report summarizes the annual CMS data and looks at both quality (as defined by Medicare metrics) and cost of care in the Medicare patient population. This data identifies the variation in both cost and quality of care among all practices in the country. Virginia Heart continues to strive for high quality and low cost, placing the Practice Performance toward the upper right quadrant of the below scatterplot graph. Our data places us more than a full standard deviation above the mean for quality, and almost a full standard deviation below the mean for cost of care.



Virginia Heart's commitment to excellence of care is demonstrated through the outstanding performance score achieved in all categories of the 2017 Quality Payment Program – MIPS (Merit-based Incentive Payment System). Unwavering dedication to improve all aspects of

patient care has resulted in the maximum possible score of 100 assigned to Virginia Heart in the transitional year of MIPS. The three core sections of MIPS are **Quality, Advancing Care Information, and Improvement Activity.**



### American College of Cardiology Benchmark Data (2018)

Much of the care provided to our patients is delivered in the outpatient setting. Future models of care emphasize outpatient and preventative measures as we move to more 'value-based' care. Aggressive management of cardiovascular diseases results in better outcomes and fewer hospitalizations. The goal is always to give patients the best chance to live more productive, active lives free of cardiac events.

We participate in PINNACLE, the nation's largest outpatient quality improvement registry and part of the family of National Cardiovascular Data Registries (NCDR). PINNACLE, like other NCDRs, was created by the American College of Cardiology (ACC) in an effort to monitor and improve patient care in part by bettering the systems of care themselves. The NCDR have remained the foundation of quality improvement efforts throughout the country and have been exported internationally.

The data (right, top) demonstrate that Virginia Heart meets and/or exceeds the national benchmarks for all indicators.

Reducing early hospital readmission following a hospitalization for either Congestive Heart Failure (CHF) or a Myocardial Infarction (MI) are published quality metrics that signify not only the quality of care provided to patients during their hospitalization, but also the transition of care back to the community. Virginia Heart has staff dedicated to this important transition of care and the continued care our patients receive on an outpatient basis. Virginia Heart's published

American College of Cardiology Pinnacle Quality Data		
Quality Measure	Virginia Heart 2018	National Benchmark 2018
Heart Failure & ACEI	95.01%	87.10%
Heart Failure & Beta Blocker	97.32%	91.10%
Coronary Disease & Antiplatelet	97.51%	87.30%
CAD, EF<40% & ACEI	84.70%	81.70%
CAD, EF<40% & Beta Blocker	98.09%	84.20%
Tobacco Screen & Cessation	100%	88.80%
Ischemic Vascular Disease: Use of Aspirin or Another Antiplatelet	91.13%	84.10%
Body Mass Index (BMI) Screening and Follow-Up	99.85%	67.30%

ACEI = Angiotensin Converting Enzyme Inhibitor    CAD = Coronary Artery Disease    EF = Ejection Fraction

Total Readmissions      2018 Top Quartile = 0.83					
Hospital/Month	Readmission Denominator	30-Day Readmission Rate	O/E Ratio - Premier	90-day Readmit Index	90-day Readmission Rate
Grand Total	721	10.7%	0.65	174	24.1%

MI Readmissions      2018 Top Quartile = 0.82					
Hospital/Month	Readmission Denominator	30-Day Readmission Rate	O/E Ratio - Premier	90-day Readmit Index	90-day Readmission Rate
Grand Total	148	8.8%	0.73	24	16.2%

CHF Only      2018 Top Quartile = 0.91					
Hospital/Month	Readmission Denominator	30-Day Readmission Rate	O/E Ratio - Premier	90-day Readmit Index	90-day Readmission Rate
Grand Total	581	11.5%	0.66	153	26.3%

readmission rates have consistently been above the top quartile and often in the top decile nationally. O/E represents the

observed to the expected readmission rate based upon patient demographics and severity of illness.



## Interventional Coronary Procedures

When patients present with acute heart attacks or ST Elevation Myocardial Infarction (STEMI), prompt management is critical to successfully limit heart muscle damage by restoring blood flow in the blocked artery.

In 2018 Virginia Heart performed over 2,700 cardiac catheterization procedures. The data below represent our success and complication rates for all coronary revascularization procedures. Acute Coronary Syndromes (ACS) includes various types of heart attacks and unstable presentations. Also included are stable coronary patients for whom an intervention is needed. These results demonstrate excellent primary success rates with low complication and mortality rates.

### Christine and Vince Cavaleri aren't letting their age—or cardiac conditions—slow them down

Vince, 89, suffers from valve disease and congestive heart failure. Christine, 77, is a heart attack survivor. But they follow the advice of Dr. Nicholas Cossa at Virginia Heart and exercise almost every day, adhere to a healthy diet and stay busy pursuing their hobbies. Vince even works part-time. As Christine says, *"You've got to stay fit if you want to stay in the game."*

Coronary Interventional Procedure Summary 2018		
Procedure for CAD	Count	% Acute Procedural Success
Acute Coronary Syndrome, ST Elevation Myocardial Infarction	184	96%
Acute Coronary Syndrome, Non-ST Elevation Myocardial Infarction	192	95%
Acute Coronary Syndrome, Not Specified	315	94%
Stable Coronary Artery Disease (Non-Chronic Total Occlusion)	166	99%
Chronic Total Occlusion	17	88%

Total PCI (Percutaneous Coronary Interventions)	% Acute Procedural Complications	% In Hospital Mortality Elective and Non Shock PCI
874	1.80%	0.24%

% Shock and High Risk PCI*	% In Hospital Mortality Shock and High Risk PCI	% Expected Mortality Shock and High Risk PCI
3.00%	28%	50%

\*Includes patients with Cardiogenic Shock and Impella or ECMO mechanical circulatory support.



Stephen M. Day, MD, FACC



## ELECTROPHYSIOLOGY DATA

Electrophysiologists, or heart rhythm specialists, focus on the electrical system of the heart in order to restore a regular rhythm. These specialists address a myriad of both fast and slow rhythms, often intervening by ablating the electrical circuit or using implantable devices. Common procedures include implanting pacemakers and defibrillators, as well as a variety of ablations for lower and upper chamber aberrant rhythms. Virginia Heart offers the most technically advanced ablation procedures for complex atrial fibrillation with excellent outcomes, including patients for whom previous ablations may have failed. Virginia Heart also offers a comprehensive ventricular tachycardia ablation program with outcomes mirroring the results of the country's most experienced academic centers.

Virginia Heart electrophysiologists are widely recognized for their excellence and participate in numerous clinical trials that bring new technologies to our patients. The following data highlights the volume and success rates for all of our electrophysiology procedures, as well as complication and mortality results. Our success rates are exceptional, which speaks to the quality of our team of electrophysiologists here at Virginia Heart.

Post Atrial Fibrillation Ablation Outcomes	
% Patients with Paroxysmal Atrial Fibrillation (AF) free from AF at 1 year	% Patients with Persistent Atrial Fibrillation (AF) free from AF at 1 year
85%	78%

Electrophysiology Ablation Procedure Summary 2018		
Procedure	Count	% Acute Procedural Success
Atrial Fibrillation Ablation with Pulmonary Vein Isolation	113	96%
Atrial Fibrillation Ablation with Pulmonary Vein Isolation and Dispersion Ablation	109	92%
Atrial Fibrillation Ablation with Pulmonary Vein Isolation and Rotor Ablation	69	94%
Supraventricular Tachycardia Ablation	259	99%
Ventricular Tachycardia Ablation for Idiopathic VT / PVCs	32	90%
Ventricular Tachycardia Ablation associated with Ischemic Cardiomyopathy	14	89%
Ventricular Tachycardia Ablation associated with Nonischemic Cardiomyopathy	14	79%
<b>Total Ablations</b>	<b>% Acute Procedural Complications</b>	<b>% In Hospital Mortality</b>
610	1.10%	0%

Electrophysiology Implantable Device Procedure Summary 2018		
Device	Count	% Acute Procedural Success
Implantable Cardiac Defibrillator	113	99.10%
Implantable Cardiac Defibrillator with BiV	71	100%
Pacemaker	298	99%
Pacemaker with BiV	19	100%
Other	6	100%
<b>Total Implanted Devices</b>	<b>% Acute Procedural Complications</b>	<b>% In Hospital Mortality</b>
507	0.50%	0%



# ECHOCARDIOGRAPHY DATA

Virginia Heart’s Echocardiography Laboratories in conjunction with Inova Cardiac Diagnostic Services, maintain the highest levels of quality and is accredited by the Intersocietal Accreditation Commission (IAC). Our entire team of experienced cardiac sonographers has attained registry credentials through Cardiac Credentialing International (CCI) or the American Registry of Diagnostic Medical Sonographers (ARDMS).

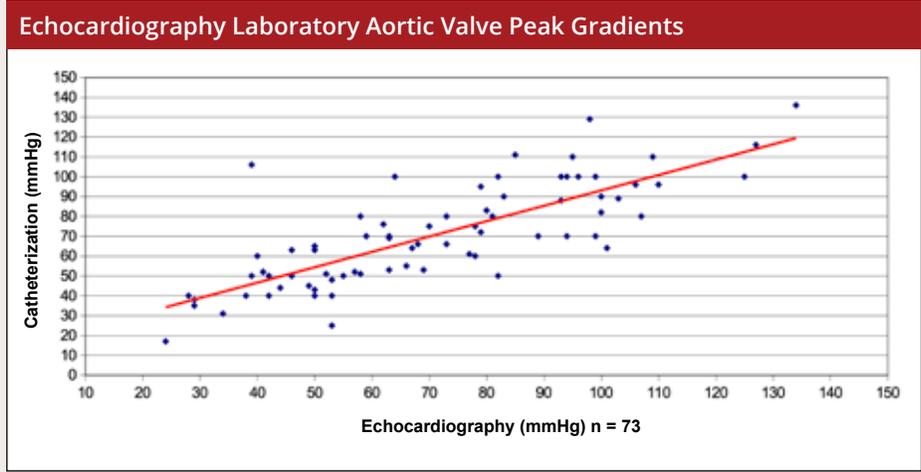
Cardiologists who interpret these studies are certified in cardiovascular disease by the American Board of Internal Medicine (ABIM) and some have attained additional certification in Special Competence from the National Board of Echocardiography (NBE).



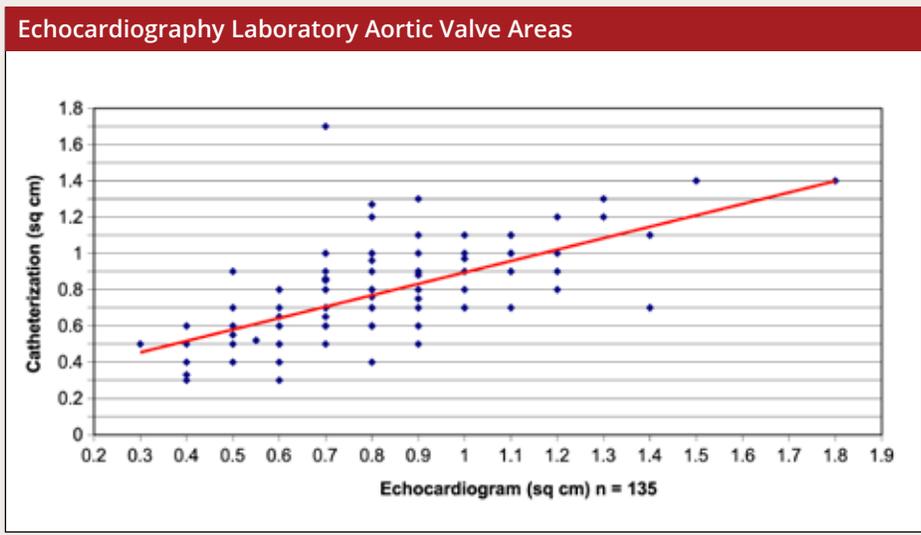
Timothy P. Farrell , MD, FACC



Tariq A. Aziz, MD, FACC



**Aortic Valve Peak Gradients:** This measures the difference in pressure across a narrowed or stenotic aortic valve. The calculated gradient by echo correlates well with catheterization lab direct measurements.



**Aortic Valve Areas:** Compares the calculated area of the aortic valve opening obtained in the echocardiography (non-invasive measurement) laboratory with the same value as calculated in the Cardiac Catheterization Laboratory. Our data continues to show a strong correlation.



We perform more than 20,000 echocardiograms each year utilizing state-of-the-art technology to aid in the diagnosis and management of both simple and complex cardiovascular diseases, including cardiomyopathies, coronary artery disease, congestive heart failure, congenital heart disease, valvular disease, and arrhythmias. Our laboratory is equipped with the most innovative instruments, including Tissue Doppler Imaging and speckle tracking to provide a comprehensive, but noninvasive view of cardiac structure and function. Data from the Virginia Heart Echocardiography Laboratory shows excellent correlation with gold standard diagnostic testing.

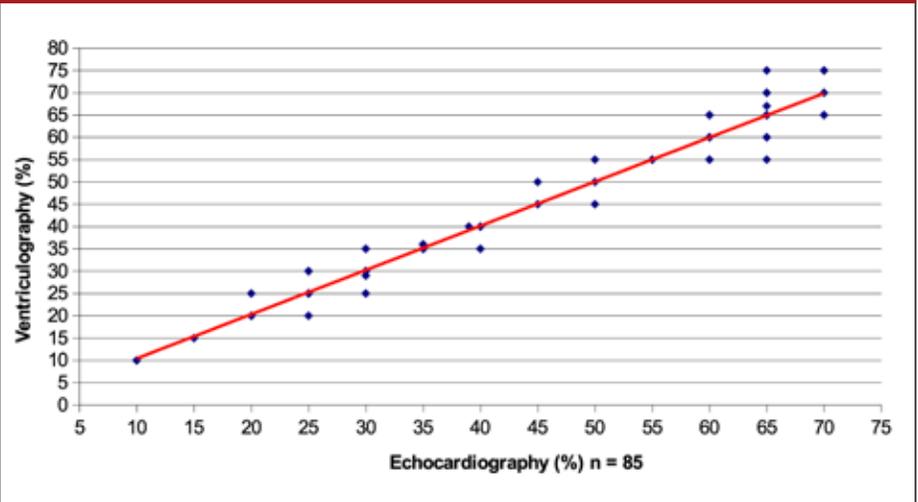


Stephen P. Rosenfeld, MD, FACC



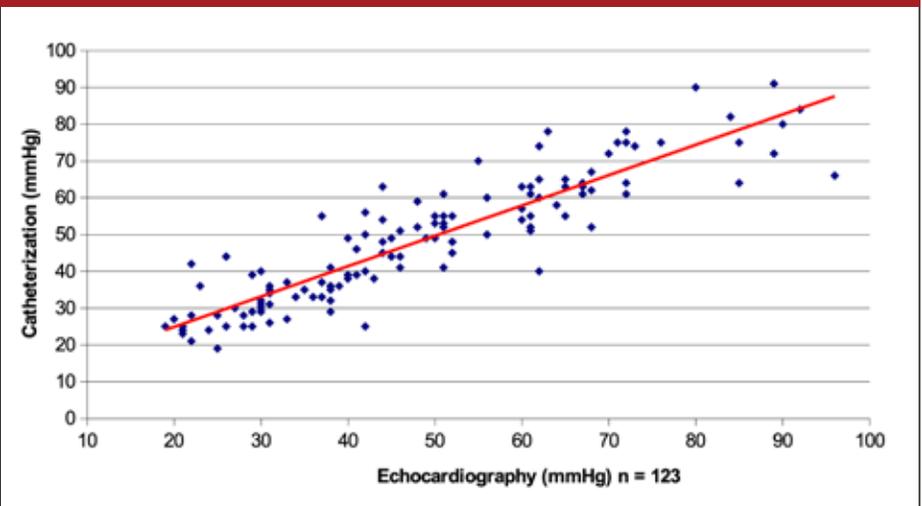
Subash B. Bazaz, MD, FACC

### Echocardiography Laboratory Ejection Fraction



**Left Ventricular Ejection Fraction:** This is a key measure of heart function and represents the amount of blood ejected with each heartbeat. This graph compares data obtained by echo to other imaging and substantiates the accuracy of the echo obtained measurements.

### Echocardiography Laboratory Right Ventricular Systolic Pressure



**Right Ventricular Systolic Pressure:** The right ventricular pressure is an important measurement in determining the health of the heart and identifying abnormalities. This measurement compares the calculation of blood pressure in the right ventricle by non-invasive echo-based estimates against direct catheter based pressure measurements obtained in the Cardiac Catheterization Laboratory. Our data shows a strong correlation.



# MYOCARDIAL PERFUSION IMAGING (MPI) DATA



## Virginia Heart Program Accreditations

We are proud of the numerous accreditations received for our Diagnostic Testing program, including those from International Accreditation Commission (IAC) for echocardiography, nuclear cardiology and vascular testing. Additionally, our Sleep Center locations received full accreditation from the American Academy of Sleep Medicine in 2016.

## Myocardial Perfusion Imaging

Since 2000, Virginia Heart has been proudly offering Myocardial Perfusion Imaging (MPI). We have expanded this service to seven locations, all accredited by the IAC, and performed more than 5,800 MPI studies in 2018 alone. Medical Director Dr. Jeffrey Luy oversees our Quality Assurance program to ensure we consistently meet our target for appropriate use of MPI, modality correlation, and goals for technical and interpretive quality. Our MPI departments together with Inova Cardiac Diagnostic Services, offer a multitude of comprehensive diagnostic procedures, including MUGA and viability imaging, as well as noninvasive nuclear stress testing to avoid unnecessary invasive procedures. Our testing modalities model ASNC guidelines and remain in accordance with our dedication to keep radiation exposures low.

Virginia Heart takes pride in utilizing technology and diagnostic studies in a clinically appropriate manner. The American College of Cardiology has published Appropriate Use Criteria (AUC) for a variety of diagnostic procedures. The AUC can never account for all clinical situations and some variance is expected; prior studies have suggested 7-10% may fall in the "rarely appropriate" category. Our adherence to AUC for 2018 was the following:

Appropriate or May be Appropriate	Rarely Appropriate
97%	3%

In addition, we strive to correlate our findings through non-invasive testing with gold standard data obtained through cardiac catheterization. Positive Predictive Value reflects the percentage of patients who have had an abnormal MPI study, undergone cardiac catheterization and are found to have blockages in their coronary arteries that match the perfusion defect identified by the study. This data correlates well with national benchmarks.

Positive Predictive Value	82%
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Jeffrey S. Luy, MD, FACC



## HEART FAILURE INITIATIVES

### Heart Failure

Virginia Heart is a recognized leader in the care of congestive heart failure (CHF). For more than a decade, the centerpiece of this effort has been our CHF Clinic. The clinic provides rapid access and protocol-driven, evidence-based care. It is supervised by our physicians and staffed by a talented pool of nurse practitioners and physician assistants. In recent years, we have engaged in pioneering efforts to improve the care of patients hospitalized with CHF and to reduce readmissions. These efforts have centered on employing checklists to drive guideline-directed care in hospitals, as well as targeted efforts to ensure expedited, post-discharge follow-up in the CHF Clinic, recognizing the intensive nature of the condition and the propensity for recurrent flares. Through such measures, Virginia Heart CHF patients have consistently charted lower rates of re-hospitalization, significantly below national benchmarks.

Based on this success, Virginia Heart physicians were recently asked to lead a system-wide Inova CHF Sprint, which aimed to mirror these efforts across all admitted patients to improve CHF care for the entire Northern Virginia community. Going forward, Virginia Heart continues to monitor CHF outcomes and looks for opportunities to improve care, targeting continuing education on novel therapies, quality initiatives aimed at maximizing utilization of outcome-improving medications, and bringing on board an advanced heart failure specialist. With each step, we aim to improve the care and the quality of life of our CHF population.



Joseph M. Kiernan, MD, FACC, FSCAI

### Inova Heart Failure Sprint

Virginia Heart is an active participant in Inova's efforts to provide optimal care for patients with heart failure across North Virginia. Our physicians and clinicians led in the design and implementation of an ongoing multidisciplinary effort to ensure best practices are employed for patients with heart failure from the moment they arrive at the emergency room, throughout their hospitalization and continuing after their discharge. Nurses, pharmacists, dietitians, social workers, exercise physiologists, and physicians work as a team to create a holistic plan ensuring patients receive state-of-the-art medical care and are empowered with the education and information needed to remain healthy through diet, exercise, and access to resources and physicians in their communities.

### Heart Failure Remote Monitoring Program

In addition to our Outpatient Heart Failure Clinic offered within our offices, we also

monitor heart failure patients in our Remote Heart Failure Clinic. Currently, this remote program monitors heart failure patients' thoracic impedance (Medtronic Optivol device), weight and blood pressure (Boston Scientific Latitude device), and pulmonary artery pressures (Abbott Cardiomems device). With remote monitoring we are able to more closely track our heart failure patients in order to assess signs of volume overload or change in their medical condition. This allows our providers to intervene sooner when patients develop acute heart failure symptoms providing more prompt relief of those symptoms, reducing the need for hospitalization, and improving patients' overall quality of life. Our heart failure patients receive regular follow-up phone calls by our heart failure nurses in the comfort of their home. In addition to monitoring for recurrent symptoms, our heart failure nurses provide ongoing education to our patients and their families.



Amit V. Patel, MD, FCCP, ABIM Sleep

Obstructive sleep apnea and other complex sleep-related breathing patterns are amongst the many conditions that can contribute to cardiovascular decline. Identification and treatment of these have been shown to have cardio-protective effects. Additionally, treatment of sleep disorders of all types improved overall health and quality of life measures.

Virginia Heart offers a comprehensive sleep medicine program staffed by Sleep Medicine Board certified providers with expertise in treating sleep disorders of all types, ranging from sleep disordered breathing to insomnia and narcolepsy. Our program includes two AASM accredited sleep labs. We offer detailed clinical evaluation, diagnostic evaluation through in-lab or home sleep testing, treatment initiation, and medical follow-up. Through

our durable medical equipment (DME) department we can ensure effective treatment of sleep disordered breathing processes with industry leading support and compliance outcomes.

Amit V. Patel, MD, FCCP, ABIM Sleep, is a sleep medicine, pulmonary and critical care boarded physician who joined Virginia Heart in 2018 and serves as Medical Director of the Virginia Heart Sleep Medicine program. Dr. Patel has a special interest in the physiology and practice of sleep medicine and has published research studies evaluating the efficacy of sleep apnea technologies. Additionally, he treats sleep disorders of all types ranging from sleep apnea and complex sleep patterns to insomnia and narcolepsy.

### **Thanks to an emergency angioplasty performed by Dr. Nicholas Cossa,**

Christopher E. Robin, 53, survived a “widow maker” heart attack. He was also diagnosed with sleep apnea through Virginia Heart’s Sleep Disorder Clinic. Now armed with two new stents in his coronary arteries and a CPAP machine, Christopher says he feels better than he has in years.

*“Everyone at Virginia Heart has been terrific,” he says.*

*“They constantly remind me that you can always turn things around.”*



Alexander G. Truesdell, MD, FACC, FSCAI, FSVM

## Complex Coronary Interventions

Virginia Heart offers highly advanced treatments for patients with complex coronary artery disease. Chronic Total Occlusion (CTO) Percutaneous Coronary Intervention (PCI) is a minimally invasive technique for patients with chronically fully blocked coronary arteries who may experience chest pain or shortness of breath and reduced quality of life and functional status. Historically, open-heart surgery has been the only treatment option available. However, new technology now offers minimally invasive alternatives, which are currently performed by only a small number of cardiologists in the United States.

## Ventricular Assist Devices

Severely ill patients often cannot tolerate needed invasive cardiac procedures or open-heart surgery. New miniaturized, temporary heart pumps, also known as ventricular assist or mechanical circulatory support devices, such as the Impella, support the heart during invasive interventions and permit physicians to perform procedures that would not otherwise be possible. Virginia Heart physicians currently have the most experience in the region with these procedures.

## Cardiogenic Shock

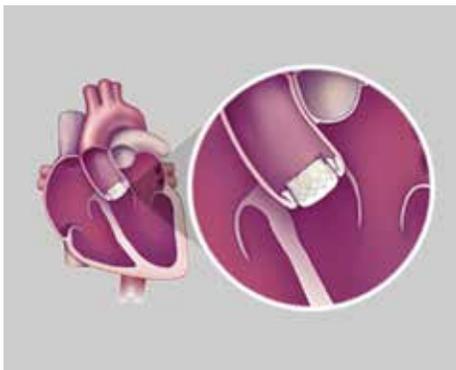
Cardiogenic Shock, or the complete collapse of the cardiovascular system due to myocardial infarction or heart failure, is a dangerous condition with a 50% survival rate nationwide. Virginia Heart physicians in partnership with the Inova Heart and Vascular Institute have developed innovative care pathways and multi-disciplinary cardiology, cardiac surgery, critical care, and heart failure teams to improve survival rates locally to 75%. The Inova Shock Program that is co-directed by Dr. Truesdell has recently gained international attention due to the outstanding results they have achieved in reducing in-hospital mortality among patients admitted in shock.



# STRUCTURAL HEART DISEASE

Structural Heart Disease (SHD) is a relatively new discipline that uses cutting-edge technology to perform catheter-based procedures previously requiring open-heart surgery, including Transcatheter Aortic Valve Replacement (TAVR), as well as Mitral Valve Replacement and repair. Other structural heart procedures include valvuloplasty and closure of cardiac defects such as a Patent Foramen Ovale (PFO) or Atrial Septal Defect. SHD is a rapidly evolving and dynamic field. With continued research, it is likely a significant majority of heart valve disease will be treated with a minimally invasive, catheter-based approach. This will allow for shorter hospital stays and rapid recovery. There are a multitude of new valves and devices under development, which could not only add years to patients' lives, but enhance the quality of those years.

Virginia Heart has been at the forefront in offering structural heart evaluations and therapies to our patients as an integral part of the Heart Valve Clinic at IHVI. Our expanding structural heart program consists of a structural heart physician, a program coordinator, and heart imaging specialists. Our structural heart physician,



TAVR Valve Device



Nadim A. Geloo, MD, FACC, FSCAI

Dr. Nadim Geloo is fellowship-trained in SHD and has 17 years of experience as an interventional cardiologist. In 2018, physicians at the Inova Valve Clinic performed 314 TAVR procedures — placing its volume in the upper 10 percent of all hospitals in the United States — with an extremely high success rate and low rate of complications. Dr. Nadim Geloo of Virginia Heart had the highest volume of valve procedures at Inova Heart and Vascular Institute.

Our integrated team working with Inova Heart & Vascular Valve Clinic guides patients through the complex process, which begins with diagnosis and culminates in a successful procedure and rapid recovery. We take pride in our personalized approach, providing individualized care and performing detailed and thorough evaluations to ensure all variables are carefully studied as each case presents its own set of unique challenges.



Watchman: Left Atrial Appendage Closure Device



The MitraClip device is a small clip that is attached to your mitral valve. It treats mitral regurgitation by allowing your mitral valve to close more completely, helping to restore normal blood flow through your heart.

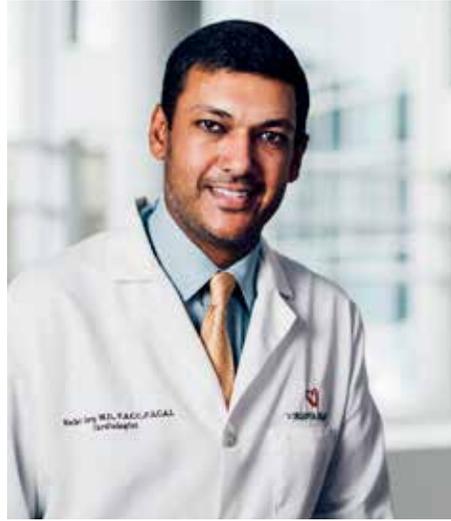


## Advanced Practice Providers

As part of our Cardiac Care Team at Virginia Heart we are fortunate to have a group of highly qualified Advanced Practice Providers (APP), including our team of Nurse Practitioners (NP) and Physician Assistants (PA). APPs are licensed healthcare providers with master's or doctorate degrees in the health sciences. Our NPs and PAs practice under the direct supervision of a cardiologist and provide high quality medical care for our patients both during hospitalizations and in our offices. At Virginia Heart we believe this team approach allows us to provide comprehensive medical care, offer extensive patient education for patients and their families, and an integration of other qualified providers between visits with the cardiologist. In addition to providing general cardiology care, our APPs practice in our office-based Heart Failure Clinics providing close medical follow-up and patient education for those with heart failure, as well as participating in our Risk Factor Modification Program, which assists patients in modifying lifestyle choices that affect cardiac risk factors.

## Congenital Heart

Each year, the population of adults born with a structural heart abnormality grows as 90% of children born with significant heart defects now live to adulthood. Many of these individuals have undergone complex surgeries in infancy and childhood. Some symptoms reappear, often dramatically, after a temporary absence from the ongoing care they received as children from a



Rajat Garg, MD, FACC, FSCAI

pediatric team. Others have had no knowledge of their congenital defect until symptoms present themselves in adulthood. At Virginia Heart, we are committed to serving this unique group of patients within our community. Drs. Mark Tanenbaum and Pradeep Nayak were founding members of the Adult Congenital Heart Program at Inova Fairfax Hospital in 1994, and have collaborated with other local specialists through the years to provide outstanding care. We have created an environment for optimal outcomes as this challenging field has developed into a mainstream cardiology subspecialty.

Collaboration with local radiologists, cardiac surgeons, and pediatric cardiologists is critical in the delivery of optimal adult congenital care. We continue to work with specialists outside our group to create an ideal environment for these adult patients to thrive.

## Vascular Disease

Peripheral Arterial Disease (PAD) is common among our patient population and carries with it a substantial burden of disability and increased mortality. Our vascular-trained cardiologists provide comprehensive management and consultation for PAD with a strong emphasis on preventive care and risk factor management. Our full-service, imaging suite operates from multiple locations and provides high quality, non-invasive studies including arterial and venous Doppler studies. Our expanding interventional program provides care for lower extremity issues ranging from claudication to critical limb ischemia at several of our office locations, including Arlington, Fairfax and Loudoun. Our emphasis is on minimally invasive/ endovascular therapies, which can substantially reduce the need for surgery.



Edward W. Howard, MD FACC, RPVI



Anne M. Safko, MD, FACC

### Weight Management – Ideal Protein

Obesity remains a major risk factor for cardiovascular disease. Weight management continues to be a severe challenge for many of our patients, as well as society as a whole. To combat this epidemic, Virginia Heart is pleased to offer the Ideal Protein Weight Loss Program, a low-fat, low-calorie, adequate protein meal replacement plan that offers a personalized approach to weight loss. The program is medically supervised and provides patients weekly coaching sessions with our Wellness Coaches. Our mission is to assist patients in not only reaching their weight loss goals, but to develop a plan for maintaining that weight loss and living a healthier lifestyle. Since we began our program in November 2013, 1,700 dieters have enrolled with a total weight loss of 41,000 pounds. With Ideal Protein, the average weight loss for participants has been 35 pounds, and 75% of patients have maintained at least 50% of their weight loss one year after completing the program, with 57% percent maintaining 75% of their weight loss.

### Women’s Heart Health

Women can frequently present with signs and symptoms of disease that are quite different than those found among men. Recognizing these differences and identifying disease indicators early is critical in providing the best possible care to women with heart disease. Virginia Heart is committed to the care and education of women in our communities. Drs. Rachel Berger, Paula Pinell-Salles, and Jennifer Shea have spearheaded our efforts to be proactive in this important area of women’s health and all three lecture to other provider and the community groups on this topic. They have actively worked to develop a Women’s Heart Health program and a unique cardio-oncology program to better serve our female patients.



Paula Pinell-Salles, MD, FACC

### After a sudden heart attack at a Redskins game, Mark knew he needed to change his lifestyle.

*“For me the importance of the Ideal Protein program was more than just losing weight, but about learning how to eat healthier and avoid a future heart attack.”* Mark followed the guidance of his Virginia Heart Ideal Protein coach and was able to meet his goal weight and improve his quality of life. *“Because I didn’t focus or care about the numbers before, I came very close to dying of a heart attack at 50. Now that I know how my diet caused my clogged arteries, I can be proactive and do something about it.”*

Virginia Heart’s Research program is nationally recognized as a leader in cardiovascular research and is among the top enrollers in the U.S. in countless practice-changing cardiology trials over the past decade. Our national reputation for high quality clinical research allows our patients the ability to participate in cutting-edge research and obtain therapies not otherwise available to them.

These cutting-edge therapies provided at the clinical trial stage are usually only tested at a limited number of high quality research programs in the country. Our reputation in the research community has allowed our involvement in these highly selective clinical trials to give our patients unique opportunities and access to new medications, devices, and therapies that are not available within other cardiology practices.

Principal Investigator (PI) oversight is a crucial predictor of research success. Dr. Tariq Haddad leads Virginia Heart’s Research division and has created strategies that expedite start-up and improve enrollment among our 40-plus physicians.

Virginia Heart has long participated in innovative clinical trials and currently has seven in active-enrollment stage and ten in the follow-up, monitoring phase. Among these therapies are PCSK9 lipid inhibitor trials, anti-platelet trials for coronary artery disease, and novel coronary disease trials. Through our close collaboration with the research team at Inova Heart and Vascular Institute, we jointly offer a number of other inpatient heart failure, lipid, electrophysiology, and device trials to qualifying patients.



Tariq M. Haddad, MD, FACC

**Current Studies Include:**

- Chronic Heart Failure – GALACTIC-HF
- Acute Myocardial Infarction (Post-AMI) – PARADISE-MI
- Atrial Fibrillation, Not Caused by a Heart Valve Problem – APIXABAN
- High Cardiovascular Risk or Hypercholesterolemia – ORION 4 and ORION 10 (PCSK9 inhibitor)
- Chronic Heart Failure with Preserved Ejection Fraction – DELIVER (Dapagliflozin)
- Chronic Heart Failure with Reduced Ejection Fraction – CardioMems device
- Artesia – Afib Eliquis in device detected AF

**Future Research Initiatives/Studies Under Consideration:**

- Lipid trials (trials to assess Lipoprotein(a), to lower LDL, lower triglycerides in diabetic patients and a trial assessing cognitive effects of marked LDL lowering)
- Antiplatelet trials and CAD and PAD
- Obesity trials
- Anticoagulation/EP trials
- Registries
- Sleep Disorder studies



# PATIENT SATISFACTION SURVEY RESULTS

A patient's experience is a reflection of the care they receive from the moment they schedule an appointment to the ongoing care provided by their team of medical professionals. Virginia Heart desires every encounter be a positive one.

Our 2018 patient satisfaction results are derived from patient surveys and include every Virginia Heart physician and Advanced Practice Provider. When compared with a national database of more than 12,000 physicians, Virginia Heart patients score the care and attention they receive in the top 20% of all other practices. The data for their scores on a scale of 1-5 (5 being the highest score reflecting the most satisfaction) for physician-centric questions is contained in the chart.

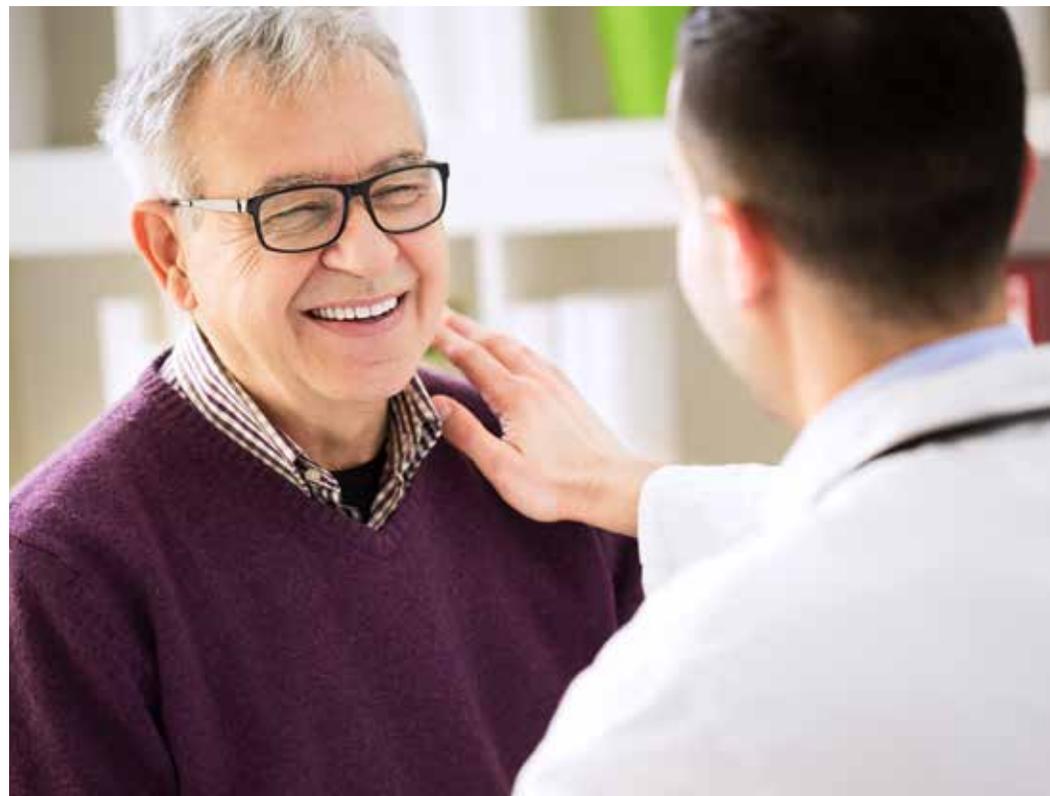
2018 Patient Satisfaction Survey		
	Virginia Heart Score (Ranked 1-5)	National Database Score (Average)
<b>Our Practice Overall</b>	4.73	4.55
<b>The quality of your medical care</b>	4.77	4.59
<b>Provider includes you in decision-making about your treatment plan</b>	4.72	4.53
<b>Overall rating of care from your provider or nurse</b>	4.78	4.63
<b>Would you recommend the provider to others?</b>	4.85	4.76
<b>Provider's willingness to listen carefully to you</b>	4.80	4.58
<b>Provider takes time to answer your questions</b>	4.80	4.60
<b>Amount of time provider spends with you</b>	4.70	4.48

\*Survey Conducted by Sullivan Luallin



## Cleveland Clinic H.E.A.R.T. Program

At Virginia Heart, we are not satisfied with merely exceeding expectations, we work aggressively to improve the overall patient experience. We recently embarked on an ambitious effort to implement Cleveland Clinic's H.E.A.R.T. program across our practice. This program empowers our employees to provide an exceptional patient experience at every point of interaction. Its foundation is compassionate communication with patients and caregivers. The ultimate goal is to improve the patient experience at every step and every level, giving ease of access through the care continuum.

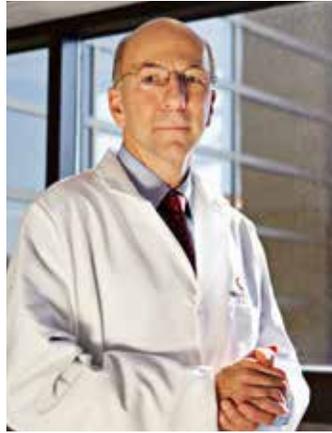




## TEACHING AND LEADERSHIP POSITIONS

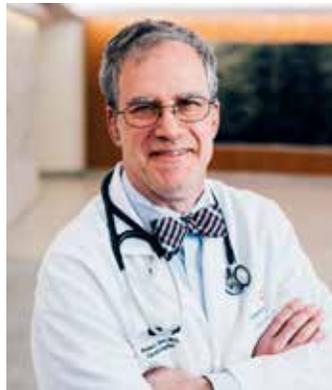
Virginia Heart physicians are not only premier providers of cardiovascular care within our communities, but also hold numerous leadership positions at many of our hospitals, as well as serving on important committees. Additionally, we have been active in several regional and national organizations.

Many of these positions are in the Quality Assurance and Improvement (QA) arena and include local hospital QA committees; VHAC (Virginia Heart Attack Coalition), a statewide STEMI network; VCSQI (Virginia Cardiac Services Quality Initiative), which tracks quality and cost across a wide spectrum of cardiovascular diseases; MedAxiom; The American College of Cardiology; and NCQA (National Committee on Quality Assurance).



Warren S. Levy, MD, FACC

**Warren S. Levy, MD, FACC** has been the lead physician at MedAxiom for a number of years and has led sessions on practice improvements, among other areas of practice-related efforts. MedAxiom is a prominent national organization of cardiologists created to improve care delivery. In 2019, it became part of the American College of Cardiology. Dr. Levy has also helped to formulate portions of the yearly cardiology quality metrics for Inova. He created a Leadership Academy at Inova in an effort to develop the next generation of physician leaders. This highly acclaimed program is already bearing fruit as participants are implementing these new skills in their fields.



Robert A. Shor, MD, FACC

**Robert A. Shor, MD, FACC** has participated in various NCQA committees, representing the ACC. NCQA is an organization dedicated to improving health care delivery and sets many of the standards of quality for health care systems. He is also vice chair of VCSQI, a unique statewide organization combining surgical and cardiology data to reduce the variability of care delivery, improve quality, and reduce costs. He is past president of the VCACC (Virginia Chapter of the American College of Cardiology), serving when the VHAC project was supported by the Chapter and launched by members of VCACC.

**Alexander G. Truesdell, MD, FACC, FSCAI, FSVM** has developed a prestigious reputation nationally and is a member of the ACC Interventional Council, a national group of interventional cardiology thought leaders. He is a leader in the Inova Shock Team, helping create a much-needed service for our most critically ill patients.

**Stuart E. Sheifer, MD, FACC** and **Jeffrey Jackman, MD, FACC** have been strong leaders in heart failure transitions of care to improve quality and decrease hospital readmissions. Their programs have been immensely successful. These are but a few of our local, regional and national efforts to improve patient care. Our physicians are highly acclaimed, nationally recognized and are often invited by prestigious organizations, such as American College of Cardiology, Heart Rhythm Society, CRT and SCAI, to attend and deliver presentations during national conferences. Our providers publish in peer reviewed journals, give educational grand rounds and frequently are interviewed as experts in their fields by local and national media.



## TEACHING POSITIONS/FACULTY APPOINTMENTS HELD

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### **Tariq A. Aziz, MD, FACC**

- Faculty appointment as Instructor, Georgetown University Dept. of Medicine (GTU)

### **Casey R. Benton, MD, FACC**

- Assistant Professor of Medicine, Virginia Commonwealth University

### **Nicholas Cossa, MD, FACC**

- Assistant Professor, Virginia Commonwealth University

### **Tariq M. Haddad, MD, FACC**

- Assistant Professor, Virginia Commonwealth University

### **Edward W. Howard, MD, FACC, RPVI**

- Clinical Instructor, Georgetown University

### **Joseph M. Kiernan, MD, FACC, FSCAI**

- Assistant Clinical Professor of Medicine and Faculty Advisor, Virginia Commonwealth University-School of Medicine

### **Warren S. Levy, MD, FACC**

- Clinical Associate Professor of Medicine and Cardiology, Virginia Commonwealth University
- Member, PAR4 Taskforce, American College of Cardiology
- Member, Medical Directors Institute

### **Michael P. Notarianni, MD, FACC**

- Assistant Clinical Professor of Medicine, Georgetown University

### **Antonio R. Parente, MD, FACC**

- Clinical Assistant Professor of Medicine, Georgetown University

### **Gautam Ramakrishna, MD, FACC**

- Assistant Professor of Medicine, Virginia Commonwealth University

### **Mark P. Tanenbaum, MD, FACC**

- Clinical Assistant Professor of Medicine and Cardiology, Georgetown University Hospital

### **Alexander G. Truesdell, MD, FACC, FSCAI**

- Assistant Professor of Medicine, George Washington University School of Medicine
- Assistant Professor of Medicine, Virginia Commonwealth University School of Medicine

### **Alireza Maghsoudi, MD, FACC**

- Assistant Clinical Professor, Virginia Commonwealth University
- Faculty Member, Cardiology Fellowship Program, Virginia Commonwealth University



## LEADERSHIP POSITIONS

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### **Regional and National Positions**

#### **Warren S. Levy, MD, FACC**

- Member, Advisory Counsel, MedAxiom
- Director, Physician Programs, MedAxiom
- Member, ProAssurance Regional Advisory Board
- Director, Inova Physician Leadership Development Program
- Board Member, Signature Partners ACO

#### **Pradeep R. Nayak, MD, FACC, FASE**

- Member, ProAssurance Regional Advisory Board

#### **Alexander G. Truesdell, MD, FACC, FSCAI, FSVM**

- Member, ACC Interventional Section Leadership Council
- Member, Cardiac Safety Research Consortium Cardiogenic Shock Working Group

#### **Robert A. Shor, MD, FACC**

- Former President of the Virginia Chapter of the ACC
- Past Chair of the Board of Governors of the ACC
- Former Secretary of the ACC
- Former Board of Trustees of the ACC
- Former Chair, Membership Committee of the ACC
- Member, Board of Directors and Vice Chair Virginia Cardiac Services Quality Initiative (VCSQI)
- Member, ACC Population Health Management Task Force
- Member, ACC Health Affairs Committee
- Member, ACC Diversity and Inclusion Task Force
- National Committee Quality Assurance (NCQA) - former Medical Advisory

### **Virginia Heart Positions**

#### **Tariq A. Aziz, MD, FACC**

- Medical Director, Virginia Heart Echocardiography

#### **Tariq M. Haddad, MD, FACC**

- Director of Research
- Core Faculty, Inova Cardiology Fellowship Program

#### **Edward W. Howard, MD, FACC, RPVI**

- Chairman, Interventional Committee

#### **Warren S. Levy, MD, FACC**

- President & Chief Medical Officer, Virginia Heart

#### **Jeffrey S. Luy, MD, FACC**

- Medical Director, Virginia Heart Nuclear Studies

#### **Amit V. Patel, MD, FCCP, ABIM Sleep Medicine**

- Medical Director, Virginia Heart Sleep Medicine

#### **Gautam Ramakrishna, MD, FACC**

- Chairman, Virginia Heart Scheduling Committee

#### **Ketan K. Trivedi, MD, FACC**

- Chairman, Virginia Heart Finance Committee

#### **Robert A. Shor, MD, FACC**

- Chairman, Virginia Heart Quality Committee



### Inova Loudoun Hospital Positions

#### Tariq A. Aziz, MD, FACC

- Member, CME/Library Committee
- Chief, Division of Cardiology
- Medical Director, Cardiac Rehab

#### Subash B. Bazaz, MD, FACC

- Medical Director, Non-Invasive Studies
- Member, Credentialing Committee
- Member, Quality Committee

#### Rajat Garg, MD, FACC, FSCAI

- Member, Critical Care Advisory
- Member, Cardiovascular Operations Committee
- Member, PCI Oversight Committee

#### Jeffrey S. Luy, MD, FACC

- Member, Inova Cardiology Pharmaceutical and Therapeutics Sub-Committee
- Member, Pharmaceutical and Therapeutics Committee

#### Dean M. Pollock, MD, FACC

- Medical Director, Cardiac Catheterization Lab

### Inova Fair Oaks Hospital Positions

#### Casey R. Benton, MD, FACC

- Section Chief, Cardiology

#### Carey M. Marder, MD, FACC

- Officer, Acute Care Safety
- Member, Bylaws Committee
- Member, Medical Executive Committee

#### Pradeep R. Nayak, MD, FACC, FASE

- Immediate Past President, Medical Staff
- Member, Medical Executive Committee

#### Gautam Ramakrishna, MD, FACC

- Chair, Patient and Safety Reliability Committee
- Member-at-Large, Medical Executive Committee
- Chair, MSET Committee
- Member, Quality Management Committee
- Member, Special Care Committee
- Member, Inova Pharmaceutical and Therapeutics Cardiology subcommittee
- Member, Inova Physician Resilience Committee

#### Stuart E. Sheifer, MD, FACC

- Vice President, Medical Staff
- Physician Champion, Patient Experience Initiative
- Physician Lead, Joint Inova-Virginia Heart CHF and MI Rehospitalization Reduction Initiative

### Inova Fairfax/IHVI Positions

#### Nicholas Cossa, MD, FACC

- Member, Invasive Quality Committee
- Medical Director, Cardiology Level 1 Program IHVI
- Member, Cardiology Operations Council

#### Joseph M. Kiernan, MD, FACC, FSCAI

- Member-at-large, Medical Executive Committee
- Medical Director, PCCU
- Co-Chair, Green and Red Team
- Member, Cardiovascular Operations Council

#### Alireza Maghsoudi, MD, FACC

- Co-Medical Director, Cardiac CT

#### Paula Pinell-Salles, MD, FACC

- Member, Strategic Planning Committee for Women and Heart Disease

#### Haroon Rashid, MD, FACC

- Medical Director, Atrial Fibrillation Ablation and Research at IHVI

#### Alexander G. Truesdell, MD, FACC, FSCAI, FSVM

- Member, Inova Vascular Operations Committee
- Co-Director, Inova Cardiogenic Shock Committee

#### Robert A. Shor, MD, FACC

- Co-Chair, Population Health – IHVI
- Medical Director of Cardiac Rehab

### Inova Alexandria Hospital Positions

#### Stephen M. Day, MD, FACC

- Medical Director, Cardiac Cath Lab
- Member, AMI Collaborative Committee
- Member AMI Medical and Mortality Committee
- Member, AMI/CHF Readmission Committee
- Member, Cath/EP Value Committee
- Director of Cardiac Rehab (Former)

#### James Duc, MD, FACC

- Medical Director, Electrophysiology Lab

#### Jeffrey Jackman, MD, FACC

- Chair, Pharmacy and Therapeutics Committee Inova Alexandria Hospital
- Member, Inova System Pharmacy and Therapeutics Committee
- Chair, Physician Advisory Council, Inova Alexandria Hospital
- Member, Peer Review Committee Inova Alexandria Hospital
- Member, Cardiac Readmission Prevention Committee

### Reston Hospital Center Positions

#### Jeffrey S. Luy, MD, FACC

- Member, Cardiovascular Service Line
- Member, Critical Care Committee

#### Dhaval R. Patel, MD, MPH, FACC

- Member, Physician Advisory Group
- Member, Cardiovascular Service Line

#### Robert A. Shor, MD, FACC

- Member, Cardiovascular Service Line

### Virginia Hospital Center Positions

#### Michael P. Notarianni, MD, FACC

- Chair, Cardiac Collaborative Quality Committee





# VIRGINIA HEART

Excellence in Cardiovascular Care

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