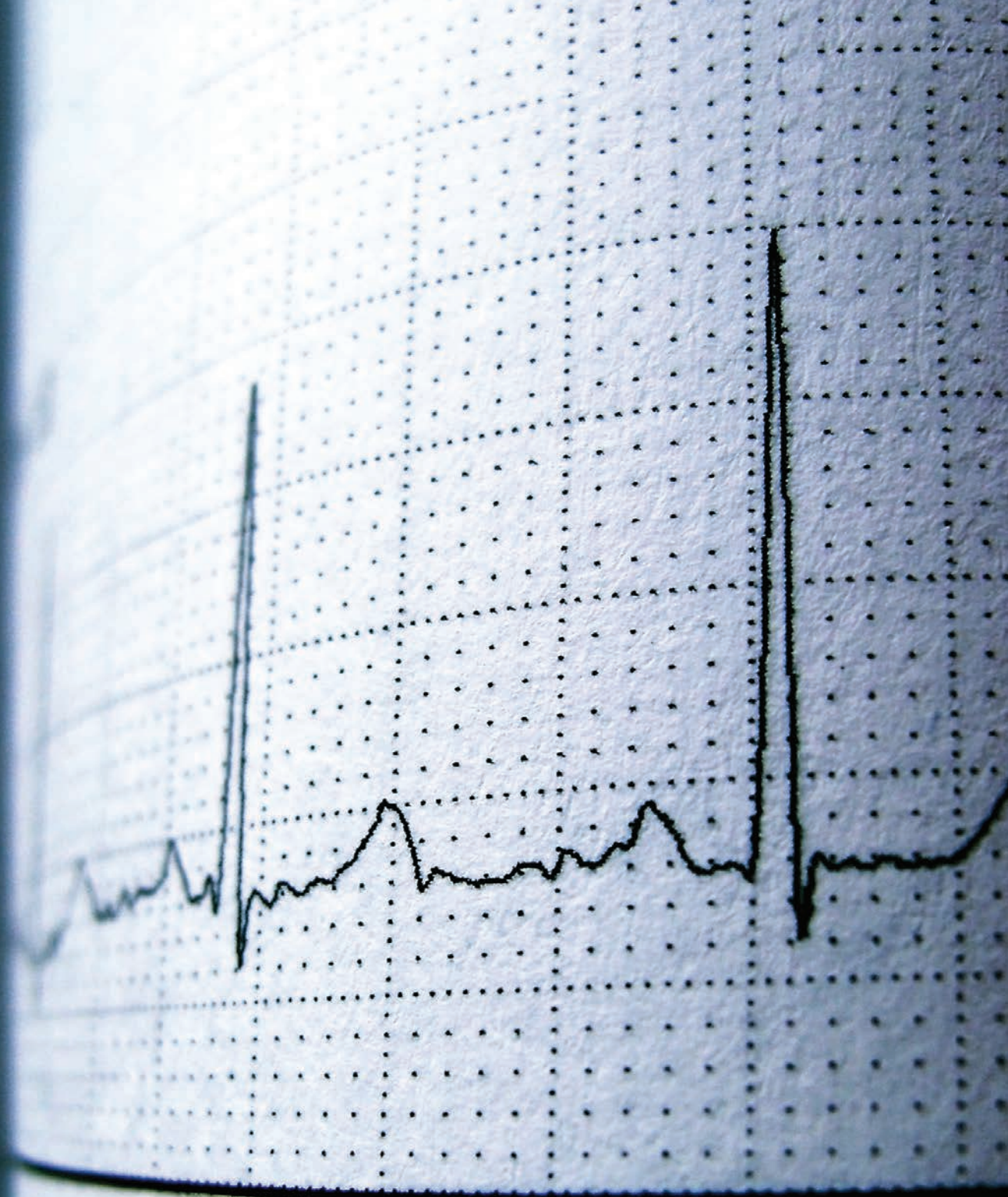


# Outcomes 2018

Inova Heart and Vascular Institute



# Outcomes 2018



*J. Stephen Jones, MD, FACS*

*“Every year, thousands of patients with complex heart, vascular and pulmonary disease are living longer, healthier lives thanks to the compassion, dedication and expertise of the physicians and staff here at Inova Heart and Vascular Institute. As a surgeon, I know that our team’s focus on safety, quality and high reliability means better outcomes for our patients and is the reason that IHVI has been established as a destination service.”*

**J. Stephen Jones, MD, FACS**  
*President and CEO, Inova Health System*



*Heather Russell*

*“Exceptional patient care comes from many different components working well together – an expectation of clinical excellence, highly skilled physicians and staff, effective communication and a passion for providing an exceptional patient experience in every way possible. At IHVI, we have all those elements solidly in place and continue to find ways to improve upon our successes.”*

**Heather Russell, RN, MS, FABC**  
*Administrator, Inova Heart and Vascular Institute*  
*Vice President, Inova Fairfax Medical Campus*

# Inova Heart and Vascular Institute

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*Christopher O'Connor, MD*

We continue our journey to become a world class, internationally recognized heart and vascular institute dedicated to providing the very best patient care supported by research and a strong commitment to lifelong learning.

Over the past year, we have seen significant improvement in outcomes for the patients we serve through our dedication to personalized care. We aspire to promote the very best work culture and provide the highest quality state-of-the-art treatment to everyone who touches the cardiovascular program, and to deliver this treatment in an environment that offers compassion, the highest value, the lowest harm and the greatest patient satisfaction.

We are committed to strengthening the standardized team-based approach to our care models and further implementing this approach throughout the care system. We initiated a multidisciplinary team approach to treat cardiogenic shock, a complex syndrome typically associated with high morbidity and mortality, and the substantial improvement in outcomes is a clear demonstration of the efficacy of this strategy. These outstanding results have been reported at national and international medical conferences and outlined in a recent article in the Journal of the American College of Cardiology, titled “Standardized Team Based Care for Cardiogenic Shock: The Inova Heart Experience.”

Our structural heart disease program has seen exciting growth. We performed over 300 Transcatheter Aortic Valve Replacements (TAVRs) in 2018 and we expect to perform the program’s 1,000<sup>th</sup> TAVR in 2019. We continue to have excellent outcomes in open-heart surgery, vascular and thoracic surgery, interventional cardiology and electrophysiology procedures.

We have seen important reductions in re-hospitalization and mortality across the domains of heart failure and myocardial infarction. In addition, we have had a 25% reduction in our aggregate harm scores and a broad-based improvement in our service line scores.

Inova Heart and Vascular Institute (IHVI) faculty members have been busy participating in innovative programs and clinical research. We have published more than 200 articles and conducted 10 educational programs in the past year. Our Cardiovascular Fellowship Training Program was accredited and initiated with great excitement, attracting more than 700 applicants.

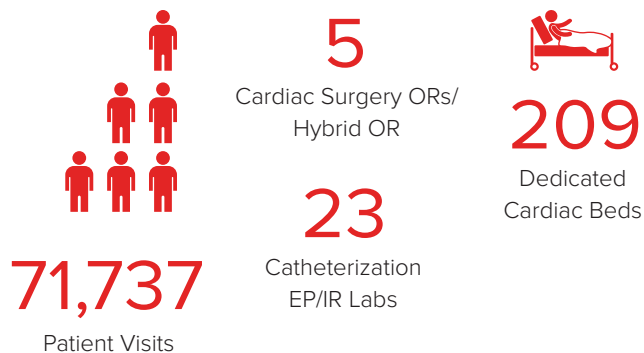
I want to personally thank all our patients and reaffirm our strong commitment to doing all we can to provide the highest quality care, best outcomes and the best value to all.

This has been an enormously successful year thanks to the outstanding efforts of our medical, nursing and professional staff. It is a privilege to lead Inova Heart and Vascular Institute and see such tremendous growth since I joined Inova four years ago. All of us look forward to even greater success for patients in 2019.

**Christopher O’Connor, MD, MACC, FESC, FHFSA**  
*President, Inova Heart and Vascular Institute*



## About IHVI - 2018



IHVI Sites of Service



25+

Inova Cardiology, Arrhythmia, Cardiac and Thoracic Surgery and Vascular practice locations in Northern Virginia and Maryland.

[inova.org/IMG](http://inova.org/IMG)



5

Hospitals



13

Noninvasive Cardiovascular Imaging and Diagnostic Service Locations



For a complete list of awards and recognition, visit [inova.org/awards](http://inova.org/awards)

## Inova Heart and Vascular Institute Hospital Service Sites

Inova Heart and Vascular Institute's clinical capabilities cover the full spectrum of complex cardiovascular and pulmonary care from medical evaluation and diagnostic testing through the most innovative minimally invasive surgical techniques and complex open surgeries, including heart and lung transplantation. A services grid on pages 12-13 highlights specific services available at each of our hospitals.

Inova Fairfax Medical Campus (IFMC), located just outside of Washington, DC, in Falls Church, VA, is home to IHVI's dedicated heart hospital which serves as the hub of the system's cardiac, vascular and pulmonary services. A range of IHVI services are available onsite at all Inova hospitals as well as through a network of 25+ outpatient physician practice sites staffed by Inova cardiologists, electrophysiologists, pulmonologists, subspecialized surgeons and 13 noninvasive vascular and cardiac diagnostic imaging service locations.



**Inova Heart and Vascular Institute  
Inova Fairfax Medical Campus**  
3300 Gallows Road  
Falls Church, VA 22042

### Centers for Medicare and Medicaid Services – 2018

"5-star" Rated Hospital (Highest Level of Performance)

### US News and World Report Rankings – 2018-19

Best Regional Hospital

#2 in DC Metro Area

#5 in Virginia

High Performing for Aortic Valve Surgery

High Performing for Heart Bypass Surgery

High Performing in Heart Failure

High Performing in Abdominal Aortic Repair

### Healthgrades – 2018

Distinguished Hospital Award for Clinical Excellence™

America's 50 Best Hospitals for Cardiac Surgery Award™

America's 100 Best Hospitals for Cardiac Care Award™

### The Leapfrog Group – 2018

"Top Large Teaching Hospital"

"A" Hospital Safety Grade – Fall 2018



### **Inova Alexandria Hospital**

4320 Seminary Road  
Alexandria, VA 22304

#### **Centers for Medicare and Medicaid Services – 2018**

“4-star” Rated Hospital

#### **Healthgrades – 2018**

Distinguished Hospital Award for Clinical Excellence™

#### **The Leapfrog Group – 2018**

“A” Hospital Safety Grade – Fall 2018



### **Inova Fair Oaks Hospital**

3600 Joseph Siewick Drive  
Fairfax, VA 22033

#### **Centers for Medicare and Medicaid Services – 2018**

“5-star” Rated Hospital (Highest Level of Performance)

#### **US News and World Report Rankings – 2018-19**

Best Regional Hospital

#3 in DC Metro Area

#6 in Virginia

High Performing in Heart Failure

#### **Healthgrades – 2018**

Distinguished Hospital Award for Clinical Excellence™

Outstanding Patient Experience Award™

Patient Safety Excellence Award™

#### **The Leapfrog Group – 2018**

“A” Hospital Safety Grade – 13 consecutive reporting periods



### **Inova Loudoun Hospital Schaufeld Family Heart Center**

44045 Riverside Parkway  
Leesburg, VA 20176

#### **Centers for Medicare and Medicaid Services – 2018**

“5-star” Rated Hospital (Highest Level of Performance)

#### **US News and World Report Rankings – 2018-19**

Best Regional Hospital

#7 (tie) DC Metro Area

#14 in Virginia

High Performing for Heart Failure

#### **Healthgrades – 2018**

Distinguished Hospital Award for Clinical Excellence™

Patient Safety Excellence Award™

#### **The Leapfrog Group – 2018**

“A” Hospital Safety Grade – 14 consecutive reporting periods



### **Inova Mount Vernon Hospital**

2501 Parkers Lane  
Alexandria, VA 22306

#### **Centers for Medicare and Medicaid Services – 2018**

“5-star” Rated Hospital (Highest Level of Performance)

#### **US News and World Report Ranking – 2018-19**

Best Regional Hospital

#7 (tie) DC Metro Region

#12 (tie) Virginia

#### **The Leapfrog Group – 2018**

“A” Hospital Safety Grade – 9 consecutive reporting periods



#### **Contact Us | Refer a Patient:**

SNAPCare Scheduling  
877.634.6682

Cardiology consults • Diagnostic cardiology studies  
Vascular labs • Vascular consults

#### **Cardiac and Vascular Access**

One Call 24/7

Adult: 703.776.5905

Pediatric: 877.900.9543

Direct admission • Transfer • Specialized transport

## Patient Experience, Outcomes and Safety

An important component of being able to achieve these ratings is the input we receive from patients and family members. We make a conscious effort to integrate their perspective to ensure patient-centered care is delivered every time, every touch.

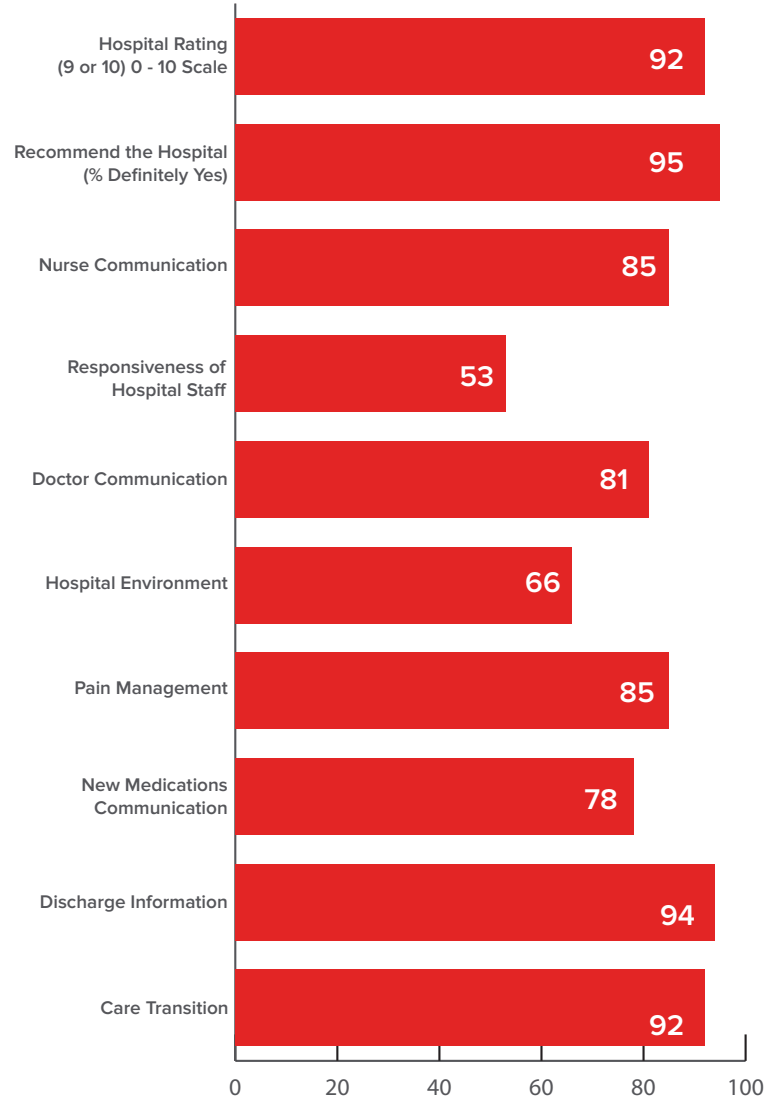
We host a monthly Patient and Family Advisory Council Meeting where a group of past patients and family members provide feedback to our administrative, nursing, patient safety and patient experience leadership.

There is also a data-driven continuous monitoring process for quality indicators and measures of patient safety. We examine both our internal data and use national registries to provide benchmark comparisons.

- Every patient care unit has specific performance metrics
- Progress and performance are displayed to keep staff focused on results
- Multi-specialty teams of nurses, physicians, IT specialists, finance and data analysts work to monitor performance and redesign processes to improve patient care

### HCAHPS

■ IHVI-IFMC National Percentile Rank



IHVI survey period showing 1/1/18 - 10/31/18

Benchmark period 4/1/17 - 6/30/18

HCAHPS – Hospital Consumer Assessment of Healthcare Providers and Systems is a nationwide patient satisfaction survey required of all hospitals that treat Medicare patients.

Percentile ranking is determined as compared against the Press Ganey database of 2,300 hospitals nationwide.

# Diagnostic Catheterization

## Diagnostic Cardiac Catheterization – 2018

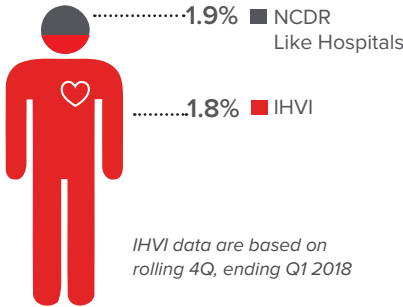
Facility	2018
IFMC	3,339
IAH	1,183
ILH	750
IHVI	5,272

2018 = rolling 4Q ending Q1

Legend:

IFMC - Inova Fairfax Medical Campus  
IAH - Inova Alexandria Hospital  
ILH - Inova Loudoun Hospital, Schauffeld Family Heart Center

## Diagnostic Cardiac Cath - Any Adverse Event



# Electrophysiology

## Ablation Volumes

	2018
Ablation Procedures (Total)	974
SVT Ablation	449
VT (Endocardial and Epicardial) Ablation	94
Afib (Paroxysmal, Persistent and Chronic)	370
Laser Lead Extractions	39

2018 annualized from YTD July data

## Device Implant Volumes

	2018
Pacemaker	710
ICDs	487
Biventricular	223
Dual and Single Chamber	264
Loop Recorder	406

2018 annualized from YTD July data

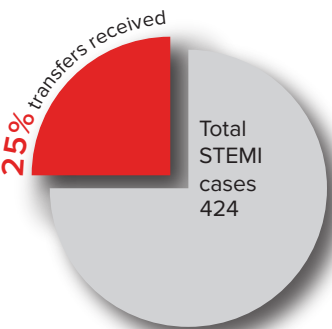


Accredited for

- Testing and Ablation
- Device Implantation
- Chronic Lead Extraction

# Interventional Cardiology

## STEMI Volume and Transfers Received



2018 = rolling 4Q ending Q1

## Door to Balloon Time (in minutes)



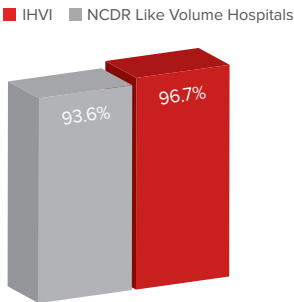
IHVI

NCDR Like Volume Hospitals

2018 = rolling 4Q ending Q1

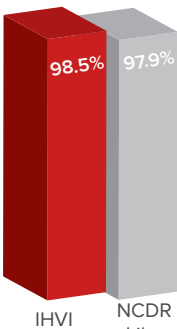
6

## Primary PCI Door to Balloon Within 90 Minutes



2018 = rolling 4Q ending Q1

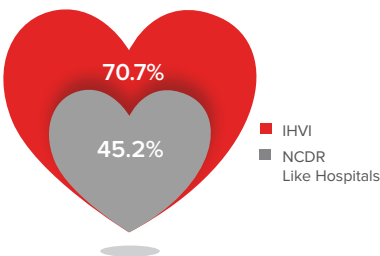
## PCI Success



IHVI  
NCDR Like  
Hospitals

2018 = rolling 4Q ending Q1

## Utilization of Radial Access for Catheterizations



2018 = rolling 4Q ending Q1

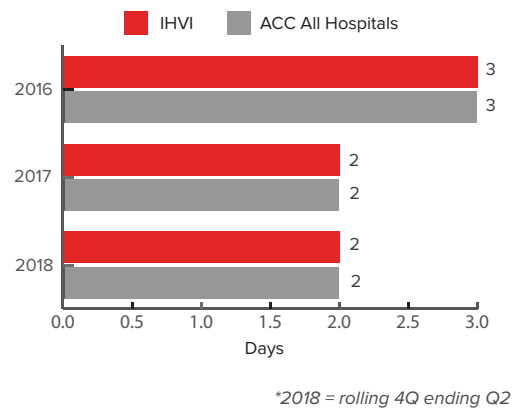
IHVI PCI Volume: 2,008



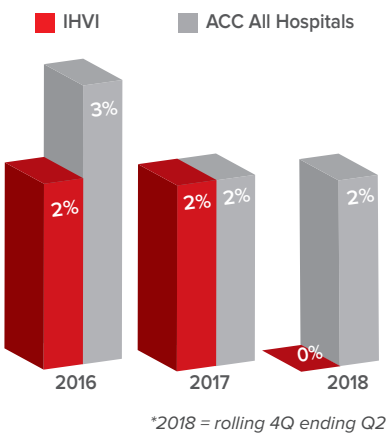


# Structural Heart

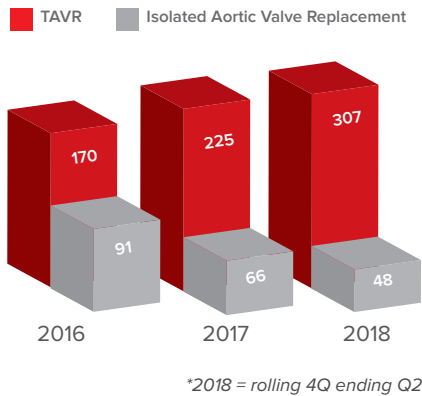
## TAVR Median Post Procedure Length of Stay



## TAVR 30-day Mortality



## TAVR vs Isolated AVR



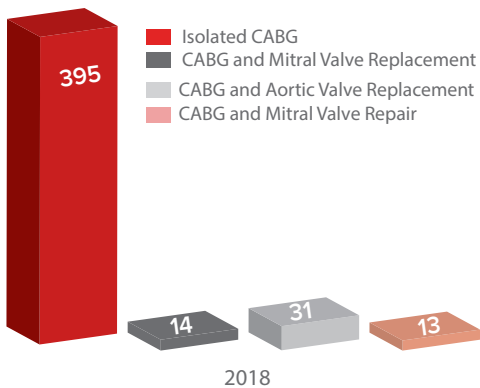
## WATCHMAN™ and MitraClip®

	2016	2017	2018
WATCHMAN™ Procedures	34	53	41
MitraClip® Procedures	6	12	18

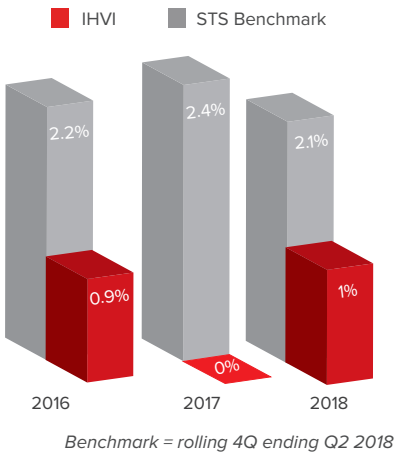


# Cardiothoracic Surgery

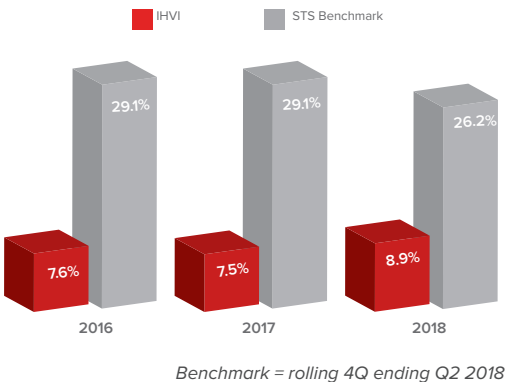
## CABG Combined Volume



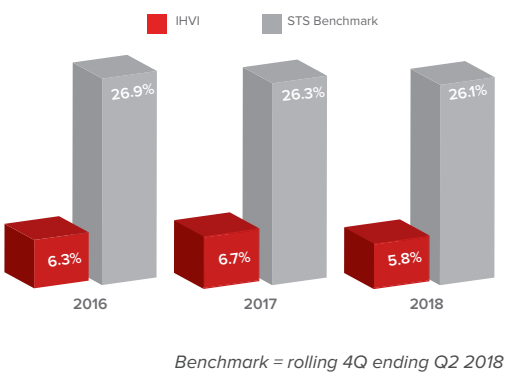
## Pure CABG Mortality



## Post-Op Blood Products Used



## Intra-Op Blood Products Used



## Valve Procedures

IHVI Valve Volume: 683

2018= rolling 4Q ending Q2

## Isolated Valve Procedures

	2018
Isolated Aortic Valve Replacement	52
Isolated Mitral Valve Replacement	37
Isolated Mitral Repair	37

2018= rolling 4Q ending Q2

# Thoracic and Interventional Pulmonology Services

## Interventional Pulmonology Volumes by Procedure

Selected Procedure Volumes	2018
Rigid Bronchoscopy	143
Endobronchial Ultrasound Bronchoscopy (EBUS)	399
Electromagnetic Navigation Bronchoscopy (EMN)	152
Airway Stent Placement	56
Flexible Bronchoscopy	372
<b>Total</b>	<b>1,122</b>

## Thoracic Surgery Procedures

Procedure Type	2018
Non-anatomic Resections	201
Lobectomy	124
Pneumonectomy	3
Chest Wall Resection	2
Esophagectomy	10
Benign Esophageal Procedures	91
Mediastinal Resections	25
Minor Procedures	68
<b>Total</b>	<b>524</b>

## Pulmonary

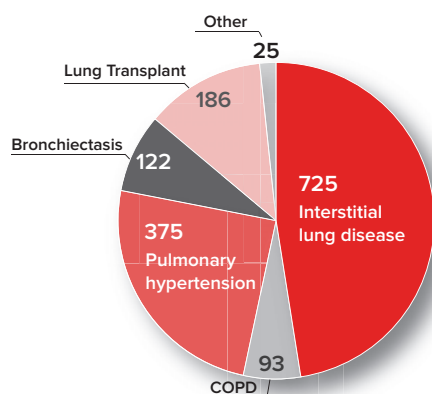
Lung Transplant Volume: 26

### Lung Transplant Survival

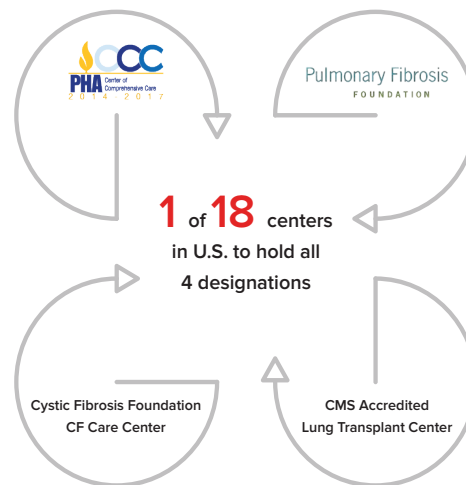
	Observed	US Average
Adult Patient Survival (1 month)	98.11%	97.15%
Adult Patient Survival (1 year)	87.91%	88.02%
Adult Patient Survival (3 year)	66.37%	69.77%

Source: SRTR data as of Jan 2018

### Patients Followed (n=1,526)



December 1, 2017 - November 30, 2018



Additional special designations:



Contact Us | Refer a Patient

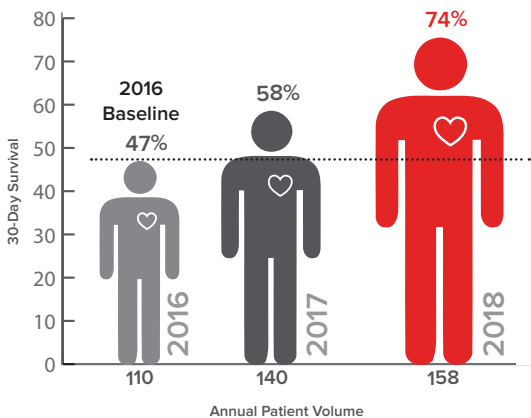
703.776.6168  
inovalung.org

# Cardiac and Respiratory Failure

## Impella® Volumes and Cardiogenic Shock Activations

	2017	2018
Impella® Volume	93	110
Shock Team Activations	140	158

## Improvement in Cardiogenic Shock Survival: IHVI 2-Year Outcomes



## ECMO 2016 – 2018

	2016	2017	2018
Days of Support	616	740	868
Hours of Support	14,018	16,901	19,763

	2016	2017	2018
Pediatric ECMO Runs	9	12	9
Adult ECMO Runs	57	68	75
Total ECMO Runs	66	80	84

2018 annualized from YTD Nov data

**Standardized Team-Based Care for Cardiogenic Shock**  
Behnam N. Tehrani, Alexander G. Truesdell, Matthew W. Sherwood, Shashank Desai, Henry A. Tran, Kelly C. Epps, Ramesh Singh, Mitchell Psotka, Palak Shah, Lauren B. Cooper, Carolyn Rosner, Anika Raja, Scott D. Barnett, Patricia Saulino, Christopher R. deFilippi, Paul A. Gurbel, Charles E. Murphy, Christopher M. O'Connor  
*Journal of the American College of Cardiology Apr 2019, 73 (13) 1659-1669; DOI: 10.1016/j.jacc.2018.12.084*  
Read full manuscript of IHVI's recent JACC article at [inovaheart.org/CardiogenicShock](http://inovaheart.org/CardiogenicShock)

# Advanced Heart Failure

## VAD and Heart Transplant Volumes

	2018
VAD Volume - Durable Devices	26
Heart Transplant Volume	24

2018 annualized from YTD Nov data



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703.776.7697 • [heartfailure@inova.org](mailto:heartfailure@inova.org)  
[inovaheart.org/AHF](http://inovaheart.org/AHF)



The Joint Commission® Gold Seal of Approval®  
for Ventricular Assist Device

# Congenital Heart Disease

## Surgical Volume

Pediatric Cardiac Cases	201*
Adult Congenital Surgical Cases	31
<b>Total</b>	<b>232</b>

*\*Total pediatric cardiac cases include 43 neonatal cases.*

## Neonatal Patients

Complex Cardiac Repairs	24
PDA Ligations - Premature Infant	19
<b>Total</b>	<b>43</b>

## Pediatric Congenital Heart Surgery

ASD	6
VSD	17
TOF	11
ASO	5
AVC (Complete, Partial)	6
PAPVR	1
TAPVR	1
COA/Hypoarch	10
Glenn/Fontan	9
Systemic Pulm Shunt	5
Pacer/ICD	8
PVR/RVOT Procedures	11
AVR/Supra and Sub Valvar	5
MV Repair/Replace	5
ECMO Cannulation	11
ECMO Procedures	12
PDA Ligation	21
Thoracic	6
Other STAT Category	10
Other Cardiac Non-Pump	41
<b>Total</b>	<b>201</b>

## Research

Research is a differentiating factor in IHVI’s expertise and depth of service offerings as demonstrated through our participation in a variety of clinical trials, our investigator-initiated research and academic contributions. Our mission is to be on the leading edge of new methods to diagnose, prognosticate and treat various conditions.



For a list of published articles, visit [inovaheart.org/publications](https://inovaheart.org/publications)



For a complete list of currently enrolling studies and locations, visit [inovaheart.org/trials](https://inovaheart.org/trials)



# Inova Heart and Vascular Institute Services

Inova Heart and Vascular Institute	IFMC	IAH	IFOH	ILH	IMVH
Adult Congenital Heart Clinic	•				
Advanced Heart Failure Program	•				
Heart Transplantation	•				
Mechanical Circulatory Support - VAD/LVAD	•				
Remote Home-based Monitoring	•				
Cardiac and Respiratory Failure	•				
Cardiogenic Shock Team	•				
Extracorporeal Membrane Oxygenation (ECMO)	•				
Impella®	•				
Pulmonary Embolism Response Team (PERT)	•	•			
Cardiac Catheterization	•	•		•	
AMI	•	•		•	
Chronic Total Occlusion Program	•				
PCI	•	•		•	
Cardiac Rehabilitation	•	•		•	•
Cardiac Research	•				
Clinical Trials Unit	•				
Thrombosis Research and Drug Development Center	•				
Cardiac Rhythm Disorders/Electrophysiology	•	•		•	
AV Node, SVT and VT Ablation	•	•		•	
Cryoballoon and Radio Frequency Ablation	•	•		•	
FIRM Mapping and Ablation	•				
Fluoro-less EP Studies	•	•		•	
Pacemakers	•	•		•	*
Conventional	•	•		•	*
Leadless	•	•			
Pulmonary Vein Isolation	•	•			
Cardiothoracic Surgery	•				
Coronary Artery Bypass Grafting (CABG)	•				
Interventional Pulmonology	•				
Minimally Invasive CABG Surgery	•				
Open Heart Surgery	•				
Thoracic Surgery	•				
Cardiovascular Genomics Center	•				
Heart and Lung Transplantation	•				

\* Emergency cases only

Inova Heart and Vascular Institute	IFMC	IAH	IFOH	ILH	IMVH
<b>Lung Services</b>	•				
Alpha-1 Antitrypsin Deficiency Clinical Resource Center	•				
Cystic Fibrosis Care Center	•				
Interventional Pulmonology	•				
Lung Transplantation	•				
Pulmonary Embolism Response Team (PERT)	•	•			
Pulmonary Fibrosis Foundation Care Center	•				
Pulmonary Hypertension Comprehensive Care Center	•				
Pulmonary Rehabilitation	•	•		•	•
WASOG Sarcoidosis Clinic	•				
<b>Noninvasive Cardiovascular Diagnostics</b>	•	•	•	•	•
Arterial Ultrasound Studies	•	•	•	•	•
Cardiac Stress Testing	•	•	•	•	•
CT	•	•	•	•	•
CT Angiography	•	•		•	•
CT Calcium Scoring	•	•		•	•
Echocardiography	•	•	•	•	•
MRI	•	•	•	•	•
Peripheral Vascular Ultrasound	•	•	•	•	•
<b>Pediatric Cardiovascular Services</b>	•				
Catheterization	•				
Cardiac Surgery	•				
Congenital Heart Disease Program	•				
Genomics Testing and Counseling	•				
<b>Structural Heart Disease Program</b>	•				
Stroke Risk Reduction - WATCHMAN™	•				
Transcatheter Aortic Valve Replacement (TAVR)	•				
Transcatheter Mitral Valve Repair - MitraClip®	•				
Transcatheter Mitral Valve Replacement (TMVR)	•				
<b>Vascular Services</b>	•	•	•	•	•
Endovascular and Open Surgical Procedures	•	•	•	•	•
Limb Preservation Program	•	•	•	•	•
Lower Limb Revascularization	•	•	•	•	•
Medical Management - Peripheral Arterial Disease	•	•	•	•	•
Vascular and Interventional Radiology	•	•	•	•	•
Wound Care	•	•	•	•	•
<b>Women's Cardiovascular Health Center</b>	•				

## LEGEND

### IFMC

Inova Fairfax Medical Campus  
Inova Heart and Vascular Institute  
3300 Gallows Road  
Falls Church, VA 22042

### IAH

Inova Alexandria Hospital  
4320 Seminary Road  
Alexandria, VA 22304

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Fairfax, VA 22033

### ILH

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Schaufeld Family Heart Center  
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### IMVH

Inova Mount Vernon Hospital  
2501 Parkers Lane  
Alexandria, VA 22306



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- Cardiology consults
- Diagnostic cardiology studies
- Vascular labs
- Vascular consults

Cardiac and Vascular Access

One Call 24/7

Adult: 703.776.5905

Pediatric: 877.900.9543

- Direct admission
- Transfer
- Specialized transport