

Preparing for cardiac surgery

Surgery date

We often do not know the final operating room schedule for a particular day until the evening before. Last minute changes in the date or time of your surgery may be needed to care for critically ill or emergency patients. Someone will call you the evening before surgery to confirm your time of surgery. We thank you in advance for your understanding.

Your preadmission testing (PAT) visit

Some patients come into the hospital a day or more before their surgery. These patients may not have a PAT visit. Your surgeon's office will let you know if this applies to you.

- You will be scheduled for a visit with the preadmission testing (PAT) team. This is an in-person visit at the hospital. You will meet a variety of clinicians to make final preparations for your surgery.
- The nurse in PAT will go over all your medications with you. For your PAT visit, please be prepared to discuss everything you take or may take in the weeks leading up to surgery, including doses. This includes prescription and non-prescription medications, vitamins, herbs, and supplements.
- If you have diabetes and wear a glucose monitor, please discuss this with the PAT team. They will provide further instructions.

GET HELP RIGHT AWAY

Always call 911 for serious problems, such as:

- fainting,
- chest pain that doesn't go away,
- or severe shortness of breath.

If you are having a valve repair or replacement

- You need to **see a dentist** within six months of your surgery to make sure you don't have any signs of infection. Infections in this area can cause complications with valve surgery.
- Your dentist must send us a letter on official letterhead that includes:
 - Your name
 - Your date of birth
 - A note stating you do not have any signs or symptoms of infection.
- Please ask your dentist to fax the letter to us at **617-632-7562**. If you or your dentist needs to reach us directly, please call 617-632-8383.

Let us know

Please call your surgeon's office at **617-632-8383** if any of the following occur in the days/weeks leading up to your surgery. Someone is available 24 hours a day, 7 days a week. Call for:

- Worsening chest pain or shortness of breath. (For chest pain that won't go away, or severe shortness of breath, call 911.)
- You get a fever, cold, cough, flu, or other illness while you are waiting for surgery.
- You have questions about your medications.
- You have diabetes, and your finger stick is over 200.

If you are waiting in the hospital for your surgery, your nurse will make sure your preparations are complete.

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Days/weeks before surgery

Medications

You will receive **specific instructions** regarding any changes in your medications you'll need to make in the days leading up to your surgery, and on the day of surgery itself. Be sure your talk with your surgeon and the PAT nurse about anything you take or might take as you prepare for your surgery. This includes prescription medications, nonprescription medications, vitamins, herbs, and supplements. A chart where you can write down specific instructions about your medications is included with this packet. See "Medications and Preoperative Checklist."

Do not make changes on your own. Wait for instructions. In particular, please be sure you've talked with your surgeon or the preadmission nurse about any adjustments to the following types of medications you take or may take in the weeks leading up to your surgery.

- Diabetes medication, including **metformin** and **insulin**
- Anticoagulant/**blood thinning** medication, including **aspirin**
- Diuretics ("water pills")
- Certain blood pressure/heart failure medications (**ACE inhibitors**)
- **Medication you may take for pain**, such as ibuprofen (Motrin, Advil), naproxen (Aleve), celecoxib (Celebrex), etc.
- Vitamins, herbs, or supplements, especially **fish oil** (these must be stopped 7 days before surgery)
- **Steroids**
- Your surgeon and preadmission nurse will tell you about any other changes you need to make in medications. **Continue to take all other medication as usual**, including beta blockers, unless you have been told not to by your surgeon or the preadmission nurse.
- If you have any questions about what to take and not to take, please contact your surgeon's office at **617-632-8383**.

If you have diabetes —

If your blood sugar is low after midnight or in the morning before surgery (less than 70 or you feel signs of low blood sugar), please take:

- glucose (15 grams), **OR**
- 4 ounces of apple juice, **OR**
- 5 sugar packets

Smoking and alcohol

- **Please do not smoke.** If you do smoke, please make sure your surgeon knows. This is important for your care.
- It is important that you **stop smoking** at least two weeks before your surgery. Talk to your doctor if you need help not smoking in the weeks/days leading up to your surgery.
- **Alcohol** — Please be sure your surgeon knows how much alcohol you drink. It's important that your surgeon has accurate information about your alcohol consumption. You will be told whether you need to decrease or stop drinking alcohol before surgery.

If surgery is delayed or postponed — In very rare cases, your surgery may need to be significantly delayed or even postponed. If this happens, and you've made changes in your medications in preparation for surgery, be sure to ask what to do about your medications while you wait.

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Evening before surgery

- **Please shower** the night before (AND the morning of your surgery) with an antiseptic soap called “chlorhexidine gluconate” (CHG) or “Hibiclens.” Remove all jewelry, including body piercing jewelry, before showering. Do not put jewelry back on until after your surgery.
- Your **showering instructions** are included in this packet. The instructions tell you to scrub the “area of surgery” for three minutes. Your area of surgery will be your chest, and possibly your legs if you are having bypass surgery.
- **Starting at 8 hours before your arrival time at the hospital**, stop eating solid food and drink only clear liquids. You may drink clear liquids up until two hours before your arrival time at the hospital. Clear liquids are: water; apple or white grape juice; black coffee or tea; Kool-Aid; Gatorade; Propel; water-based popsicles (no frozen fruit bars; no ice cream bars); Jell-O (without fruit); fat-free clear broth; any clear preoperative drinks recommended by your surgeon.

On the morning of surgery

- ⊘ DO NOT smoke.
- ⊘ STOP eating solid food eight hours before your arrival time. Stop drinking clear liquids two hours before arrival time. Your surgery will be canceled if these instructions are not followed.
- ⊘ DO NOT wear jewelry, including wedding rings and body piercing jewelry.
- ⊘ DO NOT wear makeup, body lotion, nail polish, or contact lenses.
- ⊘ DO NOT bring valuables to the hospital including insurance cards, credit cards, driver’s license. The hospital cannot be responsible for valuables.

To help with communication, we ask that your family **designate one “spokesperson”** who can receive information from our team, and then relay it to the rest of your family and friends. It’s best if the same person serves as spokesperson throughout your hospital stay.

Morning of surgery

- Stop **solid food** eight hours before arrival time; stop **clear liquids** two hours before arrival time.
- Please **shower again** on the day of surgery using the special CHG soap.
- Follow the instructions you received from your surgeon or preadmission nurse about **what medications to take and not take** on the day of surgery.
- If you wear glasses or dentures, you may wear them to the hospital. You may also bring your cell phone and charger. But please make arrangements to give them to a family member or friend before you go into the operating room.
- If you use a sleep apnea machine, please bring it with you. Make sure it is clean and in good working order, with no frayed wires.
- Please be sure you are at the hospital at the “arrival time” you were given.

GOOD TO KNOW

You may feel a variety of strong emotions as your day of surgery approaches. Some fear is normal for both you and those close to you. Help is available if worries or fears become too much. If you need help, talk to your surgeon or primary care physician.

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Arrival

- Your surgery will be on the West Campus at BIDMC. You will be given information about where to report when you arrive, and where your family may park.
- If you have any questions, please call our office at 617-632-8383.

In the preoperative area

- You will meet your preoperative nurse, who will be happy to answer any questions you may have or address any concerns.
- Tell your nurse how your spokesperson can be reached when your surgery is over.
- You will be helped into a hospital gown.
- You will meet members of your surgical team. You may be asked many of the same questions by different people you meet. Some of the questions may seem silly. (“What operation are you having today?”) This is for your safety. Please answer all the questions completely, even if you think we have the information.
- Someone may clip the hair in the area of surgery to reduce the chance of infection. **Please do not shave** in the area of your surgery.
- One or more intravenous lines (IVs) will be started. Local anesthetic, similar to Novocain, is used when these lines are put in.
- You will be given medication to help you relax before surgery. You may start to feel sleepy or lightheaded. Please do not get up to walk after this medication is given. If you need something, ask your nurse for help.

In the operating room

- You will be awake but sleepy when you are brought into the operating room. You will be helped onto the operating table.
- Soon after, your anesthesia will be given and you will fall asleep quickly. You will not be able to hear or feel anything during surgery.
- After you are asleep, a tube will be placed through your mouth and into your airways to help you breathe. A catheter will be placed in your bladder to drain your urine. These will still be in place when you first wake up after surgery.
- Some patients need transfusions of blood products during or after surgery. If you have any questions about blood transfusions, please discuss them with your surgeon.

Family and friends

- Visiting policies are subject to change. Please check the visitor information at bidmc.org for the most current policies. The person bringing you in may or may not be able to park and come in with you.
- During surgery, those waiting for you can receive general information from the Surgical Liaison Service. The liaison service can be reached by page at 617-632-8611, pager 30375.
- When your surgery is over, your surgeon will contact your family in person or by phone to report on your condition. Whenever possible, one of the nurses caring for you will also speak to your family about your condition.
- After you leave the operating room, your spokesperson can get general information about your condition by calling the cardiac surgery intensive care unit at 617-754-4650.

Medications and Preoperative Checklist

Please use this sheet to keep track of instructions you are given regarding your medications. On the inside is a checklist of key points from your packet that you'll want to remember, along with some additional tips to make sure everything goes as smoothly as possible.

My medications

Use this grid to keep track of any changes to your medications that your nurse or doctor has told you to make in the days before your surgery. The first one is filled in; this applies to everyone. Use the lines to fill in your own medications and your instructions about each one.

If you need more space there is more room on the back.

Medication	Instructions from my surgeon/nurse	Notes
Vitamins, herbs, and supplements, especially fish oil	STOP these 7 days before surgery	

Check off these key steps.

- If you are having **valve surgery**, make sure you have seen your dentist within six months of your surgery and that the dental office has faxed a clearance letter to us at 617-632-7562.
- You have **reviewed your medications** with the surgeon and the preadmission nurse. You understand what medications you may need to stop or change, and when. You know what medications to take and not take on the day of surgery.
- If you take **vitamins, supplements, or fish oil**, you will stop them 7 days before your surgery.
- You have **CHG wash** (chlorhexidine gluconate, or Hibiclens) and you know how to preform showers the night before and the morning of surgery. **Do not shave** the area of your surgery.
- You know your **arrival time** at the hospital and where to report.
- You will stop eating **solid food** 8 hours before your arrival time and start drinking only clear liquids. You will **stop clear liquids** 2 hours before your arrival time.

Make sure you have:

- Someone to stay with you** for the first week at home. If you live alone, please plan before your surgery for someone to help look after you. Talk to your care team if you are having trouble finding someone.
- A **scale** so you can weigh yourself every morning after you use the bathroom. (You will let your doctor know if your weight goes up more than 2 pounds in a day or more than 5 pounds in a week.)
- A working **thermometer** so you can check your temperature before bed every night. (You will let your doctor know if your temperature is 100.5° or higher.)
- Plain white, non-scented bar soap** (for example, Dove or Ivory) to wash your incisions.
- A **mirror** you can use to look at your incisions each day, **and/or a family member/friend** who will help you look at and care for your incisions. You'll be watching for redness, drainage, or any areas of opening.
- A **pill organizer** and an **alarm** to remind you to take your medications. Never take medications directly from the bottle! You may forget if you took it or not. Pour out your medications ahead of time into a pill organizer. You may also want to get a pill splitter at your local pharmacy. You may be asked to cut some medications tablets in half.
- Extra-strength Tylenol (acetaminophen), 500 mg.** Most patients will be asked to use this as part of their pain management plan, unless they cannot take it due to an allergy or other issue. You may use the generic (acetaminophen) or brand name (Tylenol).

Make sure to:

- ❑ **Clear paths** between the bedroom, bathroom, kitchen, and living room. Move anything that's in the way. Remove accent rugs that you could trip on.
- ❑ Place **chairs** along any long stretches of open space in your home so you can rest if you become tired or dizzy.
- ❑ Find a **recliner or comfortable chair** that you can easily get into and out of, without using your arms to push or pull yourself.
- ❑ Make sure **items** you may need or use frequently **are within easy reach** (for example, not on a top shelf).
- ❑ **Organize your home** so you can focus on resting when you return.
- ❑ **If you are employed,** complete and submit all necessary paperwork for a leave of absence or any other benefits you may receive.
- ❑ Leave **a list of emergency phone numbers** in a prominent place in your home, so those helping you can easily find it. Include numbers for your surgeon, primary care provider, and family or friends as needed.

Identify one or more family members or friends who can:

- ❑ Help you **shower** during the first week at home, or be close by while you shower in case you need help.
- ❑ Do your **grocery shopping** and **laundry** for the first 10 weeks; help with other chores that require pushing/pulling (for example, vacuuming), pet care.
- ❑ **Drive you** to appointments for 4-6 weeks. (You will not be able to drive until your surgeon says it is ok.)
- ❑ Be a **source of encouragement,** motivation, and support as you recover and as you make “heart-healthy” choices.
- ❑ **Listen to you** and support you if you are feeling frustrated, depressed, or upset. It's common to have mood swings and strong emotions after surgery. Knowing this is normal may help you get through the rough times. However, you'll be advised to call your primary care provider for help if these feelings are severe.

While a variety of people may help you in your recovery, as noted in your packet, it's important that you identify **one spokesperson** who receives information from your care team and relays it to the rest of your family and friends as you have directed. This starts right after surgery and continues through your recovery. Your spokesperson can be any adult you choose. It does not have to be your Health Care Proxy.

Medication	Instructions from my surgeon/nurse	Notes

Additional notes:

Preoperative showering instructions

At BIDMC, we are taking steps to reduce the chance of infection after surgery. Washing with a special soap reduces the number of germs on your skin. Your surgeon has asked that you follow the instructions below to clean your skin at home before your surgery.

You will need to **shower the night before and the morning of surgery with a special antiseptic soap called chlorhexidine gluconate (CHG)**. You can purchase this soap at the drugstore if you have not received it from your surgeon or the hospital. It is called either “chlorhexidine gluconate (CHG) antiseptic soap” or “Hibiclens” and may come in 2% or 4% strengths. You may use either.

Note: Do not use CHG soap/Hibiclens:

- **above your chin or in your genital area (you may use regular soap on these areas)**
- **on any skin that is not intact, or on any open wounds**
- **if you have an allergy to chlorhexidine-containing products**

Showering procedure: *Complete the night before AND the morning of surgery*

- In the shower, **wash and rinse your hair first using your normal shampoo**. Make sure you **completely rinse the shampoo** from your hair and body.
- **Wet your entire body**. Then **turn the water off or move away from the water spray**.
- **Apply the CHG soap** to your body, starting under your chin. **Do NOT use it near your eyes, ears, nose, or mouth. If you get CHG in your eyes, rinse well with warm water.**
- Gently wash your entire body from the chin down, **staying out of the water spray** as you wash. **Gently wash the area(s) where your surgery will be for about three minutes**. (Do not wash your area of surgery with CHG if it is above the chin, unless you have been told otherwise. Do not use CHG in your genital area.) If possible, have someone help you wash areas you can't reach, such as your back.
- **If you have difficulty completing the wash** because you can't reach certain areas, or for any other reason, **please tell your nurse** when you get to the medical center.
- Once you have completed the wash, **rinse the CHG soap off your body completely. Do not wash with regular soap after you have used the antiseptic CHG soap**.
- **Pat yourself dry** with a clean, freshly-washed towel. **Do not apply any powders, lotion, or perfume**. Dress with **clean, freshly-washed clothes or pajamas**. Make sure the **sheets on your bed are freshly cleaned** before you get into bed the night before surgery.
- **Do not shave** in the area of your body where your surgery will be performed.

Your hospital stay

Immediately after your surgery, you will be taken to the cardiac surgery intensive care unit (ICU). When you are ready, you will be moved to the cardiac surgery postoperative unit. Although many patients move to the postoperative unit (regular room) the day after surgery, a number of things can affect the timing of your transfer, including your body's own response to surgery, bed availability, and other factors.

Cardiac Surgery ICU

- The cardiac surgery ICU is a large, busy place. Here, a team of specially trained doctors, nurses, respiratory therapists, and others provide constant care and monitoring.
- You will start to wake up several hours after your surgery. You may see several people around your bed. This is routine. Many patients feel confused and anxious when they first wake up. Try to remember that you are never left alone in the ICU, and you are being watched very carefully.
- When you first wake up, you will be connected to intravenous lines and other tubes, including a tube to drain your urine (catheter) and a tube to help you breathe. While the breathing tube prevents you from talking, your nurses are experts at communicating with recovering patients and they will make sure you're comfortable. Many people are still very sleepy from surgery and don't remember this phase of their care. Your lines and tubes will be removed as soon as you no longer need them. In a typical recovery, most will be removed within a few days of surgery.

In the early hours, you may not be able to move without help. The nurses will be with you to help you change your position so that you are comfortable.

Pain management after surgery

From the time you wake up, your nurses will work with you on managing your pain. In the beginning, this will mean getting pain medication through your IV or through a tube in your nose. Soon after, you'll be able to take pain medication by mouth. Your nurses may also talk to you about other ways to manage pain, such as body positioning and splinting your chest with a pillow. Managing your pain is an important part of your recovery because it enables you to breathe better and move better, which helps prevent complications. But it's not realistic to expect to be free of all pain. It might help to remember that the goals of pain management are: to make sure you can walk and move around in bed; to enable you to rest and sleep; and to make sure you are not in distress.

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Cardiac surgery postoperative unit

- Most patients leave the ICU and go to the cardiac surgery postoperative unit the day after surgery. A nurse will bring you to the postoperative unit in a wheelchair. The nurses on the postoperative unit are also specially trained to care for patients following cardiac surgery. You will stay on this unit until you are ready to leave the hospital. For most patients, this is four to five days after surgery.
- On the postoperative unit, your nurses and therapists will help you recover from surgery and get back on your feet. Every day, you will be able to do a little more. Many people are surprised to hear that they will be out of bed as early as the day after surgery. Moving around as much as you can, as soon as you can, is a very important part of your recovery. It helps prevent complications such as pneumonia and blood clots, and helps your body get back to normal faster. But please don't get up on your own until your nurse says it is okay.
- A physical therapist will show you exercises to do during your recovery. He or she will see how well you are moving and decide how fast your activity should progress. Most everyone walks up at least one flight of stairs with the therapist before leaving the hospital.
- On the postoperative unit, your nurses will teach you how to take care of yourself once you are at home. You will learn how to care for your incisions, what medications to take, how to exercise safely, and when to call for help. You will receive detailed written instructions for you and your family to refer to once you leave the hospital.
- As you recover, you will be seen by a nurse case manager. The case manager works with the nurses, surgical staff, and therapists to plan each patient's care after discharge. Most patients go directly home from the hospital. Others go to a rehabilitation center for a short while before returning home. Sometimes, we know before surgery that discharge to a rehabilitation center will be best. In other cases, this is recommended by your team based on how your recovery is progressing. If a rehabilitation center is recommended, the case manager will give you and your family information about available options, including facilities that work closely with BIDMC. Be sure to speak up about any questions or concerns.

Family and friends

- ✓ Visiting policies are subject to change. Please check the visitor information at bidmc.org for the most current policies. Please know that we always strive to welcome visitors when possible.
- ✓ During the first day or so after surgery, it's best to visit for brief periods.
- ✓ Your visitors should know that you may not look like yourself right after surgery. Your face may be very "puffy" from fluids given during surgery, changing your appearance. This gets better over several days.
- ✓ You'll likely be ready for longer visits when you are moved to the cardiac surgery postoperative unit.
- ✓ Anyone who has a contagious illness should not visit you. All visitors should clean their hands before going in your room.
- ✓ Be sure to talk to the nursing staff about designating one family spokesperson to receive detailed information about your care. This helps us make sure there is clear, consistent communication between your care team and your loved ones.

What to expect when you go home

Before you go home, you will receive detailed information and instructions on what to expect during your recovery and how to care for yourself. There is a discharge class on the unit that you and your family may attend along with other recovering patients. Your nurse will let you know when the class is being held.

It might help you to know some of your discharge information in advance so that you can plan for your recovery. For more information, go to our website at bidmc.org/cardiacsurgery and click on “For patients.” A series of videos explains more about the recovery process.

Monitoring your progress

- ✓ You will be asked to record your weight and your temperature each day after you go home, and to wash your incision area(s) daily.
- ✓ Be sure you have a working scale and thermometer, and bars of mild, white soap.

When you first leave the hospital

- Most patients leave the hospital four to five days after surgery, but many things can affect the time of discharge. Ask your surgeon what to expect.
- Some patients go directly home, others go to a rehabilitation facility for further recovery.
- If you go directly home, we will arrange for a visiting nurse to see you at your home.

Activity

- Most patients are able to walk a flight of stairs at least once a day as soon as they get home.
- Your physical therapist will give you an exercise program.
- You will not be allowed to lift, push, pull, or carry anything that weighs more than 10 pounds for 10 weeks.
- You will not be allowed to drive for at least one month after surgery.
- No tub bath until you see your surgeon who will make sure your incisions are fully healed. You may shower as soon as you get home using mild, white soap.
- No swimming for 10 weeks.
- No work-related activities for the first month. Ask your surgeon when you may expect to return to work.
- You will tire more easily than usual during the first months of your recovery. Your care team will talk with you about balancing periods of activity with periods of rest for the best results.
- Some patients are more comfortable sleeping in a sitting-up position, such as in a reclining chair, during the first few weeks.
- Ask your surgeon when you may travel.

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- Six-eight weeks after surgery, you may benefit from participating in an outpatient cardiac rehabilitation program. These programs combine supervised exercise with nutrition counseling, advice on lifestyle changes, stress management, and more. Ask your surgeon or cardiologist for more information or to be referred to a program near you.

Pain

- You will be given a prescription for pain medication to use at home. The medication does not take away your pain completely. It is designed to “take the edge off” of your pain so that it feels manageable. Managing your pain is important to your recovery. If you are in too much pain, you are not likely to move around much, and this can cause complications.
- You will be given detailed information on pain management. Be sure to ask any questions you may have.
- If your pain management program is not working for you, it will be important for you to let your surgeon know.

Fluid retention

- You may be given lots of IV fluids during surgery. This can cause you to be “puffy” for a while.
- Your regular shoes may not fit when you are ready to go home. You might want to bring a pair of loose-fitting slippers or shoes to wear home from the hospital, in case this happens to you.
- You will be taking medication after surgery to help remove the fluid.

Diet

- You will be given information on following a “heart-healthy” diet. This includes eating foods that are low in saturated fat and sodium (salt).
- It’s normal to have a decreased appetite after surgery or to feel like nothing tastes good. You may prefer small, nutritious snacks over large meals. It will be important for you to get the right nutrition, even when you don’t feel like eating much.
- Information on following a heart-healthy diet is included in this packet.

Emotions

- You may experience strong, changing emotions during your recovery. This is normal.
- Remember that your recovery from heart surgery will be slow but steady. You may not see progress from one day to the next, but you should see steady improvement week by week.
- If at any time you feel overwhelmed with troubling thoughts or emotions, or you feel you cannot participate in your recovery, please speak to your surgeon or primary care physician about a referral to a counselor.

About your heart

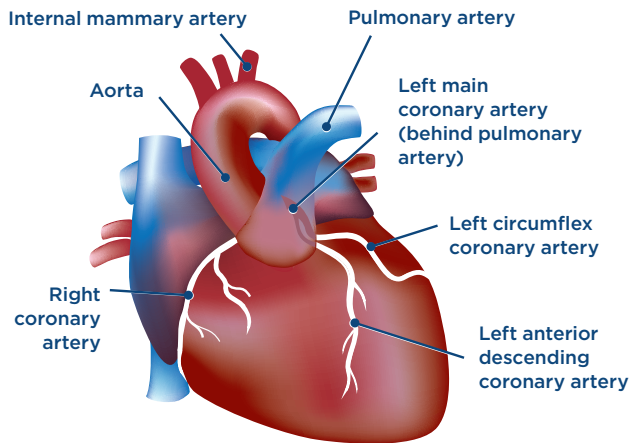
Your doctor has recommended heart surgery. Heart surgery is done to treat many different conditions, including: **coronary artery disease, aortic valve disease, mitral valve disease, hypertrophic obstructive cardiomyopathy, atrial fibrillation,** and **thoracic aortic aneurysm** or dissection.

This sheet explains how your heart works, and gives information about conditions that may require heart surgery.

About your heart

The heart is a hollow organ made of muscle. It is a little larger than your clenched fist. It has four chambers or compartments. The two top chambers are called atria (each one is an atrium), and the two bottom chambers are called ventricles. The blood flows into and out of each chamber, and is controlled by valves which open and close in order to keep the blood flowing in one direction.

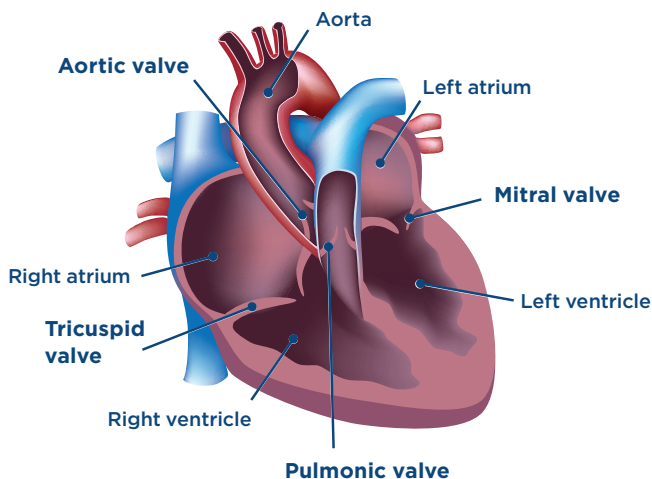
The heart has one job: to pump blood to all parts of the body. Blood is filled with oxygen and nutrients, which all body cells need. The blood flows through large and small arteries in order to reach all the body tissues.



Coronary arteries

The heart itself needs a supply of oxygen-rich blood in order to work as it should. Just as the blood flows through arteries to nourish the rest of the body, it also flows back over the outside of the heart muscle through blood vessels called the **coronary arteries**. These arteries supply the heart muscle with blood, giving it the energy it needs to keep pumping.

There are two main coronary arteries – the **left main coronary artery** and the **right coronary artery**. The left main artery divides into two large branches called the circumflex and the left anterior descending arteries. These arteries, along with many small branches, deliver blood to all parts of the heart muscle.



Heart valves

Four valves inside your heart ensure that the blood flows in just one direction:

Tricuspid valve

The tricuspid valve is in the right side of your heart, between the right atrium (upper chamber) and right ventricle (lower chamber).

Pulmonic valve

The pulmonic valve is in the right side of your heart. Blood is pumped from the right ventricle, through the pulmonic valve, and out to the lungs to be enriched with oxygen.

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Mitral valve

The mitral valve is in the left side of your heart, between the left atrium (upper chamber) and the left ventricle (lower chamber).

Aortic valve

The aortic valve is in the left side of your heart. Blood is pumped from the left ventricle through the aortic valve, and out to the body.

Valves protect against backward blood flow. They are similar to doors that open and shut. They consist of small flaps of tissue, called leaflets, that open to allow blood to move forward through your heart during half of the heartbeat and close to prevent blood from flowing backward during the other half of the beat. The leaflets in two of the valves, the mitral on the left and the tricuspid on the right – also have tough, fibrous strands of tissue called chordae tendineae that connect the valves to the muscles inside the ventricle walls. These strands and muscles keep the leaflets stable, protecting against any backward blood flow.

Aorta

The aorta is the largest artery in the body. (Arteries are blood vessels that carry blood away from the heart and to the body tissues.) Your aorta is about the size of a garden hose. Blood flows from your left ventricle through the aortic valve and into the first part of the aorta. The aorta curves in an arch in your chest, and then continues down into your abdomen. The part of the aorta that is in your chest is called the **thoracic** aorta. The part of the aorta that is in your abdomen is called the **abdominal** aorta. All the blood that is pumped out of your heart goes into the aorta and then on to smaller arteries throughout the body.

Conditions treated by heart surgery

This section explains some of the conditions that can be treated by cardiac surgery.

Coronary artery disease

Coronary artery disease (CAD), sometimes called coronary heart disease, is a narrowing of one or more of the arteries that feed the heart muscle. The narrowing is caused by the build-up of a substance called plaque inside the wall of a blood vessel. Plaque is made of fat, cholesterol, calcium deposits, and inflammatory white blood cells that have gotten into the blood vessel wall. The plaque causes the wall to “bulge” into the inside of the vessel where the blood normally flows. This causes the narrowing that is the hallmark of CAD.

CAD plaques can grow or become unstable and rupture into the blood vessel, allowing a blood clot to form at the spot of the rupture. This can further narrow or even block the already narrow artery, causing an even greater interruption in blood flow. If the interruption is prolonged, damage to the heart muscle can occur. This is known as a heart attack, also called a myocardial infarction, or MI.

Coronary bypass surgery is recommended for some people with CAD. It creates a detour around one or more blocked arteries, using a blood vessel taken from another part of the body. The detour is called a “graft.” Usually, an artery from the chest or a vein from the leg is used, because both the chest and the leg have many other blood vessels. Depending on the patient, one or more bypasses may be done.

Patients who have coronary bypass surgery still need to follow a heart-healthy lifestyle after the operation. This helps prevent plaque from forming in the coronary graft or other blood vessels in the body.

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Heart valve disease

Heart valve disease occurs if one or more of the heart valves don't work well. Birth defects, age-related changes, infections, or other conditions can cause one or more of the heart valves to not open fully or to let blood leak in the wrong direction. These conditions can make the heart work harder and affect its ability to pump blood.

In heart valve surgery, the damaged valve is either repaired or replaced. New valves can be made from animal tissue, metal, or plastic. Your surgeon will tell you more about how your heart valve problem will be treated.

Valve conditions requiring surgery usually involve the valves on the left side of the heart, and include:

- **Aortic regurgitation (also called aortic insufficiency)** – the aortic valve doesn't close tightly enough. This causes some of the blood that has just been pumped from the left ventricle out to the body to leak back into the ventricle.
- **Aortic stenosis** – the aortic valve becomes thick, stiff, and narrowed, causing it not to open fully. This causes a partial obstruction of blood flow from the left ventricle out to the body.
- **Mitral regurgitation (also called mitral insufficiency)** – the mitral valve doesn't close tightly enough. This causes some of the blood that has just been pumped from the left atrium to the left ventricle to leak back into the atrium. One of the common reasons for mitral regurgitation is mitral valve prolapse, a condition in which one or more of the mitral valve leaflets bulges into the left atrium as the left ventricle contracts. A relatively common condition, mitral valve prolapse affects an estimated 2% of adults in the US. Most cases do not require treatment, but if regurgitation is severe, surgery may be recommended.
- **Mitral stenosis** – the mitral valve becomes narrowed, causing it to not open fully. This causes a partial obstruction of blood flow from the left atrium to the left ventricle.
- **Bicuspid aortic valve** – a birth defect in which the aortic valve has two leaflets instead of three. This can sometimes cause the valve to not function properly.

Valve vocabulary

- **Regurgitation, or backflow**, occurs if a valve doesn't close tightly and some blood flows in the wrong direction with each heartbeat. Valve regurgitation is sometimes called valve insufficiency or valve incompetence.
- **Stenosis** is a narrowing of the valve opening. Blood flow through the valve is reduced.

Hypertrophic obstructive cardiomyopathy (HOCM)

Hypertrophic cardiomyopathy is a thickening in the walls in the lower chamber(s) of the heart (the ventricles). It sometimes affects the wall separating the two ventricles. This wall is called a septum. Thickening of this wall can cause a partial blockage of blood flow out of the heart. This is called hypertrophic obstructive cardiomyopathy (HOCM). In some cases, an operation called septal myectomy can be done to remove the thickened parts of the wall to improve blood flow through the heart.

Atrial fibrillation

Atrial fibrillation (AF) is an abnormal heart rhythm. It occurs when the coordinated electrical signals that normally cause the heart to beat are replaced by multiple, rapid signals coming from the top chambers (atria) of the heart. This causes a fast, irregular heartbeat that is less efficient than a regular heartbeat. Because the atria are not contracting normally, some blood can remain inside these chambers instead of being pumped out with each contraction. This can lead to the development of blood clots, which increases the risk of stroke.

Atrial fibrillation is usually treated by using medications or other non-invasive treatments that interrupt the abnormal signals. In some cases, the areas that are sending the abnormal signals can be treated with surgery. This is usually only done in patients who are already having a heart operation for another reason.

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Thoracic aortic aneurysm or dissection

Sometimes an area of the aorta becomes weak, causing the blood vessel wall to widen or bulge out like a balloon. This is called an aneurysm. If the aneurysm bursts, it causes severe internal bleeding.

Areas of the aortic wall can also “split” or tear. This can cause bleeding inside the artery wall. This is called a dissection. An aneurysm can increase the risk that a dissection will occur.

In some patients, cardiac surgery is done to repair or replace areas in the thoracic aorta that are affected by an aneurysm or dissection.

Heart-healthy food choices

Most Americans do not have a “heart-healthy” diet. We eat too much saturated fat and sodium and not enough whole grains, fruits, and vegetables. This puts us at risk for heart disease – the leading cause of death in America.

You can start any time to make healthier choices and reduce your risk for heart disease. If you already have heart disease, making healthy food choices is an important part of your treatment.

Learning healthy eating habits takes time and practice. Here are some of the most important things to remember. For more detailed information and advice on how you can make a heart-healthy diet a way of life, ask for a referral to a dietitian or call 617-667-2565 to make an appointment.

Cholesterol, triglycerides, and sugar

- **Cholesterol and triglycerides** are types of fat that occur naturally in the body. The food you eat can affect the levels of these substances that are found in your blood.
- People with **high levels** of triglycerides and/or certain types of cholesterol (see box) are at **increased risk for the clogged arteries** that occur in heart disease.
- **Not all cholesterol is the same** (see box). Having too much “bad” cholesterol in your blood, or not enough “good” cholesterol, can lead to clogged arteries, which can cause chest pain, heart attacks, strokes, and other problems.
- Research has shown that eating foods high in cholesterol (such as eggs and shellfish) does not really affect the cholesterol in your blood. But **eating foods high in saturated fats and trans fats** (see next page) can **make “bad” cholesterol high and can raise triglycerides** as well.
- High triglyceride levels can also be related to **too much sugar** in the diet, as well as **too much fat, refined grain, or alcohol**.

Cholesterol: the good and the bad

Not all cholesterol is created equal! You may hear your doctor talk about “good” and “bad” cholesterol.

LDL cholesterol is “bad.” It can build up in the blood and **lead to clogged arteries**.

HDL cholesterol is “good.” It helps remove the bad cholesterol from the blood and **helps prevent clogged arteries**.

Following a heart-healthy diet is the first and most important step in making sure you don’t have too much “bad” cholesterol.

What else should you do to improve your LDL and HDL levels? This is different for everyone. Your doctor will measure your levels and go over your medical history. Your doctor will then let you know what lifestyle changes and/or medical treatments will be helpful to reduce your risk of heart problems.

Keeping cholesterol and triglycerides in the right range: The importance of dietary fats

- Not all fats are bad. A healthy diet *should* include some healthy fat.
- Eating the **right types of fats** is one of the most important things you can do to help keep your cholesterol and triglyceride levels in a healthy range.

- Dietary fats can be saturated, unsaturated, or trans fats, based on their chemistry.
- **Saturated fat and trans fat can raise LDL (“bad”) blood cholesterol and triglycerides.** Most saturated fats come from **animal sources**. Most trans fat is man-made. It is made by adding hydrogen to a normally unsaturated oil to make it saturated. (This is called hydrogenation.) A heart-healthy diet should **limit saturated fats** and **avoid trans fats completely**.

Fats that raise LDL (“bad”) cholesterol and triglycerides



Saturated fats: Limit or avoid	Trans fats: Avoid
Meat and cheese (moderate intake of certain types can be ok on your heart-healthy diet; see food lists)	Margarine
Butter (use in very small portions, if at all; see food list)	Deep-fried restaurant foods like fried fish or chicken, french fries, and donuts
Whole milk, 2% milk, condensed or sweetened milk (avoid)	Any packaged or processed food containing hydrogenated or partially hydrogenated oils , such as many crackers, cookies, and other baked products
Cream (avoid)	
Ice cream (avoid)	
Coconut oil (avoid)	
Palm oil (avoid)	

Saturated fats (limit or avoid)
Many are animal-based

- **Unsaturated fats are the healthiest choices.** Most unsaturated fats are **plant-based**. They can be monounsaturated or polyunsaturated. Monounsaturated fats have the added advantage of increasing the HDL (“good”) cholesterol. But even healthy fats should be used in moderation, because they are high in calories.



Unsaturated fats: Healthiest choices, when used in moderation

Polyunsaturated fats (good choice)	Monounsaturated fats (good choice and increases “good” cholesterol)
sunflower oil	olive oil
soybean oil	canola oil
corn oil	safflower oil
cottonseed oil	sesame oil
	peanut oil
	avocados
	peanut butter or other nut butters
	nuts and seeds

Unsaturated fats (healthiest fats)
Mostly plant-based

Sodium (salt)

- Lowering sodium (salt) in the diet can have a variety of health benefits.
- Too much sodium in the blood can cause the body to hold on to fluid, putting a strain on the heart.
- Most people take in way too much sodium. For many in the U.S., this can be up to 4,500 milligrams (mg) a day. You should aim for between **1,500 and 2,000 mg a day** for a heart-healthy diet. Just one teaspoon of table salt has 2,300 mg – more than you should have in an entire day.
- It's important to **avoid table salt**. In addition, it's important to know that a lot of the sodium in your diet probably comes from **processed foods**. This includes fast food, canned soups, processed cheese, deli meats, chips, cookies, and more.
- Check food labels on all packaged food to see how many milligrams of sodium are in each serving. If there is **more than 300 mg per serving**, this food is **not a good choice**.
- Foods labeled "**low sodium**" contain **140 mg of sodium or less per serving** and can be good choices as long as you limit portion sizes. Foods labeled "reduced sodium" or "no salt added" may still have a high sodium content. Check food labels to find out.

Making sense of labels

You may wonder:

- *Is a food marked "reduced sodium" or "reduced fat" always a good choice?*
- *Must I choose an "extra lean" protein, or is "lean" ok? What about "low fat" or "reduced fat?"*

The labels on foods can be very confusing. For example, something marked "reduced" sodium or "no salt added" may still have too much sodium for you. Some foods marked "low fat" may be ok for you; others may have too much saturated fat for a heart-healthy diet. Check the nutrition label for actual amounts of fat or sodium.

Talk to your dietitian about your favorite packaged foods and ask what varieties are best for you.

Fish and omega 3

- Studies show that eating certain types of fish can reduce your risk of heart disease. This is thought to be due to a substance called **omega 3 fatty acid**, present in certain varieties of fish.
- Aim for at least two servings a week of oily fish containing omega-3 fatty acids, such as **salmon, fresh albacore tuna or sardines** (packed in water), or **lake trout**.
- While fish is the best source of omega 3, non-fish sources can also boost heart health. Examples are walnuts, soybeans, chia seeds, and flax seed oil.

Fruits and vegetables, dietary fiber, and whole grains

- As a general rule, choosing **more fresh fruits and vegetables** is an important step toward heart-healthy eating.
- When we eat vegetables, plants, and grains, some of the food is not fully digested and stays in our intestines. This part of the food is called **fiber**.

- Fiber is classified as either “soluble,” meaning it dissolves in water; or “insoluble,” meaning it does not easily dissolve.
- Research shows that a diet high in fiber has many health benefits. **Soluble fiber** can reduce LDL (“bad” cholesterol) and total cholesterol in the body, which **reduces the risk of heart disease**. Examples of soluble fiber are **oats, barley, oranges, dried beans, and lentils**.
- **Insoluble fiber** has health benefits too, including helping with digestion and lowering LDL cholesterol (“bad” cholesterol). Examples of insoluble fiber are **wheat bran, whole grains, and many fruits and vegetables**.

Calories, portions, and exercise

- Being **overweight increases your risk** for heart disease.
- Even if you choose healthy, low-calorie foods, large **portion sizes** can cause you to gain weight.
- Eating large portion sizes also increases your intake of all the ingredients in the food, which can counter the effects of a healthy food choice. For example, a food with only 140 mg of sodium per serving is a good, low-sodium food. But if you eat 3 servings, that’s 420 mg – a much less healthy option.
- **Exercise burns calories** and is an important part of keeping your weight in check. **It also boosts your HDL (“good”) cholesterol** level.

Eating out

- **You can enjoy restaurant meals** on a heart-healthy diet. Choose restaurants that offer fresh foods and lean protein prepared in a heart-healthy way, such as baked, grilled, boiled, or steamed. Avoid fried food.
- Choose **menu items that don’t have breading, creamy sauces or dressing, or cheese**.
- Ask for **salad dressings and sauces on the side** so you can control portions.
- Ask that your food be prepared **without salt, MSG, or soy sauce**.

Whole grain foods have many health benefits and are an important part of a heart-healthy diet.

- A **whole grain** contains all the edible parts of the grain.
- **Refined grains** have been processed so that one or more of the edible parts are removed. This removes much of the nutritional benefits of the food. **Enriched** grains are refined grains in which some of the nutrition is added back, but not nearly all. **Bleached** flours are refined flours that are chemically treated for color; many nutrients are removed in the process.
- **Multigrain** simply means the food contains several different types of grain. The grain may or may not be whole grain.
- Some people think that by choosing **wheat flour** (over white or all-purpose flour) they are getting whole grain flour. This may or may not be true. If the wheat flour is whole grain, it will be labeled “**100% whole wheat.**”

Heart-healthy food choice guidelines

Best choice	OK in moderation	Avoid
Meat, poultry, fish, and vegetarian protein		
<ul style="list-style-type: none"> ▪ White meat poultry ▪ Extra lean ground turkey ▪ Fresh fish ▪ Canned fish in water ▪ Clams, oysters, lobster, scallops ▪ Tofu, tempeh, soy or vegetable burgers, soy protein crumbles 	<ul style="list-style-type: none"> ▪ Lean cuts of meat with fat trimmed (limit to 6 ounces per week) <ul style="list-style-type: none"> ♦ Loin, leg, round, extra lean hamburger greater than 90% lean 	<ul style="list-style-type: none"> ▪ Dark meat poultry, poultry skin ▪ Goose, duck ▪ Any fried meat or fish ▪ Higher fat cuts: ribs, T bone steak, hamburger less than 90% lean ▪ Bacon, sausage ▪ Pre-packaged cold cuts, or processed cold cuts (such as salami, bologna, pepperoni) ▪ Hot dogs
Milk and dairy products		
<ul style="list-style-type: none"> ▪ Fat free (skim) or low fat milk ▪ Non-fat or low fat yogurt ▪ Non-fat or low fat cottage cheese ▪ Fat free or low fat cheese 	<ul style="list-style-type: none"> ▪ Reduced fat cream cheese/sour cream (be careful as these items may be high in sodium; check the label) 	<ul style="list-style-type: none"> ▪ 2% or whole milk ▪ Full fat sour cream/cream cheese ▪ Full fat cheeses; full fat yogurt ▪ Ice cream
Cereal, grains, starchy vegetables		
<ul style="list-style-type: none"> ▪ Whole grain breads/whole grain flour ▪ Whole grain pasta ▪ Whole grain crackers ▪ Oatmeal (unflavored) ▪ Oat/barley ▪ Quinoa ▪ Brown rice 	<ul style="list-style-type: none"> ▪ Flavored oatmeal (can be high in sugar) 	<ul style="list-style-type: none"> ▪ White bread ▪ White rice ▪ White pasta
Fruits and non-starchy vegetables		
<ul style="list-style-type: none"> ▪ Fresh, frozen, canned fruits & vegetables without added sugars or salt 		<ul style="list-style-type: none"> ▪ Fried vegetables ▪ Vegetables prepared or dressed with butter, cheese, cream sauces ▪ Fruits in syrups

Best choice	OK in moderation	Avoid
Fats and oils		
<ul style="list-style-type: none"> ▪ Olive oil, peanut oil, sunflower oil, safflower oil, sesame oil, canola oil, corn oil, cottonseed oil, soybean oil ▪ Butter-like spreads, made with one of the heart-healthy oils listed above ▪ Seeds/ nuts (remember portion control) ▪ Avocado ▪ All natural peanut/nut butters without added sugars <p>*All fats and oils are high in calories. Be careful of portions.</p>	<ul style="list-style-type: none"> ▪ Butter is a better choice than margarine, but only in very small amounts. This means your intake should be no more than 1 teaspoon in a single day. 	<ul style="list-style-type: none"> ▪ Shortening ▪ Margarine ▪ Hydrogenated oils (check ingredients list) ▪ Coconut oil ▪ Palm oil ▪ Peanut /nut butters with added sugars and/or hydrogenated oil
Soups and sauces		
<ul style="list-style-type: none"> ▪ Low sodium broth based soups with vegetables ▪ Oil based salad dressings 	<ul style="list-style-type: none"> ▪ Condiments such as ketchup, mustard, mayonnaise, relish, hot sauce, barbeque sauce, honey, maple sugar (can be high in sugar, salt) 	<ul style="list-style-type: none"> ▪ Cream based soups (chowders, cream soups) ▪ Creamy salad dressings ▪ Soy sauce ▪ Jelly/jam with added sugars
Desserts and snacks		
<ul style="list-style-type: none"> ▪ Fresh fruit desserts ▪ Fruits, vegetables ▪ Low fat yogurt ▪ Hummus ▪ Air popped plain popcorn 		<ul style="list-style-type: none"> ▪ Bakery items: cakes, cookies, croissants, bagels, donuts, biscuits, pastries, pies, cookies ▪ Chips, pretzels, snack mixes, crackers ▪ Buttered popcorn
Beverages		
<ul style="list-style-type: none"> ▪ Water; seltzer ▪ Coffee: black or with low fat dairy ▪ Herbal or green tea: black or with low fat dairy 	<ul style="list-style-type: none"> ▪ Diet soda (limit, but a better choice than regular sodas) 	<ul style="list-style-type: none"> ▪ Sodas ▪ Juices ▪ Sweetened coffee/tea ▪ Sports/energy drinks

Alcohol may be ok in moderation. But please check with your health care provider about whether alcohol use is safe for you.

Important! This list provides broad guidelines only. A dietitian can help you make specific plans for heart-healthy eating that considers your own preferences and will work best for you! To meet with a dietitian at BIDMC, please call 617-667-2565.

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Reading food labels

Remember: Read food labels for all processed and packaged foods to be sure you are meeting your goals for “heart-healthy” eating.

Serving size

This refers to a typical serving size. In the example to the right, this is 2/3 cup. All the information on this label is for 2/3 cups of this food. If you eat more, you are getting more calories, fat, etc.

Calories

This is the number of calories in one serving (2/3 cup). Ask your doctor or dietitian what your total daily calorie intake should be.

Total fat, saturated fat, trans fat

As a general rule, **aim for foods with a total fat of 5 grams or less per serving**. But remember: Not all fats are created equal. Saturated and trans fat clog arteries. Try to choose foods with 0 grams of these unhealthy fats.

Cholesterol

High levels of cholesterol in the body increases your risk for heart disease. But cholesterol content in food is not the most important thing to watch for. Focus on limiting saturated and trans fats. Doing this will help improve your cholesterol level.

Sodium

Studies have shown that a diet low in sodium has many health benefits, especially for those with cardiovascular disease. Most people should aim for no more than 1,500 – 2,000 mg of sodium per day. Ask your doctor what level of sodium intake is best for you. Foods with 140 mg or less of sodium per serving can be good choices, as long as you are only eating one serving.

Dietary fiber

A diet high in fiber can help reduce your risk for cancer and heart disease. Aim for 25 to 30 grams of fiber each day.

Nutrition Facts	
8 servings per container	
Serving size	2/3 cup (55g)
Amount per serving	
Calories	230
% Daily Value*	
Total Fat 8g	10%
Saturated Fat 1g	5%
Trans Fat 0g	
Cholesterol 0mg	0%
Sodium 160mg	7%
Total Carbohydrate 37g	13%
Dietary Fiber 4g	14%
Total Sugars 12g	
Includes 10g Added Sugars	20%
Protein 3g	
Vitamin D 2mcg	10%
Calcium 260mg	20%
Iron 8mg	45%
Potassium 240mg	6%
<small>* The % Daily Value (DV) tells you how much a nutrient in a serving of food contributes to a daily diet. 2,000 calories a day is used for general nutrition advice.</small>	