



### **SAMPLE Self-Assessment Program Questions and Educational Critiques**

The American Society for Preventative Cardiology Self-Assessment Program (SAP) Series consists of a Question Book with Multiple Choice and/or Multiple True/False Questions and a corresponding Educational (Learning) Critique Book that contains detailed explanations for the correct and incorrect answers, based on current, peer-reviewed literature.

The following pages contain sample multiple-choice questions and the corresponding educational critiques.

■ Items 60–62

A 65-year-old woman comes to the lipid clinic for evaluation of dyslipidemia. She is 5'4", weighs 150 lbs, waist circumference 34", and blood pressure 142/88 mm Hg. Her sister, age 62, recently had coronary artery bypass surgery, and she smoked 2 packs of cigarettes/day. Her mother died at age 59 of MI and she was also a heavy smoker. Her father is alive and well at age 88. Her labs are as follows:

Total Cholesterol	238 mg/dL
HDL-C	58 mg/dL
LDL-C	140 mg/dL
Triglycerides	200 mg/dL
hs-CRP	10 mg/L, repeat 12 mg/L
Lp(a)	50 mg/dL

She brings with her the following printout from the web ([www.reynoldsriskscore.org](http://www.reynoldsriskscore.org)):

**If you are healthy and without diabetes, the Reynolds Risk Score is designed to predict your risk of having a future heart attack, stroke, or other major heart disease in the next 10 years.**

In addition to your age, blood pressure, cholesterol levels and whether you currently smoke, the Reynolds Risk Score uses information from two other risk factors, a blood test called hsCRP (a measure of inflammation) and whether or not either of your parents had a heart attack before they reached age 60 (a measure of genetic risk). To calculate your risk, fill in the information below with your most recent values. [Click here](#) for help filling the information.

Gender  Male  Female

Age  Years (Maximum age must be 80)

Do you currently smoke?  Yes  No

Systolic Blood Pressure (SBP)  mm/Hg

Total Cholesterol  mg/DL (or)  mmol/L

HDL or "Good" Cholesterol  mg/DL (or)  mmol/L

High Sensitivity C-Reactive Protein (hsCRP)  mg/L

Did your Mother or Father have a heart attack before age 60?  Yes  No

[Calculate 10 year risk](#)

**As shown in the graph below, at Age 65, your chance of having a heart attack, stroke, or other heart disease event at some point in the next 10-years is 22 percent. This risk is approximately 11 times higher than that of a Woman the same age who has optimal levels of all modifiable risk factors.**

[current Age](#) [Age 75](#) [Age 85](#) [Print](#) [Age 65](#)

Your 10-year risk (age 65)	22%
Your 10-year risk (age 65) if,	
• you didn't smoke	10%
• your blood pressure was 120	14%
• your cholesterol was 160 mg/DL (4.10 mmol/L)	13%
• your hsCRP was 0.5	13%
• all the above were optimal	2%

The graph above also compares your risk to that of a Woman of age 65 who has optimal levels for all modifiable risk factors, and shows what your risk would be if you improved your individual risk factors. For young Woman, risk may appear to be low over the next 10-years, yet can be very high over a lifetime. Thus, to see what your risk would be as you get older if your risk factors remain the same, click on the buttons above.

60. In addition to the Framingham co-variates of age, blood pressure, smoking, TC, and HDL-C, the Reynolds Risk Score improves global risk prediction by providing information on which *one* of the following blood biomarkers?

- (A) Lp(a).
- (B) Fibrinogen.
- (C) Homocysteine.
- (D) High sensitivity C-reactive protein (hs-CRP).
- (E) ICAM-1 (inflammatory cell adhesion molecule-1).

61. In addition to the Framingham co-variates of age, blood pressure, smoking, TC, and LDL-C, the Reynolds Risk Score improves global risk prediction by providing information on which *one* of the following clinical characteristics?
- (A) Body mass index (BMI).
  - (B) Family history of MI before age 60.
  - (C) Menopausal status.
  - (D) Alcohol use.
  - (E) Exercise frequency.
62. When compared to the Framingham Risk Score, the Reynolds Risk Score has the greatest improvement in risk re-classification among which *one* of the following groups?
- (A) Low Framingham Risk (estimated 10-year risk <5%).
  - (B) Intermediate Framingham Risk (estimated 10-year risk 5 to 20%).
  - (C) High Framingham Risk (estimated 10-year risk >20% or with diabetes).

■ Item 63

You are referred a healthy 67-year-old menopausal woman (not on hormone replacement therapy [HRT]), a non-smoker, whose father (a diabetic) died of a heart attack at the age of 55. She is currently on multiple antihypertensive medications (lisinopril, amlodipine, HCTZ) and requests a second opinion regarding initiating aspirin and lipid-lowering therapy. She has the following laboratory profile:

Total Cholesterol	226 mg/dL
HDL-C	46 mg/dL
LDL-C	140 mg/dL
Triglycerides	125 mg/dL
Glucose	110 mg/dL
Height	5'2"
Weight	151 lbs.
Waist Circumference	36"
Blood Pressure	122/78 mm Hg

63. Which *one* of the following statements is INCORRECT regarding this patient?
- (A) Her Framingham score is 6% for risk of MI in 10 years.
  - (B) She is at increased risk for CHD because of family history of premature coronary artery disease (CAD) and age (>55).
  - (C) Her ATP III LDL goal is <130 mg/dL with initiation of drug therapy recommended at an LDL level >160 mg/dL.
  - (D) Measuring hs-CRP in this patient would not be appropriate as an additional risk stratification measure in determining the need for lipid-lowering therapy.
  - (E) She meets the requirement characteristics for metabolic syndrome.

## Bibliography

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## Items 60–62

Answers 60 (D); 61 (B); 62 (B)

The Reynolds Risk Score was developed to improve global risk prediction in women. Among a derivation cohort of 16,400 initially healthy women followed over a 10-year period, 36 demographic and blood variables were used to define the most clinically efficient prediction model for future heart attack, stroke, and cardiovascular death. While many factors including homocysteine, Lp(a), fibrinogen, and intracellular adhesion molecule (ICAM)-1 were univariate predictors of risk, of the novel blood biomarkers, only high sensitivity C-reactive protein (hs-CRP) added additional clinical information to global cardiovascular risk. Similarly, while obesity, hormone therapy, alcohol consumption, and exercise were all predictors of risk, the only demographic variable that substantially improved global risk was knowledge of family history of myocardial infarction (MI) before age 60. These findings are of interest as they suggest that, in addition to traditional Framingham co-variables, knowledge of inflammation (hs-CRP) and genetics (family history) are important in a clinical realm. The Reynolds Investigators then went on to prospectively test the new Reynolds Risk Score to the Framingham Score in an additional group of 8158 women who were also followed over 10 years for vascular events. In this group, while the Reynolds Risk Score performed better than the Framingham Score overall, the benefit of re-classification was most relevant among those at 5 to 10 and 10 to 20% estimated 10-year risk, the “intermediate risk” group. The Reynolds Risk score can be accessed at [www.reynoldsriskscore.org](http://www.reynoldsriskscore.org)

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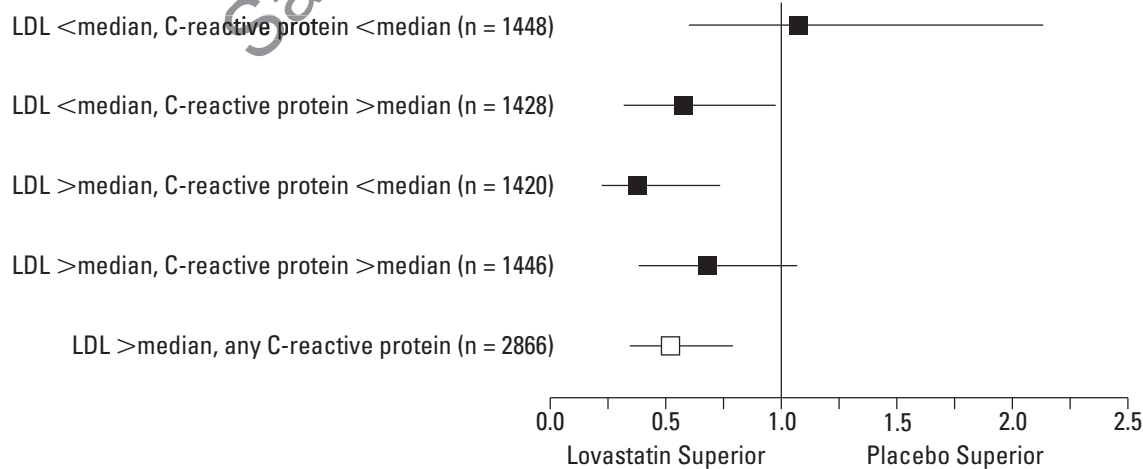
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**Item 63**                      **Answer D**

This patient's Framingham Risk score (6%) indicates she is low risk (<10%) for MI. With a family history of premature coronary artery disease (CAD), and a personal history of low HDL-C level and advanced age, the ATP III guidelines indicate initiation of drug therapy at an LDL-C level >160 mg/dL (moderate risk for CHD with 2+ risk factors and 10 year risk <10%). With an LDL-C level of 140 mg/dL, she is below the recommended guidelines for initiating statin therapy.

The Air Force/Texas Coronary Atherosclerosis Prevention Study (AFCAPS/TexCAPS) (Figure 2) evaluated the predictive value of hs-CRP and demonstrated that patients with an LDL level below the median (<150 mg/dL), as in this patient, and an hs-CRP above the median would have a significant relative risk reduction with statin therapy compared to those with both the LDL and hs-CRP below the median. In view of her family history of premature CAD and age, measurement of hs-CRP would be an appropriate additive measure in the risk stratification process of this patient as part of the decision-making process to start lipid-lowering therapy.



**Figure 2**

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