Patient Assessment

- Instruct patient to fast for 9–12 hours (may take medications with water).
- Check fasting lipid panel (total cholesterol, HDL-C, TGs, calculated LDL-C*) before starting antiretroviral regimen and 3–6 months after.
  - *If TG > 400 mg/dL, calculated LDL-C is not reliable. Calculate non-HDL-C = Total cholesterol – HDL-C, or, send directly measured LDL-C.
  - If TG ≥ 200 mg/dL, calculate non-HDL-C, which is a secondary goal of therapy after LDL-C.
- Consider secondary causes of dyslipidemia (e.g. hypothyroidism, nephrotic syndrome, excessive alcohol intake, medication-induced [e.g., thiazides, testosterone], poorly controlled diabetes mellitus)
- Risk stratify

Does patient have established coronary heart disease (CHD)?
Does patient have a coronary risk equivalent (1 or more of the following)?

☐ Cerebrovascular disease ☐ Abdominal aortic aneurysm
☐ Peripheral vascular disease ☐ Diabetes mellitus

No
Count CHD risk factors

Yes
High risk category

1 Current CHD Risk Factors:
check all that apply

- ☐ Cigarette smoking
- ☐ Hypertension (BP ≥ 140/90 or on antihypertensive medication)
- ☐ Age (men ≥ 45, women ≥ 55 years)
- ☐ Family history of premature CHD
  - ✓ In male first-degree relative < 55 years
  - ✓ In female first-degree relative < 65 years
- ☐ Low HDL-C (< 40 mg/dL)*

*Subtract one risk factor if HDL-C ≥ 60 mg/dL

2 Number of Risk Factors:

- **≥ 2:** Calculate 10-year risk of CHD event using Framingham calculator.
- **0–1:** Low risk

(http://hin.nhlbi.nih.gov/atpiii/calculator.asp) or see Framingham Calculator Worksheets.

3 Risk Categories

- **If risk >20%, patient has coronary risk equivalent state**
- 10–20% moderate risk
- <10% low risk

Determine LDL-C or Non-HDL-C Goal Based on Risk Category

Risk Category	LDL-C Goal (mg/dL)	Non-HDL-C Goal (mg/dL)	LDL-C to Initiate TLC* (mg/dL)	LDL-C to Consider Drug Therapy (mg/dL)
CHD or risk equivalent	< 100 (< 70 optional)	< 130 (< 100 optional)	≥ 100	≥ 130
≥ 2 risk factors and 10–yr risk:				
10–20%	< 130 (< 100 optional)	< 160 (< 130 optional)	≥ 130	≥ 130
<10%	< 130	< 160	≥ 130	≥ 160
0–1 risk factor	< 160	< 190	≥ 160	≥ 190

* TLC = Therapeutic Lifestyle Change

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Patient Management

- Address non-lipid risk factors (e.g., smoking cessation, treating hypertension)
- Recommend lifestyle changes: refer to dietician if possible or see APLA Nutrition Fact sheet on Lowering Cholesterol and Triglycerides for dietary instructions. Encourage aerobic exercise (30–60 mins ≥ 5 times/week). Reassess lipids in 4–8 weeks.
- If high LDL-C or TGs are deemed related to HAART, consider changing antiretrovirals if treatment history permits. Examples:
  - Switching within PI class (e.g., to atazanavir with or without low dose ritonavir) or from PI to NNRTI
  - Switching d4T to alternative NRTI such as tenofovir or abacavir

If not at lipid goals at 4–8 weeks, consider pharmacologic lipid-lowering therapy

Lipid-Lowering Therapy

↑ LDL-C or ↑ non-HDL-C and TG < 500 mg/dL

Check baseline LFTs and creatine kinase (CK) level before initiating lipid-lowering therapy. Transaminase levels > 3 x upper limit of normal are a relative contraindication for statin use. Asymptomatic CK elevations are common and useful to document at baseline but are not a contraindication for statin use.

Start statin[1]:

- Pravastatin 20–40 mg daily
  OR
- Atorvastatin 10 mg daily
  OR
- Fluvastatin 20–40 mg daily (as an alternative)

Monitor:

- Check LFTs and fasting lipids in 4–6 weeks.
- Monitor LFTs at least every 6 months thereafter [2]

Further dosage guidelines:

Titrate up dose of statin as tolerated to reach lipid goal, checking fasting lipids and LFTs after 4–6 weeks of dose change.

- **Pravastatin:** Maximum recommended dose 80 mg daily
- **Atorvastatin:** Maximum recommended dose 80 mg daily
- **Fluvastatin:** Maximum recommended dose 80 mg daily

Routine monitoring of creatine kinase in asymptomatic patients is not recommended. Myalgias with normal CK are frequently reported and may respond to switching to an alternative statin. Discontinue statin for muscle symptoms and CK > 10 x upper limit of normal. Be aware of uncommon but serious side effect of **rhabdomyolysis**.*

TG ≥500 mg/dL[3]

Start fibrate:

- Gemfibrozil 600 mg bid (before breakfast and dinner)
  OR
- Micronized fenofibrate 48–145 mg daily

Alternatives:

- Fish oil capsules (2-4 g/day omega-3 fatty acids [EPA + DHA[4]])
- Check fasting lipids and LFTs in 4-6 weeks

If TGs remain ≥ 500:

- Reinforce diet/exercise
- Consider adding fish oil or referral to lipid specialist

If LDL-C/non-HDL-C remains high: Consider adding ezetimibe 10 mg daily or extended release niacin (starting dose 500 mg at bedtime and may titrate up to 2000 mg at bedtime) or refer to lipid specialist.

Notes: Incidence of cutaneous flushing and hepatoxicity are reduced with extended release formulations of niacin (e.g., Niaspan®)

* **Rhabdomyolysis:**

Symptoms:

- Dark, red, or cola colored urine is the hallmark along with muscle pain, weakness, or tenderness
- Fever, nausea, and vomiting may also occur

Diagnosis:

- Urinalysis may reveal casts and may be positive for hemoglobin in the absence of RBC on microscopic exam
- Positive urine or serum myoglobin
- High creatine kinase (CK, CPK)
- Serum potassium may be high

Hospitalization and aggressive management may be indicated.

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Footnotes:

1
- Simvastatin, pravastatin and atorvastatin levels are reduced with concomitant therapy with efavirenz or nevirapine. Pravastatin levels are reduced with the use of ritonavir or nelfinavir. Simvastatin and lovastatin are contraindicated if patient is taking cytochrome P450 inhibitors (e.g. PIs, delavirdine). Atorvastatin levels are increased modestly with concurrent use of cytochrome P450 inhibitors; consider maximum dose of 40 mg daily in presence of such inhibitors.
- Insufficient data exist on rosuvastatin in HIV-infected patients, but incidence of myositis and hematuria in the general population may be elevated relative to other statins, especially at high doses.

2
- For ALT (SGPT) or AST (SGOT) > 3 to 5 times the upper limit of normal, consider dose reduction, interruption, or discontinuation of statin.

3
- Lowering of TGs may unmask elevated LDL-C. If high TGs and high LDL-C co-exist, consider combination therapy with a fenofibrate + statin, which is associated with increased risk of rhabdomyolysis.
- Non-HDL-C is a secondary target of therapy when TGs are high. Non-HDL-C lowering may be achieved by intensifying LDL-C lowering or adding niacin or a fibrate.

4
- EPA = eicosapentaenoic acid
  DHA = docosahexaenoic acid. Add the amounts of the long chain omega-3 fatty acids EPA plus DHA listed on the label of the fish oil supplement to determine the number of grams/day; 1000 mg = 1 gram.
- Niacin (extended release niacin: starting dose 500 mg at bedtime and may titrate up to 2000 mg at bedtime)

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Framingham Point Scores

Estimate of 10-year Risk

Men

STEP 1. Calculate the number of points for each risk factor.

AGE		TOTAL CHOLESTEROL†						SMOKING*						HDL†		SYSTOLIC BLOOD PRESSURE‡		
			Age						Age									
Age	Points	mg/dL	20-39	40-49	50-59	60-69	70-79		20-39	40-49	50-59	60-69	70-79	mg/dL		mm Hg	untreated	treated
20-34	-9	<160	0	0	0	0	0	Non-Smoker	0	0	0	0	0	≥60	-1	<120	0	0
35-39	-4	160-199	4	3	2	1	0	Smoker	8	5	3	1	1	50-59	0	120-129	0	1
40-44	0	200-239	7	5	3	1	0							40-49	1	130-139	1	2
45-49	3	240-279	9	6	4	2	1							<40	2	140-159	1	2
50-54	6	≥280	11	8	5	3	1									≥160	2	3
55-59	8																	
60-64	10																	
65-69	11																	
70-74	12																	
75-79	13																	

STEP 2. Sum the points for each risk factor. The 10-year risk for myocardial infarction and coronary death (hard CHD) is estimated from total points, and the person is categorized according to absolute 10-year risk.

TOTAL POINTS	<0	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	≥17
10-YR RISK, %	<1	1	1	1	1	1	2	2	3	4	5	6	8	10	12	16	20	25	≥30

Women

STEP 1. Calculate the number of points for each risk factor.

AGE		TOTAL CHOLESTEROL†						SMOKING*						HDL†		SYSTOLIC BLOOD PRESSURE‡		
			Age						Age									
Age	Points	mg/dL	20-39	40-49	50-59	60-69	70-79		20-39	40-49	50-59	60-69	70-79	mg/dL		mm Hg	untreated	treated
20-34	-7	<160	0	0	0	0	0	Non-Smoker	0	0	0	0	0	≥60	-1	<120	0	0
35-39	-3	160-199	4	3	2	1	1	Smoker	9	7	4	2	1	50-59	0	120-129	1	3
40-44	0	200-239	8	6	4	2	1							40-49	1	130-139	2	4
45-49	3	240-279	11	8	5	3	2							<40	2	140-159	3	5
50-54	6	≥280	13	10	7	4	2									≥160	4	6
55-59	8																	
60-64	10																	
65-69	12																	
70-74	14																	
75-79	16																	

STEP 2. Sum the points for each risk factor. The 10-year risk for myocardial infarction and coronary death (hard CHD) is estimated from total points, and the person is categorized according to absolute 10-year risk.

TOTAL POINTS	<9	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	≥25
10-YR RISK, %	<1	1	1	1	1	2	2	3	4	5	6	8	11	14	17	22	27	≥30

Footnotes

* "Smoker" refers to any smoking in the past month. † Total cholesterol and HDL should be the average of at least 2 measurements. ‡ Blood pressure value is that obtained at the time of assessment regardless of antihypertensive use.

Adapted from Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults. Executive Summary of the Third Report of the National Cholesterol Education Program (NCEP) Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults (Adult Treatment Panel III). JAMA, 2001. 285(19): 2486-97.

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FEBRUARY 2006

HIV Nutrition Education
Nutrition Fact Sheet

APLA
AIDS Project Los Angeles

Lowering Cholesterol and Triglycerides

Cholesterol and triglycerides are two types of fat found in foods. The body also makes these fats called blood lipids. HIV infection causes elevated triglyceride levels and some HIV medications can increase cholesterol and triglycerides levels. High blood lipids levels increase risk for heart disease. Your doctor can discuss all the options for treating elevated lipid levels and make a referral to a registered dietitian to discuss your diet. In general, limiting or reducing the amount of saturated fat and cholesterol, in your diet can lower lipid levels. The following are some suggestions to help you get started. It may be difficult to do all of them, but try a few to see what works for you.

Tips to reduce cholesterol and triglyceride levels

- Lose weight if overweight. Maintain a waist measurement well below 40 inches for a man and 35 inches for women.
- Reduce the amount of fat, particularly saturated and trans-fat in your diet. This includes foods such as:

Butter	Cookies	Cream cheese	Sausage	Bologna
Margarines	Pies	Sour cream	Chicken skin	Pepperoni
Gravies	Cakes	Cheese	Bacon	
Sauces	Muffins	Cream	Salami	
Deep fried foods	Crackers	Ice cream	Hot dogs	

- Foods that have trans fats will have the words hydrogenated or partially hydrogenated in the list of ingredients. In 2006, trans fats will be included on the nutrition label. Choose foods without hydrogenated fats or those where it is not listed first or second in the list of ingredients.
- Choose the leanest cuts of meat, and remove any extra fat or skin.
- Choose mono- and polyunsaturated fats over saturated fatty foods. For example, nuts, seeds, oils, and avocado. Eat one ounce of nuts such as walnuts or almonds five times a week.
- Increase Omega-3 fatty acids. Eat fish* rich in this special fat (salmon, herring, sardines, anchovy, halibut, mackerel two to three times a week. See word of caution about fish.
- Add flaxseed (grind up) or flaxmeal to foods such as cereals, yogurts, and pancake batter.
- Increase fiber in your diet. Eat at least 3 pieces of fruit a day and one cup of vegetables, which are not cooked in butter, cheese or cream sauces. Choose whole fruits over juice.
- Eat beans and legumes, whole grains, cereals and starches.
- Choose non-fat or one percent (1%) fat dairy products (non-fat yogurt and non-fat or 1 percent fat milk). Avoid whole- and "low-fat" dairy products. That means 2% fat content or above.
- Add soy products such as tofu to your diet a couple of times a week.
- Consider plant stanol/sterols found in butter substitutes such as Take Control or Benecol. Consume 2-3 grams a day. They help remove cholesterol from the body.
- Limit simple sugars (soda, desserts, candy, fruit juice) and alcohol, especially if you have high triglycerides. Cut back on juice if consuming large amounts. A serving of juice is about 4-6 ounces or ½ to ¾ of a cup.

For more information or to sign up for nutrition classes call:
Janelle L'Heureux MS RD: **213201-1556** jlheureux@apla.org or go to www.apla.org .

- Develop a routine of regular physical activity and weekly exercising. Walk at least 30 or more minutes everyday or at least five times a week.

Note about eggs and cholesterol

An egg contains about 200 milligrams of cholesterol, almost the amount of cholesterol not to exceed in a day when following a low cholesterol diet. However, eggs are low in saturated fat. In addition, eggs contain important nutrients and are a good and inexpensive source of protein. If trying the other tips to reduce cholesterol and triglycerides does not lower values enough, consider limiting your egg consumption to 3-4 eggs a week or try egg substitutes.

% Daily Value

Use the % Daily Value column on the food label to help select foods low in saturated fat and cholesterol and high in fiber. A percent daily value of 5 to 10% represents a low to moderate source of the particular nutrient, vitamin or mineral or food component, whereas 20% or more is a high source. For example, if it says a serving provides 25% for saturated fat (this is based on following a 2000-calorie diet), eating the serving size amount would be a high source of saturated fat, almost one fourth of the amount you should eat in an entire day. However, this high source can be balanced by several other choices of low percentage foods throughout the day. Try to keep the percentage low for saturated fat, cholesterol and sugars and higher for fiber.

Term	Examples
Monounsaturated fats	Olive, canola and peanut oils, avocados and most nuts
Saturated Fats	Whole milk, butter, ice cream, whole milk cheeses meats, and vegetable oils like palm and coconut and cocoa butter
Trans Fats	French Fries, potato chips, cookies, cakes, pies, donuts, crackers, margarines, microwave popcorn, coffee creamers, and many other products. Read the ingredient list.
Simple sugars	Sucrose (table sugar, brown sugar) and glucose (dextrose, corn syrup, high fructose corn syrup, glucose syrup)
Starches	Potatoes, parsnips, yams, the flours, products and whole grains of wheat, rice, oats, corn, barley, rye, soy. These could also be breads and breakfast cereals, etc.
Legumes	Beans, peas, peanuts and lentils

*Caution: The Food and Drug Administration (FDA) and the Environmental Protection Agency (EPA) have advised that groups most sensitive to methylmercury — women of childbearing age and young children — not eat swordfish, king mackerel, tilefish (golden bass or golden snapper) and shark, all of them having relatively high mercury levels. Furthermore, the FDA, which oversees fish sold in stores and restaurants, advises these women and children that 12 ounces a week, of various kinds of fish, is safe. The EPA, which is concerned with freshwater fish of the sort anglers bring home, advises the same group to eat no more than six ounces week for adults, or two ounces a week for children.

