

Transcatheter Aortic Valve Replacement (TAVR)

Treatment for aortic stenosis

This handout explains when your doctor may advise TAVR to treat aortic stenosis. It includes the benefits and risks of TAVR, and what to expect during TAVR at University of Washington Medical Center (UWMC).

Transcatheter Aortic Valve Replacement at UWMC

Transcatheter aortic valve replacement (TAVR) is a safe treatment for some people who have aortic stenosis (AS), a narrowing of the aortic valve opening in the heart.

The Regional Heart Center at UWMC was one of the very first sites in the U.S. to do TAVR, as part of a study called the PARTNER trial. The findings of this study led to the Food and Drug Administration (FDA) approving TAVR for people who are at **high** risk for or cannot have open heart surgery. Other people also may be able to have TAVR as part of a research study at UWMC.

Medicare requires that all hospitals that offer TAVR have a specially trained Heart Team. This team includes a heart surgeon and a heart doctor called an *interventional cardiologist*. The team works together to assess patients with AS and then do the AVR procedure that is best for each patient.

During TAVR, you will have *general anesthesia* (medicine to make you sleep and block pain), a breathing tube, and a *ventilator* (a machine to help you breathe during surgery).

During TAVR, your surgeon and cardiologist will work together. They will:

- Place a *catheter* (thin tube) in an artery that leads to your heart.



During TAVR, our team will use the most up-to-date technology to guide the placement of your new heart valve.

- Move a compressed, manmade (*prosthetic*) valve through the catheter to your heart. (The valve will be around a deflated balloon as it goes through the catheter.)
- Inflate the balloon when it is inside the diseased aortic valve and put the manmade valve in place. The valve will expand to fill this space.

Types of TAVR

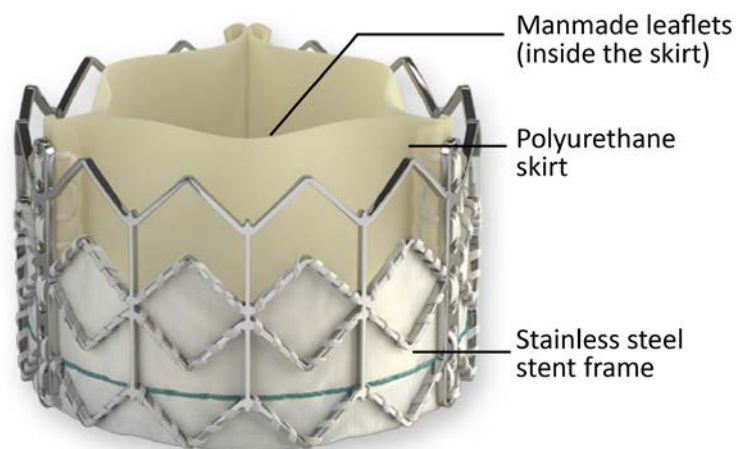
There are several ways to do TAVR. Each uses a different way to reach your heart:

- In *transfemoral* TAVR, the catheter is placed in the *femoral* artery in your groin area. Your surgeon will reach this artery by making a small incision in your upper leg or lower groin to expose the artery.
- In *transapical* TAVR, the catheter is placed in the tip of your heart, which is called the *apex*. To reach the apex, your surgeon will make a small incision in the side of your chest, between your ribs.
- In *transaortic* TAVR, the catheter is placed in your *aorta*, the large artery that is right above your aortic valve. To reach your aorta, your surgeon will make a small incision near your breastbone.

What type of valve is used for TAVR?

The FDA must test and approve manmade heart valves before they can be used in TAVR. At this time, the only *transcatheter heart valve* (THV) approved by the FDA is the Edwards Sapien THV. It includes:

- A stainless steel stent frame (scaffold)
- A polyurethane skirt (lining)
- 3 manmade leaflets made of heart tissue from a cow (*bovine* tissue)



The Edwards Sapien transcatheter heart valve.

Is TAVR at UWMC right for me?

UWMC's Heart Team includes cardiac surgeons, interventional cardiologists, cardiac anesthesiologists, cardiac imaging specialists, nurse practitioners, physician assistants, and nurses and technicians. All members of our Heart Team have advanced training and experience in evaluating and treating people for TAVR.

UWMC also provides advanced heart failure care and a special intensive care unit for heart patients. This unit includes cardiac anesthesiologists and critical care medicine specialists.

Patients at UWMC have access to many different care providers. These include social workers; nutritionists; respiratory, physical, occupational, and speech therapists; and other specialists in areas such as vascular surgery and kidney disease.

The UWMC Regional Heart Center has done more than 200 TAVR procedures. We have the most experienced TAVR team in Washington, Wyoming, Alaska, Montana, Idaho, and Oregon. We do about 12 TAVR surgeries each month, with excellent results.

What are the benefits of TAVR?

The original PARTNER study followed patients with severe AS. There were 2 parts of the study:

- One part compared TAVR using the Edwards Sapien transcatheter heart valve (THV) to traditional AVR. Patients in this part of the study were at high risk for traditional open heart surgery but still could have had it.
- Another part of the study compared TAVR to treating aortic stenosis with medicines in patients who could **not** have surgery.

Study Results

- **In patients who could NOT have open heart surgery:** TAVR with Edwards Sapien THV proved to be better than medicines. Patients who had TAVR had:
 - More ongoing benefits 1 to 2 years after TAVR, including fewer deaths and hospital stays.
 - Improved heart function, quality of life, and symptoms.
- **In patients who COULD have open heart surgery but were at high risk for it:** Results of TAVR with Edwards Sapien THV were similar to the results of surgery to replace the aortic valve.

- Rates of death from all causes were about the same in each group.
- Both TAVR with Edwards Sapien THV and traditional open heart surgery improved symptoms.
- The Edwards Sapien THV performed much like the valves used in *surgical aortic valve replacement (SAVR)*.
- In both the TAVR and SAVR groups, problems occurred during the procedures. Some of these events led to death from stroke or major bleeding. These problems were more common in the patients who had TAVR at first. The rates of occurrence became similar 1 to 2 years after the procedures.
- After 2 years, a comparison of patients who had TAVR and those who had open heart surgery showed that both groups had similar:
 - Levels of symptom improvement and other benefits
 - Survival rates

What are the overall risks of TAVR?

TAVR has a high success rate, but it does have risks. The biggest risks are:

- Bleeding
- Problems with the blood vessels that are used for the procedure, such as a tear or a bleeding complication
- Stroke
- Kidney failure
- Leaking between the diseased aortic valve and the new valve
- Abnormal heart rhythms, which may require medicine or a permanent pacemaker

Your Heart Team will talk with you about your specific risks based on your heart condition, past surgeries, and other diseases you may have.

Other concerns about TAVR include the risks of *general anesthesia* (medicine to put you in a deep sleep for the procedure), *pneumonia* (a lung infection), *arrhythmia* (abnormal heartbeat), and infection at the sites where the catheter enters your body.

What can I expect during my TAVR?

- You will have general anesthesia, which will put you into a deep sleep.

- Once you are asleep, you will be put on a breathing machine to help you breathe during surgery. To do this, a tube will be put down your throat. You will not feel this.
- During TAVR, your doctor will place a device called a *pacing wire* in your heart for a short time. This will make your heart beat very fast for a few seconds. This is done to limit blood flowing past the new valve when it is being placed. During these few seconds, you will have lower blood flow to your brain, kidneys, and other organs. Your doctor will remove the pacing wire after the procedure.
- Your doctor will use 3 methods to see inside your body during surgery. They are:
 - A type of X-ray called *fluoroscopy*. This will allow your doctor to see your heart as the TAVR surgery is being done. Fluoroscopy uses radiation. Your doctor will explain the risks of radiation to you.
 - A dye, or *contrast* material. This will make it easier for your doctor to see your aortic valve. Some patients may have an allergic reaction or kidney problems after receiving this dye. (See page 3 of the handout “Preparing for Your TAVR.”)
 - *Echocardiography*. In this type of ultrasound, a *scope* (a special probe) is usually placed in your esophagus, which lies right behind your heart. This allows your doctor to see all parts of your heart very clearly.

Types of TAVR

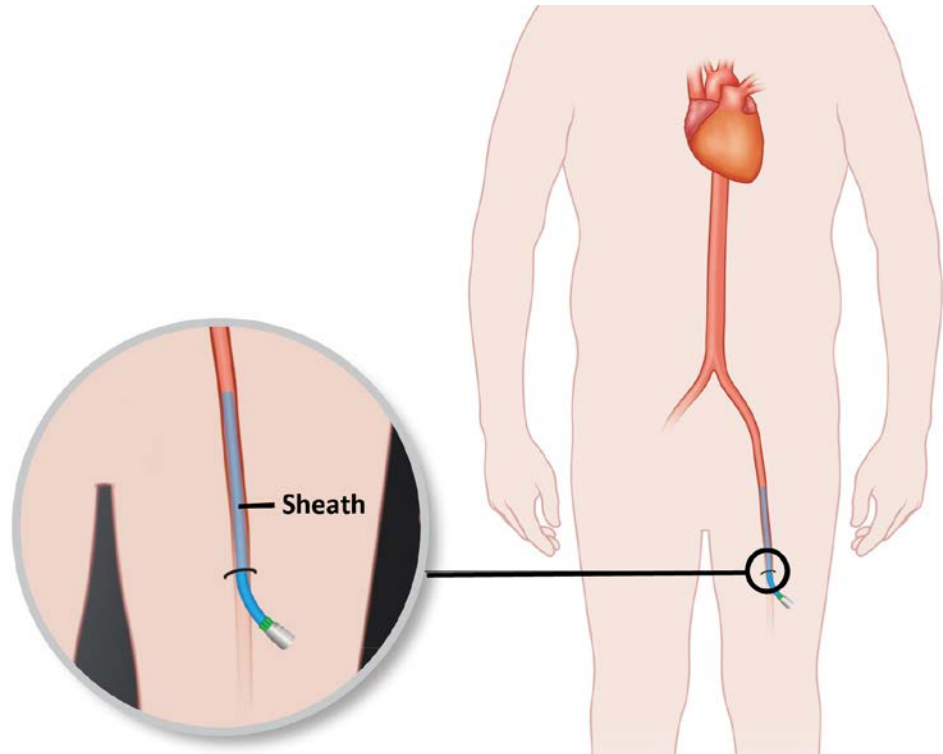
In this handout, we will describe 2 types of TAVR:

- *Transfemoral* aortic valve replacement
- *Transapical* aortic valve replacement

A third type of TAVR, called *transaortic* valve replacement, is explained in a separate handout. Ask your nurse for this information, if needed.

Transfemoral Aortic Valve Replacement

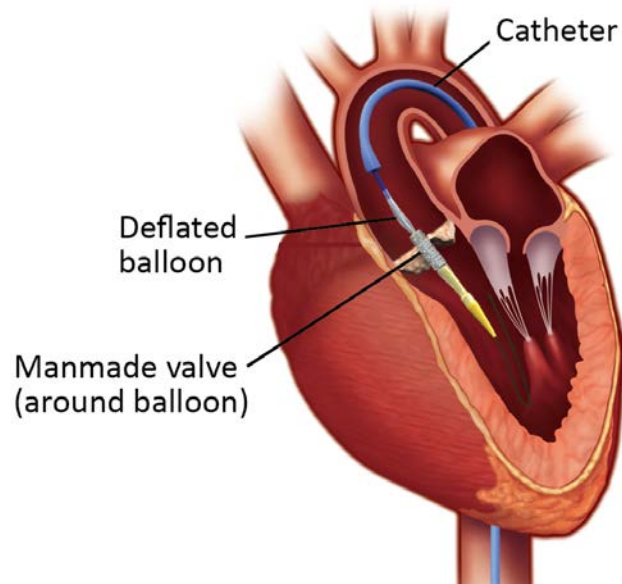
A transfemoral aortic valve replacement is done through your *femoral* artery. This artery is in your upper leg or groin (see drawing on page 6).



The catheter enters your body through the femoral (thigh) artery.

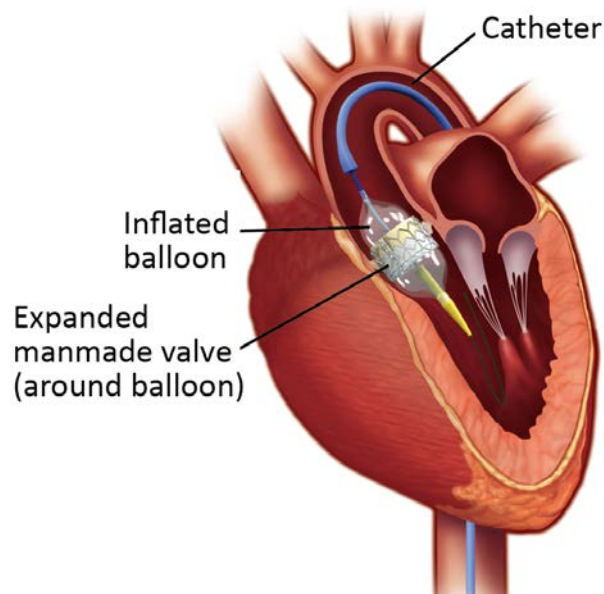
During this type of TAVR:

- After you receive anesthesia and are in a deep sleep, your doctors will make a small *incision* (cut) in your upper leg or lower groin.
- Next, your doctors will put a *sheath* (a hollow tube, a little wider than a pencil) through the incision and into your femoral artery.
- Your doctors will then put a catheter that has a deflated balloon on the end through the sheath. Your surgeon will move it through your femoral artery up to your aortic valve.
- Once the balloon reaches your aortic valve, your doctors will inflate the balloon with fluid. This will open your narrowed valve.
- After your valve is opened, your doctors will deflate the balloon and remove it from your artery.



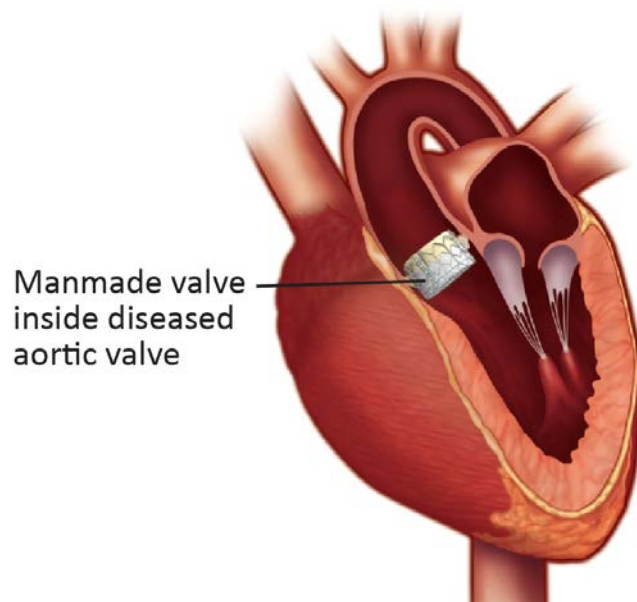
Crimped valve around the deflated balloon in your aortic valve.

- Next, your doctors will place the new heart valve around the deflated balloon. It will be crimped to make it small enough to fit through the sheath.
- Using fluoroscopy as a guide, your doctors will move the balloon and valve through your femoral artery up into your aortic valve.
- When the balloon and new valve reach your aortic valve, the balloon will be inflated with fluid again. This will allow the new valve around the balloon to expand inside your diseased valve.

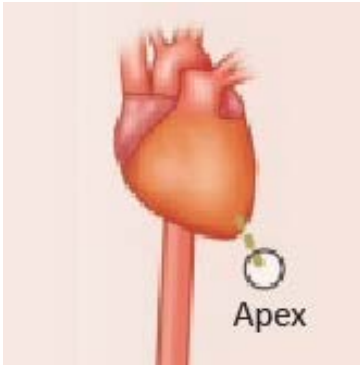


Inflated balloon with the expanded valve, inside the diseased aortic valve.

- As the valve is expanded, the new valve will push against the leaflets of your diseased valve. This will hold the new valve in place.
- Your doctors will keep your heart stable by speeding up your heart rate for a short time.
- When the new valve is in place, your doctors will deflate the balloon and remove it.
- Your doctors will make sure your new valve is working correctly before removing the sheath from your leg and closing your incision. If the new valve is not working correctly, you may need to have open heart surgery or another type of surgery.



Manmade valve in place after balloon and catheter are removed.



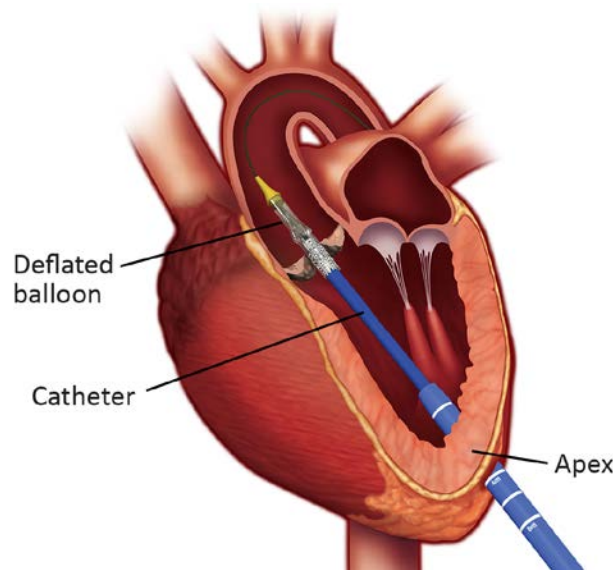
In transapical aortic valve replacement, the catheter is placed in the lowest tip of your heart, called the apex.

Transapical Aortic Valve Replacement

A transapical aortic valve replacement is done through the *apex* of your heart. This is the lowest tip of your heart (see drawing at left).

During this type of TAVR:

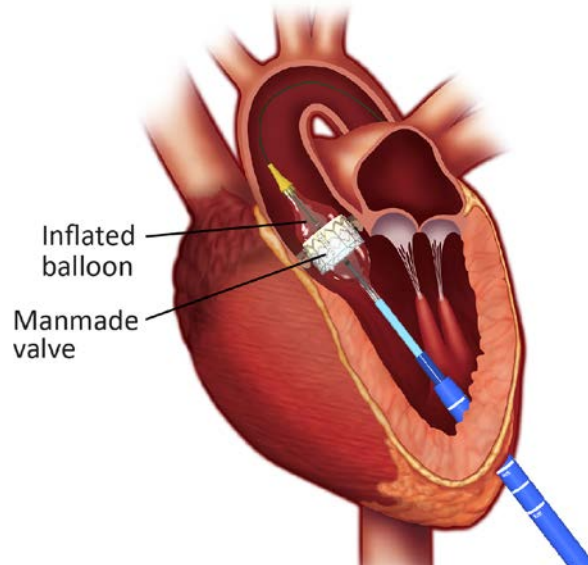
- After you receive anesthesia and are in a deep sleep, your surgeon will make a small *incision* (cut) in your chest between your ribs. This will allow your doctors to reach the apex of your heart.
- Next, your doctors will put a *sheath* (a hollow tube, a little wider than a pencil) through the incision into your apex, then into the left ventricle (the lower chamber of your heart on the left side).
- Your doctors will then put a catheter that has a deflated balloon on the end through the sheath. Your surgeon will move this through your left ventricle up to your aortic valve.
- Once the balloon reaches your aortic valve, your surgeon will inflate the balloon with fluid. This will open your narrowed valve.
- After your valve is opened, your surgeon will deflate the balloon and remove it from your ventricle.



The catheter with the deflated balloon enters your heart through the apex.

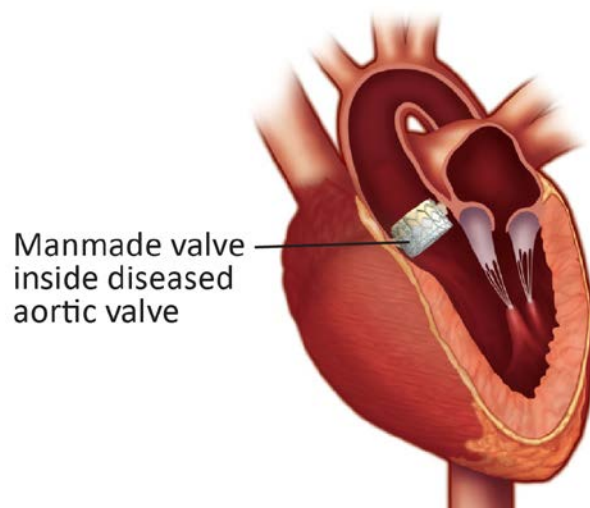
- Next, your doctors will place the new heart valve around the deflated balloon. It will be crimped to make it small enough to fit through the sheath. Using fluoroscopy to guide them, your doctors will move the balloon and valve through your ventricle and into your aortic valve.

- When the balloon and new valve reach your aortic valve, the balloon will be inflated with fluid again. This will allow the new valve around the balloon to expand inside your diseased valve.



The inflated balloon with the expanded manmade valve.

- As the valve is expanded, your doctors will keep your heart stable by speeding up your heart rate for a short time.
- The new valve will push against the leaflets of your diseased valve. This will hold the new valve in place.
- When the new valve is in place, your surgeon will deflate the balloon and remove it.



The manmade valve in place after the balloon and catheter are removed.

- Your TAVR team will make sure your new valve is working correctly. If it is, they will remove the sheath from your apex and close your incision with *sutures* (stitches). If the new valve is not working correctly, you may need to have open heart surgery or another type of surgery.

Your Hospital Stay After TAVR

Right after your surgery, you will be moved to the Intensive Care Unit (ICU). There, nurses will monitor you closely. Most patients stay in the ICU for 1 day after surgery.

From the ICU, you will go to a regular hospital room on the Cardiology unit of the hospital. Each day, you will get more active, as you are able. You will go from sitting in a chair to walking, and you will progress to eating regular meals and taking medicines by mouth. You will also work with physical and occupational therapists who will teach you how to move safely when you do your usual daily activities.

Most patients who have transfemoral aortic valve replacement stay in the hospital for 3 to 4 days after the procedure. Most patients who have transapical aortic valve replacement stay in the hospital for 4 to 5 days after the procedure.

By the time you leave the hospital, you will:

- Be walking on your own
- Be at your goal weight
- Have your follow-up visit scheduled
- Know who and when to call after you leave the hospital if you have any questions or concerns

If you are scheduled for transcatheter aortic valve replacement at UWMC, you will receive other handouts about what to expect during your hospital stay after surgery.

To Learn More

To learn more about aortic stenosis and TAVR, please visit www.newheartvalve.com.

Images in this handout are courtesy of Edwards Lifesciences.

Questions?

Your questions are important. Call your doctor or healthcare provider if you have questions or concerns.

Cardiac Services: 206.598.4300