PHC

432 Team

17

TBL1: Dyslipidemia

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None

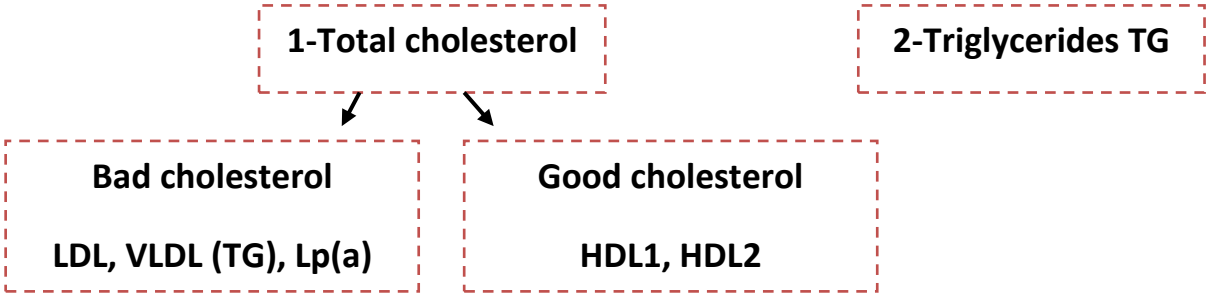
Objectives

1. Definition and Lipid metabolism
2. CVD risk factors & FRS
3. Introduction to new guidelines on lipid management
4. Comparison with ATP III guidelines
5. Current statin treatment recommendations
6. Criticism to AHA/ACC

Definition and lipid metabolism:

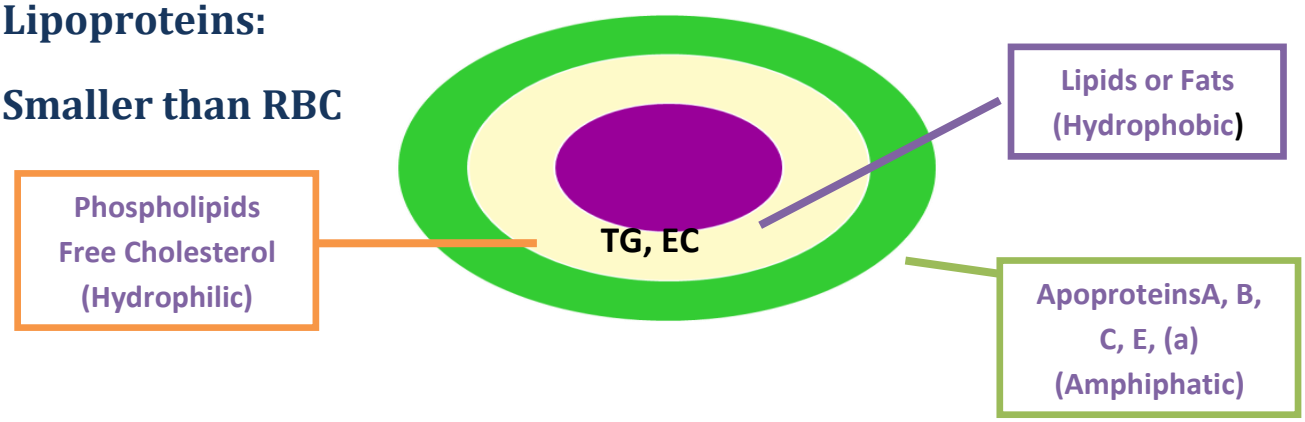
A disorder of lipoprotein metabolism, including lipoprotein overproduction or deficiency. May be manifested by elevation of the total cholesterol , (LDL) and the triglyceride concentrations, and a decrease in the (HDL) concentration in the blood

2 Types of lipids in blood:



Lipoproteins:

Smaller than RBC



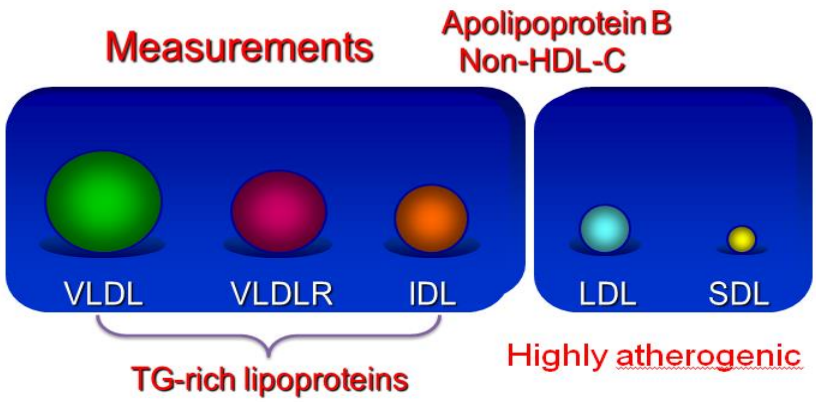
The carriers:

Apo A I and A II for HDL

Apo B100 for LDL

Apo B100+C+E for VLDL, IDL

Apo B100+Apo(a) for Lp(a)

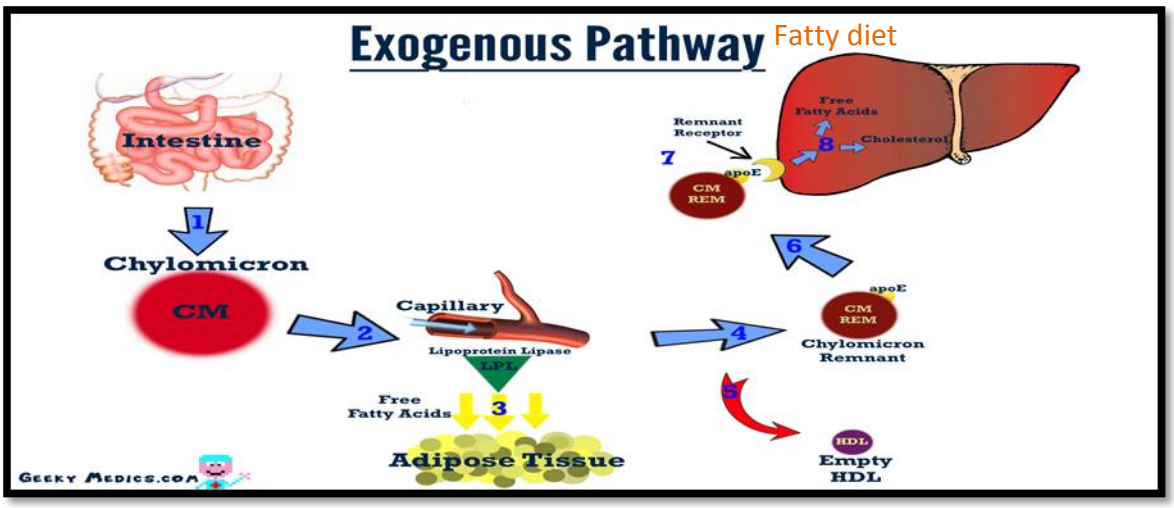


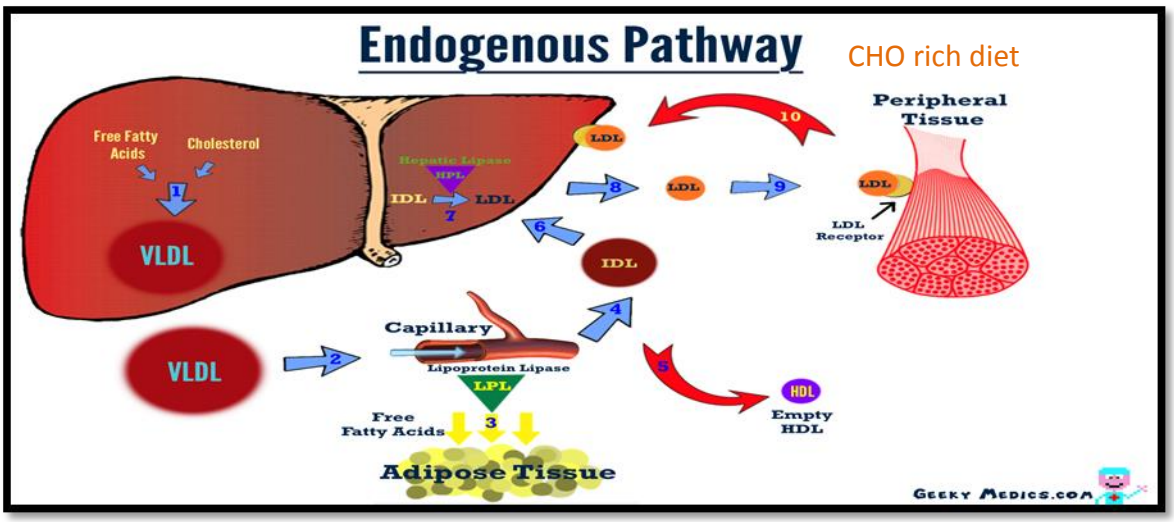
Types	Chylomicron	VLDL	LDL	HDL
Made by:	small intestines in the fed stat	the liver from excess dietary carbohydrate and protein along with the Chylomicron remnant	The Liver "VLDL once it has lost a lot of its TG's"	the Liver and Small Intestine
Absorbed into	the lymph vessels, then into the blood			
Rich in	TGs	TGs	Cholesterol	
Function	transport fats from the intestinal mucosa to the liver	Deliver TGs to body cells	Deliver cholesterol to all body cells	Pick up cholesterol from body cells and take it back to the liver

Function:

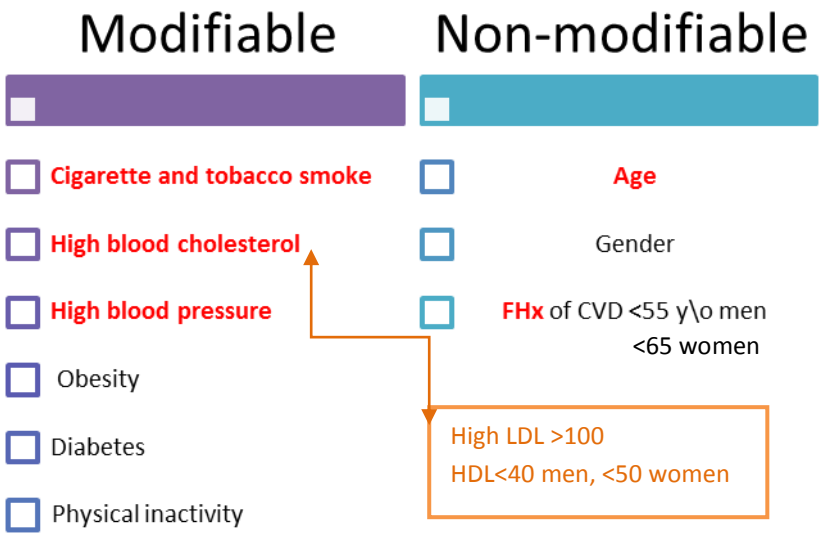
- ♣ Chylomicrons carry triglycerides(fat) from the intestines to the liver, to skeletal muscle, and to adipose tissue.
- ♣ (VLDL) carry (newly synthesized) triglycerides from the liver to adipose tissue.
- ♣ (IDL) are intermediate between VLDL and LDL. They are not usually detectable in the blood.
- ♣ (LDL) carry cholesterol from the liver to cells of the body - "bad cholesterol"
- ♣ (HDL) collect cholesterol from the body's tissues, and take it back to the liver - "good cholesterol"

Metabolism:





CVD risk factors & FRS

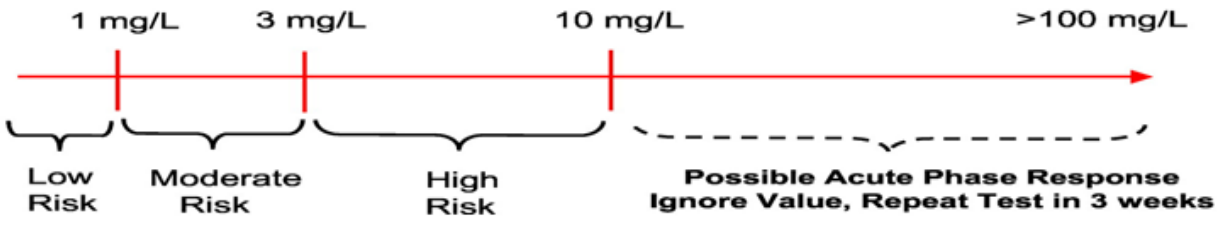


Emerging risk factors for CAD

Table 2. ***Emerging Risk Factors According to ATP III Final Report Update 2004***
1. Elevated high-sensitivity C-reactive protein
2. Coronary artery calcification
3. Elevated lipoprotein (a)
4. Homocysteine
5. Fibrinogin

C-reactive protein **>2 means high risk**

- A person's baseline level of inflammation, as assessed by the plasma concentration of CRP, predicts the long-term risk of a first myocardial infarction.

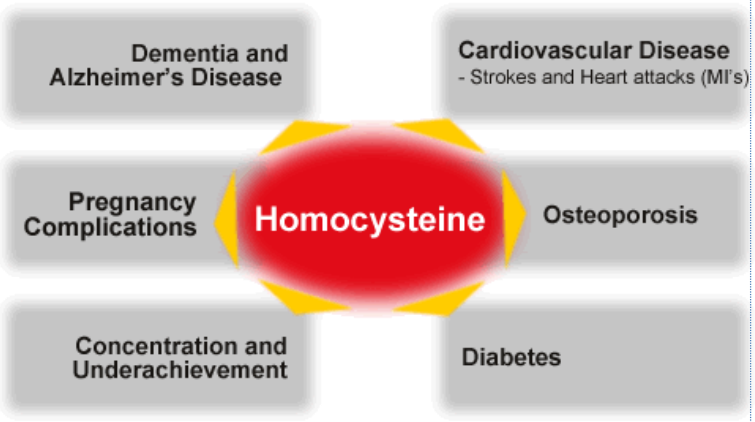


In pt with chest pain and C reactive protein level is
Between 3 to 10 : → that indicate the pt is at high risk of develop an attack
If higher than 10 → that indicate that the pt is having an acute attack

Figure 4. clinical interpretation of hs-CRP for cardiovascular risk prediction.

Homocystine: Test: Fasting homocysteine level

- ♠ Normal < 13 umol/L
- ♠ Moderate 13-16 umol/L
- ♠ Severe >16 umol/L
- ♠ A non-protein amino acid.
- ♠ Elevated levels have been may cause:
- ♠ Atherosclerosis.
- ♠ Venous thrombosis



- ♠ **Management:**
- ♠ B6, B12 & folate supplementation decrease homocysteine levels.

The Framingham risk score

- ♣ Scoring system used to calculate a pt's risk of coronary events
- ♣ The Framingham Heart Study first introduced the term *risk factor* to medical literature
- ♣ The following risk factors are used to assess cumulative risk:

- ✓ **Age**
- ✓ **Smoking Status**
- ✓ **Systolic BP**
- ✓ **HTN treatment**
- ✓ **Total cholesterol levels**
- ✓ **HDL-C level**

NCEP/Framingham Estimate of 10-Year Coronary Heart Disease Risk in Men

Age (y):	20-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79
Points:	-9	-4	0	3	6	8	10	11	12	13

Total Cholesterol	Points: Age 20-39y	Age 40-49y	Age 50-59y	Age 60-69y	Age 70-79y
<160 (mg/dl)	0	0	0	0	0
160-199	4	3	2	1	0
200-239	7	5	3	1	0
240-279	9	6	4	2	1
≥280	11	8	5	3	1

HDL Cholesterol	Points
≥60 (mg/dl)	-1
50-59	0
40-49	1
<40	2

	Points: Age 20-39y	Age 40-49y	Age 50-59y	Age 60-69y	Age 70-79y
Nonsmoker:	0	0	0	0	0
Smoker	8	5	3	1	1

Systolic BP	Points: Untx'ed	Tx'ed
<120 mmHg	0	0
120-129	0	1
130-139	1	2
140-159	1	2
≥160	2	3

Points Total:	<0	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	>17
10-Year Risk (%):	<1	1	1	1	1	1	2	2	3	4	5	6	8	10	12	16	20	25	≥30

Untx'ed = Untreated Tx'ed = Treated y = Years

Table 3. ***Classification of Patients based on The Framingham Risk Score***

Low risk	**<10% coronary heart disease risk at 10 years**
Intermediate risk	**10-20% risk of coronary event at 10 years**
High risk	**>20% risk of coronary event at 10 years**

Example

A 46-year-old man asymptomatic, non-smoker, because of being informed to have high cholesterol, a complete lipid profile was requested.

F/H: unremarkable.

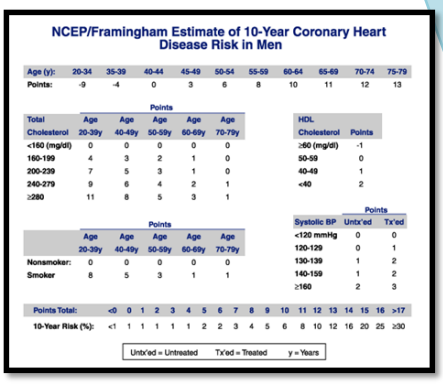
Bp 130/70 , BMI 24.5 kg/m^2, Chol. 6.2 mmol/L , Trig. 2.32 mmol/L. Next Visit:

Cholesterol: 6.40 mmol/L (247 mg/dl)

LDL-C : ..... 4.31 mmol/L (166 mg/dl)

HDL-C: ..... 1.13 mmol/L (44 mg/dl)

Trig.: ..... 2.12 mmol/L (188 mg/dl)



How are you going to **measure his risk to decide his management**?

**** Points:-**

Age: 3

T. cholest.: 6

Non-smoker: 0

HDL-c : 1
Systolic Bp : 1
Total: 11
10-year Risk: 8%

Calculating 10-Year Risk in Women

Age (years)	20-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79
Points	-7	-3	0	3	6	8	10	12	14	16

Points

Total Cholesterol	Age 20-39	Age 40-49	Age 50-59	Age 60-69	Age 70-79
<160 (mg/dL)	0	0	0	0	0
160-199	4	3	2	1	1
200-239	8	6	4	2	1
240-279	11	8	5	3	2
≥ 280	13	10	7	4	2

Points

HDL CHOLESTEROL	Points
≥ 60 (mg/dL)	-1
50-59	0
40-49	1
< 40	2

	Age 20-39	Age 40-49	Age 50-59	Age 60-69	Age 70-79
Nonsmoker	0	0	0	0	0
Smoker	9	7	4	2	1

Systolic BP	Untx"ed	Tx"ed
<120	0	0
120-129	3	1
130-139	4	4
140-149	5	3
≥ 160	6	4

Points total:	<9	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	≥25
10 year Risk (%)	<1	1	1	1	1	2	2	3	4	5	6	8	11	14	17	22	27	≥30

Untx"ed = Untreated Tx"ed =Treated

Cases in which you don't need FRS ?

Patients who already have a high risk due to other diseases:

- ♣ Stroke or TIA
- ♣ Bypass surgery or balloon angioplasty
- ♣ Type 2 diabetes
- ♣ Kidney disease
- ♣ Abdominal aortic aneurysm
- ♣ Familial hypercholesterolemia
- ♣ Peripheral artery disease
- ♣ Carotid artery disease

They already have HIGH RISK to develop CHD

Introduction to new guidelines on lipid management

AHA/ACC v.s IAS guidelines

ACC/AHA 2013 "new"	International Atherosclerosis Society (IAS)
• ACC/AHA (evolved from **ATP IV**/NHLBI efforts) • Recommendations based on what has been shown to reduce risk in RCTs • Many areas left to clinical judgment where RCT data were not available or limited • **Fire and forget**	• **ATP III** • Apo B-containing lipoproteins is causally associated with ASCVD risk and that lowering "atherogenic cholesterol" (LDL-C and non-HDL-C) will reduce risk • **Treat to target "not good"**

ACC/ AHA: Use Critical Questions (CQs) to create the evidence search from which the guideline is developed

2013 ACC/AHA Guideline on the Treatment of Blood Cholesterol to Reduce Atherosclerotic Cardiovascular Risk in Adults

1. Cholesterol Panel: 3 CQs not TG
2. Risk Assessment Work Group: 2 CQs
3. Lifestyle Management Work Group: 3 CQs

What has changed compared to ATP3 guideline?

- ♠ No specific LDL cholesterol target
- ♠ Initiate either moderate-intensity or high-intensity statin therapy for patients who fall into the four categories
- ♠ Measure lipids during follow-ups to assess adherence to treatment, not to achieve a specific LDL target

	ATP-III	AHA/ACC
Basis for recommendations	Expert opinion based on pathophysiology, observational, & RCT data	Evidence-based recommendations based on RCTs and systematic reviews
Risk stratification	CHD equivalents, risk factors, 10-year risk of MI	4 specific risk groups based on benefits in clinical trials
Risk calculation	Framingham risk score	Pooled cohort equation
Goals of therapy	LDL & non-HDL levels (stratified by risk)	Statin intensity (% LDL reduction)
Role for monitoring	Fasting lipid panel to assess achievement of goal	Fasting lipid panel to assess **adherence/therapeutic response**
Role of non-statin agents	Encouraged use if needed to achieve LDL or non-HDL goal	Discourages use in most patients because of lack of evidence on improving outcomes

The scope of the new AHA/ACC 2013 guidelines

- ♣ Focus on treatment of blood cholesterol to reduce ASCVD risk in adults
- ♣ Emphasize adherence to a heart healthy lifestyle as foundation of ASCVD risk reduction
- ♣ Identify individuals most likely to benefit from cholesterol-lowering therapy "4 statin benefit groups " "see below"
- ♣ Identify safety issues

ACC/AHA - Why Not Continue to Treat to Target?

Major difficulties:

- ♠ Current RCT data do not indicate what the target should be
- ♠ Unknown magnitude of additional ASCVD risk reduction with one target compared to another

- ♠ Unknown rate of additional adverse effects from multidrug therapy used to achieve a specific goal

Therefore, unknown net benefit from treat-to-target

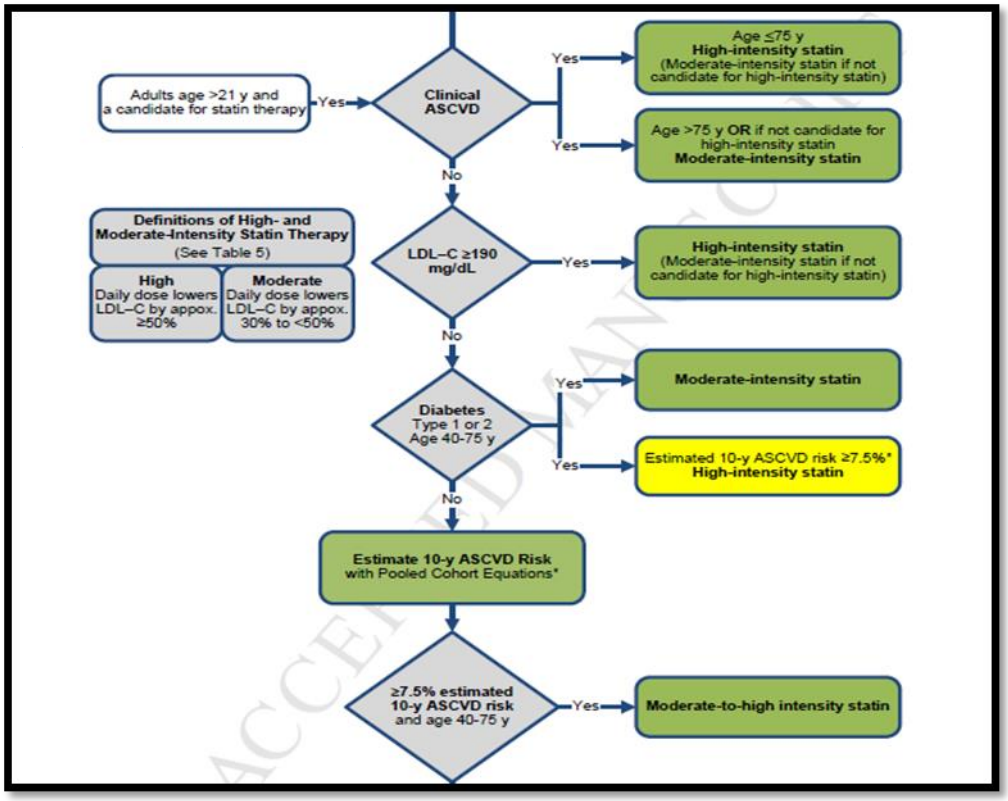
4 Major Statin Benefit Groups >21 y\o

- ♦ Individuals with clinical ASCVD "see below"
- ♦ Individuals with LDL >=190
- ♦ Individuals with DM, 40-75 yo with LDL 70-189 and without clinical ASCVD
- ♦ Individuals without clinical ASCVD or DM with LDL 70-189 and estimated 10-year ASCVD risk >7.5%

Summary of Drug choice based on ATP III

Lipid abnormality type	First choice	Additional	Remarks
↑ LDL	Statin	Ezetimibe	Myopathy ↑
↑ TG	Fibrate	Niacin	↓ CHO intake
↓ HDL	Niacin	Fibrate	Exercise
↑ LDL + ↑ TG	Statin + Fibrate	Niacin	Myo risk ↑ ↑
↑ LDL + ↓ HDL	Statin + Niacin	Fibrate	Exercise
↑ TG + ↓ HDL	Fibrate + Niacin	Statin	Exercise
↑ LDL + ↑ TG + ↓ HDL	Statin + Fibrate	E, N, BA, FO	Myo risk ↑ ↑ ↑

Treatment algorithm:-



-This algorithm: ACC/AHA 2013 recommendations for blood cholesterol guidelines:

-You see the 4 statin benefit groups in the middle: on top, you see the patient's group with clinical ASCVD, below that you see the group with LDL >190, below that you see the patient's with history of DM 40-75 years old, and in the bottom, you see patients who don't have the characteristics of the first 3 groups but their 10 year ASCD risk is greater than 7.5%

-For the first group: based on the guidline, if you have **clinical ASCD, are younger than 75** and don't have any history of intolerance to statin, **you should be started on high intensity statin**. On the other hand, if you are **older than 75, or not a candidate for high intensity** statin due to lets say intolerance to statins, you are a candidate for **moderate-intensity statin**

-For the second group, if your **LDL is greater than 190, you need to be started on high-intensity statin, unless you have contra-indication to high dose →start on moderate dose**

-For the third group, **individuals with diabetes** with above mentioned group age, you need to calculate the 10 year ASCVD risk using a new equation/calculater called "pooled Cohort Equations" **→if the 10 year risk is greater than 7.5%, start them on high-intensity, otherwise, you can start them on moderate-intensity statin**

-For the last group, you need to calculate patient's risk factor and start them on **moderate-to-high intensity statin if their estimated 10-y ASCVD risk is greater than 7.5%**

- Keep that in mind that what we mean by "high intensity" statin, is the daily dose of statin that lowers the LDL by appox greater than 50%, and what we mean by moderate intensity statin, is the daily dose of statin that lowers the LDL by appox 30-50%.

Don't Forget Healthy Lifestyle:

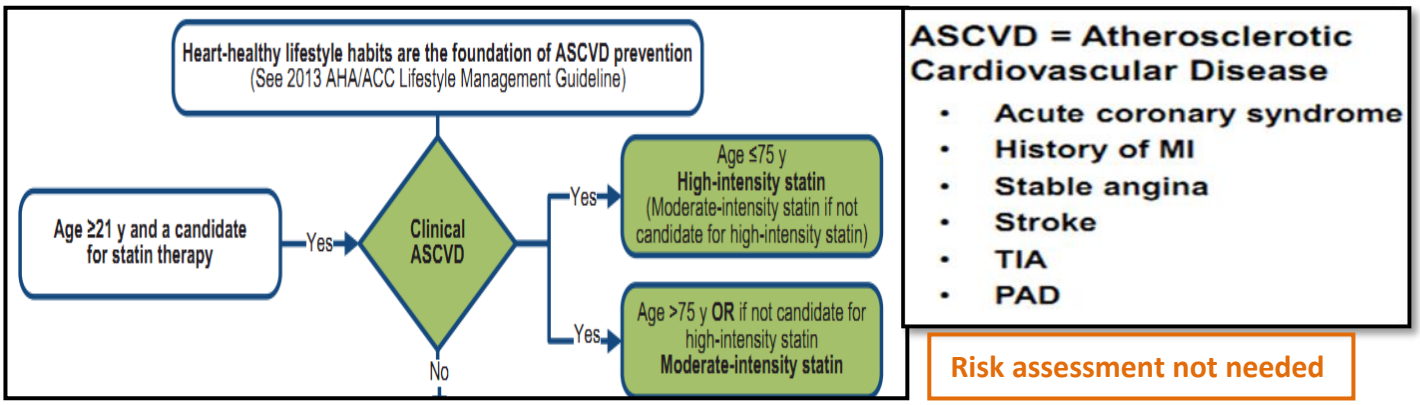
- ♣ Healthy diet
- ♣ Regular exercise
- ♣ No Smoking
- ♣ Maintain healthy weight

2013 ACC/AHA/NHLBI Guideline on Lifestyle for CVD Prevention:

- ♠ Mediterranean or DASH-type diet
- ♠ Restrict consumption of saturated fats, trans fats, sweets, sugar-sweetened beverages, and sodium.
- ♠ Physical activity of moderate to vigorous intensity lasting 40 minutes per session 3-4 times per week

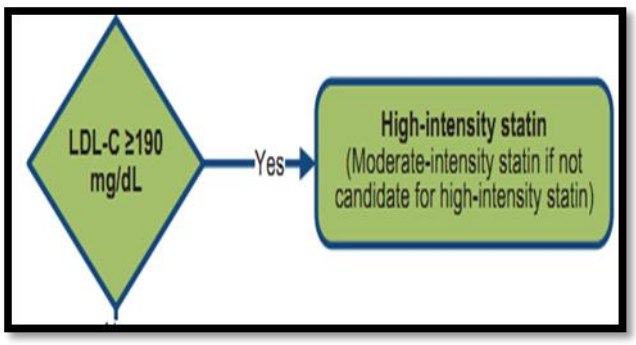
Eat a dietary pattern that is rich in fruit, vegetables, whole grains, fish, low-fat dairy, lean poultry, nuts, legumes, and nontropical vegetable oils consistent with a Mediterranean or DASH-type diet.

1. Patients with clinical ASCVD:

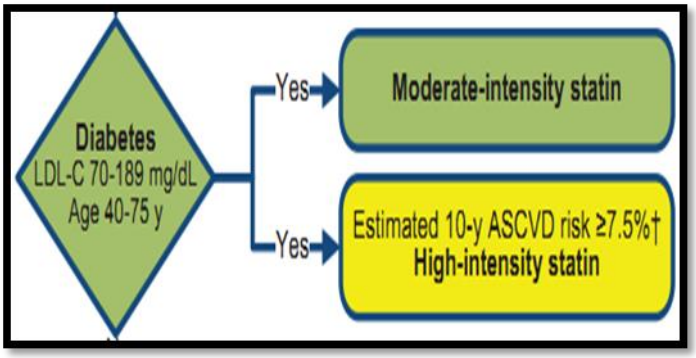


2. LDL greater than 190 mg/dl:

- ♣ These are patients with familial hyperlipidemia "usually"
- ♣ They deserve special consideration
- ♣ Often start with untreated LDL of 325-400 mg/dl

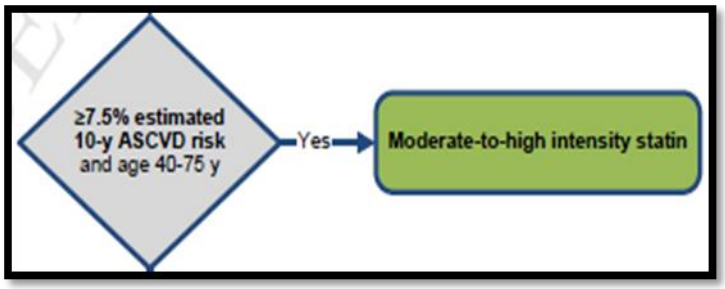


3. Patients with DM, age 40-75 years:



- ♣ All have indication for statin
- ♣ Diabetics with > 7.5% 10 year risk get high intensity statin therapy
- ♣ Diabetics with < 7.5% 10 year risk of CAD get moderate intensity statin therapy

4. Age 40-75 years that do not meet above criteria, but have a 10 year risk of >7.5 %:



- ♣ 10 year and lifetime risk as determined by CV Risk Calculator.
- ♣ Specifically designed for this trial
- ♣ Downloadable on AHA or ACC site

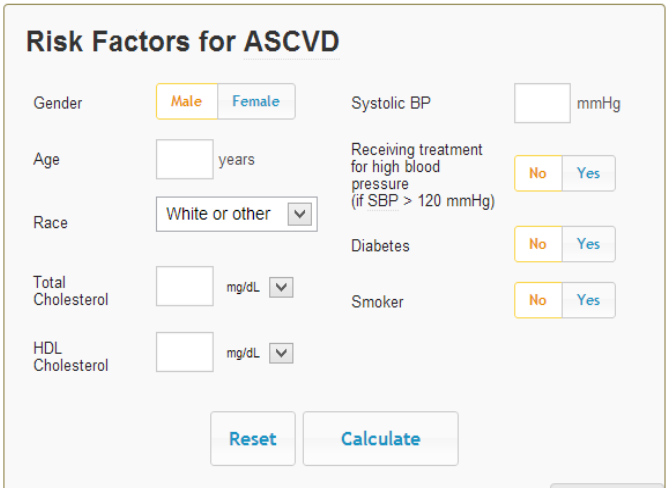
****Dosing Statins:**

Table 5. High- Moderate- and Low-Intensity Statin Therapy (Used in the RCTs reviewed by the Expert Panel)*

High-Intensity Statin Therapy	Moderate-Intensity Statin Therapy	Low-Intensity Statin Therapy
Daily dose lowers LDL–C on average, by approximately ≥50%	Daily dose lowers LDL–C on average, by approximately 30% to <50%	Daily dose lowers LDL–C on average, by <30%
Atorvastatin (40†)–80 mg **Rosuvastatin 20 *(40)* mg** Strongest	**Atorvastatin 10 *(20)* mg** **Rosuvastatin (5) 10 mg** **Simvastatin 20–40 mg‡** **Pravastatin 40 *(80)* mg** **Lovastatin 40 mg** ***Fluvastatin XL 80 mg*** **Fluvastatin 40 mg bid** ***Pitavastatin 2–4 mg***	***Simvastatin 10 mg*** **Pravastatin 10–20 mg** **Lovastatin 20 mg** ***Fluvastatin 20–40 mg*** ***Pitavastatin 1 mg***

Pooled Cohort Risk Assessment Equations

Predicts 10-year risk for a first atherosclerotic cardiovascular disease (ASCVD) event

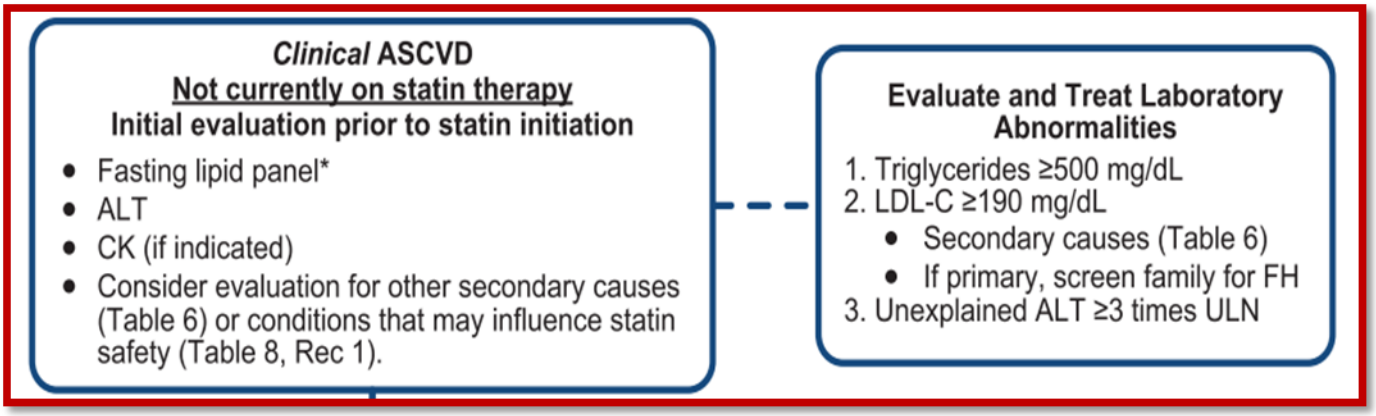


This is the new equation, the pooled cohort risk assessment equation:

As you can see, there are different parameters that you need to plug in to the equation to calculate the risk: gender, age, race, total cholesterol, HDL, systolic BP, whether or not you are on any anti-HTN meds, any history of DM or being a smoker

No recommendations on statin therapy for patients with

- ♣ NYHA class II-IV
- ♣ ESRD on dialysis



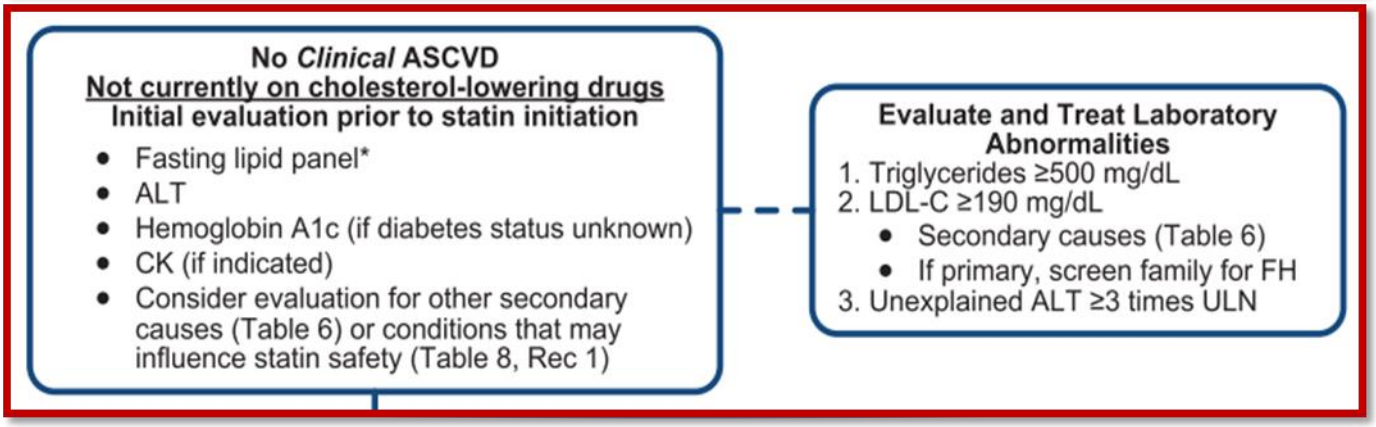


Table 6.

Secondary Causes of Hyperlipidemia Most Commonly Encountered in Clinical Practice

Secondary Cause	Elevated LDL-C	Elevated Triglycerides
Diet	Saturated or *trans* fats, weight gain, anorexia nervosa	Weight gain, very-low-fat diets, high intake of refined carbohydrates, excessive alcohol intake
Drugs	Diuretics, cyclosporine, glucocorticoids, amiodarone	Oral estrogens, glucocorticoids, bile acid sequestrants, protease inhibitors, retinoic acid, anabolic steroids, sirolimus, raloxifene, tamoxifen, beta blockers (not carvedilol), thiazides
Diseases	Biliary obstruction, nephrotic syndrome	Nephrotic syndrome, chronic renal failure, lipodystrophies
Disorders and altered states of metabolism	Hypothyroidism, obesity, pregnancy*	Diabetes (poorly controlled), hypothyroidism, obesity; pregnancy*

2013 AHA/ACC Cholesterol Guidelines: Monitoring of statins

Baseline ALT prior to initiation

- Consider baseline CK in patients at risk for muscle disorders
- Routine ALT or CK levels not recommended unless symptomatic

Baseline fasting lipid panel

ALT> 3 times or CK> 1000 stop statin

- 4-12 weeks to assess therapeutic response and every 3-12 months if clinically warranted
- Reinforce adherence if response is less than expected
- Dose may be decreased if 2 consecutive LDL <40

STATIN Safety recommendations

Conditions that could predispose pts to statin side effect:

- Impaired renal or hepatic function
- History of previous statin intolerance or muscle disorder
- Age >75
- History of hemorrhagic stroke

Consider use of lower-intensity statin if any of these characteristics are present

- ♣ Select the appropriate dose
- ♣ Keep potential Side effects and drug-drug interaction In mind (grade A)
- ♣ If high or moderate intensity statin not tolerated, use the maximum tolerated dose instead
- ♣ It may be harmful to initiate simvastatin 80mg, or increase the dose of simvastatin to 80mg (Grade B)

Management of adverse effects:

- ♣ Mild to moderate muscle symptoms
  - ✓ D/C statin until muscle symptoms resolve
  - ✓ Re-challenge with a lower dose
  - ✓ If symptoms resume, D/C statin and re-challenge with lower dose of different statin
  - ✓ Gradually titrate to target dose
  - ✓ If symptoms don't resolve after 2 months, assume it is not statin-related and resume original statin
- ♣ New onset diabetes
  - ✓ Reinforce lifestyle modifications
- ♣ Memory impairment
  - ✓ Consider other potential causes before stopping statin

Non-statin therapies:

- ♠ Non statin therapies, alone or in combination with statins, do not provide acceptable risk reduction benefits compared to adverse effects.
- ♠ These include:

— **Zetia** **Fibrates**

— **Fish oil** **Niacin**

♠ For the most part, these should be avoided with few exceptions

Medications for Hyperlipidemia:

Drug Class	**Agents**	**Effects (% change)**
HMG CoA reductase inhibitors	Statins	↓LDL (18-55),↑ HDL (5-15) ↓ Triglycerides (7-30)
Cholesterol absorption inhibitor	Ezetimibe	↓ LDL(14-18), ↑ HDL (1-3) ↓Triglyceride (2)
Fibric Acids	Gemfibrozil Fenofibrate	↓LDL (5-20), ↑HDL (10-20) ↓Triglyceride (20-50)
Omega 3 fatty acid ethyl ester	Lovaza	↓Triglyceride

Drug Class	***Agents***	***Effects (% change)***	***Side Effects***
HMG CoA reductase inhibitors	Statins	↓LDL (18-55),↑ HDL (5-15) ↓ Triglycerides (7-30)	Myopathy, increased liver enzymes Contraind. pregnancy
Cholesterol absorption inhibitor	Ezetimibe	↓ LDL(14-18), ↑ HDL (1-3) ↓Triglyceride (2)	Headache, GI distress
Fibric Aci ds (Fibrates)	Gemfibrozil Not mixed with statin Fenofibrate Ok with statin	↓LDL (5-20), ↑HDL (10-20) ↓Triglyceride (20-50) High TG>> pancreatitis	Dyspepsia, gallstones, myopathy
Bile Acid sequestrants Ok for pregnancy	Cholestyramine	↓ LDL ↑ HDL No change in triglycerides	GI distress, constipation, decreased absorption of other drugs

Omega-3- Fatty acids Or Fish-oil		↓ non-HDL (VLDL, IDL) ↑ HDL C ↓ TG	Bleeding GI upset

The role of non-statin agents:

— Limited evidence to support use of non-statin agents

— Consider use of non-statin agents in the following situations:

In addition to statins in high-risk patients with less than anticipated response:

- ♣ Clinical ASCVD and age<75
- ♣ Baseline LDL>190
- ♣ Age 40-75 years with diabetes
- ♣ Completely statin-intolerant
- ♣ TG (>500)

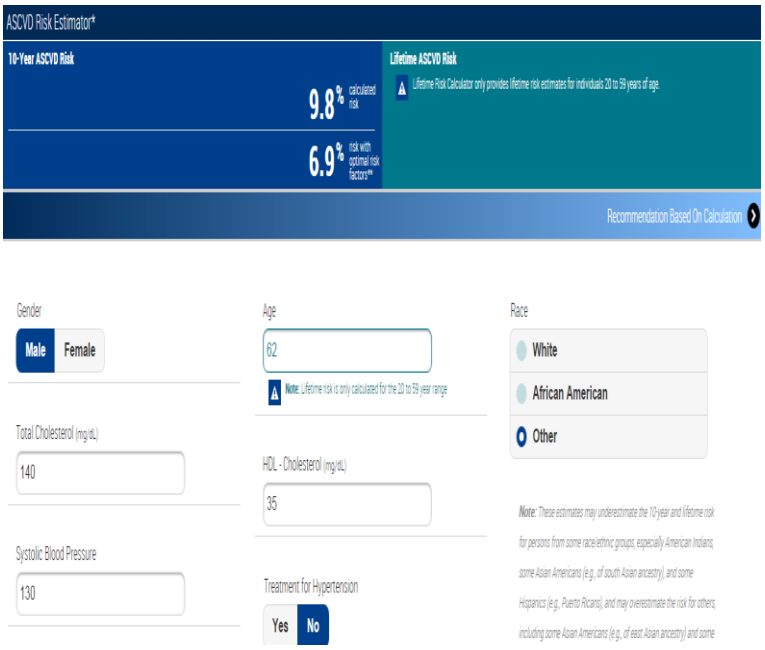
Summary:

- ♣ Fire and forget approach
- ♣ Know the 4 high risk groups
- ♣ Use medications proven to reduce risk, ie statins
- ♣ Encourage healthy lifestyle
- ♣ Don't forget patient preference

Case:

62 year old male

- ♦ Total cholesterol: 140
- ♦ Low HDL: 35
- ♦ SBP: 130 mmHg
- ♦ Not taking anti-hypertensive medications
- ♦ Non-diabetic
- ♦ Non-smoker
- ♦ Calculated 10 yr risk of ASCVD : 9.8%



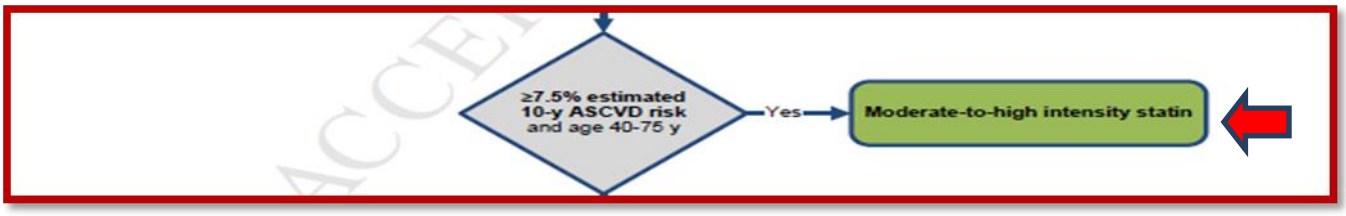


Table 5. High- Moderate- and Low-Intensity Statin Therapy (Used in the RCTs reviewed by the Expert Panel)*

High-Intensity Statin Therapy	Moderate-Intensity Statin Therapy	Low-Intensity Statin Therapy
Daily dose lowers LDL–C on average, by approximately ≥50%	Daily dose lowers LDL–C on average, by approximately 30% to <50%	Daily dose lowers LDL–C on average, by <30%
Atorvastatin (40†)–80 mg **Rosuvastatin 20 *(40)* mg**	**Atorvastatin 10 *(20)* mg** **Rosuvastatin (5) 10 mg** **Simvastatin 20–40 mg‡** **Pravastatin 40 *(80)* mg** **Lovastatin 40 mg** *Fluvastatin XL 80 mg* **Fluvastatin 40 mg bid** *Pitavastatin 2–4 mg*	*Simvastatin 10 mg* **Pravastatin 10–20 mg** **Lovastatin 20 mg** *Fluvastatin 20–40 mg* *Pitavastatin 1 mg*

Pooled Cohort Equations: Criticism:

- Estimates of 12 million to 45 million additional candidates for statin therapy based on CV risk estimates
- Pencina* et al. estimated 87.4% of men and 53.6% of women ages 60-75 would now be eligible for statins
- Validation attempts have yielded conflicting results:
- 75%-150% when applied to data from the Women's Health Study and the Physician's Health Study
- Muntner‡ et al. reported good results in actual vs. predicted 5-year risks in a contemporary cohort of the REGARDS study

Observed and expected events for different scores were compared in MESA after a 10.2- year follow-up:

Table 2. Predicted and Observed Events for Each Risk Score

Risk Score	Predicted Events, *n* (%)	Observed Events, *n* (%)	Signed Absolute Difference	Discordance, %*	c-Statistic	Discrimination Slope
Total (*n* = 4227)						
FRS-CHD†	397.6 (9.41)	263 (6.22)	3.18	51	0.68	0.05
FRS-CVD‡	561.3 (13.28)	448 (10.60)	2.68	25	0.71	0.09
ATPIII-FRS-CHD§	288.7 (6.83)	134 (3.17)	3.66	115	0.71	0.06
RRS‖	314.0 (7.43)	323 (7.64)	−0.21	−3	0.72	0.07
AHA-ACC-ASCVD¶	387.2 (9.16)	218 (5.16)	4.00	78	0.71	0.06
Men (*n* = 1961)						
FRS-CHD†	251.1 (12.80)	164 (8.36)	4.44	53	0.69	0.05
FRS-CVD‡	358.7 (18.29)	261 (13.31)	4.98	37	0.71	0.09
ATPIII-FRS-CHD§	218.6 (11.15)	86 (4.39)	6.76	154	0.71	0.05
RRS‖	213.5 (10.89)	196 (9.99)	0.89	9	0.70	0.06
AHA-ACC-ASCVD¶	232.1 (11.84)	125 (6.37)	5.46	86	0.71	0.06
Women (*n* = 2266)						
FRS-CHD†	146.5 (6.47)	99 (4.37)	2.10	48	0.60	0.01
FRS-CVD‡	202.6 (8.94)	187 (8.25)	0.69	8	0.70	0.05
ATPIII-FRS-CHD§	70.2 (3.10)	48 (2.12)	0.98	46	0.67	0.02
RRS‖	100.5 (4.44)	127 (5.60)	−1.17	−21	0.72	0.05
AHA-ACC-ASCVD¶	155.1 (6.84)	93 (4.10)	2.74	67	0.70	0.05

Questions

1) 45-y-o male attends the clinic concerned about heart disease. Which one is most important determining his ischemic heart disease?

a. BP of 139\82 mmhg
b. BMI of 31.2kg\m2
c. Father died of MI at 50 years of age
d. Waist circumference of 88 cm

2) 52 y-o women k\c DM for routine checkup.
BP: 130\76, BMI: 29, HbA1C: 6.9%.
T.CHL: 3.8
TG: 2.2
LDL-C: 2.4
HDL-C: 0.62
Which one is most adverse outcome to increase her risk of CVD?

a. High LDL
b. Low HDL
c. Uncontrolled BP
d. Uncontrolled DM

3) Which one increases risk of venous thrombosis?

a. Homocystinaemia
b. High TG
c. High LDL
d. High VLDL

4) 52 y-o male with atypical chest pain on exertion. He used to smoke 20 cigarette\day. ECG is normal.
T.CHL: 6.3
TG: 3.5
LDL-C: 3.5
HDL-C: 0.9
C- reactive protein: 3.4 (normal less than 1)
Which lab result is best predictor of an adverse outcome in this patient?

a. HDL
b. LDL
c. TG
d. C-reactive protein

5) 44 y-o man recently discovered to have HTN, lipid profile:
T.CHL: 7.9
TG: 2.2
LDL-C: 6.2
HDL-C: 0.82
TSH: 3.6
Based on ATP 4, what is the most appropriate treatment?

a. Life style modification
b. Life style modification and low intensity statin
c. Life style modification and moderate intensity statin
d. Life style modification and high intensity statin

6) You prescribed Niacin for 48 y-o man had high TG and CHL. 2 months later he complained of flushing and asked to stop this medication. What is the most appropriate step to deal with his complaint?

a. Take Aspirin before niacin
b. Take statin before niacin
c. Take niacin at nigh
d. Take niacin with milk

7) Which of the scoring systems is used to assess risk of developing cardiovascular disease?

a. Framingham
b. Apgar
c. CHADS2
d. Alvarado

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Answers:

1st Question:C

2nd Question:B

3rd Question:A

4th Question:D

5th Question:D

6th Question:A

7th Question:A