

CUMULATIVE (FINAL) STUDY GUIDE

Ch 1, 4, 5, & 6 (Exam 1 Material) – Benefits & risks associated with physical activity, Health-related physical fitness testing and interpretation, Clinical exercise testing, & Interpretation of clinical exercise test results

Handouts: History of Framingham Heart Study (link), Risk Assessment Tool (link), PA Compendium, Case Study 1

❖ **Clinical Exercise Testing (p.114)**

- "Standard graded exercise tests (GXT) are used clinically to assess a patient's ability to tolerate increasing intensities of aerobic exercise. Electrocardiographic (ECG), hemodynamic, and symptomatic responses are monitored during the GXT for manifestations of myocardial ischemia, hemodynamic/electrical instability, or other exertion-related signs or symptoms. Ventilator expired gas analysis may also be performed during the GXT, particularly in patients with congestive heart failure (CHF), suspected/confirmed pulmonary limitations, and/or unexplained Dyspnea upon exertion."

❖ **Assessment/Diagnosis of CAD/CHD**

- (Looking for underlying Coronary Artery Disease) → *this is what will be further discussed throughout this study guide.
- Risk factors
- Signs & symptoms
- Resting ECG (Electrocardiogram)
- Cardiac biomarkers → measured to evaluate heart function (myocardial infarctions, etc.)
- Exercise ECG (including those done in the ER)
- Exercise nuclear imaging (perfusion, nuclear, thallium, cardiolite)
- Pharmacological → how do they react to dobutamine, dipyridamole, & adenosine
- Echocardiography → an ultrasound examination of the heart
- CT scan (electron beam computed tomography)
- Coronary angiography → uses dyes & x-rays to show the inside of the coronary arteries.
- Autopsy

❖ **Classification of CAD risk factors**

- Primary non-modifiable (these are factors that cannot be changed)
 - Advancing age

- Male gender
- Family Hx
- Primary modifiable (these are factors that can be changed)
 - Dyslipidemia
 - Hypertension
 - Tobacco smoking
 - Diabetes mellitus
 - Overweight or obesity
 - Sedentary lifestyle
 - Atherogenic lifestyle → promotes the formation of fat in arteries
- Emerging risk factors (lipids) → lipid changes that happen over time
 - Lipoprotein (α)
 - Lipoprotein remnants
 - Small LDL (low-density lipoprotein) particles
 - HDL subspecies
 - Apolipoproteins B & A-1
 - TC/HDL ratio (Total Cholesterol/High-Density Lipoprotein ratio)
- Emerging risk factors (non-lipids) → other changes that happen over time
 - Homocysteine (amino acid - LDL, clot) (metabolic syndrome)
 - Thrombogenic & hemostatic factors
 - Inflammatory markers (C-reactive protein)
 - Impaired glucose tolerance
 - Subclinical atherosclerosis & plaque burden
- ❖ **Risk Assessment tool for estimating your 10-year risk of having a heart attack (handout):**
<http://cvdrisk.nhlbi.nih.gov/calculator.asp>
 - Takes into account your age, gender, total cholesterol, HDL cholesterol, whether you smoke, systolic blood pressure, and if you're taking medication for high blood pressure.
 - Total cholesterol: the sum of all the cholesterol in your blood (the higher your total cholesterol, the greater your risk for heart disease).
 - Lower risk: < 200 mg/dL
 - Borderline-high risk: 200 - 239 mg/dL
 - More than twice the risk as someone below 200 mg/dL: ≥ 240 mg/dL

- HDL cholesterol: “good” cholesterol; high density lipoproteins (HDL) carry cholesterol in the blood from other parts of the body back to the liver; helps keep cholesterol from building up in the walls of the arteries; the higher your HDL, the better.
 - Major risk factor: < 40 mg/dL
 - Lower risk factor: 40 – 59 mg/dL
 - Protective against heart disease: ≥ 60 mg/dL
- ❖ **Framingham Heart Study** (handout): <http://www.framinghamheartstudy.org/about-fhs/history.php>
 - “CVD is the leading cause of death & serious illness in the U.S.”
 - This study was a big deal b/c, for the first time, it tracked a large group of people for a long period of time in order to identify the common factors or characteristics that contribute to CVD (participants had not suffered heart attacks, strokes, or CVD symptoms yet).
 - After 3 generations of studies, extensive physical examinations, and lifestyle interviews, they found:
 - The major CVD risk factors: high blood pressure, high blood cholesterol, smoking, obesity, diabetes, and physical inactivity.
 - The effects of related factors: blood triglyceride and HDL cholesterol levels, age, gender, and psychosocial issues.
- ❖ **Major signs or symptoms suggestive of cardiovascular, pulmonary or metabolic disease**
 - Angina (symptom of hard/soft/silent ischemia)
 - SOB at rest or with mild exertion
 - Dizziness or syncope
 - Orthopnea or paroxysmal nocturnal dyspnea
 - Ankle edema
 - Palpitations or tachycardia
 - Intermittent claudication
 - Known heart murmur
 - Unusual fatigue or SOB with usual activities
 - Prinzmetal (random heart problems – coronary spasms)
 - Claudication → sign of diabetes
- ❖ **ECG reading (p.148 *see images)**
 - P wave: electrical impulse going through *atria* (superior aspect of heart)
 - Atrial depolarization (atria – pacemaker of the heart)