Valley Health
Heart & Vascular
Advanced Cardiovascular Care

“We strive to provide the most advanced and comprehensive cardiovascular care, with superior outcomes... and that’s our promise to every patient who trusts us with their care.”

— Basel Ramlawi, MD,
Cardiothoracic Surgeon and Chairman,
Heart & Vascular Center
Contents

Welcome
  From Administration .................................................... 1
  From the Heart & Vascular Center Chairman .......................... 3

Comprehensive Care and Commitment to Excellence .................. 5

Cardiovascular Disease Prevention ...................................... 7
  Outpatient Clinic .......................................................... 7
  Calcium Scoring ........................................................... 8
  Women's Heart Health .................................................... 8

Cardiovascular Diagnostics & Imaging .................................. 9
  General Heart & Vascular Imaging Services at Valley Health ........ 9
  Advanced Cardiovascular Imaging at WMC .............................. 10

Ischemic Heart/Coronary Artery Disease ............................... 11
  Acute Myocardial Infarction ............................................. 11
  Treating Coronary Artery Disease ...................................... 12

Heart Rhythm Disorders & Atrial Fibrillation ........................ 15
  Treating Arrhythmias ..................................................... 15
  Pacing .................................................................. 15
  Lead Extraction ........................................................... 16
  Complex Atrial Fibrillation .............................................. 16
  Ablation: Minimally Invasive Treatment ............................... 17
  Stroke Prevention in AF .................................................. 17

Cardiothoracic Surgery .................................................... 19

Heart Valve Disease ........................................................... 21
  Advanced Valve & Aortic Center ........................................ 21
  Leading the Way Nationally in Heart Valve Repair ................. 22

Disease of the Aorta ............................................................ 25
  Advanced Valve & Aortic Center ........................................ 25

Congenital & Structural Heart Disorders ................................ 27

Heart Failure ....................................................................... 29
  Advanced Heart Failure & Cardiomyopathy Center .................. 29
  Heart Failure Monitoring System ....................................... 29
  Mechanical Circulatory Support ......................................... 30

Vascular Disease ............................................................... 31

Cardiovascular Anesthesia & Surgical Team .......................... 35
  Cardiac Anesthesia .......................................................... 35
  Cardiothoracic & Vascular Surgical Team .............................. 35

Cardiovascular Critical Care ............................................... 37

Cardiac Rehabilitation ....................................................... 39

Research ........................................................................... 41
Welcome

For more than 30 years, Winchester Medical Center has offered state-of-the-art cardiovascular care for patients throughout our region. Working in collaboration with our physician leaders and clinical team, we are continuing to build on our past successes and have developed numerous multidisciplinary clinical programs to advance heart and vascular care in our region.

It is inspiring to see the teamwork, dedication, focus on quality, and clinical advancements at Valley Health and Winchester Medical Center. I am proud to work in partnership with our heart and vascular leaders and clinical team members who are making a difference in the lives of our patients and their families.

Grady W. (Skip) Philips, III, FACHE
Senior Vice President, Valley Health
President, Winchester Medical Center

I have had the privilege of serving the cardiovascular needs of this region for over 20 years. In recent years, our Heart & Vascular providers have elevated the comprehensive and advanced nature of our services at Valley Health by leaps and bounds. Our work at the Heart & Vascular Center, in collaboration with our affiliated community hospitals, has made Valley Health the region’s leading provider of heart and vascular services. Our wide array of professionals are driven to provide the best in cardiovascular care.

On behalf of everyone on the Heart & Vascular team, I am pleased to share information on our services for prevention, early diagnosis and treatment of cardiovascular disease.

Jeffrey Behneke, MBA, BSN, RN
Corporate Director, Valley Health Heart & Vascular Services
Welcome to the Valley Health Heart & Vascular Center!

Our Heart & Vascular Center’s programs have undergone significant expansion over the past few years. Since 2016, our growth plan has led to a significant increase in the depth and breadth of our advanced cardiovascular programs. Leading-edge innovations, some of the most advanced in the country, lead to improved patient care and allow our clinicians to offer the best cardiac and vascular care – specifically tailored to each individual patient.

The main mission of our center is to offer our patients the best cardiovascular care possible in a timely and compassionate manner. To achieve this, we treat a wide range of conditions – including chest pain, disorders of heart valves, aorta, arrhythmias and heart failure – with innovative therapeutic strategies and multidisciplinary patient-tailored care. We also lead cutting-edge clinical research and training to other centers in advanced cardiovascular care. Our leadership and involvement in internationally recognized and prestigious heart valve and coronary research trials is testament to our evidence-based strategy and commitment to optimal patient outcomes.

In addition to programmatic expansion, our center is becoming more integrated across Valley Health and all of our campus locations. Such programmatic integration across all our covered geography and expansion of satellite clinical programs (e.g., a catheterization lab at Warren Memorial Hospital) allow our patients to have access to the highest levels of cardiovascular care, closer to home.

Our excellent results and life-saving cardiovascular care are due to the compassionate and conscientious care provided to our patients by our medical, nursing and care-team staff. We take pride in receiving multiple national-level recognitions from the American College of Cardiology, American Heart Association and others. We always strive to provide the most comprehensive care, with superior clinical outcomes… and that’s our promise to every patient who trusts us with their care!

On behalf of the entire Valley Health Heart & Vascular Center, I thank you for perusing our publications and invite you to learn about our programs.

**Basel Ramlawi, MD, FACC, FACS**

*Chairman, Heart & Vascular Center*

*Director, Advanced Valve & Aortic Center*
Valley Health’s Heart & Vascular Center at Winchester Medical Center offers some of the most advanced cardiovascular treatments and diagnostic services – with superior clinical outcomes. Patients and families from Virginia, West Virginia, Maryland and surrounding states are choosing Valley Health’s expert cardiologists, cardiothoracic surgeons and vascular surgeons for heart and vascular care. Our center offers multidisciplinary clinical programs specifically designed to treat the wide spectrum of cardiovascular disorders. Our highly experienced teams of specialists offer the most comprehensive range of heart and vascular services in the region, including:

- Advanced Valve & Aortic Center
- Aortic aneurysm treatment
- Complex coronary artery disease treatment
- Peripheral vascular disease treatment
- Atrial fibrillation and arrhythmia treatment
- Advanced heart failure management
- Cerebrovascular disease treatment
- Chronic venous insufficiency treatment
- Advanced cardiovascular imaging and diagnostics

Our commitment to quality and excellence in cardiovascular care is also reflected in achievements such as:

- Awarded Comprehensive Cardiac Center Certification by The Joint Commission in collaboration with the American Heart Association (2019)
- Heart Failure Accreditation by the American College of Cardiology (2018)
- Atrial Fibrillation with EPS (Electrophysiology Services) Accreditation by the American College of Cardiology (2018)
- First in Virginia to earn Cardiac Electrophysiology Lab accreditation by the Intersocietal Accreditation Commission (2017)
- First in Virginia to earn Cardiac Cath Lab accreditation by the American College of Cardiology (2017)

Minimally-Invasive Expertise

Our skilled specialists treat some of the most complex cardiovascular problems using minimally invasive procedures, including new catheter-based techniques and robotic surgery. For patients, these procedures mean smaller incisions, shorter hospital stays, less pain and quicker recovery. We offer minimally invasive approaches for valve replacement, aortic aneurysm repair, coronary artery bypass, coronary and carotid stent placement, lung resection and much more.
A Special Place for Heart & Vascular Care

Opening in early 2020, the Heart & Vascular Center building expansion at Winchester Medical Center will improve capacity for our growing cardiovascular specialty services. The new building will connect directly to the Heart & Vascular Center and unite specialists and services for the prevention, early diagnosis and treatment of cardiovascular disease under one roof. Clinic and office spaces for Winchester Cardiology and Vascular Medicine/Valley Health will be located on the mall and second levels. Clinic and office spaces for Valley Health Cardiothoracic Surgeons and Valley Health Vascular Surgeons will be located on the third level. Cardiac and pulmonary rehabilitation will be housed on the ground (garden) level.

Cardiovascular Care Closer to Home

Valley Health is committed to making specialty care more accessible in our local communities so patients can see a specialist closer to home. Cardiologists and vascular surgeons on our Heart & Vascular team bring their expertise to multispecialty clinics associated with each of Valley Health's regional hospitals in Virginia and West Virginia. Our local community hospitals offer general cardiovascular diagnostic imaging services and work closely with the Heart & Vascular Center to provide coordinated care for patients who need additional testing or interventions.
Cardiovascular Disease Prevention

Outpatient Clinic
Our team works hard to improve the cardiac health of our patients through novel treatments and prevention! One of our main goals is to reduce the risk of cardiac events through screening, monitoring and, when necessary, treating conditions that could put our patients at higher risk of cardiovascular disease. We are proud to have a dedicated preventive cardiology clinic, the first of its kind in the area.

The preventive cardiology clinic at Winchester Cardiology and Vascular Medicine | Valley Health provides services for patients who may be at higher risk for heart disease because of genetic conditions, family history and other factors, to help them manage those risks. The clinic offers assessment, screening, education and follow-up care.

Conditions addressed in the preventive cardiology clinic include:

- **Coronary artery disease, heart attack and family history of sudden death**
  - Assessment and treatment of resistant hypertension and familial hypercholesterolemia
  - High cholesterol may be genetic, and a high level of LDL (bad cholesterol) is strongly associated with a higher risk of heart attacks and stroke. Reducing the LDL level has a protective effect against heart attacks and stroke and can reduce the risk tremendously. The clinic team may recommend dietary changes and/or medication to help reduce or control LDL.

- **Hyperlipidemia**

- **Bicuspid aortic valve**
  - About 1-2% of the population have an aortic valve with two leaflets instead of three. A bicuspid aortic valve starts to narrow or leak faster than the normal aortic valve, and patients with a bicuspid aortic valve have a higher incidence of aortic aneurysm.
  - First-degree family members (children, siblings, parents) have up to a 20% chance of having a bicuspid valve themselves, and up to a 9% chance of having a dilated aorta/aneurysm even if they had a normal aortic valve. Screening for bicuspid aortic valve and a dilated aorta is recommended for first-degree relatives.

- **Aortic aneurysms and dissection**

- **Hypertrophic cardiomyopathy**

- **Cardiac evaluation and management for patients receiving oncology treatments**
Knowing that smoking is one of the leading causes of cardiac disease, we have started a dedicated smoking cessation clinic with a nurse practitioner who evaluates and follows up with patients on one-to-one visits. Group counseling is also available for those who are interested.

_to schedule an appointment with the preventive cardiology clinic at Winchester Cardiology and Vascular Medicine|Valley Health, call 540-662-0306._

**Calcium Scoring**

Patients with a family history of coronary artery disease may be candidates for calcium scoring. A low dose CT scan of the heart measures the amount of calcium in the coronary arteries, and the resulting score helps assess the individual's risk of developing heart disease. Calcium scoring is available at Winchester Medical Center.

_to schedule a low dose CT scan for calcium scoring at Winchester Medical Center, call 855-724-3384._

**Women’s Heart Health**

Heart disease is the number one killer of women, causing 1 in 4 deaths each year. Over the past few decades, heart attack survival rates have improved overall. However, the signs and symptoms of a heart attack in women may be different or less noticeable than in men. Women are less likely to experience typical chest pain during a heart attack. Our professionals understand women are typically diagnosed less frequently and are less inclined to seek prompt medical care. Since heart symptoms in women are often vague, cardiac imaging is even more important to help assess risk and guide therapy.

Many heart diseases require a combination of diet, exercise, medication and surgery to treat. Valley Health cardiovascular physicians perform many procedures using minimally invasive techniques. Minimally invasive procedures mean less pain, minimal scarring, shorter hospital stays and a quicker return to an active lifestyle. Older women in particular tend to be better candidates for minimally invasive procedures.

Women's heart health services at Valley Health are committed to improving cardiovascular outcomes for the women in our community.
Several tests diagnose possible cardiovascular disease. The choice of which tests to perform depends on several considerations including a patient’s risk factors, history of heart problems, current symptoms and the physician’s interpretation of these factors. Our Heart & Vascular team includes physicians with expertise and advanced training in cardiac diagnostics and imaging.

**General Heart & Vascular Imaging Services at Valley Health**

All Valley Health regional hospitals offer general cardiovascular diagnostic services. Most services are available at all Valley Health hospital locations.

**Stress Tests**
- Nuclear cardiology stress test
- Stress echocardiography
- Treadmill exercise stress test

**Diagnostic Cardiology**
- Echocardiography
- EKG – electrocardiography
- 24-hour Holter monitoring
- 30 day event and telemetry monitoring
- MUGA scan

**Vascular Imaging**
- Carotid duplex
- Transcranial duplex
- Renal artery duplex
- Mesenteric/visceral duplex
- Abdominal aorta aneurysm (AAA) screening
- Lower extremity arterial evaluation
- Upper and lower extremity arterial duplex
- Venous insufficiency studies

Winchester Medical Center has developed a state-of-the-art non-invasive cardiac imaging lab — among the most advanced in Virginia — with the most advanced echocardiographic equipment and an exemplary team of sonographers. Our team can study an abnormality with great precision to help cardiologists and surgeons reach a diagnosis and decide on the most appropriate treatment.
**Advanced Cardiovascular Imaging at WMC**

- 3-D echocardiography guiding valve surgeries and interventions
- 3-T cardiac magnetic resonance imaging (MRI), which allows for faster, more precise imaging of the heart structures
- Cardiac computed tomography (CT) angiography to examine the coronary arteries, heart valves and aorta
- Myocardial strain imaging to help predict cardiac chemo toxicity prior to a drop in cardiac function
- Trans-esophageal echocardiography (TEE)*

To schedule an imaging service, call 540-536-8988 (855-724-3384).

To inquire about a cardiovascular diagnostic/imaging service:

Winchester Medical Center: 540-536-8686  
Warren Memorial Hospital: 540-636-0280  
War Memorial Hospital: 304-258-5630  
Shenandoah Memorial Hospital: 540-459-1106  
Page Memorial Hospital: 540-743-8052  
Hampshire Memorial Hospital: 304-822-2166  
Valley Health Outpatient Imaging – New Market: 540-459-1515  
Winchester Cardiology and Vascular Medicine | Valley Health:  
  540-622-0306 (Winchester)  
  304-264-9485 (Martinsburg)

*Also available at Shenandoah Memorial Hospital and Warren Memorial Hospital*
Acute Myocardial Infarction

Cardiologists at Valley Health are experts in the recognition and rapid treatment of heart attacks. We work closely with local emergency medical services (EMS) providers in order to provide the best care. In fact, when an EMS unit arrives on the scene of a heart attack, there is instant communication with the Winchester Medical Center heart team. This allows the team to make preparations at the hospital to receive the patient and provide the most rapid treatment.

Valley Health was an early adopter of a healthcare communications app called Pulsara for our ST-elevation myocardial infarction (STEMI) alert process. The app runs on any smart device and enables us to communicate more easily with EMS personnel in the field as well as within our own heart attack and stroke teams in the hospital.

We work closely with state and national organizations to provide the most efficient and up-to-date treatment for our heart patients. The time it takes to open an occluded coronary artery is closely linked to survival. Whereas the national goal is to open an occluded coronary artery is within 90 minutes, in 2018 WMC cardiologists accomplished this in an average of less than 44 minutes.

In 2018, we opened an occluded coronary artery in an average of less than 44 minutes, compared to the national goal of 90 minutes.

Throughout our history, our cardiologists and cardiac surgeons have been involved in a continuous process improvement initiative involving our community, EMS agencies and all levels of care within the hospital. All Valley Health regional hospitals participate in our process improvement program, which aids in early recognition and treatment of heart attack patients throughout the system.

Winchester Medical Center has received recognition from the American Heart Association and the American College of Cardiology for our care of patients with acute myocardial infarction.

Award-winning care of patients with acute myocardial infarction
Treating Coronary Artery Disease

Interventional cardiologists at WMC offer a wide spectrum of percutaneous procedures (performed through a needle puncture through the skin) using a catheter to direct a balloon or a stent to clear coronary blockages and restore blood flow. We operate six cardiac catheterization laboratories that include rooms dedicated to coronary intervention, cardiac devices, electrophysiology procedures and hybrid procedures including complex coronary intervention, aortic valve replacement and mitral valve interventions.

In 2018, Warren Memorial Hospital expanded its cardiovascular services with the addition of a cardiac catheterization lab, offering patients more local access to high-quality diagnostic and interventional services provided in collaboration with highly experienced cardiologists and staff from the Heart & Vascular Center. A range of outpatient procedures is available in the cath lab in Front Royal including diagnostic caths, non-surgical coronary interventions (PCI) and peripheral vascular interventions.

For more information about the Warren Memorial Hospital cath lab, call 540-636-0225.

The radial (wrist) artery is used for access in over 70% of our patients, resulting in increased comfort and reduced risk of bleeding. Use of the radial artery during intervention for a heart attack has been shown to increase survival.

WMC Continues to be a Leader in Radial Artery Access for Cardiac Cath

NCDR® CathPCI Registry® (national rate) 45.2% (2018)

NCDR® (National Cardiovascular Data Registry) is an initiative of the American College of Cardiology Foundation.
Most outpatients who have cardiac catheterization procedures are discharged home the same day as the procedure. The WMC cardiac catheterization lab also has a protocol for same-day discharge of selected outpatients who undergo PCI (percutaneous coronary intervention).

Few centers offer the capability of opening coronary arteries that have been completely closed in patients with long-standing angina without surgery. Known as CTO (chronic total occlusion) procedures, WMC is the only hospital in the region that boasts this catheter-based technology. Our team of specially trained and equipped cardiologists has performed this procedure successfully in numerous complex cases.

For more information about Winchester Medical Center’s cardiovascular labs, call 540-536-8686.

For patients with chronic stable angina who have exhausted standard treatment options without relief, we offer enhanced external counter-pulsation (EECP®) therapy. This non-invasive outpatient treatment compresses the blood vessels in the lower limbs to increase blood flow to the heart.

To learn more about EECP, call 540-536-0517.

Greatest experience, depth and breadth of service in the region

- First hospital in the region to open a cardiac catheterization laboratory (in continuous operation since 1980)
- Performing coronary intervention since 1987
- Chronic total occlusion procedures for patients with long-standing closure of the coronary arteries
- Advanced surgical revascularization techniques including endovascular harvesting of radial conduits and hybrid and minimally invasive coronary artery bypass graft surgery (CABG)
- Innovative technologies including rotational atherectomy, orbital atherectomy, coronary laser and third generation stent technologies
- Dedicated acute MI program with continuous process improvement measures
Treating Arrhythmias

Valley Health's cardiac electrophysiology specialists use specialized diagnostic testing and therapeutic procedures to relieve symptoms or regulate abnormal heart rate and rhythm issues.

We offer arrhythmia treatments including
- Controlled electric shock (cardioversion)
- Medications
- Pacemakers
- Defibrillators
- Ablation

Winchester Medical Center has earned Atrial Fibrillation with Electrophysiology Services accreditation by the American College of Cardiology for demonstrated expertise and commitment in evaluating, diagnosing and treating patients with atrial fibrillation. Our cardiac electrophysiology lab was also among the first in the country to receive accreditation by the Intersocietal Accreditation Commission in the areas of device implantation, chronic lead extraction, and testing and ablation.

Pacing

For people with recurrent arrhythmias, medical devices such as a pacemaker and implantable cardioverter defibrillator (ICD) can help by continuously monitoring the heart's electrical system and providing automatic correction when an arrhythmia starts to occur.

Arrhythmia specialists at Winchester Medical Center offer pacing procedures including
- His bundle pacing (HBP), presumed to be a more physiologic method of pacing to produce the heart's normal contraction sequence
- Leadless pacemakers, which have no intravascular pacing leads for patients with certain medical conditions in need of single-chamber pacing
**Lead Extraction**

Our specialists offer pacemaker or ICD lead extraction to remove one or more leads from inside the heart. Lead extraction may be necessary because of fibrous tissue buildup on the lead, an infection involving the device and its leads or non-functioning leads.

**Complex Atrial Fibrillation**

Atrial fibrillation (AF) is the most common heart rhythm disorder, causing significant symptoms and complications such as stroke, fatigue and heart failure. At Valley Health, we specialize in the treatment of patients with advanced AF, where medical therapy is not optimal or has not been effective. Using **minimally invasive catheter-based and hybrid approaches**, we attempt to return patients to normal sinus rhythm and reduce their stroke risk.
Ablation: Minimally Invasive Treatment

Ablation surgically removes the source of the electrical abnormality of the heart, restoring a regular heartbeat. While ablation once required open chest surgery, doctors can now offer the procedure through minimally invasive means using wires and catheters inserted through vessels in the leg.

AF ablation procedures:
- Cryoablation
- Radiofrequency ablation
- Hybrid surgical ablation (epicardial and endocardial)

Stroke Prevention in AF

Patients with AF are at 500% increased risk of embolic stroke! The vast majority of these are caused by clots in the heart that develop in the left atrial appendage (LAA). Oral anticoagulation medicines (blood thinners) often cause significant problems with increased complications, cost and lifestyle changes as patients are at elevated risk of bleeding.

The experts at Valley Health offer patients an alternative to the problems associated with lifelong anticoagulation by occluding the LAA. This life-saving strategy can be used to reduce the risk of stroke in AF patients who cannot use blood thinners.

LAA exclusion can be performed using two minimally invasive approaches:
- Video-assisted device implant (epicardial – outside the heart)
- Percutaneous device implant (endocardial – inside the heart)
Bob Turney came to Winchester Medical Center to receive a left atrial appendage implant to prevent stroke. Three years before, he needed to discontinue blood-thinning medication he took to manage his AFib, but was very aware his risk of stroke would rise. “If you can get a Watchman™ device put in, that’s the way to go,” Turney says. “It’s not that I feel different physically. It’s the peace of mind I have knowing there’s not this little appendage of clots that can break off and cause a stroke.”
Our cardiac surgeons specialize in the treatment of cardiovascular disease including disorders of the heart, aorta and blood vessels. We cover the full spectrum of adult cardiac surgery (excluding transplantation), frequently offering second-opinion services for patients deemed too high risk for intervention elsewhere. Importantly, many procedures are performed through minimally invasive “key-hole” incisions, leading to improved outcomes with quicker recovery and less pain! Our surgeons collaborate with referring physicians to treat the most challenging cardiac and thoracic cases and bring a state-of-the-art, multidisciplinary team approach to treatment.

**Our cardiac surgeons most commonly perform the following procedures:**

- Heart valve repair or replacement surgery – open, minimally-invasive, catheter-based
- Coronary artery bypass grafting (CABG) – hybrid, multi-arterial, off / on pump, minimally invasive
- Surgery of the thoracic aorta – open and catheter-based
- Surgical and hybrid treatment of atrial fibrillation
- Surgery for cardiac tumors
- General thoracic surgery

There were no deaths in the AVR (aortic valve replacement) or AVR+CAB (coronary artery bypass) patient population for 2018.
“Our exceptional team at Valley Health’s Heart & Vascular Center offers the most comprehensive range of heart valve treatments anywhere, including many minimally invasive surgery options that are life-changing for patients.”

—Basel Ramlawi, MD

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Readmission Rates Within 30 Days (CABG)*</td>
<td>5.1%</td>
<td>5.5%</td>
<td>0%</td>
<td>10.3%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>New Onset Post-Op A-Fib Rates CABG* Only*</td>
<td>23.3%</td>
<td>16.0%</td>
<td>14.8%</td>
<td>26.0%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Post-Op Transfusion Rates (AVR)*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*2017 data as reported in the Data Analyses of the Society of Thoracic Surgeons National Adult Cardiac Surgery Database for the time period ending 12/31/17 published June 2018

*2018 data as reported in the Data Analyses of the Society of Thoracic Surgeons National Adult Cardiac Surgery Database for the time period ending 12/31/18 published June 2019

*Qrt 1 2019 data as reported in the Data Analyses of the Society of Thoracic Surgeons National Adult Cardiac Surgery Database for the time period ending 3/31/19 published July 2019

2017 data as reported in the Data Analyses of the Society of Thoracic Surgeons National Adult Cardiac Surgery Database for the time period ending 12/31/17 published June 2018

2018 data as reported in the Data Analyses of the Society of Thoracic Surgeons National Adult Cardiac Surgery Database for the time period ending 12/31/18 published June 2019

Qrt 1 2019 data as reported in the Data Analyses of the Society of Thoracic Surgeons National Adult Cardiac Surgery Database for the time period ending 3/31/19 published July 2019
Advanced Valve & Aortic Center

Valley Health’s Advanced Valve & Aortic Center (AVAC) offers the most advanced and minimally invasive heart valve treatment strategies and best clinical outcomes in the greater region. AVAC provides an interdisciplinary team approach to evaluation and treatment for patients diagnosed with heart valve or aortic disease. Led by experienced valve surgeons and cardiologists, the center offers a full range of treatment options and clinical expertise locally:

- Advanced **minimally invasive** small-incision and catheter-based procedures including minimally-invasive valve replacement surgery, transcatheter aortic valve replacement (TAVR), transcatheter mitral valve repair (MitraClip) and transcatheter mitral valve replacement (TMVR).
- **Experienced in all available TAVR devices**
- Strategies that are specifically tailored for each patient including conventional surgical valve repair, replacement or medical management
- Special focus on **complex mitral and aortic valve repair** for complex and high-risk patients
- More advanced mitral valve therapies than any other facility in the region
- **Second opinion service** for patients and referring physicians
- **One of the most advanced hybrid rooms in the region**
- Sophisticated, non-invasive imaging of the heart valves and related structures
- Guaranteed **same-week appointments**

**For more information, contact the Advanced Valve & Aortic Center — 540-536-4000 or AVAC@valleyhealthlink.com**

Transcatheter mitral valve replacement may be a treatment option for severe symptomatic mitral regurgitation. **Courtesy of Basel Ramlawi, MD**

Our team of experienced specialists and clinical staff participated in a clinical trial using transcatheter aortic valve replacement for low-risk patients.
Leading the Way Nationally in Heart Valve Repair

- Subspecialty and national leadership for advanced valve and aortic repair
- National principal investigator for bicuspid aortic valve TAVR clinical trial
- One of the sites participating in ReChord mitral valve clinical trial studying a device that allows surgeons to replaced damaged chordae while the heart is beating
- One of select institutions in the country, and one of the highest-enrolling sites, participating in the Medtronic Evolut Low-Risk TAVR trial (study article published by New England Journal of Medicine, March 2019)
- Participating in APOLLO transcatheter mitral valve replacement clinical trial (TMVR)
- Training site for TAVR/minimally invasive valve repair
- One of the most experienced valve surgeons in the country teaching TAVR to other surgeons, (Basel Ramlawi, MD)

**TAVR Patients With Self-Reported Improved Or Same Quality Of Life At 30 Days Post-Op**

<table>
<thead>
<tr>
<th>Year</th>
<th>2016</th>
<th>2017</th>
<th>2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Value</td>
<td>87.5%</td>
<td>90%</td>
<td>90%</td>
</tr>
</tbody>
</table>

A multi-specialized team staffs Winchester Medical Center’s hybrid room, which combines the best features of a cardiac catheterization lab and operating room.
Anthony Bellafiore participated in a clinical trial at Winchester Medical Center studying two sets of patients, one group having a transcatheter aortic valve replacement (TAVR) procedure and the other group having surgical aortic valve replacement (SAVR). Randomly selected for SAVR, he was a candidate for a minimally invasive approach for the procedure. “Dr. Ramlawi didn’t have to split my breastbone; he just made a small cut between two ribs. I was a little sore afterward but not in any pain. I was up and moving around right away,” he said. “Dr. Ramlawi’s team was great. For anybody who needs this procedure, he’s the one to go to.”
Disorders of the aorta can be some of the most challenging problems facing patients and their physicians. At Valley Health, we have a dedicated multidisciplinary team focused on the treatment of aortic disorders. Our expert specialists are able to detect and treat acute or chronic aortic problems with the most advanced and minimally invasive approaches using individualized, patient-specific strategies for optimal results and quick recovery.

- **Minimally-invasive and endovascular repair** of abdominal and thoracic aortic aneurysms (EVAR, TEVAR, fenestrated grafts)
- Dedicated multidisciplinary team focused on medical, non-surgical and interventional management
- **24/7 aortic team availability** for management of acute aortic syndromes (dissection, rupture, etc.)
- Advanced imaging of the aorta
- Innovative therapies focused on **pathology of the aortic root and arch**
- Patient-tailored strategies for patients with **connective tissue disorders** and **bicuspid aortic valve syndrome**

**Advanced Valve & Aortic Center — 540-536-4000 or AVAC@valleyhealthlink.com**

Basel Ramlawi, MD, Director
Debra Myers, DNP, FNP-BC, Coordinator

Type B aortic dissection following TEVAR
*Courtesy of Basel Ramlawi, MD*
Congenital & Structural Heart Disorders

Specialists at Winchester Medical Center offer a range of treatment options for congenital and structural heart disorders including minimally invasive procedures for defect closures:

- Atrial septal defect (ASD), ventricular septal defect (VSD) and patent foramen ovale (PFO) closure – percutaneous and surgical (minimally invasive) approaches
- Para-valvular leak closure – closing defects around artificial valves using catheter-based and minimally invasive approaches
- Congenital heart valve and aortic anomalies are routinely repaired via catheter-based and minimally-invasive surgical therapies (please refer to Advanced Valve & Aortic Center section)

About 1-2% of the population have an aortic valve with two leaflets instead of three. A bicuspid aortic valve starts to narrow or leak faster than the normal aortic valve, and patients with a bicuspid aortic valve have a higher incidence of thoracic aortic aneurysm. The preventive cardiology clinic at Winchester Cardiology and Vascular Medicine | Valley Health offers screening and treatment for patients with a family history of bicuspid aortic valve. The clinic also screens and treats individuals with a family history of hypertrophic cardiomyopathy.
Heart Failure

Heart failure is one of the most common reasons for hospital admissions. Early diagnosis and treatment allow many people with heart failure to lead normal lives and be at reduced risk for hospitalization. Our team of cardiologists and surgeons at Winchester Medical Center offer clinical expertise and a range of treatment options including medication therapy and direct intervention to manage heart failure and its symptoms.

**Advanced Heart Failure & Cardiomyopathy Center**

Valley Health has expanded its advanced heart failure services to provide more resources to help patients and their primary care provider or cardiologist manage advanced heart failure and cardiomyopathy. The Advanced Heart Failure Center at Winchester Medical Center offers outpatient evaluation and monitoring, outpatient IV infusion services and inpatient multidisciplinary rounding, along with patient education and support. The *multidisciplinary heart failure team* includes a fellowship-trained heart failure cardiologist, an experienced cardiology nurse practitioner, nurses, pharmacists, dietitians and other specialists.

**Heart Failure Monitoring System**

The CardioMEMSTM system measures and monitors pulmonary artery pressure and heart rate in certain heart failure patients with the goal of reducing heart failure-related hospitalizations. For patients for whom CardioMEMS is indicated, our interventional cardiologists can implant a small pressure-sensing device directly into the pulmonary artery during a cardiac catheterization procedure. A home electronics unit transmits the sensor’s data wirelessly to the patient’s doctor, who can use the information to help manage the patient’s heart failure before the patient experiences symptoms that lead to hospital readmission.
Mechanical Circulatory Support

Winchester Medical Center’s mechanical circulatory support (MCS) program is comprised of a multi-disciplinary team whose mission is to provide comprehensive care for critically ill patients requiring ventricular assist device (VAD) support, from time of decision to implant until cardiac transplantation or end of support. The team provides expertise for both temporary and long-term mechanical circulatory support including extracorporeal membrane oxygenation (ECMO) and devices such as the Impella heart pump and intra-aortic balloon pump (IABP).

- Comprehensive pre-implant evaluation
- 24 hour/7 day a week services
- Specializing in perioperative and perfusion services
- Cardiovascular ICU
- Comprehensive outpatient program
- Palliative care

Advanced Heart Failure & Cardiomyopathy Center — 540-536-4555

Nikolas Krishna, MD, Medical Director
Marie Amico, FNP-C, CHFN, Clinical Coordinator
Darryl Hampton, FNP-C, Ventricular Assist Device Coordinator
Kayla Roberts RT(R)(CI), Mechanical Circulatory Support Coordinator

Winchester Medical Center uses minimally invasive heart pump technology during advanced PCI procedures and in the treatment of cardiogenic shock.

We strive to provide comprehensive care for patients requiring ventricular assist device support.
Vascular Disease

Vascular surgeons and endovascular specialists at Valley Health specialize in the treatment of patients with diseases of the vascular system, the arteries and veins that carry blood throughout the body. Our team is committed to providing the highest quality vascular practices and standard of care. With state-of-the-art imaging diagnostics and both open surgical and minimally invasive (endovascular) treatment options, we provide interventions for the full spectrum of vascular disorders. Our multidisciplinary approach enables us to provide personalized treatment plans for each patient.

Our vascular surgeons and endovascular specialists treat the following conditions:

- Thoracic, abdominal and peripheral arterial aneurysms
- Aortic dissection
- Carotid artery stenosis
- Peripheral arterial disease (claudication and critical limb ischemia)
- Mesenteric ischemia and renal artery stenosis
- Deep vein thrombosis and chronic venous insufficiency, including spider/varicose veins, swelling, and wounds
- Thoracic outlet syndrome
Our experts provide the following services:

- Open and endovascular aortic aneurysm repair (EVAR, TEVAR, and FEVAR)
- Diagnostic angiography with catheter-based interventions as well as surgical reconstruction for the full spectrum of peripheral arterial disease, with a focus on aggressive limb salvage
- Carotid endarterectomy, carotid stenting, and trans-carotid artery revascularization (TCAR)
- Hemodialysis access creation and maintenance
- Endovenous ablation, phlebectomy, and sclerotherapy for venous insufficiency

For two consecutive years, Winchester Medical Center has received a 3 Star rating (the highest score possible) from the Society for Vascular Surgery (SVS) in recognition of its commitment to vascular care quality through active participation in a national benchmarking program. The Society’s Vascular Quality Initiative® (VQI) awarded WMC 3 Stars for 2018 and 2017.

No strokes in elective carotid endarterectomy procedures for vascular surgery in 2018, no deaths in elective CEA (carotid endarterectomy) patients since 2012
Raymond Utterback was one of the first Valley Health patients to have a FEVAR procedure to treat an abdominal aortic aneurysm. “My case was a bit more difficult because the stent used to reinforce the artery walls would have to go up to the level of the arteries that feed the kidneys. There was not enough room between those arteries and my aneurysm to get a good seal that would fix my aneurysm,” he said. “The fact that Dr. Borkon felt they could do it successfully gave me enough confidence so that I wasn’t concerned about the procedure. I was glad they could do it right there at Winchester.”
Cardiovascular Anesthesia & Surgical Team

Cardiac Anesthesia

Facing heart surgery and the accompanying anesthesia can be daunting for patients. Winchester Medical Center has a dedicated cardiac team of highly trained anesthesiologists with broad experience in anesthesia for open-heart surgery, minimally invasive cardiac surgery and procedures such as TAVRs.

An anesthesiologist sees and examines every patient prior to surgery to review important information and discuss the anesthetic plan. Every effort is made to put patients and families at ease. Once in the operating room, our priority is the safety and well-being of every patient we care for. Every operating room is equipped for ultrasound-guided line placements. We perform a transesophageal echocardiogram (TEE) for every patient undergoing heart surgery with general anesthesia. This allows the team to evaluate heart and valve function at any moment during the surgery.

Our anesthesiologists monitor every patient in close collaboration with the surgical team. We provide what’s called a “balanced anesthesia” – a combination of sedatives, anesthetic gases, and intravenous pain medications, depending on what is best and safest for each patient. The anesthesiology team monitors and adjusts medications as needed to raise or lower the blood pressure, stimulate the heart and control blood glucose levels. Our anesthesiologists also administer blood transfusions as needed.

Cardiothoracic & Vascular Surgical Team

WMC’s Surgical Services Department has a dedicated OR team of specially trained surgical nurses and certified surgical technologists available 24/7 for heart and vascular surgeries or endovascular procedures. The OR team also collaborates with the critical care team to provide extracorporeal membrane oxygenation (ECMO) and other circulatory support technologies for patients whose heart and lungs are unable to perform adequately.
Winchester Medical Center’s team of board certified intensivists and critical care nurses are specially trained to care for critically ill patients. Our Critical Care Unit consists of 48 patient rooms arranged in four 12-bed pods.

In addition to our 24/7 in-house physicians and healthcare providers, we have partnered with a group of intensive care physicians and nurses called Advanced ICU Care. This service provides an extra layer of support for our patients and critical care team to help supplement the care and monitoring of our critically ill patients. This added layer of care support is off-site, connected to each Critical Care room via a two-way camera, monitor and speaker system. This equipment, in addition to direct connectivity to our electronic health record, allows the bedside team and the Advanced ICU team to work together to respond rapidly to all patient needs.
Valley Health offers medically supervised exercise programs to help individuals with heart disease rebuild their strength and stamina. Candidates for cardiac rehab include patients who have experienced

- Heart attack
- Stable angina
- Angioplasty/stent
- Coronary bypass surgery
- Heart transplant
- Heart valve repair or replacement
- Heart failure

Valley Health offers cardiac rehabilitation at the following locations:

- Winchester Medical Center (Winchester, VA)
- Warren Memorial Hospital (Front Royal, VA)
- Shenandoah Memorial Hospital (Woodstock, VA)
- Page Memorial Hospital (Luray, VA)
- War Memorial Hospital (Berkeley Springs, WV)

We offer two levels of rehabilitation:

**Monitored Program**

The Monitored or Outpatient Exercise Program includes 12 weeks of exercise, three times a week, on bicycles, treadmills and other equipment. A patient's heart rate, ECG, blood pressure, oxygen saturation and glucose levels are closely monitored and documented by a health care professional specially trained in exercise therapy and heart and lung functioning. The Monitored Program also includes special cardiac education classes for patients as well as spouses or friends. The classes are held once a week (Winchester) or as scheduled (other Valley Health locations) on topics such as living with heart disease, medication, nutrition, exercise and stress management.

**Maintenance/Wellness Program**

Once participants graduate from the program, they transition to exercising independently, unmonitored. Valley Health's fitness centers in Winchester, Front Royal, Woodstock, Luray and Berkeley Springs offer maintenance or wellness programs to “graduates” who have completed the monitored exercise program or anyone who has, or may be a risk of developing, cardiovascular disease.
Valley Health’s Heart & Vascular Center at Winchester Medical Center has a long history of active involvement in clinical research trials that have helped to advance treatment options for cardiovascular care. Our tradition of active participation in cardiovascular research has enabled us to apply innovative technology for the benefit of patients in the Shenandoah Valley and surrounding region for decades.

With our experienced team of specialists, Winchester Medical Center participates in leading-edge clinical trials including:

- **Medtronic Transcatheter Aortic Valve Replacement (TAVR) Low Risk Bicuspid Study** (closed to enrollment) (Basel Ramlawi, MD, national co-principal investigator)
- **Transcatheter Mitral Valve Replacement with the Medtronic Intrepid™ TMVR System in Patients with Severe Symptomatic Mitral Regurgitation (APOLLO)** (Basel Ramlawi, MD)
- **Randomized Trial of the Neochord DS1000 System Versus Open Surgical Mitral Valve Repair (ReChord)** (Basel Ramlawi, MD)
- **Behavior of Valve Leaflets (BELIEVE) at 1 Year After Implant of LivaNova Bioprosthetic Aortic Valve** (closed to enrollment) (Basel Ramlawi, MD)
- **Perceval Sutureless Implant vs. Standard Aortic Valve Replacement (PERSISET-AVR)** (closed to enrollment) (Basel Ramlawi, MD)
- **AEGIS II Study to Investigate the Efficacy and Safety of CSL112 in Subjects With Acute Coronary Syndrome** (Jason Call, MD)
- **Medtronic Evolut™ Low-Risk TAVR Trial** (closed to enrollment)
  Study article co-authored by Basel Ramlawi, MD, published by New England Journal of Medicine, March 2019
  Food & Drug Administration expanded approval of TAVR for low-risk patients announced August 16, 2019
- **Pioneer III to Assess the Safety and Efficacy of the BuMA Supreme™ Drug Coated Coronary Stent in Patients with Coronary Disease** (closed, no longer enrolling) (Jason Call, MD)
- **Safe STEMI Study of Access Site for Enhancing PCI in STEMI for Seniors** (Jason Call, MD)
- **Hemodynamic-GUIDEd Management of Heart Failure (GUIDE-HF)** (Nikolas Krishna, MD)
- **Supporting Patients Undergoing High-Risk PCI Using a High-Flow Percutaneous Left Ventricular Support Device (PHP SHIELD II)** (Neal Gaither, MD)
- **A Phase 2 Proof of Concept, Double-Blind, Randomized, Placebo-controlled Study to Evaluate the Efficacy of ASP1128 (MA-0217) in Subjects at Risk for Acute Kidney Injury following Coronary Artery Bypass Graft (CABG) and/or Valve Surgery** (Astellas 1128-CL-0201) (Basel Ramlawi, MD)
- **Irrigated Radio Frequency Ablation to Terminate Non-Paroxysmal Atrial Fibrillation (Terminate AF Study)** (Basel Ramlawi, MD)
Research – continued

- Evaluating Procedural Efficiency with Active Esophageal Warming during Cardiac Cryoablation Procedures (Zachary Hollis, MD, and Daniel Alexander, DO)
- Sorin Universal REgistry on Aortic Valve Replacement (SURE-AVR) (Basel Ramlawi, MD)
- Optimize PRO (Basel Ramlawi, MD)
- Clinical Study of the BioVentrix Revivent TC™ System for Treatment of Left Ventricular Aneurysms (ALIVE Trial) (Basel Ramlawi, MD and Jason Call, MD)
- Acurate IDE Clinical Study (Basel Ramlawi, MD)
Contact Information

**Schedule an Appointment**  
540-536-8988 (855-724-3384)

**Transfer a Patient**  
540-536-4057 (866-962-3627)

**Reach a Physician**  
540-536-8000

**Advanced Valve & Aortic Center**  
540-536-4000

**Advanced Heart Failure & Cardiomyopathy Center**  
540-536-4555