

WHAT TO EXPECT WITH YOUR TAVR PROCEDURE



HENRY FORD HOSPITAL

A photograph of an elderly man with a white beard and hair, smiling broadly while fishing. He is wearing a tan fishing vest over a blue and white plaid shirt and light-colored pants. He is holding a fishing rod with both hands, and the background shows a calm body of water and a rocky shoreline.

CENTER FOR STRUCTURAL HEART DISEASE



After completing tests on your body and heart, the Structural Heart Team recommends a Transcatheter Aortic Valve Replacement (TAVR) as the best way to treat your heart valve issue. A team of highly trained Henry Ford heart specialists will replace your heart valve with a procedure that is less invasive than standard open heart surgery.

HOW IS THE TAVR PROCEDURE PERFORMED?

'Transcatheter' means we use a catheter (a small flexible, hollow tube) to place a new valve in the heart. Your Structural Heart Team will make a small opening in either a vessel or the chest wall, thread the catheter carrying the new valve on the end into the right position, and then open the valve snugly in place.

The transcatheter valve procedure can be performed from multiple different starting points:

- **Transfemoral TAVR:** a small opening is made for a catheter in a large artery in the groin

area at the top of the leg. The catheter is threaded through the leg artery, up the aorta around the arch and into the aortic valve for valve placement.

- **Transapical TAVR:** a three to four inch opening is made in the chest wall, between the ribs on the left side. The catheter is inserted through the chest wall, the heart wall and directly into the aortic valve for valve placement.
- **Transaortic TAVR:** a two to three inch opening is made at the top

of the breast bone. The catheter is inserted directly into the aorta and down into the aortic valve for valve placement.

- **Transcaval TAVR:** a small opening is made for a catheter in a large vein at the top of the leg (groin area). The catheter is inserted into the leg vein and threaded up the inferior vena, then crosses over from the vena cava into the abdominal aorta. The catheter continues up the aorta, around the arch and into the aortic valve for valve placement.

PREPARING FOR THE PROCEDURE

The amount of time until your procedure will depend on many things: your overall health, the severity of your symptoms, the type of procedure being performed and if you are involved in a research study assessing a new valve or technique. While you are waiting, continue to see your primary care provider or regular cardiologist for health issues. They remain responsible for your health and heart problems.

WHAT IF YOUR HEALTH CHANGES WHILE WAITING FOR YOUR PROCEDURE?

Aortic stenosis is a slowly worsening disease; over time the valve stiffens and has greater difficulty opening and closing causing less blood to push through. As the opening becomes narrower, many people become more tired, short of breath, or feel heaviness in their chest. You may notice a small increase in your symptoms

while you are waiting for your TAVR procedure. Have your regular heart provider continue to follow your symptoms during your wait. If there is a sudden change in your health or you are admitted to the hospital, please contact us.

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(313) 916-1878**

After we have been contacted, we will contact your doctor and may request your transfer to Henry Ford Hospital. In some cases it may be necessary to perform a balloon procedure on the diseased valve to temporarily improve the blood flow through the valve to allow time for your health and strength to improve.

GETTING READY FOR THE PROCEDURE

During the evaluation period for TAVR, write down any questions you may have about the procedure and the time afterwards. We encourage you to contact the Structural Heart Disease office and ask questions. It is better for you to have all your questions answered during the assessment time than to wait until the morning of the procedure. As you prepare:

MEET WITH OTHERS ON YOUR HEALTH CARE TEAM

The Structural Heart Team may ask you to see other health care providers as part of your evaluation. For example, a pulmonologist may help improve lung health, a physical therapist may help improve ability to move, a dietitian may provide instructions to improve your health through better eating, or a psychologist may help the heart valve team better understand how to provide the best care based on your needs.

PLAN FOR GOING HOME

You will need to have a plan for assistance when you return home before your heart valve procedure. Begin planning as soon as you know you are having TAVR. The length of your hospital stay will be anywhere from

two to 10 days, depending on the approach. We will plan for you to return home as soon as we think it is safe for you to leave, as most people recover better and faster when they are in their own home.

First, make arrangements for your transportation home. Ambulance service will not drive patients from the hospital to their home. If you live more than one hour from the hospital, you may prefer to stay one night in our apartment guest housing. Please call (313) 916-3299 for more information.

Next, you will need help when you return home. Most people say that it takes them one to two months to fully recover. We suggest that you arrange for someone to stay for at least the first week or longer to help as you rebuild your strength.

If you require more time for strength and re-conditioning, you may require home care assistance or transfer to an assisted or skilled nursing facility. Your Structural Heart Team will assist with these arrangements, if necessary.

GETTING READY FOR THE PROCEDURE

ADVANCE PLANNING

We also recommend you make a plan for the care you prefer if your health worsens. Start the conversation now with your loved ones. Choose someone you trust to be your Patient Advocate. Your advocate will make medical decisions if you are ever too sick or unable to make them yourself. Write down the treatment options you prefer on an Advance Directives and Durable Power of Attorney Health Care form. Talk with your family and your doctor about your future health care, in case there is a time you cannot speak for yourself. For more information, visit henryford.com/advancecareplanning

KEEP ACTIVE

Talk with your doctor or the Structural Heart Team for the level of activity best for you. Stay as active as you are able. Try to exercise every day, keeping your exercise sessions short if you are easily tired or have symptoms. If you develop shortness of breath, chest heaviness, dizziness or fatigue, then slow down and rest. The goal of activity is to maintain your muscle strength, which will help you in your recovery.

DRIVING

For people waiting for a heart valve replacement, we recommend no driving until after your procedure. However, talk with your doctor or the Structural Heart Team about whether or not driving is safe for you.

EAT HEALTHY

Healthy eating is important to help healing after your procedure. If you are on a low-salt or fluid-restricted diet, continue to follow these instructions.

TAKE YOUR MEDICATIONS

Continue to take your medications as prescribed. Although there are no medications that will reduce the calcium that has thickened and stiffened the heart valve, there are medications that help manage the symptoms.

DENTAL CARE

Good oral care is important. If you have your own teeth and have not had a dental exam within six months, arrange for a dental appointment promptly. If dental procedures are needed, have them done before your valve procedure. Bacteria in the mouth can infect the new valve. After your valve procedure, you will need to take antibiotics prior to dental work.

REGISTRY AND RESEARCH OPPORTUNITIES

The Center for Structural Heart Disease (CSHD) both leads and participates in numerous studies exploring new ways to treat heart valve problems. You may be approached about participating in a study if your CSHD physician thinks your heart problem may benefit from a new treatment option. Participating in a study is entirely up to you. We encourage you to ask questions and discuss with your family or support person in making the decision to participate.



YOUR PROCEDURE APPOINTMENT CALL

Our goal is to schedule your TAVR procedure in a timely fashion with as much advance notice as possible. You will receive a phone call to schedule your procedure date and to provide reporting instructions. This is a good time to bring up any additional health issues or to ask questions.

Please be aware that sometimes we need to cancel or postpone cases due to emergencies or other surgeries. If this occurs, we will reschedule your procedure as soon as possible.

At the time of scheduling your procedure, your health history will be reviewed.

- If you take blood thinners such as Coumadin (warfarin), Eliquis (apixaban) or Pradaxa (dabigatran), you will be given instructions on when to stop them before your procedure.
- If you take medications for diabetes, you will be given instructions on how to adjust your dose prior to coming to the hospital.
- Your allergy history will be reviewed. If you have an allergy to contrast dye, you will be given a prescription for medication to help prevent any

reactions during the procedure. This may be started prior to coming to the hospital or, if you are pre-admitted, after you arrive.

- In the week prior to your procedure, you will need to have blood and urine testing to help the team prepare for your procedure.
- You will receive instructions where to report on the day of your procedure and when to stop eating and drinking.

Some people need a Right Heart Catheterization (RHC) to measure the pressures in their heart prior to their procedure. This allows your Structural Heart Team to make adjustments to your medications or fluid status. You will be scheduled to arrive the day before the actual TAVR. The RHC involves the insertion of a special IV line called a 'Swan-Ganz catheter' through a large vein, usually on the right side of the neck. After the pressures in your heart are assessed, you will be transferred to the intensive care unit to spend the night.

If you do need a RHC, we will call you the afternoon of the day prior with your scheduled time and instructions.

THE DAY OF YOUR PROCEDURE

Do not eat or drink after the time identified in your scheduling call, except for sips of water with medications.

- You will receive special instructions during your scheduling call regarding diabetes medications (insulin and oral medications), anti-coagulants (Warfarin, Dabigatran, Apixaban) and if you have an IV dye allergy.
- You will report directly to the cardiac cath lab on K-2 in the Henry Ford Hospital Clinic (K) building.
- Your loved ones may join you in the cardiac cath lab after you have been settled prior to your procedure. They will be asked to provide a cell phone number for contacting while you are in the procedure or if they prefer to leave for a short while.
- Those with you will keep your personal belongings, and we will provide you with a hospital gown to wear.

WHAT TO BRING TO THE HOSPITAL

Items that you might need during your hospital stay:

- Toothbrush and toothpaste
- Comb or brush
- Slippers
- Glasses
- Hearing aides
- Reading materials
- Walking aides, such as walkers or a cane.

You may be moved from one room to another during your stay, so bring only items with little personal or monetary value as we do not want to risk losing anything of value during your stay.

If you do have glasses, hearing aides or dentures, if possible label or engrave them with your name and contact information.

GIVING CONSENT FOR YOUR PROCEDURE

Before the procedure, your doctor or one of our fellows or nurse practitioners will review the risks and benefits of the TAVR procedure. This is a good time to ask questions about all aspects of the procedure. You will be asked to read and sign a consent form that states you understand the risks and benefits of the procedure.

THE TAVR PROCEDURE

1. Your TAVR procedure will begin in the pre-procedure area in either the Cardiac Catherization Laboratory on K-2 OR the Pre-Anesthesia Care Unit (PACU) on level 4.
2. Two intravenous (IV) catheters will be started to administer medications and IV fluid.
3. You will be attached to a heart monitor so we can follow your heart rate and rhythm during the procedure.
4. You will also have a special intravenous catheter placed into an artery, usually in the wrist, to allow continuous monitoring of your blood pressure during the procedure.
5. You may have a catheter placed in your bladder to drain urine. This may be removed at the end of the procedure or as soon as you are able to stand to use the toilet.

ANESTHESIA

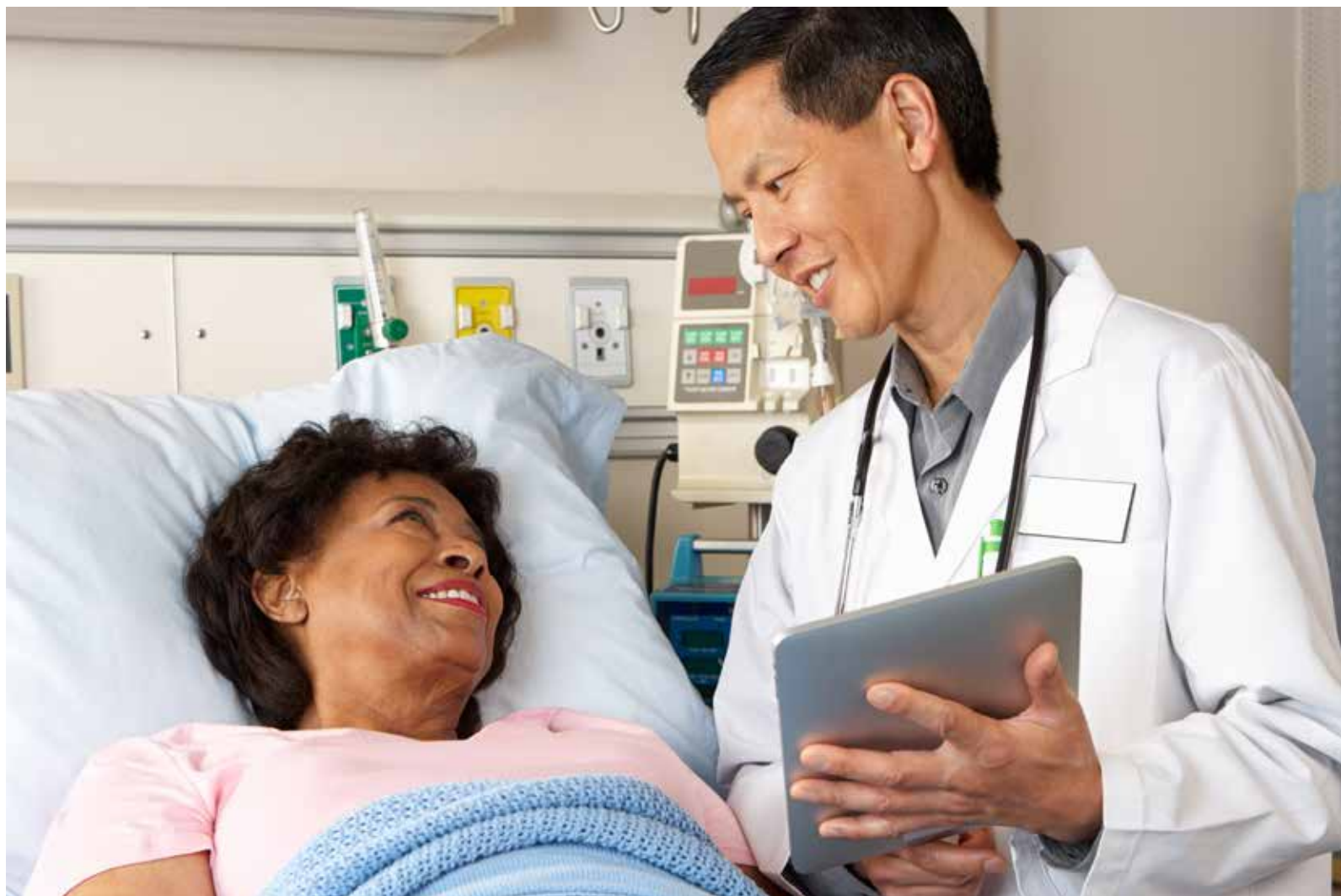
The anesthesia team will interview you in the pre-procedure area to help determine the level of anesthesia needed for your procedure. An anesthesiologist will give you medications to either make you sleep or become very relaxed during the procedure.

There are three levels of anesthesia:

- **General Anesthesia:** This anesthesia makes you sleep by causing all your muscles to relax, including the muscles of breathing. After you are asleep, specialists will place a tube in your throat and into your lungs to prevent any fluid from entering your lungs. This allows you to have oxygen and helps you breathe.

If you are worried about feelings of claustrophobia, please let the anesthesia team know prior to your procedure. They will be able to give you medicine to help you relax until the breathing tube is removed.

- **Moderate Sedation:** this anesthesia makes you feel relaxed and sleepy. You may doze off but are still able to follow simple instructions if needed. A breathing tube is generally not used with moderate sedation.
- **Local Anesthesia:** Includes medication which 'numbs' or 'freezes' the area in which the catheters are placed. This is to prevent pain or discomfort. When local anesthesia is used, a breathing tube is not needed.



DURING THE PROCEDURE

The TAVR procedure takes around three or four hours. The heart valve placement takes about 30 to 45 minutes. The remaining time is used putting in lines, making sure you are asleep, checking your breathing and removing lines when the procedure is complete.

- During all TAVR procedures: A pacemaker catheter is placed in a vessel (groin or neck) threaded up into the heart and placed in the right side of the heart to help control your heart rate during the procedure.
- Henry Ford Heart Specialists use a special x-ray machine to see inside your body, to guide catheters and valve placements.

IF YOU ARE HAVING TAVR THROUGH A LEG VESSEL (TRANSFEMORAL):

- An additional small opening is made in the vessel in the groin area. A catheter is placed and threaded through an artery, up the aorta and through the heart valve. In some patients the valve is first 'stretched' with a balloon procedure. In other patients, the valve is placed directly with the first catheter.
- Once the valve is placed, the catheter and wires are removed. The catheter site in the vessel is sutured with internal 'stitches' and a dressing is placed over the site.

IF YOU ARE HAVING TAVR THROUGH THE CHEST WALL (TRANSAPICAL OR TRANSAORTIC):

- A small incision is made in either the left side of your chest or through the upper part of the breast bone. The catheter is placed either directly into the bottom of the heart into the heart valve or into the upper part of the aorta and into the heart valve.
- A chest tube is placed to help drain any blood or fluid that builds up during the procedure.

- In some patients, the valve is first 'stretched' with a balloon procedure first. In other patients, the valve is placed directly with the first catheter.
- Once the valve is placed, the catheter and wires are removed. The site where the catheter was placed is closed with sutures. The chest wall or breast bone incision is closed with sutures.
- Dressings are placed over the incision sites.
- The chest tube may be left in place for a day or two to drain any fluid.

IF YOU ARE HAVING TAVR THROUGH A VEIN IN THE LEG (TRANSCAVAL):

The transcaval approach is a way to deliver the heart valve for people who are unable to have the procedure through the standard leg or chest wall approaches. This is usually because the leg arteries are too small, and surgeons determined a chest approach is not an option.

- A small, second opening is made in a vein in the groin area. A catheter is placed and threaded up through a large vein toward the heart. Partway up the body, the Structural Heart Team creates an opening and inserts a tunnel like catheter that crosses over into the aorta, allowing the catheter to travel to the heart valve. In some patients, your natural valve is first 'stretched' with a balloon procedure. In other patients, the new valve is placed directly with the first catheter.
- Once the valve is placed, the catheter and wires are removed. The crossover site is closed with a small plug.
- The catheter site in the vessel is sutured with internal 'stitches.' Dressing is placed over the site.

THE FIRST 24 HOURS AFTER TAVR

After TAVR, you will be cared for in the intensive care unit in a private room for at least one night.

EQUIPMENT

- You will continue to be attached to a heart monitor. The nurses will watch for changes in your heart rhythm.
- You will have an intravenous line in your neck and another in your arm.
- You may have a urinary catheter; the goal is to remove the catheter as soon as your period of bed rest is completed.
- The goal is to remove all major lines as soon as possible after your procedure. If you have a chest tube, our goal is to remove it the next day. But it is determined by how much drainage is present.
- In most cases, the breathing tube is removed prior to leaving the procedure room or shortly after arriving to the critical care area. If you wake up and find the tube is still in place, you will still be able to communicate.

POSITIONING

- If you had a procedure through the groin area (TF or TC TAVR), you will have a period of time in which you lie flat (two to four hours). This is to make sure bleeding at the site does not occur. Your nurse will assess your groin site frequently until your period of bed rest is complete. For an early morning case, the goal is to have you sitting up in a chair by the end of the day.
- If you had a procedure through your chest wall (TA or TAO TAVR), you will be able to raise your head up. As soon as your blood pressure and heart rate are stable, you will be out of bed and in a chair, usually the morning following surgery.

ACTIVITY

- Immediately following the procedure, there will be a period of bed rest only. This will be determined by the type of lines, your breathing status and the type of procedure you had. We will help you move in bed from side to side frequently. Your activity level will be increased as soon as safely possible. Our goal is to have you up and walking as soon as possible, preferably no later than the day after your procedure.
- You will be provided with an 'Incentive Spirometer,' a breathing exercise device to help encourage deep breathing to prevent lung congestion and infections. You will be encouraged to breathe into the Spirometer frequently.



THE FIRST 24 HOURS AFTER TAVR

NUTRITION

Once the anesthesia has worn off and you feel better, you may begin with chips of ice, progress to drinking clear liquids and then eating. If you were on dietary restrictions prior to your procedure, we will continue with the same afterward.

PAIN AND DISCOMFORT

You will receive medication to help relieve pain and discomfort. Let your nurse know about your pain. We can give you medication for pain relief.

- If you had a transfemoral or transcaval TAVR through the groin, you may have pain in the groin. You may also develop a large bruise that will likely last for weeks but will go away with time.
- If you had a transapical or transaortic TAVR through the chest wall, you may have pain in the chest area. After a chest wall procedure, deep breathing is important to prevent lung infections. If you experience pain, you may not breathe as deeply as needed.

To help manage your pain, we use a 'Pain Rating Scale' that uses numbers from zero to 10.

You will be asked "On a scale of zero to 10, where zero is no pain and 10 is the worst pain ever, how would you rate your pain right now?" This

is a standard scale that is used in all areas of the hospital and helps us compare your pain experience over time. Please don't hesitate to let your nurse know if you are having pain and where it rates on the pain scale.

Our goal is to keep your pain rating at two or less. If you have pain greater than two, we will give you pain medication. Do not worry about taking too much pain medicine. It is important for your recovery to control your pain so that you may progress forward. Your pain will decrease with time. As you recover, you will need less and milder pain medication.

VISITORS

At Henry Ford Hospital, we recognize the importance of family members and loved ones in your rest, care and healing. Our visitation policy was developed with the expectations for visitation, to reinforce a culture of safety, and to embrace a family-centered care philosophy. Providing care for you is our first priority.

Patients in the critical area may be very sick, so we limit the number of visitors to two at a time. Children under the age of 12 may not visit. General visitation hours are 10 a.m. to 8 p.m. Arrangements can be made with the nurse to allow one person to spend the night. Visitors may be asked to leave during patient care periods.

Guest housing is available on campus to allow family to remain nearby. Please call (313) 916-3299 in advance to make arrangements.

FOOD

Meal trays are provided for patients only. If desired, visitors may bring their own food or drink, or visit the Henry Ford Hospital café or restaurants. Eating and drinking is not permitted in the ICU. Visitors may either eat in the waiting rooms or in designated areas, such as the cafeteria or hospital restaurants.

FACILITIES

For infection control purposes, visitors are not permitted to use the patient's bathroom, including the shower, or lie down in the patient's bed. Please ask a staff member for accommodations. Flowers and live plants are prohibited in Intensive Care Units.

CELL PHONE USE

For patient privacy and to promote a healing environment, cell phone use by visitors is restricted in the Intensive Care Units and other units as determined by unit.

BELONGINGS FROM HOME

No personal belongings from home are allowed in the intensive care unit. We recommend you pack a bag with disposable personal items for your family to bring to you when you are transferred to the general telemetry unit.

MOVING TO GENERAL CARDIAC TELEMETRY UNIT

As soon as we feel your health has progressed and care needs are reduced, you will 'graduate' to a general nursing floor. For some, your progress may be so rapid that you may be discharged from the hospital directly from the critical care area.

You will notice that your nurse is caring for several patients instead of just one on a general floor. This is because the patients here are also recovering nicely as they prepare to leave the hospital. While you are

here, we will continue to watch your heart with a wireless heart monitor.

NUTRITION

For the first few days following your procedure, you may notice your appetite is smaller. It is important that you drink fluids and eat enough food to help in your recovery. If you have special dietary considerations, let your nurse know.

VISITORS

General visiting hours are 10 a.m. to 8 p.m. Visitors may be asked to

leave during patient care periods. Children 12 or older may visit but must be accompanied and supervised at all times by a responsible adult other than the patient. Visitation by children under the age of 12 must be pre-arranged with unit staff.

Arrangements can be made with the nurse to allow one person to spend the night. Guest housing is available on campus to allow family to remain nearby. Please call (313) 916-3299 in advance to make arrangements.

LEAVING THE HOSPITAL

Your time in the hospital will vary based on the type of procedure and your other health issues.

In general:

- Transfemoral TAVR patients can be ready to leave the hospital the second day after their procedure. The usual stay is four to five days.
- Transcaval TAVR patients usually stay six to eight days. They need additional evaluation to determine if the pathway has begun healing.
- Transapical or Transaortic patients usually need more time because it takes longer for the chest incision to stabilize and begin healing. They generally stay for five to seven days.

TESTS

Before you leave the hospital, you will need to have an Echo cardiogram to check the valve function and position and may need a chest X-ray to assess your lung status. If you were involved in a study, you will require additional assessments and blood tests.

ACTIVITY

Depending on your activity level and need for assistance in the hospital, you may be evaluated by Physical and/or Occupational Therapy coordinators to assess your need for activity support, assistive devices, home support or continued rehabilitation. For some people, their heart problem has caused them to become weak or unsteady. Short-term rehabilitation may be arranged by our case management with help from you and your family in order to help regain strength.

MEDICATIONS

Most people who undergo TAVR continue taking their regular heart medications after they leave the hospital. These will be reassessed at your follow-up visit. We may also prescribe medication to prevent clots from forming on your new valve by making your blood less 'sticky'.

Before you leave, we will provide you with detailed information on home expectations in our booklet "*Going Home After TAVR*".

FOLLOW-UP

After your procedure, you will need to be seen in the Center for Structural Heart Disease at one month and one year following your procedure. You will also continue to follow-up with your primary care physician and regular cardiologist after your heart valve is replaced.



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