# Module 2: Types of Cardiovascular Disease and Their Treatments

# Objectives

**By the end of this module, students will have learned. . .**

- The diseases that are involved in cardiovascular disease

- The complications of cardiovascular disease

- Methods for diagnosing cardiovascular disease

- The treatments for managing cardiovascular disease

# What diseases are involved in cardiovascular disease?

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- Hardening of arteries (atherosclerosis)
- High blood pressure (hypertension)
- Heart attack (myocardial infarction)
- High cholesterol (dyslipidemia)
- Stroke
- Heart failure

# Hardening of arteries (atherosclerosis)
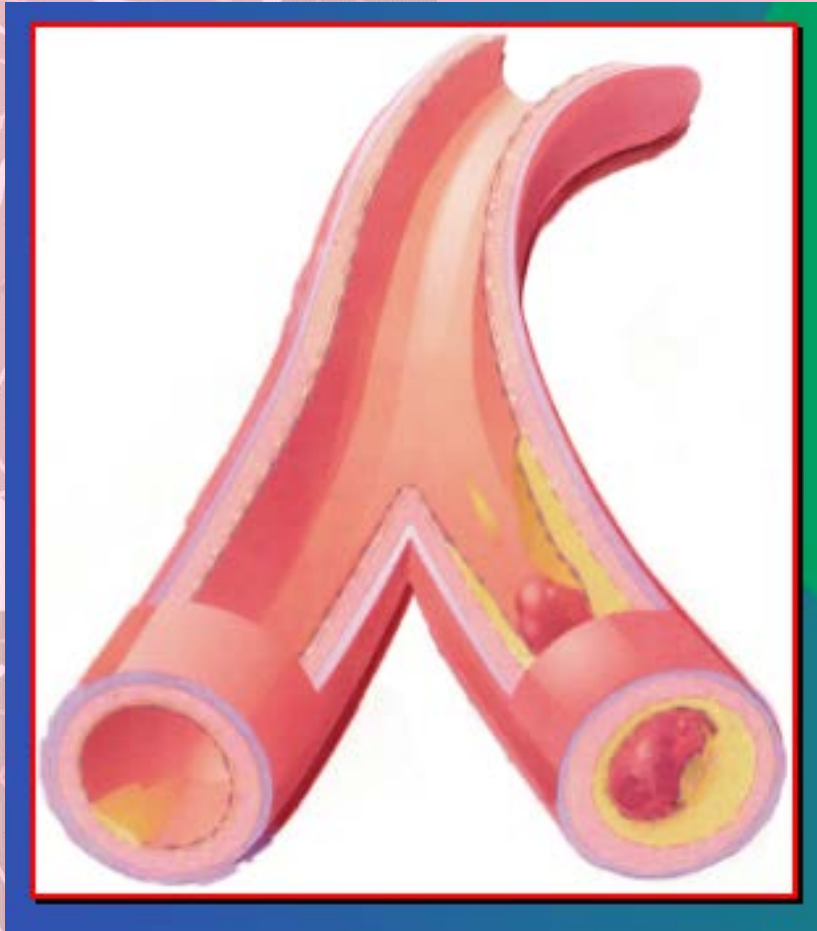


- Inner walls of arteries become narrower due to build up of plaque.

- Limiting the flow of blood to both the heart and brain.

- Plaque breaks apart = formation of clot → blockage of artery → heart attack and strokes

# High Blood Pressure (Hypertension)

# High blood pressure

- May not cause symptoms
- Increases the workload on the individual's heart due to:
  - Enlarged heart
  - Arterial damage
  - Heart attack
  - Stroke
  - Kidney disease

# High Blood Pressure

- 74.5 million people in the United States are hypertensive (have high blood pressure)

- **Pre-hypertension** signals the <u>increase for primary prevention and education to reduce blood pressure and prevent hypertension</u>

- **Hypertension** means that pressure in your arteries is consistently above the normal range (120/80)

References:
 American Heart Association, High Blood Pressure Statistics.  Available at http://www.americanheart.org/presenter.jhtml?identifier=4621.  Accessed April 13, 2010.

# Understanding the Numbers

- Two numbers (i.e. 125/80)
- **Systolic** blood pressure (top number)
  - Pressure when the heart is beating
- **Diastolic** blood pressure (bottom number)
  - Pressure when the heart is at rest between contractions

# High Blood Pressure

- From 115/75 mmHg, the risk of cardiovascular disease *doubles* for each increase of 20/10 mmHg.

- **Pre-hypertension**
  - Systolic blood pressures between **120 – 139**
  - Diastolic blood pressures between **80 – 89**

- If people with pre-hypertension make health-promoting <u>lifestyle modifications</u>, their risk for developing cardiovascular disease is reduced.

References:
 American Heart Association, High Blood Pressure . Available at http://www.americanheart.org/presenter.jhtml?identifier=4623. Accessed April 13, 2010.

# Blood pressure classification

| BP classification | Systolic Blood Pressure | | Diastolic Blood Pressure |
|---|---|---|---|
| Normal | <120 | And | <80 |
| Pre-hypertension | 120-139 | Or | 80-89 |
| Stage 1 hypertension | 140-159 | Or | 90-99 |
| Stage 2 hypertension | >= 160 | Or | >=100 |

# HIGH CHOLESTEROL (Hypercholesterolemia)

# High cholesterol

- **High cholesterol** <u>increases risk of heart attack and stroke</u>

- <u>2 things can decrease blood flow in an artery:</u>
  - **Atherosclerosis:** hardening of arteries because of the production of plaques
  - **Arteriosclerosis:** stiffening of arteries

- Cholesterol levels are affected by age, sex, heredity and diet.

# HDL

**HDL (high-density lipoprotein)**

- •"Healthy" cholesterol because it reduces risk of stroke and heart attack.

| | **Men** | **Women** |
|---|---|---|
| **Low HDL Levels** | **< 40 mg/dL (high risk)** | **< 50 mg/dL (high risk)** |
| **Target Range for HDL** | **40 – 59 mg/dL (the higher, the better)** | |
| **To Decrease Your Risk for Complications** | **> 60 mg/DL (lower risk for heart attack, stroke)** | |

# LDL

**LDL (low-density lipoprotein)**
- •Main carrier of *harmful* cholesterol in blood
- •High levels mean higher risk of heart disease and stroke

| | RANGE |
|---|---|
| **Optional goal if at high risk for heart attack** | **< 70 mg/dL (will be reabsorbed by the body)** |
| **Optional goal if you have heart disease, DM** | **< 100 mg/dL** |
| **Near or above optimal** | **100 – 129 mg/dL** |
| **Borderline High** | **130 – 159 mg/dL** |
| **High** | **160 – 189 mg/dL** |
| **Very High** | **> 190 mg/dL** |

# What are COMPLICATIONS of Cardiovascular Disease?
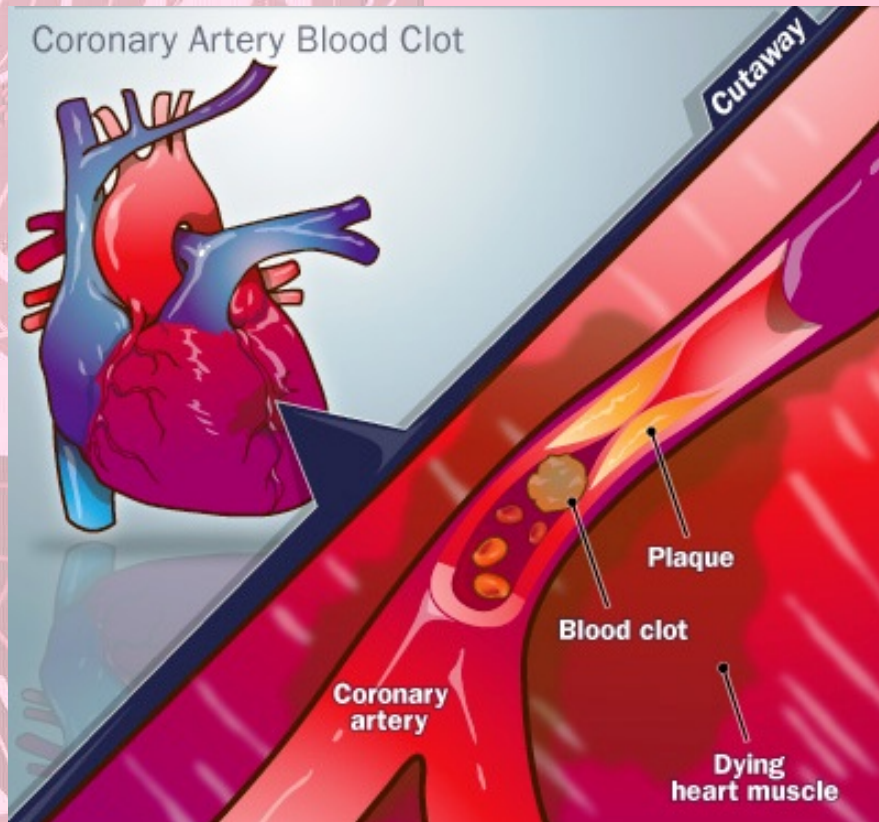
# Complications of Cardiovascular Disease

- Heart attack
- Stroke
- Congestive Heart Failure
- Sudden death

# HEART ATTACK
# (Myocardial Infarction)

# Heart Attack

- A heart attack occurs when the blood flow to a part of the heart is blocked, usually by a blood clot.



Coronary Artery Blood Clot

Cutaway

Plaque

Blood clot

Coronary artery

Dying heart muscle



Indications of a heart attack include sweating, anxiety and chest pains

**Levine's Sign**

# Heart Attack Warning Signs

- **Chest pain or discomfort** – feels like tightness, lasting more than a few minutes, or comes and goes.

- **Pain or discomfort radiating to other areas of upper body** – can include pain or discomfort in one or both arms, neck, jaw or stomach

- **Shortness of breath** – comes along with chest discomfort

- **Other signs**
  - Fatigue
  - Sweating (diaphoresis)
  - Anxiety
  - Dizziness or fainting
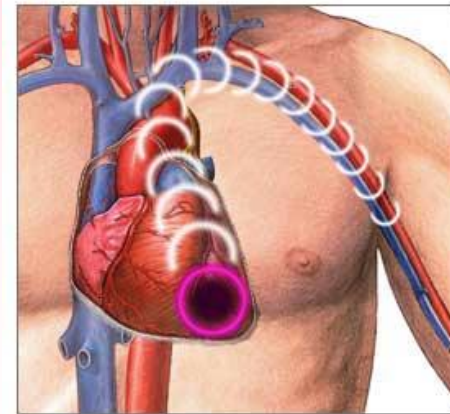


Pain radiating down arm might signal heart attack

American Heart Association, 2002

# Angina Pectoris

- Symptoms of a heart attack (chest pain), but doesn't cause cardiac muscle death (infarct)

- Uncomfortable pressure, fullness, squeezing or pain in the center of the chest.

- **<u>Angina</u> is a sign that someone is at increased risk of heart attack, cardiac arrest and sudden cardiac death.**

# STROKE
# (Ischemic or Hemorrhagic)

# Stroke

- **Stroke** is a type of cardiovascular disease.

- **Affects arteries** within & leading to the brain.

- Occurs when a blood vessel that carries oxygen and nutrients to the brain is either **blocked by a clot (ischemic) or bursts (hemorrhagic).**

- Part of the brain **cannot get the blood** (and oxygen) it needs, **so it starts to die (infarct).**

American Stroke Association

# Stroke Warning Signs





To keep her balance the child with ataxia walks bent forward with feet wide apart. She takes irregular steps, like a sailor on a rough sea or someone who is drunk.

- **Hemiparesis or Hemiplegia**
  - Sudden numbness or weakness of the face, arm, or leg, especially on one side of the body.

- **Altered Level of Consciousness (ALOC)**
  - Sudden confusion, trouble speaking or understanding.

- **Ocular disturbances**
  - Sudden trouble seeing, double vision

- **Ataxia**
  - Sudden trouble walking, dizziness, loss of balance or coordination.

- **Intracranial pressure or bleed, ischemia**
  - Sudden severe headache with no known cause.

# Effects of Stroke

- Physical damage depends on what part and how much of brain was affected

- Because one side of the brain controls the opposite side of the body, a stroke affecting one side results in complications on the *other* side of the body.

# Effects of Stroke

- **Left Brain Damage**
  - Paralysis on the <u>right side</u> of the body
  - Speech or language problems
  - <u>Slow</u> cautious behavioral style
  - Memory loss

- **Right Brain Damage**
  - Paralysis on the <u>left side</u> of the body
  - Vision problems
  - <u>Quick</u> inquisitive behavioral style
  - Memory loss

# Congestive Heart Failure (CHF)

- <u>A condition in which the heart can't pump enough blood to the body's other organs.</u>

- **Cardiomyopathy:** the cardiac muscle has weakened

- **Risk Factors for CHF:**
  - Narrowed arteries
  - Past heart attack
  - High blood pressure

- **Heart valve disease** due to past rheumatic fever or other causes.

- **Endocarditis or Myocarditis:** Infection of the heart valves and/or heart muscle itself

# What are the methods used in diagnosing cardiovascular disease?

# What are the methods used in diagnosing cardiovascular disease?

- **Encourage your patient to go in for regular check-ups with physician (diagnostic testing)**

- **Know what the numbers mean**
  - High blood pressure
  - High cholesterol
  - A1C – Blood glucose

# Diagnostics

- **EKG/ECG (electrocardiogram)** – measure heart's electrical activity.

- **Exercise stress test** – a monitoring of the heart before and after stress due to exercise

- **Coronary angiography**

- **Blood pressure checks**

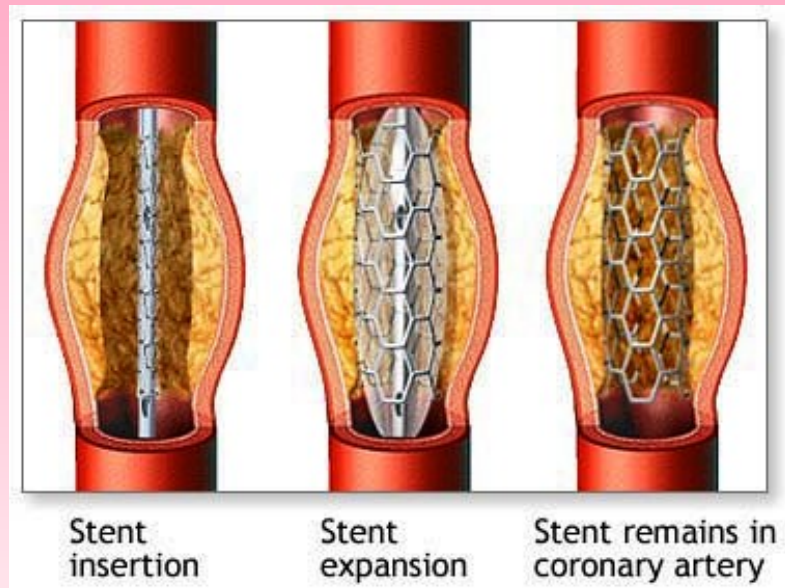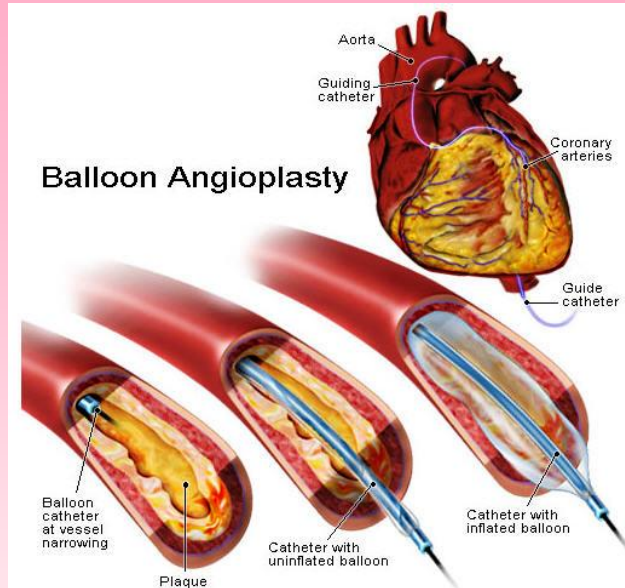- **Blood test** (check cholesterol, blood sugar)

# What are the treatments for cardiovascular disease?

# Treatments – Medications

If the patient is at high risk or diagnosed with heart disease the doctor may prescribe a number of the following medications:

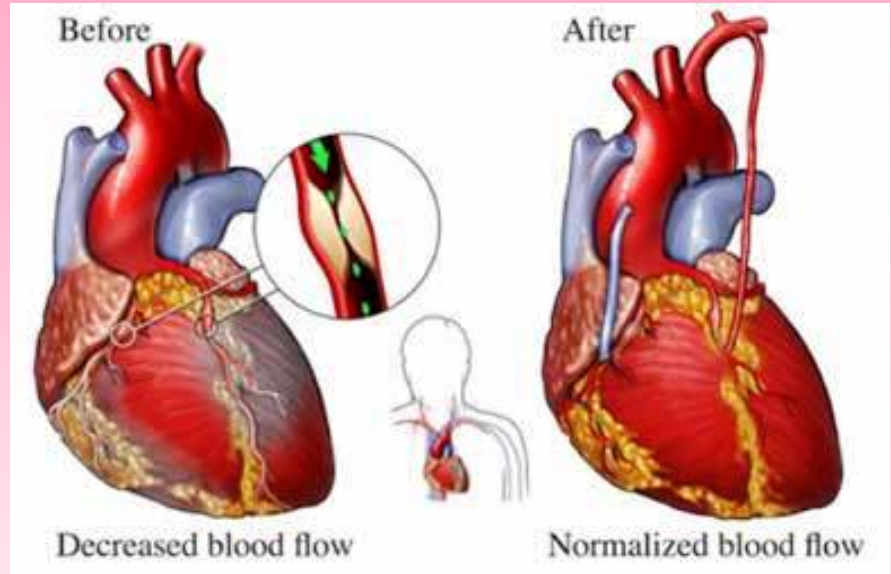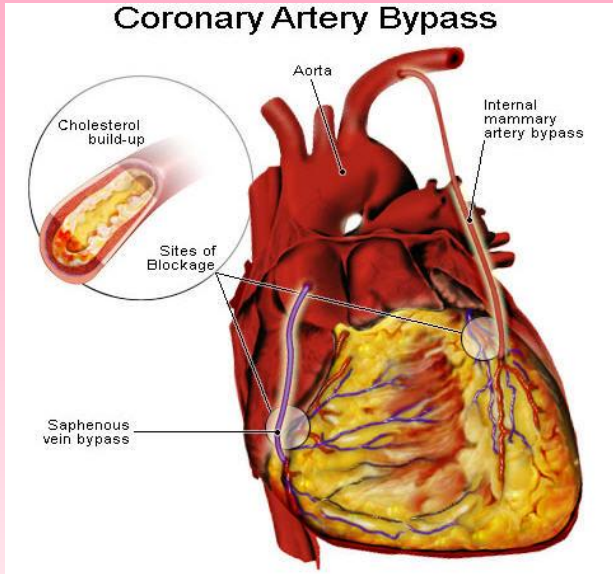| | |
|---|---|
| Statins | Cholesterol lowering |
| Aspirin/Anticoagulants | Blood-clot-preventing |
| Beta-blockers, ACE inhibitors or calcium-channel blockers | Reduce the strain on the heart by lowering blood pressure |

# Treatments – Angioplasty



Balloon Angioplasty

Aorta
Guiding catheter
Coronary arteries
Guide catheter

Balloon catheter at vessel narrowing
Catheter with uninflated balloon
Catheter with inflated balloon
Plaque



Stent insertion
Stent expansion
Stent remains in coronary artery

| Angioplasty | A procedure in which a balloon-type catheter is threaded through a blood vessel in the groin and into the heart arteries.  The balloon is inflated and used to break apart the plaque on the artery walls.  Doctors may also insert a stent to keep the artery open. |
|---|---|

# Treatments – CABG


Coronary Artery Bypass


Before / After — Decreased blood flow / Normalized blood flow

| Coronary artery bypass surgery (CABG) | A procedure that allows blood flow to the heart restored. A blood vessel from the thigh, arm or the chest wall is used to bypass the blocked coronary artery. Depending on the number of blocked arteries, the surgery may be referred to as double-, triple-, or quadruple-bypass. |
|---|---|

# Review

**In this module, we covered. . .**

- The diseases that are involved in cardiovascular disease

- The complications of cardiovascular disease

- Methods for diagnosing cardiovascular disease

- The treatments for managing cardiovascular disease

# Questions or Comments