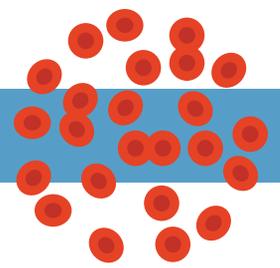


WHY CHOLESTEROL MATTERS:



Why You Should Be Tested for High Cholesterol and FH



Mended Hearts

Guiding Your Way

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Mended Hearts gratefully acknowledges the support of Amgen.



Cholesterol: What Is It?

Cholesterol is a substance your body makes naturally. It is soft and waxy, similar to fat, and is present in your body's cells and in your bloodstream. Cholesterol is necessary to your survival — it's what your body uses to make new cells. Much of the cholesterol in your body occurs naturally, but you also get a lot from the food you eat, especially animal products such as meat, cheese and butter.

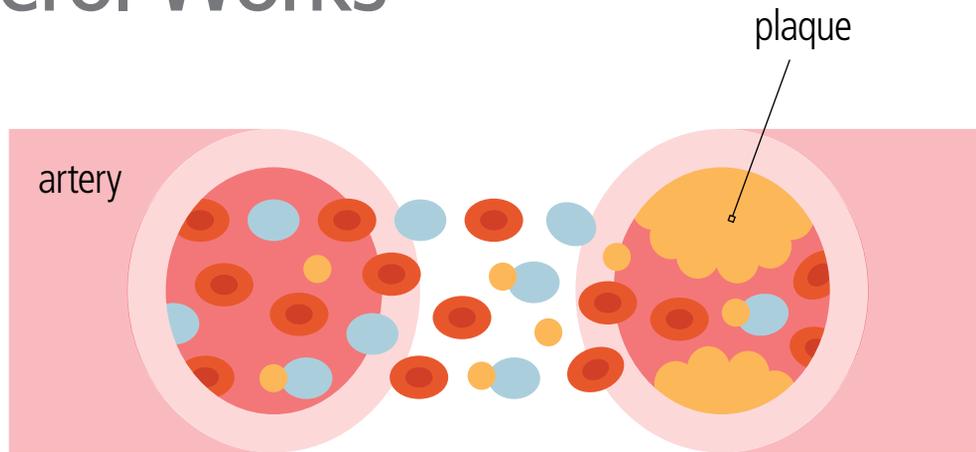
The truth is that cholesterol in itself is a good thing. The problem comes when your body has too much cholesterol. Too much of the wrong kind of cholesterol creates an increased risk of **cardiovascular disease**, such as **coronary heart disease** and **stroke** — the No. 1 and No. 4 killers in the nation. In fact, people who have high levels of cholesterol are at twice the risk for developing heart disease as those with lower levels.

So having high cholesterol is a clear health concern. The good news is that high cholesterol can be treated very effectively, lowering the risk for cardiovascular disease.



How Cholesterol Works

Cholesterol travels through the bloodstream to reach the cells. When there's too much cholesterol in the bloodstream, it can bind with other substances in the blood to form a buildup on the interior walls of the arteries that carry blood to the heart. This buildup is called **plaque**.



As plaque continues building up inside artery walls, it slowly starts to clog the artery. This condition is known as **atherosclerosis**, in which the artery walls become rough and the passageway for blood to pass through is reduced. As this process continues, the flexible artery walls become stiffer and thicker, which causes the passageways to narrow even more. In time, blood flow becomes severely constricted. This can cause serious health problems.

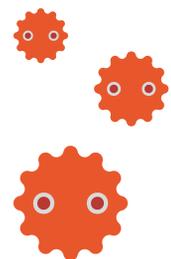
One of the problems with atherosclerosis is that special types of blood cells, called platelets, begin to stick to the surface and clump together. This can lead to a blood clot. In time, the buildup of plaque and platelets can close off the artery entirely or cause a rupture, which can release the blood clot into the bloodstream. Once there, the clot can travel to the heart, where it can cause a **heart attack**, or to the brain, where it can cause a stroke — among other serious potential health problems. Clearly, controlling cholesterol levels is very important.

Atherosclerosis video

Types of Cholesterol

There are three main types of cholesterol:

- **Low-density lipoproteins (LDL-C):** Sometimes referred to as “bad” cholesterol, LDL-C helps substances stick to the inner walls of your arteries. Keeping LDL-C at lower levels is an important part of good heart health.
- **High-density lipoproteins (HDL-C):** Not all cholesterol is bad news. Sometimes called “good” cholesterol, HDL cholesterol actually helps your arteries keep cholesterol from sticking to the artery walls and moving through the bloodstream. HDL cholesterol even helps remove cholesterol from your bloodstream. Higher levels of HDL-C are associated with good heart health.
- **Triglycerides:** A third type of cholesterol can also help clog the arteries. Triglycerides are also made by the body, but too much can be a bad thing for your health. Being overweight or obese, smoking, being physically inactive, drinking too much alcohol and eating too many carbohydrates can all increase triglyceride levels in your bloodstream. Diabetes and a family history of high triglyceride levels can also contribute to higher levels in your body.



TRIGLYCERIDE

The Fasting Lipoprotein Profile

How does your healthcare provider determine what your cholesterol level is? The most common method for determining that number is the **fasting lipoprotein profile**. The “fasting” part of the profile means that prior to the blood test, you can

have no food or drink for a period of time beforehand — usually 8 hours. This simple blood test measures total cholesterol, LDL cholesterol, HDL cholesterol and triglyceride levels to get an



Cholesterol Screening video

overall picture of the presence of cholesterol in your bloodstream. The blood test itself takes only a few minutes. Your healthcare provider will usually go over the results with you in a future office visit or over the phone.

Your healthcare provider may also order additional advanced blood tests if your fasting lipoprotein profile doesn't provide enough information about your overall cholesterol picture. These tests and results may include:

- **Apolipoprotein B (apoB):** This test measures the concentration of lipoprotein particles that have an apoB molecule on their surface. The results of an apoB test can help your healthcare provider understand your real cholesterol situation is if your LDL-C number is at your target level, but you have diabetes, insulin resistance or cardiovascular disease. This test does not require fasting beforehand.

- **Non-HDL-C:** This is a simple number arrived at by subtracting your HDL-C number from your total cholesterol number. It provides an estimate of your cholesterol levels in what are called atherogenic particles — those most likely to cause the buildup of plaque inside your artery walls. It is often recommended as a key number to use to estimate risk in patients who have triglycerides in excess of 200 mg/dL. We'll talk more about numbers later in this guide.
- **LDL-C particle number:** This newer type of test measures the concentration of LDL-C particles by using nuclear magnetic resonance spectroscopy, an advanced imaging technique that takes spectrographic images to determine molecular properties. It can provide very detailed information about the exact types of cholesterol molecules present in the bloodstream and whether they pose a risk for cardiovascular disease.



QUIZ 1

*You're making great progress!
Take a short quiz on what
you've learned so far.*

Cholesterol: The Risks

Several factors affect how high your cholesterol levels are. Your genetic background plays a big role. So do your lifestyle and any medical conditions you have that affect cholesterol levels in the bloodstream. Risk factors include:

- **Diet:** It's true, you are what you eat. If you eat foods that are high in **saturated fat** and cholesterol, it can increase the amount of LDL and total cholesterol in your bloodstream.
- **Overweight and obesity:** Carrying too much weight can also increase your risk. Being overweight or obese can raise LDL-C, total cholesterol and triglyceride levels.
- **Smoking:** Tobacco smoke is terrible for your health. Among many other problems, it can raise your triglyceride levels and lower your levels of HDL-C.

Obesity video

- **Physical activity:** Your body needs physical activity for your overall health. People who don't get enough physical activity can become overweight or obese. But getting the physical activity you need can actually help you lose weight and raise your level of HDL-C.
- **Genes:** Yes, you can inherit high levels of LDL-C and triglycerides, or low levels of HDL cholesterol, from your parents or other family members.
- **Age:** The older you get, the more likely you are to have abnormal cholesterol levels. Past the age of 65, the risk increases significantly.

Smoking Cessation video

These are the main risk factors for getting high cholesterol. But other health conditions can impact your levels of cholesterol and triglycerides, including:

- Liver disease
- Underactive thyroid
- Pancreatic disease
- Diabetes
- Kidney disease

There's another aspect to these risk factors, too. If you have two or more of these factors, your risks for having high cholesterol are even higher. And, of course, having high cholesterol is itself a risk factor for serious cardiovascular conditions, including coronary heart disease, heart attack, stroke, **angina**, **arrhythmias** and other diseases. People who also have **high blood pressure** or **diabetes** are at an even greater risk for these conditions.

Understanding Your Numbers

Healthcare providers use one or more sets of clinical guidelines available today to determine what your cholesterol situation means in terms of your risk for cardiovascular disease. That's why it's particularly important to talk with your healthcare team about your numbers and what they mean, as well as any other medical conditions you may have.

Your healthcare provider will help you understand what treatment options make the most sense for your situation. This way, you get a complete picture of your overall cardiovascular health, including your fasting lipoprotein profile results.

In addition to your cholesterol numbers, there are other measurements that your healthcare provider can use to help determine your risk for cardiovascular disease. These include your body mass index (BMI, which is a calculation of your weight relative to your height), blood pressure and **fasting blood sugar**. The ideal numbers are:

- **BMI** less than 25 kg/m²
- **Blood pressure** lower than 120/80 mmHg
- **Fasting blood sugar** less than or equal to 100 mg/dL

Date	Total cholesterol	HDL	LDL

My Cholesterol Levels

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QUIZ 2

*You're making great progress!
Take a short quiz on what you've learned so far.*

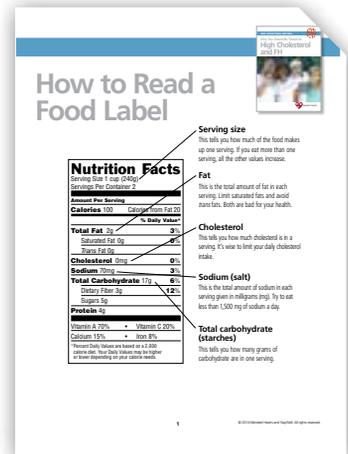
Treating High Cholesterol

If your critical numbers are not within healthy ranges, you may very well be at a higher risk for cardiovascular disease. Your healthcare provider will work with you to help you make improvements to your overall health and to keep your risks for serious conditions at bay. In most cases, the initial approach is to make changes to your diet and level of physical activity.

Eating Healthy

No matter who you are and what your health situation is, eating a heart-healthy diet makes good sense. If you have high cholesterol or abnormal numbers for any of the other key measurements, it's that much more important.

A good place to begin when making changes to your diet is to cut down on foods that are high in cholesterol, saturated fat and *trans* fats. All of these types of fats are bad for you because they raise your LDL and triglyceride levels. Dietary cholesterol is found in animal products, so keep those to a minimum in your daily fare.



How to Read a Food Label
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limit these

In general, you want to **limit**:

- Whole-fat dairy products, such as whole milk, cream, cheese, butter and ice cream
- Egg yolks
- Organ meats (liver, kidney, brain, sweetbreads)
- High-fat processed meats (hot dogs, salami, bologna, sausage)
- Untrimmed fatty meats
- Meat from ducks or geese (that have been raised for market)
- Bakery goods that have been made with egg yolks, saturated fats and *trans* fats



Instead of those options, choose foods that are low in saturated fat, total fat and cholesterol.

Also look for foods that are high in **fiber**. These include whole grains, fruits and vegetables, which are also high in soluble fiber — a type of fiber that dissolves in water and can help lower your levels of LDL and total cholesterol. All these foods are **good choices**:

- A variety of deeply colored fruits and vegetables, several servings per day
- A variety of fiber-rich grain products, including whole-grain bread, cereal, pasta and brown rice, 6 to 8 servings per day, with at least half of those servings whole grain
- Lean meats and poultry without the skin, up to 5 to 6 total ounces per day — about the size of your fist
- Fatty fish, baked or grilled, at least 2 servings per week
- Nuts, seeds and legumes (dried beans or peas), 4 to 5 servings per week
- Unsaturated vegetable oils, including canola oil, corn oil, olive oil and safflower oil; limit tub or liquid unsalted margarines and the spreads made from them

good choices

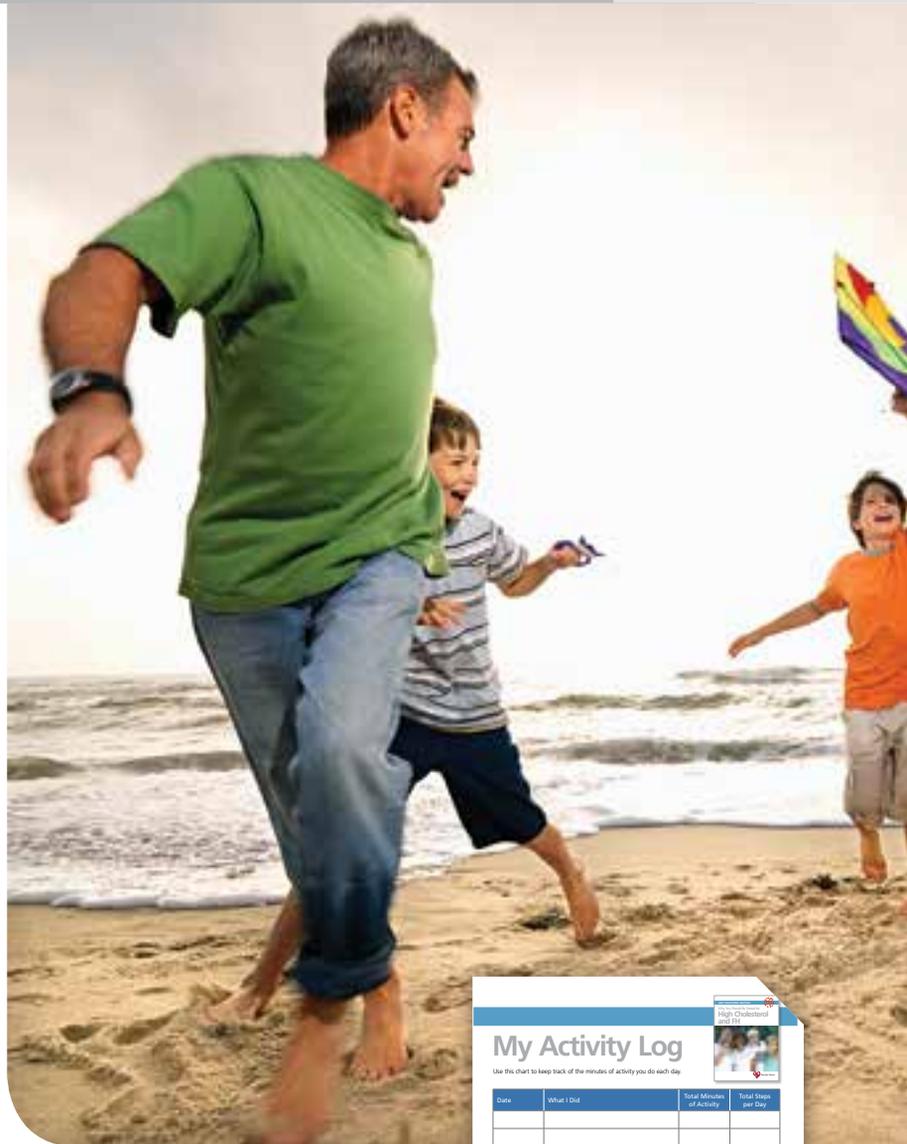


Physical Activity

Just as important as eating a healthy diet is getting enough physical activity each week. In general, you want to aim for at least 30 minutes of moderate-intensity physical activity most days of the week.

It doesn't have to come all at once. It's just as effective to fit in physical activity throughout the day, as you can. Consider:

- Parking farther away from your usual destinations and walk the extra distance
- Taking the stairs instead of the elevator
- Walking short distances instead of driving
- Taking the dog for a longer walk a couple of times per day, and bringing your family or friends along, too
- Dancing around the house to your favorite music



Date	What I Did	Total Minutes of Activity	Total Steps per Day

My Activity Goals: _____ minutes per day _____ steps per day

My Activity Log
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Medication

For some people, making changes to diet and physical activity levels is enough to bring their cholesterol levels down to a healthy range. That’s not true for everyone, however. If lifestyle changes don’t lower your risks enough, your healthcare provider may prescribe medication to help bring your cholesterol number into a healthy range.

Usually the first line of defense in prescribing medication to treat abnormal cholesterol levels is a **statin**. Statins are a type of medication that help your body process and remove cholesterol. They’re most effective in lowering LDL cholesterol. But as with any medication, statins can have side effects. The most common are constipation, stomach pain, cramps or gas. In some cases, people experience muscle pain, weakness or brown urine.

There are different types of statins, and each one works a little differently from the others. The table below lists optimal dosages for each major type of statin and the three main levels of statin therapy intensity:

High-Intensity Statin Therapy	Moderate-Intensity Statin Therapy	Low-Intensity Statin Therapy
Daily dose lowers LDL-C on average, by approximately $\geq 50\%$	Daily dose lowers LDL-C on average, by approximately 30% to $< 50\%$	Daily dose lowers LDL-C on average, by $< 30\%$
Atorvastatin (40†)–80 mg Rosuvastatin 20 (40) mg	Atorvastatin 10 (20) mg Rosuvastatin (5) 10 mg Simvastatin 20–40 mg‡ Pravastatin 40 (80) mg Lovastatin 40 mg Fluvastatin XL 80 mg Fluvastatin 40 mg bid Pitavastatin 2–4 mg	Simvastatin 10 mg Pravastatin 10–20 mg Lovastatin 20 mg Fluvastatin 20–40 mg Pitavastatin 1 mg

Sticking to Your Medication Plan

You may have heard this before, but it's true: Medicines don't work the way they should unless you take them the way they're supposed to be taken. That means taking medications safely and as your healthcare provider instructs you to.

Here are some ways to take your medications correctly:

- Keep taking your medications (whether oral or injected) unless your healthcare provider instructs you to stop.
- Set a medication schedule, and stick to it. It helps to take your medications at the same time every day, as your healthcare provider instructs. Many people find it helps to take medications while doing other daily rituals, such as eating (if it's OK to take your medications with food) or when it's time to brush your teeth.
- Always read the labels carefully. Medication labels contain important information about the proper dosage, whether to take the medication with food or drink, and whether to avoid any particular foods or drinks while taking the medication. For example, grapefruit and grapefruit juice are known to interfere with the effectiveness of statin medications.
- Sort your medications into a weekly pillbox. If you need to take medications at different times of the day, use a pillbox that is divided into time-of-day compartments. They're available at most drug stores.
- Make a pill calendar or medication reminder chart to help you remember when to take your oral and injectable medications. Consider setting an alarm on your clock, watch or smartphone to help you remember when to take them. Or ask your family or friends to help you remember.



Generic Name	Brand Name (if any)	Strength (dose)	Quantity per Dose	How Often to Take	Purpose	Notes/Date

My Medication List
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Asking the Right Questions

Many people find it helpful to answer questions about their lifestyle in order to make the changes they need to make. Answering these questions can help you ask your healthcare provider how you can improve your health. Consider asking yourself:



- Am I eating a heart- and brain-healthy diet?
 - » Does it include fruits, vegetables, high-fiber whole grains, low-fat or fat-free dairy products, lean meat, poultry and fish two times per week?
 - » Am I keeping saturated fats, trans fats and added sugar to a minimum?
 - » Am I limiting salt (sodium) to no more than 1,500 mg per day?
 - » Am I keeping my alcohol intake to no more than 2 drinks per day (for men) or 1 drink per day (for women)? (A drink is one 12 oz. can or bottle of beer, one 5 oz. glass of wine, or 1.5 oz. of liquor.)
- Am I getting enough physical activity every week? If not, how can I get more?





What is FH?

Familial hypercholesterolemia (FH) is a big phrase for a relatively simple idea. It refers to a genetic disorder in which LDL cholesterol is present in very high levels from birth.

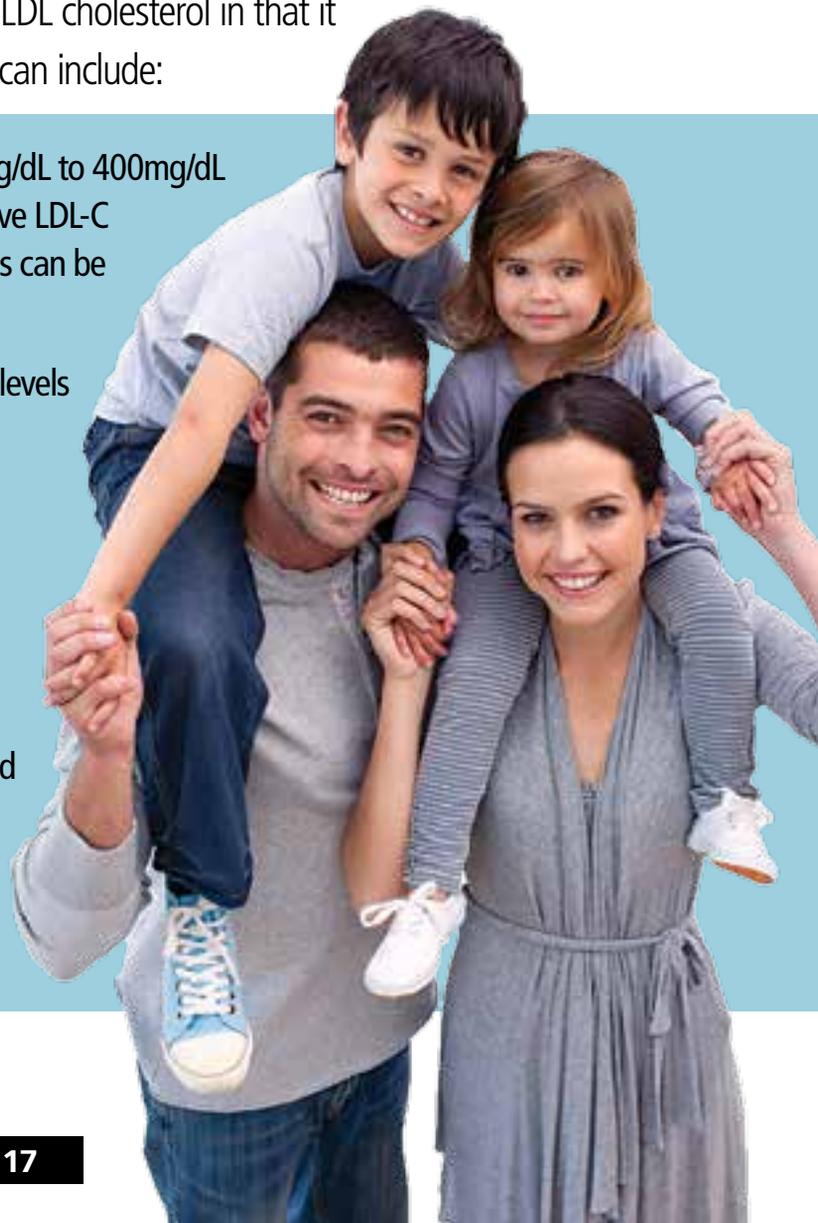
How severe FH is depends on a person's genetic profile. If a person with FH inherited one faulty gene from a parent, that person's LDL cholesterol level can be 2 to 3 times higher than normal. But if a person inherits two faulty genes (one from each parent), it can be worse — LDL levels as high as 3 to 6 times higher than normal.

About 1 in 200 people have FH, but according to the FH Foundation, only around 10 percent are diagnosed. The condition can be devastating to those who have it. Unless treated properly, people with FH who have one faulty gene can have a heart attack or other cardiac event as young as in their 40s or 50s. Those with two faulty genes can have cardiac events as young as in their late teens or early 20s. This type of FH is much more difficult to treat.

Signs and Symptoms of FH

FH is somewhat different from “typical” high LDL cholesterol in that it can have distinct signs and symptoms. These can include:

- Untreated LDL-C levels that range from 190mg/dL to 400mg/dL or even higher. (Children with FH generally have LDL-C levels above 160mg/dL, but in pre-teens, levels can be even lower.)
- A family history of early heart attacks or high levels of total and LDL cholesterol
- LDL-C levels in either or both parents that are elevated and resistant to treatment
- Xanthomas (waxy deposits of cholesterol in the skin or tendons), xanthelasmas (yellowish cholesterol deposits in the eyelids) or corneal arcus (white, arced cholesterol deposits around the cornea of the eye)
- Angina (chest pain), which can signal the presence of heart disease



Diagnosing and Treating FH

Healthcare providers diagnose FH by taking a complete family medical history and doing a physical examination. They will often order a fasting lipoprotein profile, as well. If the LDL cholesterol level is severely high, FH is sometimes the culprit. Other tests measuring heart function and genetic profile may also be ordered. Diagnosing FH as soon as possible is absolutely critical because the condition can lead to serious heart events.

Treating FH typically takes a more aggressive approach, involving medication, low-fat diet, exercise, weight control and not smoking. Changes to diet and exercise are nearly always part of the treatment plan, with total fat intake limited to less than 30 percent of total daily calories. For people with FH who are overweight or obese, weight loss is usually part of the plan. But these changes are rarely sufficient for helping people with FH get their cholesterol numbers into healthy ranges.

Often, medication therapy is started for people with FH at an early age when it is detected in a young person. Sometimes a doctor will treat FH with some combination of the following medications, each of which have a different mechanism of action and can complement each other: statins, bile acid-sequestering resins, fibrates and nicotinic acid.

Consult a FH specialist about the right medications for you.

For some people with FH, even adding medications to the treatment plan doesn't lower cholesterol levels enough. In these cases, a procedure called apheresis may be the next step. This is a process in which blood is extracted through a machine, cleansed of excess LDL cholesterol by filters and returned to the patient.

Living with FH

Because of the risk of a serious heart event, such as a heart attack, people with FH must take great care to stick to their treatment plan for the best possible health outcomes. That means taking their medication exactly as directed and keeping all healthcare appointments, along with managing their diet and physical activity plans as closely as possible.

The risk of cardiovascular disease is very high in people with FH unless they can keep their LDL-C levels sufficiently low, so it's vital that they follow doctor's orders as closely as possible.



QUIZ 3

Congratulations!

Take this final quiz on what you've learned!



Wenter's Tale

She was with friends at a restaurant when the sweats suddenly hit her. That's all it was, just sweating. A hot flash, perhaps? "We were joking that '40 is the new 60' and this was the world's biggest hot flash! For about 25 minutes, I was uncomfortable but not enough to go home," said Wenter Blair, describing those odd sensations just a few years ago. "I got back to the house later, and I was still thinking it was just a hot flash . . . the next morning I got up and called my OB/GYN, and she said she wanted me in the office right now. So I went in — she met me at the front door and immediately hooked me up to an EKG machine. When it was done, she said, 'Honey, you had a heart attack last night.'"



Wenter Blair

It took three more heart attacks, several heart procedures and the insight of a leading cardiologist to get to the bottom of what was really wrong with Wenter Blair: She has familial hypercholesterolemia, better known as FH. Blair, the co-founder and a member of the founding Board of Directors of the FH Foundation, has taken her frightening experiences and turned them into a major cause: educating all who need to know about the very real threat FH poses to their lives.

Today, Blair has her FH — and that of her son, Christian, who also has it — under control is leading a healthy life. Once he was diagnosed, Christian was immediately started on a pediatric dose of statin therapy. "Christian's LDL is now 112 and we have 100 percent eliminated his heart and stroke threat from his future," said Blair. "It cost me \$4 a month to get his prescription, to save my child's life."



“If someone is diagnosed with FH, everyone needs to be tested in the family — everyone is under threat, even if they’re apparently perfectly healthy. Everyone needs to have a lipid panel done, they need their lipid numbers.”

Blair has one major message for everyone: “FH is not curable, but it is 100 percent treatable if caught at the pediatric stage,” she said. “High cholesterol is not benign. It’s a fit-as-a-fiddle person’s issue. It’s a child’s issue. It is absolutely necessary to save these children’s lives.”



Your Comments and Suggestions are Needed!

And now, please tell us what you think about this workbook! We need your suggestions to make sure that this has everything you need to know about cholesterol and FH. Go to our **online survey** and answer just a few questions. It will only take a few minutes of your time. Thank you for your help!