



# Lowering Your Risk for Heart Disease and Stroke

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# How many risk factors for cardiovascular disease can you spot in this cartoon?



"Not much - just flushing out my arteries."

# Cardiovascular Health

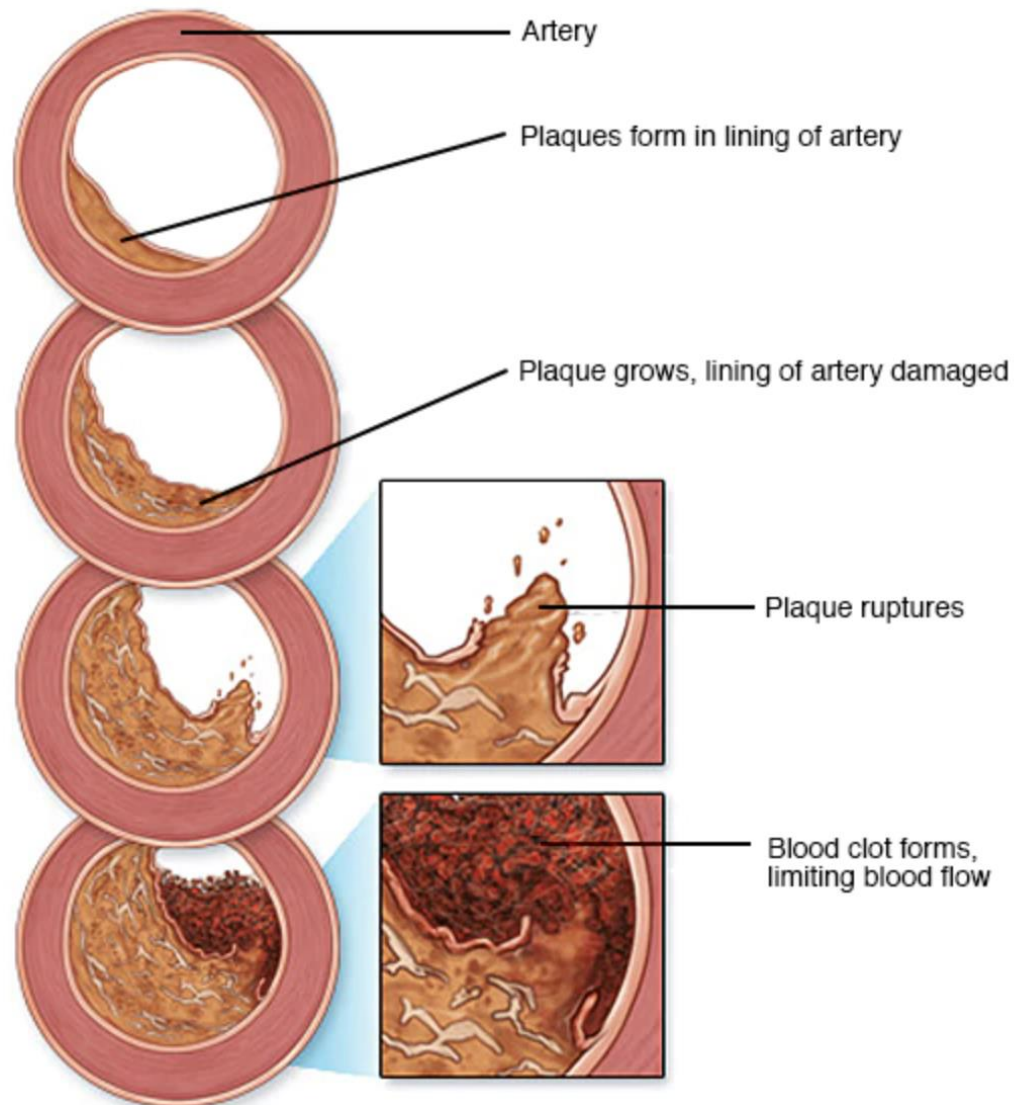
The American Heart Association defines **Cardiovascular Health** as having 7 components:

1. Healthy Diet
  2. Physical Activity
  3. Abstinence from Tobacco
  4. Normal Body Mass Index (BMI)
  5. Favorable Blood Pressure
  6. Total Cholesterol
  7. Glucose
- 
- The diagram uses two brackets to group the components. A red bracket on the right side groups items 1 through 4, labeled 'Health Behaviors'. A blue bracket on the right side groups items 5 through 7, labeled 'Health Factors'.
- Health Behaviors
- Health Factors

# Atherosclerotic Cardiovascular Disease (ASCVD)

- Leading cause of morbidity and mortality across the globe
- >\$200 billion in healthcare services, medications, and lost productivity (United States)
- Suboptimal **prevention** and **risk factor modification** is the cause for much of this

# What is Atherosclerosis?



# Diseases Caused by Atherosclerosis

- **Coronary Artery Disease** – heart blockages
- **Carotid Artery Disease** – blocks blood flow to the brain
- **Peripheral Artery Disease** – impairs blood flow to muscles & tissues
- **Aneurysms** – bulging arteries that can rupture or reduce blood flow
- **Chronic Kidney Disease** – kidneys help waste exit our bodies

# Prevention and Risk Factor Modification

- Diet
- Tobacco Use
- Lipids
- Hypertension
- Weight & Obesity
- Physical Activity & Exercise
- Blood Sugar Regulation/Diabetes
- Mental Health\*

AHA defines ideal levels for each risk factor to achieve very low cardiovascular risk

Fewer than 5% of people maintain the IDEAL measures

The best approach is to modify as many risk factors as possible to lower your risk of cardiovascular disease

# Prevention through Diet Modifications

- Eat a diet HIGH in:
  - Fruits & Vegetables
    - Folate, potassium, fiber, and flavonoids are beneficial
  - Whole Grains
    - As opposed to refined grains in order to retain the fiber and micronutrients
  - Nuts & Legumes
    - High in unsaturated fat, fiber, and micronutrients
  - Seafood
    - Rich in long-chain omega-3 fatty acids
    - Omega-3 fatty acids are thought to reduce arrhythmia, clot formation, inflammation, & blood pressure



# Prevention through Diet Modifications

- Eat a diet VERY LOW in:
  - Processed meats
  - High consumption of unprocessed red meat
  - Refined grains
  - Sugar sweetened beverages
  - Added sugar
  - Trans fats
  - Saturated fats
  - Sodium

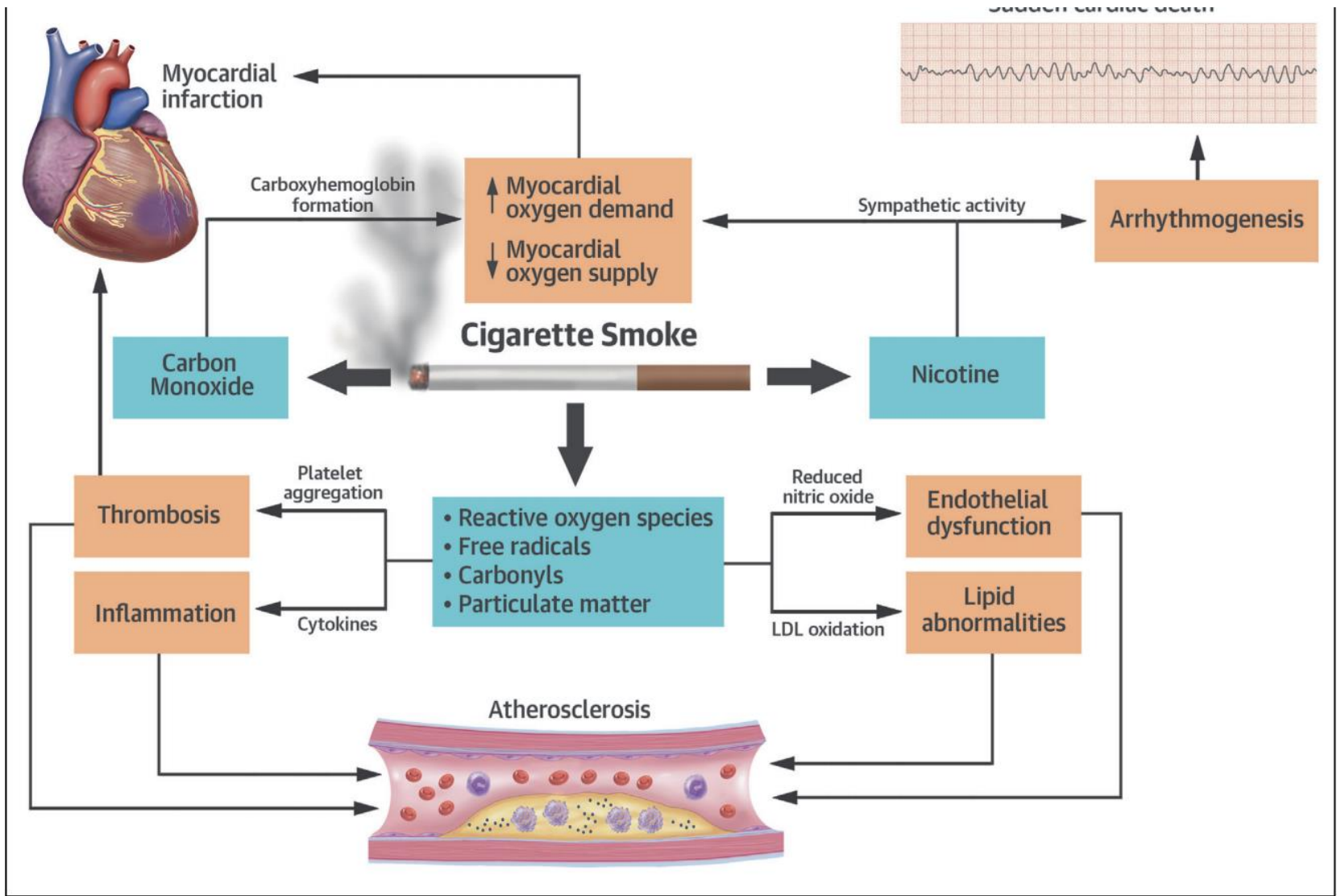
# Prevention through Diet Modifications

- Other Categories:
  - **Dairy**
    - Weak correlation that dairy reduces CV risk and low-fat dairy is optimal
  - **Coffee & Tea**
    - Moderate intake of coffee has shown reduced CV risk
    - Flavonoids in tea independently associated with lower CV risk
  - **Alcohol**
    - We don't recommend that you START drinking to prevent cardiovascular disease
    - There is some data that moderate intake may provide some benefit
    - Women: fewer than 7 standard drinks/week
    - Men: fewer than 14 standard drinks/week\*

# Tobacco and Cardiovascular Disease

- Tobacco is the **#1 cause of death** worldwide.
- Tobacco **kills more than 6 million people** every year around the world.
- Smoker's **life expectancy is 10 years less** than non-smoker.
- Smoking is responsible for ~20% of the CV deaths in the United States.

# Tobacco's Effects on the Cardiovascular System



# Health Benefits of Quitting Tobacco

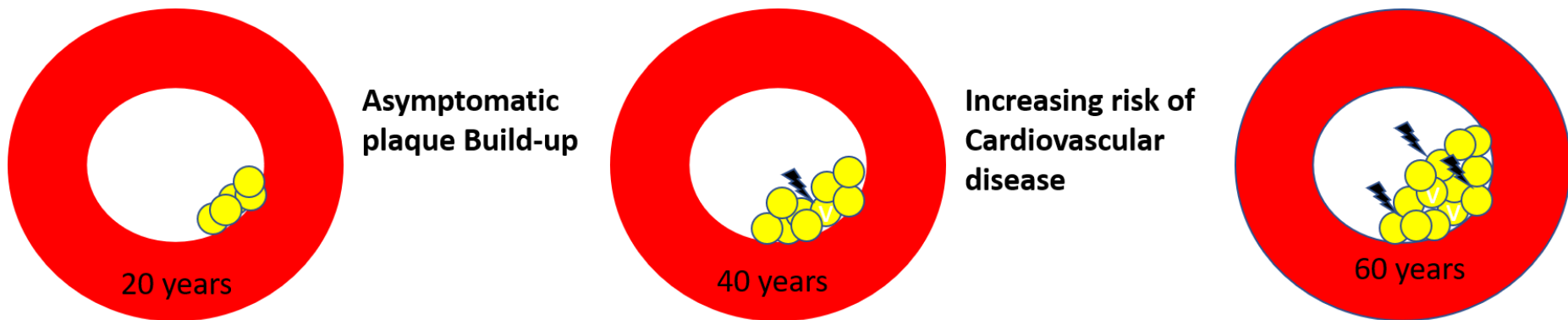
- Quitting before 40 reduces risk of dying from smoking-related disease by 90%.
- Quitting after 65 leads to health benefits and mortality is reduced even in people over 70 who stop smoking.
- **It's never too late to stop smoking!**
- The benefits of stopping starts after ONE day.
- Even one cigarette per day is associated with higher risk of CV disease.

# How to Stop Using Tobacco

- Combination of medical therapy and counseling
- Talk to your doctor about the medications available
  - Varenicline, Bupropion
- 1-800-QUIT-NOW - a free service to help smokers quit
- National Cancer Institute offers SmokeFreeTXT program

# Lipids and Cardiovascular Health

- Lipid molecules play a central causal role in the **development and progression** of atherosclerosis.
- Low-Density Lipoproteins (LDL) carry lipid and cholesterol molecules around the body.
- Over many years, LDL molecules settle into the artery walls and trigger an inflammatory process that makes a complex plaque.



**Total Plaque Burden = Cumulative Exposure to LDL-C**

# Lowering Lipid Levels to Reduce CV Risk

- Diet
  - Reducing saturated fats
  - Replace carbohydrates with unsaturated fats or plant-based protein
  - High fiber foods, nuts and plant-based diet can reduce LDL-C by 30-40 mg/dl
  - Following this type of diet as early as possible can lower plaque burden
  - Work closely with your doctor to identify a diet you can adhere to for lowering LDL-C
- Exercise – minor impact on LDL-C levels



# Medications to Lower LDL-C

- Statin medications lower LDL-C and are an important part of reducing CV risk in at-risk patients.
- People with significant plaque or growing plaque benefit from statins.
- Statins are used in early adulthood if you have a high inherited burden of LDL-C.
- Age, gender, diabetes, hypertension, and smoking status are all taken into account to determine if a statin is needed:

<http://tools.acc.org/ASCVD-Risk-Estimator-Plus/#!/calculate/estimate/>

# Hypertension

- High blood pressure is the leading risk factor for cardiovascular disease
- Prevalence in the United States:
  - 32% of adults using the >140/90 cut-off
  - 46% of adults using the >130/80 ACC/AHA cut-off
- Diseases attributed to high blood pressure:
  - Stroke (hemorrhagic and ischemic)
  - Heart attacks (ischemic heart disease)
  - Heart failure
  - Peripheral artery disease
  - Chronic kidney disease
  - Dementia due to small blood vessel disease

# Causes of Hypertension

- Genetics
- Diet
  - High sodium
  - Low potassium
- Physical inactivity
- Obesity/Overweight
- Social determinants of health

# Measures to Reduce Blood Pressure

- Medications when recommended by your healthcare provider
- Follow a diet rich in fruits, vegetables, whole grains, nuts, legumes, lean protein, and low-fat dairy products
- Moderate aerobic exercise and resistance exercise
  - Lower blood pressure by 5-7 mmHg and 4-5 mmHg, respectively
- Weight loss
  - Lower insulin resistance
  - Lower inflammation
  - Reduced oxidative stress

# Monitoring Blood Pressure

- Self-monitoring and sharing blood pressure readings with your healthcare provider
- Ambulatory (in-clinic) monitoring – not perfect
  - “White Coat Hypertension”
    - $>140/90$  in clinic,  $<135/85$  average awake BP outside of clinic
    - May not be benign
  - “Masked Hypertension”
    - $<140/90$  in clinic,  $>135/85$  average awake BP outside of clinic
    - Associated with a 2x higher risk of CV disease.
  - Team-based approach to monitoring and following-up is key

# Overweight and Obesity

- Overweight and obesity affect  $\frac{3}{4}$  of adults in the United States
- In general, overweight is BMI >25 and obesity is BMI >30
- Waist circumference and waist-to-hip ratio
- Increased intake of refined carbohydrates and sugars, along with reduced physical activity → overweight and obesity
- Obesity independently increases risk of:
  - Hypertension
  - Insulin resistance
  - High Cholesterol
  - Metabolic syndrome
  - Inflammation

# Obesity and Cardiovascular Risk

- Obesity impacts heart muscle function and structure.
- The heart works harder in obesity and over time this causes strain.
- Obesity increases risk of obstructive sleep apnea (OSA).
- OSA further stresses the heart.

# Weight Loss

- Calories OUT > Calories IN → negative energy balance
- Exercise 225 to 420 minutes/week to lose weight
- Exercise 200 to 300 minutes/week to prevent weight gain after loss
- Reduce sugar intake to no more than 9 teaspoons/day for men and no more than 5-6 teaspoons/day for women
- Focus on a diet pattern that is Mediterranean-based
  - Emphasis on plant-based foods, whole grains, low-fat dairy and low amounts of red meat



# Physical Activity & Exercise

- Physical inactivity – 20-30% increased risk of death compared to those who are physically active
- Consequences of physical inactivity:
  - Cardiovascular Disease (stroke and heart attack)
  - Heart Failure
  - Hypertension
  - Type 2 Diabetes
  - Cancer
  - Osteoporosis

# Physical Activity Protects Your Cardiovascular System

- Lowers depression and stress, increases social interactions
- Protects from arrhythmias
- Protects from developing blood clots
- Increases insulin sensitivity
- Increased HDL and lowers LDL
- Lowers triglycerides
- Decreases blood pressure
- Decreases fat stores
- Decreases inflammation
- Improves blood flow throughout the body and to your heart

# How much exercise?

## What kind of exercise?

<b>Intensity</b>	<b>METS</b>	<b>Examples</b>
Sedentary Behavior <sup>*</sup>	1-1.5	Sitting, reclining, or lying; watching TV
Light	1.6-2.9	Walking slowly, cooking, light house work
Moderate	3.0-5.9	Brisk walking (2.4-4mph), biking 5-9mph, ballroom dancing, active yoga, recreational swimming
Vigorous	≥6	Jogging/running, biking ≥10mph, singles tennis, swimming laps

- Engage in at least 150 minutes/week of moderate exercise OR 75 minutes/week of vigorous exercise.
- Set small goals and choose an activity you ENJOY and that is accessible.

# Blood Sugar and the Cardiovascular System

- Hyperglycemia → Pre-Diabetes → Type 2 Diabetes
- Type 2 Diabetes leads to a 2-3x increased risk of cardiovascular disease.
- Risk factors for Type 2 Diabetes overlap with other cardiovascular risk factors.
- There are new medications for type 2 diabetes that have been shown to lower cardiovascular risk (GLP-1 agonists and SGLT-2 inhibitors).
- Hyperglycemia without diabetes does not necessarily increase the risk of cardiovascular disease, but does increase the risk of developing diabetes.

# Screening for Diabetes

- Hemoglobin A1c indicates your average blood glucose over a 3 month period:
  - Normal 5.6 or **less**
  - Pre-Diabetes 5.7- 6.4
  - Type 2 Diabetes 6.5 or **greater**
- Fasting plasma glucose (FPG)
  - Normal **less than** 100
  - Pre-Diabetes 100-125
  - Diabetes 126 or **greater**
- Screen with a hemoglobin A1c or fasting blood glucose every 3 years for people:
  - Blood pressure > 135/80
  - BMI >30
  - Known heart disease

# Management of Type 2 Diabetes and CV Risk

- Hemoglobin A1c  $>6.5$ 
  - Diet changes including heart healthy, low-carbohydrate, low-sugar diet
  - Exercise: moderate for 150 minutes/week OR vigorous 75 minutes/week
  - Metformin to lower blood sugar and lower cardiovascular risk

AFTER diagnosis of diabetes and follow-up:

- Hemoglobin A1c  $<7$ 
  - Keep up diet changes and medications, if started
- Hemoglobin A1c  $>7$ 
  - Add SGLT-2 or GLP-1 if other cardiovascular risk factors

# Psychological Well Being and Cardiovascular Disease

- Well-established association between depression, anxiety, anger, PTSD and chronic distress and the development of cardiovascular disease
- New evidence: **positive psychological well-being** is independently associated with lower risk of cardiovascular disease
  - Positive thoughts
  - Optimism
  - A sense of purpose in life
  - Happiness
- Positive psychological well-being associated with lower blood pressure, favorable lipid levels, lower hemoglobin A1c

# Take Home Messages

- Maintain a healthy lifestyle throughout life.
- Work closely with your doctor so they can better understand the non-medical impacts on your cardiovascular health.
- Quit tobacco!
- Patients 40-75 years old should undergo atherosclerotic cardiovascular disease (ASCVD) risk estimation with their doctor to decide if lifestyle changes or medications are appropriate.
  - <http://tools.acc.org/ASCVD-Risk-Estimator-Plus/#!/calculate/estimate/>



# Take Home Messages

- Consume a heart healthy diet emphasizing vegetables, fruit, nuts, whole grains, lean vegetable or animal protein, and fish. Minimize trans fats, red meat, processed meat, refined carbohydrates and sweetened beverages.
- If overweight or obese, focus on counseling and calorie restriction.
- 150 minutes/week of moderate exercise OR 75 minutes/week of vigorous exercise
- Patients with Type 2 Diabetes should increase exercise and improved diet along with medications – Metformin and for some SGLT-2 or GLP-1.

# Take Home Messages

- Aspirin therapy for prevention only if 10-year cardiovascular risk is greater than 10%
- Statin therapy for LDL cholesterol >190, OR people with diabetes between 40-75, OR people at higher risk based on the ASCVD risk estimator
- Target blood pressure is <130/80 mmHg

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# References & Resources

- JACC Focus Seminar Series  
[https://www.onlinejacc.org/Collection/FocusSeminar?\\_ga=2.160866877.1642625552.1603033482-1539094223.1603033482](https://www.onlinejacc.org/Collection/FocusSeminar?_ga=2.160866877.1642625552.1603033482-1539094223.1603033482)
- Arnett, *et al* 2019 ACC/AHA Guideline on the Primary Prevention of Cardiovascular Disease: Executive Summary; A report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines. *Circulation*. 2019; e563-e595
- ASCVD Risk Score Estimator
  - <http://tools.acc.org/ASCVD-Risk-Estimator-Plus/#!/calculate/estimate/>



Thank You!





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