



PURDUE UNIVERSITY NORTHWEST

How to Control Cholesterol

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Introduction to the Integrative Physiology and Health Sciences Center Team

- John Durocher, PhD- Principal Investigator



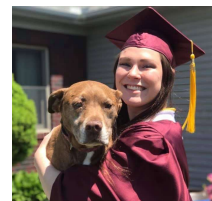
- Matthew Ladwig, PhD – Co-Investigator



- Grant Thivierge, MS – Project Coordinator



- Reagan Bishop, MS Student



Today's Outline

1. Overview of Life's Simple 7
2. Review the basics of cholesterol
3. Ways of measuring cholesterol levels
4. Causes of high cholesterol
5. Prevention and management of high cholesterol
6. Lifestyle Changes that Help to Control Cholesterol
7. Questions & Discussion

Life's Simple Essential 7 (8)

- **Life's Essential 8** are the key measures for improving and maintaining cardiovascular health, as defined by the American Heart Association.
- Better cardiovascular health helps lower the risk for heart disease, stroke and other major health problems.
- **What's new in 2022:**
 - Adds sleep as a component of heart health.
 - Creates a new guide to assess diet.
 - Accounts for vaping and secondhand smoke.
 - Adjusts cholesterol and blood sugar measures.
 - Scores each component to average an overall heart health score on a scale from 0-100.



Healthy For Good™



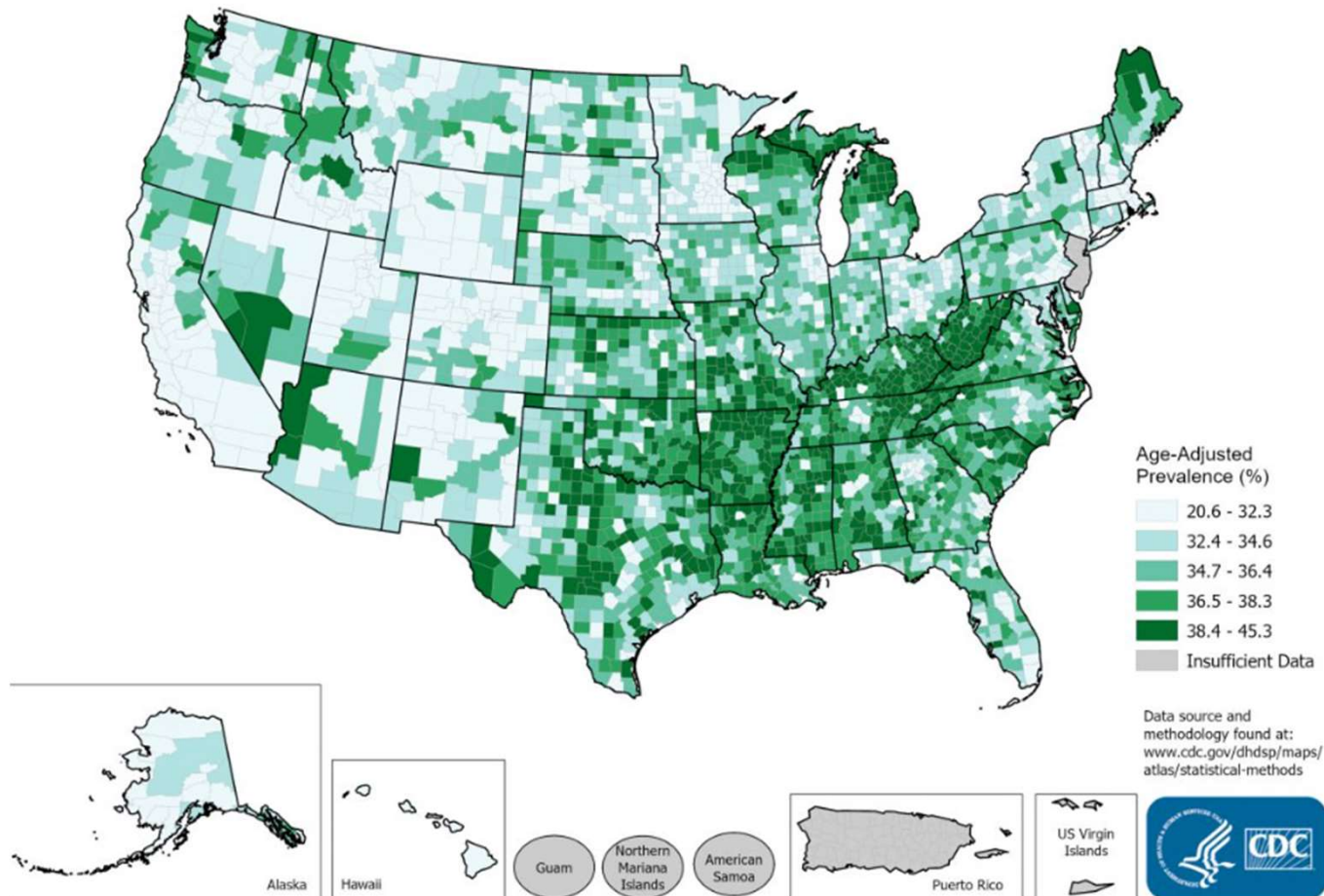
Most recent CDC data shows that more than 40% of American adults have total cholesterol levels higher than 200 mg/dL.



Get your My Life Check® Assessment now at heart.org/mylifecheck.

*Note that data shown in infographic is from 2017.

High Cholesterol Prevalence, 2018 - 2020 Adults Screened, Ages 18+, by County



High total cholesterol in the United States

- Nearly 94 million U.S. adults age 20 or older have total cholesterol levels above 200 mg/dL.
- About 28 million adults in the United States have total cholesterol levels above 240 mg/dL.¹
- Nearly 7% of U.S. children and adolescents ages 6 to 19 have high total cholesterol.¹
- Having high blood cholesterol raises the risk for heart disease, the leading cause of death, and for stroke, the fifth leading cause of death.

What is cholesterol?

- A soft, fat-like, waxy substance found in the bloodstream and in all your body's cells.
- It is normal and healthy to have cholesterol but very high levels of cholesterol are dangerous to your health.
- Sources of cholesterol
 - Our bodies' liver make the cholesterol we need.
 - The rest of the cholesterol comes from animal foods we eat.
 - Dietary cholesterol- meat, poultry and dairy products.

Dietary Cholesterol

- **Sources**- meat, poultry and dairy products all contain dietary cholesterol.
- The foods above are high in **saturated** and **trans fats**.
- These fats cause your liver to make **more cholesterol** than it otherwise would.
- For some people, this added production means they go from a normal cholesterol level to one that's unhealthy.
- **Some tropical oils** – such as palm oil, palm kernel oil and coconut oil – contain saturated fat that can increase bad cholesterol

Everyone wants to be more *happy* than *lousy*

There are two kinds of cholesterol

| Bad cholesterol | Good cholesterol |
|---|---|
| Low density lipoprotein (LDL) | High density lipoprotein (HDL) |
| More likely to cause build-up in our arteries | Absorbs cholesterol, carries it back to liver, and flushes it from the body |
| Raises our risk of heart attack and stroke | Lowers our risk of heart attack and stroke |

L- LOUSY

H- HAPPY

Low levels of LDL cholesterol and high levels of HDL cholesterol are desirable and protect against heart disease.

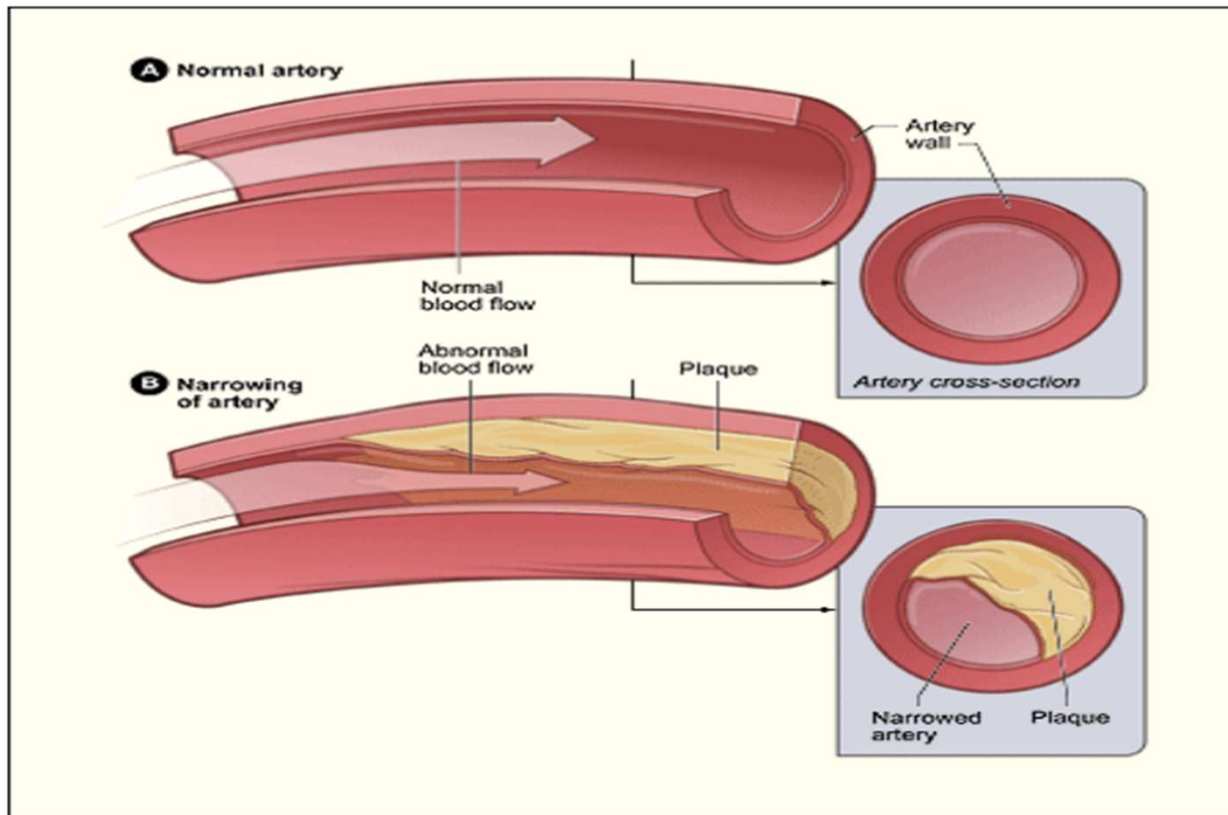
Why it's important to know if you have high cholesterol?

- Too much cholesterol in the blood can cause build-up in our arteries (“plaques”).
- Blood has a harder time getting through
- This can mean:
 - a stroke, if blood doesn't get to the brain
 - a heart attack, if blood doesn't get to the heart

Cholesterol is risk factor for heart disease.



Normal artery vs. narrowing of the artery



Cholesterol and heart disease: the connection

- A collection of heart-related diseases
 - Most common type in the U.S. is **coronary artery disease**
- **Most common cause** is narrowing or blockage of the arteries around the heart so blood can't get through as easily.
 - Happens slowly over time
 - It's the major reason people have heart attacks
- **Other causes** are related to the valves in the heart or how the heart pumps. If the blood doesn't pump well, the heart can fail.

Risk factors for heart disease

| Conditions* | Behavior/Lifestyle* | Family History |
|---------------------|--------------------------|-----------------|
| High cholesterol | Smoking | Genetic factors |
| High blood pressure | Diet / excessive alcohol | Age |
| Diabetes | Lack of exercise | Male |
| | Obesity | |
| | High Stress | |

*Modifiable risk factors

Trivia

- What are the symptoms of high cholesterol?
 - a. Headache
 - b. Vomiting
 - c. Cold fingers and toes
 - d. There are no symptoms

Are you up to the [cholesterol] test?

- Measured with a blood test
- It's best not to eat 9 to 12 hours before
- **Scores**
 - Total cholesterol
 - LDL ('bad') cholesterol
 - HDL ('good') cholesterol
 - Triglycerides- another type of fat that causes hardening of the arteries



Understanding Cholesterol Tests

| | High | Borderline | Desirable |
|------------------------|---------------------|-------------------|------------------|
| Total cholesterol | Above 240 | 200 to 239 | Below 200 |
| Triglycerides | Above 200 | 150 to 199 | Below 150 |
| LDL (bad cholesterol) | Above 160 | 130 to 159 | Below 100 |
| HDL (good cholesterol) | Less than 35 | 35 to 60 | Above 60 |

You have the power to change high cholesterol

- Things we can change

- What we eat
- Physical activity
- Body weight

- Things we cannot change

- Age
- Gender
- Family history



How can we lower cholesterol?

- There are two main ways to lower cholesterol

1. Medication

2. Lifestyle changes

- Diet
- Physical activity
- Weight loss



Medication

- **Statins** lower LDL cholesterol by:
 - Slowing down how quickly the liver makes cholesterol.
 - Increasing the liver's ability to remove LDL in the blood.
- Statins don't cure high cholesterol
- You need to keep taking the medicine to keep your cholesterol level in the normal range



Diet and cholesterol: you are what you eat

- Limit foods high in saturated fat and trans fat.
- The AHA recommends limiting saturated fat to less than 6% of daily calories.
 - Limit your intake of red meat and dairy products made with whole milk.
 - Choose skim milk, low-fat or fat-free dairy products.
 - Limit fried food and cook with healthy oils, such as vegetable oil
 - Limit sodium and sugar-sweetened foods and beverages



Eat a heart-healthy diet

- A heart-healthy diet emphasizes fruits, vegetables, whole grains, poultry, fish, nuts and non-tropical vegetable oils.
- To be smarter about what you eat, pay more attention to **food labels**. As a starting point:
- **Know your fats**. Knowing which fats raise LDL cholesterol and which ones don't is key to lowering your risk of heart disease.
- **Cook for lower cholesterol**. A heart-healthy eating plan can help you manage your blood cholesterol level.

Increasing physical activity can lower cholesterol

- **Activity** is especially important for people
 - With high cholesterol
 - Who are overweight or obese
 - Have a large waist measurement
 - Men: larger than 40 inches
 - Women: larger than 35 inches



Become more physically active

- A sedentary lifestyle lowers HDL cholesterol.
- Less HDL means there's less good cholesterol to remove bad cholesterol from your arteries.
- At least **150 minutes** of moderate-intensity **aerobic exercise** a week is enough to lower both cholesterol and high blood pressure.
- **Examples:** brisk walking, swimming, bicycling or even yard work can fit the bill.



American Heart Association
Healthy for Good

How much physical activity do you need?

Here are the American Heart Association recommendations for adults.

- Fit in 150+**
Get at least 150 minutes per week of moderate-intensity aerobic activity or 75 minutes per week of vigorous aerobic activity (or a combination of both), preferably spread throughout the week.
- Move More, Sit Less**
Get up and move throughout the day. Any activity is better than none. Even light-intensity activity can offset the serious health risks of being sedentary.
- Add Intensity**
Moderate to vigorous aerobic exercise is best. Your heart will beat faster, and you'll breathe harder than normal. As you get used to being more active, increase your time and/or intensity to get more benefits.
- Add Muscle**
Include moderate- to high-intensity muscle-strengthening activity (like resistance or weight training) at least twice a week.
- Feel Better**
Physical activity is one of the best ways to keep your body and brain healthy. It relieves stress, improves mood, gives you energy, helps with sleep and can lower your risk of chronic disease, including dementia and depression.

Move more, with more intensity, and sit less.

Find out how at heart.org/movemore.

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Don't weight- be proactive with your health

- **Being overweight**
 - Increases the risk for heart disease
 - Increases our cholesterol
- **Losing weight**
 - Lowers LDL (bad cholesterol)
 - Lowers total cholesterol
 - Raises HDL (good cholesterol)
- **To loose a pound a week:**
 - Eat 500 fewer calories each day or
 - Burn 500 more calories each day



What might managing your cholesterol mean for you?

- **Imagine** 6 months from now, you've made some changes to your diet, exercise, weight, or medications.
- **What does your life look like?**
- Setting **SMART** goals
- **S**pecific
- **M**easurable
- **A**ttainable/Achievable/Action-Based
- **R**ealistic
- **T**ime-specific

Check, Change and Control

- When it comes to cholesterol, remember: check, change and control.

That is:

- **Check** your cholesterol levels. It's key to know your numbers and assess your risk.
- **Change** your diet and lifestyle to help improve your levels.
- **Control** your cholesterol, with help from your doctor if needed