**Hyperlipidemia**

**1. Screen appropriate patients for hyperlipidemia**

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| **Standard:** | **Adults at any age with the following risk factors:** | | **Children:** |
| Women ≥ 50 or post menopausal | Diabetes | Evidence of atherosclerosis | FMHx - hypercholesterolemia |
| Men ≥ 40 | Smoking | Rheumatoid Arthritis | FMHx - Chylomicronemia |
|  | HTN | Systemic Lupus |  |
| ***minimum q 5 yrs for all*** | Obesity (BMI >27) | Psoriasis |  |
|  | FMHx: premature CAD | HIV on HAART |  |
|  | Erectile dysfunction | eGFR <60 |  |
|  | Clinical signs (xanthelasmas, xanthomas, arcus senilis/cornealis) | |  |

**2. In all patients whose cardiovascular risk is being evaluated, include the assessment of lipid status**

Order a fasting (10-12h ideally with no alcohol for 24-48h) lipid profile on the people who fit into the above categories. Include TC, HDL-C, triglycerides, fasting blood glucose. Also order TSH (to uncover hypothyroid-induced hyperlipidemia) and ALT, AST, Cr, CK (for baseline, as you will monitor these later if you start pharmacotherapy). Consider hs-CRP. No evidence that ApoB is superior to other markers. “Despite an increasing number of new potential markers of risk, the traditional CVD risk factors remain the priorities for screening and treatment as appropriate.” – 2009 CDN CVS guidelines

3. **When hyperlipidemia is present, take an appropriate history, and examine and test the patient for modifiable causes (e.g., alcohol abuse, thyroid disease)**

Ask about all the risk factors listed in #1 above, and do tests listed in #2 above.

*Assess:* age (most important factor); family history of premature CVD (<60 years); obesity (especially abdominal obesity); assess for metabolic syndrome [visceral adipose tissue mass (i.e. toxic waist), dyslipidemia (elevated triglycerides and low HDL-C), elevated blood pressure and elevated serum glucose – see Table 2 on page 2 of first link below for more details]; level of cardiometabolic fitness; alcohol use (CAGE screen).

*Consider tests for subclinical atherosclerosis:*

-High sensitivity C-reactive protein (hs-CRP) (class I evidence for benefit of statin therapy in those with intermediate risk Framingham score, and hs-CRP >2.0 mg/L)

- Anklebrachial index (class II, level C) - <0.90 = index for PVD, high likelihood of CVD

- Carotid ultrasound (class IIa, level C)

- Graded exercise testing (class IIa, level C)

- EKG (class IIb, level C)

**4. Ensure that patients diagnosed with hyperlipidemia receive appropriate lifestyle and dietary advice. Periodically reassess compliance with this advice (especially in patients at overall low or moderate CV risk)**

-Smoking cessation

-Diet (reduced saturated fats and refined sugars, low sodium, lots of fruits and vegetables; for patients with hypertriglyceridemia reduce alcohol intake and increase omega-3 & -6 intake)

-Weight reduction and maintenance

-Exercise guidelines (with caveat that more is better for everyone):

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| **Age 5 - 17** | **Adults** | **Age >65** |
| 60 mins/day with 3 sessions vigorous activity/week, strengthen bone and muscle 3 days/week | >150 minutes/week, at least 10 mins per session, strengthen bone and muscle 2 days/week | Same as adults + exercise to improve balance/prevent falls |

-Stress management

**5. In treating hyperlipidemic patients, establish target lipid levels based on overall CV risk**

Determine risk using the Framingham risk score (link provided below) modified for family history (double the cardiovascular disease risk percentage if any cardiovascular disease is present in a first-degree relative before 60 years of age). In men older than 50 years or women older than 60 years of age, of intermediate risk whose low-density lipoprotein cholesterol does not already suggest treatment, high-sensitivity C-reactive protein can be used for risk stratification.

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|  | \*Clinicians should exercise judgment when implementing statin therapy. Meta-analysis of statin trials show that for each 1.0 mmol/L decrease in low-density lipoprotein cholesterol (LDL-C), there is a corresponding 20% to 25% RR reduction. Those whose 10-year risk for cardiovascular disease is 5% to 9% have been shown in randomized clinical trials to achieve the same RR reduction from statin therapy as those at higher 10-year risk, but the absolute benefit of therapy is estimated to be smaller. |

apoB Apolipoprotein B; CAD Coronary artery disease; FRS Framingham risk score; HDL-C High-density lipoprotein cholesterol; hs-CRP Highsensitivity C-reactive protein; PVD Peripheral vascular disease; RRS Reynolds Risk Score; TC Total cholesterol

Surprisingly, pharmacotherapy is NOT in the guidelines; see first link below, page 9 for summary, but basically most people do fine on statin monotherapy. Initiate Tx in all High Risk pts, Moderate Risk patients with LDL >3.5 or TC/HDL >5, and in Low Risk patients with LDL >5 or TC/HDL >6.

**6. In patients receiving medication for hyperlipidemia, periodically assess compliance with and side effects of treatment**

Most lipid-lowering medications are well tolerated. Serum transaminases and creatine kinase should be followed regularly (every 6 to 12 months) or when symptoms develop. Follow-up is not required if levels are consistently normal and the patient has no symptoms.

Most common side effects for statins are:

-Mylagia (5%, though similar rates seen in placebo) – dull muscle ache worse with exercise – diagnosis based on drug cessation and re-challenge.

-Myositis also involves muscle discomfort and CK >3x upper limit of normal.

-Rhabdomyolysis (rare <1:100 000) – severe muscle pain, acute renal failure, myogolobinuria, CK >10000; stop statins and hospitalize for supportive care until stable.

-ALT >3 times upper limit of normal – usually dose related

-CI in pregnancy

Most common side effects for niacin are:

-Increase in ALT (measure at baseline and at 1-3 months after starting niacin)

-Increase in serum glucose (check fasting glucose and HgbA1C q6-12 months, d/c if they deteriorate)

-Check uric acid levels

-Flushing, itchy skin (Pg mediated, so take ASA first)

Most common side effects of fibrate-treated patients:

-Increase in plasma creatinine; start with low doses, re-evaluate kidney function ; Nx, cramping

-Increases effect of warfarin (both fibrates & warfarin are albumin-bound)

-Increase gallstones risk (b/c increased cholesterol secretion in bile)

**References:**

<http://www.ccs.ca/download/consensus_conference/consensus_conference_archives/2009_Dyslipidemia-Guidelines.pdf> page 9 is a pretty good summary (also available as an iPhone app from iTunes)

[www.csep.ca/guidelines](http://www.csep.ca/guidelines) Canadian physical activity guidelines

<http://www.framinghamheartstudy.org/risk/coronary.html> Original Framingham; link below easier:

<http://mdcalc.com/framingham-coronary-heart-disease-risk-score-si-units/> online calc – easier to read