

Patient Education
intermountainhealthcare.org/heart

Heart Care Handbook





ABOUT THIS HANDBOOK

This handbook won't teach you everything you need or want to know about heart disease and heart-healthy living. But it will give you a good start. To write this book, we consulted local experts as well as the latest guidelines and recommendations of national organizations such as the American Heart Association (AHA), the American College of Cardiology (ACC), the Centers for Disease Control (CDC), and the National Institutes of Health (NIH). All of these resources are listed in Chapter 10, along with cardiac rehab programs, books, and other trusted websites to help you learn more.

You don't need to read this book from front to back. Use the Table of Contents in the front of the book (or on the first page of each chapter) to help you find what you need. Use the book for a long-term reference. Make notes in the margins, highlight important information, and add notes from your healthcare providers and cardiac rehabilitation staff.

If you have questions, talk with your healthcare providers. And don't be afraid to accept help from concerned loved ones and friends. With support and treatment, you can manage your disease and lead a healthier and happier life.

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Looking Ahead

Heart disease affects more than your physical health, it can affect your whole life. In the coming months, your emotions, relationships, and routines may all undergo changes and challenges. You'll probably need support to change negative patterns and stick to a healthier way of living. The good news? Most heart patients learn new ways to manage their health and face the future with renewed confidence. With time, support, and education, so can you.

The key to recovery is a good care team and effective treatment. In this section, you'll meet the team and get some helpful tips on managing your emotions as you take this journey.

Your Cardiac Care Team

YOU are the most important part of this care team. You'll need to communicate with everyone on the team and be involved in your care from the very beginning. Here are some tips:

- **Ask questions!** Write questions down as you think of them, and don't be afraid to ask them.
- **Give honest feedback.** Your input about your symptoms, side effects, or health history can help providers tell if your treatment is on track.
- **Keep your appointments.** Follow-up is crucial. Use appointments to ask questions and clarify your care plan. Take notes (or take someone with you to take notes).
- **Follow your care plan.** Discuss what tests or treatments you may need and why they are important. Tell all care providers about all medication you are taking. Agree on steps you will take to help your heart. Ask about your progress and when you need to follow up next.

You won't face heart disease alone. Both in the hospital and out, many different healthcare providers may be involved in your care. This might seem overwhelming at first, but each person plays a different role.

- **Your primary care provider:** This is your regular doctor, who will continue to care for your general health. You'll need to make sure your primary care doctor knows about your heart tests, treatments, and medication.
- **Physician specialists:** One or more physician specialists may also work with you.
 - **Cardiologists** diagnose and treat heart-related conditions.
 - **Cardiothoracic surgeons** focus on heart surgery and related follow-up care.
 - **Intensivists** care for you in the intensive care unit.
 - **Anesthesiologists** manage your anesthesia during surgery, and follow up with you in recovery.
- **Advanced practice providers (APP):** These include nurse practitioners (NPs) and physician assistants (PAs). These clinicians have advanced degrees and provide a wide range of medical services under the direction of a doctor.
- **Nurses and nurse assistants:** Nurses who work in intensive care or other cardiac care units have special training and provide ongoing education related to heart disease. Nursing assistants will help with much of your daily care.
- **Other healthcare professionals:** You may also work with other care providers.
 - **Care managers or social workers** can help with concerns like insurance and home care.
 - **Dietitians** monitor your nutrition status while in the hospital and provide nutrition education and advice on following a heart-healthy diet once you're home.
 - **Exercise physiologists** work together with you to monitor and increase your activity, within appropriate guidelines.
 - **Pharmacists** prepare and deliver medication.
 - **Respiratory therapists** arrange or supervise breathing treatments.
 - **Technicians** operate medical equipment for various tests and procedures.

The Role of Cardiac Rehab

To help you adjust to your diagnosis and get the best results from your treatment, your healthcare provider may refer you to a **cardiac rehabilitation program (cardiac rehab)**. Cardiac rehab reinforces every part of your treatment plan, whether you're in the hospital or out.

Your cardiac rehab program might include the following services:

- **Exercise.** Supervised exercise sessions are tailored to your needs and abilities. Exercise physiologists and exercise therapists will monitor your heart rate, EKG, blood pressure, and signs and symptoms and report your progress to your doctor.
- **Education.** You'll learn more about your disease, procedures, medications, signs and symptoms, risk factors, and positive lifestyle changes.
- **Social and emotional support.** Your care team, as well as other patients, will support you as you adjust to your condition and make lifelong changes to reduce your risk for further heart problems.

Although it can be hard work, most heart patients enjoy cardiac rehab. They find it interesting, encouraging, and even fun. Talk to your healthcare providers about how to get involved in a cardiac rehab program near where you live. A list of Intermountain Healthcare programs and contact numbers is provided in **Chapter 10**.

PROVEN BENEFITS

Participating in cardiac rehab can help you:

- Reduce fear and anxiety
- Recover faster
- Improve fitness
- Decrease symptoms
- Improve confidence
- Make lifelong changes
- Reduce risk of further heart problems





FAMILY OR FRIEND? What YOU can do

A loved one's diagnosis affects you, too. To help you ALL feel better and adjust more quickly, try the following:

- **Listen.** Let your loved one express feelings and fears. Try not to offer much advice at first. They probably just need to talk.
- **Help with practical details.** Although you don't want to overprotect your loved one, you might take away some of their stress by handling some practical responsibilities until they feel better.
- **Support healthy habits.** You might help by organizing medication, adjusting the family's diet, or joining an exercise routine.
- **Get support for yourself.** You're under stress too. Take time for yourself, and accept support from others.

Your Emotional Needs: What You May Feel

After a heart disease diagnosis, many people have reactions like the following:

- **Shock, disbelief, denial:** Immediately after your diagnosis, you may have a hard time acknowledging your condition. It's tough to be told you have heart disease. It's a new and unwelcome companion to your life.
- **Anxiety, anger, and depression:** People often struggle to take on new daily routines. Some people feel newly vulnerable. Some people have bothersome thoughts that make it hard to have a helpful outlook, such as "Why me?" or "What if?"

Fortunately, **most people find that these feelings gradually go away.** In fact, such feelings seem to be part of the normal healing process. As physical health improves, so do emotions and attitudes.

What you can do

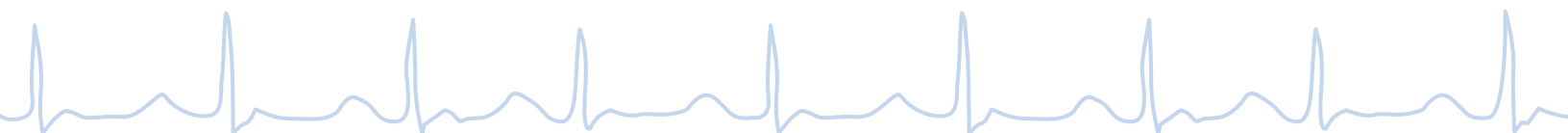
Try these tips to help you manage your emotions and keep moving forward:

- **Take care of your emotional health.** As you work with your healthcare providers to manage your physical health, don't neglect your emotional health. Physical and emotional health can go hand-in-hand. You'll probably gain emotional strength as you become physically stronger. Yet, if depression or anxiety continue, or if they interfere with daily activities, call your healthcare provider.
- **Reach out.** You may need encouragement, advice, or just someone to talk to. Talk to your healthcare providers. They can put you in touch with counselors, peer volunteers, or religious guides who can help you and your family get through this difficult time.
- **Get practical.** Sometimes the practical aspects of your care can be stressful. If you're worried about your household or personal affairs, talk to your healthcare providers. They can put you in touch with a social worker or case manager. This person can help you understand medical bills, arrange payments, figure out transportation needs, or access community support services like Meals on Wheels.
- **Be patient.** Usually, emotional health improves along with physical health. You'll probably feel more hopeful as you get used to a healthier lifestyle. Try to stay optimistic. With help and patience, you **CAN** lead a life of renewed satisfaction and purpose.

1 Going Home

This chapter has specific instructions to guide you in your initial steps to recovery after a heart attack or open heart surgery.

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“ After my diagnosis, I was in shock for a while. Then I guess I felt angry. I didn’t want to hear about my diet, my exercise plan... and I didn’t want to start taking medication. But slowly I got out of my funk. I realized life doesn’t have to stop because I have heart disease. There are a lot of things I still want to do, and I’m going to take care of myself and make sure I do them. ”

Thomas, diagnosed with coronary artery disease



“ Even while I was feeling all the symptoms — the chest and jaw pain, the heaviness — I didn’t think I could be having a heart attack. Thank goodness my husband did! He called 911 and probably saved my life. Now I’m recovering and learning to take better care of myself. ”

Maria, 6 months after her heart attack



“ To be honest, I wasn’t too keen on the idea. Opening my chest up? Operating on my heart? You bet I was nervous. But after some recovery time, I’m surprised at how good I feel. I’m walking and doing things again, and I feel younger than I have in years. ”

John, 3 months after open heart surgery

Heart Attack: What Happened

The heart is a hard-working muscle that acts as a pump to circulate blood to all parts of your body. To do this, the heart itself also needs the oxygen and nutrients carried by blood.

Normally, the heart receives an adequate blood supply through the coronary arteries. However, **during a heart attack, blood flow through a coronary artery is blocked or severely limited for a period of time.** This means the muscle doesn't get enough oxygen and blood, and the result can be permanent damage to a portion of your heart. The size and location of your heart muscle damage depends on which coronary artery or branch is blocked.

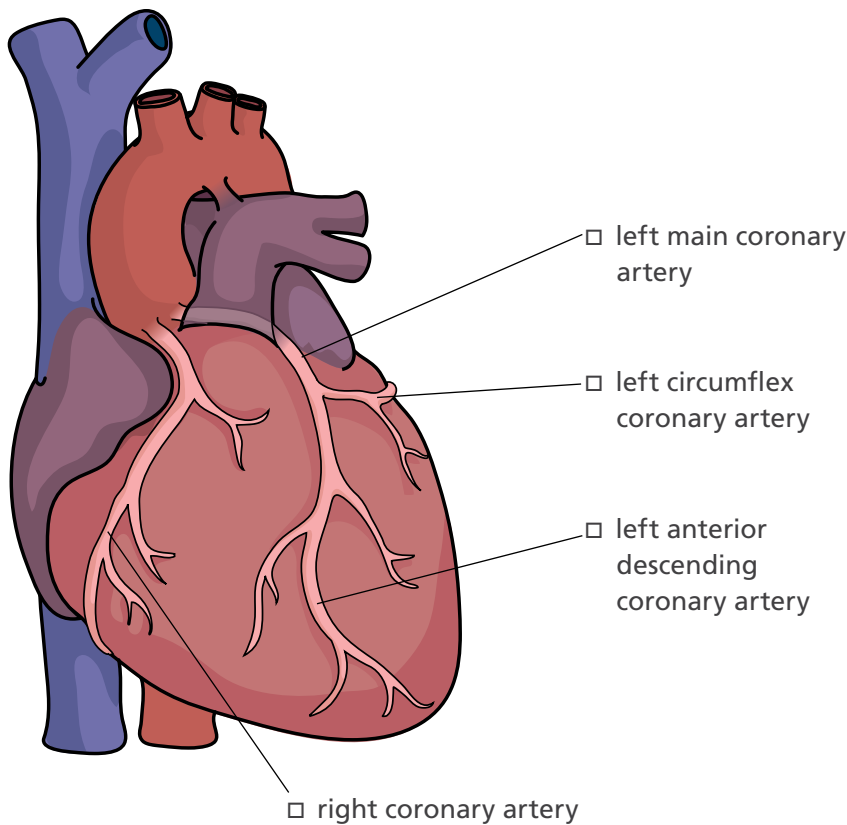
HEART ATTACK — ANOTHER NAME

A heart attack is also called a **myocardial** (heart muscle) **infarction** (tissue death), or **MI**. An MI results from the lack of oxygen and blood to the muscle.

Your heart attack

You had a heart attack on (date): _____

The following coronary arteries were blocked: _____



other: _____



What causes a heart attack?

Arteries can be blocked by three problems, which may occur alone or in combination to produce a heart attack:

- Fatty buildup in the artery (**atherosclerosis**)
- A blood clot in an artery already narrowed by atherosclerosis
- A spasm of the artery’s muscular wall

Without enough blood and oxygen, the heart muscle begins to die.

How are heart attacks treated?

During a heart attack, the immediate goal is to minimize heart damage by restoring blood flow to the heart as quickly as possible. Later on, treatment can help your heart heal, make it easier for your heart to pump blood, and reduce your cardiac risk factors. The table below provides an overview of some common heart attack treatments.

EARLY TREATMENTS during and right after a heart attack

Defibrillation corrects the fast, chaotic heartbeat that can happen during a heart attack. Defibrillators use powerful electrical signals to shock the heart back into a normal rhythm.

Oxygen therapy increases available oxygen for your body’s tissues and organs, reducing the workload on the heart.

Thrombolytic therapy is “clot busting” medication that dissolves blood clots and restores blood flow through the coronary arteries.

Emergency angioplasty or stent placement can also open up a blocked coronary artery. Angioplasty works by compressing the plaque that blocks a coronary artery. This widens the passage and improves blood flow to the heart. In many cases, a stent (a tiny tube) is inserted to hold the artery open.

OTHER TREATMENTS for heart attack patients

Medication is prescribed to treat symptoms, control cardiac risk factors, prevent blood clots, and ease the heart’s workload. Be sure to take all medications exactly as directed, and continue to take them until your doctor tells you to stop.

Cardiac rehab consists of education, supervised exercise, and social and emotional support. Cardiac rehab helps you recover faster, reduce your cardiac risk factors, and return to a full and productive life.

Ongoing lifestyle management, such as regular exercise, a healthy diet, weight management, stress reduction, and quitting smoking, can help prevent further heart attacks.

And, if necessary...

Cath lab procedures (such as angioplasty or stent placement described at left) or **heart surgery** may be needed to open or bypass narrowed arteries and improve blood flow to your heart muscle.

For more information

For information on diagnostic tests, see **Chapter 4**. To learn more about treatments, see **Chapter 5**.

In the ICU after a heart attack

In the period right after your heart attack, you'll be in the hospital's **intensive care unit (ICU)**. In the ICU, care will focus on assessing the damage to your heart, preventing complications, and monitoring and treating your symptoms. Here are some of the treatments you can expect to receive in the ICU:

- **Oxygen** to support your heart during this early recovery period
- **Medication** given through an IV, as pills, or by other methods
- **Monitoring** your heart on a constant basis and regular checks of your vital signs
- **Frequent blood draws** for laboratory tests
- **Imaging tests** such as x-rays and echocardiograms (“echoes”)
- **Electrocardiograms (EKGs or ECGs)** for ongoing assessment of your heart rhythm
- **Limited activity**, alternating with bed rest, as directed by your healthcare providers

Depending on your condition, you may also need additional equipment, monitoring, or support. For example, you may have a **feeding tube**. You may have a **Swan-Ganz catheter** (a soft tube placed in a large vein in your leg, upper chest, or neck) to measure pressures in your heart. You might also need a **ventilator** (breathing machine) to help you breathe properly. Ask your healthcare providers to explain any of the care you receive.

After you are treated in the ICU, the length of your hospital stay can vary from just a few days to several weeks or more. Skip to page 18 to see what happens next.

YOUR JOB IN THE ICU

In the ICU, your job is to take care of yourself as much as possible. This means doing the following:

- **Observing the rules about visitors.** Most hospitals have restricted visiting hours and recommend no children in the unit. Limit your visitors to 1 or 2 close family members at a time. This will keep you from getting too tired, limit your exposure to germs, and improve your recovery.
- **Communicating with healthcare providers about your symptoms.** Report any unexpected symptoms immediately.
- **Resting as much as possible.** Although it can be difficult to rest in the busy ICU environment, try to keep quiet and relaxed.

Open Heart Surgery: What Happened

On (date): _____

You had the following surgery:

Heart valve repair or replacement

Your surgeon repaired or replaced a damaged heart valve. See page 91.

Coronary artery bypass grafting (CABG)

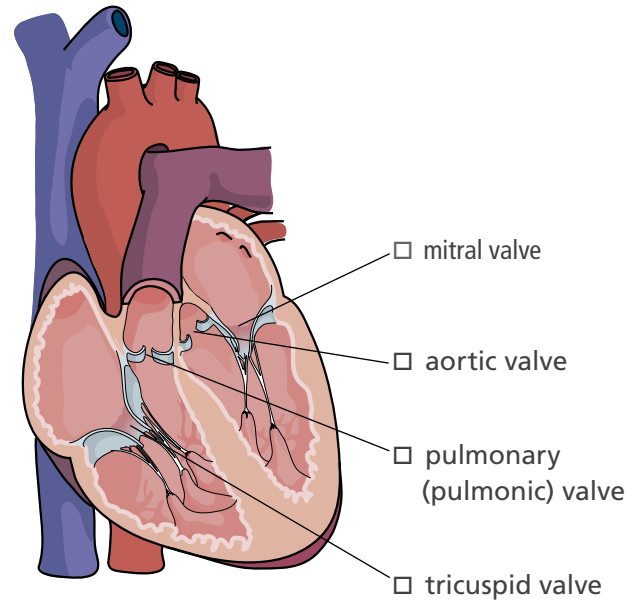
A blood vessel from your leg, arm, or chest wall was used to bypass coronary arteries blocked by fatty plaque (atherosclerosis). See page 90.

Other:

If you had:

Heart valve repair or replacement

Which valve did you have surgery on?

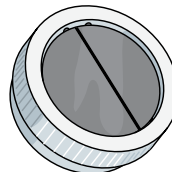


Was the valve replaced or repaired?

- replaced repaired
- Ross procedure

Was a mechanical or biological valve used?

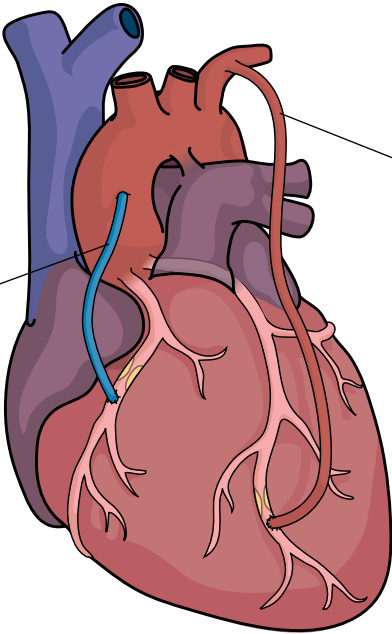
- mechanical biological



If you had:

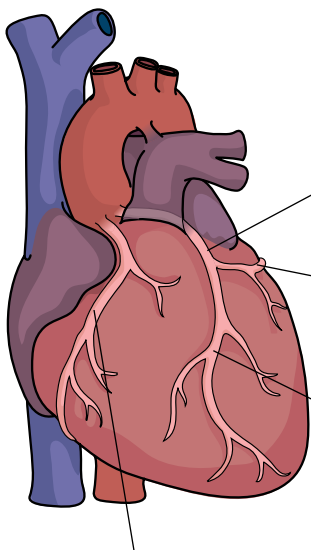
Coronary artery bypass grafting (CABG)

If a vessel from your arm or leg was used, it was grafted (inserted) above and below the point of blockage.



If the internal mammary artery from your chest wall was used, it was redirected to bypass the blocked artery.

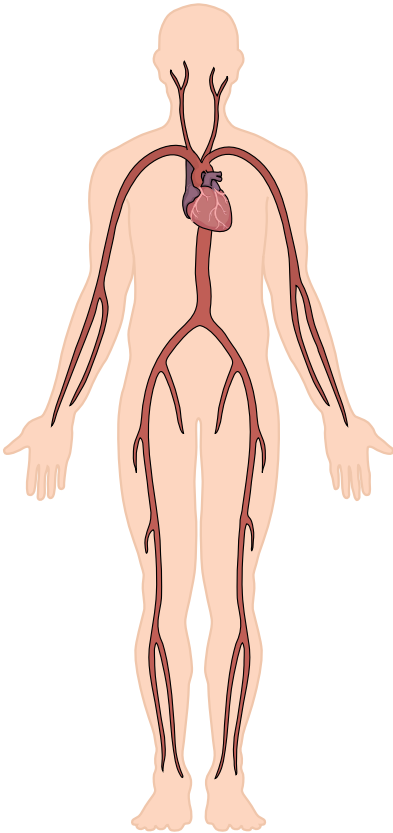
Which coronary arteries were bypassed?



- left main coronary artery
- left circumflex coronary artery
- left anterior descending coronary artery

- right coronary artery
- other:

Which arteries and/or veins were used?



- internal mammary artery
- radial artery
- saphenous vein
- other:

BELLS AND WHISTLES

In the ICU, care will focus on monitoring your condition closely. Monitoring equipment will emit alarms from time to time, but that doesn't always mean there's an emergency. Often these alarms merely prompt your providers to do routine checks or other tasks.



In the ICU after open heart surgery

Your recovery will begin right after your surgery, during a stay in the intensive care unit (ICU). Within an hour or two, your family will be able to come in for their first visit. Here's what they can expect to see:

- **Equipment and monitors.** In the ICU, various sensors and machines constantly check your vital signs, such as your heart rate, blood pressure, temperature, breathing rate, and oxygen levels. Thin wires (**pacing wires**) may connect from your chest to a small machine that can pace your heart if it's beating too slowly.
- **Grogginess and puffiness.** You'll still be a little groggy when your family first sees you and you'll look a little swollen or puffy. This is a normal result of the fluids you receive during surgery. This puffiness will gradually go away over the next few days.
- **Endotracheal (ET) tube and ventilator.** An ET tube is a tube placed through your nose or mouth into your trachea (windpipe). The ET tube used during surgery will remain in your throat to help you breathe. The ET tube is attached to a breathing machine called a ventilator. You won't be able to talk while the tube is in place, though your healthcare providers may ask you to communicate by writing on a board, or by nodding your head or wiggling your toes. Once you're fully awake and breathing well on your own, your providers will remove the tube.
- **Tubes for blood, fluids, and medication.** You and your loved ones should expect to see tubes in your neck, arms, or legs. These will be connected to bags and bottles of fluid. For example, chest tubes may help drain blood from your chest into a canister. Other tubes may deliver fluids and medication to your body through a vein, or help monitor your condition. The tubes will be removed when they're no longer necessary.

- **Work with a respiratory therapist.** During your surgery, it's normal for your lungs to partially collapse, and for mucus to build up in them. To help, a respiratory therapist will visit you regularly after surgery to assess and help improve your lung function. Your therapist will probably ask you to do exercises such as deep breathing and coughing. At some point during your hospital stay, you'll need to begin using an incentive spirometer, which will help reinflate your lungs and prevent complications.



- **Support stockings.** Shortly after surgery, healthcare providers will outfit you with **anti-embolism support stockings** (commonly called T.E.D. hose) to help prevent blood clots, improve circulation, and reduce swelling in your legs. You may be given ACE bandages or compression boots instead. You may be instructed to wear these for several weeks after your surgery.

Over the course of your stay in the ICU (usually only 1 or 2 days) your healthcare providers will gradually remove various monitors and tubes. Then you'll be transferred out of intensive care to another room in a different unit of the hospital.

MANAGING YOUR PAIN: What to expect

Pain management is an important part of your treatment. You'll feel better and may recover more quickly from surgery if your pain is controlled.

Pain is a personal experience that is unique for each person. Your healthcare provider will regularly ask you to rate your level of pain, usually on a 0 to 10 scale: 0 for no pain, 10 for the worst pain.

Together, you will agree on a comfort goal. A **comfort goal** is a level of pain that is tolerable and allows you to participate in other important parts of your recovery, like deep breathing and walking.

There are many kinds of pain medication and many ways to take it. At first, you'll probably receive your pain medication through an IV. Your IV may even be attached to a pump that allows you to control your own pain medication with the touch of a button. Later on, you'll probably use pills to manage your pain.

Before you go home, your healthcare providers will go over a pain treatment plan with you, including how to gradually reduce the dosage and frequency of pain medication as you recover.

VISITING, WITH LIMITS

Outside the ICU, visiting hours are generally open. But you may still want to limit the number or length of visits. You need to focus on recovering, not entertaining, and you still need a lot of rest.



CONTINUITY IN CARE

The same team of doctors who directed your care in the ICU will continue to oversee your treatment when you move to another area of the hospital.

Beyond the ICU

Moving out of the ICU and into what is often called a “step-down unit” is an important milestone. It means that your health is stable and improving. Regardless of whether you had a heart attack or open heart surgery, here’s what you can expect in this area of the hospital:

- **Continued monitoring and treatment.** As you might expect, care outside of the intensive care unit is less “intense.” There, you’ll notice a decrease in testing and monitoring, although oxygen therapy, monitoring of your heart and vital signs, medication, lab tests, and imaging tests will likely continue.
- **Increased activity.** Research has shown that too much bed rest can actually slow your recovery. That’s why your healthcare providers will work with you to gradually increase your physical activity. The goals are to help you avoid muscle loss and stiffness, prevent complications like blood clots, and build up your strength to go home and resume daily activities.
- **Cardiac rehab.** Cardiac rehab staff will visit you daily to guide your increasing activity. They will help you progress from bedside stretching and gentle exercises to hallway walks, increasing your distance a little each time. You may even exercise on a recumbent stepper machine. During these activities, staff will monitor your heart’s response and give feedback to your doctors. Before you go home, cardiac rehab staff will give you guidelines on increasing your activity at home. They will also help arrange for outpatient cardiac rehab if recommended by your doctor.
- **Increased independence.** To help you prepare to go home, your care team will encourage you to do more self-care activities, such as brushing your teeth, showering, and shaving.
- **Home instructions.** Small group and one-on-one teaching from your nurses, cardiac rehab staff, and other healthcare providers will help you understand what you need to do after you leave the hospital. This includes information about the immediate recovery period as well as how to manage your heart disease over the long term.
- **If you had open heart surgery, you’ll continue respiratory therapy and use of support stockings.**

Recovering at Home

The at-home recovery period typically lasts 2 to 6 weeks after a heart attack and 4 to 8 weeks after open heart surgery. During this time, you'll take steps to promote and monitor your healing, while you gradually return to normal activities. You'll also lay the foundation for a healthier lifestyle. All of this will help you stay well and prevent further heart problems.

This section provides general guidelines to follow during your recovery. **If your healthcare providers' specific instructions differ in any way from those given here, always follow your providers' instructions.** Also, if you have any doubts or questions about your progress, please talk about them with your care team.

Write down your questions as you think of them.

Make sure you understand these important aspects of your care.

- Taking your medication
- Self-monitoring
- Making follow-up appointments
- Caring for your incisions, if you had open heart surgery
- Promoting healthy circulation, if you had open heart surgery
- Balancing rest and activity
- Resuming sexual activity
- Returning to work
- Driving and traveling
- Eating properly
- Increasing your activity level

The following pages explain these topics.

IF YOU'RE TAKING WARFARIN (COUMADIN)

- You'll need to have regular blood tests, called PT (or PT/INR) tests. These tests tell your healthcare provider if your blood is clotting at the right level. **See the Anticoagulation Record on page 33.**
- Avoid drastic changes in your diet and be consistent in the amount of dark green, leafy vegetables (like spinach) you eat from day to day. These vegetables are important for your health. They also contain vitamin K, which affects how warfarin works. Eat about the same amount of these vegetables each day so your response to warfarin stays the same.
- Limit cranberry juice to ½ cup (4 ounces) per day. Drinking more than ½ cup of cranberry juice can affect how warfarin works in your body.
- Your doctor may also tell you to avoid drinking grapefruit juice at the same time you take your warfarin (doctor advice varies).
- Talk to your provider before taking aspirin or arthritis medication.

✓ Taking your medication

Research has shown that medication can lower your risk for further heart problems. Medications after surgery or a heart attack are prescribed by your healthcare providers to meet your unique needs. Your discharge instructions sheet will list the medications you will need to take after you go home. Here are some basic tips for managing your medication:

- **Listen carefully, ask questions, and take notes when your providers explain your medication to you.** It's important to understand why you're taking each of your medications, as well as how and when to take them.
- **Take only those medications prescribed by your healthcare providers.** If you were taking other medication at home before your heart attack or surgery, check with your providers to see if you should continue taking them. This includes over-the-counter medication like cold medicines, pain relievers, vitamins, herbal remedies, inhalers, or patches. Especially, do NOT take anti-inflammatory (NSAID) pain relievers such as ibuprofen or supplements such as St. John's Wort or high-dose vitamin E without checking with your doctor.
- **Don't stop taking any medication unless you're told to do so.** When you leave the hospital, you may receive an initial supply (usually 30 days) of medication from the hospital pharmacy. You'll probably need to refill these at your regular pharmacy. Be sure you have refill instructions and necessary prescriptions, and order refills before you run out of medication.
- **Tell your healthcare providers about any side effects from your medication.**

For more information on heart medications and how to manage them, see **Chapter 6**.

If you need dental work

Dental procedures can allow bacteria to enter the bloodstream, which may cause infection. If you've had heart valve surgery, ask your healthcare providers if you need to take an antibiotic before dental work.



CALL YOUR HEALTHCARE PROVIDER

if you notice bleeding from your gums, or blood in your urine or stools.

Self-monitoring

Make sure your home recovery stays on track by watching your symptoms. The table below shows what you should monitor after a heart attack or after open heart surgery. Use the Health Tracker forms on pages 31–32 to help you monitor your health as you recover.

Monitor after a HEART ATTACK	Monitor after OPEN HEART SURGERY
<ul style="list-style-type: none">• Weight. Weigh yourself daily and write down your weight. The best time to weigh yourself is in the morning, after emptying your bladder but before eating. A weight gain, especially a rapid gain, may mean you're retaining too much fluid. Call your healthcare provider if you gain more than 2 pounds in one day or more than 5 pounds in a week.• Heart rate (pulse). After a heart attack, you may experience an irregular heartbeat or feel like your heart is racing. If your heart is beating fast for a long period of time and you feel lightheaded and weak, call your healthcare provider.• Chest pain. You should NOT have chest pain like your previous angina or heart attack pain. If you have chest discomfort of any type, follow the instructions for "If Chest Pain Strikes" at the end of the handbook (page 170). Angina pain is often described as a "smothering feeling" or discomfort, pressure, or pain in the chest, back, neck, jaw, shoulders, or arms.	<ul style="list-style-type: none">• Temperature. You may be instructed to take your temperature daily for the first 10 days. A persistent fever or a sudden high fever could be a sign of infection.• Weight. You may be instructed to weigh yourself daily and write down your weight. The best time to weigh yourself is in the morning, after emptying your bladder but before eating. A weight gain, especially a rapid gain, may mean you are retaining too much fluid. Call your healthcare provider if you gain more than 2 pounds in one day or more than 5 pounds in a week.• Heart rate (pulse). Sometimes after surgery you may experience an irregular heartbeat or feel like your heart is racing. If your heart is beating fast for a long period of time and you feel lightheaded and weak, call your healthcare provider.• Pain. It's normal to have some pain and discomfort after open heart surgery. Along with pain around your incisions, you may have pain or tightness in your shoulders or upper back between your shoulder blades. If your mammary artery was used for bypass surgery, you may also feel a dull ache or numbness on the left side of your chest where the mammary artery used to deliver blood. Your prescribed pain medication should provide some pain relief in these cases. However, if your pain limits your daily activities, contact your healthcare provider. You might need an adjustment to your pain medication. Note: Be alert to any angina pain. Angina pain is NOT normal after heart surgery. Angina pain is often described as a "smothering feeling" or discomfort, pressure, or pain in the chest, back, neck, jaw, shoulders, or arms.• Breathing. Use your incentive spirometer 3 or 4 times a day for the first 10 days you're at home. Not only will this help keep your lungs healthy and expanding, it may alert you to problems in your lung function.

✓ Self-monitoring (continued)



WHEN TO CALL YOUR HEALTHCARE PROVIDER

As you monitor your recovery, it's important to call your healthcare provider if you notice certain symptoms. Be sure to call if you notice any of the symptoms below:

- Weight gain of more than 2 pounds in one day or more than 5 pounds in a week
- Excessive swelling in the hands or feet
- Racing or irregular heartbeat, especially if it's accompanied by lightheadedness or weakness
- Angina or a "smothering feeling"
- Pain that limits your daily activities
- Shortness of breath
- **If you had open heart surgery:** temperature over 100.4°F for 3 days in a row, or any fever over 101.5°F.

✓ Making follow-up appointments

You'll probably be instructed to make several follow-up appointments with your healthcare providers. It is important to keep these appointments.

YOUR APPOINTMENT WITH:	SHOULD OCCUR:
Your primary care provider	<ul style="list-style-type: none">• If you had a heart attack: Within a few days, or up to 2 to 3 weeks of your discharge from the hospital• If you had open heart surgery: Within a few days, or up to 2 weeks of your discharge from the hospital
Your cardiologist	<ul style="list-style-type: none">• If you had a heart attack: Within 2 months after your discharge• If you had open heart surgery: Within 6 weeks after your discharge
Your surgeon (if you had open heart surgery)	4 to 6 weeks after surgery, or when indicated by surgery staff
Outpatient cardiac rehabilitation	As early as your first week home

✓ Caring for your incisions after open heart surgery

If you had open heart surgery, you will have incisions in various places, including your sternum, leg, chest, and possibly your arm. These incision sites will need daily attention for the first few weeks. To help speed your healing, follow these guidelines:

- **Check your incisions every day for signs of infection** until they're fully healed. (See the signs of possible infection listed at the right.) Slight itching, redness, numbness, or soreness is normal during the healing process. You may also have a lump at the top of an incision, which will disappear with time.
- **Don't be alarmed by a slight movement or clicking feeling in your sternum when you move or turn.** This is normal for the first 6 to 8 weeks after your surgery.
- **Don't try to remove your sutures (stitches).** Your sternum sutures will dissolve on their own. If you notice a small bit of suturing poking out through your incision, leave it alone.
- **If the strips of tape over your incision (steri-strips) haven't fallen off after a week, remove them.** Gently pull up on one side, then the other.
- **Keep your incisions clean and dry while they're healing.** It's okay to get them wet in the shower. It's even okay to wash them gently with mild soap and water in the shower. Just pat them dry afterward. **Avoid baths,** since bathtub soaking exposes your incisions to more bacteria.
- **Don't put any lotions, creams, or ointments on your incisions until they're healed.** This will help prevent infection and irritation.
- **Protect your incisions from the sun.** Incisions may sunburn easily. While they're healing, keep your incisions covered with loose clothing when you're in the sun. After they heal, use sunscreen. Sun exposure can cause scar tissue to darken further.

LIFE WITH WIRES

After open heart surgery, your sternum was wired back together with stainless steel wires. Normally you can't feel these wires, and they don't need to be removed.

Your stainless steel wires will show up on x-rays, but they won't set off alarms on an airport security device.



WHEN TO CALL YOUR HEALTHCARE PROVIDER

Call your healthcare provider if you notice:

- Sternum, leg, arm, or chest tube incisions that are red or hot to touch
- An increase in the amount of drainage from incisions
- Change in color of drainage from incisions (from clear yellow to cloudy white or yellow), possibly with a foul smell
- Increased swelling or soreness around incisions, especially with a fever
- Increased swelling or redness at an intravenous (IV) site
- Clicking or movement in your sternum after the first 6 to 8 weeks

HOW LONG IS THE RECOVERY PERIOD?

Expect to recover:

- **2 to 6 weeks** after a heart attack
- **4 to 8 weeks** after surgery

During your recovery period, IT'S OKAY TO...

- Do light cooking.
- Do light housework, such as dusting, making the bed, and washing small loads of dishes.
- Visit with friends and family for short periods (5 to 10 minutes).
- Enjoy light hobbies such as reading, computer work, or handiwork.
- Do personal grooming, dress in your regular clothes, and eat meals with your family.
- Climb stairs slowly, and
- stop and rest if necessary to complete them comfortably.
- Go to a movie or out to dinner.

✓ Promoting healthy circulation after open heart surgery

Your healthcare provider will probably prescribe medication to prevent blood clots and increase your blood flow. Besides taking your medication, here are a few things you can do to promote good circulation after heart surgery:

- **Continue to wear the support stockings (T.E.D. hose) as long as your healthcare providers tell you to.** Here are general guidelines:
 - If you had bypass surgery that used a vein from your leg, continue to wear your support stockings on the leg with the incision until the swelling goes away.
 - If you had valve surgery, wear hose on both legs for about one week or until leg swelling goes away.
 - At first, you should have someone help you put on your stockings. This will help you avoid straining your sternum as it heals.
- **Prop up your legs while you're resting.**
- **If an artery from your arm was used for bypass surgery, prop up your arm while you're resting.**
- **Avoid crossing your legs when you're sitting down.**
- **Avoid sitting in an upright chair for more than an hour at a time.** Sitting in a recliner is okay.



WHEN TO CALL YOUR HEALTHCARE PROVIDER

Call your provider if you have calf swelling or tenderness, warmth or pain.



✓ **Balancing rest and activity**

Both rest and activity are vital to your recovery. Here are some guidelines for achieving a healthy balance between the two:

- **Try to get at least the same amount of sleep every night that you were getting before your surgery.** During your initial recovery, your sleep schedule may be disrupted. You may find it hard to fall asleep or wake up in the middle of the night and not be able to get back to sleep. Talk to your healthcare providers if you have trouble sleeping. If you're taking pain medication after surgery, sometimes taking a pain pill before bed can help.
- **Limit your social activities.** To allow you more rest time, limit your visitors and keep visits short. If you had surgery, for the first 4 to 6 weeks your resistance to disease is lower. During this time, avoid being around friends or family with colds or the flu.
- **Take naps.** Naps can be good for you, as long as they don't interfere with your nighttime sleep. An hour of napping during the day is usually about right.
- **Rest after sexual relations or meals:**
 - If you had a heart attack, rest for 30 to 45 minutes.
 - If you had open heart surgery, rest for an hour.
- **Take frequent, short rest periods.** Frequent rests will help more than taking longer rest periods.
- **Follow the activity guidelines** to the right and on the previous page.



WHEN TO CALL YOUR HEALTHCARE PROVIDER

If you consistently have trouble sleeping, talk to your healthcare provider.

During your recovery, AVOID these tasks:

- Heavy housework, such as vacuuming, scrubbing floors, or moving furniture.
- Tasks that require holding your breath or tensing your body, such as opening stuck jar lids or windows.
- Straining during a bowel movement.
- Lifting, pushing, or pulling anything over 10 pounds, including wet laundry, grocery bags, pets, or grandkids.
- Mowing the lawn, shoveling dirt or snow, or pruning shrubs and other heavy gardening.
- Tasks that require you to keep your arms over your head or behind your back for long periods of time, such as washing windows or painting the ceiling.
- Twisting your body when reaching.
- Climbing stairs too quickly.
- Hobbies or sports that may place stress on your sternum, if you had open heart surgery. Examples include fishing, golfing, horseback riding.



Sexual activity is about as demanding as climbing a flight or two of stairs, though most people agree that the stairs are less fun!



Ease back into work gradually. Try lighter-duty assignments and shorter days at first.

✓ Resuming sexual activity

It's normal for both you and your partner to be a bit anxious about resuming sexual relations. Sex does place some demand on your heart, but most experts believe it's safe to have sex as soon as you feel able. Here are some guidelines to follow:

- **Wait to have sex until you feel physically and emotionally ready.** Until then, find other ways to be intimate, such as touching and holding.
- **When you do decide to have sex again, enjoy it!** Try not to worry too much about your health.
- **Choose comfortable positions** that don't put too much strain on your body.
- **Avoid sex directly after eating.** Rest for 30 to 45 minutes after a meal if you had a heart attack, and an hour or more if you had open heart surgery

✓ Returning to work

After a heart attack or surgery, people are often eager to get back to work, if only for the comfort of a familiar routine. Here's what your healthcare providers will probably tell you about going back to work:

- **Don't hurry to go back to work.** It's important to give your heart a chance to heal before you try to do too much.
- **Expect to wait a while before your healthcare providers approve your return to work.** The time frame for returning to work will depend on your individual condition, the type of work you do, and when you're able to drive. If you had a heart attack, you will probably need to wait at least 2 to 4 weeks. If you had open heart surgery, you will probably wait at least 6 to 8 weeks. Once you return to work, gradually ease into your work schedule.

TAKING CARE OF YOURSELF EMOTIONALLY

After open heart surgery or a heart attack, you'll probably feel a range of emotions. You might feel shock, anger, anxiety, or depression. The good news is that for most people, these feelings gradually go away. You can help by paying attention to your emotional needs. To learn more about what you may feel and what you can do, see **page 8**.

✓ Driving and traveling

You might have a bit of “cabin fever” during your at-home recovery. If you leave the house, follow these guidelines for driving and traveling:

- **You can travel as a passenger.** However, when you’re riding for long distances, don’t travel for more than an hour or two at a time. Stop the car, get out, and walk around for a few minutes. If you’re traveling in an airplane, get out of your seat every hour and walk up and down the aisle. This will get your blood flowing and reduce your risk of blood clots. Remember to wear your seat belt!
- **You shouldn’t drive until your healthcare provider tells you it’s safe.** This includes driving cars, bicycles, motor bikes, tractors, and lawn mowers. You’ll probably wait 2 to 4 weeks after a heart attack or at least 4 weeks after open heart surgery. During this time, your reflexes and reaction time will be slower than normal due to weakness or pain medication. After surgery, you also risk injuring your sternum on the steering wheel, or by having to turn or twist unexpectedly.

✓ Eating properly

For the first few weeks, you may not have much of an appetite. If you had open heart surgery, your sense of taste may even be diminished, and the smell of food might make you nauseated. Nevertheless, you need to eat to keep up your strength and speed your recovery. Here are a few guidelines:

- **Eat what appeals to you, and try to have a wide variety of foods.** Since protein is important for healing, include sources such as low-fat meat and dairy products, beans, nuts, and seeds. If you have no appetite, your healthcare provider may recommend a nutrition drink that contains vitamins, minerals, protein and energy to help you heal. Remember, good nutrition fuels your recovery.
- **Eat small, frequent meals.** Large meals make the heart work harder.
- **Rest after each meal.** If you had a heart attack, rest 30 to 45 minutes. If you had heart surgery, rest for an hour.
- **Cut down on caffeine.** Caffeine makes the heart work harder and can cause skipped heartbeats. Ask your providers how much caffeine is safe for you. You probably know that coffee, tea, and chocolate contain caffeine, but it’s also in many soft drinks (Coke, Pepsi, Mountain Dew) and some over-the-counter medication. Check the labels.
- **After your initial recovery, begin a heart-healthy eating plan.** This means following a diet low in saturated fat, cholesterol, and sodium.



For more information

For general information on heart-healthy eating, see **Chapter 8**. See a registered dietitian (RD) for education on specific guidelines based on your individual needs.



CARDIAC REHAB BENEFITS

Cardiac rehab can reduce symptoms and help you recover faster. Even more important, it can help lower your risk of future heart problems.

EVERYTHING IN MODERATION

- Don't exercise to the point of exhaustion. You shouldn't feel the need to lie down for several hours after exercise.
- Avoid exercising in very cold temperatures (less than 35°F or 1° C). If you need to be outdoors in winter, try to go out in the middle of the day. Be sure to dress in warm layers.
- Avoid exercising in the heat of a hot summer day (more than 85°F or 29° C). Instead, go out in the early morning or evening. Make sure it's okay with your healthcare provider before using a sauna, steam room, or hot tub.

✓ Increasing your activity level

Exercise is important during your immediate recovery period and for the rest of your life. Cardiac rehab staff will work with you to create a plan of gradually increasing activity. This plan can safely lead you through recovery and into a longer-term exercise program. Participating in outpatient cardiac rehab can help.

In cardiac rehab

Cardiac rehab helps with every aspect of your recovery, and includes one or more of the following services:

- **Supervised exercise sessions.** Cardiac rehab staff will design sessions to match your needs and ability level.
- **Education that helps you take charge.** You'll learn more about your condition, risk factors, and how to make positive lifestyle changes.
- **Social and emotional support.** Cardiac rehab staff and other patients offer support as you adjust to the changes in your life.

To learn more about cardiac rehab, see page 7. For a list of cardiac rehab programs, see Chapter 10.

At home

You'll also follow an exercise program at home. Keep the following tips in mind:

- The first couple weeks, stay in your home or close to home. When you first venture away from home, take a buddy with you. Also, remember that the farther you go, the farther you have to return if you have symptoms. Start with a shorter course and repeat it to build your strength and confidence.
- Start each session with the gentle warm-up exercises you learned in the hospital.
- With any exercise, start slowly. Then gradually increase your pace as you are able.
- Finish with a slow-down (cool-down) period to let your heart rate and muscle activity gradually return to normal.

Sample home recovery exercise plan

You will need to gradually increase your activity level at home. Your healthcare provider will help adapt the following plan to fit your unique situation. You can track your progress using the exercise progress record on the next page.

Week	How Often	How Long (minutes)	How Hard	Recommended Heart Rate Range	Notes
1	2 to 4 times per day	5 to 10 min.	very light, light		
2	2 to 3 times per day	10 to 15 min.	very light, light		
3	2 times per day	15 to 20 min.	light to moderate		
4	1 to 2 times per day	20 to 30 min.	light to moderate		
5	1 to 2 times per day	30 to 35 min.	moderate		
6	1 to 2 times per day	35 to 45 min.	moderate		



EXERCISE WARNING SIGNS... AND WHEN TO CALL YOUR HEALTHCARE PROVIDER

Stop exercise, sit down, and rest if you have any of the following symptoms with exercise:

- Any chest pain (angina), including pain, tightness, or heaviness in the chest, neck, jaw, or arms. If you have chest pain, follow the “If Chest Pain Strikes” guidelines on page 170.
- Dizziness or lightheadedness
- Shortness of breath
- Extreme fatigue (tiredness)
- Numbness or tingling in the hands or feet
- Vision problems
- Excessive or cold sweating
- Nausea and/or vomiting
- Pulse rate more than 30 beats above resting rate

If these symptoms continue after rest, see the “Summary of When to Seek Medical Care” on the last page of this chapter.

For more information

To learn how to build a safe and effective exercise program, see **Chapter 7**.

Recordkeeping During Home Recovery

Exercise progress record

Use this chart to record your exercise progress during recovery. Be sure to include exercise at cardiac rehab.

Date	Time	Activity	How Long	How Hard (describe)	Heart Rate	Symptoms

Health tracker after a heart attack

Use this chart to help monitor your health during your early recovery period as directed by your healthcare providers. Not all measurements are necessary every day.

Date	Time	Weight	Resting Heart Rate (pulse)	Blood Pressure	Symptoms

Health tracker after open heart surgery

Use this chart during your early home recovery period as directed by your healthcare providers.
Not all measurements are needed every day.

Date	Time	Temperature	Weight	Resting Heart Rate (pulse)	*Pain (1–10)	Breathing (spirometry)	Other Information/Symptoms

Warfarin anticoagulation record

If you're taking warfarin (Coumadin), you'll have regular blood tests to check if your blood is clotting at the right level. This test is called a **PT** (or **PT/INR**) test. Your warfarin dose may change based on your test results.

To make sure you know your current dose, fill in the spaces below each time you have your PT/INR test. Share this record with your healthcare providers at each visit.

Date	PT	INR	Coumadin Dose	Next Blood Test	Next Clinic Visit

When to Seek Medical Care



SEEK EMERGENCY CARE

if you have any of the following symptoms:

- Chest pain that's not relieved by rest or nitroglycerin (see "If Chest Pain Strikes" on page 170)
- A sudden increase in shortness of breath (trouble breathing)
- Very slow or very fast resting heart rate (below 50 or over 130 beats per minute), unless your providers say otherwise
- Sudden numbness or weakness in arms or legs
- Sudden, severe headache
- Fainting spells

IF YOU HAD A HEART ATTACK OR SURGERY, call your healthcare provider if you have any of the following symptoms:

- Bleeding from your gums, or blood in your urine or stools
- Weight gain of more than 2 pounds in one day, or more than 5 pounds in a week
- Excessive swelling in your hands or feet
- Shortness of breath (trouble breathing) if it has started recently or is getting worse
- Shortness of breath that awakens you at night or requires you to sleep propped up
- Episodes of dizziness, lightheadedness, or weakness
- Nausea, vomiting, or diarrhea that doesn't get better
- Depression that isn't getting better or that interferes with daily activities
- Any other symptom that concerns you

IF YOU HAD HEART SURGERY, also watch for these symptoms and call your healthcare provider if they occur:

Temperature over 100.4°F for 3 days in a row, or any fever over 101.5°F

- Angina or a "smothering feeling"
- Racing or irregular heartbeat, especially if accompanied with lightheadedness or weakness
- Pain that limits your daily activities
- Leg, arm, or sternum incisions that are red or hot to touch
- Increase in amount of drainage from incisions
- Change in the color of drainage from incisions, from clear yellow to cloudy white or yellow, possibly with a foul smell
- Increased swelling or soreness around incisions, especially with a fever
- Clicking or movement in your sternum after 6 to 8 weeks
- Calf swelling or tenderness, warmth, or pain

2 Understanding Heart Disease

The term “heart disease” encompasses a range of different problems. Learning more about how the heart works will help you understand your unique situation.

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“ I was a mechanical engineer for 40 years, but I never thought about the mechanics of my heart. So it was interesting to learn all about this organ, how it works, and what can go wrong... it gave me a whole new respect for my heart, and my health in general. The best engineers in the world couldn't make a machine this good if they tried. I just have to take better care of it. ”

Arthur, one year after
his heart attack

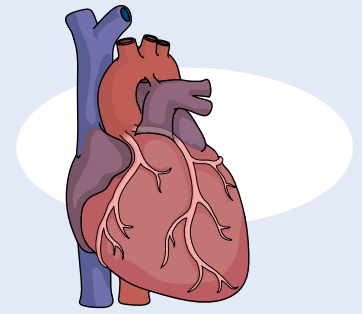
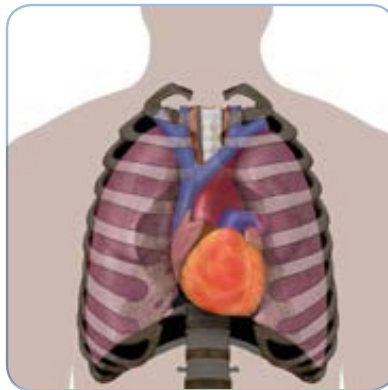
Your Heart and How it Works

The human heart is a pear-shaped, fist-sized body organ with muscular walls. It controls the flow of blood to every part of your body. It's located just left of center in your chest, right behind your **sternum** (breastbone). The heart weighs less than a pound, but every minute or so, its strong pumping action can cycle all the blood in your body through its chambers.

Basic terms

A review of some basic terms can help as you learn more about the heart. Here are a few:

- **Arteries and veins.** Both are blood vessels, but what's the difference between an artery and a vein? An **artery** sends oxygen-rich blood out from the heart to all the areas of the body. A **vein** moves blood from the body back to the heart, so it can be pumped to the lungs to pick up more oxygen. Together, they make sure all the cells in your body have the oxygen they need to work properly.
- **Heart, lung, and blood vessel terms.** Here are the meanings behind some common terms:
 - **Cardio / cardiac** = related to the heart
 - **Pulmonary** = related to the lungs
 - **Vascular** = related to the veins and arteries
- **Chambers of the heart.** The heart has four chambers that keep oxygen-depleted blood from mixing with oxygen-rich blood. The upper chambers, which receive blood, are called the **right atrium** and the **left atrium**. The lower chambers, which pump blood out of the heart, are called the **right ventricle** and the **left ventricle**.

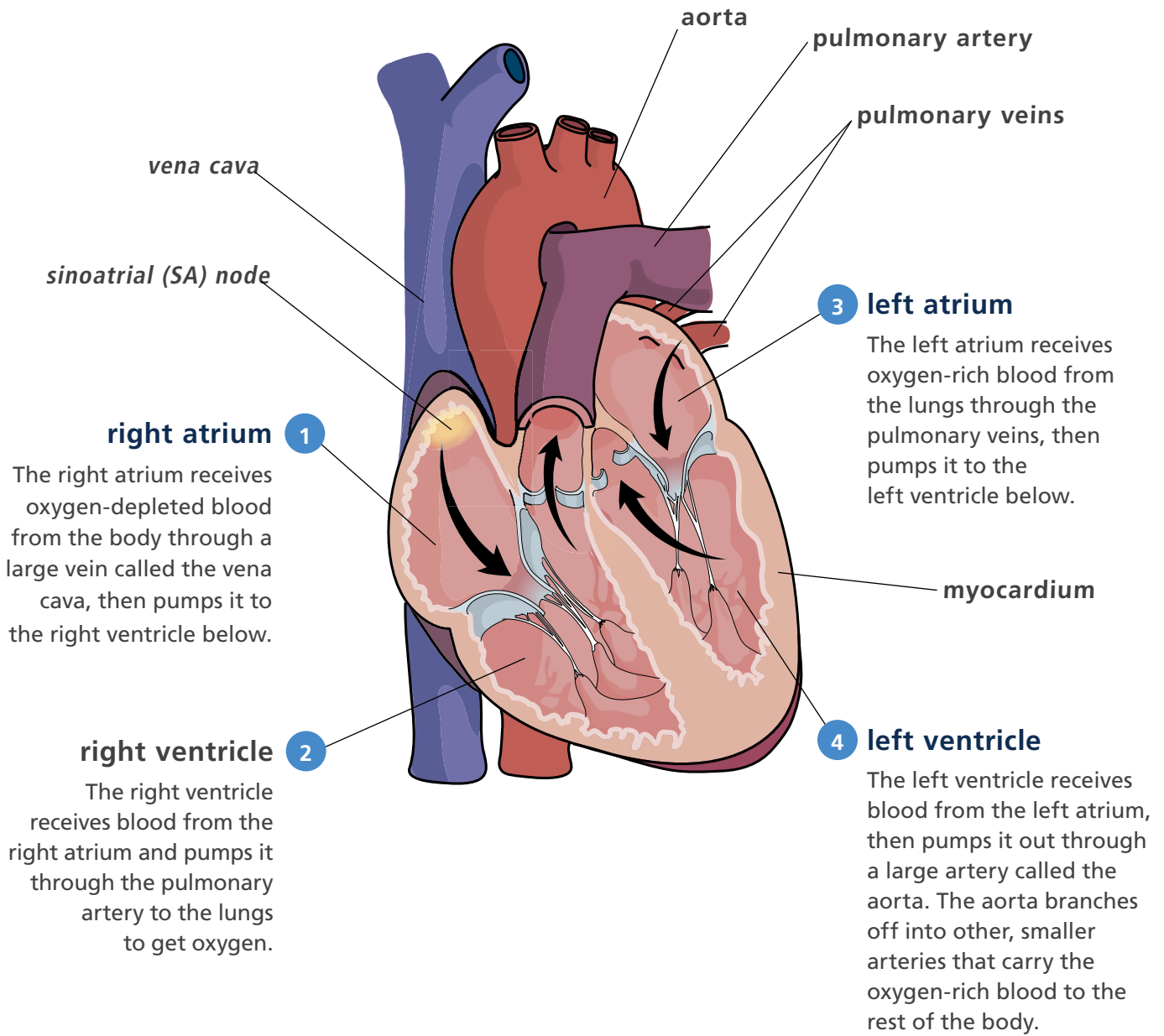


MORE HEART FACTS

- The heart muscle is the strongest muscle in your body! In one day, your heart pumps about 2,000 gallons of blood. By the time you're 70 years old, your heart has pumped about 50 million gallons of blood.
- How fast your heart beats depends on many factors, including your age, size, physical fitness, medications, and more. For example, a newborn baby's heart beats about 120 times per minute, while an average adult heart beats only about 70 times per minute. Athletes can have resting heart rates as slow as 50 beats per minute or less.
- The noise your heart makes when it beats (*lub-dub*) is actually the closing of valves inside the heart as each cycle of blood flows through the heart chambers. (You'll learn more about heart chambers and valves on the following pages.)

The heart chambers and flow of blood

The diagram below explains how the four heart chambers work and shows how blood moves through them. (The left and right labels may seem reversed, but that's because the heart is shown as if it's facing you.)

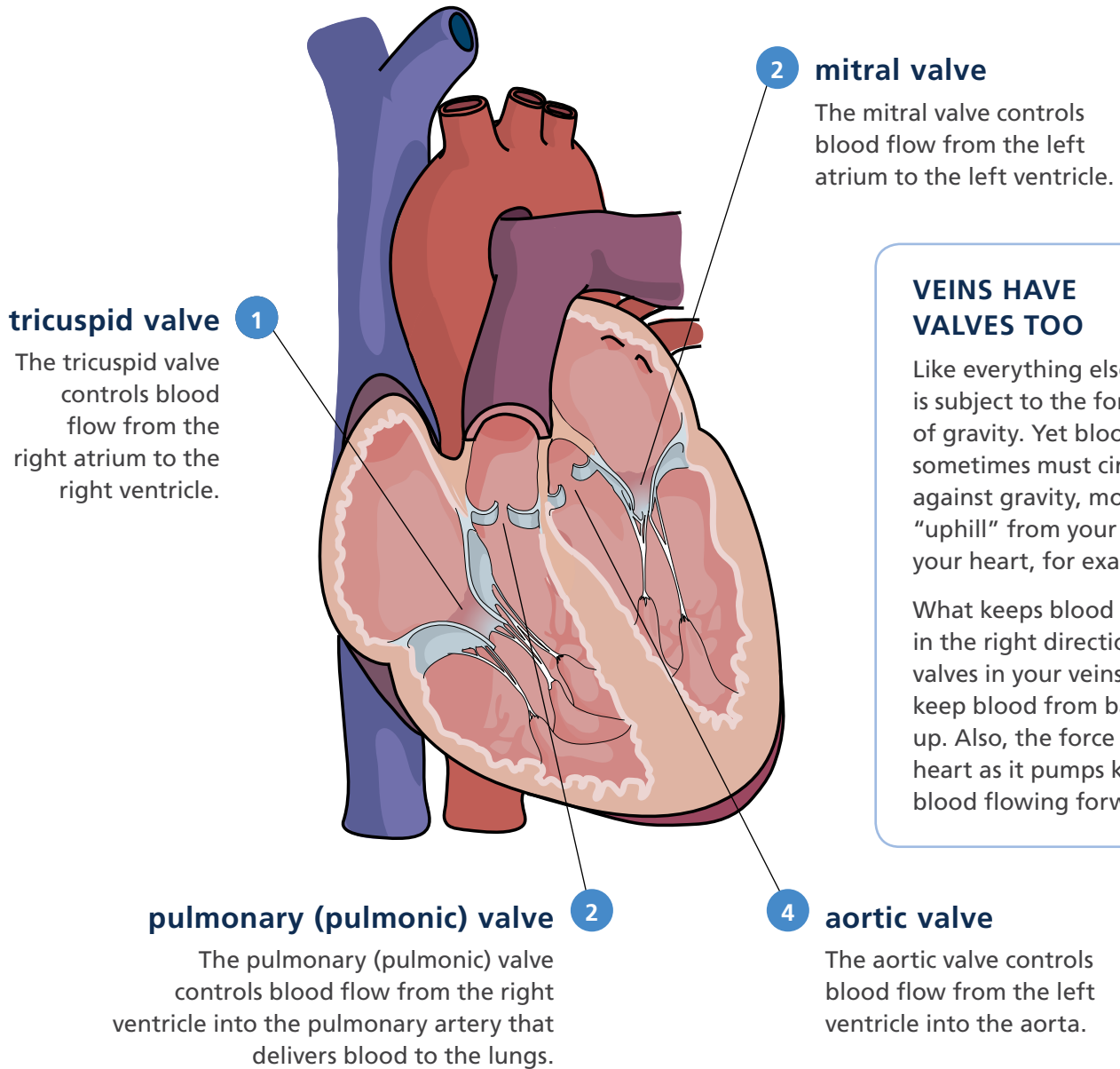


WHAT MAKES YOUR HEART PUMP?

To pump blood throughout your body, your heart contracts (squeezes) and relaxes in a rhythm. A natural “pacemaker,” the **sinoatrial (SA) node**, sits at the top of the right atrium and controls this rhythm by sending out a series of electrical impulses. The impulses travel from the SA node down an electrical pathway along the heart muscle walls, causing the heart to contract. The muscular heart wall is called the **myocardium**. The myocardium serves as a strong pump to move blood through your blood vessels.

The heart valves

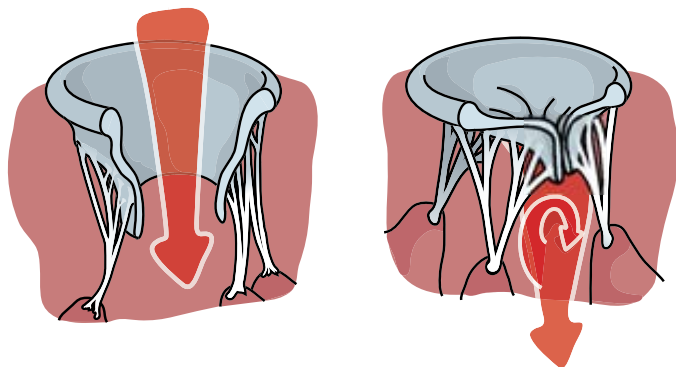
Four heart valves control the flow of blood through the heart. They act as one-way doors, opening to let blood exit or enter a chamber, then closing to keep blood from flowing backward.



VEINS HAVE VALVES TOO

Like everything else, blood is subject to the forces of gravity. Yet blood sometimes must circulate against gravity, moving “uphill” from your legs to your heart, for example.

What keeps blood moving in the right direction? Tiny valves in your veins help keep blood from backing up. Also, the force of your heart as it pumps keeps blood flowing forward.



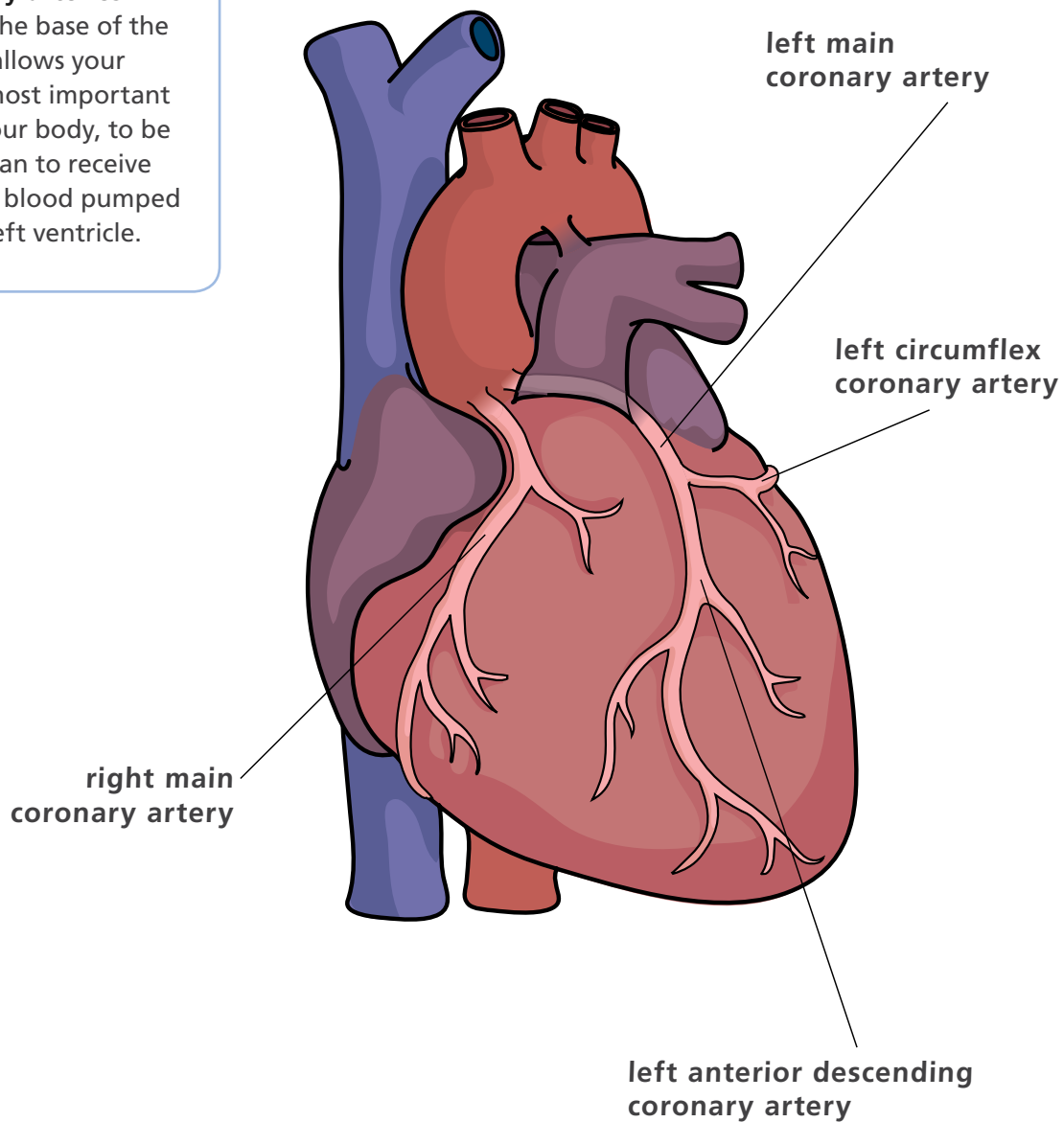
The cross-sections on the left show how a heart valve opens to let blood flow through, and then closes to prevent blood from backing up.

The coronary arteries

When your heart's left ventricle pumps blood into the aorta, the first muscle to receive the oxygen-rich blood is your heart itself. It receives this blood through the **coronary arteries** on the surface of the heart. These coronary arteries branch off into smaller and smaller **collateral arteries** that feed every part of your heart muscle. The major coronary arteries are labeled below.

First things first

The **coronary arteries** branch off the base of the aorta. This allows your heart, the most important muscle in your body, to be the first organ to receive oxygen-rich blood pumped out of the left ventricle.



What Happens with Heart Disease?

Heart disease is a generic term that describes many different problems affecting the heart. Heart disease can affect your coronary arteries, heart valves, heart rate and rhythm, or heart muscle. The most common heart problems are discussed in the following sections. As you read, keep in mind that the various problems that affect the heart are often related.

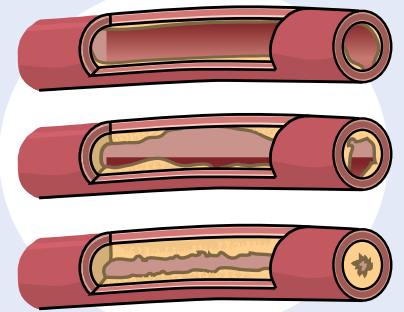
Coronary artery disease (CAD)/ atherosclerosis

Coronary artery disease (CAD) is a narrowing of the coronary arteries that supply blood and oxygen to the heart. CAD is usually caused by a process called **atherosclerosis**. Atherosclerosis means that fat, cholesterol, and other substances have built up in the coronary arteries. This buildup, often called **plaque**, irritates and scars the arteries, causing them to become hard and thickened. Over time, atherosclerosis narrows the opening that blood passes through, limiting the amount of blood delivered to your heart. When this happens, you have CAD.

Risk factors for CAD include anything that damages your arteries. Some of these risk factors are beyond your control, such as your family medical history or your age. Yet other risk factors can be changed, and include your lifestyle choices such as smoking, diet, and your activity level. **Chapter 3** of this handbook discusses cardiac risk factors in more detail.

See **Chapter 4** to learn more about tests used to diagnose CAD, such as electrocardiograms (EKGs), stress testing, echocardiograms, cardiac MRI, and nuclear imaging. See **Chapter 5** for information on treatments, including angioplasty, stent placement, and coronary artery bypass grafting (CABG).

How do you know if you have CAD? Unfortunately, many people don't know they have it until the disease is fairly advanced. At this point, they may experience **angina** or a **heart attack**, which are described on the following page.



The drawings above show the process of **atherosclerosis**. Fat, cholesterol, and other substances build up in the coronary arteries. Over time, this narrows the arteries and limits the amount of blood that passes through them to your heart muscle.

Running the numbers

Coronary artery disease, also called coronary heart disease, is the most common form of heart disease. Around 18.2 million Americans suffer from CAD. It's the number one killer of both men and women in the U.S.

Despite these grim statistics, most people can live full and rewarding lives with heart disease. The keys are paying attention to your symptoms, getting good medical care and taking care of yourself.



ANGINA OR HEART ATTACK?

It's probably angina if you have the following symptoms:

- Discomfort, pressure, or pain in the chest, back, neck, shoulders, jaw, or arms that is usually relieved by rest or medication.

You could be having a heart attack if you have one or more of the following symptoms:

- **Chest discomfort.** Discomfort in the center of the chest that lasts more than a few minutes, or that goes away and comes back. It can feel like uncomfortable pressure, pain, squeezing, or fullness.
- **Discomfort in other areas of the upper body,** such as your arms, neck, jaw, or stomach.
- **Shortness of breath.**
- **Other signs** include breaking out in a cold sweat, nausea, or lightheadedness.

See the **Heart Zones Action Plan** and **If Chest Pain Strikes** on the last pages (169–170) of this book. Remember, quick action can save your life!

Angina (chest discomfort)

Angina, also called **angina pectoris**, is the discomfort or pain that occurs when a narrowed coronary artery decreases the blood supply to your heart muscle. People describe angina as discomfort, tightness, pressure, or pain in the chest, back, neck, shoulders, arms (especially the left arm), or jaw. These symptoms most often happen with increased activity or emotional stress.

Angina is a sign that your heart muscle isn't getting the oxygen it needs. It doesn't cause permanent damage to your heart but it can be a warning of a heart attack. So even though some people experience angina for many years without ever having a heart attack, you should still take angina pain seriously.

Heart attack

A **heart attack** occurs when the flow of blood through a coronary artery is severely limited or completely blocked. Most of the time, a heart attack causes permanent damage to your heart muscle, which is why it's also called a **myocardial infarction** or **MI**. (**Myocardial** means “heart muscle,” and **infarction** means “tissue death”). Atherosclerosis can lead to a heart attack in 3 ways:

- The buildup of fatty deposits (**plaque**) can severely narrow or completely block the coronary artery.
- The diseased, narrowed coronary artery can encourage the formation of a blood clot (**thrombus**) that can block the artery.
- The irritated coronary artery can go into **spasm** (tighten up), sealing the artery shut.

The symptoms of a heart attack are like those of angina, but the pain of a heart attack is usually more severe and prolonged. During a heart attack, you may also have one or more other symptoms. These include nausea and vomiting, shortness of breath, lightheadedness or dizziness, sweating, and discomfort in your arms, neck, jaw, or stomach. The symptoms of a heart attack can come on suddenly, or can build over several hours.

A heart attack may occur after years of angina pain, or it may strike without any warning at all. Yet once a heart attack begins, it's vital to get treatment quickly. **Quick treatment minimizes heart muscle damage and can save your life!**

Tests to diagnose a heart attack include electrocardiography (EKG), stress tests, echocardiography, cardiac MRI, and nuclear imaging (see **Chapter 4**.) Treatments typically address the coronary artery disease that caused the attack (see **Chapter 5**.)

Heart valve disease

Heart valves control blood flow through your heart. When valves are damaged, they often don't open and close properly. This leads to backflow of blood or limits the forward flow of blood, and makes your heart work harder to move the same amount of blood. In time, this extra work can weaken your heart muscle and may lead to heart failure (described below). Heart valve disease can also cause heart rate and rhythm problems and other complications.

Heart valve disease has several possible causes. You may have been born with a valve defect. Your valves may have been damaged by coronary artery disease or by an illness such as rheumatic fever, or your heart valves may simply be wearing out as you grow older. Three common types of valve problems are:

- **Insufficiency.** The valve fails to close completely and permits blood backflow.
- **Stenosis.** Thickened tissue narrows the valve opening and limits the amount of blood that can pass through.
- **Prolapse.** Mitral valve leaflets (flaps) protrude backward into the left atrium whenever the heart contracts. This causes some blood to flow backwards inside the heart.

See **Chapter 4** to learn more about tests to diagnose heart valve disease, such as echocardiography, cardiac catheterization, EKGs, and stress tests. See **Chapter 5** to learn about treatments, such as valvuloplasty (PTBV) and heart valve repair or replacement.

Heart failure and cardiomyopathy

Heart failure is a condition in which your heart can't pump enough blood to meet your body's needs. It frequently involves congestion (blood and fluids backing up in your system). Key symptoms may include shortness of breath, a dry and hacking cough, weight gain, swelling, and fatigue.

Heart failure develops because the heart muscle becomes weak or loses the ability to pump correctly. If the heart is not "squeezing" well to get enough blood to your body, you have **systolic** heart failure. If the heart can't "relax" to fill with enough blood between contractions, you have **diastolic** heart failure.

Heart failure is often caused by other conditions, such as atherosclerosis, heart attack, high blood pressure, heart valve problems, and alcohol or drug abuse. Heart muscle weakening and damage is often called **cardiomyopathy**, which literally means "heart muscle disease." Sometimes the damage occurs for no known reason. This is called idiopathic cardiomyopathy (**idiopathic** means "no known cause").

Heart failure tests include EKGs, echocardiography, cardiac catheterization, and cardiac MRI (see **Chapter 4**). Treatment includes medication (see **Chapter 6**). It can also include ventricular assist devices or heart transplant (see **Chapter 5**).

HOW COMMON ARE VALVE PROBLEMS?

Around 8 million Americans have heart valve disease, including over 13% of Americans over 75 years old. The most common and serious valve problems happen in the aortic and mitral valves.



IF YOU HAVE HEART FAILURE

Heart failure is a serious problem that requires careful management. If you're diagnosed with heart failure, your healthcare providers will give you more information, including Intermountain's **Living with Heart Failure** booklet. They can also give you tools and tips to help you take care of yourself.

ARRHYTHMIA UPDATE

Arrhythmias are very common, especially as you get older. Many cases are harmless, but some are dangerous and require treatment. Your healthcare provider can help you understand what arrhythmia means for you.

Arrhythmias

Arrhythmias, also called **dysrhythmias**, are heart rhythm problems. They occur when the heart's natural pacemaker, the SA node, is no longer in control of the electrical impulses that cause your heart to pump. Instead, impulses may be blocked or may start elsewhere in the heart muscle. This disrupts the heart's normal rhythm and makes it work less efficiently.

Arrhythmias can result from a number of different conditions. Some of these are lack of oxygen to the heart (often caused by atherosclerosis), heart valve disease, or damage to the heart muscle. People may experience arrhythmias as palpitations, a “fluttering” or “racing” heart, or skipped heartbeats.

Atrial fibrillation is the most common type of irregular heartbeat. It is caused by an abnormal rhythm in the upper chambers of the heart (the atria). Normally, an electrical pulse travels through the heart about 60 to 100 times per minute while you're at rest. But with atrial fibrillation, the electrical pulses come too fast. The pulses in the upper chambers then compete for a chance to travel to the lower chambers of the heart. The result is a rapid, irregular heartbeat.

Tests to diagnose heart rhythm problems include EKGs, echocardiography, and cardiac catheterization (see **Chapter 4**.) Treatments include medication, ablation, pacemakers, implanted defibrillator devices, and surgery (see **Chapter 5**.)



Congenital heart defects

Although the term “heart defect” can refer to many different heart problems, it’s often used to talk about defects in the wall (**septum**) that divides the two upper or two lower chambers of the heart. Three of the more common defects are:

- **Atrial septal defect (ASD).** This congenital defect (birth defect) is fairly common. With ASD, there is a hole in the wall between the left atrium and right atrium, the two upper chambers of the heart. The hole allows oxygen-rich and oxygen-poor blood to mix, and overfills the right atrium with blood. As a result, too much blood flows into the right ventricle and lungs. Your heart has to work harder, and your lungs can be damaged.
- **Patent foramen ovale (PFO).** Fetuses have a normal opening (called a foramen ovale) between the left and right atria of the heart. But if this opening fails to close naturally soon after birth, the result is an open (patent) foramen ovale, or PFO. Most of the time, this defect doesn’t cause significant health problems, and doesn’t require treatment. When a PFO is serious enough to cause problems, healthcare providers may recommend a procedure to close the hole.
- **Ventricular septal defect (VSD).** This problem is a hole in the wall between the two lower chambers of the heart (the ventricles). It may be a birth defect or a result of damage to the heart. With a VSD, oxygen-rich blood from the heart’s left ventricle is forced through the hole into the right ventricle. The blood is then pumped back to the lungs, even though it’s already been refreshed with oxygen. This is inefficient, and makes your heart work harder.

See **Chapter 4** to learn more about tests to diagnose congenital heart defects, such as echocardiography, cardiac MRI, and electrocardiograms (EKGs). **Chapter 5** includes information about heart defect repairs.



THE LONG-TERM EFFECT OF A BIRTH DEFECT

Congenital heart defects are often detected and treated in infancy. However, for some people the symptoms associated with a defect appear in adulthood.

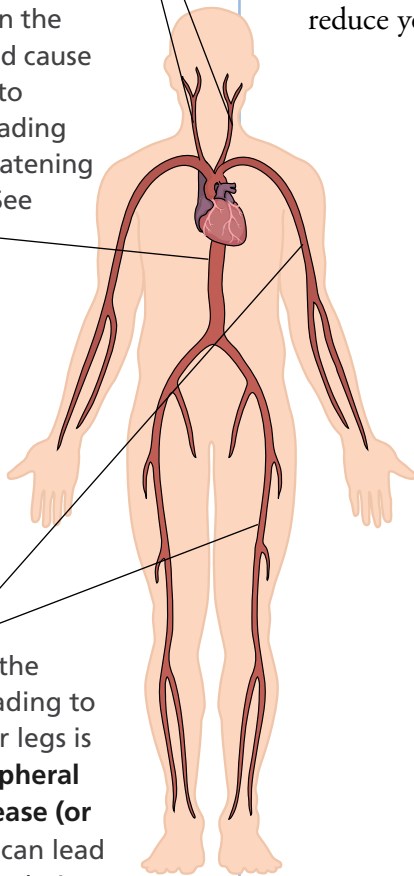
For example, if a heart valve is missing one of its “leaflets” at birth, over time the valve can become narrowed or leaky. The result is heart valve disease, which is treated by repairing or replacing the valve.

Related Conditions

Disease in the carotid arteries leading to the brain could cause a stroke. See the next page.

Weak, thin, bulging areas (**aneurysms**) in the artery walls, especially in the **aorta**, could cause the artery to rupture, leading to life-threatening bleeding. See page 48.

Disease in the arteries leading to the arms or legs is called **peripheral artery disease (or PAD)**. This can lead to poor circulation, difficulty walking, and loss of limbs.



The heart isn't the only part of the body that can be affected by narrowed, blocked, or damaged blood vessels. Diseases of the blood vessels (called **vascular diseases**) also affect other areas of the body.

If you have coronary artery disease, you're more likely to have artery disease in other areas of your body. Your healthcare providers will be alert to this, and can diagnose and treat these related problems along with your heart disease, or you may be referred to a vascular specialist. The steps you take to reduce your risk for heart disease will also help reduce your risk for other vascular problems.

Peripheral artery disease (PAD)

Peripheral artery disease (PAD), often called **peripheral vascular disease (PVD)**, is a condition in which the arteries that carry blood to the legs or arms become narrowed or blocked. PAD affects about 8.5 million Americans over the age of 40. As with coronary artery disease, the most common cause of PAD is **atherosclerosis** (buildup of fatty plaque in the walls of the blood vessels). In some cases, PAD may be caused by blood clots that lodge in the arteries and restrict blood flow.

Although some people with PAD have no symptoms, others experience symptoms such as muscle cramping, aching, pain, and numbness. The most common symptom of PAD is the feeling of cramping and aching in the legs or hips, especially when walking. This symptom, known as **claudication**, occurs when there's not enough blood flowing to the leg muscles during exercise. The pain typically goes away when the muscles are given a rest.

See **Chapter 4** for more information about tests to diagnose PAD, such as peripheral angiography and vascular studies. See **Chapter 5** for details on PAD treatments, such as angioplasty, atherectomy, and stent placement.

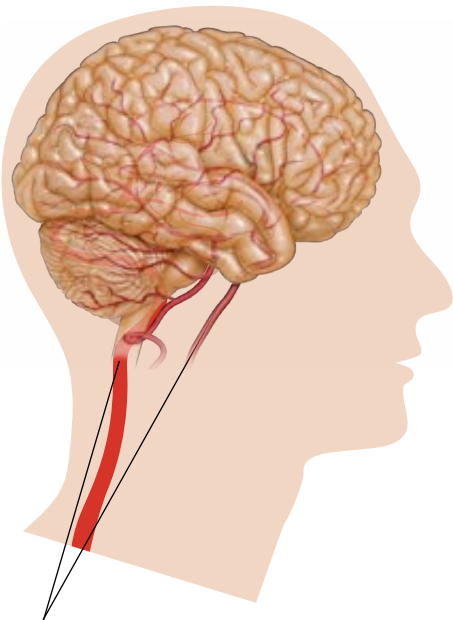
If you experience symptoms of PAD, don't dismiss them as a normal part of aging. Talk to your healthcare provider.

Carotid artery disease and stroke

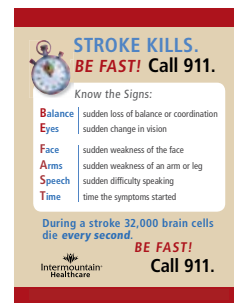
The **carotid arteries** are the major arteries in your neck that supply your brain with blood. Carotid artery disease occurs when these arteries become narrowed or blocked. Blockage can occur from buildup of fatty plaque in the artery walls (atherosclerosis) or from a blood clot. If a carotid artery is completely blocked, this can cause a **stroke** (also called a **brain attack**). A less common cause of stroke is a rupture (break) in a blood vessel leading to the brain.

A stroke happens when the blood supply to the brain is suddenly interrupted. Without oxygen, nerve cells in the affected area of the brain can't work, and die within minutes. When nerve cells can't work, the part of the body they control can't work either. And because dead brain cells aren't replaced, stroke can have permanent, devastating effects, such as loss of speech, motor skill, and memory. Stroke is the leading cause of disability for adults and the fourth leading cause of death in the United States.

The symptoms of stroke are listed at the right. As with a heart attack, recognizing these signs and symptoms and responding immediately are the keys to minimizing damage and possibly saving your life.



ARTERIES and smaller **blood vessels** carry oxygen-rich blood to your brain. A stroke, sometimes called a brain attack, happens when the flow of blood through any of these vessels is suddenly cut off.



Stroke can kill. **BE FAST!**

Know the signs of stroke:

Balance: Sudden loss of balance or coordination

Eyes: Sudden loss of vision or double vision

Face: Sudden weakness in the face

Arms: Sudden weakness of an arm or leg

Speech: Sudden difficulty speaking

Time: Time the symptoms started

You and your family should **ALWAYS** watch for these signs.

Call 911 **Get treatment fast!**

If you notice any of the signs listed above, call 911 right away. During a stroke, 32,000 brain cells die every second, so every second counts to help prevent brain damage.

Tests to diagnose the cause of a stroke include CT scans, echocardiograms, and peripheral vascular studies (see **Chapter 4**). See **Chapter 5** for details on treatments that address the problem in the carotid artery, such as stent placement.



TIA: an early warning sign of a stroke

People with carotid artery disease sometimes experience stroke-like attacks called **transient ischemic attacks (TIAs)**, which last for a few minutes to an hour and can involve one or more of these symptoms:

- Weakness, numbness, or tingling on one side of the body
- Inability to speak clearly
- Inability to control the movement of an arm or leg
- Losing vision in one eye

Don't ignore these symptoms, even if they go away quickly. See a doctor. A TIA is a warning sign of carotid artery disease and a possible stroke in the future.

Aortic aneurysm

When the wall of an artery becomes thin and weak, it can stretch and bulge like a balloon. This weakened area is called an **aneurysm**. When it happens in the aorta, it's called an **aortic aneurysm**. The most common part of the aorta affected is in the abdomen (belly). This is called an **abdominal aortic aneurysm** or **AAA**.

The aorta is the main artery out of your heart that carries blood to all parts of your body. Therefore, an aortic aneurysm is a dangerous condition. If it grows large enough and the artery wall grows very weak, the pressure of blood flow can cause the artery wall to rupture (burst). This leads to internal bleeding that can threaten your life.

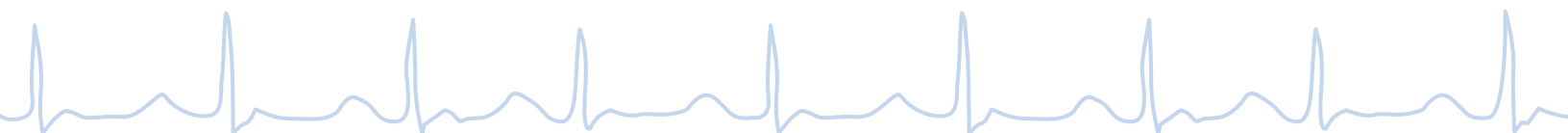
Unfortunately, aortic aneurysms often produce no symptoms until they rupture. Before rupture, some patients with an AAA may have severe, steady back or abdominal pain that is not relieved by pain medication. Sometimes your healthcare provider can detect a mass in your abdomen.

The most common causes of aortic aneurysm are atherosclerosis and high blood pressure. At highest risk are males over the age of 60 who smoke, and people with a family history of AAA. If you're at risk, you should be evaluated early and monitored regularly.

3 Cardiac Risk Factors

Over the years, researchers have discovered many factors that can contribute to the development of heart disease. Some of these are beyond your control, while others can be modified through treatment and lifestyle changes. This section describes these risk factors and summarizes what you can do to reduce your risk for further heart problems.

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“ Both my dad and brother had heart attacks. That was a wake-up call for me. I started looking at my life and the risk factors I had — and I realized some things had to change. So rather than wait until I have a heart attack too, I’m doing things right now to lower my blood pressure and cholesterol. ”

Alan, family history
of heart disease

What Are Cardiac Risk Factors?

Cardiac risk factors are conditions or behaviors that increase your chance of developing heart disease. They're also factors that can make your existing heart disease worse. An important goal of your treatment is to reduce or eliminate these risk factors as much as possible.



RISK FACTORS YOU CANNOT CHANGE

Some risk factors that affect your heart health cannot be changed. However, it's still important to be aware of them. Awareness gives you a chance to educate yourself and take measures to safeguard your health in other ways. Several of these factors are listed below:

- **Age:** Your risk increases with age
- **Sex (gender):** The risk is higher for men of any age and for women after menopause
- **Family history (heredity and race):** Heart disease tends to run in families, and is more common in some ethnic groups
- **Personal history:** People with past heart problems have more risk



RISK FACTORS YOU CAN CHANGE

Other risk factors are within your control. By making positive lifestyle changes and/or taking medications, you can reduce or eliminate the risk to your heart from the factors listed below:

- **High blood pressure** (hypertension)
- **High blood cholesterol** (high total cholesterol, high LDL, low HDL, high triglycerides)
- **Smoking**
- **Diabetes**
- **Physical inactivity**
- **Excess weight**



OTHER FACTORS THAT MAY PLAY A ROLE

Researchers continually discover other single factors and groups of factors that seem to relate to heart disease. A few of these factors are listed below:

- Excessive alcohol use
- Illegal drug use
- Birth control pills
- C-reactive protein (CRP)
- Metabolic syndrome
- Sleep apnea
- Stress
- Vitamin D deficiency

Each of these factors is discussed on the following pages.



WOMEN AND HEART DISEASE

Many people think that women don't get heart disease. In fact, heart disease is an important health issue for women. Here's why:

- Nearly 400,000 women die from heart disease every year — more than from breast, lung, uterine, and ovarian cancers combined. In fact, heart disease is the cause of death for 1 out of every 4 women.
- Heart disease in women of all ages is growing rapidly.
- At older ages, women are more likely to die from a heart attack than men.

Heart disease is the number one killer of men AND women in America.

Risk Factors You Cannot Change

Risk factors are things that make it more likely that you might get a certain medical condition. Below are some risk factors that you can and can't change, and why they put your heart health at risk.

Age

The older you get, the more likely it is that you will have **atherosclerosis** [ath-er-oh-skleeer-OH-sis], or fatty plaque buildup in the arteries, and that it will advance to the point where it produces symptoms. About 4 out of 5 people who die from coronary artery disease are 65 or older.

Sex (gender)

Overall, men have a higher risk for heart disease than women. But the difference narrows after women reach menopause. This is because the female hormone estrogen seems to have a protective effect against heart disease. However, after the age of 65, the risk for heart disease is about the same between the sexes when other risk factors are similar.

Family history (heredity and race)

Heart disease tends to run in families. For example, if your parents have (or had) heart disease, you're more likely to develop it yourself. Also, the risk of heart disease is higher among African Americans, American Indians, Hispanic Americans, and Americans of Pacific Island descent. Most people with a strong family history of heart disease also have one or more other risk factors, such as high blood pressure or diabetes.

Personal history

If you've already had angina or a heart attack your risk for having more heart problems is higher.

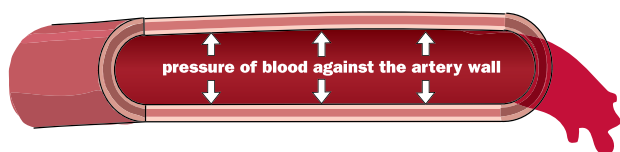
Risk Factors You Can Change

High blood pressure (hypertension)

Many people have high blood pressure (also called hypertension) without knowing it. That's why it's sometimes called "the silent killer." If you don't detect and treat high blood pressure, it greatly increases your risk of heart attack and stroke.

What is blood pressure?

Blood pressure (BP) is the force of blood pressing against the walls of the arteries, like the pressure of water in a garden hose.



What is HIGH BP and why is it bad for your heart?

Sometimes blood pressure increases to help your body deliver more blood where it's needed, for instance, to your muscles during exercise. However, if your BP stays high for long periods of time, your heart has to pump blood against more resistance. Over time, this can injure your heart and your arteries. Here's what can happen:

- Arteries can become scarred, hardened, and severely weakened
- Atherosclerosis can develop or increase
- Blood clots can form in the arteries
- The heart muscle can enlarge and weaken, making it a less efficient pump

These changes to your arteries and heart reduce the amount of oxygen delivered to all your vital organs. This increases your risk for heart attacks, strokes, and other serious health problems.

How is high BP diagnosed?

Blood pressure readings can vary during the day, depending on what you're doing and how you're feeling. If your blood pressure readings are consistently high, your healthcare providers will diagnose you with high blood pressure.

How is BP measured?

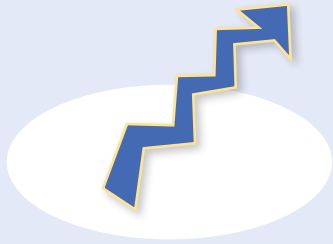
Blood pressure is measured with a simple instrument that has a complicated name: **sphygmomanometer** [sfig-moh-man-AHM-eh-ter]. Blood pressure is expressed in millimeters of mercury (mm Hg) in 2 numbers, for example, 120 "over" 80 or 120/80).

$$\frac{120}{80} \quad \begin{array}{l} \text{systolic} \\ \text{over} \\ \text{diastolic} \end{array}$$

Your **systolic** [sis-TALL-ik] blood pressure is the top number. It reflects the pressure of the blood flow when the heart beats. Your diastolic [DIE-eh-stall-ik] blood pressure is the bottom number. This reflects the pressure of blood flow when the heart relaxes between beats.

National blood pressure guidelines:

BP Category	Systolic	Diastolic
Normal	less than 120	and less than 80
Elevated	120 to 129	and less than 80
HYPERTENSION		
Stage 1	130 to 139	or 80 to 89
Stage 2	140 or higher	or 90 or higher



“HIGH CHOLESTEROL” AS A CATCH-ALL TERM

People use the term “high cholesterol” to describe several different conditions:

- High total cholesterol
- High LDL cholesterol
- Low HDL cholesterol
- High triglycerides

Each of these conditions is a risk factor for heart disease.

High cholesterol

Cholesterol is a soft, waxy substance that carries digested fat from your liver to the parts of your body that need fat for energy and healing. It also carries fat to “fat storage sites” in your body, such as your stomach and hips. Your liver produces most of the cholesterol in your body, but some comes from eating foods high in cholesterol and saturated fats.

Cholesterol and fat travel in your bloodstream in packages called **lipoproteins** [lip-puh-PROH-teen]. Lipoproteins are classified by their density, and different types play different roles in your heart health.

What are the different types of cholesterol and fat, and are they all bad?

A certain amount of fat and cholesterol in your blood is healthy and normal. But too much cholesterol and fat in your blood, or abnormal levels of certain types of these substances, can cause atherosclerosis. For example, all of the following increase your risk:

- **High levels of LDL cholesterol (“bad cholesterol”).** LDLs are low-density lipoproteins. These carry the largest amount of cholesterol in the blood. When too much LDL cholesterol circulates in your bloodstream, it can build up in the walls of your arteries. This most commonly happens which can happen if you eat too much fat or cholesterol. Along with other substances, LDL cholesterol can form hard plaque in your arteries and cause atherosclerosis. This brings serious risks for your heart and other vital organs.
- **Low levels of HDL cholesterol (“good cholesterol”).** HDLs are high-density lipoproteins. Too little HDL cholesterol in your bloodstream can also increase your heart risk. That’s because HDL cholesterol removes some of the LDL cholesterol from the artery walls, preventing or slowing the buildup of dangerous plaque. You want high levels of this “good” HDL to help keep your arteries clear and your heart protected.
- **High levels of triglycerides.** Triglycerides are the most common type of fat in your blood. Studies show that many people who have heart disease have high triglyceride levels. High triglyceride levels, combined with low HDL cholesterol or high LDL cholesterol, seem to speed up atherosclerosis.

How are cholesterol problems diagnosed?

Your healthcare providers can check your blood cholesterol with a blood test called a **lipid panel**, also called a lipid profile. A full panel provides the readings listed in the table below.

LIPID PANEL READINGS

COMPONENTS of a lipid panel	RECOMMENDED levels*
Total cholesterol Lower is better.	200 mg/dL or less is desirable
LDL (“bad cholesterol”) Lower is better.	100 mg/dL or less is the goal for people with multiple cardiac risk factors 70 mg/dL or less is optimal for most patients with heart disease
HDL (“good cholesterol”) Higher is better.	40 mg/dL or more for men 45 mg/dL or more for women
Triglycerides Lower is better.	150 mg/dL or less is normal
Ratio of total cholesterol to HDL Obtained by dividing total cholesterol by HDL. Lower is better.	4.5:1 or less

* These are general guidelines. Your healthcare provider can help you set personal goals for cholesterol levels, based on your condition and other risk factors.



FINDING THE FACTOR

By itself, high blood cholesterol doesn't cause any symptoms. As a result, many people don't know that they face this cardiac risk factor.

Experts recommend that everyone over the age of 20 should get their cholesterol levels checked at least once every 5 years.



SMOKING AS A HEART RISK

Cigarette smoking is a widespread and significant cardiac risk factor. Smokers have at least twice the risk of heart attack or stroke as nonsmokers. They also have less chance of surviving a heart attack than nonsmokers.

Smoking

You already know that smoking damages your lungs and increases your chance of developing dangerous lung diseases. You might even have heard that smoking is bad for your skin and eyes. But did you know that smoking can also hurt your heart? Here's what it can do:

- **Speed up atherosclerosis.** Smoking damages the tissues of the artery walls, constricts blood vessels, and raises blood cholesterol. All of these can speed the buildup of fatty plaque in your arteries and increase your risk for heart problems.
- **Increase strain on your heart.** When atherosclerosis narrows blood vessels, your heart has to work harder to pump blood throughout the body. Nicotine also causes your heart rate to increase and the blood vessels to constrict, both of which add to the strain on your heart.
- **Lower the amount of oxygen in your blood.** Because a smoker's heart muscle is working harder, it requires more oxygen. Yet smoking actually decreases the oxygen level in the blood. The carbon monoxide in cigarette smoke replaces as much as 15 to 20% of the oxygen normally carried by the red blood cells.
- **Increase your risk of spasms and blood clots in your coronary arteries.** Spasms and blood clots can cause heart attacks.



For more information

Chapter 9 provides more information and resources to help you quit smoking.

Diabetes and high blood glucose levels

If you have diabetes, you're prone to having too much glucose (sugar) in your blood. This extra blood glucose can damage your blood vessels and increase your risk for heart attack, stroke, and other health problems. In fact, about $\frac{2}{3}$ of people with diabetes die from a heart attack or stroke. Controlling your blood glucose levels can help prevent these and other complications.

Even if you don't have diabetes, your blood glucose levels may be higher than normal. This is a condition often called **prediabetes**. Studies show that regular exercise, a healthy diet, and reaching and maintaining a healthy weight can reduce blood glucose levels and delay diabetes or even prevent it.

For more information

Ask your healthcare providers about where to find information on Intermountain's diabetes education materials and classes.

Managing your diabetes can lower your risk for heart disease as well as your risk for other complications caused by high blood glucose levels.



DIABETES: UNDER YOUR CONTROL?

Even though you can't change the fact that you have diabetes, you **CAN** work to manage it as well as possible. For this reason, your healthcare providers consider diabetes a "partially modifiable" risk factor for heart disease. They'll work closely with you to help limit its effect on your heart.

BACK IN THE DAY

In the early 1900s, about 90% of the workers in farming, industry, and manufacturing got enough exercise on the job. Today, only 5% of jobs provide enough exercise to keep us healthy and 25% of all Americans are totally inactive. For most people these days, physical fitness takes a conscious effort.

WHEN POUNDS EQUAL PROBLEMS

Fat is living tissue that requires a blood supply. Extra fat means extra blood vessels to pump blood through, and extra work for your heart. This can put a strain on your heart. Carrying excess fat also encourages inactivity and can foster stress and depression.

For more information

Chapter 7 can help you build a heart-healthy exercise program.

Chapter 9 has information on maintaining a healthy weight.

Physical inactivity

Physical inactivity is a major risk factor for coronary artery disease. Many studies have confirmed that people who don't get regular exercise are more likely to develop heart disease. If they have a heart attack, they are more likely to die from it. People in this group are also more likely to have other cardiac risk factors such as high blood pressure, excess weight, and diabetes.

Experts agree that physical activity should be performed regularly. It doesn't matter if it's a structured program or part of your daily routine. ALL exercise adds up to a healthier heart. Even small increases in daily activity can reduce your risk of heart problems. If you do have heart surgery, physical activity can help you as well. People who are active recover more quickly from surgery.

Excess weight

If you have a lot of excess weight from body fat, you're more likely to develop heart disease. This is true even if you have no other risk factors. Excess body fat hurts your heart in the following ways:

- Puts extra strain on your heart muscle
- Raises blood cholesterol and triglyceride levels, and lowers HDL
- Increases your risk of developing type 2 diabetes
- Raises blood pressure

How do you know if you need to lose weight? Healthcare providers use several different measures to assess body weight. Common ways of looking at body weight include the following:

- **Body mass index (BMI).** This is a measure of body mass based on your height and weight. It's helpful in showing whether you are overweight. The web page at www.cdc.gov/healthyweight/assessing has a calculator to help you figure your own BMI.
- **Waist circumference and waist-hip ratio.** Measuring your waist and hips can show where your body tends to store fat. People who store body fat around the waist have more risk of heart disease. Generally, men with a waist over 40 inches and nonpregnant women with a waist over 35 inches are at higher risk.
- **Body composition measures.** There are several different methods to check how much of your weight is due to muscle or fat, for example, skin fold tests and underwater weighing.

Other Factors That May Play a Role

Several other factors may play a role in the development and progression of heart disease.

Excessive alcohol use

Excessive drinking can raise blood pressure and cause heart failure. It can also contribute to obesity and cholesterol problems, both of which play a role in heart disease. However, moderate alcohol consumption seems to have a protective effect on your heart, including raising levels of HDL cholesterol. The American Heart Association recommends that people who drink should limit their alcohol to 1 drink a day for women, and 1 or 2 drinks for men.

Illegal drug use

Illegal drugs, such as cocaine, heroin, marijuana, ecstasy, or methamphetamine, are toxic to your heart muscle. They can lead to heart rhythm problems, cardiovascular disease, heart attack, or heart failure.

Birth control pills

Studies show that women who use high-dose oral contraceptives are more likely to have a heart attack or stroke. This is because these pills can encourage the formation of blood clots in the blood vessels. Using birth control pills may also worsen the effects of major risk factors such as high blood pressure, high cholesterol, smoking, diabetes, and excess weight. Stopping birth control pills reduces these risks.

Sleep apnea

Research suggests links between heart disease and sleep apnea. People with sleep apnea stop breathing during sleep and wake often during the night to catch their breath. Often, people with sleep apnea don't know they have this condition. After a sleep apnea diagnosis, simple strategies or special breathing equipment can keep airways open during sleep.

Stress

Although the connection has proven difficult to understand, many scientists have noted a relationship between stress and heart disease risk. For this reason, most cardiac rehabilitation programs teach stress management to heart patients.

C-reactive protein (CRP)

C-reactive protein (CRP) is a protein in the body. CRP levels increase when blood vessels are inflamed. Researchers have found that blood levels of CRP are elevated for as many as 6 to 8 years before a first heart attack or stroke. For this reason, many healthcare providers monitor CRP in their patients' blood with a high-sensitivity CRP (**hs-CRP**) test. Patients with elevated CRP can begin an early, aggressive program of heart disease prevention.

Metabolic syndrome

Also called **syndrome X**, **metabolic syndrome** is really a cluster of factors that together have been shown to coincide with heart risk. These factors are a large waist, high triglyceride levels, low HDL, high blood pressure, and high fasting blood glucose. Weight loss, exercise, and a heart-healthy diet low in sugar and refined carbohydrates are often prescribed to help treat metabolic syndrome.

Vitamin D deficiency

Recent research studies suggest that low levels of vitamin D may cause increased risk of heart disease, and that taking vitamin D supplements may help reduce this risk for some patients. Check with your doctor about taking a supplement, and choose milk or other foods fortified with vitamin D. You may also want to get moderate amounts of sunshine. Your body uses sun to make vitamin D.



LIFESTYLE MANAGEMENT: your responsibility

What does it take to manage your lifestyle effectively? First of all, it takes personal responsibility. Only you can change the daily choices that affect your heart health. It also requires keen awareness of your risks, symptoms, and behaviors, and a strong resolve to act in new ways.

For some people, this is the most difficult aspect of treatment. But it's also the most rewarding. After all, these are things YOU can pursue to improve your health, and studies show that they really work.

How Lifestyle Management Can Help

Cardiac risk factors tend to travel together.

For example, a person who's overweight is also more likely to have high blood pressure and be physically inactive. A person with diabetes is likely to have high cholesterol. The good news is this: Making even one positive change in your life, such as getting more exercise, can lower several different risk factors at once. The better you manage your lifestyle, the greater the potential to help your heart.

Later chapters of this book are dedicated to the major elements of lifestyle management to reduce risk factors:

- **Chapter 7** teaches you the importance of **exercise** and how to create and maintain an exercise program that works for you.
- **Chapter 8** teaches you the importance of a **healthy diet** and practical steps to get you there.
- **Chapter 9** summarizes other lifestyle management elements including **quitting smoking**, achieving and maintaining a **healthy weight**, and **managing stress**.

Read these chapters and talk to your healthcare providers. They can help you create a lifestyle management plan tailored to your needs. Cardiac rehab staff can also monitor your progress, offer encouragement, and provide extra tools and tips to help you succeed. See **Chapter 10** for locations and phone numbers of cardiac rehab programs near you.



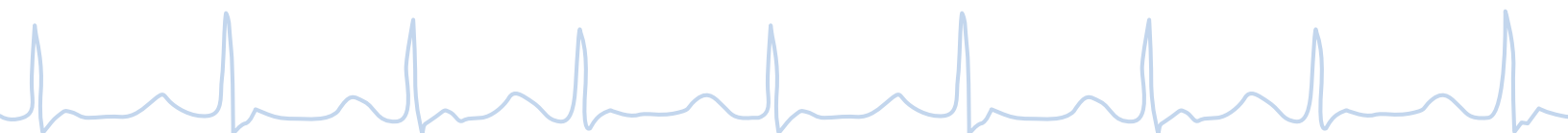
Don't forget to manage your medication!

Another important aspect of lifestyle management is taking your heart medications exactly as directed by your healthcare providers. **Chapter 6** provides information and tips to help you get the most from your heart medication.

4 Diagnostic Tests

Your healthcare providers may order tests to diagnose and monitor your condition or to assess your risk for further heart problems. This chapter summarizes the most common tests, including their purpose and what to expect. If there are specific things you need to do to prepare for (or recover from) a particular test, your healthcare providers will give you detailed instructions.

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“ When you get sick, the first thing you want to know is “what’s wrong?” My doctors would recommend one test, say the results were inconclusive, then order another. Different people would use different words, like heart disease, atherosclerosis, or heart attack. Did I have one condition, or ten? I trusted my doctors, but I didn’t really know what was happening.

Over time and with my doctors’ and nurses’ help, I began to understand my condition better and why they needed to do different tests to decide on the best treatment. I also learned to ask more questions. So did my husband. We started to feel more in control of things, and I could finally feel a little more hopeful. ”

Angela, 1 year after initial diagnosis of heart disease

Medical History and Physical Examination

A medical history and a physical exam are important first steps. They may allow your healthcare provider to confirm or rule out a heart problem right away. They can also help show which additional tests you need.

Here's what you can expect from a medical history and physical exam:

- **Medical history.** To take a medical history, your healthcare providers simply talk to you. Usually they'll start by reviewing your medical chart and previous health problems. Then they'll ask you about your current symptoms, family history, and lifestyle. Questions may include:
 - What symptoms do you have?
 - Do you have any discomfort?
 - Where do you have discomfort?
 - How often does this happen and during which activities?
 - What relieves your discomfort?
 - What other symptoms happen when you feel discomfort?
 - Has anyone in your family ever had heart problems?
 - Do you smoke?
- **Physical exam.** A basic physical exam usually follows the medical history and provides more clues to your condition. During the exam, your healthcare providers will check vital signs, such as heart rate and blood pressure. They'll also check for lung congestion, swelling in your arms or legs, or any areas of tenderness on your body.



HELP MAKE HISTORY

Answer medical history questions as completely as you can. The information you give will help your healthcare providers see the pattern of your symptoms and the factors that may be causing them.



Questions?

If you have any questions about what your provider is looking for, feeling, or listening to during the physical exam, be sure to ask.

Blood Tests

Your healthcare provider may order blood tests to learn more about your heart problem. Here are a few of the most common tests:

- **Blood electrolytes.** Checking levels of chemicals called **electrolytes** can help show the cause of a heart problem or help in treating it. Electrolytes include calcium, potassium, sodium, and magnesium. These are all important for your heart and other major organs.
- **Blood cell count.** This blood test includes levels of white blood cells (WBCs) and red blood cells (RBCs). This test helps your healthcare provider check for an infection or measure your body's ability to fight infections. It also shows how well your blood can carry oxygen to vital organs such as the heart.
- **Cardiac marker analysis.** Damaged heart cells release certain chemicals. These telltale chemicals are called **cardiac markers** or **cardiac enzymes**. Two examples are **troponin** and **CPK-MB**. Along with other tests, checking for these markers in your blood can help show whether or not you have recently suffered (or are suffering) a heart attack.
- **BNP.** When the heart is under stress, it releases a chemical called **BNP (B-type natriuretic peptide)**. Measuring the BNP levels in your blood is one way to detect your risk for coronary artery disease or heart failure.
- **Blood coagulation tests.** **Anticoagulants** (sometimes called “blood thinners”) are drugs that cause your blood to take longer to clot. They help prevent dangerous clots from forming in your heart and blood vessels. Yet in doing so, they also bring a risk of bleeding. If you're taking the anticoagulant warfarin (Coumadin), your healthcare provider will order regular blood tests to make sure your blood is clotting at the right level. The most common clotting test is called a **PT/INR test**. The **PT** (prothrombin time) is how long it takes your blood to clot. An **INR** (internationalized normalized ratio) is a calculation based on the PT.
- **Glucose test.** A glucose (blood sugar) test helps your provider check for diabetes and whether it's in good control. High blood glucose levels can lead to coronary artery disease. This test may also show if you've had a stressful event (such as a heart attack) that can raise your blood glucose.



Simple blood tests can help your healthcare provider learn more about your heart problem.

- **Lipid tests.** These tests check the levels of cholesterol, triglycerides, and other fatty substances in your blood. Test results help to show your risk for coronary artery disease and your body's ability to process fats. They can also help your provider decide whether you need treatment or check how well your treatment is working.
- **hs-CRP.** Your healthcare provider may order a **high-sensitivity CRP test (hs-CRP)** to measure the level of C-reactive protein in your blood. High levels of this protein occur when blood vessels are inflamed. This can signal higher risk for heart disease.

Peripheral Vascular Studies

If you have coronary artery disease, you may also be at risk for problems with arteries in other parts of your body. Narrowing, blockage, or blood clots can happen in the arteries that lead to your brain (causing stroke), your kidneys, and your arms and legs.

To check for problems like these, your healthcare provider may send you for ultrasound tests of the arteries and veins throughout your body. **Ultrasound studies** are safe and painless tests that use sound waves to search for plaque or narrowing in the arteries. There are four general types of studies.

- **Peripheral.** These tests search for blockage or narrowing in the arteries in your arms and legs. One type of peripheral vascular test is the **ankle brachial index (ABI test)**, which compares the blood pressure in your ankle and your arm.
- **Carotid.** Assesses the carotid arteries in your neck.
- **Abdominal.** Assesses blood flow in the aorta, the main artery carrying blood out of the heart, and in the arteries that lead to the kidneys, intestines, and liver.
- **TCD (transcranial Doppler) ultrasound.** Examines the blood flow within the brain.

MIXING AND MATCHING

Researchers have discovered that running several different tests at once and looking at the results together can give new insight into your health and health risks.

For this reason, your healthcare provider may order the following tests to assess your cardiovascular risk:

- hs-CRP
- Fasting lipid profile
- Fasting blood glucose

These tests can also be used to identify other problems in people with known heart disease. Depending on your circumstances, to assess your risk, your doctor might also order a CT scan to measure your coronary calcium score (see page 67).

Lung and Oxygen Tests

To provide oxygen to all parts of your body, your heart and lungs work together closely. So it makes sense that lung problems and heart problems often appear at the same time. Lung problems may cause some of your heart symptoms, or vice versa. To check for problems with your lungs and heart, your healthcare provider may order the tests described below.

Pulse oximetry

Pulse oximetry measures how well oxygen is being delivered throughout your body. In this test, a small clip is attached to one of your fingers. The clip shines an infrared light through your skin and registers the amount of oxygen in your tissues. A **pulse oximeter**, also known as an **oxygen saturation monitor**, displays this amount as a percentage.

If your oxygen saturation level is consistently below 90%, you may need extra oxygen. This will help prevent further damage to your heart and other tissues.



Pulse oximetry tells whether there's enough oxygen in your tissues.

Pulmonary function testing (PFT)

Pulmonary function testing is a general term for tests that help determine how well your lungs and airways are working. These tests require you to breathe into a machine.

One common test, **spirometry**, measures how much air you can breathe out, and how fast. Another test, the **VO₂ test**, measures your body's ability to use oxygen during exercise.



Pulmonary function tests, such as spirometry, can determine how well your lungs and airways are working.

Sleep Studies

Medical research has suggested links between heart disease and sleep apnea. With **sleep apnea**, breathing is interrupted frequently during sleep. People with sleep apnea continually wake up during the night to catch their breath. Often, people don't know that they have this condition.

To check for sleep apnea and other sleeping problems that may affect your heart health, your healthcare providers may order a **sleep study**. A sleep study is a painless test that involves an overnight stay in a sleep clinic. During the study, sensors monitor your sleep quality, heart rate, and blood oxygen levels.

Chest X-rays

Chest x-rays help to check for certain heart and lung problems. For example, the x-ray outline of your heart and lungs can show heart enlargement or lung congestion. An x-ray image will not, however, show coronary artery disease.

Don't be surprised if you have more than one chest x-ray during the course of your treatment. Healthcare providers often use chest x-rays to check for complications after heart surgery. They may also use follow-up chest x-rays to check your heart's response to medication. Modern x-ray techniques use very low levels of radiation.

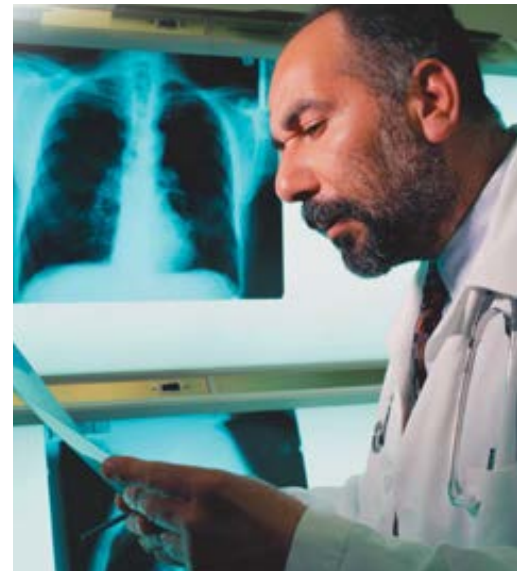
Cardiac CT Scans

A cardiac CT scan combines x-rays of thin cross-sections of your heart to create a 3-D image. You lie on a table that slowly moves you through a CT machine, and a rotating x-ray tube takes cross-section images. With some CT scans, a contrast dye is injected to help highlight the blood vessels. A cardiac CT scan provides very detailed images to help detect problems with the heart and arteries. The risk of a contrast reaction or the radiation risk from a single CT scan is very low. Please talk with your doctor if you have specific concerns.

SLEEP AND YOUR HEART HEALTH

Scientists continue to study the link between sleep and heart health. Below are two important findings:

- Sleep apnea is associated with an increased risk of stroke.
- Sleep apnea can contribute to heart rhythm problems, including bradycardia (a too-slow heartbeat) and atrial fibrillation.



Electrocardiograms



What to expect

An EKG is safe and completely painless. It doesn't put electrical currents into your body. It just monitors your heart's naturally occurring electrical activity.

During an EKG, sensing electrodes are placed on your skin. Your skin will need to be cleaned first and perhaps shaved. The whole process usually takes about 15 minutes.

Your heart's electrical activity appears on a monitor, and your healthcare provider can record or print it.

An **electrocardiogram** (EKG or ECG for short) records the electrical activity of your heart. An EKG provides information about your heart's rate and rhythm. It also diagnoses **ischemia** [is-SKEEM-ee-uh] (lack of oxygen to the heart muscle), heart attacks, and a variety of other heart conditions.

To perform an EKG, your healthcare provider places sensing electrodes on the skin of your chest, arms, and legs. The electrodes are small sticky patches with wires that connect to a monitor. The monitor captures and displays your heart's electrical activity, and can record it on graph paper. These recordings are often called **tracings**.



12-lead EKG

The number of electrodes you'll wear during your EKG depends on the kind of information your providers want to capture. The most common test is a **12-lead EKG test**. This test uses 10 electrodes to generate 12 different views of the heart's electrical activity.

As an initial diagnostic test, your healthcare provider will probably order a **resting 12-lead EKG**. Later, they may want to use a 12-lead EKG to help measure your heart's response to stress. Stress testing is discussed on page 72.



A 12-lead EKG provides 12 different views of the heart's electrical activity.

Telemetry

A telemetry pack is a portable heart monitor that you wear around your neck or waist, or in the pocket of a hospital gown. The telemetry pack is connected to a few electrodes placed on the skin of your chest area, and sends your EKG to a distant screen. From there, a clinician can continually monitor and record your heart rate and rhythm. Telemetry is often used while you're in the hospital or during outpatient cardiac rehab sessions.

A telemetry unit can also be used for an extended period while you're at home to track heart rhythm problems. This type of test is often called **ambulatory telemetry**. See page 71 for details.

A telemetry pack allows continuous monitoring of your heart's electrical activity.



A TIME FOR TESTS

The tests described in this chapter aren't just for people with heart disease. Many healthcare providers recommend baseline EKGs or echocardiograms after age 50.

Signal-averaged electrocardiogram (SAEKG)

Like other specialized EKG tests, a signal-averaged electrocardiogram (SAEKG) can provide more detailed information about your heart rate and rhythm. A SAEKG uses a computer to strengthen and filter certain electrical signals. This helps your healthcare providers assess whether you're at risk for developing dangerous heart rhythms. As with the standard 12-lead EKG, the SAEKG is safe and completely painless.



What to expect

Most people find Holter or telemetry monitors easy to live with. Both monitors are small and can be attached to your belt or carried in a pouch around your waist or neck. They don't interfere with most daily activities.

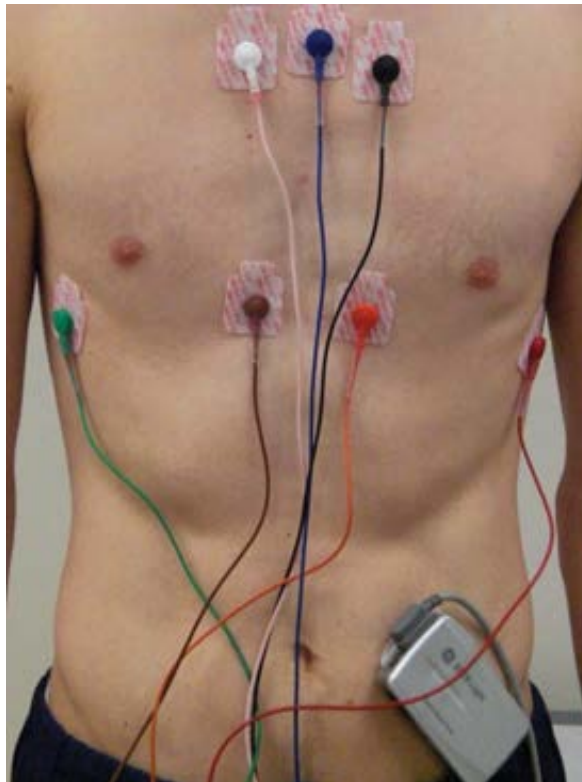
When you feel symptoms such as dizziness, palpitations (irregular heartbeats), or chest pain, you "mark" the Holter data record by pushing a button on the machine. You also record symptoms in a diary.

Ambulatory EKG monitoring

Ambulatory EKG monitoring allows your healthcare providers to monitor your EKG over a period of time, while you're going about regular activities.

Holter monitoring

A Holter monitor continuously records your heart rate and rhythm over a period of 24 to 48 hours. Holter monitoring is usually done while you're at home. It requires you to keep a diary of your activities and symptoms while wearing chest electrodes and a small recording machine. At the end of the test period, your healthcare providers will match up your EKG data and your diary. Together, the two pieces of information can show when your heart is having rate or rhythm problems. The information can also reveal signs that your heart muscle needs more oxygen.



For **Holter monitoring**, several electrodes (usually 7) are placed on your chest and connected to a small monitor worn around the waist or neck, or on a belt loop.

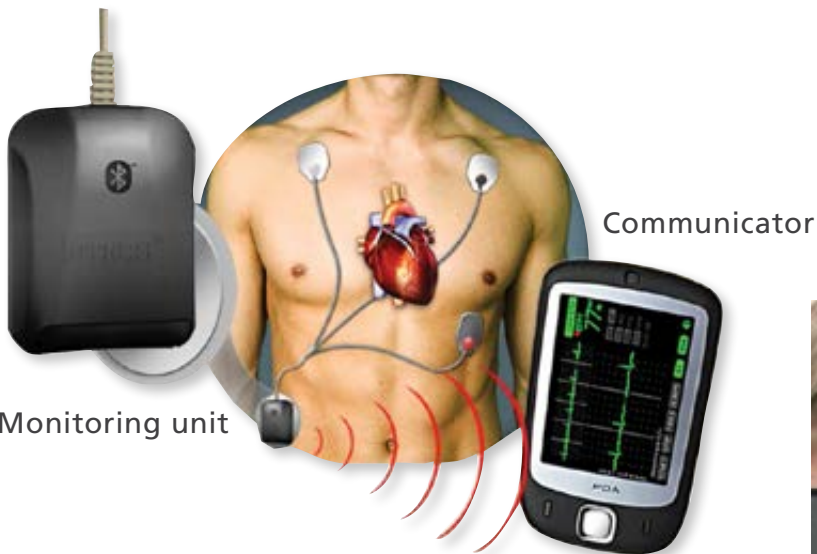
Ambulatory telemetry

Ambulatory telemetry occurs over a longer period — up to 30 days — and works well when heart symptoms are unpredictable. It involves wearing a telemetry unit and using a small wireless communicator.

The telemetry unit monitors your heartbeat all the time. The wireless communicator picks up the information and sends it to the monitoring station. When you feel a symptom, you press a button on the monitoring unit. The heart rhythm "event" is marked in the record, so your healthcare providers can focus on what was happening during that event. If you can't press the button or don't feel symptoms during a heart event, don't worry! The monitoring unit will still record the event.



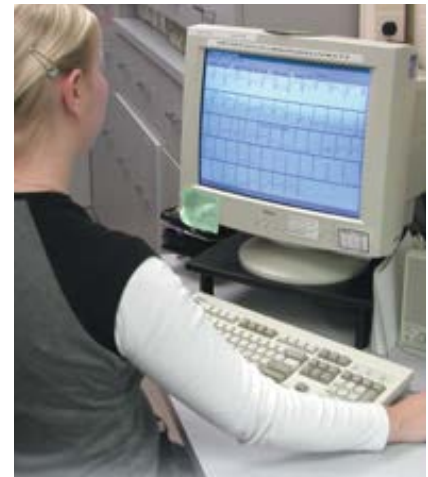
For **ambulatory telemetry**, 2 or 3 electrodes are placed on your chest and connected to a small monitor worn around the waist or neck, or on a belt loop. You unhook the monitor daily and whenever you shower, and then hook it up again.



Monitoring unit

Communicator

The telemetry unit sends information about your heartbeat 24 hours a day. When you feel a symptom, press a button. Your cardiologist or a certified technician can review your heart rhythm online, see a report that shows what was happening when you felt symptoms, or both.



Stress Testing



What to expect

Stress tests are generally painless and quick. Here's what you can expect:

- Before your stress test, you'll need to refrain from smoking, eating, and drinking (especially caffeinated beverages) for a few hours. Check with your healthcare provider about any medication you should avoid taking before the test.
- During your test, you need to communicate about how you're feeling. It's particularly important to speak up if you feel chest discomfort, dizziness, or nausea.
- After you stop exercising, or after you stop receiving medication that stimulates your heart, your healthcare providers will continue to monitor your heart for a while. This is because some symptoms don't appear until your heart is recovering from stress.

You may not have any heart symptoms when you're resting. In this case, an EKG and other tests performed at rest may not give your healthcare providers the information they need. That's why they may want you to have a **stress test**.

A stress test is a practical way to assess your heart's capacity for work and to identify coronary artery disease or the need for further tests or treatments. A stress test involves inducing (causing) heart stress and then monitoring your heart's reaction.

Inducing stress

There are two ways to induce the necessary stress for a stress test. These can be used alone or together:

- **Exercise.** An exercise stress test examines your heart function under the stress of exercise. In the test, you walk on a treadmill or ride a stationary bicycle at gradually increasing workloads.



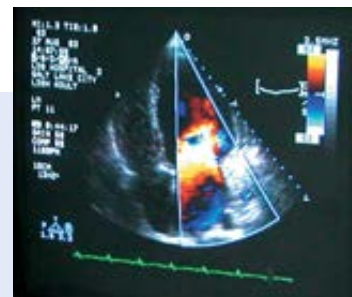
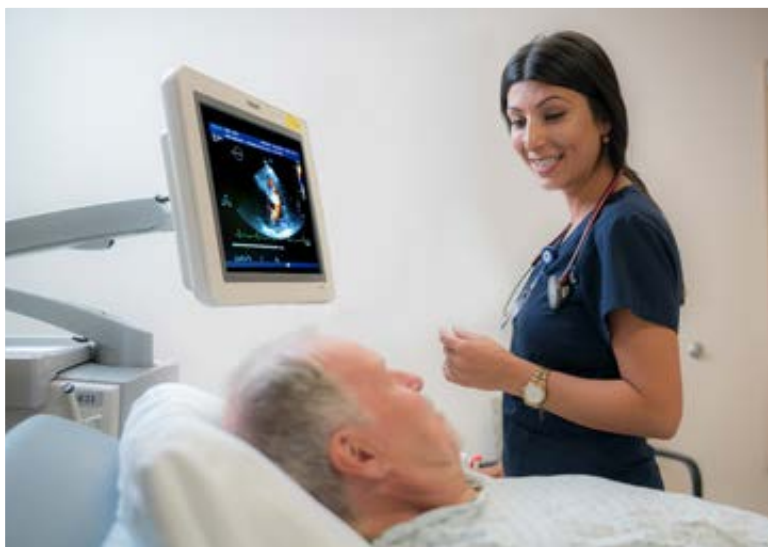
- **Medication.** If you can't exercise at a level that stresses your heart because you have arthritis or another problem that limits your activity, your healthcare provider can give you a medication that stimulates your heart.

Monitoring the heart's response

Before, during, and after a stress test, your healthcare providers monitor your vital signs and your EKG. A stress test can also be combined with other testing, such as an echocardiogram or nuclear imaging, to provide even more information. These tests are described on the following pages.

Echocardiography

An **echocardiogram** (“**echo**” for short) is a cardiac ultrasound. In cardiac care, **ultrasound** helps assess the condition of your heart. It uses a device called a **transducer** to send high-frequency sound waves through the body. As the waves bounce (or “echo”) off structures in the body, they are shown as images on a monitor.



During your echo, you'll be able to see a picture of your beating heart.

Healthcare providers commonly use the following types of echoes:

- **Standard echocardiogram.** In a standard echo, a technician obtains images of your heart by moving the transducer across your chest. The echo can show the heart walls, valves, and the emptying and filling of the heart chambers. It can also show the thickness of the heart wall and the condition of the sac around the heart. These views can help show whether there are any structural problems with your heart. Combined with cardiac Doppler testing (described below), an echo can also help measure your **ejection fraction (EF)**, which is the amount of blood your heart pumps out with each beat. An echo can be done during or after a stress test to compare views of your heart at work and at rest. This is called a **stress echo**.
- **Cardiac Doppler.** In this test, the ultrasound waves bounce off red blood cells moving within the heart chambers. This reveals the speed and direction of blood flow within your heart and helps to show how well your heart valves are working.



What to expect

A standard cardiac echo takes about an hour and is completely safe. It's also painless. With the help of gel applied to your skin, the transducer moves smoothly over your body.



What to expect

During a TEE, a transducer is placed into your esophagus, but a sedative helps you relax and you don't remember the procedure. An anesthetic spray numbs your throat.

During a cardiac MRI test, you'll lie down on a table which is moved inside a magnetic chamber. The chamber looks like a large tube. The test usually takes 45 minutes to an hour. You'll need to stay very still. You'll also need to hold your breath for 8 to 15 seconds at a time. During this safe and painless test, you'll hear some buzzing and thumping.

- **3D echo.** Some echocardiograms are enhanced so that the doctor can see a three-dimensional picture and rotate it to see the heart from multiple angles. Seeing these additional views can provide better information about your heart.
- **TEE.** If you're having heart surgery, or if a standard echocardiogram produces poor images, your healthcare provider may order a **transesophageal** [tranz-eh-soff-uh-GEE-ul] **echocardiogram (TEE)**. With TEE, a provider will numb your throat and guide a transducer into your esophagus (through your mouth) until it rests directly behind your heart. From this vantage point, the transducer can obtain high-quality images of your heart from all sides.
- **Ultrasound tests in the cardiac cath lab.** Some ultrasound tests use a catheter to give a view of the internal structures of your heart or coronary arteries. See page 78 for information on intracardiac echo (ICE) and intravascular ultrasound (IVUS) tests.

Cardiac MRI (Magnetic Resonance Imaging)

A cardiac MRI test uses powerful magnets to create pictures of your heart and coronary arteries. During this test, you're placed in a chamber surrounded by a magnetic field. In response to the magnetic force, the atoms that make up your body's tissues produce weak signals. A computer magnifies and records these signals. They can then be used to create cross-section views ("slices") of your heart as well as three-dimensional images. These can be still or motion pictures.

A cardiac MRI test can reveal the structure and size of your heart chambers, wall, and valves. It can also be used to show blood flow to and through your heart, and to measure your **ejection fraction** (see the description at left). A cardiac MRI can help your healthcare providers determine the extent of heart muscle damage, assess blood flow problems, and detect leaking in the heart's chambers and valves.

HEART ACTION AS A FRACTION

Your **ejection fraction (EF)** is the percent of the blood in your heart that is pumped out with each beat. **A normal ejection fraction is between 55% and 75%.** A low ejection fraction may mean that your heart isn't pumping enough blood to meet your body's needs.

Several different tests, such as an echo, a cardiac MRI test, and a ventriculogram, can measure your ejection fraction. Each of these tests is described in this chapter.

Nuclear Imaging

Nuclear imaging tests measure the pattern of blood flow to the heart muscle. These tests begin with an injection of radioactive chemicals (**radionuclides**) into your bloodstream through an IV. The resulting picture, called a **nuclear scan**, helps healthcare providers detect heart damage and assess heart function. The radionuclides injected into your bloodstream act as tracers. They give off gamma rays, which are detected with imaging equipment called a **gamma camera**.

Nuclear imaging tests are used in several ways:

- **To evaluate areas of damaged heart muscle after a heart attack.** Tracers are absorbed by healthy tissue at a different rate than by diseased or damaged tissue. On a nuclear scan, areas of the heart muscle not receiving a good blood supply may appear as “cold spots.”
- **To assess whether you have coronary artery disease** and measure how much your arteries are blocked. In this kind of test, you will exercise to reach a target heart rate. The test compares blood flow to the heart during rest and during exercise. This shows whether your heart is getting enough blood flow when it is under stress.
- **To measure the effectiveness of treatment** such as bypass surgery or any other procedure designed to restore blood supply to the heart.



During a cardiac MRI or nuclear imaging study, you will lie still while a large imaging camera is brought close to your chest.

WHAT'S IN A NAME?

Cardiac nuclear scans show areas of the heart with poor blood delivery (poor perfusion). For this reason, they're often called **myocardial** (heart muscle) **perfusion imaging** or **nuclear stress tests**. You may also hear other terms used for these tests. They may refer to a substance or camera used in the test (for example, **SPECT scan** or **PET scan**).

A cardiac nuclear scan may be combined with a CT scan in a procedure called a cardiac **SPECT/CT** or **PET/CT** scan. In this type of test, the nuclear camera and CT combine to provide even more detailed information. CT scans are discussed on page 67.



What to expect

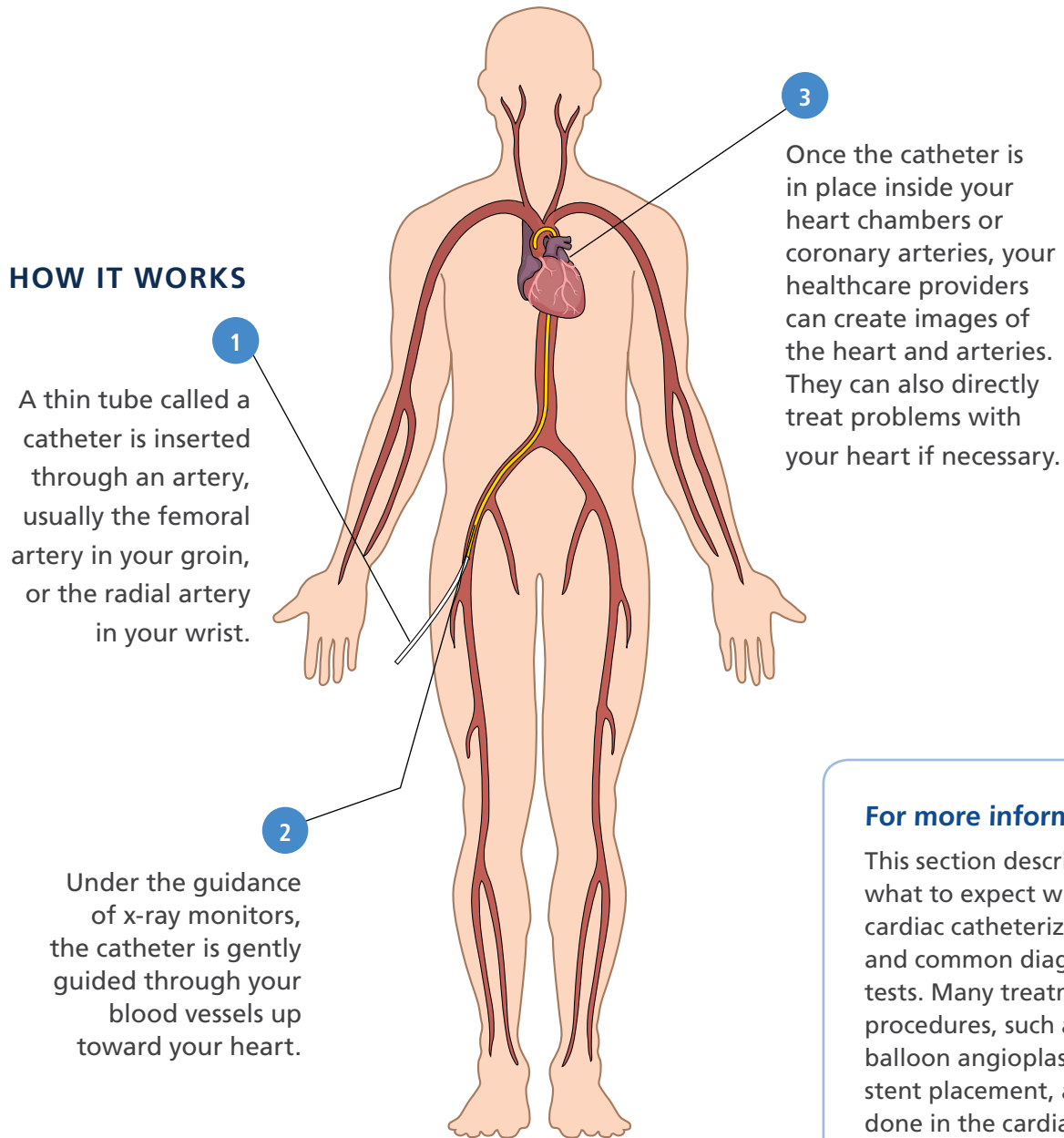
Nuclear imaging is a painless procedure. The only thing you'll really feel is the IV placement for injecting the radionuclide [raid-ee-oh-NU-klide] before the scan. And don't worry! The radionuclide rapidly leaves your body, and the radiation exposure poses very little risk.

A nuclear imaging study can take less than an hour or up to several hours, depending on whether it is coupled with a stress test. Stress testing is discussed on page 72.

Cardiac Catheterization

Cardiac catheterization is a common non-surgical procedure performed in a catheterization laboratory (cath lab). Cardiac catheterization allows your healthcare providers to do many different tests and measurements to diagnose and treat problems with your heart and coronary arteries.

HOW IT WORKS



For more information

This section describes what to expect with cardiac catheterization and common diagnostic tests. Many treatment procedures, such as balloon angioplasty and stent placement, are also done in the cardiac cath lab. For more information on treatments, see Chapter 5.



What to expect: THE CATH LAB EXPERIENCE

Most cardiac catheterization procedures take an hour or two to complete, and require only a short hospital stay. You'll get specific information and instructions before your procedure, but here's generally what you can expect from your experience in the cath lab.

Before your cardiac catheterization, your healthcare providers will explain its risks and benefits. You may be asked not to eat or drink anything after midnight the night before your procedure. Right before your procedure, a provider may shave or clip hair in the area where the catheter will be inserted.

During your catheterization, you'll be awake. This allows you and your healthcare providers to communicate. Here's the process:

- 1** To keep you from feeling pain where the catheter is inserted, a local anesthetic is injected at the insertion site. This injection might be a little uncomfortable. Some people compare it to a bee sting.
- 2** Next, a sheath (a thin tube that's like a sleeve for the catheter) is inserted into the blood vessel. The catheter is then inserted through the sheath. You might feel a bit of tugging or pressure at this point.
- 3** Your provider guides the catheter through your body and into your heart or coronary arteries. Video monitors show the catheter's movements. You shouldn't feel the catheter moving.
- 4** Once the catheter is in place, your providers may perform several tests or procedures. Sometimes a solution called **x-ray contrast** is injected through the catheter into the coronary arteries. The contrast shows up on x-rays, revealing narrowing or blockage in the arteries. Some patients say they feel a "hot flush" when the contrast is injected.
- 5** Your healthcare providers will tell you if you should cough, hold your breath, or do anything else to help them.

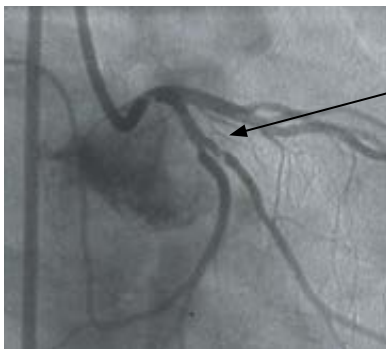


After your procedure, the catheter and sheath are removed. Depending on where the catheter was inserted into your body, your providers will close the insertion site with pressure, stitches, a clamp, or a special plug. You may need to stay lying down for a couple of hours or more after your procedure. If you're going home after your catheterization procedure, you'll get specific directions on how to care for the catheter insertion site.

Cath lab diagnostic procedures

Following are descriptions of the most common diagnostic procedures performed in the cath lab.

- **Angiograms:** Coronary angiograms are x-rays used to assess narrowing or blockages in your **coronary arteries**. An x-ray contrast solution is injected through the catheter and into the coronary arteries. X-rays then capture images of blood flow through the arteries. Angiograms can also be used to assess blockage in:
 - **Carotid arteries**, leading to the brain
 - **Renal arteries**, leading to the kidneys
 - **Peripheral arteries**, leading to the arms or legs



An angiogram can show blockage and narrowing in your arteries.

- **Cardiac biopsies:** In a cardiac biopsy, a catheter with a small grasping device is threaded into your heart to take a small piece of tissue. A lab analysis of this tissue can show whether you have inflammation of the heart muscle (myocarditis). It may also help find the cause of heart muscle disease (cardiomyopathy). A biopsy can also help show if there is rejection after a heart transplant.
 - **Coronary flow (also known as an FFR test):** This test can help show whether a narrowed section of a coronary artery is likely to cause problems in the future. The catheter is attached to a sensor that measures blood pressure in the artery before and after the narrowed area. Comparing the two measurements can show how much the narrowed area is limiting blood flow.
 - **Heart valve assessments:** During a catheterization, healthcare providers can also measure blood pressures in — and blood flow through — the heart chambers. These measurements can show whether the heart valves are working properly.
 - **Intracardiac echo (ICE):** In this test, the catheter carries an ultrasound sensor to create an image of the heart's internal structure. ICE is often used for guidance as devices or balloons are placed in the heart.
 - **Intravascular ultrasound (IVUS):** This test uses high-frequency sound waves to create a motion picture of your coronary arteries. The catheter carries a device called a **transducer**, which sends out sound waves that bounce off the artery structures. These wave echoes are converted into images on a monitor.
 - **Electrophysiology (EP) studies:** Electrophysiology studies help your doctor diagnose and evaluate abnormal heart rates and rhythms. During these studies, one or more specialized catheters are guided into your heart to send small electrical impulses. How your heart responds to these impulses gives your doctor important information about what might be causing your heart rhythm abnormalities, and how best to treat them. EP studies are often done before heart rhythm procedures, such as placement of a pacemaker or a treatment called **ablation**. See **Chapter 5** for more about heart rhythm treatments.
- **Left ventriculograms:** A left ventriculogram is like an angiogram, but the x-ray contrast is injected into the left ventricle, the main pumping chamber of the heart. A ventriculogram can measure your **ejection fraction (EF)**, which is the amount, or percentage, of blood the heart pumps out with each beat. The EF is an important measure of how well your heart does its job and is often used to evaluate heart function in patients who have heart failure. Read more about your ejection fraction on page 74.
 - **Right heart cath:** In a right heart cath, a catheter is threaded into the right side of the heart and into part of your lungs. Your providers can then measure pressures in your heart chambers and check your heart valves. They can also measure the amount of oxygen in the blood in different areas of your heart. This provides important information about overall heart function.

Common treatment procedures performed in the cath lab are discussed in the next chapter.

5 Treatment Procedures

A heart disease treatment plan is tailored to your specific condition and your current health and lifestyle. For many people, this may mean more than one treatment procedure, along with taking medication and making lifestyle changes. The following pages describe the most commonly used treatment procedures, how they work, and what you may experience if you have them.

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“ I had a stent put in last month. My doctors did a good job explaining what they were going to do, but it was still hard to believe they COULD do it. Go in through your leg to fix an artery in your heart? But I was surprised at how smoothly it went. It didn't take that long, and it didn't hurt that much. Plus, it seems to have worked! I feel pretty lucky that this treatment was an option for me. ”

Miguel, 1 month after
angioplasty and stent
placement

Cardiac Cath Lab Procedures

As described in the previous chapter, **cardiac catheterization** can be used to diagnose and treat many different heart problems. The following pages describe the most common treatment procedures performed in a cardiac cath lab. These procedures are sometimes called **percutaneous coronary interventions (PCIs)**. Most of the time, the goal is to open up coronary arteries narrowed by the fatty plaque buildup of atherosclerosis.

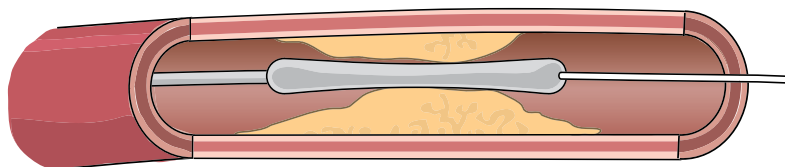
For more information

See **Chapter 4**, page 77, for information on what to expect before, during, and after a cath lab procedure.

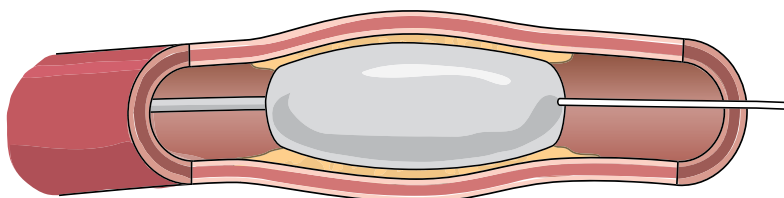
Angioplasty (PTCA, or balloon angioplasty)

Percutaneous transluminal coronary angioplasty (PTCA, or balloon angioplasty) helps restore a healthy blood flow to the heart by reopening arteries that are narrowed by fatty plaque. Here's how it works:

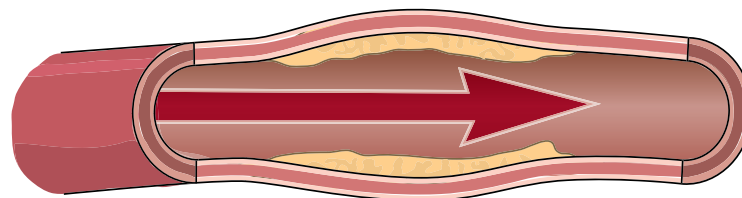
- 1 A catheter (tiny tube) is guided into a narrowed section of a coronary artery. The catheter has an expandable balloon attached to it.



- 2 Once the catheter is in the correct place in the artery, the balloon is inflated. The inflated balloon compresses plaque against the artery wall.



- 3 The balloon catheter is then deflated and removed. Blood flows freely again through the newly widened artery.



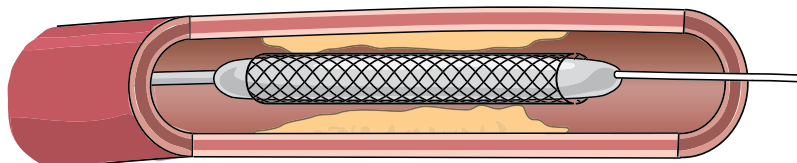
AFTER YOUR STENT IS PLACED

Although you may already be taking regular aspirin, after your stent is placed you will probably take additional medications called **platelet inhibitors** (antiplatelets) for the first several weeks or more. These medications can help prevent blood clots in and around the stent. You can read more about these medications in **Chapter 6**.

Stent placement

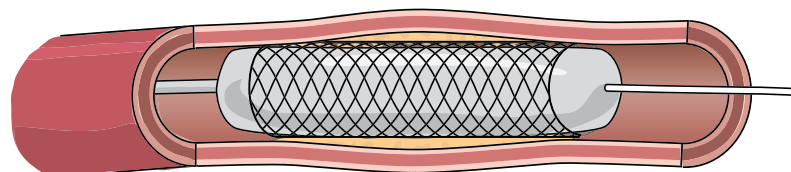
A **stent** is a small metal coil or tube that is placed in a narrowed artery to hold it open. To place the stent, your healthcare provider first performs angioplasty or atherectomy to compress or cut away plaque buildup in the artery. Sometimes the stent can be placed during a balloon angioplasty. Here's how stent placement works:

1



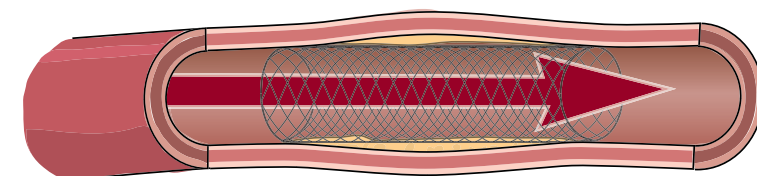
The balloon catheter with a stent is put in place.

2



The balloon is expanded.

3



The balloon is deflated and removed. The stent remains behind to hold open the artery and help maintain good blood flow.

In some cases, your healthcare providers may use a **medication-coated stent** (also called a **drug-eluting stent**). This type of stent may further reduce **restenosis** (renarrowing of the artery) by discouraging scar tissue from forming in the stent area. Your healthcare provider will choose the best stent for your unique situation.

Other procedures to open up arteries

Cutting balloon angioplasty

Cutting balloon angioplasty is another way to open up an artery that's narrowed by fatty plaque. This type of balloon may work best on softer plaque, or where an artery splits into two.

As with traditional angioplasty, a catheter with a balloon is threaded into an artery. As the balloon inflates, microscopic blades expand to make tiny cuts in the plaque. These cuts make the plaque break apart evenly, which prevents trauma to the artery and reduces the risk that scar tissue will form.

Atherectomy

Atherectomy cuts through plaque in an artery and removes it. The most common type is **rotational atherectomy** (rotablation), which is sometimes used on very hard plaque. This procedure uses a catheter with an abrasive burr near the tip. The burr grinds plaque into tiny particles. The particles float harmlessly away in your bloodstream.

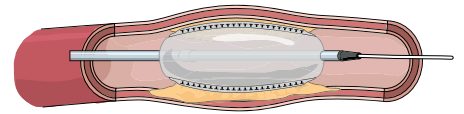
Heart valve treatment or replacement

Valvuloplasty (PTBV)

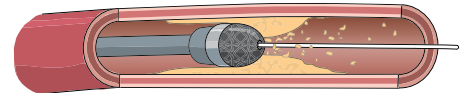
PTBV stands for **percutaneous transluminal balloon valvuloplasty**. It is a procedure to treat a hardened, narrowed heart valve (heart valve stenosis) and is done in the cath lab. During valvuloplasty, a catheter with a balloon is threaded through a blood vessel into your heart. The catheter is placed inside the narrowed valve and the balloon is inflated. This stretches the valve, helping it to move better. When the catheter is removed, blood flows more easily through the valve.

Transcatheter aortic valve replacement (TAVR)

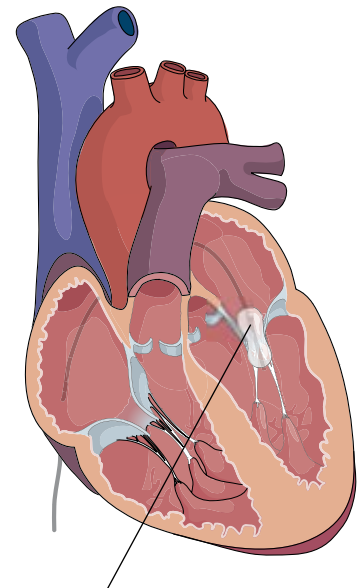
Sometimes a diseased valve must be replaced, and surgery (see page 91) is a common way to do this. But for some patients with aortic valve disease, a cath lab procedure called **TAVR** is recommended. This procedure uses a catheter with a replacement valve compressed at the end of the catheter tip. A doctor threads the catheter through a blood vessel into your heart. The replacement valve is expanded to replace the diseased aortic valve, and the catheter is removed. The new valve is made of a durable metal frame combined with animal tissue to create the flaps. Blood can flow to your body more normally when the new valve is in place.



In **cutting balloon angioplasty**, tiny blades help to break apart and compress plaque.



Rotational atherectomy grinds away plaque.



In valvuloplasty, a balloon expands to stretch the narrowed valve.

For more information

See **Chapter 2** to learn how heart valves work and what can go wrong.

SEPTAL ABLATION

Septal ablation is used when the septum (wall) that divides the lower chambers of the heart becomes abnormally thick. The procedure corrects the problem so that blood can flow more freely in the heart.

Septal ablation is sometimes called alcohol ablation. In this cardiac cath lab procedure, pure ethyl alcohol is injected into the arteries that feed the septum. This thins the septum, so the heart can work more efficiently.

Ablation

Ablation is a technique typically used to treat abnormal heart rates and rhythms (**arrhythmias**). It involves **ablating** (destroying) a very small, targeted area of the heart muscle. By destroying the area that is causing the faulty rhythm, ablation restores a normal heartbeat. Ablation is often performed as part of an **electrophysiology (EP) study**. (For more information on EP studies, see page 78.)

Here's how ablation works:

- 1 You're given a mild sedative so you'll feel little or no pain.
- 2 A specialized catheter is guided through a blood vessel to your heart.
- 3 An instrument on the end of the catheter either burns or freezes away the cells that are causing the heart rhythm problem.
- 4 The catheter is removed from your body.

Ablation is one of the most common procedures done in the cath lab has a high success rate. Septal ablation (see the description at left) is also performed in the cath lab.

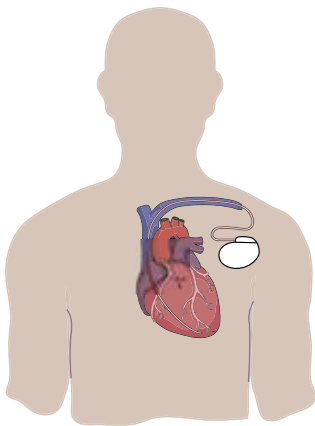
Pacemakers and implantable cardioverter defibrillators (ICDs)

To correct abnormal heart rhythms (arrhythmias) and help your heart beat more efficiently, your doctor may recommend a device implant. The most common device implants are **pacemakers** and **implantable cardioverter defibrillators (ICDs)**. These devices are usually implanted in the cath lab, but may also be implanted during surgery.

Pacemakers

Pacemakers are usually used to correct heart rhythms that are too slow or are out of sync. A pacemaker typically has two parts: a pulse generator, and one or more leads. The **pulse generator** includes a battery and circuits that create electrical pulses. The **leads** are wires that send the electrical pulses to your heart. There are three general types of pacemakers:

- **A single-chamber pacemaker** has one lead. It's attached in either the upper right chamber (right atrium) or the lower right chamber (right ventricle).
- **A dual-chamber pacemaker** has 2 leads. One is attached in the right atrium, and the other is attached in the right ventricle.
- **A biventricular pacemaker** has 3 leads. One is in the right atrium, one in the right ventricle, and one in the left ventricle. The third lead is often added to an ICD, described below, to help the heart pump better in patients with heart failure.



Most pacemakers are about the size of a silver dollar and weigh less than 3 ounces. ICDs are slightly larger.

The newest pacemakers can monitor your activity levels and adjust their pace to match. They track your heart rate and rhythm, and some even track the fluid volume in the heart. These special features help your healthcare providers adjust the device and your medication. Some devices can be checked over the phone, with your heart data sent directly to your healthcare team.

Implantable cardioverter defibrillators (ICDs)

ICDs are used to prevent or treat fast or chaotic arrhythmias called **ventricular tachycardia (v-tach)** or **ventricular fibrillation (v-fib)**.

Here's how an ICD works:

- If your heart begins to beat too fast, the ICD first alters the pacemaker's speed to bring the heart back to a normal rhythm. This is called **antitachycardia pacing**, and you won't feel anything while it happens. If this doesn't work, the ICD sends a low-energy electrical impulse (shock) to your heart at the same time as your regular heartbeat. This is called **cardioversion**, and you may feel this.
- If your heartbeat is chaotic or dangerously fast, the ICD sends a high-energy shock to your heart muscle to restore a normal rhythm. This is called **defibrillation**. You will probably feel quite a jolt when this happens.

A **biventricular ICD** helps coordinate the pumping action of the heart. Heart failure can sometimes alter the timing of the ventricles so they don't pump in unison. While a regular pacemaker sends an electrical signal to just the right ventricle, a biventricular ICD sends a signal to both ventricles to prompt them to pump at the same time. This helps your heart beat more efficiently. This device is used in some patients with heart failure when medication doesn't help the symptoms.

REGULAR MAINTENANCE

- **For the battery:** Every 4 to 10 years or so, a pacemaker or ICD may need to be removed for battery replacement, and then re-implanted.
- **For the leads (wires):** Sometimes, old wires have to be removed. This may be because you need a new or upgraded device, or because a lead isn't working properly. Doctors can use a laser to clear scar tissue so the wires can be removed more easily.



What to expect

- 1 You'll be given a local anesthetic to block feeling to the upper chest area.
- 2 The doctor makes a small incision in your upper chest and separates the tissues to create a small "pocket."
- 3 With the visual guidance of x-rays, wires (leads) from the pacemaker or ICD are passed through a small vein in your chest. The wires are then attached in your heart.
- 4 The main body of the pacemaker or ICD is placed into the surgical pocket.
- 5 The skin is closed with skin adhesive, stitches, or staples.

The whole procedure takes about an hour. Your doctor will often do an EP study (see page 78) to make sure the device is working properly.



Life with a pacemaker or ICD

Along with a better heartbeat, a pacemaker or ICD brings a few other changes to your life. Follow the tips below to protect your device:

- **Let people know.** Carry your device ID card at all times. It will give healthcare providers important information in an emergency. Before any procedure, tell your dentist or healthcare provider that you have a device.
- **Avoid contact sports** or other activities that could bump the device.
- **Avoid strong electromagnetic fields** that could interfere with the device. Don't linger around anti-theft detection devices at store entrances. Just walk through at a normal pace. Stay away from MRI equipment, arc welders and industrial equipment, and radio transmitters (such as ham radios or antennas used to control toys). Keep your cell phone 6 to 12 inches away from the device. Computers and other small appliances are fine as long as they are grounded and in good working order.
- **At the airport, carry your device ID card and walk through the screening device at a normal pace.** If you set off an alarm, show your device ID. Ask them not to search you with the hand-held screening wand, because it contains a strong magnet.

A HIGH RATE OF SUCCESS

Heart defect repairs have a high rate of success. Most of the time these procedures completely cure the defect and help you avoid further problems.

OPERATING ROOM OR CATH LAB?

Your healthcare provider may opt to repair a heart defect with open heart surgery. The decision depends on several factors, including the extent of the defect and your overall health.

Heart defect repairs

The term “heart defect” often refers to an abnormal opening in the wall (**septum**) that divides the two upper chambers or the two lower chambers of the heart. Examples include atrial septal defects (ASDs), patent foramen ovals (PFOs), and ventricular septal defects (VSDs). These are discussed in Chapter 2. Such defects don't always require treatment. When they do, sometimes medication treats the symptoms. In other cases, your healthcare provider may recommend a procedure to repair the hole in the heart wall.

Most heart defects can be repaired in a cath lab procedure. Here's how:

- 1 A catheter guides a flexible closure device through a blood vessel into your heart.
- 2 Once the device is in the correct place, it can expand (open) to plug the hole. There are different types of devices, but they all generally work a bit like an umbrella. When the device is collapsed, it's small enough to travel inside your blood vessel. When it's opened, it covers a larger area.
- 3 When the catheter is removed, this plugging device remains behind to close the hole in your heart. Eventually the device becomes covered with the body's own tissues.

During surgery, the surgeon repairs the defect with stitches (sutures) or patches it with a large “swatch” made of a surgical material or your own tissue.

Abdominal aortic aneurysm (AAA) repairs

An **abdominal aortic aneurysm (AAA)** is a weakened section of the aorta in the section that travels through your abdomen (belly). The aorta is the body's largest artery. An AAA can be dangerous. If it's large or growing, it should be repaired.

Your doctor might recommend surgery to replace the weakened section of aorta. Many patients can have a cath lab procedure that places a **stent graft** (a small tube) that "lines" the aorta and protects it from pressure.

Compared to surgery, a stent graft is faster and has a shorter recovery time. The downside is that you will need lifetime follow-up tests to ensure the stent stays in place. Based on your circumstances, your doctor will recommend an option and help you decide.



What to expect

If your doctor recommends AAA repair in the cath lab, here's what to expect:

- You'll have general anesthesia, so you will feel no pain.
- The doctor will make two small incisions in blood vessels in your groin.
- A catheter will be inserted into each blood vessel, and threaded to your aorta.
- One catheter will deliver the stent graft. The second catheter will be used to help fit the graft into the aorta.
- The doctor will remove the catheters and close the incisions. The stent graft remains to line the aorta.

If your doctor recommends surgery to repair your AAA, you can learn more about the surgery from these Intermountain Fact Sheets:

- *Abdominal Aortic Aneurysm (AAA) Surgery: Preparing for the Surgery*
- *Abdominal Aortic Aneurysm (AAA) Surgery: Recovering at Home*

Your healthcare providers may give you these fact sheets. You can find them at [intermountainhealthcare.org](https://www.intermountainhealthcare.org).



YOUR SURGICAL TEAM

Each person on your surgical team has an important role to play:

- A **cardiovascular surgeon** is a doctor who specializes in surgeries on the heart and major blood vessels. With the help of surgical assistants and specially trained nurses, the surgeon performs the “handiwork” of your heart surgery.
- An **anesthesiologist** is a doctor who gives medication to keep you asleep and free of pain during surgery.
- A **perfusionist** is a technician who operates the heart-lung bypass machine, if necessary, during surgery.
- **Physician assistants** and **nurse practitioners**, along with other providers such as **technicians** and **nurses**, may help monitor your condition during and after surgery.

Heart Surgeries

Open heart surgery refers to any surgery where the chest is opened and surgery is performed on the heart. The term “open” refers to the chest, not the heart itself. The heart may or may not be opened, depending on the type of surgery.

Your healthcare providers may recommend open heart surgery for many different reasons. Most often, open heart surgeries treat blockages in the coronary arteries or correct problems with the heart valves. Open heart procedures can also repair heart defects and help correct heart rhythm problems. A person with a failing heart that doesn’t respond to other treatment might receive a heart transplant in open heart surgery.

What to expect

If you need to have open heart surgery, here’s what you can expect before and during your surgery.

Before your surgery

Although different hospitals and surgical teams have slightly different processes, you’ll probably have instructions and care similar to that described below:

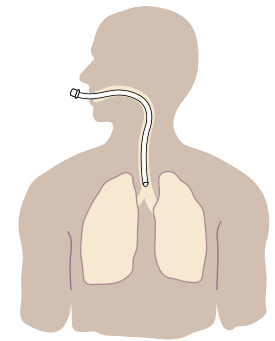
- **Orientation to hospital routines.** Before your surgery, a nurse educator or other member of your hospital care team will explain hospital routines to you and your family, such as meal times and visiting hours. They’ll also tell you how to use hospital equipment (such as your call light and adjustable bed) and answer any questions you have.
- **Meetings with members of your surgical team.** You’ll meet your surgeon and your anesthesiologist before surgery. They’ll review your medical record with you, go over the surgical and medication plan, and answer your questions.
- **Testing.** A respiratory therapist will check how well your lungs are working. You’ll also have other tests, such as a chest x-ray and blood and urine tests. These tests help your team understand your condition more precisely. They can also help your team anticipate your body’s response to surgery and monitor you more closely afterward.
- **Informed consent.** You’ll need to sign an informed consent agreement before your surgery. This makes sure that you understand the benefits and risks of surgery, and gives the hospital and your healthcare providers permission to treat you.

- **Medication.** Before surgery, your healthcare providers will probably tell you to stop taking aspirin or other blood-thinning medication. They may give you an antibiotic to begin taking the day before surgery. You'll also be told whether to continue any other medication you take regularly.
- **Fasting.** You'll probably be asked not to eat or drink anything after midnight the night before your surgery. This helps prevent complications during surgery.

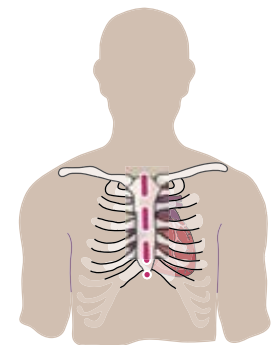
During your surgery

Your surgical team will follow a plan tailored to your health needs and the type of surgery you're having. Here are a few elements common to most open heart surgeries:

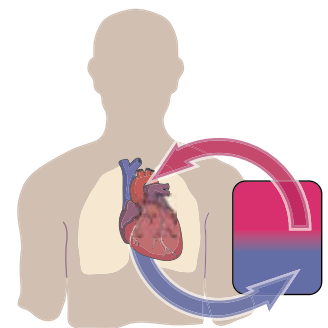
- **Keeping you asleep and pain-free.** An anesthesiologist administers special medication to keep you asleep and free of pain during your surgery.
- **Keeping your airways open.** An **endotracheal tube (ET)** is inserted into your throat and windpipe and connected to a breathing machine (**ventilator**). The ventilator "breathes" for you while you're asleep. The ET tube may also stay in place for several hours after surgery to ensure that you're breathing well.
- **Reaching your heart.** To get to your heart, your surgeon makes an incision (cut) down the middle of your chest and separates your breastbone (**sternum**). After surgery, your surgeon rejoins your breastbone with wires or heavy sutures, then sews up the incision.
- **Keeping your blood circulating.** For many open heart surgeries, the heart is stopped during surgery and restarted when the procedure is completed. This requires the use of a **heart-lung bypass machine** (a pump) to take over the work of the heart and lungs during surgery. However, some heart surgeries can now be performed on a beating heart. In such cases, the procedure is performed "**off-pump,**" without the use of a heart-lung machine.



ET tube in place



Chest incision through sternum



Heart-lung bypass machine

COMMUNICATING WITH YOUR FAMILY

Open heart surgery usually lasts at least 4 hours.

While you're in surgery, a member of the operating room staff may call or visit the waiting room to update your loved ones. After the surgery, your surgeon will talk to them about the operation.

For more information

See **Chapter 1** to learn more about what to expect **after your surgery**, including information on home recovery.

HOW IS A VEIN REMOVED FROM MY LEG OR ARM?

Sometimes, doctors make a larger incision (cut) to remove a vein from your leg or arm to use in a coronary bypass. The length of the incision depends on how many bypasses you need.

In other cases, the medical team uses a method called **endoscopic vein harvesting**. With this method, special instruments and a video camera are used to remove the vein in a less invasive way. With this method, you'll have just two tiny incisions.

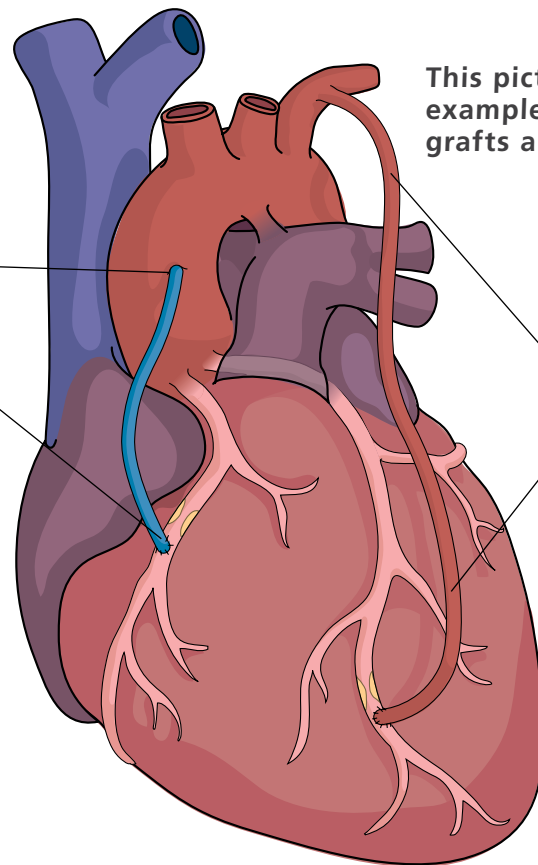
Coronary artery bypass grafting (CABG)

Coronary artery bypass grafting (CABG, often pronounced “cabbage”) is one of the most commonly performed open heart surgeries. In this procedure, a vein from your leg or an artery from your chest wall or arm is used to bypass a coronary artery that is narrowed or blocked by fatty plaque buildup.

Because a surgeon can perform several bypasses during a single surgery, CABG is often a good option for people with narrowing or blockage in several coronary arteries. CABG is also a good option for people with severe angina or severe narrowing in the left main coronary artery, or for people whose arteries have renarrowed after cath lab procedures.

Because it restores the flow of oxygen-rich blood to your heart, CABG can give you a whole new lease on life. However, keep in mind that fatty plaque can build up in the new grafts just like it did in your original arteries. This means that you'll need to follow your treatment plan carefully to make sure that your grafts stay as healthy and plaque-free as possible.

If a **leg or arm vein** is used in your heart bypass, the vein is grafted (inserted) above and below the point of blockage. The vein does the artery's job of supplying blood to a particular area of your heart. Your body won't miss the vein. Other veins in the area will take over the blood flow.



This picture shows examples of how bypass grafts are placed.

If the **internal mammary artery** is used, it is redirected to a point past the blockage, as shown here.

Heart valve repair or replacement

In a healthy heart, valves ensure the proper one-way flow of blood through the heart. If your heart valves have been damaged or diseased, they may fail to open and close correctly. This puts extra strain on your heart muscle. In this case, your healthcare providers may recommend open heart surgery to repair or replace your heart valve(s).

Heart valve repair

To repair a damaged valve, your surgeon can reshape or remove parts of the valve to make it function better. For example, if the valve fails to close tightly (called **valve insufficiency**), your surgeon may remove extra tissue or strengthen parts of the valve by sewing a ring around the valve opening.

Heart valve replacement

If your heart valve can't be repaired, your surgeon will replace it with a mechanical or biological valve. Each type of valve is described at right.

Ross procedure (pulmonary valve translocation)

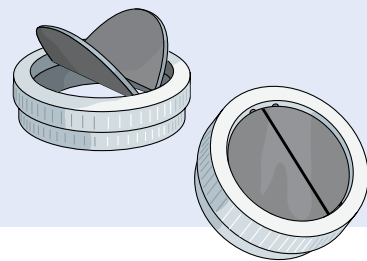
The **Ross procedure** is a valve replacement option to treat a damaged aortic valve. This procedure, also called a **pulmonary valve translocation**, replaces your damaged aortic valve with your own pulmonary valve. To fulfill the function of your pulmonary valve, your surgeon inserts a human donor valve in the pulmonary valve position.

This procedure has several advantages:

- In the high-stress position of the aortic valve, your own pulmonary valve will wear better and last longer than a donor valve would. The pulmonary and aortic valves are nearly identical in size, shape, and strength.
- Since the pulmonary valve doesn't undergo the same high level of stress that the aortic valve does, the replacement valve can usually function well there.
- Since no mechanical valves are used, there's no need for you to take anticoagulants (blood thinners) to prevent blood clots.

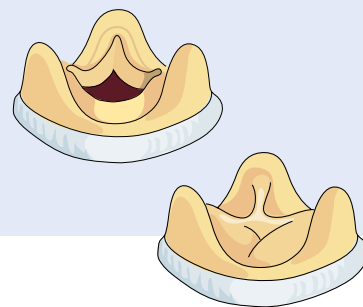
MECHANICAL VALVES

Mechanical valves are typically made of plastic, metal, or cloth. They are usually quite durable. However, they require life-long use of anticoagulants (blood thinners) to prevent blood clots.



BIOLOGICAL VALVES

Biological valves come from human donors or from animals (usually pigs), and don't usually require lifelong use of anticoagulant medication. For this reason, biological valves are often a good option for women who want to have children, and for athletes in sports with a high risk of injury. However, biological valves don't tend to last as long as mechanical valves, and may need to be replaced in your lifetime.





HOW DOES AN LVAD WORK?

An LVAD weighs less than a pound (anywhere from 5 to 14 ounces). In some cases, the LVAD is implanted in the upper abdomen, just below the heart or just below the diaphragm. In other cases, the LVAD is attached to the heart itself. The LVAD does not replace the heart. It runs in parallel to the heart, helping the left ventricle to pump more efficiently.

An LVAD is small and silent, with a wearable power system that includes batteries and a small computer. Many heart failure patients with LVADs have longer lives, with the ability to do normal activities such as spending time with family, hobbies, driving, and traveling.

Image printed courtesy of HeartWare, Inc

Ventricular assist devices

A ventricular assist device is an implantable heart pump that is used to treat heart failure. There are several kinds of ventricular assist devices.

Left ventricular assist device (LVAD)

The **left ventricular assist device (LVAD)** is the most common type. An LVAD supports the left ventricle of your heart, the heart's most important pumping chamber. An LVAD is used in two main situations:

- As a **bridge therapy** to support your heart while you are waiting for a heart transplant.
- As a **permanent therapy** (also called a destination therapy) for patients with advanced heart failure who are not eligible for a heart transplant due to age, certain types of cancer, or other conditions.

When might an LVAD be considered? Medical therapies are very effective in treating heart failure. However, in many patients heart failure will eventually progress to the point where medications or pacemaker-type devices are no longer helpful. You may want to talk to your physician about an LVAD when:

- You can no longer walk a block without shortness of breath.
- Your doctor decreases your heart failure medication because you have low blood pressure.
- You need more and more diuretic medication to control your weight.
- You've been admitted to the hospital because your heart failure is significantly worse.
- Your symptoms haven't improved after receiving **cardiac resynchronization therapy (CRT)**. CRT is a pacemaker-type device that corrects heart rhythm problems caused by heart failure.
- You're not happy with the quality of your life.

Temporary ventricular assist device (VAD)

A **temporary ventricular assist device (temporary VAD)** is a small mechanical pump that gives short-term support for the heart from a few hours up to 15 days. It's typically used to give your heart time to strengthen if you have heart failure as a result of heart surgery or a heart attack. This type of VAD is placed into the large blood vessels in your groin, and it supports the heart by pumping blood throughout your body. One benefit of this type of VAD is that it can be rapidly inserted in the operating room or cardiac cath lab.

Aneurysm repair

In some cases, open heart surgery can repair an aneurysm (a bulging, weakened area) in the heart muscle or aorta.

- **Heart muscle aneurysm.** Heart attacks are the most frequent cause of heart muscle aneurysms. An aneurysm can keep the heart from pumping properly, and may cause pain, shortness of breath, or an irregular heartbeat. To repair a heart muscle aneurysm, your surgeon either patches the weakened area, or removes it and sews together the surrounding tissue.
- **Aortic aneurysm.** To repair a damaged aorta, your surgeon will first clamp it to control bleeding, then remove the enlarged section of the vessel and replace it with a synthetic tube graft. (An aortic aneurysm can also be repaired in a cath lab procedure. See page 87.)

Heart rhythm treatment — the maze procedure

Some treatments for heart rhythm disorders are performed with surgery. For example, the **maze procedure** treats atrial fibrillation. **Atrial fibrillation** is an abnormal heart rhythm caused by erratic impulses in your **atria** (the top chambers of the heart). These erratic impulses cause the atria to **fibrillate** (quiver).

The maze procedure is named for the maze-like network of scars that your surgeon creates on your heart muscle. The scars redirect the heart's electrical impulses, eliminating erratic impulses and restoring the heart's normal rhythm. These therapeutic scars can be made in several different ways. Your surgeon may make small incisions in the heart muscle, then sew them closed. Or, your surgeon may choose to freeze part of the muscle or create the scar using an electromagnetic energy source.

Carotid endarterectomy

The name **carotid endarterectomy** is a mouthful, but it is a relatively simple surgery that removes plaque in one of your **carotid arteries**. These are the main arteries in your neck that supply blood to the brain. In this case, the chest is not opened. The surgeon exposes the artery through a small incision in the neck. After removing the plaque, the surgeon may use a patch made of skin or synthetic material to widen the artery. A carotid endarterectomy might be recommended if you have been experiencing stroke-like events called **transient ischemic attacks (TIAs)**, caused by blockages in tiny arteries in the brain. One or more TIAs are a sign of atherosclerosis, which may also be present in the carotid arteries. If plaque buildup is found there, this surgery is used to improve blood flow to the brain and help prevent a future stroke.



CONSTANT IMPROVEMENT: 60 YEARS OF HEART SURGERY

Heart surgeries have been performed since 1953 when the first heart-lung bypass machine was developed. Since then, the methods and technologies continue to improve. Relatively recent advances include:

- The ability to perform open-heart surgery on a beating heart without the use of the heart-lung machine.
- Performing some heart surgeries without opening the chest, and with fewer and smaller incisions.
- Avoiding surgery altogether by finding new techniques for treating heart problems, such as valve repair in the cardiac cath lab.

To keep up with recent treatment advances, check out the web resources in **Chapter 10**.



What to expect

Heart transplantation is an open heart surgery that lasts at least 4 to 6 hours. During the surgery, a heart-lung bypass machine takes over the work of the heart and lungs.

Once the new heart is positioned in the chest and surgically attached to the major vessels, it usually begins to beat on its own. Then the heart-lung machine can be detached.

Initial recovery after the transplant surgery takes 6 to 8 weeks.



Heart transplant

A heart transplant replaces a severely diseased or malformed heart with a new heart from a human organ donor. This procedure is considered for late-stage heart failure after other attempts have failed. Transplantation is a treatment, not a cure, for heart failure. When it is successful, it offers an average of 9 to 15 years of additional life.

Patients considering a heart transplant should keep in mind that surgery is only one step in the process. There are several other steps in the process:

- **Assessment.** If your healthcare provider thinks you are a candidate for a heart transplant, a transplant team will assess whether you are a good candidate. This requires a series of medical tests.
- **Locating a match.** You are placed on the waiting list for a donor heart. Waiting times vary from days to months, depending on organ availability and your condition.
- **Lifelong maintenance medication.** You must commit to taking daily medication (immunosuppressants) to prevent rejection of the donor heart and other medications to protect from infections and complications.



6 Medication

Taking medication is one of the most important aspects of your treatment. To get the most benefit from your medications, and to avoid mistakes and complications, it helps to understand why you're taking them and how they work. This chapter describes the most common heart medications and provides tips on taking them safely and consistently.

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“ After my husband’s surgery, we had a lot of new medication to keep track of and a lot of questions, too. We wondered if he could still take his antacids, or if vitamins were okay. I’m glad we could call the pharmacist and ask. A lot of our questions didn’t occur to us until we were already at home, and you need to be sure you’re taking your medicine right. ”

Elizabeth,
wife of open heart
surgery patient

How Medication Can Help

Medication can help your heart in the following ways:

- Decrease your heart's workload
- Maintain good blood flow to the heart muscle
- Decrease the risk of forming blood clots
- Control heart rhythm disorders
- Control heart disease risk factors such as high blood pressure, diabetes, and high cholesterol
- Relieve pain and promote sleep

Different medications have different effects, and these can vary from person to person. Your healthcare providers may start you on one or more medications, check how well they work and how well your body is tolerating them, and then make changes if necessary.



COMMUNICATION IS KEY

Talk to your healthcare providers about your medication. They need your feedback to understand how you're responding to treatment and whether they need to adjust something.

THE RESEARCH IS CONVINCING

Some heart medication can dramatically improve heart function, reduce your risk for a cardiac event (such as a heart attack), and prolong your life. Whatever medications you're prescribed, take them faithfully and as instructed. This includes blood pressure medication, beta blockers, ACE inhibitors, or any others. Each has a unique purpose, and sometimes work in combination with each other to improve your condition. To learn more about your medication, refer to the "Table of Common Cardiac Medications" beginning on page 100.

Tips for Managing Your Medication

TAKING NOTE

As you learn about your medication, write down instructions in your own words. Ask your healthcare provider to double-check your notes to make sure you've heard correctly.



“SHOULD I REFILL THIS ONE?”

One common mistake is neglecting to refill prescriptions given during a hospital stay. Be sure to ask your healthcare provider how long you should take each medication.

It's important to take your medications exactly as your healthcare providers have prescribed them. Missing a dose, or taking too much, can cause serious problems. In fact, **medication error is the biggest reason heart patients require hospitalization.**

Here are some tips to help you manage your medications:

- **Make sure you understand exactly how to take your medication.** Always ask your healthcare provider about the following:
 - When to take each medication
 - How much to take and how long to take it
 - Whether there are any special instructions, such as taking a pill with a meal or on an empty stomach
 - Any side effects you may have
 - What to do if you skip a dose by accident
- **Tell your healthcare providers if you're taking medication for anything else besides your heart condition.** Providers can help ensure there are no harmful interactions between drugs.
- **Avoid “shopping around” for doctors and pharmacies.** It's natural to want additional opinions about your condition, or to want a pharmacy that has the lowest prices or the best location. Just be aware that moving from doctor to doctor (or pharmacy to pharmacy) can be tricky. If you get new prescriptions from different doctors and new medications from different pharmacies, you risk having problems because medications can interact with each other. Avoid shopping around, or at least make sure that you communicate fully with each new healthcare provider.
- **Talk to your healthcare providers before you take over-the-counter (OTC) medications or supplements.** People sometimes get into trouble when they add OTC substances to their daily medications. **NEVER** take any OTC substances without first consulting your healthcare provider. These include dietary supplements like herbs and vitamins, pain and cold medications, and so on.

- **Don't skip a dose or stop taking medication suddenly.** Most heart medications must be taken regularly. It can be dangerous to stop taking some medications suddenly. NEVER stop taking medication without first talking to your healthcare provider.
- **Set an alarm clock to remind you when it's time to take your medication, or take it at the same time you do other regular activities.** For example, take your medication right after brushing your teeth in the morning, or while watching the evening news.
- **Organize your pills.** Use a divided pillbox for different times of the day or different days of the week. Pull out only enough pills to fill the pillbox. For longer-term storage, use the original bottle for each medication. This system can help you see at a glance whether you've taken each dose.
- **Store your medications properly.** First, keep all medications out of the reach of children. Also, be sure to store your medications in their original containers. Keep containers in a dry, cool storage area unless you are told otherwise. Generally speaking, bathroom medicine cabinets are NOT a good place to store medications. The moisture in most bathrooms can make medication less effective.
- **Order more medication when you're down to a one-week supply.** It's important to avoid running out of your prescriptions. Pharmacies sometimes have a delay in filling orders. Consider signing up for auto-refill and/or home delivery for your medications.



A SHOT NEVER HURTS

To support your treatment, your healthcare providers may recommend these health maintenance measures:

- **An annual flu shot:** Influenza vaccines can help you avoid this year's worst flu
- **A pneumococcal vaccine:** A "pneumovax" can help protect you from pneumonia, meningitis, and other serious infections

Studies have shown that both types of vaccine are very safe and very effective.

CARRY A CARD

Keep a written list of all your medications and dosages in your wallet or purse. Keep a list of any medication allergies with this list.

If you use an Intermountain pharmacy, you can ask your pharmacist for the Intermountain MED Card.



Table of Common Cardiac Medications

Only your healthcare providers can tell you the exact purpose of your specific prescriptions. However, it's likely that your medications fall into the categories described in the table below. Use this table as a reference to help you learn more about the medication you're taking.

MEDICATION CATEGORIES	EXAMPLES*	SIDE EFFECTS AND NOTES
<p>ACE inhibitors (angiotensin converting enzyme inhibitors)</p> <p>OR</p> <p>ARBs (angiotensin II receptor antagonists)</p> <p>These medications block stress hormones and relieve stress on the heart's pumping action. They improve symptoms and reduce hospitalizations for patients with heart failure.</p>	<p>ACE inhibitors:</p> <ul style="list-style-type: none"> • benazepril (Lotensin) • captopril (Capoten) • enalapril maleate (Vasotec) • fosinopril (Monopril) • lisinopril (Prinivil, Zestril) • quinapril (Accupril) • ramipril (Altace) <p>ARBs:</p> <ul style="list-style-type: none"> • candesartan cilexetil (Atacand) • irbesartan (Avapro) • losartan (Cozaar) • olmesartan (Benicar) • telmisartan (Micardis) • valsartan (Diovan) <p>Other:</p> <ul style="list-style-type: none"> • sacubitril/valsartan (Entresto) 	<p>Side effect:</p> <p>A dry, non-productive cough is a common side effect of ACE inhibitors.</p> <p>Note:</p> <p>Don't use potassium supplements or salt substitutes without first asking your healthcare providers.</p>
<p>Antiarrhythmics (heart rhythm medications)</p> <p>These control irregular heartbeats and maintain a normal heart rate and rhythm.</p>	<ul style="list-style-type: none"> • amiodarone (Cordarone) • disopyramide phosphate (Norpace) • dofetilide (Tikosyn) • dronedarone (Multaq) • flecainide (Tambocor) • mexiletine HCl (Mexitil) • procainamide (Procan, Pronestyl) • propafenone HCl (Rythmol) • propafenone HCl SR (Rythmol SR) • sotalol (Betapace) 	<p>Notes:</p> <ul style="list-style-type: none"> • As with any medication, take antiarrhythmics exactly as ordered. • If you're taking some of these medications, you'll need ongoing monitoring by your healthcare provider. • If you're taking an extended-release tablet, be sure to swallow the pill whole. Do not break, chew, or crush it.

*Generic drug names are listed in lowercase letters.

MEDICATION CATEGORIES	EXAMPLES*	SIDE EFFECTS AND NOTES
<p>Anticoagulants and platelet inhibitors (“blood thinners”)</p> <p>These cause your blood to take longer to clot, which can reduce the risk of strokes and heart attacks that can occur when blood clots get stuck in small blood vessels.</p>	<p>Anticoagulants:</p> <ul style="list-style-type: none"> • enoxaparin (Lovenox) • heparin sodium • warfarin (Coumadin) <p>Platelet inhibitors:</p> <ul style="list-style-type: none"> • aspirin • cilostazol (Pletal) • clopidogrel bisulfate (Plavix) • prasugrel (Effient) • ticagrelor (Brilinta) • ticlopidine (Ticlid) <p>Direct thrombin inhibitor:</p> <ul style="list-style-type: none"> • dabigatran (Pradaxa) <p>Factor Xa inhibitor:</p> <ul style="list-style-type: none"> • rivaroxaban (Xarelto) • apixaban (Eliquis) 	<p>Side effect:</p> <p>Call your healthcare provider if you notice bleeding from your gums, or blood in your urine or stools.</p> <p>Notes:</p> <ul style="list-style-type: none"> • Make sure your provider knows about all other medication you’re using. Many substances, including over-the-counter drugs and herbal supplements, should not be used while you’re taking some blood thinners. • If you’re taking some of these medications, you’ll need ongoing monitoring by your healthcare provider. • If you miss a dose, do NOT take extra the next time to “catch up.” • if you're taking warfarin, be consistent with your diet, especially foods rich in vitamin K (see chapter 8). • If you use warfarin, you'll need regular blood tests (called PT/INR tests) to monitor this medication's effects. Keep these regular test appointments.
<p>Antihypertensives (blood pressure medication)</p> <p>These are commonly used to treat high blood pressure by relaxing and widening blood vessels.</p>	<ul style="list-style-type: none"> • clonidine HCl (Catapres, Dixarit) • doxazosin mesylate (Cardura) • hydralazine HCl • methyldopa (Aldomet) • minoxidil oral (Linoten) • prazosin HCL (Minipress) • terazosin HCl (Hytrin) 	<p>Note:</p> <p>As with any drug, don’t stop using blood pressure medication without first asking your healthcare provider.</p>
<p>Beta blockers</p> <p>These medications are often prescribed to treat angina, high blood pressure, and irregular heart rhythms. They:</p> <ul style="list-style-type: none"> • Block stress hormones and relieve stress on the heart’s pumping action • Relax the blood vessels so blood can move more easily • Improve the heart’s function • Reduce symptoms and lessen the chance of future hospitalizations 	<ul style="list-style-type: none"> • atenolol (Tenormin) • bisoprolol (Zebeta) • carvedilol (Coreg) • labetalol HCl (Normodyne, Trandate) • metoprolol succinate (Toprol XL) • metoprolol tartrate (Lopressor) • nadolol (Corgard) • nebivolol (Bystolic) • propranolol HCL (Inderal) • sotalol (Betapace) • timolol maleate (Blocadren) 	<p>Side effects:</p> <ul style="list-style-type: none"> • In some people, beta blockers can cause drowsiness. • Call your healthcare provider right away if you have any of these side effects: <ul style="list-style-type: none"> – Chest pain (may be related to your disease and not a side effect) – Fainting or severe dizziness – Slow, fast, or irregular heartbeat – Swelling of your feet or ankles – Unusual bleeding or bruising – Unusual weight gain – Wheezing or trouble breathing

*Generic drug names are listed in lowercase letters.

MEDICATION CATEGORIES	EXAMPLES*	SIDE EFFECTS AND NOTES
<p>Calcium channel blockers</p> <p>These are commonly used to treat high blood pressure, coronary artery spasms, and angina. They restrict the normal flow of calcium into the cells of the heart and blood vessels. This discourages smaller vessels from narrowing and going into spasm, and it also reduces the heart's workload and need for oxygen.</p>	<ul style="list-style-type: none"> • amlodipine besylate (Norvasc) • diltiazem HCL (Cardizem, Dilacor, Tiazac) • felodipine (Plendil) • nicardipine HCL (Cardene) • nifedipine (Adalat, Procardia) • verapamil HCL (Calan, Covera, Isoptin) 	<p>Side effect:</p> <p>Calcium channel blockers can cause swelling in your feet and legs.</p>
<p>Digitalis glycosides</p> <p>These strengthen the heart muscle, treat irregular heart rhythms, and improve exercise tolerance.</p>	<ul style="list-style-type: none"> • digoxin (Lanoxin) 	<p>Note:</p> <p>Many drugs, including some antacids and other over-the-counter medications, can affect how digoxin works in your body. As always, make sure your healthcare provider knows about all the medications and supplements you're taking.</p>
<p>Diuretics ("water pills")</p> <p>These help rid your body of excess fluid and salt. They are often prescribed for high blood pressure and congestive heart failure.</p>	<ul style="list-style-type: none"> • amiloride (Midamor) • bumetanide (Bumex) • chlorothiazide (Diuril) • ethacrynic acid (Edecrin) • furosemide (Lasix) • hydrochlorothiazide (Esidrix, HydroDIURIL, Microzide, Oretic) • indapamide (Lozol) • metolazone (Mykrox, Zaroxolyn) • torsemide (Demadex) • triamterene (Dyrenium) <p>Aldosterone receptor antagonists</p> <ul style="list-style-type: none"> • eplerenone (Inspra) • spironolactone (Aldactone) <p>Combination products</p> <ul style="list-style-type: none"> • amiloride and hydrochlorothiazide • spironolactone and hydrochlorothiazide (Aldactazide) • triamterene and hydrochlorothiazide (Dyazide, Maxzide) 	<p>Side effects:</p> <ul style="list-style-type: none"> • Diuretics can cause extreme weight loss, lightheadedness, or increased blood pressure. <p>Notes:</p> <ul style="list-style-type: none"> • Diuretics make you urinate more. You may want to take diuretics early in the morning and/or afternoon. This will help you avoid having to get up at night to urinate. • Since the use of some diuretics can cause loss of potassium from the body, potassium supplements are often prescribed with diuretics. See "potassium supplements" later in this table.

*Generic drug names are listed in lowercase letters.

MEDICATION CATEGORIES	EXAMPLES*	SIDE EFFECTS AND NOTES
<p>Lipid medications (blood cholesterol lowering agents, antihyperlipidemics)</p> <p>The medications in this category work in different ways. Depending on which one you're taking, lipid medications can lower your levels of cholesterol, LDL, and triglycerides — as well as treat abnormally low levels of HDL cholesterol.</p>	<p>Statins</p> <ul style="list-style-type: none"> • atorvastatin calcium (Lipitor) • fluvastatin sodium (Lescol) • lovastatin (Mevacor) • pitavastatin (Livalo) • pravastatin sodium (Pravachol) • rosuvastatin (Crestor) • simvastatin (Zocor) <p>PSK9s</p> <ul style="list-style-type: none"> • evolocumab (Repatha) • alirocumab (Praluent) <p>Fibrates</p> <ul style="list-style-type: none"> • fenofibrate (Tricor) • gemfibrozil (Lopid) <p>Bile acid sequestrants</p> <ul style="list-style-type: none"> • colesevelam HCl (Welchol) • cholestyramine (Questran) • colestipol HCl (Colestid) <p>Other lipid medications</p> <ul style="list-style-type: none"> • niacin (Niaspan, Nicolar) • omega-3 fatty acids (brands vary) • icosapent ethyl (Vascepa) 	<p>Side effect: Call your healthcare provider right away if you have any unexplained muscle pain, weakness, or cramps.</p> <p>Notes:</p> <ul style="list-style-type: none"> • The cornerstone of treating high blood cholesterol is a low-fat, low-cholesterol diet. Drug therapy only works when you also follow dietary guidelines. • With many lipid medications, you can't eat grapefruit or drink grapefruit juice. Ask your healthcare provider. • Take your statin medication with your evening meal or at bedtime. • If you take fenofibrate (Tricor) AND also take cholestyramine (Questran), colestipol (Colestid), or colesevelam HCl (Welchol), take your dose of fenofibrate at least 1 hour before, or 4 to 6 hours after, these other medicines.
<p>Nitrates and other antianginals</p> <p>These are commonly used to prevent, reduce, or relieve angina pain. They work by relaxing blood vessels and increasing the supply of blood and oxygen to the heart while reducing the blood pressure that your heart has to pump against.</p>	<p>Nitrates (nitroglycerin)</p> <ul style="list-style-type: none"> • oral nitroglycerin (Dilatrate-SR, Imdur, ISMO, Isordil, Monoket) • nitroglycerin ointment (Nitro-Bid Ointment, Nitrol) • nitroglycerin skin patches (Deponit, Minitran, Nitro-Dur, Transderm-Nitro) • nitroglycerin sublingual tablets (Isordil, Nitrostat, Nitrogard, Sorbitrate) • other nitroglycerin tablets, capsules, and sprays (Nitro-Bid, Nitrocine, Nitroglyn, Nitrolingual, Nitrong, Nitrostat) <p>Other antianginals</p> <ul style="list-style-type: none"> • ranolazine (Ranexa) 	<p>Notes about nitrates:</p> <ul style="list-style-type: none"> • If your nitroglycerin pills come with instructions to dissolve them under your tongue, be sure to do this. Do NOT swallow them. The drug won't work if it's in your stomach. • Store nitroglycerin in its original bottle, in a dark place. This helps preserve its potency. • Replace your nitroglycerin pills every three months, because they lose their effectiveness. <p>Notes about ranolazine (Ranexa):</p> <ul style="list-style-type: none"> • Ranolazine has many drug interactions. Be sure to tell your doctor about all other medications you are taking. • Do NOT take ranolazine if you have severe liver disease.

*Generic drug names are listed in lowercase letters.

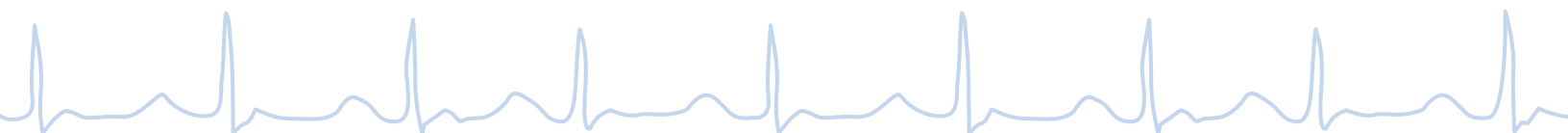
MEDICATION CATEGORIES	EXAMPLES*	SIDE EFFECTS AND NOTES
<p>Pain medications</p> <p>These are commonly prescribed after a cardiac procedure or surgery.</p>	<p>Prescription medications:</p> <ul style="list-style-type: none"> • acetaminophen and codeine (Tylenol #3) • hydrocodone bitartrate and acetaminophen (Lortab, Vicodin) • oxycodone HCl and acetaminophen (Percocet) • oxycodone HCl and aspirin (Percodan) • tramadol HCl (Ultram) <p>Non-prescription medications:</p> <ul style="list-style-type: none"> • acetaminophen (Tylenol) • ibuprofen (Advil, Motrin) • naproxen (Aleve) 	<p>Side effect: Pain medication may cause dizziness or drowsiness.</p> <p>Notes:</p> <ul style="list-style-type: none"> • Don't take more pain medication or take it more often than prescribed. • Avoid driving, using machines, or doing anything else that could be dangerous if you're not alert. • Don't drink alcohol while you're using pain medications, especially acetaminophen (Tylenol). Acetaminophen can damage your liver and drinking alcohol can increase this risk. • If you're taking acetaminophen (Tylenol) don't use more than 4 grams (4,000 milligrams) in 24 hours. Watch out for acetaminophen as an ingredient in other medications.
<p>Potassium supplements</p> <p>These are commonly prescribed to offset loss of potassium from the body, which can occur with the use of some diuretic medications.</p>	<ul style="list-style-type: none"> • K-Dur • K-Lyte • K-tab • Micro K • Slow K • Klor-con 	<p>Note:</p> <ul style="list-style-type: none"> • Some brands of potassium have a waxy residue that may appear in stool (bowel movements). This is normal. • Be sure to follow your healthcare provider's directions about taking potassium.
<p>Stool softeners</p> <p>These make bowel movements easier. They are commonly prescribed after heart surgery to prevent straining and to get your digestive system functioning normally again.</p>	<ul style="list-style-type: none"> • docusate calcium (Surfak) • docusate sodium (Colace) • docusate sodium and casanthranol (Peri-Colace) • DOS 	<p>Notes:</p> <ul style="list-style-type: none"> • Don't use stool softeners if you have severe stomach pain, nausea, diarrhea, or vomiting. • To avoid dependency, don't use stool softeners for longer than 1 week, unless approved by your healthcare provider. If you're taking pain pills, you may need to continue taking stool softeners until you're finished taking the pain pills.

*Generic drug names are listed in lowercase letters.

7 Activity for a Healthy Heart

Everyone needs regular physical activity to stay healthy. This chapter has information to support your more active lifestyle.

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“ I was discouraged at first, but at cardiac rehab, I got to know Carolyn. She’s in her late 60s and doing really well. I was surprised to hear that she walked two miles every day. She told me that she started slowly, and worked her way up. She also talked about how she overcame her depression and her fear of dying after her surgery.

Her story gave me a new resolve. Every day I would walk a little further, just a block or so each day...and I started to get more energy. Now I’m at the point where my wife — who doesn’t have heart disease — can barely keep up with me. ”

**Ben, 4 months after
bypass surgery**

Why Exercise?

Physical activity has many health benefits, including reducing your risk of dying from heart disease. In fact, regular exercise can reduce your risk just as much as quitting smoking, improving your cholesterol, or lowering high blood pressure. Not only that, but exercise can help reduce your cholesterol and blood pressure, too! The benefits of regular exercise are summarized below.

Physical benefits

- Strengthens your heart muscle, making it a better pump
- Increases your blood volume and the capacity of your blood to carry oxygen
- Reduces the stickiness of platelets in your blood, which lowers the risk of blood clots and blocked arteries
- Increases muscle strength and endurance, and improves your muscles' ability to use oxygen from the blood for energy
- Maintains bone, ligament, and tendon strength
- Helps to prevent osteoporosis (loss of bone density) or slow its progress
- Improves your lipid profile by helping to lower LDL cholesterol and raise HDL cholesterol
- Helps to prevent or reduce high blood pressure
- Burns calories and builds muscle mass, helping you achieve and maintain a healthy weight
- Reduces the risk of developing diabetes

Social and emotional benefits

- Increases confidence and self-esteem
- Reduces feelings of depression and anxiety
- Improves your quality of life
- Releases serotonin, a “feel-good” hormone made by your brain

THE SURGEON GENERAL SAYS...

“Scheduling time for physical activity is essential. Physical activity can help control weight, reduce risk for many diseases, strengthen bones and muscles, improve your mental health, and increase your chances of living longer. The real reward is invigorating, energizing, joyous health.

”

OF SPECIAL INTEREST TO OLDER ADULTS...

Regular exercise lowers your risk of falling and breaking bones and improves your ability to live independently.



HOW TO STAY ON TRACK?

Research has shown that the following factors play a big role in whether or not you'll continue an exercise program:

- Confidence in your ability
- Enjoyment
- Support from others
- Knowing the benefits



CARDIAC REHAB: a great way to do it!

Participating in cardiac rehab can help you with all the factors above, especially when you're getting started. For more information on cardiac rehab, talk to your healthcare providers and see the list of cardiac rehab programs in **Chapter 10**.

Getting Started

- **Consult with your healthcare providers.** You should never just plunge into a new fitness routine. Meet with your healthcare providers first. Because they know your medical history, they can help you understand your limits and set realistic goals. In a cardiac rehab program, trained professionals can guide you step by step as you get started.
- **Set S.M.A.R.T. goals.** The best goals are **Specific, Measurable, Attainable, Realistic, and Time-based**. The example goals below show the difference between a not-so-smart goal and a S.M.A.R.T. one:

Carol's goal	Ruth's goal
<p>"I want to exercise more and be an active person."</p> <p>Carol's goal isn't very helpful.</p> <p>(How much more will she exercise? When? How will she get there? How will she measure it?)</p>	<p>"By June, I'll be walking 40 minutes every day. I'll start at 15 minutes each day. Each week I'll add 5 more minutes, until I've met this goal."</p> <p>Ruth's goal is helpful because it is:</p> <ul style="list-style-type: none">• Specific. Notice the details?• Measurable. Ruth will know if she's met this goal, using a calendar and a clock.• Attainable and realistic. She'll start slow and build up.• Time-based. 40 minutes daily, by June.

- **Participate in cardiac rehab or find an exercise companion.** Having someone to exercise with can help you stay on a regular schedule. It can also make fitness a lot more fun!
- **Consider your interests.** You're more likely to keep up a new habit if it reflects who you are and what you like to do. Think of ways to add variety and challenge to your routine.
- **Find the right gear.** You don't need a new wardrobe or a lot of equipment. Just wear comfortable clothing and appropriate footwear.
- **Define a program.** The more specific you are in defining your program, the easier it will be for you to follow it and track your progress.

GOAL-SETTING TOOLS

It's easier to stay motivated if you choose a goal you're really ready to work on. Intermountain tools can help you assess your readiness, set a goal, and make a plan. Ask your provider about the *Live Well Readiness Worksheet* and the *Live Well Action Plan*.



How Much is Enough?

The F.I.T. Factors

Aim for at least **150 minutes of moderate aerobic activity a week**, or at least 30 minutes on most days of the week. You're more likely to “stick with it” and gain health benefits if you choose activities you enjoy and gradually increase your total amount of physical activity. This can be done by adjusting one or more of the F.I.T. factors described below.

Frequency (how often)

To get the benefits of exercise, you need to do it regularly. Experts recommend a minimum of 5 days a week or more. Of course, how often you exercise will depend on how hard you're able to exercise (your exercise intensity) and how long.

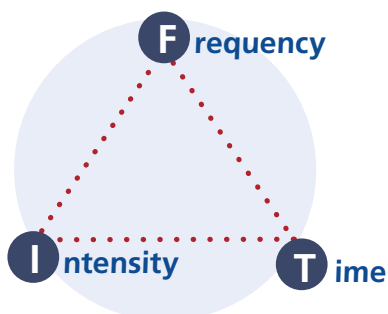
Intensity (how hard)

Exercise doesn't have to be vigorous or feel “hard” to benefit you. Brisk walking is a great choice. As long as you're exercising often enough and long enough, a moderate level of intensity will give you important heart health benefits. Page 111 has information on how to monitor and safely increase your exercise intensity.

Time (how long)

Even if you can't exercise very long at first, eventually you want to be able to exercise for 30 to 60 minutes at a time. Your first goal, especially after surgery, is to build up to 30 or more minutes at a time. Once you can do that, then you can focus on increasing the intensity. Recent research shows that from time to time, it's okay to break up your exercise into shorter, more frequent sessions. This can make it easier to fit your exercise into a busy day, and the variety might help keep you motivated! Exercise sessions need to be a minimum of 10 minutes to achieve benefits.

Like the sides of a triangle, each F.I.T. factor affects the others. For example, if your sessions are shorter, you may do them more often or at a higher intensity. If your sessions are longer, you may do them less often or at a lower intensity. Your healthcare providers can help you find a good balance between these factors.



UN-F.I.T. FACTS

Despite what we've learned about the health benefits of exercise, more than 60% of adults fail to get the recommended amount of physical activity. In fact, over 25% of adults aren't active at all.



Not all of your daily activity needs to come from formal exercise sessions. Daily activities, such as gardening, climbing stairs, or even housework, can bring important health benefits too. According to the American Heart Association, ALL activity adds up to a healthier heart.

MAKE ROOM FOR MORE MOVEMENT!

You can do a lot to improve your fitness by simply changing a few habits. Here are some ideas:

- Take the stairs, not the elevator.
- Walk whenever you can, instead of driving.
- Get off the bus a stop early.
- Stand up while talking on the phone.
- Lose your TV remote control. Get up to change channels or get up and move during commercials.
- At work, use lunch hours and coffee breaks to take a walk around the building.
- Make social occasions more active. Instead of dining out, go dancing!

MIX AND MATCH

Especially at first, it's a good idea to do aerobic exercise and strength training on different days. This allows your body to recover between strength training sessions. But stretching combines well with both aerobic exercise and strength training, especially at the end of a session (see page 113).

Three Types of Activity

You can get a moderate amount of physical activity in a variety of ways. The important thing is to choose activities you enjoy and that fit into your daily life. Doing a variety of types of exercise makes your workouts more interesting and a wider variety of health benefits.

Aerobic exercise

Aerobic activity should be at the center of your exercise program.

Aerobic means “with air” or “with oxygen.” Aerobic exercise uses oxygen from the blood to fuel your muscles. It's the best type of exercise for your heart health. Aerobic activities generally use large muscle groups, are rhythmic, and can be performed continuously over a period of time at moderate intensity. See page 114 for more information.

Strength training

Strength training, often called resistance training, helps build and maintain endurance, muscle strength, and bone health. It often involves some form of lifting weights, and when done appropriately is an important part of your regular exercise routine. However, resistance training is **NOT** appropriate for all patients. For example, if you've had open heart surgery you should not do any form of strength training until you're cleared by your surgeon, usually 4 to 6 weeks after surgery. Always talk to your healthcare provider before beginning or advancing a resistance training program. In most cases, a trained professional should guide your weight training. See page 115 for more information.

Stretching

As you age, your muscles tighten and your range of motion can decrease. This can hinder your daily activities and make you more prone to injury. **Regular stretching can help lengthen your muscles and restore your range of motion.** Stretching can also get your blood flowing and help prepare your muscles for other exercise. See page 116 for more information.

There are several different ways that you and your healthcare providers can monitor how hard you're working and guide your exercise intensity. Three of the more common methods are described here.

Monitoring Your Intensity

“Talk/sing” test

The simplest way to check your intensity is to see whether you can talk or sing while you exercise. If you're too out of breath to carry on a conversation, you need to slow down. On the other hand, if you can energetically sing a full song without pausing for some extra breaths of air, you may need to pick up the pace.

Perceived exertion (PE)

One way to judge your exercise intensity is to rate your **perceived exertion**, or how hard you feel you're working. Your healthcare providers may use a rating scale like the one shown below. Your goal is to be able to work at a level that feels “moderate” to “somewhat hard.” As your fitness level improves, you'll be able to do a higher level of work (for example, a faster pace) while you're still at a moderate or somewhat hard perceived exertion. Pay attention as you become more fit. What seems “somewhat hard” at first may become “very light” later. This is your cue to pick up the pace!

0–10 PERCEIVED EXERTION SCALE	
0	No effort at all: you're completely at rest
0.5	Very, very light effort
1	Very light effort
2	Light effort
3	Moderate, medium effort
4	Somewhat hard effort
5	Hard effort
6	
7	Very hard effort
8	Cannot catch your breath
9	Almost maximum effort
10	Maximum effort: you can't work harder

You may see this scale used to measure your perceived exertion during cardiac rehab sessions.

WHAT DOES “MODERATE” TO “SOMEWHAT HARD” FEEL LIKE?

Here's how to tell if you're at the right exercise intensity:

- You might be breathing a little heavier, but you're not out of breath.
- You can talk, but not sing.
- You might be perspiring lightly, but you're not dripping with sweat.
- Your muscles may feel a little tired, but they're not burning.
- You feel invigorated, not exhausted.



ASK, DON'T GUESS

Ask your healthcare providers for an appropriate target heart rate range for you. Don't estimate one for yourself.

Many of the target heart rate formulas (such as those promoted in health clubs) aren't right for you. Why? You may be on medication that makes such formulas invalid, or your condition may warrant special considerations.

Heart rate (HR)

Another way to check how hard your heart is working is to monitor your heart rate. Your healthcare providers can help you determine a target heart rate range for exercise. At first, your target heart rate will probably be no more than 20 to 30 beats per minute above your resting rate. As you progress, your target heart rate range may change. This rate is based on several factors, including your age, your condition, and the medications you're taking.

If you attend cardiac rehab, staff will monitor your heart rate for you, and you may be connected to a heart monitor that automatically measures your heart rate and rhythm. You should also learn to monitor your heart rate yourself. Knowing how to check your heart rate may also come in handy for other aspects of your treatment, for example, to assess the effect of a medication.

HOW TO COUNT YOUR OWN HEART RATE

- 1** Place 2 fingers along the radial artery on the thumb side of your wrist, as shown in the photo on the left. You can also use other arteries to count your pulse, such as the carotid artery on either side of your Adam's apple in your neck. If you do use the carotid artery, press on one side of the neck only, and don't press too firmly. This could cause you to faint.
- 2** Press firmly, then gently release the pressure until you feel the pulse.
- 3** Use a watch with a second hand (or a digital watch). Count the number of pulses you feel for a specific length of time: usually 10 or 15 seconds. Begin your count with "0, 1, 2, 3..."

4 Calculate your heart rate in beats per minute:

If you counted for **10 seconds, multiply by 6** to estimate the number of beats per minute.

Example: If you counted 14 beats in 10 seconds, your heart rate is 84 beats per minute ($14 \times 6 = 84$)

If you counted for **15 seconds, multiply by 4** to estimate the number of beats per minute.

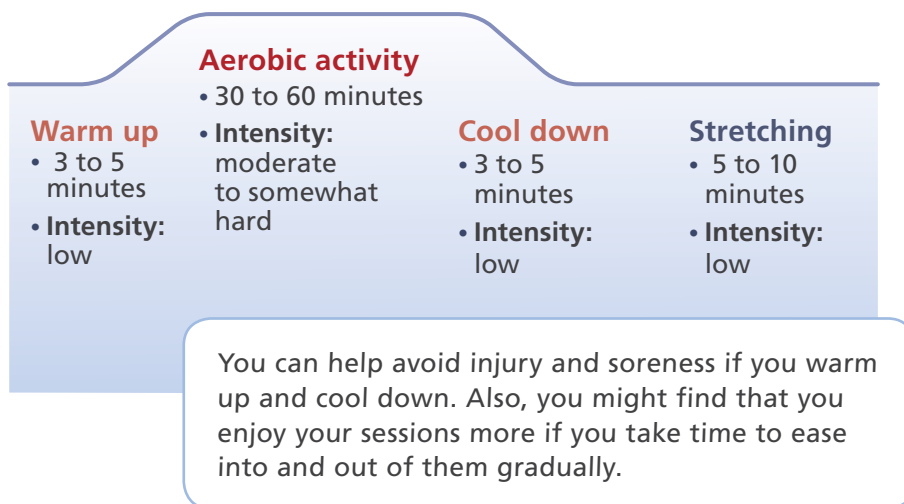
Example: If you counted 17 beats in 15 seconds, your heart rate is 68 beats per minute ($17 \times 4 = 68$)

In some situations, it's important to count your pulse for a full minute for a more accurate number.

The Shape of a Session

Abruptly starting or stopping an exercise session is asking for trouble. It increases your risk for injury, heart rhythm and blood pressure problems, dizziness, and muscle soreness. Instead, your exercise session should have a shape like the diagram below. Start with a warm-up period, exercise at moderate intensity, and then finish with a cool-down period.

- Warming up doesn't require different exercises. It simply means working less intensely than during the peak of your exercise session. For example, if you're walking, begin and end your walk at a slower pace.
- Cooling down should also involve stretching exercises to improve your flexibility when your muscles are warm.



STAY MOTIVATED

- **Make both short- and long-term goals.** Your healthcare providers can help. For example, if your long-term goal is to exercise half an hour each session, set a short-term goal of 10 minutes every day this week. The next week, set a goal of 12 minutes a day, and so on until you reach your long-term goal.
- **Discuss your goals with family and friends.** Their encouragement can help you keep going. They might even join in! Better yet, participate in a cardiac rehab program, where staff and exercise companions can help keep you motivated.

BARRIERS AND BREAKTHROUGHS

Everyone has something that gets in the way of regular exercise. The trick is to figure out what YOUR barrier is, and find a way to get around it. Here are some examples:

- **"I don't have time."** No one does. You have to schedule activity into your daily routine, and make sure that it doesn't drop off your schedule when you get busy.
- **"I'm too tired."** Even if you feel tired, give physical activity a chance. Once you get into a routine, you'll find that exercise actually gives you more energy. It helps you sleep better, too!
- **"I don't like doing anything after I get home from work."** Time your exercise for early in the day. Walk the dog before leaving for work. Or, pack your gym bag the night before and have it in the car, so you can visit the gym on your way home.
- **"I'm too out of shape."** No one is too out of shape, old, or clumsy for physical activity. After all, our bodies are made to move and regular activity can help you lose extra weight so you can move more easily.
- **"It's boring."** Don't get stuck with the same exercise routine every day. Alternate the gym with doing activity outdoors. And get together with friends or family to exercise!

AEROBIC EXERCISE: The basics

Why? To build your heart's endurance.

How often? Most days of the week (at least 5, preferably every day).

How long? Follow the advice of your cardiac rehab or physical therapist on the length of your sessions, depending on your situation and endurance. Then gradually build it up, eventually to 60 minutes every day. (See the chart on page 118.)

How hard? Most aerobic exercise should be at a "moderate" to "somewhat hard" intensity (see page 111).



Tips for aerobic exercise

For general health and to prevent further heart disease, you need at least 30 minutes of moderate aerobic activity most days of the week. Of course, if you've had heart surgery or a heart attack, this is more than you can do for the first few weeks. Start slowly, but each week add a bit more time to your daily sessions until you meet your goal. A great way to get started is by participating in a cardiac rehab program, where the staff will monitor your heart, encourage you, and help you build your endurance.

As you work up to more aerobic exercise, your body will reward you. Aerobic exercise releases brain chemicals called **endorphins**, which boost your mood.

There are dozens of ways to "rev up" and get your heart pumping a little faster and stronger. Choose activities you enjoy, and don't settle for doing the same thing every day. Examples of aerobic activity include:

- Brisk walking
- Jogging
- Bicycling
- Swimming
- Water exercise
- Dancing
- Aerobic fitness classes or videos
- Using aerobic equipment, such as a treadmill, stationary bike, stair climber, or rowing machine
- Hiking
- Cross-country skiing or snowshoeing



STAY MOTIVATED

- **Track your progress.** Write down how much you exercise every day, or simply put an "X" on the calendar. Over time, your progress will be plain to see!
- **Reward yourself.** Rewards worked for you as a kid, and they probably will now, too. When you reach an activity goal, give yourself a heart-healthy treat, such as a night out on the town, a new shirt, or a nice hot bath. (Make sure your reward isn't food, and that it's something special you wouldn't do anyway.)

Tips for strength training

Strength training isn't just for bodybuilders! Research has shown that people with heart disease benefit from an exercise program that includes strength training a few times a week.

Make sure your healthcare provider has cleared you to begin a strength training program, then add strength training sessions 2 or 3 times a week. Start gently and gradually build up. Especially after surgery or a heart attack, it's best if a trained professional supervises your strength training. Again, cardiac rehab is a great way to get started.

Ways to do strength training

Examples of ways to add strength training to your routine:

- **Resistance bands and tubes.** These are highly portable, safe, and inexpensive. They're especially good for lighter resistance training.
- **Weight training machines.** These come in a wide variety, and are available at gyms and recreation centers.
- **Weights.** You can work many different muscle groups with a simple pair of hand weights or ankle weights.
- **Body weight movements.** You can do exercises like push-ups, knee-bends, and sit-ups almost anywhere, without expensive equipment.
- **Strength training programs and classes.** Many fitness centers, recreation centers, and health clubs offer programs and classes that include strength training.

GETTING STARTED — SOME EXAMPLES



Shoulder press

- 1 Begin with your elbows bent and your hands at shoulder level.
- 2 Slowly extend one arm above your head.
- 3 Stop when your elbow is almost straight. Slowly lower your arm and repeat on the other side.



Mini squats

- 1 Start with your feet apart for balance.
- 2 Slowly bend your legs until your knees are over your toes. Don't bend further than this. You should always be able to see your toes during this exercise. Straighten up again.

STRENGTH TRAINING: The basics

Why? To build muscle, bone, and general strength.

How often? 2 to 3 days per week, with a day off between sessions to let your muscles recover.

How long? Follow the advice of your cardiac rehab therapist or physical therapist.

How hard? Intensity should feel moderate (see page 111). Don't hold your breath while lifting weights.

WORKING MUSCLES WISELY

- **Be sure you talk to your healthcare providers** before starting any strength training program.
- **Work different muscle groups each training session** to prevent injury. Each week, try to work all your major muscle groups. Don't just focus on one part of the body.
- **Don't hold your breath while lifting weights.** Exhale (breathe out) during the harder part of each movement. Inhale (breathe in) during the easier part.
- **Listen to your body.** If any exercise feels unsafe or painful, stop and reduce the weight or intensity.

STRETCHING: The basics

Why? To build flexibility and balance.

How often? At the end of every exercise session.

How long? 5 to 10 minutes.

How hard? Intensity should feel low.

WHAT IF YOU MISS A FEW EXERCISE SESSIONS?

A few days off usually isn't cause for concern. Just get back into your exercise routine as soon as you can.

- If you've only skipped a day or two, pick up where you left off.
- If you've missed more than a week, start back at a lower level than before and work back up from there.
- If you missed exercise because of a short-term, minor illness (like a cold), wait until you feel normal before you start exercising again. Then start at a lower level and work back up.
- If you've missed sessions because you have a minor injury, wait until your pain disappears. Start back to exercise at two-thirds of your normal intensity, just to make sure you don't re-injure yourself. Work back up from there.

Don't waste energy feeling guilty about not exercising. After all, nobody's perfect! Instead, use that energy to get back on track.

Tips for stretching

Stretching can give you longer, looser muscles and increase your range of motion. It also conditions your muscles and improves your balance. The bonus is that stretching just plain feels good!

Stretching guidelines

Follow these guidelines to make sure your stretches are safe and effective:

- **Stretch when your muscles are already warm.** If you haven't just exercised, warm up your muscles by walking for 5 minutes or so.
- **Don't rush through your stretching routine.** It's an important part of your daily exercise.
- **Stretch gently, slowly, and smoothly.** Stretch only to the point where you feel mild tension in the muscle you are stretching. Then hold that position for at least 15 seconds, gently extending the stretch as your muscle loosens. Don't bounce when you stretch. This can damage your muscles.
- **Breathe normally during each stretch.** Holding your breath tightens up your muscles and makes the stretch more difficult.
- **Stretch each major muscle group through a full range of motion.** Repeat each stretch 2 to 3 times.

GETTING STARTED — SOME EXAMPLES



Low back stretch

Gradually lower your abdomen to your lap, and hug your knees. Hold for about 20 seconds.



Calf stretch

Stand facing the wall, using both hands for support. Step one leg behind you, keeping the leg straight and the toe and heel on the ground. Slowly lean in toward the wall, bending the front knee until you feel a comfortable stretch in the calf of your back (straight) leg. Hold for 20 seconds, then repeat on the other side.



Quadriceps (front thigh) stretch

With your knee pointing toward the ground, bend one leg behind you. Reach down with the same-side hand and grasp your ankle. Keep your knee pointing down as you gently pull your heel toward your buttocks. Hold for 15 to 20 seconds, then repeat on the other side.

Exercising Safely

The goal of any exercise program is to improve your health. Yet if you overdo it, expose yourself to temperature extremes, or ignore important warning signs. You may end up doing more harm than good.

PROTECT YOURSELF FROM HEAT AND COLD

On a hot day, you risk heat stress. Heat stress puts an extra workload on your heart. If you're exercising outdoors on a hot day, do the following:

- Exercise in the cooler parts of the day (morning and evening).
- Drink enough water to avoid dehydration.
- Wear a hat and sunscreen.
- Wear light, loose-fitting clothes.

On a cold day, you risk an increase in angina symptoms. This is due to cold air constricting (tightening) of your lungs and blood vessels. If you're exercising outdoors on a cold day, do the following:

- Exercise in the warmest part of the day (afternoon).
- Keep your mouth covered to help warm up the air you breathe.
- Dress in layers.
- Wear a hat and scarf. Up to 40% of your body's heat is lost through your head and neck.
- Help prevent a fall by avoiding patches of ice and snow.

PAY ATTENTION TO EXERCISE WARNING SIGNS

As you exercise, pay attention to your body. If you have any of the following symptoms, slow down or stop exercise right away:

- Any chest pain (angina), including pain, tightness, or heaviness in the chest, neck, jaw, or arms. If you have chest pain, follow the "If Chest Pain Strikes" guidelines on page 170 of this handbook.
- Lightheadedness or dizziness
- Nausea or vomiting
- Extreme fatigue (tiredness)
- Muscle pain
- Excessive sweat or cold sweat
- Vision problems
- Numbness or tingling in hands or feet
- Irregular or too-rapid heartbeat
- Unusual shortness of breath, more than you'd expect for your level of exercise, or so that you cannot carry on a short conversation.

If symptoms persist after you've stopped exercising, follow the Heart Zones Action Plan on page 169.



**What's the biggest risk of exercise?
NOT STARTING.**

Attending cardiac rehab is a great way to keep your fitness plan on track. Exercise physiologists can monitor your progress and tailor a fitness program to fit your unique needs. Studies show that cardiac rehab is the most effective way to start and maintain a fitness program.

Your Personal F.I.T. Plan

The chart below provides a sample exercise progression based on the F.I.T. factors you learned in this chapter. Your healthcare provider can help you adapt the sample program for your unique situation, including giving you a **target heart rate range** to guide your intensity.

Set a gradually increasing weekly goal, keep track of your progress, and reward yourself for successes along the way.

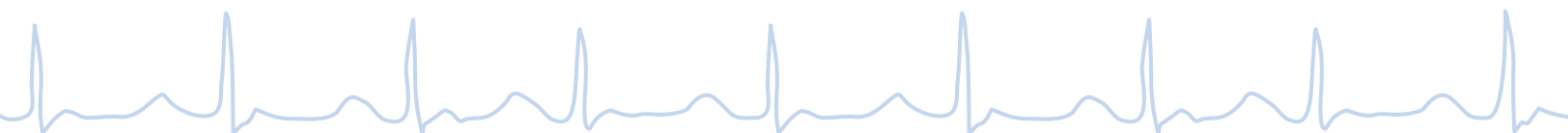
SAMPLE F.I.T. Goals Your goals may differ, and should be based on your own exercise tolerance.	YOUR PROGRESS Each day, record the number of minutes you exercise and your heart rate during exercise.							TOTAL WEEKLY MINUTES Goal: 150 minutes by week 7 or 8
	Sun	Mon	Tues	Wed	Thur	Fri	Sat	
Weeks 1 to 2 F. Once a day or split into 2 sessions a day I. Light effort target heart rate: _____ T. Start with 5 to 10 minutes and progress to 15 to 20 minutes	week 1			m i n u t e s				
				h e a r t r a t e				
	week 2			m i n u t e s				
				h e a r t r a t e				
Weeks 3 to 4 F. Once a day or split into 2 sessions a day I. Light to moderate effort target heart rate: _____ T. Start with 15 to 20 minutes and progress to 30 to 35 minutes	week 3			m i n u t e s				
				h e a r t r a t e				
	week 4			m i n u t e s				
				h e a r t r a t e				
Weeks 5 to 6 F. Once a day or split into 2 sessions a day I. Moderate to somewhat hard target heart rate: _____ T. Start with 30 to 35 minutes and progress to 40 to 50 minutes	week 5			m i n u t e s				
				h e a r t r a t e				
	week 6			m i n u t e s				
				h e a r t r a t e				
Weeks 7 and 8 F. Once a day or split into 2 sessions a day I. Moderate to somewhat hard target heart rate: _____ T. Start with 30 to 35 minutes and progress to 60 minutes	week 7			m i n u t e s				
				h e a r t r a t e				
	week 8			m i n u t e s				
				h e a r t r a t e				

8 Nutrition for a Healthy Heart

Eating right is one of the best things you can do for your heart. This chapter provides guidelines for heart-healthy eating and offers tips for making dietary adjustments easier and more enjoyable.

Keep in mind that your healthcare providers will tailor dietary recommendations to your specific health needs. So if your healthcare providers' instructions are different from what you read here, always follow your providers' instructions.

THE IMPORTANCE OF HEALTHY EATING	121
BUILDING BLOCKS	122
Eat lots of fruits and vegetables	123
Eat more whole grains	125
Choose heart-healthy proteins	127
Choose unsaturated fats and oils	130
Choose low-fat dairy products or dairy alternatives	133
Limit sodium (salt), sugar, and alcohol	135
SHOPPING, COOKING, AND DINING OUT	137
Reading food labels	137
Modifying recipes	138
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Dining out	141
GO, SLOW, AND WHOA: TRAFFIC CONTROL FOR YOUR PLATE	143
HEART-HEALTHY SAMPLE MENU	144





“ When I went to see my doctor, he said my cholesterol was pretty high. That surprised me, because I’m not overweight and I’m in decent shape. But my doctor explained the risks, so I took it seriously.

Diet was the toughest change for me, but my wife helps. She’s always trying out new recipes, and serving lots of vegetables and fruit. And I’ve gotten really good at reading food labels. You have to watch out. The figures they quote are just for one serving, not for the whole package. So when you start to calculate, you see you’re getting way too much fat and salt.

Anyway, the best motivation is seeing that healthier eating really can make a difference. With medicine and a good diet, my cholesterol is down quite a bit. ”

Gordon,
diagnosed with CAD
and high cholesterol

The Importance of Healthy Eating

Healthy eating is important for everyone, at every stage of life. But for someone with heart disease risk factors, it's vital. Chapter 3 describes some risk factors for heart disease that you can change, such as high blood pressure, high blood cholesterol, smoking, high blood glucose (sugar), diabetes, physical inactivity, and excess weight.

A good diet can help your heart by doing the following:

- **Help you control or even eliminate major cardiac risk factors** by lowering your cholesterol, losing excess weight, controlling blood sugar and diabetes, lowering your blood sugar, and decreasing inflammation.
- **Ease the symptoms and progression of heart failure** by reducing your body's tendency to retain fluids.
- **Help your heart medications work better** and with fewer side effects.

And healthy eating simply makes you feel better. You'll have more energy, more restful sleep, and improved digestion. Feeling better makes any treatment or prevention plan more effective.



RX FOR AN RD

Your healthcare providers may refer you to a **registered dietitian (RD)** to help you make changes to your diet. An RD can teach you about nutrition, help you choose foods and plan menus, monitor your progress, and encourage you to stick with your eating plan.

See page 155 for information on contacting an RD.

QUALITY AND QUANTITY

Heart-healthy eating should be creative and enjoyable, NOT an exercise in denial.

As you begin to change your eating habits, try not to focus on what you're giving up. Instead, realize that with just a few small adjustments, you can continue enjoying your favorite foods. You'll also feel better and have more energy.

Remember: heart-healthy eating aims to improve the quantity AND the quality of your life!



Check out the USDA's choosemyplate.gov website. You'll find lots of nutrition information and interactive tools, including a menu planner that you can tailor to your age, sex, and activity level.



Building Blocks

What does a healthy diet look like? How can you get a proper balance of nutrients, control your weight, and avoid harmful ingredients?

With all of the diet plans and nutrition research flooding the news, it may seem like there are no clear answers to these questions.

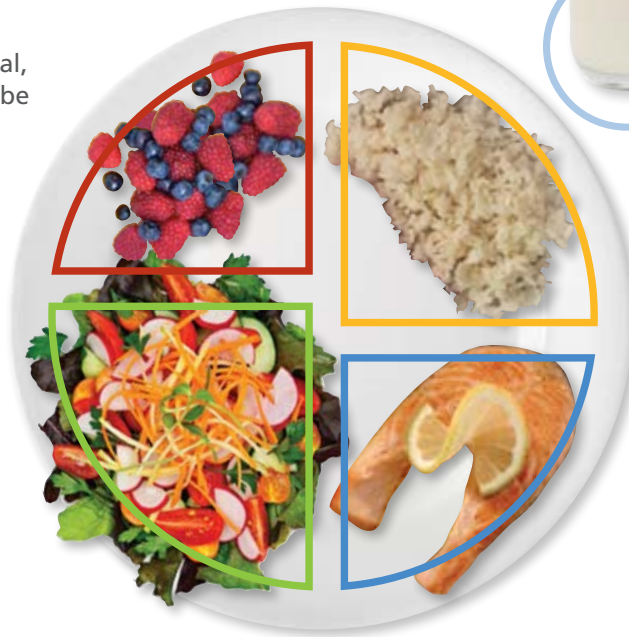
The truth is, there is a lot of agreement about how you should eat to protect your heart. Research from the past several decades clearly shows that you can build a heart-healthy diet with six basic building blocks, arranged in the right proportions. See the plate below.

1

Eat lots of fruits and vegetables

In fact, in a typical meal, half your plate should be fruits and vegetables.

(See page 123.)



2

Eat more whole grains

Grains and starches together should fill about 1/4 of your plate for most meals.

(See page 125.)

3

Choose heart-healthy proteins

A healthy portion will take up about 1/4 of your plate.

(See page 127.)

4

Choose unsaturated fats and oils

(See page 130.)



5

Select low-fat dairy products or dairy alternatives

(See page 133.)



6

Limit your sodium (salt), sugar, and alcohol

(See page 135.)



1 Eat lots of fruits and vegetables

It's probably no surprise to hear that fruits and vegetables are good for your overall health. For one thing, people who eat lots of fruits and vegetables usually eat less fat. But did you know that they're especially good for your heart? Here's why:

- Fruits and vegetables can be a great source of **soluble fiber**. Soluble fiber has been proven to reduce blood cholesterol levels.
- Fruits and vegetables provide **antioxidants** such as vitamin C, vitamin E, beta-carotene, and lycopene. Antioxidants protect your cells from damage. They're like "rust-proofing" for your body. Taking antioxidant supplements has not been shown to prevent heart disease. But studies have shown that foods with antioxidants (see the list at right) do help protect your heart from disease.
- Fruits and vegetables are an important source of **minerals** such as calcium, potassium, and magnesium. A mineral-rich diet can help lower blood pressure and keep electrolytes in proper balance.
- Many fruits and vegetables contain **flavonoids**, a kind of plant nutrient (**phytonutrient**) that may improve heart health. The best sources of flavonoids are brightly colored fruits and vegetables, such as berries, apples, tomatoes, broccoli, carrots, and onions.



TOP ANTIOXIDANT FOODS

These foods have the most antioxidants per serving:

- Kidney beans, pinto beans, black beans, and red beans
- Blueberries, blackberries, cranberries, raspberries, strawberries, and cherries
- Artichokes
- Prunes and plums
- Walnuts
- Apples

Spices such as cinnamon, cloves, and oregano are also rich in antioxidants.

RED FOODS TO THE RESCUE

The antioxidant lycopene seems to play a powerful part in reducing the risk for a heart attack. Research studies showed that men who had the highest amount of lycopene in their body fat were half as likely to suffer a heart attack than those with the least amount. Lycopene gives certain foods a red color. To help your heart, eat more of these red, lycopene-rich foods:

- Tomatoes and tomato products
- Watermelon
- Strawberries
- Pink grapefruit*

*Grapefruit and grapefruit juice interact with some drugs. Do not eat them unless your physician or pharmacist has approved it.

1

Building Block 1:

Eat lots of fruits and vegetables

TARGETS

To make sure you're eating enough fruits and vegetables, aim for the following:

- Eat 4 to 6 servings (about 2 to 3 cups total) of fruit each day
- Eat 4 to 6 servings (about 2 to 3 cups total) of vegetables each day

SAMPLE SERVINGS (PORTIONS)

Fruits

- 1 medium piece of fruit (orange, apple, kiwi, plum, peach, pear, or nectarine)
- ½ banana
- 1 cup melon or berries
- ½ cup unsweetened juice
- ¼ cup dried fruit

Vegetables

- 1 cup raw vegetables
- 1 cup leafy green vegetables
- ½ cup cooked vegetables
- ½ cup vegetable juice



TIPS

Here are a few tips for getting enough fruits and vegetables in your daily diet, and for getting the most benefit from them.

TO HELP YOU EAT ENOUGH FRUITS AND VEGETABLES:

- Top a bowl of whole grain cereal with sliced bananas or berries each morning.
- Make a healthy fruit smoothie with frozen bananas and berries and a splash of 100% juice.
- Keep your freezer well stocked with frozen vegetable combinations. Cook them with a healthy protein source for a quick stir-fry lunch or dinner.
- Keep a fruit basket instead of a candy dish at your desk.
- Choose restaurants that offer a healthy salad bar.
- Keep prewashed lettuce greens and sliced vegetables in the fridge to make quick salads.
- Use dried fruit as a quick snack or as a topping for cereal, salad, or yogurt.

TO GET THE MOST OUT OF EACH SERVING:

- Choose whole fruits more often than fruit juices. Whole fruits are higher in fiber.
- For more fiber, leave the peel or skin on fruits and vegetables where appropriate.
- Choose fruits and fruit juices without added sweeteners or syrups.
- Choose fresh or frozen vegetables without added sauces, fats, or salts.
- Steer clear of deep-fried vegetables or vegetables smothered in butter or cream sauce.
- Eat more dark green and deep yellow or orange vegetables. These vegetables tend to be the most nutrient-rich.*

*Dark green, leafy vegetables are high in vitamin K, which may interfere with blood-thinning medication such as Coumadin. If you take a blood-thinning medication, keep your intake of vitamin K-rich foods consistent. Be careful not to significantly increase or decrease how much or how often you eat them. Ask your healthcare providers for more information.

Avoid grapefruit and grapefruit juice while taking blood pressure or cholesterol-lowering medications.

2 Eat more whole grains

Foods like bread, rice, and pasta are a staple of diets all over the world. These grains, and starchy vegetables like potatoes, may be big hits at your house, too. But as with other foods, some grains and starches are better for your heart than others. To improve your heart health, you need to choose whole grain products and other unprocessed starches instead of refined starches.

Whole grains and other unprocessed starches: the healthiest choice

Whole grain foods include all parts of the grain kernel: the bran, the germ, the exosperm, and the endosperm. Whole grains and other unprocessed starches are far better for your heart than refined foods, because they provide more of the following:

- **Dietary fiber.** Studies have linked high-fiber diets to reduced blood cholesterol.
- **Complex carbohydrates.** Compared to the carbohydrates provided by white bread, white rice, and other processed foods, whole grains give you longer-lasting energy, more fiber, and more nutrients.
- **Vitamins and minerals.** Whole grains are rich in heart-healthy nutrients like the B vitamins, vitamin E, and minerals like magnesium, copper, selenium, and zinc.

Whole wheat, brown rice, and oats are just a few examples of whole grains. “Unprocessed starches” also include beans and vegetables like whole white and sweet potatoes, peas, squash, and corn simply prepared with little or no fat. If eaten with the skin on, these starchy vegetables provide even more fiber and other nutrients.

Refined starches: a less-nutritious choice

Refined (or processed) grains are milled differently than whole grains. The milling process removes the bran and often the germ from the grain, stripping away fiber and many other important nutrients. And although some nutrients are added back in when refined grain is fortified, not all of them are replaced. **That’s why refined foods like white bread, white rolls or buns, white pasta, or white rice are less nutritious.** They are lower in fiber and nutrition, and give you only short-lived energy.



FIBER FACTS

There are two main types of dietary fiber: **soluble** and **insoluble**. Both types are important, but soluble fiber has special benefits for your heart. Research shows it can lower LDL cholesterol levels.

The National Heart, Lung, and Blood Institute recommends eating at least 5 to 10 grams of soluble fiber a day. Eating 15 to 25 grams of soluble fiber can significantly reduce cholesterol. The following foods are good sources of soluble fiber:

- Oatmeal and oat bran
- Barley
- Brown rice
- Psyllium husk or seeds, found in some bran cereals and in fiber supplements
- Legumes, such as peas and beans, especially lentils, lima beans, kidney beans, and pinto beans
- Nuts
- Pectin, found in fruits such as apples, citrus fruits, pears, prunes, blackberries, and mangos
- Vegetables, especially broccoli, carrots, artichokes, winter squash, and asparagus
- Ground flax and chia seeds

2

Building Block 2:

Eat more whole grains

TARGETS

Aim for 5 to 8 servings (about 5 to 8 ounces total) of grain and other starches every day. Try to make at least half of the servings whole grains.

SAMPLE SERVINGS (PORTIONS)

- 1 slice of 100% whole grain bread
- ½ cup cooked brown rice, bulgur, barley, or millet
- ½ cup whole grain cereal or cooked oatmeal
- ½ cup cooked whole wheat pasta or whole wheat couscous
- 6 whole grain crackers
- 3 cups air-popped popcorn
- ½ cup corn



TIPS

Most people have no problem eating enough starches. The trick is to eat more whole grains and other unprocessed starches. Follow the tips below.

- **Read food labels.** Although whole grain foods are usually darker and crunchier than refined foods, you can't always identify them by color and texture. Beware of packaging that says "multigrain" or "made with 100% wheat." These claims can be misleading. Instead, check the ingredient list for the word "whole," for example, "whole grain" or "whole oats." See page 137 for more information on reading food labels.
- **Find cookbooks or recipes** that emphasize whole grains.
- **Use a pressure cooker** to cook whole grains more quickly. Whole grains may take longer to cook than processed grains.
- **Watch out for "tag-along trouble."** Many whole grain snacks and cereals are high in sugar and fat. Read food labels carefully. Steer clear of grain products made with hydrogenated fats, which contain harmful trans fats.
- **Branch out with your beans.** Try lentils, navy beans, chickpeas (garbanzo beans), white beans, and black beans.
- **Try whole grain products** you haven't tried before:
 - Amaranth topped with your favorite tomato-based sauce
 - Barley in soups, stews, or as a side dish
 - Bulgur as a hot cereal or in tabouli salad
 - Whole cornmeal or polenta served as a hot cereal
 - Whole-wheat couscous flavored with raisins, almonds, cinnamon, and ginger for dessert
 - Cracked wheat in whole grain cereals or whole wheat berries
 - Kashi used as a pilaf or hot cereal
 - Millet cooked as a hot cereal or pilaf
 - Quinoa served as a pilaf or in chili (be sure to rinse quinoa before cooking)

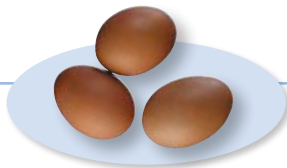
3 Choose heart-healthy proteins

Protein is an important element of a healthy diet. Dietary protein helps repair body tissues and build muscles, including your heart muscle. Unfortunately, many sources of protein are also high in saturated fat and cholesterol. How can you meet your protein needs AND lower cardiac risk factors at the same time? The trick is getting your protein from the right sources.

The information here will help you choose proteins from both animal and plant sources that are low in saturated fat and cholesterol. Many of these foods also provide additional nutrients, such as omega-3 fatty acids and fiber.

Heart-healthy animal proteins

- **Fish and shellfish:** Fish and shellfish are good sources of protein that are typically lower in saturated fat than other animal proteins. In addition, several varieties of fish, such as herring, salmon, trout, and sardines, are also rich in omega-3 fatty acids.
- **Poultry:** Skinless, white-meat poultry (such as chicken and turkey) are all good sources of low-fat protein. Watch out for poultry such as duck and goose, which are higher in fat.
- **Eggs:** Eggs are a good choice for most people. In the past, it was thought that eggs should be limited in a heart-healthy diet, because egg yolks contain cholesterol. We now know that it's the trans fats and saturated fats that increase bloodstream cholesterol. Eggs are low in these fats. In addition, eggs produced today have less cholesterol than they used to, about 185 mg each.



HOW MANY EGGS?

Eggs — especially the yolks — provide high-quality protein and essential vitamins and minerals. Cutting eggs from your diet is not recommended. If your doctor recommends that you limit cholesterol to 200 mg daily, you may need to eat less than one whole egg per day. Limit eggs in recipes by substituting one egg with 2 egg whites, ¼ cup egg substitute, or — in baking only — ¼ cup applesauce.

HOW MUCH DIETARY CHOLESTEROL?

Dietary cholesterol is only found in foods that come from animals, such as meat, fish, dairy products, and eggs.

You need cholesterol for your body to function normally. But too much cholesterol in your diet can raise your blood cholesterol — and increase your risk for atherosclerosis. For this reason, the American Heart Association recommends that you limit dietary cholesterol to 200 mg a day or less.

HOW MUCH FISH?

People who eat fish often have lower heart disease rates. The American Heart Association recommends that people eat fish 2 to 3 times each week. Good fish to consider include:

- Lake trout
- Salmon
- Sardines
- Canned light tuna
- Herring

Mercury is increasingly common in many sea fish. To protect yourself, eat these fish no more than 3 times per month: halibut, sea bass, swordfish, grouper, canned albacore tuna, and red snapper. Avoid eating orange roughy, mackerel, shark, and swordfish.

WHEN YOU CHOOSE BEEF OR PORK

When planning meals with beef and pork, stick to the leanest cuts. A few examples are listed below:

Lean beef

- Round or flank
- Sirloin tip roast
- Steak
- Tenderloin rump
- Extra lean ground hamburger, ground round

Lean pork

- Sirloin roast
- Tenderloin
- Loin chops

VEGETARIANS AND VITAMIN B₁₂

Vitamin B₁₂ is an essential nutrient that is particularly important for your heart health. It's found in animal products such as fish, poultry, meat, eggs, and dairy products. While B₁₂ isn't naturally found in plant foods, many foods, like some cereals and soy beverages, are fortified with it. If you're a strict vegetarian, you should eat fortified foods daily or take a supplement.

B₁₂

What about other animal proteins, like beef and pork?

Because these meats tend to be high in saturated fat and cholesterol, they don't merit the term "heart-healthy." But that doesn't mean you can't eat them. Just limit these meats to 2 to 3 times per week and always choose the leanest cuts you can find. Always use low-fat cooking methods such as grilling, broiling, baking, roasting, or stewing.

Heart-healthy plant proteins

- **Beans:** Beans are a great source of protein and have the added benefit of being high in soluble fiber and other nutrients. There are many types of beans that can be used in a variety of ways. Examples include black beans, pinto beans, navy beans, kidney beans, garbanzo beans, split peas, black-eyed peas, and lentils.
- **Soy and soy products:** Heart-healthy soy protein is found in soybeans (also called edamame), tofu, tempeh, soymilk, soy yogurt, textured soy protein, soy flour, soy nuts, and soy protein powder. Several "meat substitutes" such as meatless burgers and hotdogs also contain soy protein. Many soy products are high in sodium, so check for sodium content.
- **Nuts and nut products:** Nuts are a great source of protein, carbohydrates, vitamins, minerals, and heart-healthy fats. Evidence suggests that eating at least ½ cup to 1 cup of nuts per day reduces total cholesterol and LDL cholesterol, which is important in decreasing the risk of heart disease. Some good nuts to try are almonds, pistachios, pecans, peanuts, pine nuts, and walnuts.
- **Seeds:** Seeds, like nuts, give you protein along with many other heart-healthy nutrients. A few good examples include pumpkin, sunflower, sesame, and chia seeds. Use seeds on top of salads and cereals, or mixed into a healthy trail mix.



3

Building Block 3:

Choose heart-healthy proteins

TARGETS

Eat 2 to 3 servings (about 4 to 6 ounces total) of heart-healthy protein daily. Get your protein from a variety of sources.

SAMPLE SERVINGS (PORTIONS)

- 3 ounces fish, white-meat poultry (skin removed), or extra-lean red meat
- 2 tablespoons peanut butter or other nut butter such as almond butter or soy butter
- ½ cup steamed soybeans with pods removed
- ½ cup tofu or tempeh
- 1 egg or 2 egg whites
- ½ cup cooked beans, peas, or lentils
- 1 ounce nuts or seeds
- ½ cup low-fat cottage cheese

TIPS

Here are some tips for a protein-rich, heart-healthy diet:

- **Avoid processed meats.** Foods such as hot dogs, salami, and other lunch meats are usually high in fat and sodium.
- **Watch your portion sizes.** Stick to portions that are about the size of a deck of cards or the palm of your hand. If it's bigger than the palm of your hand, it's bigger than one portion.
- **Experiment with meatless recipes.** Try substituting beans, low-fat cheese, or tofu in your favorite recipes.
- **Check out vegetarian cookbooks** to get ideas for tasty, easy-to-prepare entrées.

A GOOD DAY FOR HEART-HEALTHY PROTEINS

The notes below show how you can eat healthy proteins from a variety of sources all day long.

For breakfast:

- Try scrambled tofu or an egg with fresh, chopped vegetables and herbs.
- Serve a high-protein fruit smoothie by blending silken tofu with frozen berries and bananas.
- Spread 2 tablespoons of natural peanut butter on toasted whole grain bread. Top with sliced bananas and a sprinkle of sunflower seeds.
- Add 1 ounce of toasted nuts and/or seeds to any whole-grain cold or hot breakfast cereal.
- Steer clear of high-fat breakfast meats such as bacon or sausage. Many grocery stores and specialty stores carry healthy meat-free alternatives.



For lunch and dinner:

- A cottage-cheese-and-fruit plate makes a quick and easy light meal.
- Use flavored, baked tofu in stir-fry dishes.
- Turn an ordinary salad into a high-protein meal by topping it with kidney beans, garbanzo beans, or black beans. Add a sprinkle of sunflower seeds, sesame seeds, or slivered almonds for added protein and crunch.
- Use lean cuts of thinly sliced turkey for sandwiches on whole grain bread.
- Experiment with different kinds of bean soups or chili, such as navy bean or black bean.

For snacks:

- For a healthy high-protein snack, choose nuts or seeds instead of pretzels or chips.
- Serve hummus (made from garbanzo beans) with pita strips for a great appetizer.
- Low-fat refried beans mixed with a touch of fresh salsa make a great bean dip. Serve with baked tortilla chips as a quick and healthy snack.
- Steamed soybeans, also known as edamame, make a terrific high-protein snack. (Remember to remove the pod.)

WHAT THE AHA SAYS ABOUT FATS...

The American Heart Association (AHA) recommends that ALL Americans, not just those with heart conditions, limit their intake of saturated fat and dietary cholesterol. A practical step in this direction is to eat unsaturated fats instead of saturated fats.



OMEGA-3 FATTY ACIDS ARE ESPECIALLY HEART HEALTHY

One type of polyunsaturated fat that's particularly good for your heart is omega-3 fatty acid. This type of fat can help lower your triglycerides and help reduce inflammation. Good sources include:

- Salmon (fresh or canned), herring, lake trout, and sardines
- Soybeans and soybean oil
- Walnuts and walnut oil
- Flaxseeds (ground) and flaxseed oil
- Foods fortified with omega-3 fatty acid, such as eggs, margarine, and soy milk

4 Choose unsaturated fats and oils

Dietary fat has essential nutrients that keep your body running smoothly. Fat also adds flavor and texture to meals and helps you feel satisfied after eating. Some fats have been shown to be heart-healthy, while others may increase cardiac risk factors. How do you make good decisions about fat in your diet? The key is learning about and choosing the right types of fats.

Unsaturated fats: the healthiest choice

Unsaturated fat is a type of fat that is liquid at room temperature and comes mostly from plant sources. Eating foods high in unsaturated fat, especially in place of foods with a lot of saturated fat, may help lower LDL cholesterol levels. This helps to reduce your risk of heart disease. There are two main types of unsaturated fat: **monounsaturated** and **polyunsaturated**.

- **Monounsaturated fats** occur mostly in plant oils.

Good sources of monounsaturated fats include:

- Olive, canola, and peanut oils
- Olives, nuts, and avocados

- **Polyunsaturated fats** are found in plant foods and some fish. Good sources of polyunsaturated fat include:

- Vegetable oils such as safflower, sunflower, corn, cottonseed, flaxseed, sesame, and soybean oils
- Fatty fish, such as salmon, trout, tuna, sardines, and herring



WHAT ABOUT FISH OIL SUPPLEMENTS?

If you eat enough foods high in omega-3 fatty acids, you may not need to take a fish oil supplement. If your dietitian or healthcare provider has recommended taking omega-3 fatty acids, be sure your supplement contains the amounts they recommend. To figure the total amount of omega-3 fatty acids in the supplement, add the grams of EPA and DHA together.

Saturated fat: a less-healthy choice

Saturated fat is a type of fat that is usually solid at room or refrigerator temperature. It's found mainly in foods that come from animals, although some plant oils also contain saturated fat. Eating foods high in saturated fat and total fat has more influence in raising your blood cholesterol than anything else you eat. **Try to limit the foods you eat with saturated fats.** Here are a few examples of foods that are high in saturated fat.

- **Animal sources:**

- Fatty meats such as prime grade, rib cuts, restaurant hamburgers, bacon, sausage, pepperoni, hot dogs, luncheon meats, and dark meat and skin of poultry
- High-fat dairy products such as whole milk and 2% milk, butter, cream, creamed soups, cheese, cream and cream cheese sauces, whipped toppings, and ice cream
- Lard, meat gravies from pan drippings, and other meat fats

- **Plant sources:**

- Cocoa butter, coconut, and coconut milk
- Tropical oils such as coconut, palm, and palm kernel oil

Trans fats: unhealthy for your heart

Trans fats raise levels of LDL ("bad") cholesterol and total cholesterol. They are particularly harmful because they also raise triglycerides and lower good HDL cholesterol. **Aim for zero trans fats in your diet.**

Trans fats are found naturally in dairy products and some meats, but it's also important to avoid trans fats in packaged foods. **Read labels closely.** Food labels are required to list the amount of trans fats in the "Total Fat" section of the nutrition label. **Avoid foods that contain hydrogenated or partially hydrogenated oils.** Many products are now trans-fat free, but read labels of the following products carefully:

- Many margarines (especially stick margarines)
- Vegetable shortening
- Packaged snack foods such as chips, crackers, cookies, and many candies
- Bakery items such as doughnuts, pastries, biscuits, and pies
- Microwave and theater popcorn
- All deep-fried foods, such as fries, fish sticks, chicken nuggets, onion rings, and others



BUTTER VS. MARGARINE

Confused about what to use? The best choice is a healthy unsaturated oil, such as olive oil, instead of butter OR margarine. Otherwise, use these tips for choosing heart-healthy margarine:

- Choose a soft-tub margarine with liquid vegetable oil as the first fat ingredient.
- Better yet, choose a margarine that lists zero trans fats in the Nutrition Facts label and has no partially hydrogenated fat in the ingredients.
- Read labels to choose one of the specialty margarines containing plant substances called **stanols** and/or **sterols**. Studies show that food supplemented with at least 2 to 3 grams of these substances can help reduce LDL ("bad") cholesterol by 5% to 15% in 2 to 4 weeks. Stanols are also available as pills, chews, and powders.
- Look for other products with added stanols or sterols as well. They include some brands of yogurt, orange juice, mayonnaise, fat-free milk, cold cereals, cheese, breads, granola bars, and even chocolate and caramel chews.

4

Building Block 4:

Choose unsaturated fats and oils

TARGETS

Keep your total fat intake to 25 to 35% of your total daily calories.

The healthiest way to stay within this range is to stick to the following guidelines:

- Monounsaturated fats should account for 20% or fewer of your total daily calories.
- Polyunsaturated fats should account for 10% or fewer of your total daily calories.
- Saturated fats should account for fewer than 7% of your total daily calories.
- Trans fats should account for as few of your total daily calories as possible.

HOW MUCH FAT?



Keep fat to 25% to 35% of daily calories. (That's 56 to 78 grams of fat for a 2,000 calorie diet.)

SO...WHAT DO ALL THESE NUMBERS MEAN?

The numbers are important, but all you really need to remember are the six heart-healthy building blocks. If you eat according to the building blocks, you should be able to hit these targets without crunching numbers.

TIPS

To meet these targets for fat in your daily diet, try the following:

- Read food labels for saturated fat, cholesterol, and trans fat content.
- Watch out for hidden fats added during cooking or processing.
- Choose heart-healthy snacks instead of snacks with a lot of saturated fat. Here are some examples:
 - Air-popped, not microwave popcorn with a light oil or butter spray
 - A handful of mixed nuts
 - Celery topped with natural peanut butter
 - Baked corn chips served with a guacamole dip
 - Whole-grain crackers served with an olive- or bean-based spread
- Substitute olive oil for butter or margarine whenever possible. Here are some delicious examples:
 - Combine olive oil with balsamic vinegar to use as a dipping sauce for bread — or better yet, fresh veggies
 - Lightly dress sliced potatoes with olive oil and fresh herbs, then bake to make healthy fries
 - Toss whole-wheat pasta with olive oil and herbs along with a small amount of fresh Parmesan cheese, instead of high-fat cream or Alfredo sauce
- Make your salad or sandwich heart-healthy by doing the following:
 - Experiment with homemade salad dressings by combining olive oil or another heart-healthy oil with different seasoned vinegars
 - Sprinkle your salad with sunflower or sesame seeds instead of bacon bits or croutons
 - Try different kinds of olives to add flavor to a salad
 - Use ¼ of a sliced avocado instead of mayonnaise or salad dressing on any sandwich

5 Choose low-fat dairy products or dairy alternatives

Dairy products are a good source of calcium, protein, vitamin A, and vitamin D. However, they can be high in fat and cholesterol, which can be a problem for anyone looking to reduce their cardiac risk factors.

Yet no one needs to give up dairy products. Sticking to low-fat dairy products or dairy alternatives will give you the same nutritional benefits without the drawbacks. Turn the page for targets and tips that will help you make the switch to low-fat dairy.



THE CALCIUM CONNECTION

Dairy products such as milk, yogurt, and cheese are excellent sources of calcium. Yet other foods can provide calcium, too. Try dark green leafy vegetables, tofu, beans, almonds, and calcium-fortified juices and cereals. These foods boost your calcium intake and provide other helpful nutrients at the same time.

LACTOSE INTOLERANT?

The lactose, or milk sugar, in dairy products can be difficult for some people to digest.

If you have trouble with lactose, try the following tips to make sure you get the nutrients you need:

- Look for dairy products (such as Lactaid or Dairy Ease) that have been pretreated with lactose enzymes.
- Use a lactase supplement, such as Lactaid or Dairy Relief, before drinking milk or eating ice cream.
- Use calcium-enriched soymilk, rice milk, and almond milk. These dairy alternatives are lactose-free.
- Yogurt, cottage cheese, and cheese are lower in lactose than milk. Try them to see if you can tolerate these foods.



5

Building Block 5:

Select low-fat dairy products and dairy alternatives

TARGETS

Stick with products that are 1% fat or less, and aim for 3 servings (3 cups total) every day.

SAMPLE SERVINGS (PORTIONS)

- 1 cup low-fat, skim, or fat-free milk
- 1 cup fortified soymilk
- 1 cup low-fat yogurt or calcium-fortified soy yogurt
- 1 ounce low-fat cheese
- ½ cup low-fat cottage cheese



TIPS



Tips for meeting this target include the following:

- Use low-fat milk or soymilk on whole grain cereals.
- Choose enriched soymilks and other milk substitutes. For example, many soymilk brands are enriched with calcium, vitamin A, and vitamin D. Drink it plain, on cereal, or as a milk substitute in any recipe.
- Give yourself time to adjust to the taste of low-fat milk or soymilk. With time, most people come to enjoy these heart-healthy alternatives just as much as the “originals.”
- Watch out for coffee creamers and whipped toppings. These often contain a lot of saturated fat. Check the labels, and keep an eye out for low-fat or fat-free creamers and toppings.
- Try low-fat powdered milk. It's easy to prepare and store and adds richness to coffee or tea. Also, adding low-fat powdered milk to a glass of skim milk makes it taste richer.

6 Limit sodium (salt), sugar, and alcohol

A heart-healthy diet means making good choices, and in some cases, setting a few limits. Here's why you may need to limit sodium, sugar, and alcohol.

- **Sodium (salt):** Cutting back on salt is important for anyone, but especially for people with high blood pressure, heart failure, or people who tend to retain fluids. Less sodium means less fluid in your body and a lighter workload for your heart.
- **Sugar:** Most sweets have a lot of flavor and a lot of calories, but not much nutrition. That's why they're often called "empty calories." For a healthy weight and longer-lasting energy, keep sugar and sweets to a minimum.
- **Alcohol:** A little bit of alcohol won't hurt, and may even help, your heart. But your alcohol intake should be moderate. For women, "moderate" means 1 drink a day. For men, the limit is 1 or 2 drinks a day. One "drink" means 12 ounces of beer or wine cooler, 5 ounces of wine, or 1 ounce of hard liquor. Stick with these targets to avoid the extra calories and the extra risks that alcohol use can bring. If you have heart failure caused by alcohol, stop drinking entirely.

SODIUM, POTASSIUM, AND HIGH BLOOD PRESSURE

High blood pressure affects more than 1 in 4 Americans. It makes your heart work harder, damages arteries, and increases your heart disease risk. Limiting sodium can help reduce this risk. But you may also be able to improve your blood pressure by adding potassium and calcium to your diet. Potassium-rich foods include dark green leafy vegetables, fruits from vines, and root vegetables. Here are a few examples:

- Potatoes, white or sweet
- Winter squash
- Prunes
- Cantaloupe and honeydew
- Oranges, apricots, bananas
- Soybeans (cooked)
- Spinach
- Tomatoes and tomato products
- Milk (skim or 1%) and plain yogurt (lowfat or nonfat)
- Dry beans, including white beans, lima beans, and lentils

What about salt substitutes? Talk to your healthcare provider before you use salt substitutes. They often contain large amounts of potassium. They may be useful to some people, but harmful to others with certain medical conditions.



TEA? CHOCOLATE? WINE?

Indulge (a little)

Fruits and vegetables are great sources of healthy flavonoids. But so are chocolate, tea, and wine. Here's how to handle those hankerings in a healthy way:

- **Choose chocolate that's low in sugar and fat.** Avoid milk chocolate. Instead, go for dark chocolate with at least 70% cocoa content. A ½-ounce to 1-ounce serving of rich dark chocolate (about half a regular-size chocolate bar) will satisfy a sweet craving while giving you a good dose of flavonoids.
- **Take your tea in any color you like.** Two or 3 cups of green, black, or white tea each day will nicely boost your flavonoid intake. Skip the cream and sugar, though, and stick to decaf if you have trouble sleeping. Be aware that most teas contain Vitamin K. Do not change your intake of tea if you are on blood-thinning medication.
- **Enjoy your wine in moderation.** If you don't drink, don't start. If you do, keep it to the limits listed at left. You'll get the most benefit from wine's flavonoids with the least risk.

6

Building Block 6:

Limit sodium (salt), sugar, and alcohol

TARGETS

Sodium: Reduce your sodium intake to 1,500 mg a day.

Recent U.S. Dietary Guidelines recommend that most people limit salt to 1,500 mg (about a half teaspoon) or less per day. This is less than the previous limit of 2,300 mg per day.

If you have heart failure or high blood pressure, it's doubly important to stick to this limit. A Registered Dietitian (RD) can help with a plan based on your needs and preferences. See page 155 for information on contacting an RD.

If you have heart failure, you may also need to follow an eating plan that limits fluids and alcohol.

Sugar: Avoid foods and drinks with added sugar, except as an occasional treat.**Alcohol:** If you don't drink, don't start. If you do, keep it light.

Women should have no more than 1 drink a day. Men should have no more than 1 to 2 drinks a day. People with alcohol-related heart failure should not drink alcohol at all.

TIPS

To lower your sodium intake, here's what you need to do.

- **Follow a diet based on the previous building blocks.** Together, they stack up to a heart-healthy diet with few processed foods.
- **Avoid adding salt to your food** while cooking or at the table.
- **Be aware that nearly all the foods you eat contain a little bit of sodium.** Check food labels closely, and keep track of your sodium intake each day.
- **Avoid processed foods,** which are typically high in salt. For example, most canned foods, potato chips, pretzels, crackers, lunch meats, salted nuts, and frozen dinners contain a lot of salt.
- If you have a water softener, **don't use softened water** for drinking or cooking water. Water softeners add quite a bit of sodium to the water.
- **Check medication labels.** Many over-the-counter medications such as laxatives, pain relievers, or heartburn medicine contain sodium. Ask your healthcare provider before you make any medication changes.
- **Use spices or flavorful foods** such as onions and garlic to season meals without adding salt. However, watch out for onion salt and garlic salt, which contain sodium.



Shopping, Cooking, and Dining Out

To change what goes on your plate and in your mouth, you'll need to change how you shop for groceries, cook your meals, and order your food at restaurants. This section will help you make these changes.

Reading food labels

Reading labels can help you make healthy food choices. Look for key words that fit the requirements of your eating plan. For example, look first for foods labeled “high fiber” or “reduced sodium.”

Even more important, pay close attention to the ingredients list and to the “Nutrition Facts” label. Look at the “% Daily Value” for each nutrient. If it's 5% or less, the food is low in that nutrient. If it's 20% or higher, the food is high in that nutrient.



TRUTH IN LABELING

Federal law governs the key words, health claims, and nutrition facts that appear on a food product label. This makes food labels a trustworthy and valuable resource for heart-healthy eating. Always read food labels carefully. Use the glossary in chapter 10 for help.

Nutrition Facts	
6 servings per container	
1	Serving size 1 cup (230g)
Amount per serving	
2	Calories 245
3	% Daily Value*
4	Total Fat 12g 14%
5	Saturated Fat 2g 10%
6	Trans Fat 0g
7	Cholesterol 8mg 3%
8	Sodium 210mg 9%
9	Total Carbohydrate 34g 12%
10	Dietary Fiber 7g 25%
	Total Sugars 5g
	Includes 4g Added Sugars 8%
	Protein 11g
	Vit. D 4mcg 20% Calcium 210mg 16%
	Iron 3mg 15% Potassium 380mg 8%
*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.	

Even though a food label may list “0 grams” per portion, there still may be some of that nutrient in the food. For example, a label for a nonstick spray may define a portion as 3 sprays and list “0 grams” of total fat in each portion. However, if you use more than 3 sprays, you may be getting some fat.

- 1 Serving size:** Is the serving size appropriate for you? If not, you'll need to adjust the calorie and nutrition values to fit that amount you'll actually eat in one serving.
- 2 Calories:** Different people need a different number of calories each day. Look here to see how a serving adds to your daily count.
- 3 % Daily value:** The daily values on food labels are listed for people who should consume 2,000 calories (or 2,500 calories) per day. YOUR daily values may be different.
- 4 Total fat:** Aim low here. For heart-healthier eating, choose foods lower in total fat. Beware of entrées that have more than 10 grams of fat per serving, or other foods that have more than 3 grams of fat. Notice that polyunsaturated and monounsaturated fats are included under “Total Fat” but are not listed separately.
- 5 Saturated fat:** Eat as little of this as possible. Saturated fat raises blood cholesterol.
- 6 Trans fat:** Eat as little of this as possible. Trans fat raises blood cholesterol and lowers HDL.
- 7 Cholesterol:** Too much cholesterol can lead to heart disease. Aim for 200 mg a day or less.
- 8 Sodium:** Most of us consume far more sodium (salt) than we need. Prepared and processed foods are often the cause. Aim for 1,500 mg a day or less.
- 9 Dietary fiber:** Aim for 25 to 30 grams of fiber each day, with most coming from whole grains.
- 10 Sugars:** Compare the sugar grams with the total carbohydrate grams. If the numbers are close to the same, the product is high in sugar and not the best choice.

ON SECOND THOUGHT...

Instead of modifying your current recipes, you might want to check out heart-healthy cookbooks and magazines listed in Chapter 10. These resources explain how to prepare old favorites and new dishes in a heart-healthy way.

Modifying recipes

With a little creativity and planning, most recipes can be made heart-healthy, often with little or no change in taste or texture. To lower the fat, cholesterol, and sodium content of your favorite recipes, first examine the ingredients. Identify any ingredients you need to avoid or reduce, and apply one of these methods:

- **Elimination.** If the ingredient isn't essential, don't use it! For example, you can leave the salt out of many recipes and still have great results.
- **Reduction.** Can you use less of a particular ingredient? Many recipes will still turn out beautifully if you use less sugar, fat, or oil.
- **Substitution.** Here's your chance to be truly creative: What ingredient substitutions can you make to produce healthier dishes? The table below presents a few tried-and-true food substitutions.

Instead of this INGREDIENT...	Try this SUBSTITUTE...
1 cup butter	<ul style="list-style-type: none">• ½ to 1 cup margarine with a liquid vegetable oil as the first ingredient
1 cup lard	<ul style="list-style-type: none">• ½ to 1 cup vegetable oil (preferably olive, canola, safflower, corn, soybean, or sesame oil)
1 cup shortening	<ul style="list-style-type: none">• ¾ cup oil, especially for cookies and breads (food will be crispier)• 1 cup applesauce, especially for cakes, muffins, and quick breads (food will be moister)
1 cup whole milk	<ul style="list-style-type: none">• 1 cup skim or 1% milk• Nonfat powdered milk, reconstituted• 1 cup plain low-fat soymilk or rice milk
1 cup cream	<ul style="list-style-type: none">• 1 cup evaporated skim milk
1 cup shredded cheese	<ul style="list-style-type: none">• ½ to 1 cup lower-fat cheese (Alpine Lace, Free N' Lean, etc.)• ¼ cup very sharp cheese• Mix ½ cup low-fat cottage cheese with ½ cup lower-fat or regular cheese for casseroles
1 tablespoon salad dressing	<ul style="list-style-type: none">• ½ to 1 tablespoon low-calorie salad dressing
1 cup whipped cream	<ul style="list-style-type: none">• Homemade substitute: Mix ¼ cup ice water with ¼ cup non-fat milk powder. Sprinkle powder into ice water to avoid lumps. Beat until thick, then add ¼ tsp. vanilla, ½ tsp. lemon juice, and ¼ cup sugar.• Nonfat or low-fat vanilla yogurt <p><i>Note: Nondairy whipped toppings are available in high-fat or low-fat versions. Read labels.</i></p>

Instead of this INGREDIENT...	Try this SUBSTITUTE...
1 cup mayonnaise	<ul style="list-style-type: none"> • 1 cup nonfat or low-fat yogurt • ¾ cup plain low-fat yogurt mixed with ¼ cup or less low-calorie mayonnaise • 1 cup low-calorie imitation, light, or fat-free mayonnaise
1 ounce cream cheese	<ul style="list-style-type: none"> • 1 ounce Neufchatel cheese • 1 ounce light cream cheese • 1 ounce fat-free ricotta cheese
1 cup sour cream	<ul style="list-style-type: none"> • 1 cup plain or low-fat yogurt • 1 cup lower-fat or nonfat sour cream • 1 cup homemade mock sour cream: Blend 1 cup low-fat cottage cheese, 2 Tbsp. buttermilk, and ½ to 1 tsp. of fresh lemon juice in a blender until smooth.
1 ounce square baking chocolate	<ul style="list-style-type: none"> • 3 Tbsp. cocoa powder plus 1 Tbsp. oil
1 pound ground beef	<ul style="list-style-type: none"> • 1 pound or less extra-lean ground beef (7% fat or less) • 1 pound vegetables (for lasagna or pasta sauces, try zucchini or mushrooms) • 1 pound tofu • 1 pound lean poultry (turkey or chicken) <p><i>Note: To lose more fat, use ¼ pound less per person and drain the fat after cooking. If beef is browned before being added to a sauce or casserole, you can rinse it in hot water.</i></p>
Salt	<p>To lower your salt intake, experiment with other herbs and spices to add flavor to your meals.</p> <p>Here are just a few examples:</p> <ul style="list-style-type: none"> • Allspice: stew, tomatoes, peaches, applesauce, gravies • Basil: fish, lamb, salads, Italian sauces • Cinnamon: fruits, pork, bread, sweet potatoes, squash, plain yogurt • Cumin: chili, stews, beans • Curry: lean meats, chicken, fish, tomatoes, sauces, rice • Dill: fish, chicken, vegetables, potatoes, salads, pasta • Garlic: lean meats, fish, poultry, soups, salads, vegetables, pasta dishes • Lemon or lime juice: fish, poultry, salads, vegetables, sauces • Nutmeg: potatoes, chicken, fish, cauliflower, broccoli, and cabbage dishes • Onion: lean meats, stews, vegetables, salads, soups, beans • Oregano: sauces, Italian dishes, salads, vegetables • Paprika: fish, poultry, soups, salads, meats, sauces, baked potatoes, beans • Rosemary: chicken, fish, lean pork sauces, stuffing, potatoes, peas, lima beans • Sesame seeds: salads, breads, chicken, vegetables, casseroles • Tarragon: sauces, salad dressings, marinades, vegetables, beets, chicken, fish • Thyme: lean meats, poultry, sauces, soups, peas, salads, tomatoes



Preparing foods

The way you prepare foods can have a big impact on how healthy they are for you. Here are a few guidelines for heart-healthy cooking:

- Steam, broil, bake, grill, or boil foods whenever possible.
- If you must fry, use a nonstick cooking spray and nonstick cookware instead of oil.
- When cooking stew, soups, or other dishes in which the fat cooks into the liquid, prepare food a day in advance and refrigerate it. You can easily remove the hardened fat from the food before reheating. This trick also works well for fatty canned foods. Simply chill the can before opening and remove the hardened fat.
- Sauté or stir-fry vegetables in liquid rather than butter or oil. Good liquids for sautéing include water, bouillon, or defatted chicken, vegetable, or beef stock.
- Roast, bake, barbecue, or broil meat on a rack so that fat drips away from the meat.
- To enhance the flavor of low-fat cuts of meat, rub a salt-free seasoning blend on the meat. Spray a pan with oil and sear the meat on medium heat, then add a bit of water or salt-free broth to the pan until it just touches the meat. Cover the pan, turn the temperature down to low, and finish cooking.
- When making gravy, add a few ice cubes to cooled meat drippings. The fat will cling to the ice cubes, which you can then remove. The result is a tasty, low-fat gravy.
- Use vegetable puree to thicken gravies, sauces, soups, and stews. To make vegetable puree, process cooked vegetables in a blender.



Dining out

Heart-healthy eating doesn't mean you have to prepare all your own meals at home for the rest of your life. If you enjoy eating out, you should certainly continue. It just requires a little extra thought and flexibility on your part. This section provides a few strategies to help you make good choices when dining out.



Choosing a restaurant

You should be able to find something healthy to eat at most restaurants. However, keep in mind the following points:

- Fast-food restaurants are notorious for featuring meals that are high in fat, cholesterol, salt, and calories. However, most places offer some healthier choices as well. Tips for eating at fast-food places include:
 - Choose chicken or fish entrées instead of beef and pork. Avoid breaded meats.
 - Skip the “super-sized” version of your meal. Even if you’re not trying to lose weight, a “biggie” meal is probably more than you need to eat at one sitting. Some super-sized meals have more fat and calories than you need in an entire day!
- Restaurants with salad bars are a good option. A trip to the salad bar can make it easier to get all your daily vegetables and fruits and is a good way to fill up. To make a healthy salad:
 - Limit fatty meats and cheese. Choose healthier options such as beans, nuts, and seeds.
 - Watch out for salad dressings, which may contain a lot of salt and fat. Choose a reduced-fat dressing or use a flavored vinegar and a drizzle of olive oil.
- With ethnic dining, there are no absolutes like “Mexican food is unhealthy” or “Japanese food is good for you.” You just have to use good sense when you choose from the menu. The table on the next page gives you a few tips on how to choose restaurant foods wisely.



SELECT YOUR SALAD SENSIBLY

Salad dressings may contain a lot of salt and fat as well as salty, fatty meats and cheeses. Limit these items, or choose healthier alternatives.

IS DIET SODA A GOOD CHOICE?

Most people know that drinking sugary soda pop is unhealthy. But is diet soda a healthy way to go?

Actually, recent research has shown a relationship between drinking diet soda and gaining weight. The best choice is water. Save soda for special occasions.



ASK YOUR SERVER

Keep in mind that you can always ask your server about ingredients and cooking methods. You can also ask whether a particular dish can be prepared in a heart-healthier way. For example, many restaurants will be happy to prepare your meal without salt, steamed rather than fried, and with sauces, gravies, and dressings served “on the side.”

KEEP IT SIMPLE

A good rule of thumb for choosing heart-healthy entrées: Choose foods in their simplest forms. For example, skinless chicken breast is a better choice than breaded chicken, and a broiled fish fillet is better than stuffed fish.

Avoiding restaurant excess

Restaurants tend to give you large servings. To avoid eating too many calories, salt, fat, or cholesterol in one meal, consider these tactics:

- **Drink water** (unless you’re on a fluid-restricted diet). Sipping water throughout the meal can help you avoid overeating or drinking too much alcohol.
- **Beware the bread basket.** After choosing one piece of bread, ask that the bread basket be removed (or move it to the other side of the table). Ask for olive oil instead of butter.
- **Ask that your food be prepared without added salt.**
- **Split a meal with a friend.**
- **Reconsider dessert.** There are a lot of ways you can still enjoy an end-of-meal treat without too much fat, sugar, or calories. You can share a dessert with a friend or two, enjoy a hot beverage, or order fresh fruit as a dessert.
- **Take food home.** Once you’ve eaten an appropriate amount, stop eating. Take leftover food home to enjoy later or share with someone else.

Choosing healthy foods while dining out

To make healthy choices at a restaurant, it helps to know a few cooking terms. These will help you know and understand ingredients and preparation methods, and help you make better choices from the menu.

CHOOSE foods that are described as:	AVOID foods that are described as:
<ul style="list-style-type: none"> • Steamed • In its own juice • Garden fresh • Broiled • Roasted • Poached • Dry broiled (in lemon juice or butter) • Lean 	<ul style="list-style-type: none"> • Buttery, buttered, in butter sauces • Creamed, in cream sauce, in its own gravy, hollandaise • Au gratin, parmesan, in cheese sauce, scalloped • Sautéed, fried, pan-fried, crispy, braised • Breaded, stuffed • Casserole, prime, hash, pot pie • Marinated (in oil), basted in butter or gravy, in brine

Go, Slow, and Whoa: Traffic Control for Your Plate

If you use the six building blocks to make good food choices, you'll probably find yourself eating less of some foods, and more of others. Use this chart to help you remember which foods you should eat most often (Go!), eat occasionally (Slow!), and avoid or eat sparingly (Whoa!).

Food type	Go!	Slow!	Whoa!
Fruits	<ul style="list-style-type: none"> All whole fruits Frozen fruit with no added sugar 	<ul style="list-style-type: none"> Fruit juice 	<ul style="list-style-type: none"> Sweetened fruit juice Fruit canned in syrup
Vegetables	<ul style="list-style-type: none"> Fresh and frozen vegetables Canned vegetables that have been rinsed and drained, or low-sodium varieties Low-sodium vegetable juices 	<ul style="list-style-type: none"> Avocado Canned vegetables 	<ul style="list-style-type: none"> Vegetables in butter or cream sauce Fried or glazed vegetables Salted or pickled vegetables, including sauerkraut Regular vegetable juices
Breads, cereals, and snacks	<ul style="list-style-type: none"> Whole-grain bread Brown rice Whole-wheat couscous, quinoa Oatmeal Whole-wheat bagels, pasta, and whole-wheat and corn tortillas Low-fat, low-sodium crackers Rye or rice wafers Air-popped popcorn 	<ul style="list-style-type: none"> Home-made pancakes, muffins, and waffles White bread, white rice, and white pasta 	<ul style="list-style-type: none"> Donuts and croissants Salty snacks: pretzels, chips, crackers, etc. Store-bought baked goods made with saturated fat or hydrogenated oils, such as muffins, cupcakes, sweet rolls, etc. Egg or chow mein noodles Fried rice
Potatoes and other starchy vegetables	<ul style="list-style-type: none"> White or sweet potatoes (whole, with skin on) Corn (without salt or butter) 		<ul style="list-style-type: none"> Fried potatoes: french fries, hash browns, tater tots Baked or mashed potatoes with butter and/or sour cream
Fats and oils	<ul style="list-style-type: none"> Margarine that is "trans fat free" Monounsaturated oils: peanut, olive, or canola oil Polyunsaturated oils: safflower, sunflower, soybean, or corn oil 	<ul style="list-style-type: none"> Margarine that is not "trans fat free." If you choose this type of margarine, look for liquid vegetable oil as the first fat ingredient. 	<ul style="list-style-type: none"> Cottonseed, palm, or coconut oil Butter Regular mayonnaise Lard or solid shortening
Meats and meat substitutes	<ul style="list-style-type: none"> Fish: trout, halibut, salmon, cod, water-packed tuna or salmon, shellfish Poultry: skinless white meat Lean beef: round, flank, sirloin, extra-lean ground Lean pork: sirloin, tenderloin, loin chops Leg of lamb, well-trimmed Beans and lentils 	<ul style="list-style-type: none"> Shrimp, lobster Dark meat poultry and lightly marbled beef or pork Peanut butter Eggs (1 large egg per day) Unsalted nuts: walnuts, pecans, almonds, peanuts, Brazil nuts Unsalted seeds: pumpkin seeds, sunflower seeds 	<ul style="list-style-type: none"> Prime and rib meats Restaurant hamburgers Luncheon meats and cold cuts (ham, bologna, pastrami, salami) Pepperoni and pizza meats Organ meats (kidney, liver) Sausage, bacon, and fried meats Pickled meats Salted or honey-roasted nuts
Milk and milk products	<ul style="list-style-type: none"> 1% or skim milk, nonfat dry milk, evaporated skim milk, fortified soy milk Nonfat or low-fat yogurt Low-fat cottage cheese Fat-free cheese, sour cream, or whipped topping 	<ul style="list-style-type: none"> 2% milk Frozen yogurt Pudding with nonfat milk Low-fat cheeses Sherbet, sorbet, and gelato 	<ul style="list-style-type: none"> Whole milk and chocolate milk Cream and half & half Evaporated or condensed milk Sour cream and ice cream Whipped cream or nondairy whipped topping
Beverages	<ul style="list-style-type: none"> Water Coffee, tea, and other beverages 	<ul style="list-style-type: none"> Alcoholic drinks, including wine and beer Fruit juice 	<ul style="list-style-type: none"> Any beverage (including alcoholic) containing whole milk, cream, or chocolate

A Heart-healthy Sample Menu

Eating according to the six heart-healthy building blocks is one of the best things you can do to lower your cardiac risk factors. And, as you learn to make healthier choices, you might be surprised at how many different and delicious options you have for meals and snacks. The sample menu below shows how much variety and good taste you can have in an ordinary day.

BREAKFAST	SNACK	LUNCH	SNACK	DINNER	SNACK
<ul style="list-style-type: none"> • 1 cup oatmeal with cinnamon, almonds, and 1 teaspoon brown sugar • 1 cup skim or soy milk • 1 small banana • Low-fat or nonfat yogurt 	<ul style="list-style-type: none"> • Dried fruit and nut trail mix (½ cup) 	<ul style="list-style-type: none"> • Tuna sandwich on whole grain bread (served with low-fat mayonnaise, lettuce, tomato, and avocado) • 1 cup fresh melon • Celery and carrot sticks 	<ul style="list-style-type: none"> • 1 cup light yogurt • 1 cup fresh berries 	<ul style="list-style-type: none"> • Tossed salad with olive oil vinaigrette • 3 ounces tofu, skinless chicken, or fish • 1 cup brown rice pilaf • ½ cup grilled or steamed vegetables • Baked cinnamon apple 	<ul style="list-style-type: none"> • 3 cups air-popped popcorn with olive oil spray or with margarine labeled “trans fat free”

For more information

Chapter 10 provides many resources for heart-healthy eating:

- Educational and support programs to help you adjust your eating habits
- Websites that offer a range of resources to help you understand and manage your heart disease
- Cookbooks and magazines for recipes and information

MY RISK FACTORS:

NUTRITION GOALS TO REDUCE MY RISKS:



Log on to choosemyplate.gov for personalized meal plans, meal tracking worksheets, and more tips and resources.

9 More Healthy Habits

Quitting smoking, maintaining a healthy weight, and managing stress are three more ways you can help your heart. The information and tips in this chapter can help you build these heart-healthy habits.

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“ I came here from Armenia, and my bad habits came with me. For example, I smoked for so many years. And like a lot of other people, I kept gaining more weight as I got older, and then, boom! I had a heart attack when I was 62. My arteries were 90 percent blocked. My cholesterol was 320. I knew I had to take better care of myself. For my kids and my grandkids, that’s what I’m learning to do. ”

Rubik,
4 months after
a heart attack

Quitting Smoking

By itself, cigarette smoking increases the risk of heart disease. When it acts with other factors, it greatly increases your risk.

Here's the good news: if you quit smoking now, you'll see immediate health benefits, even if you've smoked for many years. These include a reduction in your risk of heart attack. Ten years after quitting, your risk of death from heart disease is almost the same as if you had never smoked.

If you smoke, talk to your healthcare providers. They can help you plan a way to quit smoking, and can suggest programs and methods to help you cope with the stress of quitting. They may also advise medications to help reduce your craving for cigarettes and ease your withdrawal symptoms.

Keep in mind that there are no right or wrong ways to quit smoking, and no one way is right for everyone. The key is to keep trying until you succeed. It takes most smokers several attempts before they're able to quit for good. Yet with each attempt, your chances of staying smoke-free increase, along with your chance for a healthier heart.

QUITTING: IT'S SIMPLE, BUT NOT EASY

Controlling one of your biggest cardiac risk factors — smoking — is as simple as quitting. But "simple" doesn't mean "easy." Quitting smoking may be one of the hardest things you have to do in your life. Yet at least 50 million Americans have quit smoking, and so can you!



TRY, TRY AGAIN

If you've tried to quit smoking before without success, try again. Most smokers make at least 5 attempts before they're able to quit smoking for good.

Ask your healthcare provider for a copy of Intermountain Healthcare's *Quitting Tobacco: Your Journey to Freedom* (Dejar de fumar: su viaje a la libertad). This booklet presents a step-by-step approach to quitting. It also lists more Intermountain Healthcare, state, and national resources to help you.



Programs to help you quit smoking

For structured support to help you kick the smoking habit, you may want to try one of the programs listed below.

Utah Tobacco Quit Line

In English: tobaccofreeutah.org/quitting

1-800-784-8669 (1-800-QUIT-NOW)

En español: 1-877-629-1585

The Utah Tobacco Quit Line is a free, **phone-based** service available to all teens, uninsured adults, and adults on Medicare or Medicaid. In addition to other services, the Quit Line provides support and information for pregnant women trying to quit tobacco.

Quit for Life Program

www.quitnow.net

1-866-QUIT-4-LIFE (1-866-784-8454)

Quit for Life is a confidential, **phone-based** program to help you quit tobacco. It offers one-on-one phone support from a trained specialist, who can help create a personalized quit plan that fits your needs and preferences. The program also includes a quit guide and workbook, online support community, and stress management tools and materials. This program is available at no charge for SelectHealth members. It's available in English, Spanish, and a wide variety of other languages, including sign language. Translation services are also available.

Online or Phone Text Programs

The programs listed here are anonymous and effective, and most of them are free.

www.ffsonline.org

Get advice and support from the American Lung Association. (Free.)

<https://medicaid.utah.gov/tobacco-cessation-program/>

Get support from experts and from others on the journey to freedom from tobacco. (Free.)

www.becomeanex.org

Relearn life without tobacco. Make a plan and become an EX. (Free.)

<https://smokefree.gov/tools-tips/text-programs>

Provides free text messaging programs. Includes Spanish options.

Maintaining a Healthy Weight

When you're overweight, your heart has to work harder to pump blood to the excess fat you carry. So even if you're just a few pounds overweight, you need to lose the excess weight to help your heart.

How losing weight can help

Losing excess weight can have a major impact on your health and quality of life. Here's what losing weight can do for your heart:

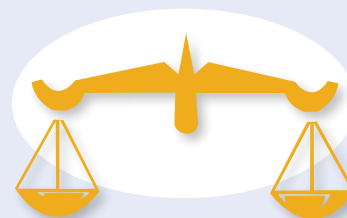
- Ease your heart's workload
- Help reduce other cardiac risk factors, such as high cholesterol and diabetes
- Make it easier for you to be physically active

When you lose weight, you also reduce risks for other health problems. You'll probably feel better, too. People who've succeeded at weight loss say they have more energy and a better outlook.

A plan for weight loss

If you need to lose weight, don't do it alone. For a safe, permanent weight loss, and for extra support, let your healthcare providers help you. They can create a complete program that tailors the following elements just for you:

- **A consistently active lifestyle.** Your healthcare providers can design an exercise program to help make sure you're using all of the calories you're eating. The plan will match your current level of fitness, your weight loss goals, and your interests.
- **Healthy food choices.** An eating plan based on the 6 building blocks for heart-healthy eating is a good start (see **chapter 8**). A registered dietitian (RD) can create an individualized eating plan to support your weight loss. This may involve counting calories as well as servings. The RD may suggest that you boost your intake of some foods to help make sure you're getting the nutrients you need while you lose weight.
- **Goals and supervision for a gradual, permanent weight loss.** Crash diets and fad diets rarely work in the long term, and are often unsafe. A registered dietitian can give you personalized goals and support to help you lose weight slowly and permanently. A good goal for most people is to try to lose weight at a rate of **one or two pounds a week**. Participating in cardiac rehab is a good way to get on track for a healthier weight.



food & drink

physical activity

CALORIES IN VERSUS CALORIES OUT

A calorie is a measure of the energy value of food. According to experts, maintaining a healthy weight is often a calorie-balancing act: making sure that the number of calories you eat balances with the energy you use in your daily activity.

- If you eat more calories for a period of time, you'll gain weight, unless you increase your activity level to offset the imbalance.
- If you eat less *or* increase your activity, you can expect to lose weight. If you do *both*, you can expect to lose even more.
- If you're using all the calories you're eating, you've achieved a balance that will allow you to keep weight off for the long term.



ANOTHER REASON TO READ FOOD LABELS

You might be surprised at the portion sizes of some packaged foods. Read labels carefully to make sure you're eating only one serving at a sitting.

For more information

Look at **Chapter 10** for a list of resources to help you lose weight. **Chapters 7 and 8** can help with information on healthy exercise and diet. Also, keep communicating with your healthcare providers! As you work to lose weight, they can help you clear the hurdles and celebrate your successes.

Tips for losing weight

Change is rarely easy. As you begin trying to lose weight, you'll probably find that your old, familiar habits are getting in the way. How do you break the cycle and begin winning the battle of the bulge?

The key is increasing your awareness. This means noticing how much you eat and when, and how much you move your body during the day. This awareness can help you build new habits that are healthier for your heart. Here are a few ways to start:

- **Get a move on.** Look for ways to be active all day long, not just as part of formal exercise. Look for chances to stand rather than sit down, and to walk rather than drive. Choose active recreation, like dancing or horseshoes, more often than the TV, computer, or other sit-down entertainment. As a simple way to track your movement, get a pedometer to see how far you walk each day. A good goal is increasing your steps over time until you take 10,000 steps (5 miles) every day.
- **Beware of “unconscious eating.”** It's easy to overeat if you're watching television or doing some other distracting activity at the same time. Turn off the TV during meals or snacks and slow down as you eat. Be aware of each bite you take and enjoy it!
- **Eat for hunger's sake.** Before eating a snack, ask yourself, “Why am I eating this?” If you're eating because you're truly hungry, go ahead. If you're eating for other reasons, such as boredom, loneliness, or stress, do something else instead. Don't rely on food to be your main source of entertainment, companionship, or comfort.
- **Control your portions.** You can control your portion sizes by keeping serving platters off the table, eating from smaller plates and bowls, and measuring your helpings as you serve yourself. Avoid eating directly from food packages, and keep in mind that if it's bigger than your hand, it's probably more than one portion.
- **Eat a healthy breakfast every day.** Research has shown that people who regularly eat a healthy breakfast are more likely to lose weight and keep it off.
- **Lead yourself out of temptation.** Most people have “trigger foods” that they tend to overeat when given the opportunity. Figure out what your triggers are, and try to keep them out your house. Some common trigger foods include potato chips, ice cream, and white bread.
- **Write it down.** Record your daily exercise and activity as well as notes about what, when, and how much you eat. A daily diary can focus your weight loss efforts and help your healthcare providers see what works best for you.
- **Cook your own meals.** The average American eats out four times a week. By cooking meals yourself, you can control the fat, calories, and salt in your food.

Managing Stress

Some research suggests that heart disease is affected by various environmental, psychological, and social factors. These include stress, social isolation, certain personality traits, and other factors.

What is stress?

Stress is your physical and emotional response to anything you perceive as overwhelming. This reaction is often called the “fight or flight” response. Stress isn’t harmful in itself. It’s a natural part of life. Sometimes it’s even enjoyable, for example, as with the excitement of a surprise party or a good TV thriller. Stress becomes negative when you can’t manage the bodily processes that come with it.

When is stress harmful?

Too much stress can take a toll on your health and your life. It can cause anxiety, fear, anger, distraction, and depression. It can make relationships difficult and harm your quality of life. It can also slow or limit your recovery from heart surgery or heart attack.

Stress doesn’t just affect you mentally. It can also cause physical symptoms that can harm your heart over time. These include:

- Increased heart rate
- Increased blood pressure
- Shallow and rapid breathing
- Increased adrenaline
- Higher blood cholesterol and blood sugar

These physical reactions to the “flight-or-fight” response may cause other problems:

- Hardening of the arteries
- Lack of oxygen to the heart muscle
- Blood clots
- Heart rhythm problems

People who react to stress with anger or hostility may be especially at risk for the negative effects of stress on the heart. Stress experienced as depression also seems to be a strong predictor of heart problems.



GUESSING STRESS

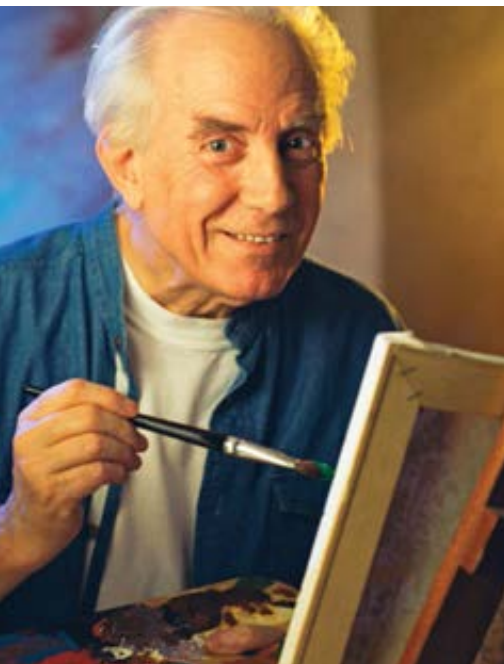
Stress is difficult to measure. Researchers don’t yet know whether it acts as an independent cardiac risk factor, or whether it acts by affecting other factors.

Either way, most cardiac experts recommend stress management as part of a complete lifestyle management program. Reducing stress can give you more energy and motivation to make other heart-healthy changes in your life. For example, it’s probably easier to quit smoking if you’re not feeling stressed!



WHEN TO TALK TO YOUR HEALTHCARE PROVIDER

If you routinely feel anxious, tense, or depressed and find that these feelings interfere with sleeping, eating, relationships, or work, talk to your healthcare provider. Counseling and medications may help.



Tips for managing stress

Along with making changes in your diet and level of activity, managing stress may help you live a longer and better life. Everyone experiences stress. The key to stress management is to make sure your responses to stress are healthy. Here are few strategies:

- **Be aware of your stress symptoms.** Notice when you're feeling tense, angry, discouraged, or anxious. Notice also when you're displaying your own "stress behaviors." For example, you may be eating too much, not sleeping well, or picking fights with people.
- **Take immediate action.** When you're feeling stressed, stop what you're doing and try some deep breathing, meditation, or relaxation exercises. Yoga and Tai Chi can also help you relax.
- **Adjust your outlook.** Do you tend to imagine worst-case scenarios, obsess over details, or take things too personally? See if you can adjust your viewpoint. Spend some time every day thinking about what's going right in your life. Try to see the humor in difficult situations, and give others the benefit of the doubt. Finally, always try to put things into perspective by asking, "Will this matter in five years?"
- **Re-prioritize your time.** Are you too busy? Are you busy with things you don't really enjoy? Or, do you find yourself with too much free time, which leads you to worry more? If so, schedule your time to reflect your interests and know that it's okay to just say "no." Set realistic goals, avoid feeling rushed or pressured, and enjoy your activities!
- **Move from worry to action.** Taking action to solve a problem can relieve anxiety and give you a sense of control. Talk through conflicts instead of letting them fester.
- **Try to spend more time around people who comfort and support you.** If you can, try to avoid being around people who don't handle stress well or who cause you stress.
- **Know when to ask for help.** You don't have to try to handle everything on your own. Ask your friends and family to support you.
- **Develop de-stressing habits.** Here are more ways to reduce your stress:
 - Get regular exercise and sleep.
 - Pursue hobbies that interest you and give you an escape.
 - Participate in cardiac rehab, which offers stress management and relaxation training.

10 Glossary and Resources

Adjusting to heart disease can be a little like going to a foreign country. It helps to know the language and where you can go for help. This chapter provides definitions and resources to help you find your way as you learn to live well with heart disease.

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“ Who would have thought that heart disease would actually expand my horizons? But there’s a whole world of books, websites, programs, and people that I’m learning from. Most importantly, in cardiac rehab, I’ve learned I can support other people and that people want to hear what I have to say. It helps me, too. So I guess my heart really is healing, in more ways than one. ”

Agnes,
6 months after
a heart surgery

Intermountain Resources

Cardiac rehabilitation programs

Several Intermountain Healthcare facilities offer outpatient cardiac rehabilitation. Cardiac rehab provides individualized exercise and education in a fun and supportive environment. It's ideal for people recovering from heart attacks, heart surgeries, and other heart problems. You may need a referral from your healthcare provider to participate.

LOCATION OF PROGRAM	PHONE NUMBER
American Fork Hospital 98 N 1100 E #402 American Fork, UT 84003	(801) 492-2408
Bear River Hospital 905 N 1000 W Tremonton, UT 84337	(435) 207-4770
Cassia Regional Medical Center 1501 Hiland Avenue Burley, ID 83318	(208) 677-6530
Cedar City Hospital 1303 N Main Cedar City, UT 84721	(435) 868-5258
St. George Regional Hospital 1380 East Medical Center Drive St. George, Utah 84790	(435) 251-2279
Intermountain Medical Center J. L. Sorenson Heart & Lung Center 5121 South Cottonwood Street Murray, Utah 84157	(801) 507-4688
Layton Hospital (In the PT gym) 201 Layton Parkway Layton, Utah 84041	(801) 543-6115
Logan Regional Hospital 500 East 1400 North Logan, Utah 84341	(435) 716-5323
McKay-Dee Hospital Center Cardiac/ Fitness Institute 4421 Harrison Boulevard Suite A-10 Ogden, Utah 84403	(801) 387-3067
Utah Valley Regional Medical Center 395 W Cougar Blvd Provo, Utah 84604	(801) 357-3878

NUTRITION HELP: WEIGH TO HEALTH PROGRAMS

If you'd like help with nutrition counseling and weight loss, check the Weigh to Health program. This program is available at many Intermountain facilities. Weigh to Health includes both group classes or one-on-one nutritional counseling sessions.

For a list of contact numbers and classes, go to:

intermountainhealthcare.org/nutrition and click this link: **Weigh to Health Program.**



HELP FROM AN RD...

A registered dietitian (RD) can help you create an eating plan based on your doctor's advice and your own unique needs. To see a list of registered dietitians with contact information, see the Intermountain website:

intermountainhealthcare.org/RD

Classes, Websites, and Phone Numbers



Education, tools, and classes

Along with cardiac rehab, Intermountain offers a variety of other resources:

- **The Weigh to Health® program and help from registered dietitians.** See the previous page for information on these resources.
- **Education and tools.** Ask your provider about Intermountain booklets and trackers focused on high blood pressure, high blood glucose, diabetes, high cholesterol, and quitting tobacco.
- **Classes and support groups.** Contact your local facility for more information on the following services:
 - Diabetes education
 - Support for quitting tobacco
 - Health and physical fitness evaluations

The organizations and services listed below provide information about heart disease and support for lifestyle management.

Intermountain Healthcare
(801) 442-2000
intermountainhealthcare.org

Intermountain Heart Care Center
intermountainhealthcare.org/heart

Agency for Healthcare Research and Quality
ahrq.gov

American Association of Heart Failure Nurses
aahfnpatienteducation.com

American College of Cardiology
cardiosmart.org

American Diabetes Association
(800) 342-2383 (800-DIABETES)
diabetes.org

Academy of Nutrition and Dietetics
eatright.org

American Heart Association (AHA)
(800) 242-8721
heart.org

American Lung Association
(800) 586-4872 (800-LUNGUSA)
lungusa.org

Centers for Disease Control and Prevention
(800) 232-4636
cdc.gov/heartdisease

Healthy People 2020
healthypeople.gov

Heart Failure Online
heartfailure.org

Heart Failure Society of America
abouthf.org

Million Hearts Initiative
millionhearts.hhs.gov
National Coalition for Women with Heart Disease
(202) 728-7199
www.womenheart.org

National Diabetes Education Program
ndep.nih.gov

National Heart, Lung, and Blood Institute
(301) 592-8573
nhlbi.nih.gov

National Stroke Association
(800) 787-6537
stroke.org

Weight-control Information Network (WIN)
health.gov/node/136

Women's Heart Health
womenshealth.gov/heart-health-stroke

Books

Every year, more books on heart disease and heart-healthy living are produced. Those listed below are favorites of Intermountain Healthcare providers.



HEART DISEASE AND GENERAL LIFESTYLE MANAGEMENT

- *American Heart Association: To Your Health! A Guide to Heart-Smart Living.* Clarkson Potter, 2001.
- *The Cardiovascular Cure: How to Strengthen Your Self Defense Against Heart Attack and Stroke.* Judith Zimmer, John P. Cooke. Broadway Books, 2002.
- *Diagnosis: Heart Disease: Answers to Your Questions About Recovery and Lasting Health.* John W. Farquhar, M.D., Gene A. Spiller, Ph.D., Gene A. Spiller. W. W. Norton & Company, 2002.
- *Heartfulness: A Guide to Heart Health and Life Balance.* Neil W. Treister. Infinity Publishing, 2004.



EMOTIONAL SUPPORT AND STRESS MANAGEMENT

- *10 Simple Solutions to Stress: How to Tame Tension and Start Enjoying Your Life.* Claire Michaels Wheeler. New Harbinger Publications, 2007.
- *Heartmates: A Guide for the Spouse and Family of the Heart Patient.* Rhoda F. Levin, et al. Fairview Press, 2002.
- *The Relaxation and Stress Reduction Workbook.* Martha Davis, Elizabeth Robbins Eshelman, Matthew McKay, Patrick Fanning. New Harbinger Publications, 2008.
- *The Stress Management Handbook: Strategies for Health and Inner Peace.* Lori Leyden-Rubenstein. McGraw-Hill, 1999.



EXERCISE AND PHYSICAL FITNESS

- *Aerobic Walking, The Weight-Loss Exercise: A Complete Program to Reduce Weight, Stress, and Hypertension.* Mort Malkin. Wiley, 1995.
- *American Heart Association Fitting in Fitness: Hundreds of Ways to Put More Physical Activity into Your Life.* American Heart Association. Clarkson Potter, 1997.
- *The Complete Guide to Walking for Health, Fitness, and Weight Loss.* Mark Fenton. The Lyons Press, 2008.
- *Stretching: 30th Anniversary Edition.* Bob Anderson, Jean Anderson (illustrator). Shelter Publication, 2010.
- *Weight Training Workouts that Work.* James Orvis. Ideal Pub, 2000.

CHOOSING A COOKBOOK

A good way to review a new cookbook is to check it out from your public library before buying it. This way you can see if the recipes fit your tastes and lifestyle, for example, gourmet or simple, ethnic or mainstream. Here are a few other things to look for:

- Sound nutrition principles. Steer clear of fad diet books that offer “quick fixes.”
- Recipes that are generally low in saturated fat, cholesterol, and sodium.
- Easy-to-find ingredients.
- Easy-to-follow instructions.
- Recipes that give nutrition information, for example, calories, fat grams, sodium, cholesterol.

MORE RECIPE RESOURCES

Look for these magazines at your supermarket or online:

Cooking Light
(cookinglight.com)

Eating Well
(eatingwell.com)

Vegetarian Times
(vegetariantimes.com)

Heart-healthy cookbooks

American Heart Association Low-Fat, Low-Cholesterol Cookbook, 4th Edition. American Heart Association, 2010.

American Heart Association Meals in Minutes Cookbook: Over 200 All-New Quick and Easy Low-Fat Recipes. American Heart Association, 2002.

Betty Crocker Healthy Heart Cookbook. Roger S. Blumenthal, Juli Hermanson. Betty Crocker, 2004.

The Cardiac Recovery Cookbook: Heart Healthy Recipes for Life After Heart Attack or Heart Surgery. M. Laurel Cutlip. Hatherleigh Press, 2005.

Cooking Smart for a Healthy Heart. Reader's Digest, 2008.

The DASH Diet for Hypertension. Thomas Moore, M.D., Mark Jenkins, Laura Svetkey, M.D., Pao-Hwa, Ph.D., Njeri Lin, Ph.D. Pocket, 2011.

The EatingWell for a Healthy Heart Cookbook. Philip Ades, Editors of EatingWell Magazine. 2008.

The Diabetes & Heart Healthy Cookbook. American Diabetes Association and American Heart Association. American Diabetes Association, 2004.

Eat, Drink, and Be Healthy: The Harvard Medical School Guide to Healthy Eating. Walter C. Willett. Free Press, 2005.

The Healthy Heart Cookbook for Dummies. James M. Rippe, Amy G. Myrdal, Angela Harley Kirkpatrick, Mary Abbott Waite. John Wiley & Sons, 2000.

The Healthy Heart Cookbook: Over 700 Recipes for Every Day and Every Occasion. Joseph Piscatella, Bernie Piscatella. Black Dog and Leventhal Publishers, 2003.

The New American Heart Association Cookbook, 8th Edition. Clarkson Potter, 2010.

Glossary A to Z

The list below defines many terms used in this book, along with others you might hear your healthcare providers use. If you see a page reference, you'll find a more detailed discussion of the concept on that page.

A

abdominal aortic aneurysm (AAA)

An aneurysm (weakened section) in the abdominal section of the aorta. See page 48.

ablation

A treatment procedure that involves destroying (ablating) a small, targeted area of the body's tissues. In heart care, ablation is often used to treat heart rhythm problems or correct a septum that is too thick. See page 84.

ACE inhibitors

Medications used to treat high blood pressure and heart failure. See page 100.

aerobic exercise

A type of exercise that uses oxygen from the blood to fuel muscles. Aerobic means "with air." Aerobic exercise has important heart benefits, including lowering LDL cholesterol, burning fat, and increasing the oxygen-carrying capacity of the blood. See page 110.

AICD (automatic implantable cardioverter defibrillator)

See implantable cardioverter/defibrillator.

ambulatory EKG monitoring

A type of EKG monitoring that allows you to move about while you wear electrodes and a portable recorder. Examples include Holter monitoring and ambulatory telemetry. See page 70.

ambulatory telemetry

A test that involves wearing a telemetry monitor for up to 30 days while you go about normal activity. See page 71.

aneurysm

A localized weakness and swelling of the wall of a blood vessel or of the heart wall. An aneurysm can result from physical injury, disease such as atherosclerosis, smoking, or a birth defect.

ankle brachial index (ABI)

A test that compares the blood pressure in your ankle and arm, to search for blockage or narrowing in the arteries of your arms or legs.

angina (angina pectoris)

Discomfort, pain, or tightness in the chest, arm, shoulder, back, neck, or jaw caused by a temporary lack of oxygen to the heart muscle. Angina usually occurs when the heart's oxygen demands increase, such as during exercise, stress, or emotional upset. See page 42.

angiogram

An image produced by angiography.

angiography (coronary angiography, coronary arteriography, dye study)

A cardiac cath procedure in which a special dye is injected into a coronary artery. The dye makes the arteries visible to x-rays and can show narrowing or blockage. See page 78.

angioplasty (percutaneous transluminal coronary angioplasty [PTCA], balloon angioplasty)

A treatment in which a catheter with a deflated balloon at the tip is inserted into a narrowed artery. The balloon is then inflated at the narrowed section to help widen the artery and improve blood flow. See page 81.

angiotensin II receptor antagonists (ARBs)

Medications commonly used to treat high blood pressure and heart failure symptoms (fluid retention and shortness of breath). See page 100.

anti-anginals

Medications used to prevent, reduce, or relieve angina pain. See page 103.

antiarrhythmics

Medications used to control irregular heartbeats and maintain normal heart rhythm. See page 100.

anticoagulants ("blood thinners")

Medications that slow blood clotting. See page 101.

anti-embolism stockings

See T.E.D. hose.

antihyperlipidemics

See lipid medications.

antihypertensives

Medications that help control high blood pressure by relaxing and dilating blood vessels. See page 101.

antioxidants

Substances found in foods — especially fruits and vegetables — that help protect your cells from damage. Studies have shown that foods with antioxidants can help protect your heart from disease. See page 123.

antiplatelets

See platelet inhibitors.

aorta

The large artery that leaves the left ventricle of the heart and carries oxygen-rich blood to different regions of the body. See page 38.

aortic

Related to the aorta.

aortic valve

The heart valve that controls blood flow from the left ventricle through the aorta. See page 39.

apnea

See sleep apnea.

ARBs

See angiotensin II receptor antagonists.

arrhythmia (dysrhythmia)

A disturbance of the heart's regular rhythm. Arrhythmia occurs when the sinoatrial node no longer controls the heart's electrical impulses. See page 44.

arterial

Related to the arteries.

arterioles

Small branches of the arteries.

arteries

Blood vessels that carry blood away from the heart.

ASD

See atrial septal defect.

atherectomy

A cardiac catheterization procedure in which plaque is cut up and removed from the walls of an artery. The goal is to improve blood flow to the heart. See page 83.

atherosclerosis (*coronary atherosclerosis*)

A disease process in which plaque, a mixture of cholesterol, calcium, and blood-clotting materials, builds up on the inner walls of the arteries. Atherosclerosis narrows arteries and causes them to harden, thicken, and become less elastic. In the Heart Care Handbook, this word refers to coronary atherosclerosis, plaque buildup in the arteries that feed the heart. See page 41.

atria

See atrium.

atrial

Related to the heart's atria.

atrial fibrillation

An abnormal heart rhythm in which the heart's atria contract at a very rapid and irregular rate. See page 44.

atrial flutter

Rapid vibration or "fluttering" of the atria, which causes a rapid, but regular, atrial rhythm.

atrial septal defect (ASD)

A hole in the wall between the left and right atria. An ASD is often a birth defect, but it may also develop from an injury to the heart. See page 45.

atrial tachycardia

A rapid heart rate that starts in the atria. Atrial tachycardia is usually defined as 100 beats per minute or faster.

atrium (plural = atria)

One of two upper chambers of the heart. The two atria receive blood from the body or the lungs and deliver it to the lower chambers (ventricles) of the heart. See page 38.

automatic implantable cardioverter defibrillator (AICD)

See implantable cardioverter defibrillator.

B

B₆, B₁₂

Vitamins that occur naturally in food and have been shown to help maintain a healthy heart and blood vessels.

bacterial endocarditis

An infection of the inner lining of the heart or heart valves.

bad cholesterol

See low-density lipoproteins.

balloon angioplasty

See angioplasty.

beats per minute (bpm)

An expression of a person's heart rate, for example, "70 bpm."

beta blockers

Medications commonly used to treat angina, high blood pressure, and irregular heart rhythms. See page 101.

bigeminy

A heart rhythm that consists of a series of premature or abnormal heartbeats alternating with normal heartbeats. Every other heartbeat is normal.

blood cholesterol lowering agents

See lipid medications.

blood pressure

The force that blood exerts on the walls of the arteries as it is pumped through them. See page 53.

blood thinners

See anticoagulants.

body mass index (BMI)

A measure of body mass based on your height and weight, used to predict body fat.

brachial artery

An artery in the arm. The pulse in the brachial artery can be felt on the inside of the elbow.

bradycardia

An abnormally slow heart rate, generally defined as less than 60 beats per minute in adults.

brain attack

See stroke.

bypass machine

See heart-lung bypass machine.

C

CABG

See coronary artery bypass grafting.

CAD

See coronary artery disease.

calcification

The deposit of calcium salts in body tissues.

calcium channel blockers

Medications commonly used to treat high blood pressure, coronary artery spasms, and angina. See page 102.

calorie

A measure of the energy value of a food. See page 149.

capillaries

Very small blood vessels that distribute blood to body tissues and connect arteries to veins.

carbohydrates

A food source of energy found in starches, milk, fruit, and sugar.

carbon monoxide

A poisonous gas in cigarette smoke and automobile exhaust. When carbon monoxide is inhaled, it takes the place of oxygen in the red blood cells, so less oxygen is available to body cells.

cardiac

Of, near, or related to the heart.

cardiac arrest

Sudden loss of heart function because the heart stops beating.

cardiac catheterization

A procedure in which a catheter (narrow tube) is inserted into a blood vessel and then threaded through that blood vessel into the arteries and chambers of the heart. Cardiac catheterization procedures can help detect and/or treat heart problems. See page 76.

cardiac CT scan

A test that creates a 3D image by combining x-rays of thin cross-sections of your heart. See page 67.

cardiac Doppler ultrasound

A type of cardiac ultrasound that shows blood movement through the heart. See page 73.

cardiac MRI

(magnetic resonance imaging)

A test that uses powerful magnets to create pictures of the heart and coronary arteries. See page 74.

cardiac marker *(cardiac enzyme)*

A chemical released by damaged heart muscle cells. Examples of cardiac markers are troponin and CPK-MB. Cardiac marker analysis looks for these telltale chemicals to confirm a heart attack.

cardiac rehabilitation *(cardiac rehab)*

A series of services to educate and support heart patients and to physically rehabilitate the heart through monitored exercise. Many hospitals have cardiac rehab programs for both inpatients and outpatients. See page 155.

cardiologist

A doctor who specializes in diagnosing and treating heart ailments.

cardiomyopathy

A general term for disease of the heart muscle, usually associated with enlargement and weakening of the heart. See page 43.

cardiopulmonary

Related to the heart (cardio) and lungs (pulmonary).

cardiopulmonary resuscitation (CPR)

Life-saving procedures, such as chest compressions and mouth-to-mouth breathing, given to a person whose heart has stopped.

cardiovascular

Related to the heart (cardio) and blood vessels (vascular).

cardioversion

A technique using synchronized electrical shock waves to restore the heart's normal rhythm. See page 85.

carotid arteries

The main blood vessels that carry blood to the brain. The pulse in the carotid arteries can be felt on either side of your Adam's apple in your neck. See page 47.

carotid endarterectomy

A surgery that removes material blocking a carotid artery. See page 93.

catheter

A thin tube inserted into a blood vessel or body opening. See page 76.

catheterization laboratory *(cath lab)*

A hospital unit where catheterization procedures are performed. Many cath lab procedures can be done on an outpatient basis. See page 77.

CCU

See coronary care unit.

CHD

Coronary heart disease. See coronary artery disease.

cholesterol

A fatty substance made by the body and found in animal-based foods such as meats, fish, poultry, and dairy. Cholesterol is normal and necessary for important functions of the body. However, a high level of blood cholesterol can lead to coronary artery disease. See page 54.

cholesterol free

Less than 2 milligrams of cholesterol and 2 grams (or less) of saturated fat per serving.

claudication

The ache, pain, or cramping associated with lack of oxygen to a muscle. Claudication is caused by to atherosclerosis in the arteries of the arms and legs. See page 46.

clot busters

See thrombolytics.

CMR

See cardiac MRI.

collateral artery

A small, secondary branch of an artery.

collateral circulation

Circulation via the small, secondary branches of arteries. If a larger artery is narrowed or blocked, this prompts collateral circulation.

compression hose

See T.E.D. hose.

congenital defect

(congenital disorder)

A condition that is present from birth. See page 45.

congestive heart failure

Inability of the heart to pump enough blood, resulting in a buildup of fluid in the lungs, abdomen, and/or legs. See page 43.

constrict

To narrow or squeeze.

coronary

Related to an artery that supplies the heart muscle with blood.

coronary artery

An artery that supplies blood to the heart muscle. See page 40.

coronary artery bypass grafting (CABG)

(coronary bypass surgery)

An open heart surgery in which a blood vessel is used to create a bypass route around a blocked coronary artery. The goal is to restore blood supply to an area of the heart. A bypass graft can be a portion of a vessel taken from the leg or arm, or a repositioned artery from the chest wall. See page 90.

coronary artery disease (CAD)

(coronary heart disease [CHD] or ischemic heart disease [IHD])

Narrowing of the coronary arteries that supply blood and oxygen to the heart. CAD is usually caused by atherosclerosis. See page 41.

coronary atherectomy

See atherectomy.

coronary atherosclerosis

See atherosclerosis.

coronary care unit (CCU)

A hospital unit specifically designed to provide close observation, continuous treatment, and specialized nursing care to cardiac patients.

coronary heart disease (CHD)

See coronary artery disease.

coronary insufficiency

A condition that results from an inadequate supply of blood and oxygen to the heart.

coronary pressure wire

A sensor that can measure the blood pressure in an artery before and after a narrowed area in an artery. See page 78.

coronary thrombus

A blood clot inside a coronary artery. This may trigger a heart attack. See page 42.

CPK-MB

An enzyme that is released when the heart muscle is damaged. A blood test for CPK-MB can help assess heart damage caused by a heart attack.

CPR

See cardiopulmonary resuscitation.

C-reactive protein (CRP)

A protein in the body that has higher levels when blood vessels are inflamed. Researchers have found that C-reactive protein levels can help predict heart disease. See page 59.

Cutting balloon angioplasty

Angioplasty that uses a balloon with microscopic blades. The blades cut the plaque buildup before the balloon compresses it against the inside wall of the artery. See page 83.

D**defibrillation**

Shocking the heart with high-voltage electricity to restore the heart's normal rhythm.

diabetes

A disease in which the body either does not make enough insulin or does not properly use the body's insulin. Diabetes leads to high blood glucose levels. Diabetes is a major risk factor for coronary artery disease. See page 57.

diastolic

The lower of two numbers recorded in a blood pressure reading. In a blood pressure written as a fraction, this is the number shown on the bottom. The diastolic reading shows the pressure in the arteries when the heart's ventricles are relaxed between beats. See page 53.

digitalis glycosides (digitalis)

Medication used to strengthen the heart muscle and treat irregular heart rhythms. See page 102.

diuretics ("water pills")

Medications used to help rid the body of excess fluid and salt. Diuretics are commonly used to control high blood pressure and congestive heart failure. See page 102.

dyspnea

A breathless sensation or trouble breathing.

dysrhythmia

See arrhythmia.

E**ECG**

See electrocardiogram.

echocardiography

(*echo, cardiac ultrasound*)

A test that uses high-frequency sound waves (ultrasound) to create a visual image (echocardiogram) of heart structures. See page 73.

edema

A collection of excess water in the body tissues, usually in the legs and feet.

ejection fraction (EF)

The percentage of blood volume that the left ventricle pumps out with each heartbeat. See page 74.

EKG

See electrocardiogram.

electrocardiogram (ECG, EKG)

A visual record of the electrical impulses through the heart. These electrical impulses make the heart beat. See page 68.

electrolyte

A chemical in your body that can carry an electrical charge. Your body's basic functions depend on a proper balance of electrolytes.

electrophysiology (EP) study

A catheterization procedure in which small electrical impulses are delivered to the heart to help assess heart rhythm problems. See page 78.

embolism

A collection of undissolved material, usually a portion of a blood clot, that has traveled in the bloodstream and stopped in a blood vessel. Embolisms cause various health problems, depending on where they are in your body. An embolism in a vein in the lungs is called a pulmonary embolism.

endocarditis

Inflammation of the inner lining of the heart or heart valves.

endotracheal tube (ET tube)

A tube inserted into the throat and windpipe that connects a patient to a ventilator (breathing machine). See page 89.

enzyme

A substance in body cells that speeds a chemical reaction within the cells. When cells are damaged, enzymes are released into the blood. The level of certain enzymes in the blood can show the amount of damage to the tissues.

EPS

See electrophysiology (EP) study.

ET tube

See endotracheal tube.

extra lean

Less than 5 grams fat, less than 2 grams saturated fat, and less than 95 milligrams cholesterol per serving.

F**fat free**

Less than ½ gram of fat per serving.

F.I.T. factors

Factors used to define an exercise plan. An acronym for "frequency," "intensity," and "time." See page 109.

fibrillation

Extremely rapid, disorganized, irregular electrical activity of the heart, sometimes referred to as "quivering." Fibrillation may occur in the atria or the ventricles. See page 44.

flavonoid

A kind of plant nutrient that may improve heart health. Berries, apples, tomatoes, broccoli, carrots, and onions are good sources.

folate (folic acid)

A type of B vitamin that occurs naturally in food. Folate helps maintain a healthy heart and blood vessels.

G**good cholesterol**

See high-density lipoproteins.

H

HDL

See high-density lipoproteins.

healthcare provider

Any of a variety of healthcare professionals. This may include physicians, physician assistants, nurse practitioners, nurses, pharmacists, technicians, therapists, and others.

heart attack (*myocardial infarction [MI]*)

Damage to a portion of the heart muscle resulting from a total lack of blood supply to that area. Myocardial means "heart muscle" and infarction means "tissue death." See page 42.

heart block

A condition in which the electrical impulse that triggers heartbeats is slowed or blocked.

heart failure

A condition in which the heart cannot pump enough blood to meet your body's needs. Heart failure develops as a result of heart muscle weakness, often brought on by atherosclerosis, a heart attack, or heart valve problems. See page 43.

heart transplant

Replacement of a severely diseased or malformed heart with a new heart from a human organ donor. See page 94.

heart valves

One-way valves that control the direction and flow of blood through the heart. See page 39.

heart-lung bypass machine (*bypass machine or heart-lung machine*)

A machine used during open heart surgery to allow blood to temporarily bypass the heart. The machine enriches the blood with oxygen and pumps it through your body, so surgeons can work on a stopped heart. See page 89.

hematocrit

A blood test that shows the ratio of cell volume to plasma volume, providing information about the size, function, and number of red blood cells.

hemoglobin

The red pigment in the blood that carries oxygen.

high blood pressure (*hypertension*)

Increased pressure of the blood flow on the inner walls of the arteries over a period of time. High blood pressure is defined by the National Institutes of Health as a systolic reading (top number) of 140 or more and a diastolic reading (bottom number) of 90 or more. See page 53.

high cholesterol (*high blood cholesterol or hypercholesterolemia*)

Too much cholesterol in the blood. As a general term, may also refer to cholesterol imbalances, such as high levels of triglycerides or LDL ("bad") cholesterol, or low levels of HDL ("good") cholesterol. See page 54.

high-density lipoproteins (HDLs) (*"good cholesterol"*)

Substances often referred to as "good cholesterol" because they carry low-density lipoproteins (LDLs, or "bad cholesterol") away from the artery walls and to the liver. Low levels of HDLs are a sign of increased heart risk. See page 54.

Holter monitor

A portable EKG monitor used to continuously record heart rate and rhythm over a period of 24 to 48 hours. See page 70.

homocysteine

A byproduct of the body's breakdown of proteins found in dairy products and meat. Studies show that high levels of homocysteine increase the risk of atherosclerosis and blood clots. See page 59.

hs-CRP (*high-sensitivity C-reactive protein*)

A test that measures the level of C-reactive protein (CRP) in the blood. High CRP levels are linked to heart disease. See page 65.

hypercholesterolemia

See high cholesterol.

hypertension

See high blood pressure.

I

ICD

See implantable cardioverter defibrillator.

ICE

See intracardiac echo.

idiopathic

Of unknown cause.

IHD

Ischemic heart disease. See coronary artery disease.

implantable cardioverter defibrillator (ICD), or automatic implantable cardioverter defibrillator (AICD)

A device implanted in the body to correct ventricular tachycardia (a fast heartbeat) or ventricular fibrillation. Some ICDs can also act as pacemakers to correct a heartbeat that is too slow or too fast. See page 85.

inotropes

IV medications that strengthen the heart's pumping action. Inotropes are usually reserved for patients with severe symptoms.

INR

See International Normalized Ratio.

in-stent restenosis

Restenosis (re-narrowing) of an artery in which a stent has been placed.

insufficiency

Inadequate performance of a bodily function. With heart valve insufficiency, the valve fails to close completely and permits blood backflow. See page 43.

insulin

A hormone that allows cells to turn glucose (sugar) into usable fuel.

International Normalized Ratio (INR)

A standard calculation for describing the time it takes for blood to clot. Also called the PT, or prothrombin time. See page 64.

intracardiac echo (ICE)

An ultrasound test that involves placing a catheter (narrow tube) into the heart, often used to guide the placement of devices in the heart. See page 78.

intravascular ultrasound (IVUS)

A test that uses sound waves to create a motion picture of the interior of your coronary arteries. See page 78.

ischemia

Not enough blood supply to any part of the body, which reduces the oxygen to that part of the body. In the Heart Care Handbook, "ischemia" refers to lack of oxygen to the heart muscle.

ischemic heart disease (IHD)

See coronary artery disease.

IVUS

See intravascular ultrasound.

L**LDL**

See low-density lipoproteins.

left ventricular assist device (LVAD)

A mechanical pump that is implanted in the body to take over the function of the heart's left ventricle and improve blood flow to the body. See page 92.

leads

Wires that connect a pacemaker or ICD to the heart. See page 84.

lean

Less than 10 grams of fat, 4 grams of saturated fat, and 95 milligrams of cholesterol per serving.

lifestyle management

Management of behaviors to reduce cardiac risk factors. Lifestyle management includes managing exercise, diet, weight, and stress. It is an important part of heart disease treatment.

light

Can mean several things. Check the Nutrition Facts label to find out which of these it refers to:

- A third less calories, or no more than half the fat, of the original version
- No more than half the sodium, compared to the original version
- A lighter color or texture. This does not affect the nutrition of the product

lipid

Fat or fat-like substances stored in the body.

lipid medications

Medications used to treat abnormal levels of cholesterol, LDL, triglycerides, and/or HDL in the blood. See page 103.

lipid panel (lipid profile)

A blood test that checks the levels of cholesterol, triglycerides, and other fatty substances in your blood.

lipoprotein

A type of protein that moves cholesterol through the bloodstream. See page 54.

low-density lipoproteins (LDLs)

(“bad cholesterol”)

Substances often referred to as “bad cholesterol” because they tend to stick to the inner walls of blood vessels and cause atherosclerosis. High levels of LDL signal increased heart risk. See page 54.

low cholesterol

Less than 20 milligrams of cholesterol and 2 grams (or less) of saturated fat per serving.

low-fat

3 grams of fat or less per serving.

low sodium

140 milligrams or less of sodium per serving.

LVAD

See left ventricular assist device.

lycopene

An antioxidant that gives certain foods a red color. Research shows that a diet high in lycopene increases the level of lycopene in body fat and may reduce the risk for a heart attack. See page 123.

M**maze procedure**

Surgery that treats atrial fibrillation by creating therapeutic scars on the heart muscle. See page 93.

metabolic syndrome (*syndrome x*)

A complex of health factors that are linked with heart disease risk. These factors are obesity, high blood pressure, low HDL cholesterol, high triglyceride levels, high blood glucose, and a large waist: more than 40 inches around for men, or 35 inches around for women. See page 59.

MI

See heart attack.

mitral valve

The heart valve that controls blood flow between the left atrium and the left ventricle. See page 39.

monounsaturated fat

A type of unsaturated fat that may lower total cholesterol while keeping HDL cholesterol high. Avocados, olive oil, peanut oil, and canola oil are high in monounsaturated fat.

myocardial

Of or related to the heart muscle.

myocardial infarction (MI)

See heart attack.

myocardium

The middle layer of the heart wall, consisting of heart muscle. The myocardium serves as a pump to move blood through the blood vessels. See page 38.

N**nicotine**

A chemical in cigarettes that increases blood pressure and heart rate, causes blood vessels to tighten, and causes addiction.

nitrates (*nitroglycerin*)

Medication used to prevent, reduce, or relieve angina. Nitrates work by relaxing the muscular walls of arteries and veins and reducing the blood pressure that the heart must pump against. See page 103.

no added salt

No salt is added during processing. This does not guarantee the food product is sodium-free.

nuclear imaging

A general term for imaging tests that use special cameras and small amounts of radioactive materials (radionuclides) injected into the body. The radionuclides are used to create pictures that help in diagnosing heart problems. See page 75.

nuclear scan

An image that shows the location of radionuclide tracers injected into the body. See page 75.

O**obesity**

A condition usually defined as being 20% over ideal body weight, due to excess body fat.

occlusion

A blockage in the flow of blood through an artery, usually caused by atherosclerosis.

off-pump

Without the use of a heart-lung bypass machine. Open heart surgeries performed on beating (not stopped) hearts are called “off-pump” surgeries. They don't require the use of a heart-lung bypass machine. See page 89.

omega-3 fatty acid (*omega-3 fat*)

A type of polyunsaturated fat that has been shown to help lower triglycerides and reduce inflammation. Omega-3 fatty acids are found in fish and some plant sources. See page 130.

orthopnea

Difficulty breathing when lying flat. Sitting up or being propped up on several pillows can relieve orthopnea.

oxygen saturation monitor

See pulse oximeter.

oxygenated

Rich with oxygen. Blood is oxygenated by the lungs and carried to all parts of your body via arteries. In medical illustrations, oxygenated blood is usually colored red.

oxygen-depleted

Poor in oxygen. Oxygen-depleted blood returns to your heart via veins. In medical illustrations, oxygen-depleted blood is usually colored blue.

P**pacemaker**

An electronic device implanted in the body to regulate the heartbeat. It is usually used to treat abnormally slow heart rates (bradycardia). See page 84.

pacing wires

Wires that connect your heart to a machine that can pace your heart if it's too slow. Pacing wires are often used temporarily after open heart surgery.

PAD

See peripheral artery disease.

palpitations

A feeling that the heart is fluttering or pounding against the chest caused by an irregular, strong, or rapid heartbeat.

patent foramen ovale (PFO)

A birth defect in which an opening between the left and right atria of the heart fails to close naturally soon after birth. See page 45.

PCI

See percutaneous coronary intervention.

perceived exertion (PE)

A measure of exercise intensity commonly used by cardiac rehabilitation programs. Usually you'll use a scale of 1 to 10 or 6 to 20 to rate how hard you feel you're working. See page 111.

percutaneous coronary intervention (PCI)

A general term for treatment procedures performed during cardiac catheterization.

percutaneous transluminal balloon valvuloplasty (PTBV)

See valvuloplasty.

percutaneous transluminal coronary angioplasty (PTCA)

See angioplasty.

percutaneous ventricular assist device (PVAD)

A small mechanical pump that provides short-term support for the heart from a few hours up to 15 days. See page 92.

perfusion

In heart care, this term means the flow of blood to the heart muscle.

pericarditis

An inflammation of the pericardium, the fibrous sac that encloses the heart. Pericarditis may cause pain similar to that of a heart attack.

pericardium

The fibrous sac that encloses the heart.

peripheral artery disease (PAD)
(Often called *peripheral vascular disease [PVD]*)

Narrowing or blockage of the arteries of the arms and legs, usually due to atherosclerosis. See page 46.

PET (*positron emission tomography*)

A type of nuclear imaging. See page 75.

PFO

See patent foramen ovale.

phlebitis

Inflammation of a vein or veins, occurring most often in the legs.

phytonutrient

A plant nutrient.

plaque

Fatty deposits that form on the inner lining of the arteries. Plaque is a sign of atherosclerosis. See page 41.

platelet inhibitors (*antiplatelets*)

Medications that help prevent the formation of blood clots. See page 101.

platelets (thrombocytes)

The smallest of the blood cells, responsible for blood clotting.

pleural effusion

The buildup of excess fluid between the pleura, the membrane layers that line the lungs and chest cavity.

polyunsaturated fat

A type of unsaturated fat from vegetable oils such as safflower, corn, and soybean oil, and from fish such as salmon and tuna. Unsaturated fats should be used in place of saturated fats to prevent fatty deposits in the blood vessels. See page 130.

potassium (K+)

A mineral necessary for many functions, including proper function of muscles, especially the heart. Fruits, vegetables, and dairy foods contain large amounts of potassium. See pages 104, 135.

pre-hypertension

Blood pressure above the normal range, but not yet considered "high." Defined by the National Institutes of Health as systolic blood pressure (top number) between 120 and 139 and/or diastolic blood pressure (bottom number) between 80 and 89. See page 53.

prolapse

A condition in which the mitral valve leaflets (flaps) protrude backward into the left atrium when the heart contracts. This causes some blood to flow backwards in the heart. See page 43.

PT (*prothrombin time*)

The time it takes for blood to clot, or a test that measures this time. See page 64.

PTBV

Percutaneous transluminal balloon valvuloplasty. See valvuloplasty.

PTCA

Percutaneous transluminal coronary angioplasty. See angioplasty.

PT/INR

A blood test that measures the time it takes for blood to clot (prothrombin time) and expresses it in terms of an INR value. See page 64.

PTT (*partial thromboplastin time*)

The time it takes for blood to clot, or a test to measure this time.

pulmonary

Related to the lungs.

pulmonary artery

The large blood vessel that leaves the heart's right atrium and delivers oxygen-poor blood to the lungs. See page 38.

pulmonary embolism

A blocking of the pulmonary artery or one of its branches by a blood clot (embolism).

pulmonary function testing (PFT)

A general term for tests that assess how well your lungs are working. See page 66.

pulmonary (*pulmonic*) valve

The heart valve that regulates blood flow from the right ventricle through the pulmonary artery. See page 39.

pulmonary valve translocation

See Ross procedure.

pulmonary veins

Large blood vessels that deliver oxygen-rich blood from the lungs to the heart's left atrium. See page 38.

pulse

The expansion and contraction of a blood vessel, especially an artery, that corresponds to the beating of the heart.

pulse oximeter

(*oxygen saturation monitor*)

A monitoring device that shows the amount of oxygen in your tissues. See page 66.

PVAD

See percutaneous ventricular assist device.

PVD

Peripheral vascular disease. See peripheral artery disease.

Peripheral vascular studies

Ultrasound studies of arteries and veins, used to search for plaque or narrowing and assess the amount of blockage. See page 65.

R

radial artery

An artery in the arm. The pulse in the radial artery can be felt on the inner side of the wrist, on the thumb side. See page 112.

radionuclide (radioisotope)

Radioactive material injected into a vein to allow the heart or lungs to be seen on a scanner and interpreted by a radiologist. See page 75.

reduced sodium

25% less sodium than the original version of the product.

registered dietitian (RD)

A healthcare provider specially certified to teach you about nutrition and help you choose foods. See page 121.

regurgitation

Blood leaking in the wrong direction inside the heart, because a valve doesn't close properly. Mitral valve prolapse is a common cause of regurgitation. See page 43.

restenosis

Re-narrowing of an artery, especially an artery that has been widened with an angioplasty or other procedure.

resting EKG

An electrocardiogram (EKG) performed while your heart is at rest. See page 68.

risk factor

A condition or behavior that increases the likelihood of a disease or injury. In the Heart Care Handbook, "risk factor" means cardiac risk factor, and refers to any condition that damages your coronary arteries and promotes CAD. See page 51.

Ross procedure

(*pulmonary valve translocation*)

A surgery that replaces a damaged aortic valve with the patient's own pulmonary valve, and replaces the pulmonary valve with a donor valve. See page 91.

rotational atherectomy

(*rotablation*)

A type of coronary atherectomy that uses an abrasive burr to grind arterial plaque into small particles. See page 83.

S

SA node

See sinoatrial node.

SAEKG

See signal-averaged electrocardiogram.

saphenous vein

A large vein running along the inside of the thigh and calf. Part of this vein is often removed and used to bypass a blocked vessel in coronary artery bypass surgery.

saturated fat

A type of fat that is found mostly in animal-based foods, such as meat and dairy, and in some oils, including coconut oil, palm oil, and palm kernel oil. Saturated fats can raise blood cholesterol. See page 131.

septal ablation

A treatment procedure used when the septum (wall) that divides the lower chambers of the heart becomes abnormally thick. Alcohol is injected into the arteries that feed the septum, which makes the septum thinner. See page 84.

septum

A muscular wall dividing the right and left sides of the heart.

shortness of breath

Difficulty breathing, trouble getting a full breath.

signal-averaged electrocardiogram (SAEKG)

A specialized electrocardiogram (EKG) that uses a computer to strengthen and filter certain electrical signals. An SAEKG can help assess whether you're at risk for developing dangerous heart rhythms. See page 69.

sinoatrial node

(*SA node or sinus node*)

A region in the right atrium where the rhythm of the heart is established. The sinoatrial node is often called the heart's pacemaker. See page 38.

sleep apnea

A disorder marked by interrupted breathing during sleep. People with sleep apnea continually wake up during the night to catch their breath. See page 59.

sodium (salt)

A mineral that helps regulate body fluids. Excess sodium causes you to retain more fluid in your body. In turn, this increases the heart's workload and raises blood pressure. See page 135.

sodium (very low)

35 milligrams or less of sodium per serving.

sodium-free

Less than 5 milligrams of sodium per serving.

soluble fiber

A type of dietary fiber proven to reduce blood cholesterol. Fruits and vegetables are rich in soluble fiber. See page 125.

SPECT (*single photon emission computed tomography*)

A type of nuclear imaging. See page 75.

sphygmomanometer

A tool used to check blood pressure. See page 53.

spirometry

A lung function test that measures how much air you can breathe out, and how fast. See page 66.

stanol

A plant substance found in some foods. Stanol can help lower blood cholesterol. See page 131.

stenosis

Narrowing of a blood vessel, heart valve, or other bodily passage. With a heart valve stenosis, thickened valve tissue narrows the valve opening and limits the amount of blood that can pass through. See page 43.

stent

A tiny metal coil or tube that supports a blood vessel. A stent may be used to hold an artery open until you can have surgery, hold it open during surgery, or remain inside an artery to hold it open permanently. See page 82.

sternum

The breastbone. Open heart surgery requires an incision through your sternum. See page 89.

sterol

A plant substance found in some foods. Sterols can help lower blood cholesterol. See page 131.

stethoscope

An instrument used to hear sounds of the heart.

stress

A physical and emotional response to anything perceived as overwhelming. Managing stress may reduce your risk for heart disease. See page 151.

stress test

A technique that involves stressing the heart and monitoring the heart's reaction. A stress test helps to assess the heart's capacity for work. The test can use exercise, medication, or both to induce stress, and can use electrocardiography, echocardiography, and/or nuclear imaging to monitor and assess the heart. See page 72.

stroke (*brain attack*)

Brain damage due to lack of oxygen to the brain. A stroke may happen when the arteries to the brain are blocked by plaque or a blood clot, or when the arteries rupture (burst). See page 47.

syndrome X

See metabolic syndrome.

systolic

The greater of the two numbers in a blood pressure reading. In a blood pressure written as a fraction, this is the number on top. The systolic reading shows the pressure in the arteries when the heart is contracting. See page 53.

T**tachycardia**

A rapid heartbeat, usually defined as over 100 beats per minute.

talk/sing test

A simple way to gauge your exercise intensity. You should be able to talk but not sing while you're exercising. See page 111.

target heart rate (THR) range

A range of heart rates you should aim for while exercising. See page 112.

target weight

Your optimal weight, and/or your weight when you're not retaining fluid. Your healthcare provider will help you decide on an appropriate target weight.

TAVR

See transcatheter aortic valve replacement.

TCD

See transcranial Doppler ultrasound.

T.E.D. hose (*anti-embolism support stockings or compression hose*)

Tight stockings worn to help prevent blood clots in the legs. See page 17.

TEE

See transesophageal echocardiogram.

telemetry

A method of transmitting EKG impulses by radio signals to a remote monitor. See pages 69, 71.

TIA

See transient ischemic attack.

thrombolytic therapy

Giving thrombolytic medications ("clot busters") to dissolve blood clots and restore blood flow through the coronary arteries. This therapy is an important early treatment for heart attack.

thrombolytics (*"clot busters"*)

Medication commonly used as part of early treatment for a heart attack. These drugs can break up or dissolve blood clots.

thrombophlebitis

A condition in which the walls of veins become inflamed. This condition occurs primarily in the legs. It often causes clots to develop, due to decreased circulation.

thrombus

A blood clot within a blood vessel (an artery or a vein). If a portion of the clot breaks off and travels in the blood vessels, it is called an embolism. Embolisms can lodge in various body organs and create a range of problems, depending on the organ.

trachea

The windpipe.

tracings

A common term for the recordings produced by EKG tests. See page 68.

trans fat

A type of fat that has been shown to raise levels of LDL cholesterol and total cholesterol in the blood. Hydrogenated and partially hydrogenated oils contain trans fat. See page 131.

transcatheter aortic valve replacement (TAVR)

A catheterization procedure used to replace a diseased aortic valve. It involves using a catheter to deliver a replacement valve.

transcranial Doppler ultrasound (TCD)

An ultrasound study that examines the blood flow within the brain.

transducer

An instrument used in ultrasound imaging. See page 73.

transesophageal echocardiogram (TEE)

A type of echocardiogram in which a small ultrasound transducer is guided into your esophagus until it rests directly behind your heart. A TEE transducer can obtain high-quality images of your heart from all sides. See page 74.

transient ischemic attack (TIA)

A stroke-like attack that lasts for a few minutes to an hour. A TIA can cause symptoms such as confusion, weakness, numbness, vision loss, difficulty speaking clearly, or trouble controlling movement. See page 48.

tricuspid valve

The heart valve that regulates blood flow from the right atrium to the right ventricle. See page 39.

triglycerides

Fatty substances in the blood. High levels of triglycerides show risk of coronary artery disease. See page 54.

troponin

A chemical released by damaged heart muscle cells. Troponin is one example of a cardiac marker. See page 64.

U**ultrasound**

High-frequency sound waves. See echocardiography.

unsalted

No salt is added during processing. This does not guarantee the food product is sodium-free.

unsaturated fat

A type of fat that is liquid at room temperature, and comes mostly from plant sources. This type of fat is healthier for your heart than saturated fat, and includes monounsaturated and polyunsaturated fats. See page 130.

uptake test

A type of nuclear imaging that helps assess blood flow to the heart. See page 75.

V**valvular heart disease**

A condition in which the heart valves don't open and/or close properly. Types include heart valve insufficiency, prolapse, and stenosis. See page 43.

valvuloplasty (*percutaneous transluminal balloon valvuloplasty [PTBV]*)

A catheterization procedure used to treat heart valve stenosis. It involves inflating a balloon-tipped catheter inside a narrowed valve to increase the valve's mobility. This can increase the blood volume pumped out with each heartbeat. See page 83.

vascular

Related to the blood vessels.

vasodilator

Medication that causes blood vessels to dilate (expand).

veins

Blood vessels that carry blood from various parts of the body back to the heart. See page 37.

vena cava

The major vein that returns blood from the body to the heart's right atrium. See page 38.

ventilator

A breathing machine.

ventricle

One of the two lower chambers of the heart that perform most of the heart's pumping action. The right ventricle pumps blood into the lungs to receive oxygen. The left ventricle pumps oxygen-rich blood through the aorta to all parts of the body. See page 38.

ventricular fibrillation

Rapid, uncoordinated, and ineffective heartbeats. This condition can be fatal if it's not reversed.

ventricular septal defect (VSD)

A hole in the heart wall between the two lower chambers (the ventricles). See page 45.

ventriculogram

A cardiac catheterization procedure in which contrast is injected into the left ventricle to assess blood flow into and out of the ventricles. See page 78.

very-low-density lipoproteins (VLDLs)

Substances that carry fat from the liver to other parts of the body. After VLDLs unload fatty substances called triglycerides, they then turn into low-density lipoproteins (LDL, or "bad cholesterol"). See page 54.

very low sodium

35 milligrams or less of sodium per serving.

vital signs

Key measures of your health: your temperature, respiration, heart rate (pulse), and blood pressure.

VLDLs

See very-low-density lipoproteins.

VSD

See ventricular septal defect.

W**waist-hip ratio**

Ratio of waist to hip circumference. A high ratio can mean higher risk for heart disease and diabetes. See page 58.

water pills

See diuretics.

HEART ZONES — Action Plan

The zones in your Action Plan tell you how to manage heart disease symptoms.

Note: If you have heart failure, use the Heart Failure Action Plan in Intermountain's Living with Heart Failure booklet.

How you feel — your symptoms	What to do — Action Plan
------------------------------	--------------------------

I'M DOING FINE

- "Feeling fine"
- No shortness of breath
- No chest pain
- No palpitations
- No swelling



Keep up the good work!

Continue to follow your treatment plan.

I FEEL WORSE

(May have one or more of the symptoms below)

- "Not feeling well"
- Chest pain relieved with rest and/or nitroglycerin. See "If Chest Pain Strikes" on the next page.
- Fever
- Bleeding from groin
- Swelling in the hands or feet
- Racing or irregular heart beat
- Shortness of breath (trouble breathing) if it has started recently or is getting worse
- Shortness of breath that awakens you at night or happens when you're trying to lay down flat
- Dizziness, lightheadedness, or weakness
- Nausea, vomiting, or diarrhea
- Depression that lasts more than 2 weeks
- Weight gain, if you have heart failure: 2 lbs. overnight or 5 lbs. over target weight of _____
- Increased coughing
- Recent onset of vision problems
- Excessive or cold sweating
- Palpitations with heart rate less than 50 or greater than 120
- Other: _____



Call your healthcare provider.

Provider's instructions:

I FEEL I'M IN DANGER

(May have one or more of the symptoms below)

- Chest pain that isn't relieved by rest or nitroglycerin, especially if it comes with nausea, shortness of breath, weakness, and/or dizziness. See "If Chest Pain Strikes" on the next page.
- Extreme swelling in the hands, feet, or legs
- Shortness of breath (trouble breathing) that doesn't get better or suddenly gets worse
- Very slow or very fast resting heart rate (less than 40 or more than 130 beats per minute), unless your providers tell you otherwise
- Sudden numbness or weakness in arms or legs
- Sudden, severe headache
- Other: _____
- Sudden or severe chest pain



Get emergency care: Call 911.

(Do NOT go to the emergency room in a private car. You might need emergency care on the way to the hospital. Ambulance staff can provide this care.)

If Chest Pain Strikes



If you experience a smothering feeling or angina-like chest pain, including discomfort, pressure, or pain in the chest, back, neck, shoulders, jaw, or arms, follow these instructions:

- 1 Stop what you're doing, and sit or lie down.**
- 2 If you've been prescribed nitroglycerin, see if the pain can be relieved with nitroglycerin:**
 - Take one nitroglycerin pill and wait 5 minutes.
 - If the pain is not relieved, take another nitroglycerin pill and wait 5 more minutes.
 - If the pain is still not relieved, take a third nitroglycerin pill, and wait 5 minutes.
- 3 If your pain is still not relieved, call 911.** Wait for the ambulance. Do NOT go to the hospital in a private car. You might need emergency care on the way to the hospital. Ambulance staff can provide this care.



BE PREPARED

When you call your provider or seek emergency care, it helps to provide the following information:

Symptom

Where is your pain? How severe is it? How long have you had it? What do you think might have triggered it? Is it recurrent? What relieves it?

Treatments

What type of treatments have you received? When did you receive them? Did you experience any complications?

Chronic health problems

Do you have any chronic health issues, such as diabetes, arthritis, high blood pressure, asthma, etc.?

Allergies

Do you have any allergies?

Medications

What medications are you currently taking? Have there been any recent changes to your medications? Have you forgotten to take any of your medications?

NOTES

To find this booklet and other patient education, go to:
intermountainhealthcare.org/heart



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