Cardiovascular Health

Chapter Eleven
Cardiovascular Disease

- **Cardiovascular disease** (CVD) is a disease of the heart and blood vessels
- Affects 80 million Americans
- CVD is the leading cause of death in the United States
- CVD claims one life every 37 seconds—about 2400 Americans every day
- Some CVD risk factors are controllable; others are not
- There are many things individuals can do to reduce their risk of CVD
Risk Factors For Cardiovascular Disease

Major CVD Risk Factors That Can Be Changed

- Tobacco Use
- High Blood Pressure
  - Hypertension
  - See Table 11.1
- Unhealthy Cholesterol Levels
  - HDLs versus LDLs
  - See Table 11.2
- Physical Inactivity
- Obesity
- Diabetes

Major Risk Factors That Can Not Be Changed

- Heredity
  - Multiple genes contribute to CVD risk
- Aging
  - CVD risk goes up with age
- Being Male
  - Men face a higher risk, especially earlier in life
- Ethnicity
  - African Americans have higher rates of hypertension and stroke
HDL versus LDL

<table>
<thead>
<tr>
<th>LDL</th>
<th>HDL</th>
</tr>
</thead>
<tbody>
<tr>
<td>LDL is called “bad” cholesterol because it can build up in the walls of your arteries and form plaque. Plaque build-up in the arteries can reduce blood flow and increase your risk of heart disease.</td>
<td>HDL (high-density lipoprotein) cholesterol is also known as good cholesterol because it is thought to help remove bad cholesterol from the body</td>
</tr>
</tbody>
</table>
Foods that increase HDL and lower LDL

- Grains
- Fruit rather than juice
- Omega 3 (now in eggs and butter like spreads)
- Vegetables: broccoli, bell peppers,
- Garlic and Onions
- Good oils like nuts, avacados, olive oil
- Fish
Figure 11.1 Travels with Cholesterol

1. The liver regulates the body’s production of cholesterol, based on the amount of fat and cholesterol that is consumed.

2. Saturated and trans fats in the diet act on the liver to increase the amount of LDL circulating in the blood. Thus saturated and trans fats are more important than dietary cholesterol for raising blood cholesterol to unhealthy levels.

3. The liver packages cholesterol with triglycerides (fat) and sends it into the bloodstream as very low-density lipoproteins (VLDLs).

4. As VLDLs travel through the bloodstream, they are broken down into triglycerides (fat) and cholesterol-rich low-density lipoproteins (LDLs). Triglycerides are used for energy or fat storage.

5. LDLs deliver cholesterol to cells throughout the body. High LDL levels cause an excess of cholesterol to be delivered to cells.

6. Cholesterol not used by the cells spills out and collects on artery walls. The resulting plaque buildup inhibits blood flow and may result in a heart attack.

7. High-density lipoproteins (HDLs) seek out excess cholesterol, reducing the amount available for buildup on artery walls. High HDL levels can help reverse heart disease.

8. HDLs return cholesterol to the liver, where it is converted into bile acids for elimination or recycling.
Figure 11.2 Percentage of Adult Americans with Cardiovascular Disease

![Bar chart showing percentage of cardiovascular disease among adult Americans by race and gender.]

**FIGURE 11.2** Percentage of adult Americans with cardiovascular disease.

Contributing Risk Factors That Can Be Changed

• High Triglyceride Levels
• Psychological and Social Factors such as:
  • Stress
  • Chronic hostility and anger
  • Suppressing psychological distress
  • Depression and anxiety
  • Social isolation
  • Low socioeconomic status
• Alcohol and Drugs
Possible Risk Factors Currently Being Studied

- C-Reactive Protein (CRP)
  - Inflammatory response
- Homocysteine
  - Amino acid
- Lipoprotein(a) or Lp(a)
  - Specific type of LDL
  - Strong genetic component
- Infectious agents such as:
  - Chlamydia pneumoniae
  - Cytomegalovirus
  - Helicobacter pylori
- Metabolic Syndrome (METX)
  - Insulin resistance syndrome
  - See Table 11.3
Major Forms of Cardiovascular Disease

- **Atherosclerosis**
  - Form of arteriosclerosis - thickening and hardening of the arteries
  - Atherosclerosis – narrowed arteries by deposits of fat, cholesterol, and other substances

- **Heart Disease and Heart Attacks**
  - Myocardial infarction (MI)
  - Coronary thrombosis
  - Angina pectoris
  - Arrhythmia
  - Sudden death

- **Stroke**

- **Congestive Heart Failure**
Atherosclerosis: The Process of Cardiovascular Disease

<table>
<thead>
<tr>
<th>Table 11.3</th>
<th>Defining Characteristics of Metabolic Syndrome*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abdominal obesity (waist circumference)</td>
<td></td>
</tr>
<tr>
<td>Men</td>
<td>&gt;40 in (&gt;102 cm)</td>
</tr>
<tr>
<td>Women</td>
<td>&gt;35 in (&gt;88 cm)</td>
</tr>
<tr>
<td>Triglycerides</td>
<td>≥150 mg/dl</td>
</tr>
<tr>
<td>HDL cholesterol</td>
<td></td>
</tr>
<tr>
<td>Men</td>
<td>&lt;40 mg/dl</td>
</tr>
<tr>
<td>Women</td>
<td>&lt;50 mg/dl</td>
</tr>
<tr>
<td>Blood pressure</td>
<td>≥130/≥85 mm Hg</td>
</tr>
<tr>
<td>Fasting glucose</td>
<td>≥110 mg/dl</td>
</tr>
</tbody>
</table>

*A person is diagnosed with metabolic syndrome if he or she has three or more of the risk factors listed here.

Atherosclerosis

- Atherosclerosis is thickening of the arteries by deposits of fat, cholesterol, and other substances known as the term, ‘plaque’
- The process begins when the lining of the cells become damaged due to several factors such as
  - Smoking
  - High blood pressure
  - Deposits of LDL particles
- Blockage in the coronary arteries (coronary heart disease) can lead to a heart attack
- Blockage in the brain can result in a stroke
Heart Disease and Heart Attacks

- A heart attack, or myocardial infarction, results when the coronary artery becomes blocked.
- Angina pectoris is chest pain, a signal that the heart is not getting enough oxygen to supply its needs.
- An arrhythmia is a condition when electrical impulses that control heartbeat become disrupted, resulting in an irregular pattern.
- Sudden cardiac death or cardiac arrest is caused by arrhythmias and can result in death, if not treated immediately.
**Figure 11.3 Blood Supply to the Heart**

**FIGURE 11.3 Blood supply to the heart.** Blood is supplied to the heart from the right and left coronary arteries, which branch off the aorta. If a coronary artery becomes blocked by plaque buildup or a blood clot, a heart attack occurs; part of the heart muscle may die due to lack of oxygen.
Diagnosis and Treatment for Heart Disease

- **Diagnosis**
  - Exercise stress test
  - MRI, echocardiogram, angiogram

- **Treatment**
  - Lifestyle changes (diet and exercise)
  - Low-dose aspirin therapy
  - Prescription medications
  - Balloon angioplasty
  - Coronary bypass surgery
Stroke

A stroke or cerebrovascular accident (CVA) occurs when the blood supply to the brain is cut off.

Types of strokes:
- Ischemic stroke = caused by a blood clot
- Hemorrhagic stroke = caused by ruptured blood vessel
- TIA – “warning stroke” or “mini stroke” – sometimes results in short term loss of memory- Harry’s golf story

Strokes may cause paralysis, walking disability, speech impairment, or memory loss.

Treatment may include clot-dissolving and antihypertensive drugs.

American Heart Association estimates the 705,000 Americans suffer a stroke each year.
Congestive Heart Failure

- **Congestive heart failure** is a condition resulting from the heart’s inability to pump out all the blood that returns to it.
- Blood backs up in the veins leading to the heart, causing an accumulation of fluid in various parts of the body.
- Caused by high blood pressure, heart attack, atherosclerosis, viral infections, rheumatic fever, and birth defects.
- **Pulmonary edema** – Fluid collecting in the lungs that interferes with breathing when the individual is lying down.
Protecting Yourself Against Cardiovascular Disease

- Eat heart-healthy
  - Decreased fat and cholesterol intake
  - Increased fiber intake
  - Decreased sodium/increased potassium intake
  - Moderate alcohol consumption
  - DASH (dietary approach to stop hypertension

- Exercise regularly-clears out blood vessels and burns fatty acids
- Avoid tobacco
- Know and manage your blood pressure
- Know and manage your cholesterol levels
- Develop ways to handle stress and anger
Figure 11.4 Strategies for Reducing Your Risk of Cardiovascular Disease

**Do More**

- Eat a diet rich in fruits, vegetables, whole grains, and low-fat or fat-free dairy products. Eat five to nine servings of fruits and vegetables each day.
- Eat several servings of high-fiber foods each day.
- Eat two or more servings of fish per week; try a few servings of nuts and soy foods each week.
- Choose unsaturated fats rather than saturated and trans fats.
- Be physically active; do both aerobic exercise and strength training on a regular basis.
- Achieve and maintain a healthy weight.
- Develop effective strategies for handling stress and anger. Nurture old friendships and family ties, and make new friends; pay attention to your spiritual side.
- Obtain recommended screening tests and follow your physician's recommendations.

**Do Less**

- Don't use tobacco in any form: cigarettes, spit tobacco, cigars and pipes, bidis and clove cigarettes.
- Limit consumption of fats, especially trans fats and saturated fats.
- Limit consumption of salt to no more than 2300 mg of sodium per day (1500 mg if you have or are at high risk for hypertension).
- Avoid exposure to environmental tobacco smoke.
- Avoid excessive alcohol consumption—no more than one drink per day for women and two drinks per day for men.
- Limit consumption of cholesterol, added sugars, and refined carbohydrates.
- Avoid excess stress, anger, and hostility.

**FIGURE 11.4 Strategies for reducing your risk of cardiovascular disease.**
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