UNIVERSITY of WESTERN STATES
College of Chiropractic

DYSLIPIDEMIA CARE PATHWAY: EVALUATION SUMMARY

Updated and revised summary (7/09, 9/10, 6/11, 10/11) by Jim Gerber, MS, DC,[1] [2]

STEP 1: Determine serum lipids, preferably full lipoprotein analysis after a 12-hour fast.

STEP 2: Evaluate history for the following primary risk factors:

- Age: 45 years and over for men, and 55 years and over or postmenopausal in women.
- Family history of premature CHD (definite myocardial infarction or sudden death), before age 55 in a first-degree male relative or before age 65 in a first-degree female relative.
- Cigarette smoking.
- Hypertension, 140/90 and above or taking antihypertensive medication.
- HDL cholesterol below 40 mg/dL
- A high level of HDL cholesterol (>60 mg/dL) is called a "negative" risk factor; if a patient's HDL cholesterol is high, one risk factor is subtracted.

STEP 3: Determine 10-year risk assessment for patients with two or more primary risk factors. (See risk assessment worksheet on the back or online at www.nhlbi.nih.gov/guidelines/cholesterol.)

STEP 4: Determine required interventions for LDL cholesterol from Table 1.

Table 1. LDL Cholesterol and CHD Risk Levels Requiring Intervention

Overall Risk	No Treatment Needed	Initial* LDL Levels Requiring Conservative Intervention	LDL Levels Requiring Aggressive Intervention**
O or 1 Primary CHD Risk Factor	<160 mg/dL	160-189 mg/dL	190 mg/dL
2 or more Primary CHD Risk Factors AND 10 year risk <10%	<130 mg/dL	130-159 mg/dL	160+ mg/dL
2 or more Primary CHD Risk Factors AND 10 year risk 10-20%	<100 mg/dL	100-129 mg/dL	130+ mg/dL
Existing Clinical Atherosclerotic Disease,* Diabetes, OR 10 year risk >20%**	<100 mg/dL*** OR <70 mg/dL****	100-129 mg/dL *** OR 70-99 mg/dL ****	130 mg/dL*** OR 100+ mg/dL ****

* If patients do not respond initially to a 3-6 month trial conservative care, proceed to aggressive interventions.
**Aggressive intervention employs therapies that may increase side effects or treatment costs.
*** Existing clinical atherosclerotic disease includes coronary heart disease, symptomatic carotid artery disease, peripheral arterial disease, and abdominal aortic aneurysm.
**** Lower threshold applies to patients at *very* high risk (i.e. clinical atherosclerotic disease *coexisting* with any of the following: diabetes, metabolic ("insulin resistance") syndrome, 10 year risk over 20%, or severe uncontrolled risk factors such as smoking). Very high-risk patients also require intervention if non-HDL cholesterol (total cholesterol minus HDL) is 100 mg/dL or greater.

STEP 5: Determine whether additional interventions are required for the metabolic (insulin-resistance) syndrome when any <u>three</u> of the following are present:

- Abdominal obesity (waist circumference >37 in/94 cm in men, >31 in/80 cm in women)
- Triglyceride levels 150 mg/dL or over, or medication-treated
- HDL cholesterol levels <40 mg/dL in men, <50 mg/dL in women, or medication-treated
- Blood pressure 130/85 mmHg or over, or medication-treated
- Fasting glucose 100 mg/dL or over, or medication-treated

[1] Reviewed and approved by CSPE consensus panel. Copyright 2001, 2004, 2006
[2] Includes updated recommendations from Grundy SM, Cleeman JI, Merz CN, et al. Implications of Recent Clinical Trials for the National Cholesterol Education Program Adult Treatment Panel III Guidelines. Circulation. 2004;110:227-39.

Estimate of 10-Year Risk

Add up the points from each category and see the 10-year risk for developing cardiovascular disease.

Men

(Framingham Point Scores)

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

Total Cholesterol	Age 20-29	Age 40-49	Age 50-59	Age 60-69	Age 70-79
< 160	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		

Ag	e 20-39	Age 40-49	Age 50-59	Age 60-69	Age 70-79
Nonsmoker	0 0 0	0 0			
Smoker	8 5 3	1 1			

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

Systolic BP (mmHg)	If Untreated	If Treated
< 120	0	0
120-129	0	1
130-139	1	2
140-159	1	2
> 160	2	3

Point Total	10 Year Risk %	Point Total	10 Year Risk %
< 0	< 1	9	5
0	1	10	6
1	1	11	8
2	1	12	10
3	1	13	12
4	1	14	16
5	2	15	20
6	2	16	25
7	3	> 17	> 30
8	4		

10-Year Risk_____%

Women

(Framingham Point Scores)

Age	Points
20-34	-7
35-39	-3
40-44	0
45-49	3
50-54	6
55-59	8
60-64	10
65-69	11
70-74	12
75-79	13

Total Cholesterol	Age 20-29	Age 40-49	Age 50-59	Age 60-69	Age 70-79
< 160	0	0	0 0 0		
160-199	4	3	2 1 0		
200-239	8	6	4 2 1		
240-279	11	8	5 3 2		
> 280	13	10	7 4 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		

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

Systolic BP (mmHg)	If Untreated	If Treated
< 120	0 0	
120-129	1 3	
130-139	2 4	
140-159	3 5	
> 160	4 6	

Point Total	10 Year Risk %	Point Total	10 Year Risk %
< 9	< 1	17	5
9	1	18	6
10	1	19	8
11	1	20	11
12	1	21	14
13	2	22	17
14	2	23	22
15	3	24	27
16	4	> 25	> 30

10-Year Risk_____%

DYSLIPIDEMIA CARE PATHWAY: TREATMENT SUMMARY

Updated and revised summary (7/09) by Jim Gerber, MS, DC

Apply appropriate protocols for either conservative or aggressive intervention, based on Step 4 of the Evaluation Summary. Emphasize reducing LDL for 12 weeks, then consider strategies listed below for achieving additional lipid (triglycerides, HDL) and non-lipid (blood pressure, fasting glucose, prothrombotic state) goals as needed.

CONSERVATIVE INTERVENTIONS

Initiate Therapeutic Lifestyle Changes (TLC), adding additional specific interventions as desired. Specific interventions, including further clinical evaluations, are marked for elevated LDL, elevated triglycerides (200 mg/dL or over), or low HDL (below 40 mg/dL) as appropriate based on clinical research.

STEP 1: Further Clinical Evaluations

LDL	Rule out familial dyslipidemia, diabetes mellitus, hypothyroidism, nephrotic syndrome, chronic renal failure, obstructive liver disease, drug side effects.
TRIG	Rule out familial dyslipidemia, diabetes or the metabolic syndrome ("insulin resistance syndrome," syndrome X), alcohol abuse, kidney disease, pancreatic disorders, drug side effects.
HDL	Rule out diabetes or the metabolic syndrome ("insulin resistance syndrome"), drug side effects.

STEP 2: Therapeutic Lifestyle Changes (http://www.nhlbi.nih.gov/chd/lifestyles.htm)

- Reduce saturated fat to less than 7% of dietary calories.
- Reduce dietary cholesterol to less than 200 mg/day.
- Reduce *trans* fats as much as possible.
- Use whole grains, fruits & vegetables as much as possible and at least 20 grams of dietary fiber per day.
- Increase aerobic physical activity up to three times weekly or more.
- Reduce weight.

OPTIONAL: Additional dietary interventions

LDL	Increase dietary soluble fiber with fruit, vegetables, whole grains, oat bran, fiber-fortified foods, or supplemental psyllium, flaxseed, glucomannan, or mixed fibers.
LDL, TRIG, HDL	Consider margarines (e.g. Benecol) containing plant sterols or stanols, 2 grams/day sterols/stanols.
LDL, TRIG	Soybean foods, two or more servings/day, or 30-45 grams/day soy protein supplement.
LDL	Incorporate nuts into the daily diet.
HDL	Increase fish intake by at least one additional serving per week.
HDL	Alcohol may be permitted up to two drinks/day (1/day for women).
TRIG	If triglycerides are elevated, alcohol should be restricted to no more than two drinks per week.

IF INDICATED: Additional lifestyle interventions

HDL	Smoking cessation.

OPTIONAL: Nutritional supplements Choose one or more of the following (also see Tables 2 and 3 on next page). (See Care Pathway for cautions and side effects of the supplements listed below.)

LDL, TRIG	Garlic, standardized, at least 5000 mcg/day allicin potential.
LDL, TRIG	Inositol hexaniacinate, 1600-4000 mg/day.
TRIG	Fish oil supplement, containing 3000-7000 mg/day total omega-3 fatty acids.
LDL, TRIG, HDL	Plant sterols or stanols (e.g. beta-sitosterol, sitostanol), 1.5-3.3 grams/day.
LDL, TRIG, HDL	Chromium, 200 mcg/day. Consider up to 1000 mcg/day in suspected or confirmed cases of insulin resistance.
LDL	Vitamin C, 500 mg/day, if marginal vitamin C status is suspected.
LDL, TRIG, HDL	Pantethine, 300 mg three times daily.

IF INDICATED: Treat non-lipid CHD risk factors associated with the metabolic syndrome

- Hypertension (see Hypertension Care Pathway)
- Use aspirin or other antiplatelet therapies to reduce prothrombotic state.
- Insulin resistance (see Dyslipidemia Care Pathway)

STEP 3: Treatment Monitoring

LDL, TRIG, HDL	Re-measure lipids at 4-6 weeks and at 3 months.
LDL, TRIG, HDL	Consider additional conservative interventions or aggressive measures if conservative intervention fails for 3 months.
LDL, TRIG, HDL	After successful treatment, set up long-term monitoring schedule.

AGGRESSIVE INTERVENTIONS

Choose those marked for elevated LDL if elevations are severe (see Table 1) or unresponsive to conservative interventions within 3-6 months. Choose those marked for elevated triglycerides if unresponsive to conservative interventions within 3-6 months:

STEP 1: Increase compliance and dietary restrictions.

LDL, TRIG Refer to qualified professional, such as a registered dietitian and/or personal trainer.
LDL Introduce further restrictions of saturated fat, total fat and cholesterol.
TRIG Introduce further restriction of high glycemic index foods.

OPTIONAL: Niacin (nicotinic acid) therapy

LDL, TRIG Begin with 250 mg/day of crystalline or sustained-release niacin in divided doses.
LDL, TRIG For reducing flushing symptoms, recommend a single morning dose of aspirin (325 mg) or ibuprofen (200 mg) 30 minutes before the morning dose of niacin.
LDL, TRIG Gradually achieve, over several weeks, a daily intake of 1500 mg.
LDL, TRIG Monitor for side effects (at 3 months, then annually): Liver toxicity (serum AST, ALT), impaired glucose tolerance (fasting plasma glucose), gastritis or ulcer, increased serum uric acid leading to attacks of gout.

OPTIONAL: Red Yeast Rice, 1200-2400 mg or 10-30 mg/day total monacolins, for high LDL

OPTIONAL: Prescription drug therapy for elevated LDL non-HDL cholesterol, or triglycerides

STEP 2: Continue to monitor as outlined in STEP 3 of "Conservative Interventions" section.

Table 2. Reported Percentage Changes in Blood Lipids for Natural Supplements

Supplement	Total Cholesterol	LDL-C	HDL-C	Triglycerides
Garlic	– 0-12%	– 0-11%	0	– 0-27%
Inositol hexaniacinate	– 5-25%	N/A	N/A	– 15-27%
Fish oils	0	+ 5-10%	0	– 25-30%
Phytosterols	– 6-15%	– 8-20%	+ 0-11%	+ 1 to – 0-12%
Chromium	– 0-18%	– 0-11%	+ 0-38%	0-20%
Pantethine	– 14-17%	– 14%	+ 0-10%	– 30-48%
Gugulipid	+4% to – 11-24%	– 0-13%	+ 0-36%	– 0-27%
Niacin		– 10-30%	+ 10-40%	– 25-50%
Red yeast rice	– 11-32%	– 10-33%	0	– 0-19%

Note: When reported changes include zero, this indicates no effect according to some studies
Source: See references under Rationale for Nutritional Supplements in Dyslipidemia Protocol.

Table 3. Relative costs of dyslipidemia supplements.

Supplement	Minimum Monthly Cost*	Minimum Daily Pills*
Garlic $1	4.45	1
Inositol hexaniacinate	$33.00/26.25	3
Fish oils	$39.00	6
Phytosterols $2	8.00	6
Chromium $2.	65	1
Pantethine $60.00		3
Gugulipid $7	3.00	6
Niacin $5.	85	6
Red yeast rice	$30.00	4

*Approximate retail cost at minimum recommended dosage
Sources: See Appendix VIII in Dyslipidemia Protocol