



ADVANCED HEART FAILURE

A GUIDE FOR PATIENTS AND THEIR FAMILIES

This guide will help you understand your options for advanced heart failure therapies such as surgery, devices, and transplantation.



DO YOU HAVE ADVANCED HEART FAILURE?

Anyone with serious heart failure should see a heart failure specialist. A specialist can determine the exact cause and extent of the disease and plan the best treatment.

If you have advanced heart failure, you should also talk to a surgeon about special surgeries, mechanical devices, and transplantation.

These advanced treatments—along with exercise, proper medications, and close attention to diet—can help you feel more energetic and avoid the bad spells of shortness of breath and overwhelming fatigue that might send you to the hospital.

With the right therapy, you can have a longer and more active life.



Partnering with heart failure specialists—especially at a research-based institution such as the Temple Heart & Vascular Institute—ensures you have access to all these new treatments.

For all patients with heart failure, early evaluation and access to advanced treatments can slow disease progression and lead to a longer and more active life. Patients who present in the late stages of heart failure might miss the window of opportunity for advanced therapies and, therefore early evaluation is critical.

YOU NEED A PARTNER

Heart failure is a chronic disease that gets progressively worse. Although it cannot be cured, it can be treated. Treatment can slow progression and help you feel better. But proper treatment requires a program of lifelong care.

That's why it makes sense to find a team of heart failure specialists who know you well. After a thorough evaluation, specialists will tailor a treatment plan with all the latest medical and surgical options. Then they will stick with you over the years, checking in frequently and making changes as needed. They will also coordinate your care with your other doctors.

Here's something else to keep in mind: New therapies for heart failure are coming out every year. Cardiovascular specialists aim to use the most minimally invasive approach to fix heart problems before permanent heart damage happens. Some of the nation's leading cardiovascular centers are also now using totally artificial hearts, stem cells to grow new heart muscle, and targeted biologicals or gene therapy to prevent or reverse heart damage. Many of these new therapies are being developed right here at Temple. Your specialists will ensure you have early access to this coming wave of new heart failure treatments.



TALK WITH AN ADVANCED HEART FAILURE SPECIALIST OR CARDIOVASCULAR SURGEON

Temple's heart failure specialists and cardiovascular surgeons are among the most experienced and technologically sophisticated in the mid-Atlantic region. Our advanced therapies and surgeries for heart failure can help you by:

- Preventing severe symptoms with education, monitoring, support groups, disease management programs and electronic early warning tools
- Identifying and managing medical or other issues that aggravate the heart condition such as pulmonary hypertension, diabetes, anemia, thyroid problems, depression, sleep apnea, drug side effects, poor nutrition, alcohol/smoking and lack of exercise
- Correcting root causes or complications of heart failure with surgery such as coronary artery bypass, valve repair, ventricular or aortic reconstruction
- Controlling abnormal heart rhythms or fibrillations with devices or surgery, such as pacemaker, defibrillator, MAZE surgery or catheter ablation
- Trying new or experimental heart treatments in clinical trials or research protocols, such as devices, special surgeries, stem cell or gene therapy
- Providing hospital-based treatment for those needing cardiac ICU or stabilization, intra-aortic balloon pumps, extracorporeal membrane oxygenation or IV medications
- Increasing heart function with implantation of a mechanical heart pump ventricular assist device (permanent or temporary) or replace the heart with a total artificial heart
- Replacing a severely damaged heart with a donated healthy heart through heart or heart-lung transplantation for those who qualify

At Temple, we help patients with all forms and all severities of heart failure. Many patients with end-stage heart failure come to us battling with breathlessness and fatigue. We see others with milder symptoms but who are on the brink of irreversible disease progression. We treat the whole spectrum of heart failure.

You may have been told that you are a high risk for surgery. Don't give up hope. Our surgeons are highly experienced in techniques that may be more appropriate for high-risk or older patients with advanced heart failure. And even if you are very sick, we offer special treatments that may help you get better and qualify for surgery or new research-based therapies.

Here's the main thing to remember: Today's treatments for heart failure may relieve your symptoms, prevent serious complications, and help you live a longer and more active life.

Talk to a heart failure specialist or surgeon to learn more about your treatment options—and the risks and benefits of your specific procedure.

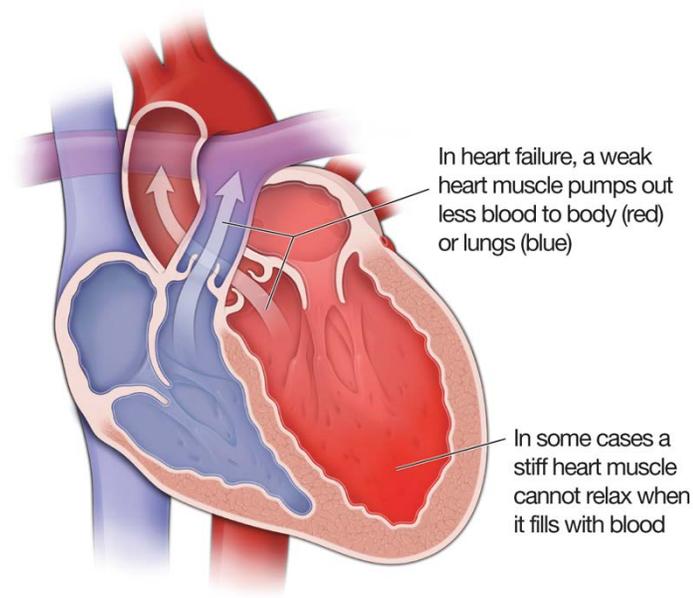
To schedule an appointment with a Temple heart failure specialist or surgeon, call 1-800-TEMPLE MED (1-800-836-7536).



INFORMATION ABOUT HEART FAILURE

What is heart failure?

In heart failure, the heart does not pump normally. The heart still beats, but it is damaged. As a result, in many people, not enough oxygen-rich blood is pumped out of the weakened heart to the rest of the body (systolic heart failure). In other cases, not enough blood can re-enter the stiffened or thickened heart between beats (diastolic heart failure).



What causes it?

The cause of heart failure is usually injury or strain on the heart muscle due to narrowed or blocked vessels that supply blood to the heart muscle (coronary artery disease or atherosclerosis), heart attack (myocardial infarction), high blood pressure (hypertension), heart valve problems (such as stenosis or regurgitation), abnormal heart rhythms (either too fast or too slow), heart muscle disease (such as cardiomyopathy), inflammation, or other conditions. Some degree of heart failure is common in older people.

What are the symptoms?

Common symptoms of heart failure are feeling tired or short of breath, swelling (edema or excess fluid) in the feet/ankles and abdomen, irregular pulse or palpitations; cough or wheezing. In the early stages of heart failure (especially diastolic heart failure), symptoms may be absent or occur only with exertion or when lying down (when fluid collects in the lungs). In advanced heart failure, or during bad periods, symptoms may include severe shortness of breath, cough with pink-tinged phlegm, or chest pain. Heart failure is a leading cause of hospitalization and death.

How is heart failure diagnosed?

Heart failure is usually diagnosed with a physical exam, blood tests, history, and tests, such as chest X-ray, electrocardiogram (ECG or EKG), echocardiogram, or heart catheterization to measure blood pumping volume or take pictures. Cardiologists may measure your “ejection fraction,” which is the amount of blood pumped out of your heart with each beat (normal is 55% or more). Some patients with diastolic heart failure have a normal ejection fraction. Other special tests (such as heart MRI, nuclear heart scan, electrophysiology measurements) may be needed to find the underlying causes or related complications.



TREATMENT OF HEART FAILURE: AN OVERVIEW

What can I expect?

Heart failure is a progressive disease, which means it usually gets worse over the years. Although there is no real cure, treatment can help you:

- Slow disease progression
- Relieve symptoms
- Avoid hospitalization
- Live longer
- Live with a better quality of life

Your chances of achieving these goals are better if you are diagnosed and treated early. However, all patients, no matter the stage of heart disease, can benefit from treatment.

Who will treat me?

You may get help from: heart failure/transplant specialists (cardiologists with advanced training), cardiothoracic surgeons, general cardiologists, electrophysiologists, cardiac interventionalists, pulmonologists (lung specialists), cardiac nurse specialists, cardiac rehabilitation and exercise specialists, dietitians, nurse educators, social workers, and—as needed—specialists from other areas (e.g., cardiac imaging, vascular surgery, gastroenterology, endocrinology).

What are my treatment options?

To help you relieve symptoms, prevent worsening, or correct underlying causes or complications of your heart failure, your treatment may include:

LIFESTYLE CHANGES AND EXERCISE

- Maintaining healthy weight and exercising regularly
- Eating a low-salt, low-fat diet
- Stopping smoking and limiting alcohol and caffeine intake
- Controlling high blood pressure, high cholesterol, and diabetes

- Monitoring your symptoms, body weight, swelling
- As needed, cardiac rehabilitation program
- Communicating with your heart failure team

MEDICATIONS

- To reduce excess fluids in body and lungs (e.g., diuretics)
- To slow the heart rate, lower blood pressure, and regulate heart beats (e.g., beta blockers)
- To reduce strain on heart and relax vessels (e.g., ACE inhibitors or ARBs)
- To boost heart strength and maintain heart rhythm (e.g., digitalis/digoxin, ACE inhibitors)
- To improve heart pumping in other ways (aldosterone antagonists, inotropes)
- To control coronary artery disease, high blood pressure, or arrhythmias

SURGERY, DEVICES, AND TRANSPLANTATION

When lifestyle changes and medications are not enough to help you feel better or lower your risk of progression, your heart failure specialist may recommend advanced surgical therapies—or enrollment in a clinical trial with a new therapy. **These advanced treatment options are described in the remaining pages of this brochure.**

Your heart failure specialist and surgeon will help you understand all your treatment options and help you decide what's best for you now—and what might be needed in the future.



Surgery, Devices, and Transplantation for Heart Failure

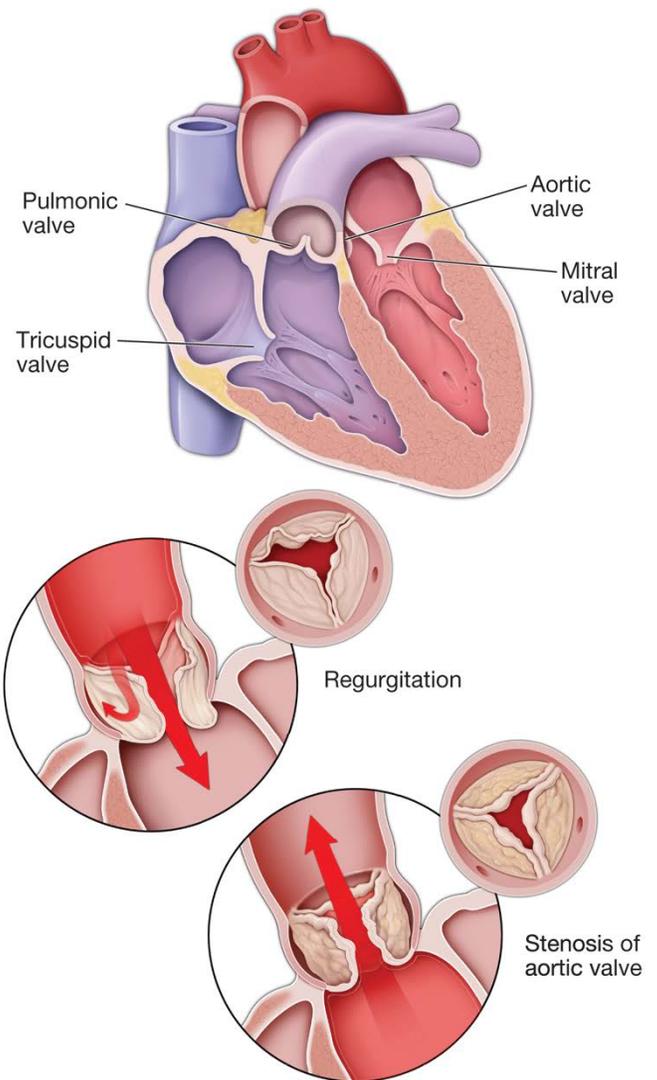
Based on your condition and symptoms, your heart failure specialist or surgeon may recommend one or more of the following surgeries or procedures.

CORONARY ARTERY BYPASS GRAFT (CABG) SURGERY

- If your heart failure is caused or worsened by a blocked coronary artery, your surgeon can use a healthy artery from elsewhere in your body to create a new pathway around the blockage. This is called coronary artery bypass graft (CABG) surgery.
- CABG brings more oxygen-rich blood to the heart muscle, helping it pump more strongly, and giving you more energy and a better quality of life.
- In some cases, you may benefit from a combination of surgical procedures all done at the same time. This might include, for example, surgery to restore coronary flow with CABG while also addressing heart failure (with ventricular surgery or device insertion), irregular heart beats (with MAZE, ablation, or device insertion) or a diseased valve or aorta.

HEART VALVE SURGERY

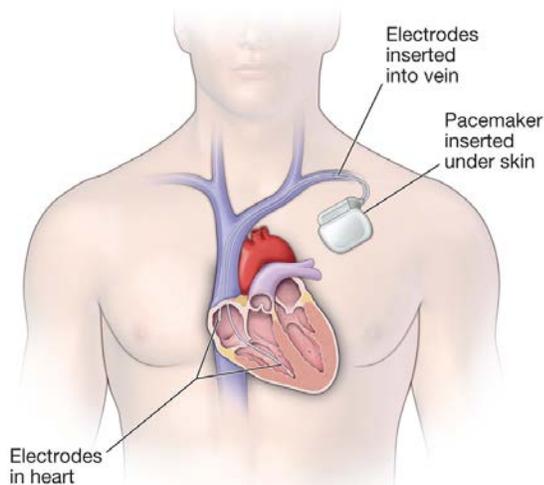
- Valve problems can be a cause or a result of heart failure. Depending on your situation, your surgeon may recommend heart valve surgery to repair or replace a valve. One of the two valves on the larger and more powerful left side of the heart—the aortic valve and the mitral valve—is usually the source of the problem.
- A stiffened aortic valve can force the heart to work harder to pump blood through the narrowed opening. Over time, all this extra work can take a toll on the heart. If aortic stenosis is causing or aggravating heart failure, your surgeon may recommend repair or replacement to reduce the strain on your heart.
- Heart failure can change the heart's shape and weaken the cord-like tendons inside the heart that attach to the mitral valve flaps. These changes may cause a leaky mitral valve (regurgitation) and produce symptoms. Your surgeon can restore the normal shape and function of the mitral valve. This stops the leakiness and decreases your symptoms.





DEVICES OR SURGERY TO TREAT ABNORMAL HEART RHYTHMS OR FIBRILLATIONS

- The heart's electrical signals can go haywire when the overworked heart changes shape or when heart tissue is damaged or has a "dead zone." This is why heart failure often leads to abnormal heart rhythms. These out-of-sync heartbeats or atrial fibrillations can cause inefficient pumping of blood or, sometimes, a dangerously erratic rhythm.



- To improve the timing of electrical signals in your heart, your surgeon can insert a device called a biventricular cardiac pacemaker. This unit, about the size of an old-fashioned pocket watch, has a generator (battery) and computer chip. It is inserted just under the skin in the upper chest near the shoulder. Wires (leads) go from the pacemaker through a vein into the heart's lower chambers.

- The biventricular pacemaker sends low-energy electrical pulses to keep the right and left chambers (ventricles) of the heart pumping together in unison. The coordination helps the heart pump more blood with each beat. This is sometimes called cardiac resynchronization therapy (CRT).
- Pacemaker batteries last about eight years and are easily replaced in a minor procedure. Most patients get pacemakers that can automatically speed up the heart rate during activities.
- Some biventricular pacemakers can also work as an implantable cardio-defibrillator (ICD), which can send a high-energy electrical zap to stop any dangerous arrhythmias.
- Inserting a pacemaker is a minor procedure that takes an hour or two; it can be done by your surgeon or by a heart arrhythmia specialist known as an electrophysiologist.
- Some patients with heart failure have atrial fibrillations that require the MAZE procedure, a surgery that cuts lightly across the heart's surface in order to block erratic electrical signals from spreading. In many cases, MAZE is done with a minimally invasive technique.



VENTRICULAR ASSIST DEVICES OR ARTIFICIAL HEARTS

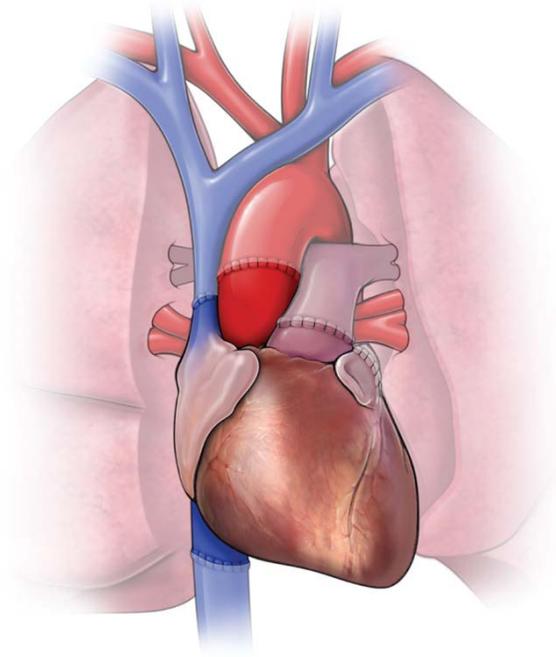
- Today, one of the best new options for patients with end-stage heart failure is the ventricular assist device (VAD). Temple surgeons specialize in inserting the newest generation of VADs (also called mechanical heart pumps or circulatory assist devices).
- The newest pumps are small, powerful, and reliable. They can help patients with heart failure live longer and feel better. More and more patients with advanced heart failure are getting VADs every year.
- Open-chest surgery is usually required to implant an MCS device. In most cases, the pump itself is placed just below the heart in the upper belly area. Sometimes, especially if the device is planned as a temporary assist, the pump is located outside the body.
- A tube draws blood from inside the heart to the pump, which then pushes it out another tube into the aorta or another artery. A wire from the device comes out of the body and connects to a battery power pack, which the patient wears on a belt or harness.
- The MCS device can serve as a permanent solution or as short-term support. Short-term “bridge” therapy with a VAD can help a patient live until a transplant can be performed. Some heart centers are qualified to perform both VAD insertions and transplantations.
- For some patients, a temporary MCS sometimes allows the heart to rest or heal enough to be ready for another surgery (such as coronary artery bypass graft or valve repair or replacement).
- There are now a variety of circulatory assist devices, including VADs for the left ventricle (LVADs), right ventricle (RVADs), or both chambers (biventricular VADs, or BVADs) as well as full artificial hearts. Some of the newer VADs can be inserted using minimally invasive techniques.





HEART TRANSPLANTATION

- For patients with end-stage heart failure, a heart transplant may be an option. “End-stage” means that the heart is severely damaged and cannot be helped with other standard procedures or surgeries. Older patients or those with serious medical conditions may not be good candidates for transplant; they may need a special treatment, such as a VAD.
- In transplantation, the failing heart is removed and replaced with a healthy heart from a deceased donor. This operation requires a median sternotomy (splitting of the breastbone) and cardiopulmonary bypass (heart-lung machine) and lasts four to five hours or more.
- In addition to the risks of surgery itself, patients considering transplant must also know that this option requires a careful selection process and a pre-transplant “wait list” period. The wait is due to the shortage of donated hearts. Some patients die while waiting.
- After the surgery, there is a long post-transplant recovery (a week or two in the hospital followed by months of frequent tests and biopsies) and a lifetime commitment to cardiac rehabilitation, lifestyle changes, and follow-up counseling, monitoring, and ongoing treatment (e.g., powerful immunosuppressants to prevent rejection).
- The good news is that many patients who receive a transplant can eventually start enjoying many of their favorite activities again—walking, sports, family outings, vacations, or even a resumption of their career. Transplantation can be truly life-saving—leading to a longer life and a better quality of daily living.





NEW THERAPIES AND CLINICAL TRIALS

- Enrollment in one of Temple’s clinical trials for new therapies may be another option for those with advanced heart failure.
- Trials involving new drugs, special surgical procedures, new transplantation techniques, novel devices, and stem cell therapies (to regrow healthy heart muscle) are underway.
- A Temple heart specialist can advise you about specific studies or novel research-based treatments that might be appropriate for you.

DEFINING EXCELLENCE IN HEART TRANSPLANTATION

The Temple Advanced Heart Failure, MCS and Transplantation Program has extensive experience in caring for patients with heart failure. We provide truly comprehensive care—from disease prevention to heart transplantation—and we have a long tradition of leadership in developing new therapies in all areas of heart disease.

- Temple’s **heart transplant outcomes are above the national average**. Temple’s **survival rate one year after a transplant is 98.1%***.
- Temple has a **higher transplant rate and shorter time to transplant** for wait-list candidates than the national average.
- Temple specializes in treating patients with advanced heart failure. We can often offer options to patients with complex cardiovascular disease that other hospitals cannot.
- We have the expertise and infrastructure needed to care for heart failure patients.
- We are consistently designated as a “Blue Distinction Center” for cardiac care by Independence Blue Cross.
- Much of what is known about transplant medicine was learned here at Temple. We have **performed well over 1000 heart transplants**, one of the largest totals in the world .
- For patients who are not candidates for heart transplant, or need a “bridge to transplant,” Temple offers a variety of advanced circulatory devices, including the latest ventricular assist devices (VADs) and total artificial heart. This gives our team more treatment options to help meet every patient’s needs.
- Temple is a center for advanced patient-focused cardiovascular research. Our Center for Translational Medicine is developing new targeted molecular therapies, gene therapies, and stem cell therapies for heart failure.

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To schedule an appointment with a Temple heart failure specialist, call 1-800-TEMPLE MED (1-800-836-7536).