

# Advancing care with clinical excellence, research, and innovation



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## Excellence is the best medicine.

Building upon decades of clinical excellence, research, and innovation, AHN Cardiovascular Institute (CVI) continually improves diagnosis and treatments through evidence-based medicine. Our multidisciplinary team of expert specialists conduct groundbreaking research, provide some of the most advanced treatments, and enhance patient safety. We are the first program in Pennsylvania and only the 16th in the United States to receive the comprehensive cardiac care certification from The Joint Commission.

### Collaboration is key.

Partnerships are the core of our care. We work closely with referring physicians so each of our patients have seamless care.

### Research backed by others.

CVI continues to expand its research efforts thanks to the confidence of the National Institutes of Health and other funding agencies. They support our pursuit of discoveries that improve the health of heart patients and save lives.

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For more information, visit  
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## CVI's Specialized Programs

Each program focuses on specific cardiovascular diseases and conditions, made up of multidisciplinary teams of highly trained, expert physicians and other health care professionals. We treat the most complex conditions with individualized care for exceptional patient outcomes.

## Heart Transplant and Mechanical Circulatory Support

### Recognition:

- Allegheny General Hospital has consistently exceeded the national average for one-year and three-year heart transplant patient survival.<sup>1</sup>

### Our innovative care:

- We regularly conduct clinical trials to continually improve treatment options and anti-rejection medications.
- We personalize immunosuppression treatments, using algorithms to select the right anti-rejection medicine based on each recipient's gender, age, race, and other factors.
- Our cardiologists and cardiac surgeons helped to pioneer the left ventricular assist device (LVAD) for short-term and long-term cardiovascular support.

### Our team includes:

- Physicians.
- Transplant nurse coordinators.
- Dietitians.
- Social workers.
- Pharmacists.

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<sup>1</sup> Claim based on one- and three-year survival rates for adult heart (single organ) transplant patients performed between 1/1/2014 and 6/30/2016 at Allegheny General Hospital vs. all facilities performing such transplants in the 16 westernmost counties of Pennsylvania during such period as reported by Scientific Registry of Transplant Recipients (SRTR). Information available at [www.srtr.org](http://www.srtr.org).



### Exploring the newest LVAD technologies.

We were the first medical team in western Pennsylvania to implant the HeartMate 3™ the latest LVAD while it was in clinical trials. The HeartMate 3™ uses magnetic levitation for more durability, and is designed to be safer than previous models.

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## Heart Failure

### Recognitions:

- Allegheny General Hospital has earned the elite Advanced Heart Failure certification from The Joint Commission and the American Heart Association.
- Allegheny General, Allegheny Valley, Canonsburg, Jefferson, and Saint Vincent hospitals are all gold certified by the American Heart Association for Get With The Guidelines® Heart Failure program.

### Our advanced therapies:

- Heart transplant.
- Mechanical circulatory support as a bridge to transplant or destination therapy.
- Acute circulatory support.
- Novel heart failure device therapies.
- Coronary artery bypass grafting.
- Minimally invasive robotic-assisted cardiac surgery.
- Implantable cardioverter defibrillator.
- Cardiac resynchronization therapy.
- Heart valve repair and replacement.
- Percutaneous interventions.
- Investigational devices.

### Program highlights:

- Heart failure disease management program that provides care for patients at home or in a skilled nursing facility.
- State-of-the-art critical care in cardiac intensive care units (CICUs) at our tertiary and quaternary care facilities.
- Remote monitoring of heart failure patients through wireless implantable devices or the CardioMEMS™ HF System to significantly reduce heart failure hospital admissions and improve quality of life.



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## Structural Heart Disease

Our catheter-based treatments help those patients with structural heart defects who are considered at high risk to undergo open-heart surgery.

### Conditions we treat:

- Congenital heart defects.
- Malformations of the heart's blood vessels.
- Aortic and mitral valve disease.
- Left atrial appendage procedures to reduce the risk of stroke.

### Our procedures:

- Transcatheter aortic valve replacement (TAVR) using percutaneous transfemoral, transapical, and transaortic approaches.
- MitraClip® System — a percutaneous mitral valve repair that allows us to treat degenerative mitral regurgitation in high-risk patients without placing the patient on cardiopulmonary bypass.
- Aortic valvuloplasty, mitral valvuloplasty, and fix paravalvular leak.
- LARIAT® suture delivery device and the WATCHMAN™ device used to prevent stroke in patients with arrhythmias who cannot use a blood thinner.
- Transcatheter mitral valve replacement.
- TriClip transcatheter tricuspid valve repair.
- Balloon pulmonary angioplasty.
- Intracoronary brachytherapy.

## Cardiogenic Shock

### Recognition:

- Our Extracorporeal Membrane Oxygenation (ECMO) program is an internationally certified Center of Excellence from Extracorporeal Life Support Organization (ELSO).

### Our advanced therapies:

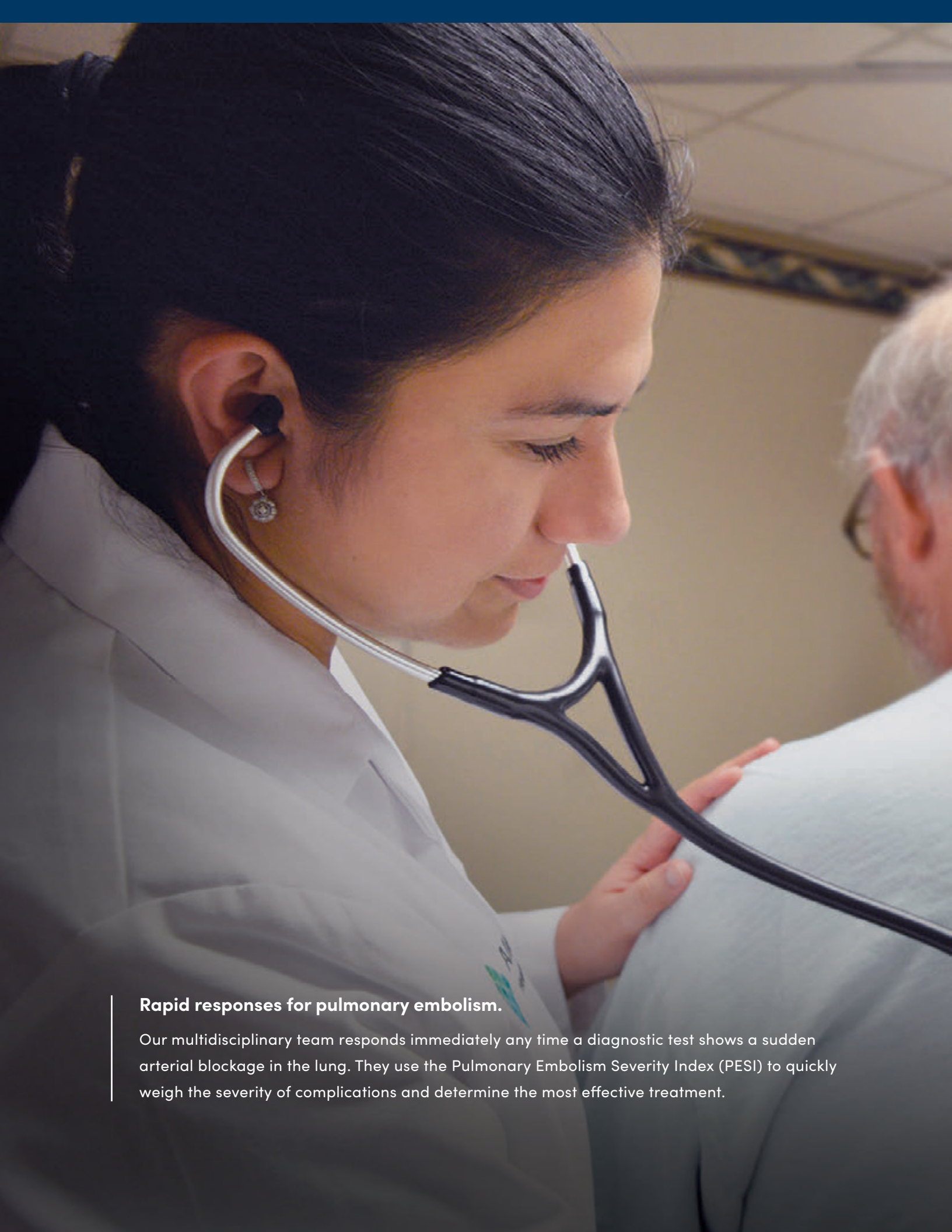
- Veno-venous ECMO for patients with damaged lungs.
- Veno-arterial ECMO for those in cardiogenic shock and pulmonary failure.

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### Rapid responses for pulmonary embolism.

Our multidisciplinary team responds immediately any time a diagnostic test shows a sudden arterial blockage in the lung. They use the Pulmonary Embolism Severity Index (PESI) to quickly weigh the severity of complications and determine the most effective treatment.

## Pulmonary Hypertension and CTEPH

### Recognitions:

- Our program is an accredited Pulmonary Hypertension Care Center (PHCC) by the Pulmonary Hypertension Association.
- We are one of the few internationally recognized centers for the treatment and care of chronic thromboembolic pulmonary hypertension (CTEPH).

### Our team includes:

- Cardiologists.
- Pulmonologists.
- Rheumatologists.
- Cardiothoracic surgeons.
- Palliative medicine specialists.
- PH specialty nurses.
- Physician extenders.
- Nutritionists.
- Social workers.
- Geneticists.

### Our nationally and internationally recognized treatments:

- PH medications.
- Indwelling hemodynamic monitors (CardioMEMS™ device).
- Home inotropic support.
- Extracorporeal membrane oxygenation (ECMO).
- Atrial septostomy.
- High-risk valve replacement.
- Tricuspid valvuloplasty.
- Palliative and lung transplantation services.

### We can offer enrollment into clinical trials that investigate new treatments for those with:

- PAH.
- CTEPH.
- Interstitial fibrosis.
- Left heart disease.
- Adult congenital heart disease.

## Arrhythmia Services

### Our treatments:

- Rhythm and rate-control medications and anticoagulants.
- Percutaneous left atrial appendage closure devices like the LARIAT® suture delivery device and the WATCHMAN™.
- Interventional treatments for atrial fibrillation such as catheter-based pulmonary vein isolation, and both radiofrequency and cryoablation.
- Hybrid convergence procedures for refractory cases.
- Maze procedures, typically done in conjunction with other cardiac surgeries.

### Other services:

- Supraventricular tachycardia and atrial flutter ablations.
- Ventricular tachycardia ablation, including under circulatory support.
- Radiotherapy ablation of ventricular tachycardia.
- Implantation of loop recorders, pacemakers, defibrillators, and cardiac resynchronization therapy devices.

### Our electrophysiologists are experts on:

- His bundle pacing techniques.
- Left bundle pacing.
- Leadless pacemakers.
- Zero fluoroscopy ablations.

## Cardiovascular Imaging

**CVI uses state-of-the-art imaging and real-time video for all our programs. We get the most detailed views of cardiovascular structures using:**

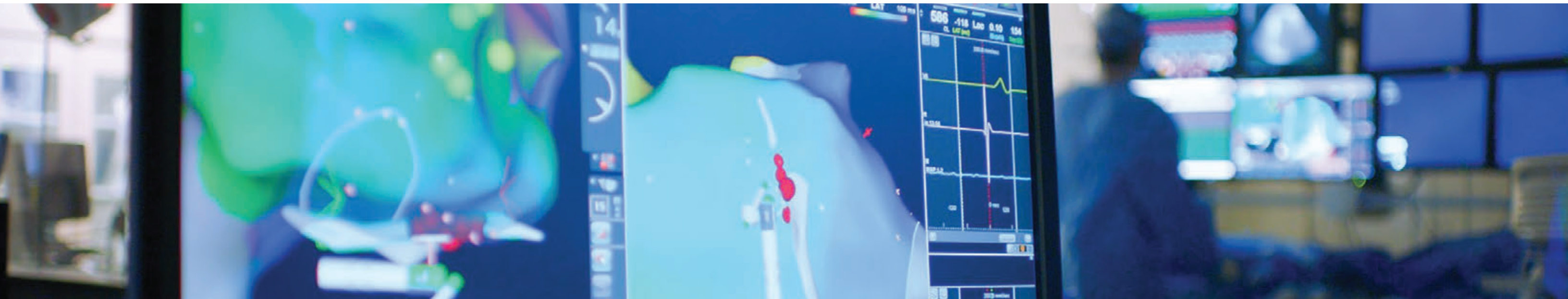
- Positron emission tomography (PET).
- 3-D and 2-D echocardiography with strain imaging.
- CT coronary angiogram with fractional flow reserve.
- Single-photon emission computerized tomography (SPECT) imaging.
- Magnetic resonance imaging (MRI).

### Our leadership through research includes:

- Demonstrating the safety and effectiveness of MRI for patients with implantable cardiac devices.
- Determining which cardiomyopathy patients would benefit from a transplant or an LVAD.
- Exploring whether cardiac MRI is better than conventional diagnostics for predicting heart attacks in women.
- Conducting rapid chest pain management using coronary CT.

### Hybrid cardiac ablation without radiation

We are one of the few medical centers in the country treating AFib using hybrid cardiac ablation, which uses an echocardiogram instead of radiation. It's a much shorter, safer surgery, and is just as successful as standard ablation.





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## Aortic Disease

### Conditions we treat:

- Aneurysms.
- Dissections.
- Tears in the inner lining.

### Our procedures:

- Hybrid thoracic endovascular aortic aneurysm repair (TEVAR).
- Aortic arch.
- Ascending trifurcated graft.
- Valve-sparing aortic root.
- Bicuspid aortic valve.
- Elephant trunk.
- Thoracoabdominal aneurysm repair.
- Complicated type B dissection management.
- Profound hypothermic circulatory arrest.



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## Vascular Disease

### Conditions we treat:

- Abdominal aortic aneurysm.
- Carotid artery disease.
- Peripheral artery disease.
- Renal artery disease.
- Venous insufficiency and varicose veins, wound healing, lymphedema, and critical limb ischemia.

### Our surgical treatments:

- Open and endovascular aortic aneurysm repairs (EVAR) with stent grafts.
- Carotid endarterectomy.
- Carotid angioplasty with stenting.
- Bypass surgery.
- Open and endovascular therapy for peripheral artery disease.
- Thrombolytic therapy/mechanical thrombectomy.
- Radiofrequency ablation for saphenous vein.
- Lutonix® 035.
- Renal artery stenosis.
- Renal angioplasty with stenting.
- Renal endarterectomy.
- Hemodialysis access surgery.

### Our evidence-based medical interventions:

- Anticoagulation management.
- Compression treatment.
- Hyperbaric oxygen therapy.
- Growth-factor therapy.
- F-scan computerized plantar measurement system.

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<sup>3</sup>Thoracic Aortic Aneurysm (TAA) Repair. Medtronic. May 2016. [www.medtronic.com/ us-en/healthcare-professionals/ therapies-procedures/cardiovascular/thoracicendovascular-aortic-repair.html](http://www.medtronic.com/us-en/healthcare-professionals/therapies-procedures/cardiovascular/thoracicendovascular-aortic-repair.html)

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## Ischemic Heart Disease

### Our surgical treatments:

- Hybrid revascularization.
- Minimally invasive coronary artery bypass.
- Off-pump coronary artery bypass.
- Arterial bypass grafting.
- Robot-assisted coronary surgery.
- Robot-assisted mitral valve surgery.

### Our medical interventions:

- Percutaneous coronary intervention, including high-risk and complete total occlusion.
- Investigative drugs and devices.
- Low-radiation protocols for revascularization ischemia assessment.

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## Adult Congenital and Other Complex Heart Disease

### Our specialty treatment options:

- Composite graft replacement and valve-sparing aortic root for patients with Marfan root aneurysm and adults with atrial septal defect coarctation.
- Aortic root enlargement procedure.
- Adult tetralogy of Fallot.
- Septal myectomy for hypertrophic obstructive cardiomyopathy.

### Our medical interventions:

- Percutaneous closure of atrial septal defect.
- Patent foramen ovale.
- Patent ductus arteriosus.
- Alcohol septal ablation.





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## Cardiovascular Disease Prevention

### Recognitions:

The CVI team offers specialized team-based care for risk factor modification and management of cardiometabolic syndrome.

- Our comprehensive hypertension center is the only center accredited by the American Heart Association in western Pennsylvania.<sup>2</sup> This center manages complex or difficult-to-treat hypertension by treating secondary causes through effective drug combinations. It also explores investigational treatments when appropriate.
- Our dyslipidemia clinic manages all forms of lipid disorders, including familial dyslipidemia.

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## Cardiac Rehabilitation

We help patients make a full recovery after a heart procedure or major surgery. We also offer virtual cardiac rehabilitation for select patients. This program is available at six locations in the region.

### Our team includes:

- Exercise physiologists.
- Nurses.
- Dietitians.
- Diabetes educators.
- Behavioral health specialists.

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<sup>2</sup> Western Pennsylvania includes the Laurel Highlands, greater Pittsburgh, Allegheny National Forest, and Pennsylvania northwest region.

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## Cardio-Oncology

For patients who receive cancer treatment, our cardio-oncology program works closely with the AHN Cancer Institute to offer care to prevent or minimize:

- Arrhythmias.
- Coronary artery blockages.
- Heart attack.
- Heart failure.
- High or low blood pressure.
- Valve disease.

### We offer:

- Evaluation and medical care before cancer-related procedures or surgery.
- Specialized treatments to minimize damage.
- Identification and treatment of chemotherapy-caused toxicity using echocardiogram with strain imaging.





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## Women's Heart Disease

The AHN Women's Heart Center is unlike any other in the region, focusing solely on treating heart conditions in women, including those that develop during and after pregnancy.

### We assess patients' risk through:

- Family medical history.
- Coronary angiography.
- Screenings for high blood pressure, high cholesterol, diabetes, and metabolic syndrome.
- Assessment of menopause-related risks.
- Framingham Risk Score assessment.
- Ankle Brachial Index assessment.

### Our testing capabilities:

- Comprehensive lipid panels.
- Inflammatory markers and genetic testing.
- Electrocardiogram.
- 24-hour ambulatory blood pressure monitoring.
- Exercise electrocardiogram stress testing.
- Myocardial perfusion imaging.
- Cardiac MRI, CT, and PET.
- Holter monitoring.
- Carotid and peripheral artery evaluation.

### Our prevention and management programs:

- Hypertension treatment.
- Dietary and nutrition counseling.
- Physical activity.
- Stress management guidance.
- Smoking cessation.
- Cholesterol management.
- Diabetes education.
- Hormone replacement guidance.
- Referrals to appropriate heart specialists.

### We work closely with AHN maternal fetal medicine specialists to treat:

- Pre-eclampsia.
- Peripartum cardiomyopathy.
- Spontaneous aortic dissection.



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## Thoracic and Esophageal Disease

**Our nationally recognized team includes AHN specialists from:**

- Cardiovascular Institute.
- Cancer Institute.
- Esophageal and Lung Institute.

**Our screening capabilities:**

- Low-dose computer tomography for those at risk for lung cancer.
- Biomarker panels and esophageal mucosal stripping to detect esophageal disease.

**Conditions we treat:**

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|----------------------------------|-----------------------|
| • Achalasia.                     | • Mesothelioma.       |
| • Barrett’s esophagus dysplasia. | • Mediastinal tumors. |
| • Esophageal cancer.             | • Myasthenia gravis.  |
| • Esophageal motility disorders. | • Tracheal diseases.  |
| • Lung cancer.                   |                       |

**Our lung and thoracic-related surgeries:**

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|---|------------------------------------|
| • Video-assisted thoracic surgery (VATS). | • Pneumonectomy.                   |
| • Endoscopic resection.                   | • Resection of mediastinal masses. |
| • Wedge resection.                        | • Thymectomy.                      |
| • Segmental lung resection.               | • Pleurectomy.                     |
| • Lobectomy.                              |                                    |

**Our esophageal surgeries:**

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|---------------------------------|-------------------------------------|
| • Esophagectomy.                | • Palliative surgery for dysphagia. |
| • Endoscopic mucosal resection. | • Stent placement.                  |
| • Heller myotomy.               | • Cryoablation.                     |
| • Peroral endoscopic myotomy.   | • Dilation.                         |
| • Submucosal dissection.        |                                     |

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## Driving Progress Through Research.

The CVI conducts pioneering research in all aspects of cardiovascular disease. We offer more than 75 clinical trials to eligible individuals, which improve national standards of care and patient outcomes.

**Our preclinical research includes:**

- Endothelial cell-based diagnostics and targeted therapeutics in pulmonary vascular disease.
- Development and testing of novel sensor technology to monitor cardiac function after open heart surgery.

**Clinical translational research includes:**

- Decision support in advanced heart failure and pulmonary arterial hypertension.
- Pulmonary arterial hypertension biobank.
- Cardiovascular tissue biobank.
- Geometric surrogates for abdominal aortic aneurysms.
- Biologic markers of functional recovery on mechanical circulatory support.

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## Endothelial Cell-Based Diagnostics for Pulmonary Vascular Disease

The CVI is analyzing its extensive bank of genetic information from patients with pulmonary vascular disease. We compare matching clinical data to determine more effective patient treatment options for pulmonary hypertension, heart failure, and transplant recipients. In addition, AHN researchers are using cells obtained during routine right heart catheterization to test drug responsiveness in vitro in order to individualize treatment responses.



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## Training the future of heart care.

Our expertise and innovation help us attract the best and brightest residents and fellows through our Accreditation Council for Graduate Medical Education (ACGME) training programs. We offer specialty training in cardiovascular disease with subspecialty training in interventional cardiology, advanced HF/transplantation, cardiovascular critical care, and advanced cardiovascular imaging.

Allegheny General Hospital integrates cardiothoracic and cardiovascular surgeries in a seven-year residency program. It's the only program of its kind in the country, giving residents clinical experience right from the start. They work directly with Department of Thoracic and Cardiovascular Surgery faculty during their first postgraduate year, with one-on-one instruction and mentoring from vascular, cardiac, and general surgery faculty.

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