



Screening for Transcatheter Aortic Valve Replacement (TAVR)



THE OHIO STATE UNIVERSITY
WEXNER MEDICAL CENTER



Table of Contents

About Your Condition

Aortic Stenosis	3
Transcatheter Aortic Valve Replacement (TAVR)	5
Screening for TAVR	7

Screening Tests

Cardiac Catheterization.....	9
Care After a Cardiac Cath.....	14
Echocardiogram	16
Stress Echocardiogram	17
Pulmonary Function Test	19
Carotid Artery Duplex Scan	21
CT (Computed Tomography) Scan	22
Type 1 Diabetes: Medicines before Tests or Surgery	24
Type 2 Diabetes: Medicines before Tests or Surgery	26

For a digital copy of this book, please visit go.osu.edu/pted3006.

Talk to your doctor or health care team if you have any questions about your care.

For more health information, go to wexnermedical.osu.edu/patiented or contact the Library for Health Information at 614-293-3707 or health-info@osu.edu.

© 2012 - November 27, 2019, The Ohio State University Wexner Medical Center.

Aortic Stenosis

About aortic stenosis and causes

Your heart has valves that help keep your blood moving in the right direction through your heart. One of the valves is called the aortic valve. It is between the pumping chamber of the heart, called the left ventricle, and a big blood vessel, called the aorta. The aorta carries blood to the rest of your body.

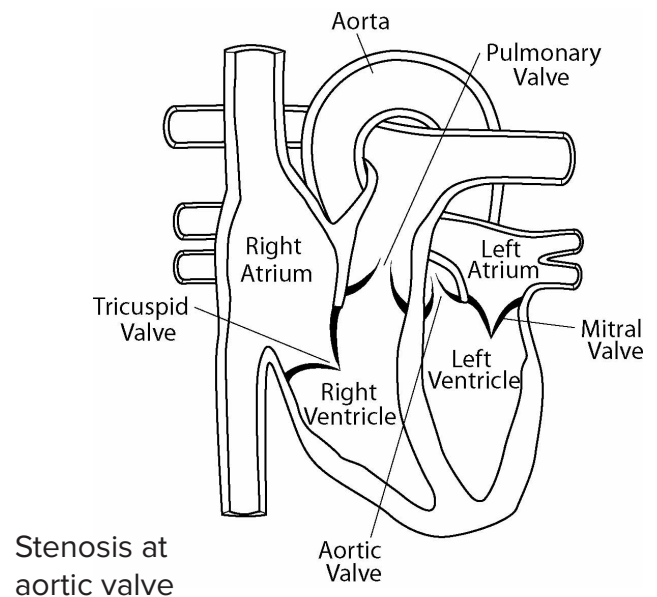
Aortic stenosis happens when the aortic valve does not open as well as it should because of calcium build-up on the valve. This causes the blood to be trapped, building up pressure inside the heart. The pressure over time causes the heart muscle to be stretched, so it does not pump as well.

There are several factors that may lead to aortic stenosis.

Factors for adults include:

- Aging, the most common factor
- Rheumatic fever
- Radiation treatments to the chest
- Some medicines

Children may also be born with this heart problem.



Signs of aortic stenosis

It may take some time for there to be signs of aortic stenosis. Your doctor may first hear a heart murmur or click when listening to your heart.

Signs may include:

- Feeling like you cannot catch your breath or having trouble breathing when you are active
- Chest pain that often gets better with rest
- Feeling faint, weak, or dizzy, most often with activity
- Feeling your heart beat is jumping, fluttering, or pounding, called palpitations

Aortic stenosis can lead to heart failure over time. Signs of heart failure include tiredness, problems with breathing, and swelling of your ankles and feet.

Treatment

Your treatment may include:

Medicines

They may be given to:

- Control your heart rhythm
- Control your blood pressure
- Lower your cholesterol

Balloon valvuloplasty

This treatment may be done to help open the valve. A thin tube, called a catheter, is guided into the heart to the aortic valve. A balloon on the end of the catheter is inflated. It stretches the valve opening. This may be used more often in children, but it can also be used in adults who are too sick to have surgery. A balloon valvuloplasty is a temporary treatment to allow the person to feel better until the valve can be repaired or replaced in surgery.

Valve replacement

This treatment is most often done through open heart surgery. The doctor removes the damaged valve and replaces it with a new valve.

Transcatheter aortic valve replacement (TAVR) or implantation (TAVI)

Instead of open heart surgery, a catheter is put in through the upper leg and guided into the heart to the aortic valve. A new valve is guided along the catheter and placed in the heart. This treatment is not available at all hospitals.

Transcatheter Aortic Valve Replacement (TAVR)

This procedure is done to replace the aortic valve in a less invasive way than open heart surgery, which means smaller incisions and an easier recovery. This is also known as a transcatheter aortic valve implantation or TAVI. You need to have some tests for screening to be sure you are able to have this procedure. These tests are described in the next sections.

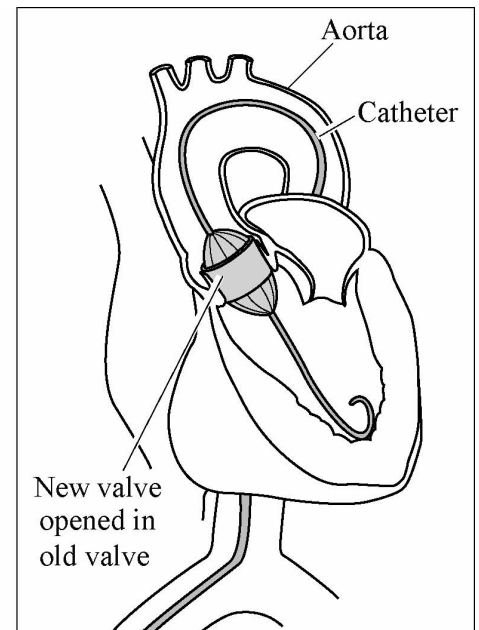
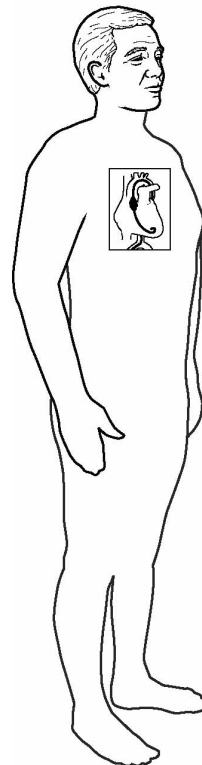
During this procedure, a catheter is placed in a blood vessel in your upper leg and guided through your heart to the aortic valve. A balloon on the end of the catheter is inflated to stretch the valve open. A new valve is then guided over the catheter to replace the old aortic valve.

How the procedure is done

Your doctor will talk to you about the procedure and explain the risks and benefits. You will be asked to sign a consent form.

This procedure is done in the Cardiac Catheterization Lab and will take 2 to 3 hours.

- You will be given medicine to make you sleepy, but you will not be completely asleep during the procedure.
- A temporary pacemaker will be placed. This will be removed right after or within 48 hours of the procedure.
- A special IV, called an arterial line, is placed to measure pressure in your heart during and after the procedure.
- The site used may be your upper leg or groin, or your chest near the breast bone. A puncture site is made to make an opening in the artery.
- A thin tube, called a catheter, is guided into the artery to the heart and to the aortic valve.



- A balloon on the end of the catheter is expanded in the aortic valve to open the valve. This makes room for the placement of the new aortic valve. The new artificial valve is guided over the catheter and into the aortic valve.
- The new valve is opened in the heart inside the old valve and it starts to work. The catheter is removed, and the puncture site is closed and covered with a dressing.

After the procedure

- You will be moved to the recovery room and closely checked. After a few hours, you will be moved to your room. Your heart rate, blood pressure, and breathing will be watched.
- You will be helped to get up within the first day after the procedure.
- Expect to stay in the hospital for 1 to 3 days after the new valve is placed.

Your care at home

- You will be taught how to care for the site where the catheter was put in.
- Take all of the medicines your doctor has ordered.
- You will need to have follow up care with your doctor here at Ohio State Wexner Medical Center at 30 days and 1 year after the procedure to check that the valve is working. Be sure to keep these appointments.
- Tell your dentist and all of your doctors that you have had a heart valve replaced. This is because you will need to take antibiotics to reduce the risk of infection before any dental or medical procedures are done.
- If you are scheduled for a magnetic resonance imaging scan or MRI, be sure the staff knows that you have a heart valve replacement and that it is safe to have an MRI.

Screening for TAVR

There are a number of tests that need to be done to see if you are able to have the TAVR procedure. This is called screening and takes about 4 weeks to complete.

Based on your screening results, you may:

- Be scheduled for aortic valve replacement surgery.
- Be scheduled for the TAVR procedure.
- Need to have more testing.
- Be told that you are not able to have the procedure.

Screening visits

You will need to make at least 2 visits for the screening at Ohio State Richard M. Ross Heart Hospital.

- A consult visit with the cardiologist and CT surgeon to examine you and review your records.
- A visit for a CT scan.

Other testing may be scheduled at your local hospital or the Ross Heart Hospital. If you have tests at another health care facility other than Ohio State, you may be given different instructions for that test than what is in this book. **The results of tests done outside of The Ohio State University Wexner Medical Center should be faxed to 614-685-0135.**

Screening tests

An overview of the tests you may need is listed here. You will be given dates and times for each of the tests you need to have done. Be sure to keep your appointments.

You will have:

- **Cardiac Catheterization** to check that the blood vessels on the outside of your heart are not blocked.
- **CT Chest Scan** of your body from your neck to your upper legs to check that your blood vessels are large enough for the catheters to fit for the procedure and that the area where the new valve needs to be placed is not too small or too large.
- **Echocardiogram** to check the structure of your aortic valve and the other valves and chambers of your heart to see how they are functioning.
- **Electrocardiogram** (ECG or EKG) to check your heart rate and rhythm.

- **Blood tests.**
- **Urine tests** including a urine culture to check for infection.
- **MRSA (methicillin resistant staph aureus) screening** to check if you carry this germ. A cotton tipped stick is used to swab the inside of your nose.

You may have:

- **Ankle Brachial Index** to check the blood pressure in your arm and legs.
- **Dobutamine Stress Echocardiogram** to check your heart function when your heart is given medicine, called dobutamine, to make it work harder. This test is done when the pumping function of the heart is reduced.
- **Pulmonary Function Test** to check how well your lungs are working.
- **Carotid Artery Duplex Study** to make sure the blood vessels in your neck that supply your brain are not blocked.

You can ask for more information about any of these tests.

Reviewing your results

When the screening process is complete, your health record and test results will be reviewed by a group of doctors. They will decide whether you are able to have this procedure.

If you have any questions about your screening process or if you need to reschedule any of your appointments, please call 614-366-8506.

Cardiac Catheterization

Cardiac Cath, Heart Cath, or Coronary Angiogram

Why the procedure is done

A cardiac catheterization is done to check the chambers, valves, and arteries of the heart. The procedure may be done on the right side, the left side, or both sides of your heart.

Your doctor may use the cardiac cath to:

- Diagnose heart and lung diseases, such as coronary heart disease, heart failure, and pulmonary hypertension.
- Provide treatment for heart disease.
- Check how well your heart is working before or after surgery.
- Measure blood flow, pressures, and oxygen levels in parts of the heart.
- Remove samples of blood or tissue for testing.

Based on why you had the procedure and the results of your cardiac cath, your doctor may recommend:

- No treatment changes
- Medicines
- Surgery
- Other procedures

Prep instructions

You will be called by Cath Lab Scheduling to review these instructions with you. Please make notes of any questions you may want to ask about the procedure or your prep.

If you take prescription medicines, **you may need to change or stop certain medicines** before this procedure. See the **Medicine Review** section for more information. Cath Lab Scheduling will give you more information if needed.

Be sure to tell staff if you have:

- **Any allergies**, or have **had problems with contrast dye** in the past.
- Any problems with bleeding.
- Problems lying flat.
- Trouble having blood drawn or getting IVs started.
- Any other planned procedures or surgeries scheduled.
- Concerns about paying for your medicines or other concerns.

Important things to know

- **Please review all of the instructions** as soon as you get them, so you can prepare. You may need to change some of your medicines.
- **Arrange to have an adult drive you** to your procedure and be there to take you home after. If you are taking a cab, bus, or other transportation service, an adult needs to ride with you for your safety.
- **Questions about your procedure** or need to change your appointment? Call Ross Heart Hospital: 614-293-8372 or East Hospital: 614-685-6961.
- **Questions about your insurance coverage?** Call Precertification at 614-685-5958.

Start clear liquids at midnight before procedure

You may eat your regular meals until midnight before your procedure. From midnight, drink only clear liquids until 2 hours before your test. *

These clear liquids are allowed:

- Water.
- Fruit juices that you can see through, such as apple, white cranberry, or white grape
- Popsicles or ice chips.
- Ginger ale or lemon-lime soda.
- Gatorade, other sports drinks or other drink mixes like Kool-Aid.
- Clear broth or bouillon.
- Jell-o.
- Coffee or tea (no milk or cream added).

*If your procedure is **scheduled after 10 AM**, **you can eat a light breakfast before 6 AM** of an egg and a piece of toast or a small bowl of cereal with milk. After that, only clear liquids until 2 hours before your procedure.

Take a shower or bath

Either the evening before or the morning of your procedure, take a shower or bath. You will not be able to shower or bathe for the first 24 hours after your procedure.

Morning of your procedure

- Take your medicines for blood pressure, heart issues, seizures, or pain with a sip of water **up to 2 hours before** your procedure as directed.
- Female patients should come prepared to give a urine sample in case a pregnancy test is needed.
- **Your driver must be present when you sign in to proceed with your test.**
- Bring these with you to your test:
 - ☐ All of your medicines in their prescription bottles that you are scheduled to take during the day.
 - ☐ A list of all medicines, including prescription and over the counter medicines, and any vitamin or herbal products you are taking.
 - ☐ A list of your allergies.
 - ☐ List of medical conditions and previous surgeries.
 - ☐ A copy of advanced directives, such as a living will or power of attorney.
 - ☐ Your photo identification, insurance card, and co-payment, if needed.
 - ☐ CPAP machine if you use one at home for sleep apnea.
 - ☐ Overnight bag packed with personal items and toiletries, in case you need to stay at the hospital. Leave this in the car until you know if you will need to stay.
- Please leave all valuables and jewelry, including piercings, at home or have your driver keep them for you.

Plan to arrive at ____AM the day your procedure is scheduled.

Before the procedure

- Your doctor will talk to you about the procedure and have you sign a consent form.
- You will need to wear a hospital gown. You can wear your glasses, dentures, and hearing aids.
- Empty your bladder before going to the procedure room.
- You will have an intravenous line (IV) put in to give you fluids and medicines during the procedure.
- Your family will be shown to a waiting area to wait until your procedure is done.

Having the procedure

The procedure is done in a special room, called the **Cath Lab**. It looks like an operating room and will feel cool. Gowns, gloves, and masks will be worn by the staff in the room.

Lights will be dim so the doctor can see the screen.

- You will be awake during the cath but you may be given medicine through your IV to help you relax. You will have small patches, called leads, placed on your body to check your heart rate during the procedure.
- The technician will scrub your arm and leg sites. Hair may be cut from the leg site, if needed, using a clipper. Often the arm site is used, but both sites will be prepared.
- Numbing medicine will be injected at the site.
- A needle is put into a vein for a right heart cath or an artery in the arm or upper leg for a left heart cath. A flexible wire is threaded through the needle and then the catheter is put over the wire in the blood vessel.
- You may feel some pressure as the catheter is put in. You may also feel some skipped heart beats as the catheter passes into the chambers of your heart.

- **Tell the staff if you feel any pressure, pain, problems with breathing or other discomfort during the procedure.**
- The doctor guides the catheter toward the heart using an x-ray screen. When the catheter is in position, a medicine, called contrast or dye, is put through the catheter. Dye lets the doctor see the coronary arteries and the chambers of the heart on the screen.
- You may feel warm, flushed, tingling and maybe some nausea for 20 to 30 seconds while the dye is injected. Some people feel a slight headache.
- Blood samples are taken and pressures are measured during the procedure.
- If stents are needed, the doctor will place them using the catheter.
- The doctor and other staff will talk to you during the procedure.
- The catheter is removed when the procedure is done. Pressure may be applied to the site to prevent bleeding.
- The procedure lasts about an hour.

After the procedure

- You will be taken to the recovery room.
- Your nurse will check your blood pressure, heart rate, and breathing during the next 2 to 4 hours. Pulses will also be checked in your arms, legs, and feet. The access site will be checked often for signs of bleeding.
- **Tell your nurse right away if you notice any swelling or bleeding in this area or if you feel pain, numbness, or tingling in your arm or leg.**

You will be given more specific discharge instructions before you are sent home.

Results of your procedure

Your doctor will talk with you after the catheterization to explain the results of your procedure.

Coronary heart disease

Cardiac cath is most often done to check for and treat **coronary heart disease (CHD)**, also called coronary artery disease (CAD). This is blockage or narrowing from a build up of plaque in the blood vessels, called **coronary arteries**, that supply oxygen to your heart muscle.

Chest pain, called **angina**, is often a sign of coronary heart disease. A **heart attack** happens when the blood flow to heart muscle is stopped, causing permanent damage to heart muscle. A cardiac cath may be done as an emergency treatment for a heart attack to prevent more damage.

Treatment for a heart blockage or a heart attack during a cardiac cath is called **percutaneous coronary intervention (PCI)** or **coronary angioplasty**. A balloon is used to push the plaque against the artery walls to open up the vessel to let more blood flow. A small wire cage or tube, called a stent, may also be placed to keep the artery open.

The stent may also be called a cardiac stent or coronary stent. If you have many places with blockage or narrowing, your doctor may place more than one stent to keep your heart arteries open.

Types of heart stents

There are two main types of heart stents:

- **Bare metal stent.**
- **Drug-eluting stent** that is coated with medicine to help prevent blood clots and scar tissue from forming.

Talk to your doctor about what type of stent is best for you.

If you have a stent placed, you will need to take **aspirin and other blood thinner medicines to prevent blood clots** from forming in the stent. How long you take these medicines will depend on the type of stent you get and your risk of forming blood clots.

Medicine review

Blood thinner medicines

Continue to take these medicines to prevent blood clots up to and even on the day of your procedure:

- Aspirin
- Brilinta (Ticagrelor)
- Effient (Prasugrel)
- Plavix (Clopidogrel)

Other medicines to prevent blood clots may need to be stopped for a few days to reduce your chance of bleeding during the procedure, such as:

- Arixtra (Fondaparinux)
- Coumadin (Warfarin)
- Eliquis (Apixaban)
- Fragmin (Dalteparin)
- Heparin
- Jantoven (Warfarin)
- Lovenox (Enoxaparin)
- Pradaxa (Dabigatran)
- Savaysa (Edoxaban)
- Xarelto (Rivaroxaban)

You will be given **instructions about these medicines when Cath Lab Scheduling calls** you to go over preparing for your procedure.

Diabetes medicines

Please review:

- Type 1 Diabetes Medicines before Tests or Surgery (page 24) - or -
- Type 2 Diabetes Medicines before Tests or Surgery (page 26)

Water pills or diuretics

Do not take water pills, such as Lasix (furosemide), Bumex (bumetanide), or Demadex (torsemide), the morning of your procedure unless you are not able to lay flat because of trouble breathing if you do not take them.

Medicines for pulmonary hypertension, erectile dysfunction (ED) or benign prostatic hypertrophy (BPH)

Let the Cath Lab know If you take these medicines:

- Adcirca, Cialis (Tadalafil)
- Viagra, Revatio (Sildenafil)
- Levitra, Staxyn (Vardenafil)

These medicines may interact with other medicines given during the procedure.

For erectile dysfunction or benign prostatic hypertrophy, stop this medicine for 48 hours before your procedure.

Other medicines

For most other medicines, such as blood pressure medicines, you should take your dose as usual the morning of your procedure.

Location of procedure

Your procedure is scheduled at:

❑ Ohio State Ross Heart Hospital 452 W. 10th Avenue Columbus, OH 43210

- › Use valet parking in front of the hospital or park in the SAFEAUTO Hospitals Garage.
- › Register in the main lobby on the first floor.

❑ Ohio State East Hospital 181 Taylor Avenue Columbus, OH 43203

- › Free parking is available in a lot off of Hawthorne Avenue, across from the hospital's main entrance.
- › Register in the main lobby on the first floor.

Care After a Cardiac Cath

Leg Site or Wrist Site

If You Have a Leg Site

What to expect

- For up to a week after your procedure, your leg site may be sore, tender, and have some bruising.
- You may have a small lump at the site that should not get larger. You may have this for 2 or 3 weeks.
- You may have a small amount of oozing from the site when the scab comes off.

Food and drink

- You can return to your usual diet.
- **Drink 6 to 8 cups of water each of the next 2 days** to help flush the contrast medicine or dye from your body unless directed by your doctor to limit fluids.

Care of your leg site

- You may shower 24 hours after your procedure and remove the bandage over your leg site.
- Gently clean the site each day with soap and water and then pat dry. Do NOT scrub the site.
- **Do NOT soak your leg site in water for 7 days after the procedure or until the site is fully healed.** This means no soaking in a bath tub, hot tub, swimming pool, or other water where your leg site would be under water.
- **Do NOT put any lotions, powders, or ointments on the site for 7 days or until the site is fully healed.**

- After you remove the bandage, you can cover the site with a band-aid for the next day or two if your clothes rub the site. Otherwise, leave the site uncovered.
- Check each day for any change in redness, swelling, bruising, and drainage.

Activity limits

- **Do NOT lift, push, or pull more than 8 to 10 pounds for 7 days.** A gallon of milk weighs just over 8 pounds.
- **Avoid movements and activities that may cause strain on the leg site.** This could include straining when having a bowel movement, bending, squatting, doing yard work, playing sports, or lifting, pushing or pulling more than 10 pounds.
- **No driving or sexual activity for 48 hours after the procedure.**

If You Have a Wrist Site

What to expect

- For up to 5 days after your procedure, your wrist site may be sore, tender, and have some bruising.
- You may have a small lump at the site that should not get larger. It should go away after 7 to 10 days.
- You may have a small amount of oozing from the site for 48 hours after the procedure if a scab comes off.

Food and drink

- You can return to your usual diet.
- **Drink 6 to 8 cups of water each of the next 2 days** to help flush the contrast medicine or dye from your body after the procedure unless your doctor directed you to limit your fluids.

Care of your wrist site

- You may shower 24 hours after your procedure and remove the bandage over your wrist site.
- Gently clean the site each day with soap and water and then pat dry. Do not scrub the site.
- **Do NOT soak your wrist site in water for 3 days after procedure or until the site is fully healed.** This means no soaking in the sink, bath tub, hot tub, swimming pool, or other places where your wrist site would be under water.
- **Do NOT put any lotions, powders, or ointments on the site for 7 days or until the site is fully healed.**
- After you remove the bandage, you can cover the site with a band-aid for the next day or two if your clothes rub the site. Otherwise, leave the site uncovered.
- Check the site each day for any change in redness, swelling, bruising, and drainage.

Activity limits

- **Do NOT lift, push, or pull more than 5 pounds for 7 days or until the site is healed.** A gallon of milk weighs just over 8 pounds.
- **Limit twisting and bending the wrist site for 3 days.**
- **No driving for 24 hours** unless directed by your doctor.

When to call your doctor about your leg or wrist site

Call your doctor if you have:

- More redness, swelling, bruising, pain or drainage at the site.
- White or yellow drainage with an odor from the site.

Weekdays from 8 AM and 5 PM call:

- Ross Heart Hospital Cath Lab:
614-293-8385
- East Hospital Cath Lab:
614-257-3571

After 5 PM, on weekends, or if you are not able to reach your doctor, call the Ohio State operator at 614-293-8000 and ask for the Cardiology attending doctor on call.

Call 911 or get emergency care if you have:

- Chest pain, shortness of breath, or any unusual symptoms including chills, fever, nausea or vomiting.
- Bleeding that does not stop after applying direct pressure.
 - For leg sites, call after 30 minutes of applying pressure and still having bleeding.
 - For wrist sites, call after 15 minutes of applying pressure and still having bleeding.

Echocardiogram

About the test

An echocardiogram is also called an echo, cardiac ultrasound, or ultrasound of the heart. It takes moving pictures of the heart using sound waves and is painless. This test allows the doctor to see your heart beating, the size and shape of your heart, and how well your heart's chambers and valves are working. The test takes about an hour or less to do.

If a **Doppler** ultrasound is being used, the doctor will also be able to see the movement of blood through your heart. During the test, you will be able to hear the “whooshing” sound of blood moving through your heart and the sound of your heart valves opening and closing.

Sometimes the pictures do not show the muscle of the heart well. If this happens, **contrast medicine** can be injected into a vein in your arm to see your heart better. A doctor will decide if contrast is needed and safe to give with your medical history.

You do not need to do anything to prepare for the test. Eat, drink, and take your medicines as you normally would.

During the test

- You will be taken to the ultrasound room. This room is dimly lit and has an exam table and the ultrasound machine.
- You will be asked to remove your clothing from the waist up and will be given a hospital gown.
- You lie on your left side on the table.
- Small pads, called electrodes, are placed on your chest to allow staff to monitor your heart's electrical activity. This is called an ECG.
- Warmed gel is placed on a wand, called a transducer. The wand sends and receives the sound waves. Gel is used between the wand and your skin to help the sound waves enter your chest.
- The sound waves are converted into moving pictures of the heart on the computer screen. The structures of the heart appear as white objects, while any fluid or blood appears black.
- The wand will be moved around, so different views of your heart can be seen. You will feel moderate pressure against your skin. Let staff know if you are uncomfortable.
- You may be asked to change positions or hold your breath for a short time during the test.
- If an imaging agent is needed (contrast), a nurse will put a very small tube, called an intravenous (IV) catheter, in your arm to give you the contrast. You may be monitored for another 30 minutes after. The contrast does not last long in the body and is low risk. Most of it is removed from the body through normal breathing.
- Several recordings of your heart will be taken. These recordings will be put on a computer disk for a heart specialist, called a cardiologist, to review.

After the test, you can go back to your normal activities. The results will be sent to your doctor who will review the results with you.

Stress Echocardiogram

About the test

A stress echocardiogram, also called a stress echo, is a test that uses sound waves to show moving pictures of your heart. The pictures are recorded while your heart is at rest and then after stress when your heart beats faster. The sound waves are from an ultrasound probe. The sounds bounce back to the probe to create pictures of your heart on a screen. The test will show if there are parts of your heart that may not be getting enough blood and oxygen because of blocked arteries, a type of blood vessel.

Preparing for the test

- **Do not eat for 2 hours before your test.** You may have small sips of water, but no other drinks and do not eat any food.
- Take your medicines with sips of water only. If you are taking heart medicines, check with your doctor about whether you should take those before the test.
- Bring a list of all of the medicines you are taking. Include prescription and over the counter medicines, and any herbal and vitamin supplements you take.
- Bring your insurance card(s) with you. There will be some forms to fill out.
- Wear tennis shoes or other good walking shoes and comfortable clothes.
- Do not apply lotion, oil, perfume, or powder to your chest before this test.

During the test

- You will need to remove all of your clothing above your waist. You will be given a hospital gown to wear for the test.
- Use the restroom before the test, so you will not need to go during the test.
- Small patches are placed on your chest. Wires are connected to the patches to record your heart rate, called an ECG or electrocardiogram.
- During the test, your heart rate, and blood pressure are checked. You also will be asked how you feel.
- Tell the doctor or nurse if you are having any pain, pressure, shortness of breath, dizziness, or other unusual feelings during the test.
- If images are difficult to obtain, there may be a need to use an imaging agent, called contrast medicine. A small needle with a tube, called an IV, will be placed in one of your arms to give the imaging agent. The imaging agent allows for better definition of your heart.
- You lie on your left side. The probe with gel is placed on your chest. Pictures are taken of your heart at rest.

- For the next part of the test, your heart needs to be stressed. This will be done by one of these ways:
 - With exercise by having you walk on a treadmill. Every few minutes, the speed and slope will increase to make your heart work harder. When your heart rate gets high enough, you will get off of the treadmill and pictures will be quickly taken of your heart.
 - Using medicine, called dobutamine, that makes your heart beat faster and harder. The medicine is given in your IV during the test. You will only have this if your test is at Ross Heart Hospital or East Hospital. Pictures are taken with the probe as your heart beats faster and harder. When your heart rate gets high enough, the medicine is stopped and a last set of pictures is taken.
- Your heart rate will be checked for about 10 minutes after your test.
- The patches are taken off your chest, and you will be able to get back into your own clothes.
- You can return to your usual activity after the test unless your doctor has given you other directions. You may feel a little tired after the test.

Getting your results

A doctor with special training in heart care, called a cardiologist, will view the pictures along with your ECG from the test. He or she will send the results to your doctor who will share them with you.

Your test location

Your test will be done at:

- ☐ **Ohio State Ross Heart Hospital, Cardiac Non-Invasive Labs**
452 West 10th Avenue, Columbus, OH 43210
- ☐ **Ohio State Medical Services and Heart & Vascular Center at Stoneridge**
3900 Stoneridge Lane, Suite A, Dublin, OH 43017
- ☐ **Outpatient Care Gahanna**
920 North Hamilton Road, Suite 400, Gahanna, OH 43230

For questions or to cancel or change your appointment at any of the places listed above, please call 614-293-7677.

- ☐ **Ohio State East Hospital**
181 Taylor Avenue, Columbus, Ohio 43203
Come into the main entrance and check at the desk for directions.

For questions or to cancel or change your appointment at East Hospital, please call 614-257-2222.

Pulmonary Function Test

About the test

The pulmonary function test is done to check the function of your lungs. The test measures both the amount of air you move in and out of your lungs, and how easy it is for you to breathe.

The test may be done to:

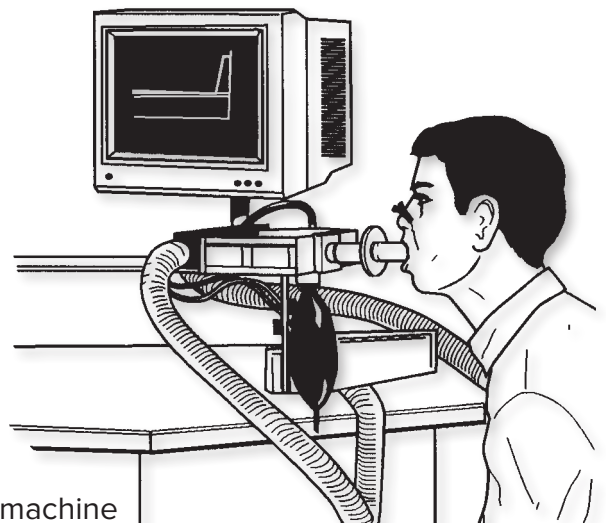
- Help your doctor diagnose lung disease or other lung conditions, like asthma.
- Monitor how your lung function may change over time.
- Help find what treatment may help you.
- Before surgery to check if you are at risk for breathing problems

Before the test

- Before your test, it is important to talk with a member of your health care team about all medicines you take, including all the medicines ordered by any of your doctors, herbs, vitamins and over-the-counter medicines. You may be told to stop taking some medicines for a period of time before your test.
- Do not smoke for at least 1 hour before your test.
- Do not drink alcohol at least 4 hours before your test.
- Do not do vigorous exercise at least 30 minutes before your test.
- Do not wear tight clothes to your test. Tight clothes may make you unable to take a full, deep breath during your test.
- Do not eat a large meal at least 2 hours before your test. A full stomach may make you unable to take a full, deep breath during your test.

During the test

- Pulmonary function tests are done in the Pulmonary Function Laboratory. A Respiratory Therapist will help you complete these tests.
- Your therapist will tell you what you will do for each test. You may be asked to breathe in as deeply as you can and then blow air out as fast as you can. You also may be asked to breathe normally, and then take in a big breath and hold it several seconds. You may repeat tests several times to make sure your measurements are accurate.



Pulmonary function test machine

- A nose clip will be put on your nose during the tests. This is done to make sure you only breathe through your mouth. If air escapes through your nose, the measurements may not be accurate.
- You may be given a medicine to inhale (breathe in). Tests will be done to see how well this medicine works.
- These tests can make you tired or short of breath. If needed, you can take rest breaks during the tests.
- Blood tests may be done to check the amount of oxygen, carbon dioxide and/or hemoglobin in your blood.

After the test

- The results of the test are reported to your doctor. Your doctor will then discuss the test results with you.
- There are no side effects from these tests. You may feel tired and want to rest after the test is over.

Carotid Artery Duplex Scan

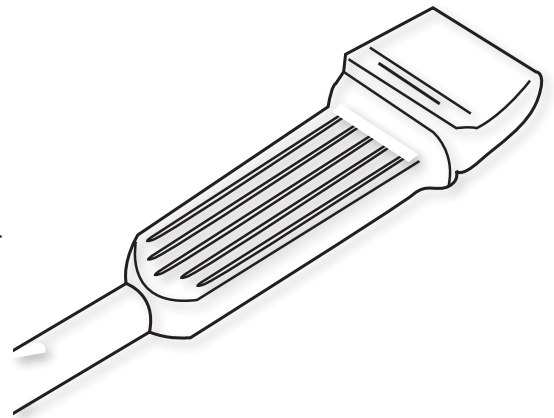
The carotid duplex scan is used to check the neck arteries for blockage in the blood flow that goes to the head.

How the test is done

The test is painless and takes about 45 to 60 minutes to do. You will be awake during the test and asked to sit in a comfortable reclining chair. The room will be darkened.

During the test, a cool gel will be put on your neck. A hand held Doppler probe will be moved over the arteries from your collar bone up to your jaw. The probe looks like a microphone. You will feel pressure as it is moved over your neck, but this does not hurt. Both sides of the neck will be checked.

As the probe passes over your artery, you will hear a whooshing sound. This sound is from the blood as it flows under the Doppler. At the same time, a picture of your artery will be seen on a small screen.



Doppler probe

After the test

- The results of the test are reported to your doctor. Your doctor will then discuss the test results with you.
- There are no side effects from these tests. You may feel tired and want to rest after the test is over.

CT Scan

About CT scans

A CT (computed tomography) scan is an x-ray scan using a special x-ray machine and computer. This scan creates pictures of thin slices or segments of your body.

The type of scan can be used to see the heart's arteries and veins. It can show pictures of how blood flows through the heart's arteries and where the blood flow may be slowed or blocked, called a Coronary Artery CT Scan.

In some cases, a medicine, called contrast, will be injected through a small needle or an intravenous (IV) line. This medicine allows certain parts of your body to show up on the CT scan, such as veins and arteries.

Preparing for the CT scan

- If you are not on any fluid restrictions from your doctor, you will need to increase the amount of water you drink the **evening before your test**. You should drink at least 5 (8-ounce) glasses of water or until your urine looks clear. This will help flush the contrast medicine from your body when the test is finished.
- **Do not eat or drink anything except water for 4 hours before your scan.**
- You should continue to drink water the day of your scan, so your urine continues to appear clear.
- You may take your normal medicines with water before the scan.
- **If you have diabetes**, talk to your doctor about any medicines you take and whether those medicines need changed before your CT scan.
- **If you have decreased kidney function**, you will need to be given extra fluids by IV 1 hour before and 2 hours after the your scan. This is arranged before your appointment.

Have questions about radiation?

At The Ohio State University Wexner Medical Center, we work hard to make sure you receive the lowest dose of radiation possible for your test. The radiation doses for our tests are lower than national averages and some of the lowest in the area. The dose you receive will be on the report from the radiologist.

Pregnant or allergic to contrast?

Tell the radiology technologist if you are pregnant or think you may be pregnant.

Tell the radiology technologist if you have an allergy to contrast medicines.

Need to reschedule or have other questions?

If you are not able to keep your appointment, call radiology scheduling at 614-293-4333. Please call us with any other questions you have.

Day of your appointment

- **Arrive 30 minutes before your appointment time.**
- Please bring a list of your medicines to your appointment. Include prescriptions and over the counter medicines, herbal products, and vitamins.
- Bring your photo ID and insurance card with you.
- After you arrive, a registered technologist will review your medical and surgical history with you.
- Before your scan, we may check your kidney function. We may check your pregnancy status if you are a woman of childbearing age.

During your scan

- A technologist will help you onto the CT table and position you to be as comfortable as possible for the scan.
- You will be asked to hold your breath and to stay still while the images are taken.
- If you need contrast medicine for your scan, it will be injected through a small needle or an intravenous (IV) line. You may get a warm feeling when the contrast medicine is injected. This is normal and goes away after a few seconds. Please tell the technologist if you have any other unusual sensations or feelings.
- If you have a subcutaneous (under the skin) port that is power injectable, bring documentation with you that states your port is power injectable, and tell your technologist.
- **Be prepared to be in the Radiology Department for 30 minutes for your scan.**

After your scan

- If you have no other tests scheduled, you will be able to go back to your normal diet and activities. No special care is needed.
- If you had contrast medicine, drink 8 (8-ounce) cups of liquid, such as, water, apple juice, or Sprite to flush the contrast medicine out of your body. Limit the amount of caffeine you drink.
- The radiologist, a doctor who specializes in radiology, will study your images very carefully and send a final report to your doctor.
- **If you have any problems or questions after your scan, call your doctor.**

Type 1 Diabetes: Medicines before Tests or Surgery

If you are not sure how to adjust your diabetes medicines, talk to your doctor or nurse before your test or surgery date. Follow your doctor's directions if they are different than these guidelines.

Diabetes medicines may need to be stopped or changed before a test or surgery. This is important for your health. There is less of a chance for infection or other problems if your blood sugar is in the normal range before a test or surgery.

- **If you are on a clear liquid diet the day before your test or surgery**, call your doctor to check if you need to make other changes to your medicine dose.
- **Check your blood sugar the morning of your test or surgery.** If it is above 250 or less than 70, call your doctor for more instructions. High or low blood sugars may result in a delay or cancellation of your test or surgery that day.
- **Tell your nurse that you have diabetes** when you arrive at the test area or at pre-operative holding area.



Your insulin

These are general guidelines for how to take insulin before tests or surgery. Many patients with type 1 diabetes need a small reduction in basal insulin before tests or surgery. Check with your doctor to see how much insulin you need and if you need to follow different guidelines.

- ❑ **If you take Humalog/Admelog (lispro), Novolog (aspart), Apidra (glulisine), Fiasp (aspart) or Regular insulin, do not take the dose the morning of your test or surgery.**
 - You can start your usual dose after your test or surgery when you are able to eat and drink.
 - Plan to check your blood sugar at least 4 times each day for the next 1 to 2 days after your test or surgery.
- ❑ **If you take Levemir (detemir), Lantus (glargine), Basaglar (glargine), Tresiba (degludec), or Toujeo (glargine) insulin, reduce your dose either the evening before or the morning of your test or surgery to 80%.**

If you multiply your usual dose by 0.8, that gives you the reduced dose. For example, if your usual dose is 32 units, $32 \times 0.8 = 25.6$. Your reduced dose would be about 26 units. A reduced dose chart is on the next page for your reference.

- **If you are not sure, ask your doctor how much insulin you should take.** Take _____ units of _____ on the night before or the morning of your test or surgery.
- If you are able to eat and drink after your test or surgery, take your usual evening dose.
- Plan to check your blood sugar at least 4 times each day for 1 to 2 days after your test or surgery.

If you wear an insulin pump

- ☐ **And your test or surgery is less than 3 hours**, you and your doctor may decide to keep the pump on.
 - Place the catheter in a location away from the area where the test or surgery will occur.
 - Consider using a **temporary basal profile** based on 0.8 of your usual basal. Reduce the basal rates down by multiplying the set basal rates by 0.8, starting with the 12:00 midnight basal rate through the test or surgery and recovery. **Discuss this with your doctor.**
 - Return to your usual basal rates after the test or surgery when you are able to eat and drink.
 - Plan to check your blood sugars more often for the next 1 to 2 days after your test or surgery.
- ☐ **And your test or surgery is longer than 3 hours or your doctor takes you off the insulin pump**, take _____ units of _____ on the morning of your test or surgery.

Type 2 Diabetes: Medicines before Tests or Surgery

If you are not sure how to adjust your diabetes medicines, talk to your doctor or nurse before your test or surgery date. Follow your doctor's directions if they are different than these guidelines.

Diabetes medicines may need to be stopped or changed before a test or surgery. This is important for your health. There is less of a chance for infection or other problems if your blood sugar is in the normal range before a test or surgery.

- **If you are on a clear liquid diet the day before your test or surgery,** call your doctor to check if you need to make other changes to your medicine dose.
- **Check your blood sugar the morning of your test or surgery.** If it is above 250 or less than 70, call your doctor for more instructions. High or low blood sugars may result in a delay or cancellation of your test or surgery that day.
- **Tell your nurse that you have diabetes** when you arrive at the test area or at pre-operative holding area.

Your oral diabetes medicines

These are general guidelines for how to take insulin before tests or surgery. Check with your doctor to see how much insulin you need and if you need to follow different guidelines.

- ☐ **If you are having a test or surgery that includes IV contrast dye and you take Glucophage, also called metformin, or any other medicine that has metformin in it, such as Metaglip, Glucovance, Avandamet or ACTO plus Met:**
 - Do not take metformin the day of your test or surgery. You should take your last dose on _____(date).
 - Do not take this medicine for 2 days after your test or surgery. Restart this medicine on the third day after your test or surgery.
 - If you are not sure if you will have a test with IV contrast, call your doctor to find out.
- ☐ **If you are having a same day test or surgery and you take other diabetes pills:**
 - Do not take your diabetes pills in the morning before your test or surgery.
 - If your test or surgery is done before noon and you are able to eat and drink, take your morning diabetes medicine after your test or surgery.
 - If your test or surgery is done after noon and you are able to eat and drink, take your diabetes medicine at the next scheduled time. You will skip your morning dose.
- ☐ **Check your blood sugar at least 4 times each day for the next 1 to 2 days after your test or surgery.**



If you take insulin

- ❑ **If you take Humalog (lispro), Novolog (aspart), Apidra (glulisine), Fiasp (aspart) or Regular insulin:**
 - Do not take the dose the morning of your test or surgery.
 - You can start your usual dose after your test or surgery when you are able to eat and drink.
 - Plan to check your blood sugar at least 4 times each day for the next 1 to 2 days after your test or surgery.
- ❑ **If you take Levemir (detemir), Glargine or Lantus (glargine), Basaglar (glargine), Tresiba (degludec), or Toujeo (glargine) insulin:**
 - Cut your dose in half the evening before or the morning of your test or surgery. For example, if your usual dose is 32 units, $32/2 = 16$. Your reduced dose would be 16 units.
 - **If you are not sure, ask your doctor how much insulin you should take.** Take _____ units of _____ on the night before or the morning of your test or surgery.
 - If you are able to eat and drink after your test or surgery, take your usual evening dose.
 - Plan to check your blood sugars at least 4 times each day for 1 to 2 days after your test or surgery.
- ❑ **If you take NPH, 70/30, 75/25, or 50/50 insulin:**
 - Reduce your evening dose the day before your test or surgery to 50%. **If you are not sure, ask your doctor how much insulin you should take.**
 - Also, reduce your morning dose by $\frac{1}{2}$ or 50% of your usual dose the day of your test or surgery. For example, if your usual morning dose is 30 units, you would take only 15 units. Take _____ units of _____ the morning of your test or surgery.
 - If you are able to eat and drink after your test or surgery, resume your usual evening dose.
 - Plan to check your blood sugars at least 4 times each day for 1 to 2 days after your test or surgery.



THE OHIO STATE UNIVERSITY

WEXNER MEDICAL CENTER

wexnermedical.osu.edu