

Analysis & Probability/Algebra: Registered Dietitian

Boise Heart Clinic

Job Description: Provide Medical Nutrition Therapy for hyperlipidemia (high cholesterol and high triglycerides), hypertension, diabetes and obesity to lower individual's risk of primary or secondary heart disease.

Problem:

Leona is a 75-year-old woman with high blood pressure, coronary artery disease, and adult-onset diabetes. Lab values on 11-11-97 showed the following:

LDL - 136

HDL - 28

Triglycerides - 326

Blood sugar - 239

Total cholesterol equals HDL (high density lipids), plus LDL (low density lipids), plus VLDL (very low density lipids), and VLDL equals 1/5 of Triglycerides.

Total Cholesterol = HDL + LDL + VLDL.

1. What are Leona's total cholesterol level, VLDL levels and total cholesterol/HDL ratio? (Round to the nearest tenth)

The risk ratio for heart disease is a ratio between the total cholesterol and HDL Levels. What is Leona's risk ration? (Round to the nearest tenth)

Circle her results as desirable or high risk on the supplemental form.

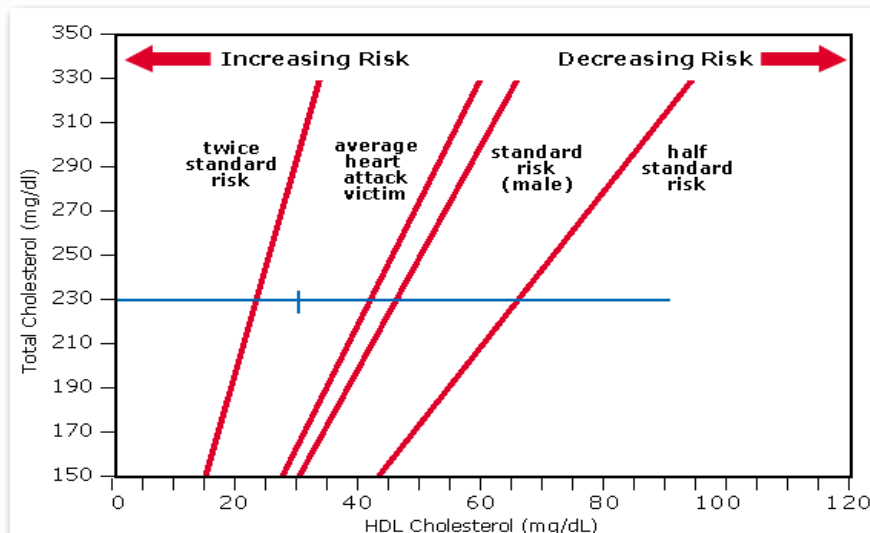
How likely is Leona to have a heart attack?

Supplemental Form

National Cholesterol Education Program's Guidelines				
		Desirable	Borderline	High
Total Cholesterol "DIET: low fat/high fiber"		Less than 200 mg/dl	200-239 mg/dl	240 mg/dl or higher
HDL Cholesterol (good cholesterol) "DIET: weight loss/exercise"		45 mg/dl or higher	35-44 mg/dl	Less than 35 mg/dl
LDL Cholesterol (bad cholesterol) "DIET: low fat/high fiber"	No Coronary Heart Disease	Less than 130 mg/dl	130-159 mg/dl	160 mg/dl or higher
	With Coronary Heart Disease	Less than 100 mg/dl	100-129 mg/dl	130 mg/dl or higher
Triglycerides "DIET: weight loss/exercise" Low refined sugars, low alcohol intake		Less than 165 mg/dl	165-249 mg/dl	250 mg/dl or higher
Risk Ratio (Total Cholesterol divided by HDL)		Less than 4.5	4.5	More than 4.5
Fasting Glucose (Blood Sugar) "DIET: Weight control, exercise, low refined sugars, balanced meal times"		Less than 120 mg/dl	120-139 mg/dl	140 mg/dl or higher

HDL, cholesterol, and your heart attack risk

Instructions: To help you track your progress and compare your risk with others, plot your lipid levels on this graph after each blood test. With a pencil, mark each axis at the points corresponding to your high-density lipoprotein (HDL) and total cholesterol levels. Then draw an imaginary line from each mark, perpendicular to the axis, and mark the point on the chart where both lines intersect. Write the date beneath the mark.



Your triglyceride level is: **326**

Chart your risk reduction over time

	DATE	HDL	TOTAL	TRIGS
VISIT 1	11-11-97	28	229	326
VISIT 2				
VISIT 3				
VISIT 4				

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See problem for details.

Solution:

#1 (Use diagrams on supplemental form as needed)

$$\text{Triglycerides VLDL} = 326 \div 5 = 65.2 \text{ VLDL}$$

$$\text{VLDL} + \text{HDL} + \text{LDL} = \text{Total Cholesterol}$$

$$65.2 + 28 + 136 = 229$$

Formula:

$$\text{Total cholesterol} \div \text{HDL} = \text{Risk ratio}$$

$$229 \div 28 = 8.2 \text{ ration}$$

#2 Leona has the lab values of someone who just had a heart attack. Therefore, if she keeps these values, Leona is VERY likely to have a heart attack.