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Low-Density Lipoprotein Cholesterol versus Lipoprotein (a) in Determining Cardiovascular Disease Risk

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Abbreviation

- ACC /AHA: American College of Cardiology/American Heart Association
- ASCVD: Atherosclerotic cardiovascular disease
- CVD: Cardiovascular disease
- HDL: High-density lipoprotein
- IDL: Intermediate-density lipoprotein
- LDL-C: Low-density lipoprotein cholesterol
- Lp(a): Lipoprotein (a)
- PCSK9: Proprotein convertase subtilisin/kexin type 9
- TC: Total Cholesterol
- TGs: Triglycerides
- WHO: World Health Organization
- VLDL: Very low-density lipoprotein

Objectives

- Review CVD and types of cholesterol
- Classify the difference between LDL-C and Lp(a)
- Review the most current guideline treatments for hyperlipidemia
- Evaluate the importance of monitor Lp(a) in determining Lp(a)-associated CVD risk
- Review available treatment for elevated Lp(a)

Cardiovascular Disease (CVD)

Heart and blood vessel disease

- Coronary heart disease
- Cerebrovascular disease
- Peripheral arterial disease

According to WHO

- 17.9 million deaths per year
  - 85% were due to heart attack and stroke
- 38% of premature deaths (under the age of 70) due to CVD

CVD Risk Factors

Modifiable

- Blood pressure
- Cholesterol
- Diabetes
- Weight
- Smoking
- Lifestyle

Non-modifiable

- Race and ethnicity
- Family history
- Biological sex

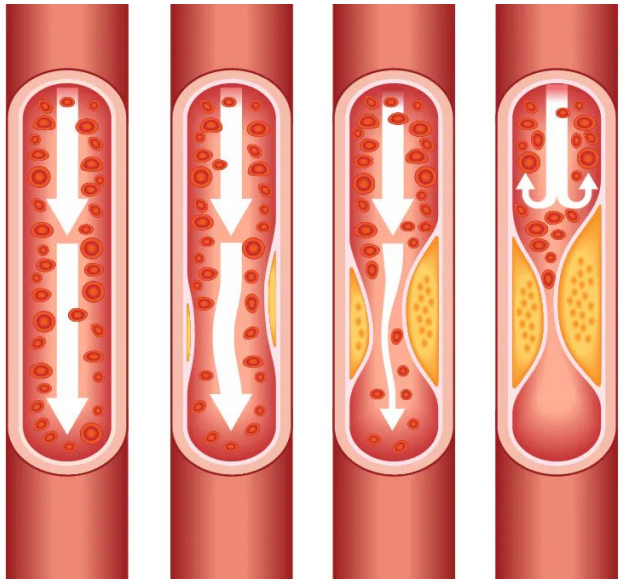
Types of cholesterols

Good Cholesterol	Bad Cholesterol
HDL	LDL
	IDL
	VLDL

Why are they good or bad?

What is LDL?

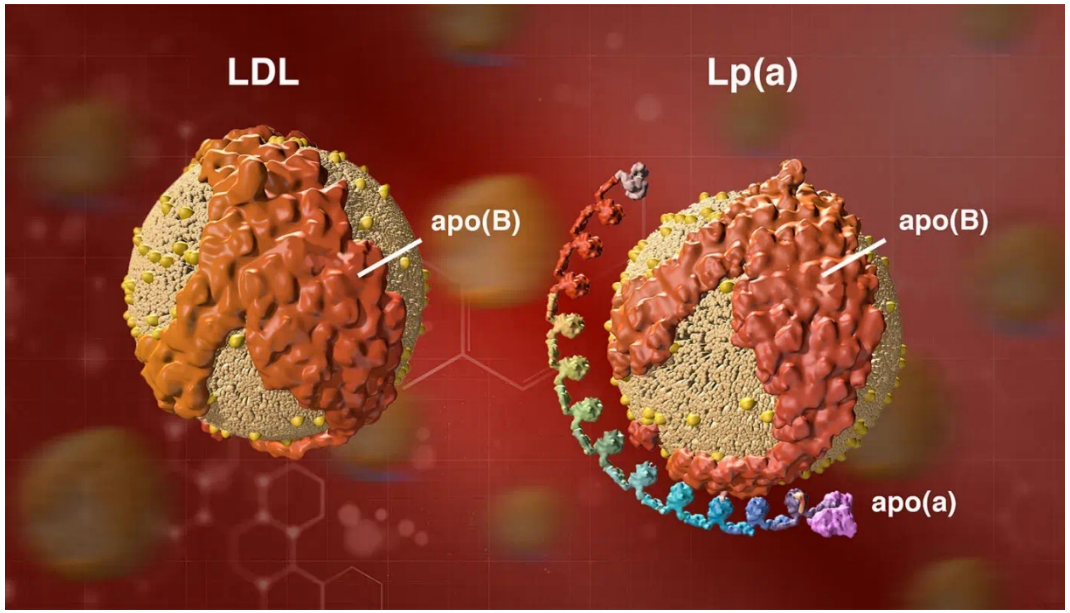
- “Bad cholesterol”
- Major cholesterol transport lipoprotein
- Carries cholesterol from liver to cells
- Can lead to plaque buildup in arteries
- Modifiable with:
  - Medications
  - Lifestyle changes



(N.d.). https://www.cdc.gov/heart-disease/data-research/facts-stats/index.htm

What is Lp(a)?

- Similar structure to LDL-C with an additional of apolipoprotein(a) (apo(a))
- Reduces fibrinolysis
- Produced in the liver
- Carries fat and lipids around in the body
- Primarily regulated by genetics
- Unclear benefit
- Highly non-modifiable



https://www.amgen.com/stories/2023/02/8-things-to-know-about-lipoproteina

Lipid Panel

LDL

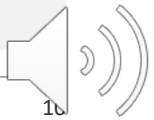
- Serum blood test
- Unit: mg/dL
- Friedewald equation
  - LDL-C = (Total Cholesterol) – (HDL-C) – (TGs/5)

LDL cholesterol, mg/dL	
Less than 100	Optimal
100 to 129	Near optimal/above optimal
130 to 159	Borderline high
160 to 189	High
190 or more	Very high

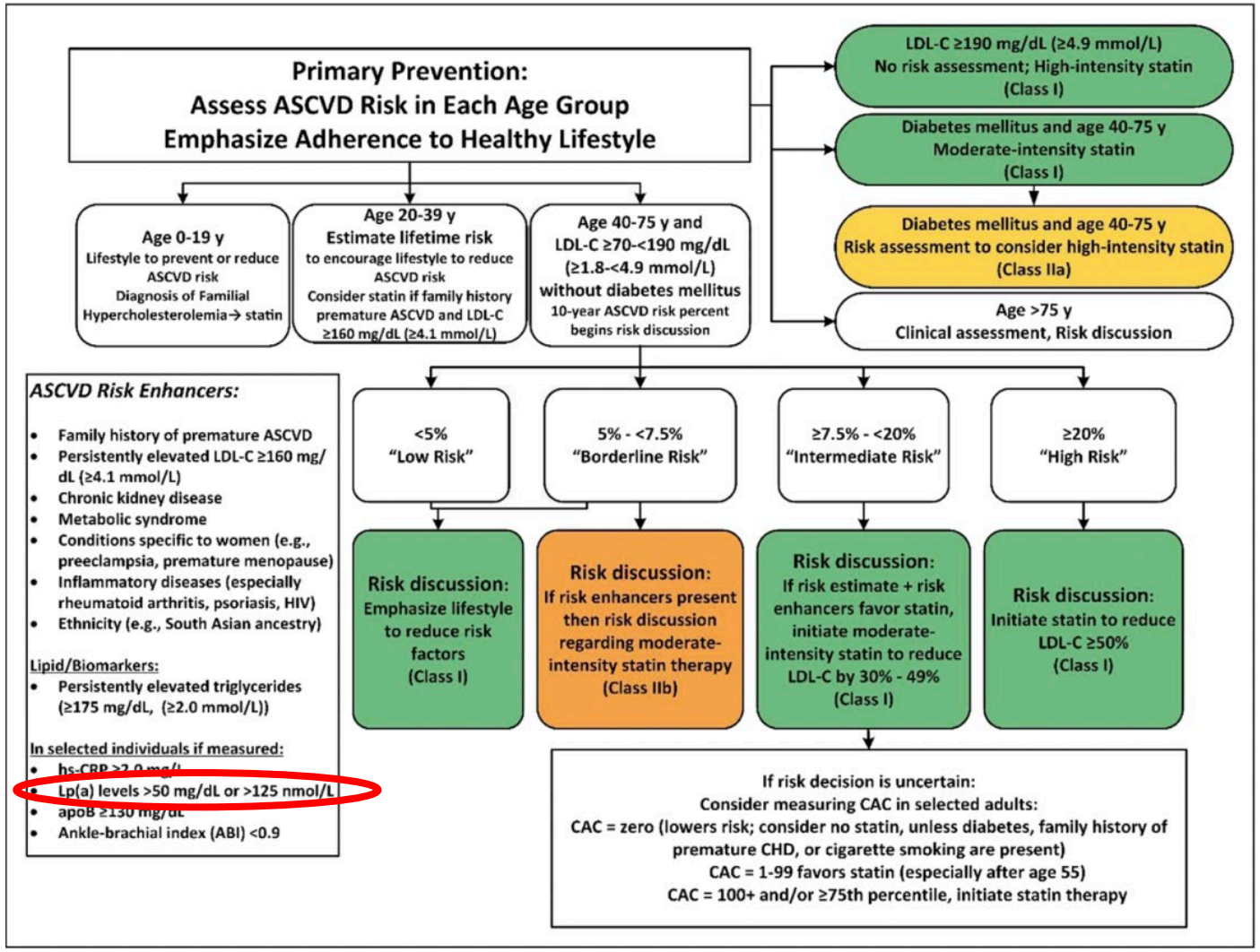
Lipid panel (cont.)

Lp(a)

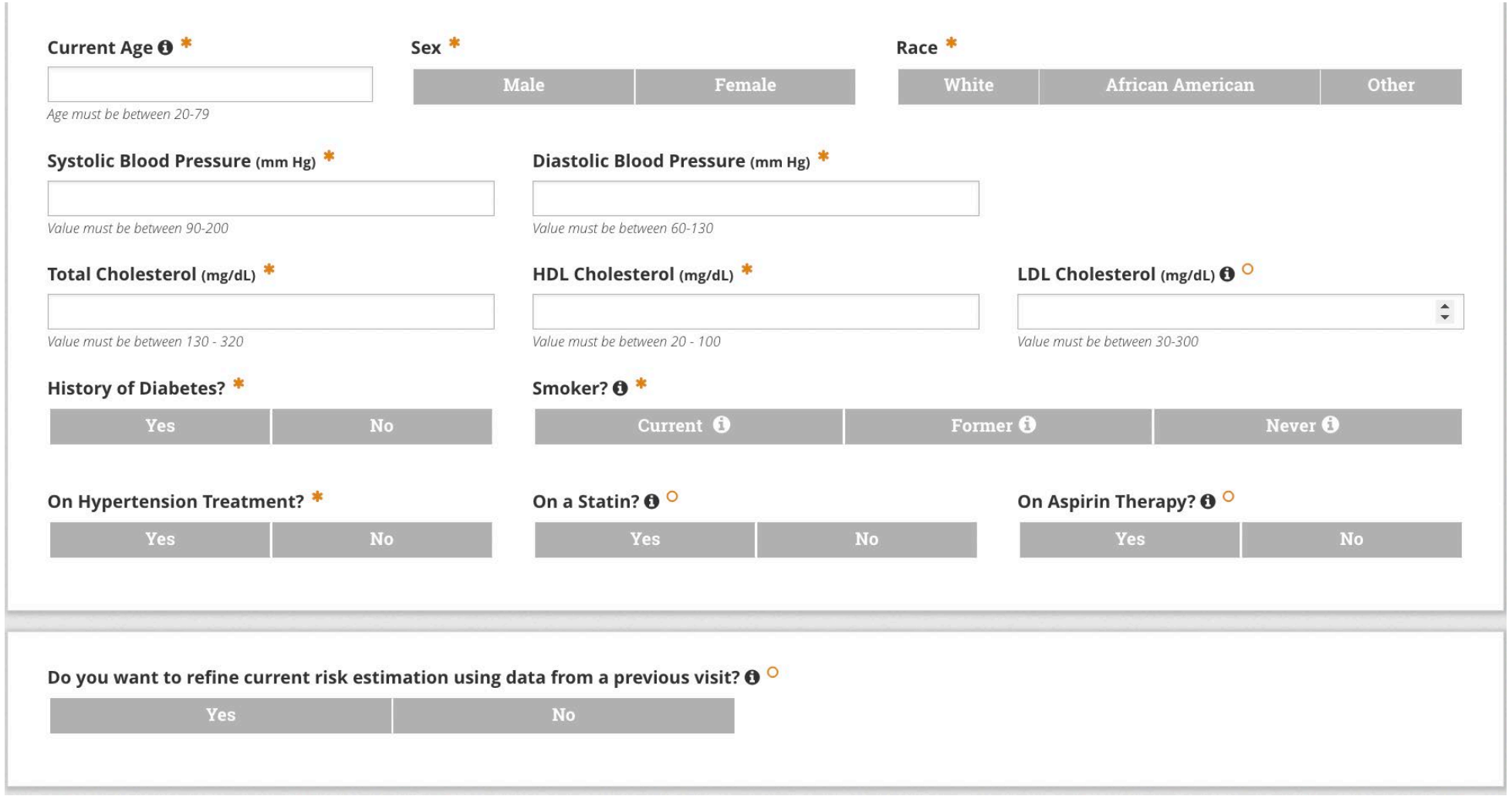
- Serum blood test
- Unit: (nmol/L or mg/dL)
- High when Lp(a) ≥50 mg/dL or ≥125 nmol/L
- Not in routine lipid panel



2018 AHA/ACC Guideline on the Management of Blood Cholesterol: A Report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines

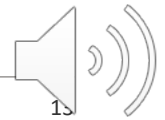


ASCVD Risk Calculator



The Importance of Screening Lp(a)

- Higher level of Lp(a) associates with higher ASCVD risk
- Independent risk factor for ASCVD
- Statin therapy – current 1st line treatment for primary and secondary prevention – does not lower Lp(a) level
- Not significantly improving through lifestyle changes



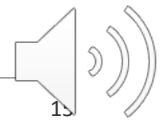
Lp(a): To Screen or Not to Screen

2018 AHA/ACC guidelines

- Does not recommend screening for general population
- May recommend for high-risk individuals:
  - Family history of premature ASCVD (males, age <55 y; females, age <65 y)
  - Personal history of ASCVD not explained by major risk factors
  - Women with hypercholesterolemia

Available Treatment

- No FDA approved treatment
- PCSK9 inhibitors have showed a reduction in 20-30% of Lp(a) level in the FOURIER Trial
  - Still require more data
- Niacin
- Lipid Apheresis
- Antisense Oligonucleotides



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