

Understanding the Results of Your CT Coronary Artery Calcium Score



Allina Health

Introduction

Congratulations! You have completed a CT scan of your heart, one of the best ways to determine your future risk for coronary artery disease.

This booklet provides information about:

- how your heart works
- your heart disease and risk factors
- how to interpret a CT coronary artery calcium score
- your treatment options to reduce your risk for coronary artery disease.

Call HeartScan Minnesota® at 612-863-3500 or 1-877-800-2728 if you have any questions.

Please use this book as a guide only. It does not replace medical or professional advice. If you have specific questions or concerns, talk with your health care provider.

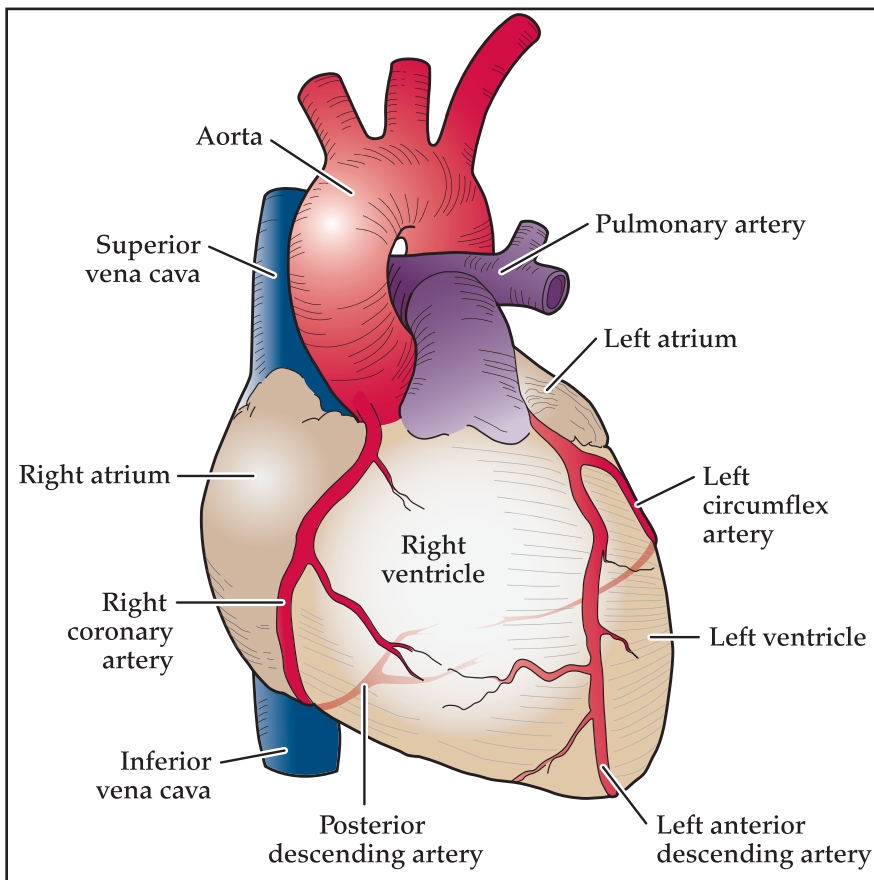
If you need to find a doctor, call Allina Health Physician Referral at 612-262-3333 and choose option No. 1.

To learn how to make an appointment with a cardiovascular specialist at an Allina Health Minneapolis Heart Institute location, call 612-863-3900 or 1-800-582-5175.

Billing Information

The cost of this scan is \$100 to be paid at the time of your exam. You will receive a receipt. Typically, this cost is reimbursable through a flexible health spending account or a health savings account. Your insurance will not be billed.

About Your Heart



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The drawing shows the parts of the heart, including the arteries.

Your heart is a muscle that pumps oxygen-rich blood to your body and brings oxygen-poor blood back to your heart and lungs.

Your blood travels through several miles of blood vessels. The cells in your body need the oxygen to survive.

Blood is supplied to your heart by two large blood vessels and their branches, called coronary arteries. These arteries are on the outside of your heart muscle.

Your right coronary artery supplies the bottom and back of your heart. Your left coronary artery divides into two large blood vessels. These supply blood to the back, left side and front of your heart.

Each side of your heart has two chambers: an upper chamber (called an atrium) and a lower chamber (called a ventricle).

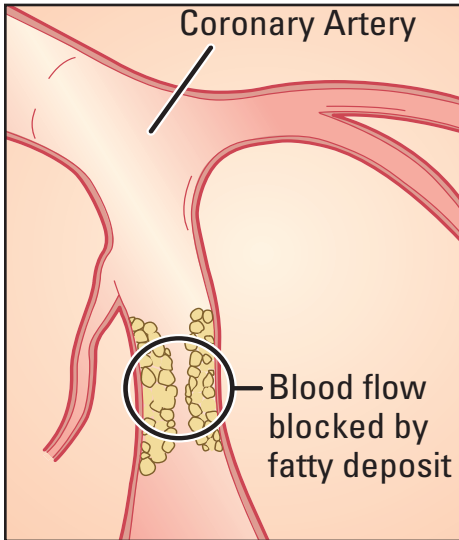
Between each chamber are valves that keep your blood moving in the correct direction.

The right side of your heart receives the oxygen-poor blood and pumps it to your lungs for a new supply of oxygen. The left side of your heart receives the oxygen-rich blood from your lungs and pumps it throughout your body.

Your heart also has an electrical system, which powers your heart's pumping system. A group of special cells sends an electrical impulse through your heart muscle causing it to contract, or beat, about 60 to 100 times per minute.

What the CT Scan Shows

The CT scanner uses an ultra-fast X-ray and detector system to take 40 to 50 cross-sectional pictures of your chest. From these pictures, the scanner can build a 3-D image of your heart in only one-tenth of a second!



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Plaque (fatty deposits) harden (calcify). The CT scan shows these areas. Your score is a predictor for future heart disease.

The purpose of this CT scan is to determine a coronary artery calcium score. This score is determined by the number, size and density (thickness) of the calcified plaque in the coronary arteries that supply blood to your heart.

Plaques are fatty deposits filled with cholesterol and inflammatory material that can form over time in your coronary arteries. As plaques develop, they harden (calcify).

The hardening of plaque is not necessarily a bad thing, it's the cholesterol and inflammatory part of the plaque that usually causes heart attacks. The CT scanner "sees" these calcifications and measures the total amount of plaque without the need for a procedure.

The more calcified plaque in your arteries, the greater your risk for future heart disease.

This CT scan does not test for blockages. It only assesses your future risk for heart disease.

Your CT Report

A cardiovascular imaging specialist will read and analyze your scan.

Your report will include the following information:

- your coronary artery calcium score, which is a marker of the total amount of calcified plaque in your arteries, which indicates your future risk for heart disease
- a percentile based on your calcium score based on your age, sex and race/ethnicity
- specific recommendations about your treatment options based on your coronary artery calcium score.

Tip

- The CT scan shows only calcified plaque in your arteries.
- It does not find other forms of heart disease such as heart failure or valve disease.
- Talk with your health care provider if you are having symptoms such as chest pain, shortness of breath or ankle swelling.

What your score means

Coronary artery calcium scores vary widely in men* and women, ranging from scores of zero to in the thousands.

An ideal calcium score is zero. Even if your score is higher than zero, there are treatment options that can help reduce your future risk for heart disease.

Share your scan results with your health care provider

You should share your CT results with your health care provider. Together, you can talk about your personal risks and how to best lower your risk for heart disease.

How to Read the Score

***In this booklet:**

Men refers to males at birth.

Women refers to females at birth.

Your CT scan will provide you with a coronary artery score. **For a general meaning of your score, please see the chart on the next page.**

Score	What it means	Treatment
Zero	Ideal result: This score shows a low short-term risk for heart disease.	<ul style="list-style-type: none"> ■ Continue your heart-healthy lifestyle. You typically do not need to take preventive medicines. □ Talk with your health care provider about treatment options if you have high cholesterol or diabetes, or if you use tobacco.
1 to 99	Mild plaque build-up: This indicates a small amount of plaque in your coronary arteries.	<ul style="list-style-type: none"> ■ While this result is generally linked with low risk for heart disease, any amount of plaque does carry some risk. □ Talk with your health care provider about if you should start medicine to lower your lipids. This can slow and even reverse plaque development.
100 to 400	Moderate plaque build-up: This indicates a moderate amount of plaque in your coronary arteries.	<ul style="list-style-type: none"> □ Talk with your health care provider about starting medicine to lower your lipids to reduce their risk for future heart disease. ■ Medicine to lower your lipids can help even if your lipid levels are normal.
More than 400	Significant plaque build-up: This indicates severe coronary atherosclerosis (hardening of your arteries).	<ul style="list-style-type: none"> □ Talk with your health care provider about: <ul style="list-style-type: none"> — lowering your cholesterol <ul style="list-style-type: none"> • your LDL (“bad cholesterol”) should be less than 70 mg/dL — managing your blood pressure — managing diabetes (if you have it) — consider taking an aspirin each day.

Heart Disease and Your Risks

Coronary artery disease is leading cause of death in the U.S. By looking at your personal risk factors, you and your health care provider can figure out how to lower your risk for heart disease.

There are two types of risk factors: those you cannot control and those you can control.

Risk factors you cannot control

■ Age

The risk of coronary artery disease increases with your age. About 4 out of 5 people who die of coronary artery disease are 65 years or older.

As you get older, more plaque can form in your arteries. The more plaque you have, the higher the risk the plaque will break apart and cause a clot to form. This may cause a heart attack or reduce blood flow to your heart.

■ Sex*

Men have a greater risk of heart disease earlier in life than women. However, after menopause, a woman's risk of heart disease gradually increases to equal a man's risk.

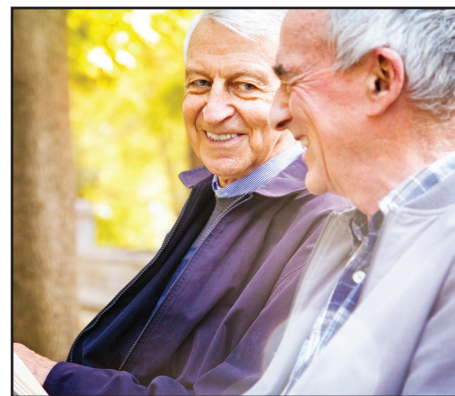
While women are less likely to build up plaque over time, women with scores higher than zero have been shown to be at higher risk than men with similar scores.

■ Family history

You have a family history of early (premature) coronary artery disease if these family members had a heart attack, stroke, bypass surgery, or stents at age:

- 65 or younger:
father, brother or son
- 55 or younger:
mother, sister or daughter.

Knowing your family history is important but your score is a better predictor of your risks. Talk with your health care provider about what you can do to reduce your risks.



***In this booklet:**

Men refers to males at birth.

Women refers to females at birth.

Risk factors you can control

■ Tobacco use

Smoking damages your blood vessel walls, speeds up formation of plaque, raises your blood pressure, causes your blood to clot faster and makes your heart work harder.

All forms of tobacco make the effects of high cholesterol and high blood pressure worse. People who smoke have a much higher risk for heart disease than people who do not smoke.

By quitting tobacco use, circulation to your hands and feet improve within 2 weeks. Within 1 year you can reduce your risk of heart disease by half. Talk with your health care provider if you need help quitting tobacco.

■ High cholesterol

Your risk for heart disease increases as your cholesterol level increases. Cholesterol is a fat-like substance which is mostly made by your liver.

A standard lipid panel includes 4 parts:

- **total cholesterol:**

This is the total amount of cholesterol in your blood.

- **LDL (low density lipoprotein) cholesterol:**

This is known as the “bad” cholesterol because higher levels can lead to increased plaque development. A lower LDL level means your risk for heart disease is lower.

- **HDL (high density lipoprotein) cholesterol:**

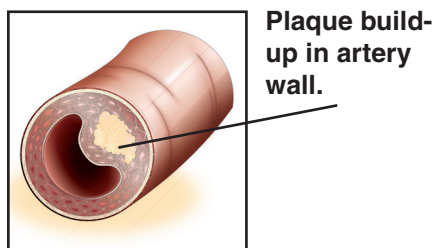
This is known as the “good” cholesterol because HDL carries cholesterol away from your blood vessels and to your liver where it is broken down. A higher HDL level means your risk for heart disease is lower.

- **triglycerides:**

This is how your body moves (transports) fat in your blood. Some types of triglycerides can cause plaque.

A heart-healthy diet and regular exercise can raise your HDL level and lower your LDL level and triglycerides. (See pages 14 to 18 to learn more.)

Several medicines have been shown to reduce LDL cholesterol and subsequently reduce the risk of heart attack and stroke. If your coronary artery calcium score is higher than 100, you should consider taking a medicine to lower your LDL level. Even small reductions in LDL have been shown to reduce a heart event risk. Ideal levels for LDL are less than 70mg/dL.



Tip

Many concerns have been raised about the safety of statins. Large, long-term statin trials have shown the medicine has an excellent safety profile with very low risk of long-term side effects.

The most common type of cholesterol medicine is a statin that can lower LDL. These medicines can decrease plaque growth over time and may even help reverse some existing plaque.

There are many non-statin medicines that can also lower your LDL level and heart disease risk.

Talk with your health care provider about the results of your calcium score. Together, you both can decide if medicine to lower your lipid level is right for you.

■ High blood pressure

High blood pressure is also known as hypertension. It puts stress on your blood vessel walls, possibly leading to heart attack, heart failure, stroke or kidney failure.

High blood pressure causes your heart muscle to become thicker (known as left ventricular hypertrophy) because your heart has to work harder. There are usually no signs or symptoms of high blood pressure.

Your blood pressure is checked with two numbers. The top number (systolic) shows the pressure in your arteries when your heart beats. The bottom number (diastolic) shows the pressure in your arteries when your heart rests.

You have high blood pressure if you usually have a top number of 130 or higher or a bottom number of 80 or higher.

Your blood pressure increases with age. If you are an African-American, you are at a greater risk for high blood pressure.

To control high blood pressure:

- If you are overweight, lose weight.
- Eat a plant-based diet that is reduced in sodium (salt).
- Drink no more than two alcoholic drinks each day.
- Be physically active.
- Take any blood pressure medicines as prescribed.

■ Diabetes

Diabetes is a major risk factor for heart and heart valve disease. This is true for both Type 1 and Type 2 diabetes. Heart disease causes nearly two-thirds (about 7 out of 10) of all deaths related to diabetes.

If you have diabetes, it is important to manage your blood glucose with food, exercise, stress control, and medicines. Talk with your health care provider about how to manage diabetes.





■ Obesity

Carrying extra weight strains your circulatory system. Extra weight also makes you more likely to have high cholesterol, high blood pressure and diabetes. It is estimated that for every extra pound of weight, your heart has to pump blood through an extra mile's worth of blood vessels.

Losing weight leads to better glucose tolerance, lower blood pressure, reduced LDL cholesterol and improved triglyceride levels.

■ Physical inactivity

Being physically inactive doubles your risk for heart disease. Even 20 to 30 minutes of moderate activity three to four times a week can reduce your risk. The type of activity you do is less important than how often and how long you do it.

Physical activity (such as walking, swimming or light jogging) lowers your triglycerides, raises your HDL levels, lowers blood pressure and gives you more energy.



■ Stress

Stress is your body's fight-or-flight response. Stress can be found in many places: home, work, school, family or traffic. Time demands and pressures will take a toll on you physically and emotionally.

How you react to stress can create health problems or make an existing problem worse. When you are under stress, you must take good care of yourself.

- Eat a well-balanced diet of whole foods. Limit the amount of highly processed, packaged foods you eat
- Do not use tobacco.
- Get plenty of rest.
- Exercise 3 to 5 times each week to release stored-up stress.
- Focus your attention on something relaxing.
- Ask for help if you can't handle your work or home duties.
- Don't worry about things you can't change.
- Write down what causes you stress.
- Avoid as much stress as possible.
- Schedule things you enjoy.
- Take a break. Sit back and take a few deep breaths.
- Have a positive attitude.
- Learn relaxation exercises.



Nutrition: Heart Health for Life

Eating is one of life's necessities — and certainly one of its pleasures. A healthy diet is a foundation to prevent and treat cardiovascular disease.

A varied diet of whole foods of mostly vegetables and fruits, whole grains, lean protein, non- and low-fat dairy, and healthy fats promotes good health.

Instead of a list of foods to eat and not to eat, a varied diet is a wide range of food choices and eating patterns.

The following guidelines will help you make heart-smart choices about your food.

Food portions: choosing right for weight control

Maintaining a healthy weight is one of the best ways to reduce your risk of heart disease. Extra weight is linked with heart risk factors of high blood cholesterol, high blood pressure and diabetes.

To reach or maintain a healthy weight is as much about what you eat as it is how much you eat.

Your portion of food is the amount you choose to eat. If your portions are too large, you may be super sizing your meals and yourself. Portion sizes have increased over the years and contribute to increasing overweight and obese adults and children.

The Nutrition Facts label on packaged foods tells you how many calories and the serving size of the food or beverage in that package.

Keeping your food portion in check with the serving size can help you reach or maintain a healthy weight.

To keep your portions under control:

- Read labels. Look at the serving size.
- Measure the serving size.
- Place the amount of food that you plan to eat in a bowl instead of snacking out of a bag or box.
- Slow down while eating and savor your food.
- Share restaurant meals or get a to-go box at the beginning of the meal and place part of the meal in the box.



Did You Know?

Most people don't eat enough vegetables and fruits. Studies show that just 1 out of 10 adults meets federal guidelines of about 5 servings of vegetables and fruits each day.

Eat more vegetables and fruits

Eating enough vegetables and fruits (known as produce) are strongly linked to good health and especially the health of the heart and blood vessels.

Fruits and vegetables are major contributors of a number of nutrients such as potassium, magnesium, fiber and antioxidants.

Think about the amount of produce you can hold in one cupped hand — that's about one-half cup (or 1 serving). And aim for variety! Produce should take up most the space when filling your plate, roughly half. Fill the other half with whole grains and lean protein such as fish, poultry, legumes or lean red meat.

Fresh, frozen and canned vegetables and fruit all count toward your daily goal. They are a convenient, tasty and nutritious way to boost your produce — and at a good value. Check labels and avoid products with extra sodium (salt) or added sugar.

To add vegetable and fruits:

- Dress your sandwich with greens, tomato, onion or avocado.
- Choose vegetables instead of a processed meat to top the pizza.
- Consider sharing a Community Supported Agriculture (CSA) with a friend to bring farm-fresh goodies into your kitchen every week!
- Keep fruit and vegetable where you can see them and pop them in your mouth.
- Top oatmeal or yogurt with berries, banana or chopped apple.

Limit unhealthy fats

Eating extra saturated fats can raise the level of LDL (low density lipoprotein) cholesterol. LDL makes up most of your body's cholesterol. High levels of LDL raise your risk for heart disease and stroke.

Saturated fats are found in:

- animal products (such as beef, pork poultry)
- full dairy products (such as whole milk, cheese, butter, sour cream)
- eggs
- tropical fats (such as coconut and palm oil).

The general recommendation for adults is to limit saturated fat to less than 10 percent of daily calories. For a 2,000-calorie diet, aim for less than 20 grams of saturated fat a day.



If you have heart disease, The American Heart Association recommends limiting saturated fat to 5 to 6 percent of total calories. For a 2,000-calorie diet, that is about 11 to 13 grams of saturated fat each day.

Eat healthier unsaturated fats

Replacing saturated fat with healthier unsaturated fat can help protect your heart.

Check food labels to determine the saturated fat value per serving.

When choosing fats, select healthier unsaturated fats:

- oils (such as olive, canola oil, sunflower, safflower, and vegetable oils)
- nuts and seeds (such as walnuts, almonds, hazelnuts, pumpkin, and flax seed)
- avocados
- seafood (such as salmon, trout, herring, tuna and mackerel).

All fats are high calorie, so eat them in moderation.



Limit sodium (salt)

Sodium is a mineral in salt. Most of the sodium you eat comes from commercially-prepared foods and restaurant meals. Foods that don't taste salty can contain a lot of sodium from added sodium compounds.

Eating too much sodium can raise your risk of high blood pressure, heart attack and stroke.

Aim for 2,300 milligrams (mg) or less of sodium each day or about 600 to 700 mg each meal. If you have heart disease, follow your health care provider's directions for how much sodium you should have.

To limit sodium:

- Choose more fresh foods than processed foods.
- Read food labels to determine the sodium per serving.
- Look for lower-sodium options.
- Use herbs and spices to flavor foods.



Moderation with added sugars

Added sugars include sugars that are added to foods and drinks. Examples include regular soda, sweetened coffee and tea, cookies, cake, candy, flavored yogurt, granola bars, and many breakfast cereals.

Foods with added sugars provide calories but generally, little nutritional value.

Eating an excessive amount of added sugar contributes to health problems such as weight gain, obesity, Type 2 diabetes, and heart disease.

Saturated Fat 1g	5%
Trans Fat 0g	
Cholesterol 0mg	0%
Sodium 120mg	6%
Total Carbohydrate 33g	12%
Dietary Fiber 3g	18%
Total Sugars 21g	
Includes 12g Added Sugars	24%
Protein 2g	
Calcium 130mg	10%
Iron 6mg	34%

Look for added sugars in the ingredients list. The higher up added sugars are on the list, the more added sugar is in the food or beverage. Added sugars include sucrose, dextrose, fructose, glucose, high-fructose corn syrup, honey, invert sugar, lactose, malt syrup, and molasses.

Check the Nutrition Facts label to learn how much sugar is in 1 serving of food or drink. The added sugar value is listed under the Total Sugars.

Limit daily added sugars to:

- less than 36 grams or 9 teaspoons for men*
- less than 24 grams or 6 teaspoons for women**.

Lower how much sugar you eat or drink.

- Choose drinks without added sugar (such as water, herbal tea, coffee, low-fat or fat-free milk, or 100% vegetable juice).
- Switch from sweetened yogurt to plain low-fat yogurt with added fruit.
- Eat sugary snacks and desserts less often and in smaller amounts.

Build a better diet. Set small goals and adopt healthier food choices and habits a little bit at a time. Small changes can make a big difference in your general and heart health.

To learn how to make an appointment with a registered dietitian nutritionist at an Allina Health Minneapolis Heart Institute location, call 612-863-3900.

Check with your insurance provider to learn what your policy covers and what you may need to pay out-of-pocket.

Did You Know?

One can of regular soda is about 37 grams of added sugar.

*Born male.

**Born female.

Exercise: Try for at Least 3 Times a Week



Some moderate exercise every day can reduce your risk of heart disease and other diseases. Exercise can:

- lower your heart's workload by decreasing your heart rate and blood pressure
- increase the metabolism of fats and lower your blood lipids
- improve the efficiency of your heart, muscles and blood vessels
- improve circulation, giving more oxygen to your muscles and tissues
- lift your spirits
- help you handle and recover from stress.

Talk with your health care provider before you begin any exercise program. In general, you should try to exercise 3 to 5 times each week (about 30 minutes each time).

There are two different types of exercises: aerobic and strength training.

- Aerobic exercise, such as walking, swimming and biking, is rhythmic, repetitive activity.
- Strength training, such as lifting weights or using resistance machines, helps you gain muscle strength and tone.

Before doing any exercise, you should do warm-up stretches. After doing any exercise, you should do cool-down stretches. You and your health care provider can create an exercise plan that is right for you.

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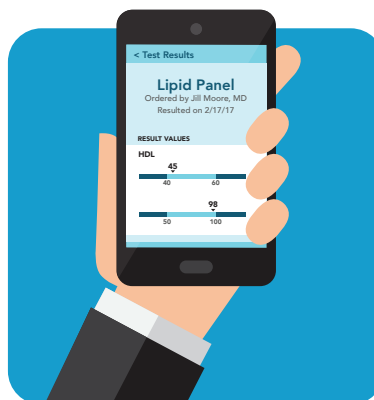
*Availability varies by location. Ask your clinic or hospital if this service is available.

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