

We would like to acknowledge the contribution of the following groups:

Vascular Protection Interdisciplinary Working Groups

Chronic Disease Physician Advisory Group

Chronic Disease Clinical Leadership Group

Specialist Consultants

Vascular Protection Clinical Champions

Utilizing the Chronic Care model, these groups developed the Vascular Protection: Dyslipidemia Clinical Guide as a decision-support tool for improved functional and clinical outcomes. This Guide supports primary care interdisciplinary team-based practice with a strong focus on self-management.

Please use and reproduce with acknowledgements to the Chinook Health Region.

Chronic Disease Management and Prevention Network:
An Alberta Health Capacity Building Initiative

Chinook Health Region
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BUILDING HEALTHY LIFESTYLES

VASCULAR PROTECTION – DYSLIPIDEMIA

1. Diagnosis

a. Definitions

Dyslipidemia: is, quite simply “abnormal lipid levels”, as measured on a blood sample and which reflects one of several disorders in the metabolism of lipoproteins. It may be classified as:

- hypercholesterolemia
- low levels of High Density Lipoproteins (HDL)
- hypertriglyceridemia

The determination of these values is “derived from the normal values present within a population and also the treatment targets suggested for persons based on their risk classification” (Canadian Guidelines for Cardiac Rehabilitation and Cardiovascular Disease Prevention, 2004, page 153).

Cholesterol: is a fat-like substance (lipid) that is present in cell membranes and is a precursor of bile acids and steroid hormones. Cholesterol travels in the blood in distinct particles containing both lipid and proteins known as lipoproteins. Three major classes of lipoproteins are found in the serum of a fasting individual: low density lipoproteins (LDL), high density lipoproteins (HDL), and very low density lipoproteins (VLDL).

Low Density Lipoprotein (LDL): is commonly referred to as “bad” cholesterol. It typically makes up 60-70% of the total serum cholesterol and contains a single apolipoprotein, namely apolipoprotein B (apo B). LDL is the major atherogenic lipoprotein and has long been identified by the National Cholesterol Education Program (NCEP) as the primary target of cholesterol lowering therapy.

High Density Lipoprotein (HDL): is commonly referred to as “good” cholesterol. It makes up approximately 20 - 30% of the total serum cholesterol. HDL cholesterol levels are inversely correlated with risk for Cardiovascular Disease (CVD). Some evidence indicates that HDL protects against the development of atherosclerosis, although a low HDL level often reflects the presence of other atherogenic factors.

Very Low Density Lipoprotein (VLDL): is triglyceride-rich lipoprotein and makes up 10 - 15% of the total serum cholesterol. VLDL is produced by the liver and is a precursor of LDL. VLDL remnants appear to promote atherosclerosis similar to LDL.

Triglycerides (TG): are not “cholesterol”, but rather another form of lipid in the body. Non-lipid risk factors of obesity, hypertension, diabetes, and cigarette smoking are also interrelated with triglycerides as are several emerging risk factors (insulin resistance,

glucose intolerance, and prothrombotic state). Thus, many persons with elevated triglycerides are at increased risk for Cardiovascular Disease (CVD). In addition, elevated triglycerides are associated with other disorders, most notably pancreatitis.

When measuring cholesterol, it is important to measure its subfractions before drawing a conclusion on the cause of the problem. The subfractions are LDL, HDL and VLDL (as reflected in the TG number). In the past, LDL and VLDL levels were rarely measured directly due to cost concerns. VLDL levels are reflected in the levels of triglycerides (generally about 45% of triglyceride is composed of VLDL). LDL is usually estimated as a calculated value from the other fractions (total cholesterol minus HDL and VLDL); this method is called the Friedewald calculation; specifically: $LDL = Total\ Cholesterol - HDL - (0.2 \times Triglycerides)$.

b. Risk Factors

The body requires cholesterol for normal functioning, however, increased cholesterol may put individuals at risk for cardiovascular disease.

Relative risk for developing dyslipidemia multiplies with the number of risk factors present.

Risk factors for Dyslipidemia:

- Men who are 40 years of age or more
- Women who are postmenopausal or over 50 years of age
- Familial hypercholesterolemia
- Diabetes
- Hypertension
- Smoking
- Abdominal obesity
- Strong family history of premature cardiovascular disease (CVD)
- Manifestations of hypercholesterolemia
- Evidence of symptomatic or asymptomatic atherosclerosis

Additional Information and Conditions:

- **Diabetes:** Uncontrolled diabetes mellitus, both type 1 and type 2, is one of the most common causes of elevated TG and is often severe in patients presenting with ketosis.
- **Obesity:** Mild-to-moderate elevations in TGs are common in obese patients.
- **Hypothyroidism:** commonly causes Low Density Lipoprotein cholesterol (LDL-c) elevations, but may also lead to mixed hyperlipidemia or isolated TG elevations. Reduced hepatic

lipase activity slows VLDL remnant catabolism. As with diabetes mellitus, untreated hypothyroidism may cause dysbetalipoproteinemia in patients with homozygous apolipoprotein E-2.

- **Nephrotic Syndrome:** is thought to increase hepatic synthesis of VLDL and may slow catabolism of both LDL and VLDL. As in hypothyroidism, elevated LDL-c levels are more common in this condition, but mixed hyperlipidemia or isolated TG elevations may be observed. Higher levels of proteinuria are correlated with more severe hyperlipidemia.
- **Drugs:** a number of medications may cause elevated LDL cholesterol or triglycerides:
 - High-dose thiazide diuretics or chlorthalidone
 - High-dose beta-adrenergic blocking agents, excluding those with intrinsic sympathomimetic activity
 - Unopposed oral estrogen replacement therapy (elevated TG's)
 - Oral contraceptives with high estrogen content (elevated TG's)
 - Tamoxifen
 - Glucocorticoids
 - Oral isotretinoin
 - Antiretroviral nucleoside analogues

c. Screening

Patients of any age may be screened at the discretion of the physician, particularly when lifestyle changes are indicated, but the following represent the usual recommendations:

- men over the age of 40
- women over the age of 50
- adults with 2 or more risk factors for CVD
- patients with clinical evidence of CVD, peripheral vascular disease or carotid atherosclerosis (signs and symptoms of carotid vessel disease including bruits with transient ischemic attacks or carotid plaque visible by means of ultrasonography)
- patients with diabetes mellitus
- patients with xanthomata or other stigmata of dyslipidemia
- patients with a family history of dyslipidemia or CVD

Although there are no evidence-based recommendations regarding the optimal frequency for repeat screening, it is reasonable to suggest that:

- asymptomatic patients every 5 years after the age of 40 for men and 50 for women. These ages have been chosen to initiate routine screening because they precede by about 5 years the accelerated rise in the incidence of clinically evident cardiovascular disease for men and women respectively.
- it is appropriate to repeat lipid measurements in patients who have acquired new risk factors or following lifestyle or pharmacologic intervention.

Screening Test:

Fasting lipid profile

- Total Cholesterol (TC)
- High-Density Lipoprotein cholesterol [HDL-c],
- Triglyceride
- Calculated LDL-c levels

A fasting blood sample is the “gold standard” for diagnosing dyslipidemia. The ideal is for the individual to forego anything by mouth except water and prescription medications for not less than 12 hours and not significantly longer than 14 hours.

When a non-fasting blood sample is necessary or for some screening protocols, a Total Cholesterol and a HDL cholesterol reading may be used. These 2 parameters are not affected by food or other intake.

d. Signs and Symptoms

Signs: Elevated cholesterol does not lead to specific signs unless it has been longstanding. Look for the following:

- xanthoma (thickening of tendons due to accumulation of cholesterol)
- xanthelasma palpebrum (yellowish patches around the eyelids)
- arcus senilis (white discoloration of the peripheral cornea)
- evidence of atherosclerosis (abdominal bruits, carotid bruits, diminished peripheral pulses, ankle-brachial index < 0.9)

Symptoms: There are no specific symptoms of elevated cholesterol, but as it leads to accelerated atherosclerosis, expresses itself in a number of cardiovascular diseases:

- Angina pectoris, leading to Coronary Artery Bypass Grafting (CABG)
- Myocardial Infarction
- Transient Ischemic Attacks (TIAs)
- Cerebrovascular accidents / strokes
- Peripheral artery disease

Hypertriglyceridemia: usually greater than 11.30mmol/L, may cause acute pancreatitis and all the sequelae of that condition. A less severe and often unrecognized condition is the chylomicronemia syndrome, which usually is caused by TG levels greater than 1000 mg/dL.

e. Testing and Evaluation:

In order to evaluate the appropriate therapy for an individual, it is necessary to calculate the Framingham Cardiovascular Risk, which is calculated based on gender, age, smoking and blood pressure, as well as Total Cholesterol (TC) and HDL values. This determines the 10-year risk of an individual developing a significant cardiovascular event.

It is of note that this calculation does NOT apply to:

- individuals with diabetes mellitus
- individuals with clinically evident cardiovascular disease (CVD)

because anyone with diabetes or pre-existing CVD is automatically considered “high risk”.

f. Further Testing

Fredrickson Classification:

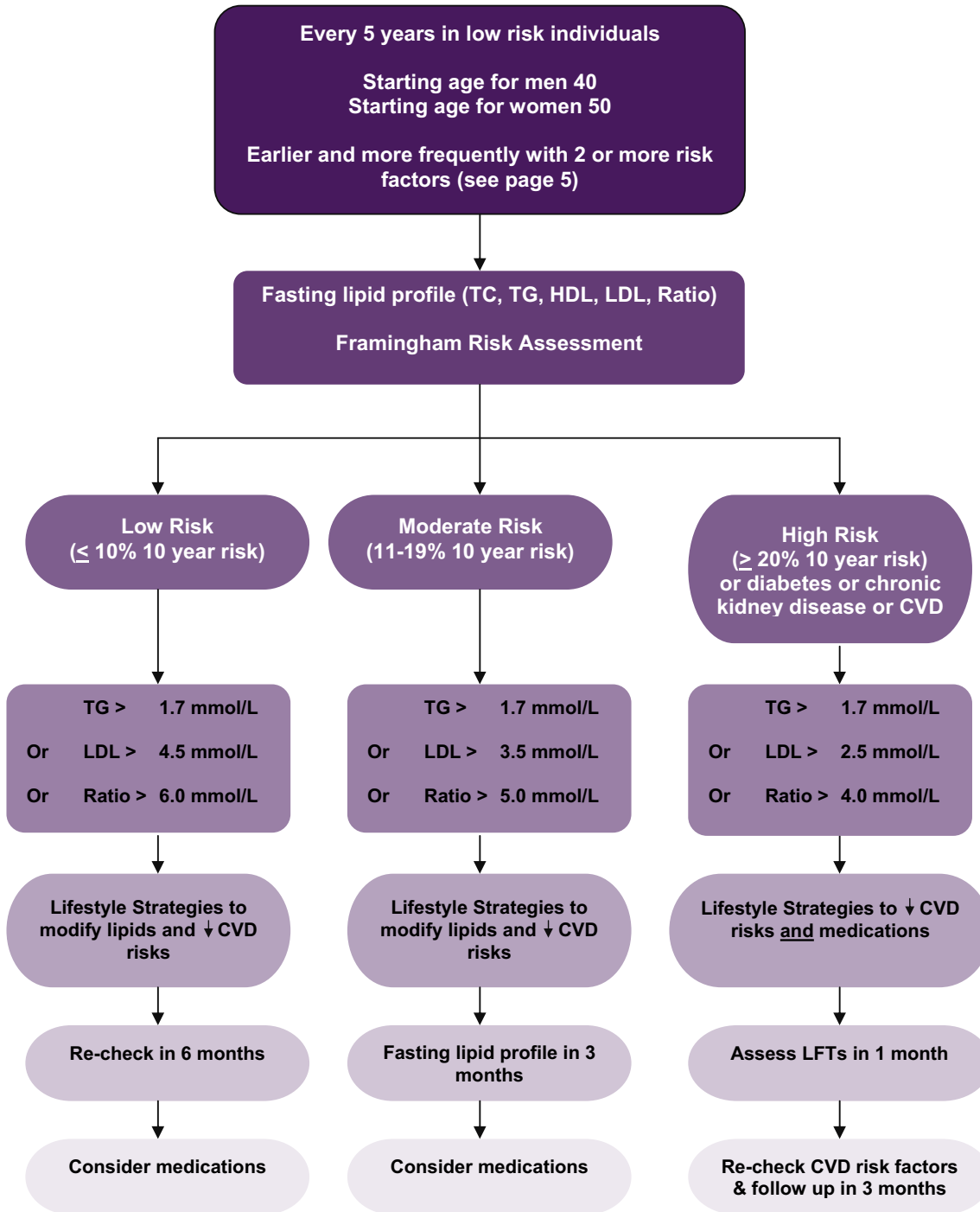
Though generally considered useful mainly for research in the present day, the **Fredrickson Classification**, based on lipoprotein electrophoresis, could be used for further testing. (see Section 2: Classification/Type/Staging).

Particle Size:

This is another, newer method of determining atherogenic risk due to dyslipidemia. Recent research has shown that both the size of the individual particles and their density (or alternately, their buoyancy), are important determinants of atherogenicity.

g. Algorithm

Screening for Dyslipidemia



TC = Total Cholesterol
 TG = Triglycerides
 HDL = High Density Lipoproteins
 LDL = Low Density Lipoproteins
 Ratio = TC : HDL
 CVD = Cardiovascular Disease

2. Classification/Type/Staging

Though not used commonly in primary care for the usual investigation and treatment of dyslipidemia, the Fredrickson Classification, performed using lipoprotein plasmaphoresis, has been the traditional and remains the most rigorous method for classifying dyslipidemias.

Fredrickson Classification	
Type I	High chylomicrons
Type II	
Type IIa	High LDL
Type IIb	High LDL and VLDL
Type III	High chylomicrons and Intermediate Density Lipoprotein (IDL)
Type IV	High Triglycerides
Type V	Very similar to Type I, but with high VLDL
Non-classified forms:	
Hypo-alpha lipoproteinemia	
Hypo-beta lipoproteinemia	

Apart from Type II and Type IV, these disorders are very rare. Some have hereditary as well as acquired forms.

If the hypercholesterolemia is hereditary (familial hypercholesterolemia), there is often a family history of premature atherosclerosis, as well as familial occurrence of the signs mentioned above.

Hypertriglyceridemia (hTG) is a common disorder and in both epidemiologic and interventional studies, is a risk factor for coronary disease. In addition, extreme elevations of TGs, usually greater than 1000 mg/dL, may cause acute pancreatitis and all the sequelae of that condition. A less severe and often unrecognized condition is the chylomicronemia syndrome, which usually is caused by TG levels greater than 1000 mg/dL.

For clinical purposes, the main types of dyslipidemia that are recognized are:

- Hypercholesterolemia (elevated TC and LDL, or elevated TC : HDL ratio)
- Low levels of HDL (high density lipoproteins)
- Hypertriglyceridemia

Lipid Patient Care Flowsheet
Co-morbid Conditions
Allergies

Patient Name

		Date:						
Every visit	Lipid Targets and Laboratory Values	Risk Assessment (10 yr risk of CAD)	<input type="checkbox"/> Low <input type="checkbox"/> Medium <input type="checkbox"/> High	<input type="checkbox"/> Low <input type="checkbox"/> Medium <input type="checkbox"/> High	<input type="checkbox"/> Low <input type="checkbox"/> Medium <input type="checkbox"/> High	<input type="checkbox"/> Low <input type="checkbox"/> Medium <input type="checkbox"/> High	<input type="checkbox"/> Low <input type="checkbox"/> Medium <input type="checkbox"/> High	<input type="checkbox"/> Low <input type="checkbox"/> Medium <input type="checkbox"/> High
		Target LDL						
		Target TC/HDL Ratio						
		Target Apo B						
Every 3 to 6 months	Lipid Targets and Laboratory Values	Total Cholesterol						
		Triglycerides						
		HDL-C						
		LDL-C						
		TC/ HDL Ratio						
		Apolipoprotein B						
		Liver Enzyme Panel (AST/ALT) Goal < N X 3						
		CK (if myalgias) Goal < N X 10						
		Statin _____						
		Fibrate _____						
	Niacin							
	Ezitimibe _____							
	Side Effects							
	Contraindications							
	ASA							
	Risk Factors	Nutrition						
		Weight						
		BMI (Goal ≤ 25)						
Waist Circ. (m ≤ 40; w ≤ 35)								
Activity								
Alcohol Usage								
Smoking								
Risk Management	Family History of Premature Events							
	Optimal diabetes control: HgA1C <7% ; FBS ≤ 6.0							
	BP goal <130/80							
	Next Steps							

Lipid Lowering Agents										
DRUGS	INITIAL DOSE	MAINTENANCE DOSE	MAXIMUM DOSE	LDL (dose effect)	HDL	TG	POTENTIAL INTERACTIONS	REQUIRED LABORATORY	SIDE EFFECTS	COMMENTS
Resins -Cholestyramine (Questran, Questran Light) -Colestipol (Colestid) - granules - tablets	4 g qd-bid 5 g qd-bid 2 g qd-bid	4-8 g (qd-bid) 5-15 g (qd-bid) 2-8 g (qd-bid)	24 g/d 30 g/d 16 g/d	↓ 15-30%	↑ 3-5%	No change or possible increase	- decreased absorption of digoxin, warfarin, thyroid, oral hypoglycemics, statins, folic acid, gemfibrozil, thiazides, tetracycline, vitamins A,D,K. - displacement of warfarin or oral hypoglycemics - increased risk of myopathies with statins, niacin, or cyclosporine	- none	- GI upset, constipation - Esophageal spasms or respiratory distress (if ingested in dry form).	- space administration of other agents 1h before or 2h after resin - Increased fluid and fiber
Fibrates - Gemfibrozil (Lopid) - Bezafibrate (Bezagen, Bezalip) - Fenofibrate (Tricor) - regular - micronized (Lipidil Macro®) - macrocoated (Lipidil Supra®)	300 mg bid 400 mg qd 100 mg tid 200 mg/d 160 mg/d	600 mg bid 400 mg qd 200 mg/d 160 mg/d	1500 mg/d 400 mg/d 400 mg/d 200 mg/d 200 mg/d	↓ 5-20% (LDL may ↑ if TG very high initially)	↑ 10-20%	↓ 20-50%	- decreased effects of insulin or oral hypoglycemics - increased risk of myopathies with statins or fibrates	- LFTs at baseline, 6 months, and 6 months to a year thereafter - CK at first sign of muscle pain (d/c drug if CKs 10 x upper limit of normal)	- GI upset, hepatotoxicity, rash, pruritis, headaches, insomnia, myopathies	-take with food (except gemfibrozil which should be taken 30 min. prior to meals)
Niacin (nicotinic acid) - Niacin Timed Release (Novo-Niacin, Vitamin B)	125 mg bid 500 mg qd	500 mg tid-qd 1500 tid-qd	2 g tid 2000 mg tid	↓ 5-25%	↑ 15-35%	↓ 20-50%		- LFTs at baseline, every 6 to 12 weeks for first year then every 6 months thereafter - uric acid and glucose at baseline and as necessary thereafter	- flushing, headache, pruritis, GI upset, hyperuricemia and gout hypertension, hyperglycemia, hepatotoxicity	- always take with food -tolerance often develops to flushing -325 mg ASA 30 min. prior to niacin may help to alleviate flushings - avoid hot beverages
Statins -Atorvastatin (Lipitor) -Fluvastatin (Lescol) -Fluvastatin (AltoCor, Mevacor) -Pravastatin (Pravachol) -Simvastatin (Zocor) -Rosuvastatin (Crestor)	10 mg 20 mg 20 mg 10-20 mg 5-40 mg 10 mg	10-60 mg qd 20-60 mg qd or bid 20-60 mg qd 20-40 mg qd 10-40 mg qd 10-40 mg qd	80 mg qd 40 mg bid 40 mg bid 60 mg qd 80 mg qd 40 mg qd	↓ 35-60% ↓ 20-35% ↓ 25-40% ↓ 20-35% ↓ 35-60% ↓ 40-65%	↑ 5-15%	↓ 7-30%	- increased risk of myopathies with niacin, erythromycin, clarithromycin, gemfibrozil, ketoconazole, itraconazole, or cyclosporine (atorvastatin, ovasatin, and simvastatin only.) - increased digoxin with atorvastatin or fluvastatin -increased warfarin levels with fluvastatin	-LFTs at baseline, every 6 to 12 weeks for first year then every 6 months thereafter - uric acid and glucose at baseline and as necessary thereafter	- GI upset, myopathies, hepatotoxicity	-all statins should be taken with evening meal or at bedtime -taking with food helps to alleviate side-effects -no clinical endpoint data available for rosuvastatin at present -adding CoQ10 60-90 mg may decrease risk of myalgias
Ezetimibe (Ezetrol)	10 mg qd	10 mg qd	10 mg qd	↓ 17%	↑ 1.3%	↓ 6%	- decreased ezetimibe in combination with cholestyramine -ezetimibe increased by concomitant cyclosporine and fibrate administration	- none	- similar to placebo	-may be used as monotherapy or in combination with a low-dose statin -No clinical endpoint data available

4. Management Strategies for Health Teams

a. Goals of Management

The goal of management is to reduce the risk of Cardiovascular Disease and in the case of severely elevated triglycerides, to prevent pancreatitis.

b. Key Clinical Targets

Target Values for LDL, HDL, TC/HDL and Triglycerides:

The target values for any individual are based on their assessed CV risk based on the **Framingham Risk Classification**. Thus, the Framingham Risk Assessment must be evaluated for each patient to determine if their lipids status requires treatment.

Assessing the 10-year risk of cardiovascular disease (CVD) based on the model adapted from Framingham

MEN

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

WOMEN

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	12
70-74	14
75-79	16

Total-C mmol/L	Points				
	Age	20-39	40-49	50-59	60-69
≤ 4.14	0	0	0	0	0
4.15-5.19	4	3	2	1	0
5.2-6.19	7	5	3	1	0
6.2-7.2	9	6	4	2	1
≥7.21	11	8	5	3	1

Total-C mmol/L	Points				
	Age	20-39	40-49	50-59	60-69
≤ 4.14	0	0	0	0	0
4.15-5.19	4	3	2	1	1
5.2-6.19	8	6	4	2	1
6.2-7.2	11	8	5	3	2
≥7.21	13	10	7	4	2

Smoker	Points				
	Age	20-39	40-49	50-59	60-69
No	0	0	0	0	0
Yes	8	5	3	1	1

Smoker	Points				
	Age	20-39	40-49	50-59	60-69
No	0	0	0	0	0
Yes	9	7	4	2	1

HDL-C(mmol/L)	Points
≥ 1.55	-1
1.30-1.54	0
1.04-1.29	1
<1.04	2

HDL-C(mmol/L)	Points
≥ 1.55	-1
1.30-1.54	0
1.04-1.29	1
<1.04	2

Systolic BP	Points	
	Untreated	Treated
< 120	0	0
120-129	0	1
130-139	1	2
140-159	1	2
≥ 160	2	3

Systolic BP	Points	
	Untreated	Treated
< 120	0	0
120-129	1	3
130-139	2	4
140-159	3	5
≥ 160	4	6

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

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

10-Year Risk _____ %

10-Year Risk _____ %

The following chart considers an individual's relative risk score and then determines the appropriate target lipid levels based upon the risk category:

Risk Categories and Target Lipid Levels			
Risk Category	Target Levels		
	LDL-C mmol/L	Total Cholesterol: HDL-C ratio	APO-B g/L
High* 10-year risk > 20% or history of diabetes, chronic kidney disease or arteriosclerotic disease	< 2.5 and	< 4	< 0.9
Moderate† 10-year risk 11 – 19 %	< 3.5 and	< 6	< 1.05
Low 10-year risk < 10%	< 4.5 and	< 6	< 1.2
A specific target for triglyceride levels is no longer recommended, however, the guidelines emphasize that a plasma triglyceride concentration of less than 1.7mmol/L is optimal.			
Recommendations for the management of dyslipidemia and the prevention of cardiovascular disease; 2003 update. Jacques Genest, Jiri Frohlich, George Fodor and Ruth McPherson (the Working Group on Hypercholesterolemia and Other Dyslipidemias) CMAJ • October 28, 2003; 169 (9). Available on-line at http://www.cmaj.ca/cgi/data/169/9/921/DC1/1 (pdf)			

c. Non-Pharmacologic Strategies

The therapeutic strategy for patients with dyslipidemia depends on both the short-term (10-year) and long-term risk for CVD.

- high risk, start drug therapy immediately and promote specific healthy lifestyle changes
- moderate risk, promote specific healthy lifestyle changes and, if target lipid levels are not achieved after 3 months, begin drug therapy
- low risk, promote specific healthy lifestyle changes and, if target lipid levels are not reached after 6 months, begin drug therapy

Summary of non-pharmacologic strategies:

Eat a healthy diet

Canada Food Guide

5 – 10 servings of grain products per day (emphasize whole grain)

5 – 10 servings of fruits and vegetables per day

2 – 4 servings of low-fat milk products per day

2 – 3 servings of low-fat meat and alternatives per day

Low fat diet

< 30% total calories from fat

< 10% of total calories from saturated fat and trans fatty acids

< 300 mg cholesterol per day

High fibre diet

> 25 – 35 g of fibre per day

Get regular physical activity

30 – 60 min of endurance (cardiovascular) activities (e.g., brisk walking, jogging, cycling) 4 – 7 days per week

Maintain ideal body weight

Advise patients with dyslipidemia who are overweight (body mass index [BMI] > 25) or have a waist circumference > 90 cm (women) or > 100 cm (men) to reduce their weight.

Encourage patients to attain and maintain a healthy body weight (BMI of 20 – 25).

Consume alcohol in moderation

Patients who choose to drink should limit their alcohol consumption to 2 or fewer standard drinks per day.

Advise patient with elevated triglyceride levels to decrease or eliminate alcohol consumption.

Stop Smoking

Advise patients who smoke, to quit and encourage young people not to smoke.

Provide patients who are unable to quit on their own with information on smoking cessation programs, nicotine replacement therapy and drug therapy where indicated.

J. George Fodor*, Jiri J. Frohlich†, Jacques J.G. Genest, Jr.§ and P. Ruth McPherson† for the Working Group on Hypercholesterolemia and Other Dyslipidemias¶

Nutrition**General Guidelines for Nutritional Therapy:****GENERAL NUTRITION GUIDELINES**

Eat three meals each day (and snacks if recommended)
 Eat at regular times (space main meals 4-6 hours apart with snacks, if required, eaten at least 2 hours before the next meal)
 Eat foods high in fibre
 Choose lower fat foods
 Limit sugars and sweets
 Limit “dietetic” foods
 Caution fad diets
 Limit salt and salty foods
 Use Canada’s Food Guide to Healthy Eating as a guide

Detailed Nutritional Therapy for Dyslipidemia:**NUTRITION MANAGEMENT FOR DYSLIPIDEMIA****Fats**

Select monounsaturated and polyunsaturated fats more often
 Decrease the proportion of saturated fats (<10% of total daily energy intake)
 Limit hydrogenated fats
 Work to reduce overall fat consumption by:

- Choosing leaner cuts of meat
- Choosing lower fat cooking and baking methods
- Limiting added fats to 3 - 6 tsp per day; choose healthy fats such as monounsaturated and omega 3 products
- Choosing lower fat dairy products
- Watching for hidden fats and sugars in baked products
- Limiting higher cholesterol foods

Fibre

Aim for 25-35 grams of fibre per day
 Select high fibre foods
 Add in 5 servings of vegetables and fruit each day
 Drink 6 - 8 glasses of water each day
 Increase fibre slowly
 Soluble fibre is helpful in assisting to lower LDL cholesterol levels
 Increase antioxidant-rich foods

Salt Intake

Limit the intake for cooking and table use
 Choose fresh/frozen foods versus canned, processed, or packaged foods
 Check with your physician or dietitian before using salt substitutes
 Monitor potassium and calcium intake

Alcohol

Limit alcoholic drinks
 Alcohol is high in calories, which may lead to weight gain
 Avoid “binge” drinking

Sugars

Limit foods that are high in sugar

Other Non-Pharmacologic Recommendations for Dyslipidemia:

	Other Non-Pharmacologic Recommendations for Dyslipidemia	Benefits
Physical Activity	<ul style="list-style-type: none"> Regular physical activity is an important aspect of good health for all people including those with dyslipidemia Any increase in physical activity is a good increase! Recommend increasing duration and intensity gradually to help avoid injury Patients / clients to consult with their doctor prior to initiating a strenuous (more exertion than moderate walking) exercise program Goal is to have patients be active for 30-45 minutes most days of the week Activity may include jogging, swimming, walking, cycling, or any other type of activity that appeals to the patient Make clear to patients / clients that higher intensities of activity are no more effective than moderate levels 	<ul style="list-style-type: none"> helps with weight loss / weight maintenance helps control blood glucose lowers the level of bad blood fats (LDL and TG's) increases the level of good blood fats (HDL) helps lower blood pressure decreases the risk for heart disease helps improve sleep quality increases circulation in the body improves wellbeing
Alcohol	<p>Canadian low risk drinking guidelines are appropriate for all lipid patients and include the following:</p> <ul style="list-style-type: none"> Limit alcohol consumption to < 2 standard servings per day Weekly consumption for men should not exceed 14 standard drinks Weekly consumption for women should not exceed 9 standard drinks 	
Stress	<ul style="list-style-type: none"> For patients where stress is a contributing factor to hypertension or may be an implicated factor, consider stress management interventions There are various approaches to stress management including: cognitive behavioral therapy, relaxation techniques, exercise, etc. Combination therapy is most likely to yield successful reductions in blood pressure 	
Smoking Cessation	<ul style="list-style-type: none"> Is essential for reducing cardiovascular risk in any individual with CV risks 	

Mental Health

As with many chronic diseases, mental health plays an important role as to how the individual may manage their condition. Dyslipidemia is certainly no exception.

d. Pharmacologic Strategies

The therapeutic strategy for patients with dyslipidemia depends on both the short-term (10-year) and long-term risk for CVD (Framingham CV Risk Assessment):

- high risk, start drug therapy immediately and promote specific healthy lifestyle changes
- moderate risk, promote specific healthy lifestyle changes and, if target lipid levels are not achieved after 3 months, begin drug therapy
- low risk, promote specific healthy lifestyle changes and, if target lipid levels are not reached after 6 months, begin drug therapy

Risk Categories and Target Lipid Levels			
Risk Category	Target Levels		
	LDL-C mmol/L	Total Cholesterol: HDL-C ratio	APO-B g/L
High* 10-year risk > 20% or history of diabetes, chronic kidney disease or atherosclerotic disease	< 2.5 and	< 4	< 0.9
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The lipid-lowering drug of choice depends on the major lipid abnormality. Recommended drug therapies for the different types of lipid disorders are as follows:

Lipid Profile	Drug of Choice
Elevated LDL-C level	
Alone	Statin with or without resin
With a moderately elevated triglyceride level	Statin
With a low HDL-C level	Combination therapy may be required (e.g., statin plus fibrate or statin plus niacin)
Normal LDL-C level	
With an elevated triglyceride level	Niacin or fibrate* or combination therapy
With a low HDL-C level	Niacin or fibrate or combination therapy

Lipid Lowering Agents										
DRUGS	INITIAL DOSE	MAINTENANCE DOSE	MAXIMUM DOSE	LDL (dose effect)	HDL	TG	POTENTIAL INTERACTIONS	REQUIRED LABORATORY	SIDE EFFECTS	COMMENTS
Resins -Cholestyramine (Questran, Questran Light) -Colestipol (Colestid) - granules - tablets	4 g qd-bid 5 g qd-bid 2 g qd-bid	4-8 g (qd-bid) 5-15 g (qd-bid) 2-8 g (qd-bid)	24 g/d 30 g/d 16 g/d	↓ 15-30%	↑ 3-5%	No change or possible increase	- decreased absorption of digoxin, warfarin, thyroid, oral hypoglycemics, statins, folic acid, gemfibrozil, thiazides, tetracycline, vitamins A,D,K. - displacement of warfarin or oral hypoglycemics - increased risk of myopathies with statins, niacin, or cyclosporine	- none	- GI upset, constipation - Esophageal spasms or respiratory distress (if ingested in dry form).	- space administration of other agents 1h before or 2h after resin - Increased fluid and fiber
Fibrates - Gemfibrozil (Lopid) - Bezafibrate (Bezagen, Bezalip) - Fenofibrate (Tricor) - regular - micronized (Lipidil Macro®) - macrocoated (Lipidil Supra®)	300 mg bid 400 mg qd 100 mg tid 200 mg/d 160 mg/d	600 mg bid 400 mg qd 200 mg/d 160 mg/d	1500 mg/d 400 mg/d 400 mg/d 200 mg/d 200 mg/d	↓ 5-20% (LDL may ↑ if TG very high initially)	↑ 10-20%	↓ 20-50%	- decreased effects of insulin or oral hypoglycemics - increased risk of myopathies with statins or fibrates	- LFTs at baseline, 6 months, and 6 months to a year thereafter - CK at first sign of muscle pain (d/c drug if CKs 10 x upper limit of normal)	- GI upset, hepatotoxicity, rash, pruritis, headaches, insomnia, myopathies	-take with food (except gemfibrozil which should be taken 30 min. prior to meals)
Niacin (nicotinic acid) - Niacin Timed Release (Novo-Niacin, Vitamin B)	125 mg bid 500 mg qd	500 mg tid-qd 1500 tid-qd	2 g tid 2000 mg tid	↓ 5-25%	↑ 15-35%	↓ 20-50%		- LFTs at baseline, every 6 to 12 weeks for first year then every 6 months thereafter - uric acid and glucose at baseline and as necessary thereafter	- flushing, headache, pruritis, GI upset, hyperuricemia and gout hypertension, hyperglycemia, hepatotoxicity	- always take with food -tolerance often develops to flushing -325 mg ASA 30 min. prior to niacin may help to alleviate flushings - avoid hot beverages
Statins -Atorvastatin (Lipitor) -Fluvastatin (Lescol) -Fluvastatin (AltoCor, Mevacor) -Pravastatin (Pravachol) -Simvastatin (Zocor) -Rosuvastatin (Crestor)	10 mg 20 mg 20 mg 10-20 mg 5-40 mg 10 mg	10-60 mg qd 20-60 mg qd or bid 20-60 mg qd 20-40 mg qd 10-40 mg qd 10-40 mg qd	80 mg qd 40 mg bid 40 mg bid 60 mg qd 80 mg qd 40 mg qd	↓ 35-60% ↓ 20-35% ↓ 25-40% ↓ 20-35% ↓ 35-60% ↓ 40-65%	↑ 5-15%	↓ 7-30%	- increased risk of myopathies with niacin, erythromycin, clarithromycin, gemfibrozil, ketoconazole, itraconazole, or cyclosporine (atorvastatin, ovasstatin, and simvastatin only.) - increased digoxin with atorvastatin or fluvastatin -increased warfarin levels with fluvastatin	-LFTs at baseline, every 6 to 12 weeks for first year then every 6 months thereafter - uric acid and glucose at baseline and as necessary thereafter	- GI upset, myopathies, hepatotoxicity	-all statins should be taken with evening meal or at bedtime -taking with food helps to alleviate side-effects -no clinical endpoint data available for rosuvastatin at present -adding CoQ10 60-90 mg may decrease risk of myalgias
Ezetimibe (Ezetrol)	10 mg qd	10 mg qd	10 mg qd	↓ 17%	↑ 1.3%	↓ 6%	- decreased ezetimibe in combination with cholestyramine -ezetimibe increased by concomitant cyclosporine and fibrate administration	- none	- similar to placebo	-may be used as monotherapy or in combination with a low-dose statin -No clinical endpoint data available

5. Management Strategies for Patients/Clients

What is cholesterol?

Cholesterol is a type of lipid or fat that is essential to the body. It plays a role in the manufacture of cells as well as hormone production. Our bodies produce cholesterol (two-thirds of the cholesterol in our bodies is manufactured by the liver), and we also obtain cholesterol from foods such as organ meats, butter, whole milk and eggs (yolks).

Normally, the blood contains a certain amount of lipids. However, an increase in the amount of lipids in the blood can accumulate on the walls of the arteries and increase the risk of heart attack or stroke.

What are “Good” and “Bad” Cholesterol?

Blood carries cholesterol to the cells, but since fatty substances do not mix with blood, cholesterol is carried by special carriers called “lipoproteins”. There are several types of lipoproteins, but the most important ones are low-density lipoproteins (LDL) and high-density lipoproteins (HDL). Low-density lipoproteins or LDL are often called “bad” cholesterol. Excess LDL cholesterol (LDL-c) in the blood can deposit on the inside of the walls of the arteries, including the arteries that feed the heart, and form atheromatous plaque. The plaque makes arteries narrower and decreases the passage of blood and oxygen. Atherosclerosis, or narrowing of the arteries, may lead to serious health problems, such as a heart attack or a stroke.

A high LDL cholesterol level may be due to various reasons. Some are genetic, whereas others are related to lifestyle, such as a lack of physical activity and/or a poor diet.

High density lipoproteins or HDL are considered to be “good” cholesterol. HDL helps carry LDL away from artery walls.

People with a high LDL levels and a low HDL levels are more at risk for developing cardiovascular diseases.

What are Triglycerides?

Triglycerides are a type of fat essential to the smooth functioning of the human body. They constitute the body’s main energy reserve and are stored in specialized tissues called “adipose tissues”. Triglycerides have some effect on heart disease, but the exact relationship is unknown. Research has found that a large number of people with heart disease have high triglyceride levels. High triglyceride levels are often associated with excess consumption of alcohol, excess weight or poorly controlled diabetes. As with cholesterol, it is important to monitor the blood’s triglyceride levels.

Why is it Important to Monitor Your Cholesterol Level?

It is important to have your cholesterol level checked on a regular basis. A high cholesterol level along with smoking, hypertension and/or diabetes, is one of the main cardiovascular disease risk factors, especially for heart attack and stroke.

If cholesterol levels are too high, plaque can build up on the inside of the walls of the arteries, including those that feed the heart. Over time this build-up can form atherosclerosis plaques or “narrowing of the arteries”. The arteries become narrowed and eventually block or slow down blood flow.

It is important to have your cholesterol and triglyceride levels checked on a regular basis because, even if they are too high, you will not have any symptoms. These levels should be checked regularly, starting at age 40 in men and at menopause, or age 50, in women. However, screening may be done earlier and more often if you have previously had heart problems, have a family history or have any other risk factors such as hypertension, diabetes or smoking.

How Can You Find Out What Your Cholesterol and Triglyceride Levels Are?

Your cholesterol and triglyceride levels can be determined from a blood test ordered by your doctor. The test results will help your doctor determine if further screening for lipid-related cardiovascular problems is needed.

The blood test will measure, among other things, your total blood cholesterol level, the ratio of the total cholesterol (TC) to high-density lipoproteins cholesterol (HDL-c), and the triglyceride (TG) level.

Target values for cholesterol and triglycerides will be determined as soon as treatment is initiated. Your doctor will determine the values that you should ideally achieve, given your other risk factors.

How Does One Maintain Balanced Cholesterol and Triglyceride Levels?

It is important to adopt a healthy lifestyle. Hyperlipidemia or a lipid (cholesterol or triglyceride) level that is too high, may be due to many factors including a diet that is too high in fat, a sedentary lifestyle or smoking.

If making lifestyle changes is not enough to bring the blood cholesterol levels back to target levels, drug treatment will be necessary.

Here is a summary of the different types of drugs used for lowering cholesterol levels:

- Statins are among the most prescribed drugs for lowering cholesterol levels. They are very effective for lowering LDL. They reduce the production of cholesterol in the liver.
- Fibrates are prescribed to lower the triglyceride level and increase the good cholesterol (HDL-c) level.

- Niacin (vitamin B) at high doses can reduce the triglyceride and LDL cholesterol levels while at the same time increasing the HDL cholesterol level. Very high doses of niacin are needed to lower cholesterol and should only be used when prescribed by a doctor.
- Resins have been used for a long time to reduce cholesterol levels. They work in the intestine to bind and remove cholesterol.
- Cholesterol absorption inhibitors are part of a new class of drugs that block the absorption of cholesterol in the small intestine. They may be used in combination with a statin to further lower LDL cholesterol levels in those patients where statin alone has failed to achieve target levels.

The effectiveness of cholesterol-lowering drugs varies from one individual to another. Your doctor will prescribe the one best suited to your health. If you have any questions or comments about your cholesterol medications, feel free to speak with your pharmacist.

How Does One Calculate the Level of Risk For Heart Disease?

It is true that the lipid (cholesterol and triglyceride) levels play a major role in the onset of cardiovascular disease. However, there are other risk factors to consider. The more risk factors and severity of these factors increase the risk of cardiovascular disease. The presence of a single risk factor, be it hypertension, diabetes, hypercholesterolemia or some other factor, will have determining effects on cardiovascular disease screening, treatment and monitoring.

A prediction table based on the Framingham Study is used to calculate your risk level. The table is used to determine the probability of developing heart disease over the next ten years:

Low:	Risk ≤ 10%
Moderate:	Risk of 11% to 19%
High:	Risk ≥ 20%

Framingham Study data can be used to fairly accurately determine target cholesterol levels, taking your risk factors into consideration:

Risk Categories and Target Lipid Levels			
Risk Category	Target Levels		
	LDL-C mmol/L	Total Cholesterol: HDL-C ratio	APO-B g/L
High* 10-year risk > 20% or history of diabetes, chronic kidney disease or atherosclerotic disease	< 2.5 and	< 4	< 0.9
Moderate† 10-year risk 11 – 19 %	< 3.5 and	< 6	< 1.05
Low 10-year risk < 10%	< 4.5 and	< 6	< 1.2

A specific target for triglyceride levels is no longer recommended, however, the guidelines emphasize that a plasma triglyceride concentration of less than 1.7mmol/L is optimal.

Recommendations for the management of dyslipidemia and the prevention of cardiovascular disease; 2003 update. Jacques Genest, Jiri Frohlich, George Fodor and Ruth McPherson (the Working Group on Hypercholesterolemia and Other Dyslipidemias) CMAJ • October 28, 2003; 169 (9). Available on-line at <http://www.cmaj.ca/cgi/data/169/9/921/DC1/1> (pdf)

Feel free to ask your doctor or pharmacist for information that will further explain this method of risk assessment, its usefulness as well as its limitations and how to interpret it.

Once your doctor knows your blood lipid levels, he/she will be able to determine the target lipid levels that you should achieve or maintain to reduce your risk of cardiovascular disease, considering your own risk factors.

WHAT LIFESTYLE CHANGES CAN BE MADE TO REDUCE CARDIOVASCULAR DISEASE?

Eating a healthy diet, exercising, going outdoors, taking the time to see your friends and laughing are all surefire methods of reducing the risk of cardiovascular disease. A healthy lifestyle does contribute to preserving cardiovascular health. A healthy lifestyle also increases the chances of any drug treatment being successful. If you really want to maximize your chances to enjoy a healthy heart for a long time, it is advisable to make the following changes:

Limit alcohol consumption

In addition to significantly increasing your calorie intake, drinking alcoholic beverages can result in increased blood pressure. It is advisable to limit your consumption of alcohol to less than two drinks per day with weekly maximum of 9 standard drinks per week for women, and 14 standard drinks per week for men.

Stop Smoking

People who smoke have a cardiovascular disease rate 70% higher than people who do not smoke. Smoking reduces the good cholesterol (HDL) level. Before you stop smoking, discuss a cessation plan with your doctor or pharmacist in order to determine the best way for you to succeed. Remember, it takes most people several attempts before they quit for good, so don't be discouraged and keep trying!

If you are a woman and smoke, watch out for a particularly hazardous combination: smoking + oral contraceptives + age greater than 35 = increased risk of clots forming in your blood vessels!

Exercise

Physical activity can be very useful in controlling blood pressure, to say nothing of its benefits in obtaining and maintaining a healthy weight. Walking up the stairs instead of taking an elevator and walking instead of driving are a sure and simple start to good physical activity and performing these activities on a regular basis increases the good cholesterol level.

To derive maximum benefit from physical activity, you should perform about 30 minutes of activity per day on a regular basis. Before starting any strenuous activity program, check with your doctor for a program tailored to your needs and state of health.

Control your weight

People who are overweight have an increased risk of high blood pressure, high cholesterol and diabetes, all of which can increase the risk of cardiovascular disease. It is important to determine your healthy weight with the help of a health professional and to work to maintain it. Weight control goes hand in hand with making wise food choices and engaging in physical activity on a regular basis.

Improve your diet

A healthy, balanced nutrition plan is key to reducing the risk and treating cardiovascular disease. In the case of hypertension, simple eating habits may help maintain blood pressure at optimal levels:

- Reduce salt intake: do not put a salt shaker on the table, avoid canned and precooked foods, choose fresh and frozen foods and use herbs, spices lemon juice or garlic instead of salt.
- Eat fresh fruits and vegetables: foods high in potassium such as bananas, oranges, melons, kiwis, potatoes and tomatoes.
- Avoid sweets and high-fat foods: read the labels on food products closely to determine how much sugar and fat they contain.
- Incorporate fibre-rich foods into your daily meal plan.

If your cholesterol and triglyceride levels tend to be high, adopting the following eating habits may help:

- Cut down on the amount of meat by eating smaller portions of lean meats and fish more often (at least twice a week). Legumes (lentils, beans, chick peas) are a good meat substitute.
- Opt for low-fat dairy products.
- Use less butter and margarine.
- Choose monounsaturated (peanut, canola, olive, sunflower) and polyunsaturated (safflower, nut, corn, soy) fats and oils.
- Avoid eating too many eggs (no more than one per day) or eat egg whites, which are fat and cholesterol free.
- Avoid sweets and high-fat foods. Read the labels on food products closely to determine how much sugar and fat they contain.
- Eat more fresh fruits and vegetables.

ARE WOMEN AFFECTED BY CARDIOVASCULAR DISEASE IN THE SAME WAY AS MEN?

Current studies show that women differ from men with regard to screening, symptoms and the treatment of cardiovascular disease. It is still poorly understood why the profile differs between the sexes. Here are some hypotheses that have been put forward:

Women are NOT less likely to suffer from cardiovascular disease

It is still often believed that women are less susceptible than men to developing cardiovascular problems. As a result, there is less tendency to monitor women for certain risk factors. This is a false belief. According to the Heart and Stroke Foundation of Canada, more women die of cardiovascular disease than men. It is, in fact, the leading cause of death in women. Eight times more women die of cardiovascular disease than breast cancer. Furthermore, the number of heart attacks is on the rise in women in their 30s and 40s.

Women have different heart attack symptoms

It seems that symptoms in women differ from those in men. Symptoms experienced by women are more subtle and therefore more difficult to detect and consequently likely to be ignored longer causing more severe damage. Only 20% of women who have a heart attack say they experienced numbness in the left arm and intense chest pain, the classic symptoms of a heart attack in men. Instead, women seem to experience pain radiating up their necks, into the jaw or the back, sudden exhaustion, vague chest pain and nausea.

The Estrogen Factor

Up until menopause, women enjoy natural protection against cardiovascular disease, thanks to estrogen. Estrogen promotes good cholesterol and helps decrease bad cholesterol. But this protection only pushes back the deadline. As women get older, they become more susceptible than men to the risk of cardiovascular disease. Women tend to be older when they experience heart problems. Women who take estrogen containing medications by mouth may have increased triglycerides.

Women's Roles

Women play many different roles in their lives. Trying to balance all of this may take up a significant amount of time, the result being that women may not give enough attention to their own health needs. Women tend to see themselves as the caregivers and not the ones who need care.

Healthy Eating to Lower LDL Cholesterol

LIMIT	FOOD SOURCES	CHOOSE	FOOD SOURCES
<p>Animal Fats</p> <p>Contain cholesterol and saturated fat that can increase LDL cholesterol levels</p>	<p>Butter</p> <p>Fatty meats</p> <p>Poultry skin</p> <p>2% or whole milk</p> <p>Cream – sour, whipping</p> <p>Lard</p> <p>Processed meats</p> <p>Gravy</p> <p>Cheese</p>	<p>Mono-unsaturated and Omega-3 fat</p> <p>Improves healthy cholesterol (HDL)</p>	<p>Canola oil</p> <p>Peanut butter</p> <p>Seeds</p> <p>Fatty fish (salmon, sardines, tuna, herring, trout and mackerel)</p> <p>Olive oil</p> <p>Nuts</p> <p>Avocado</p>
<p>Saturated / Trans Fats</p> <p>Increase LDL cholesterol and risk for heart disease</p>	<p>Shortening</p> <p>Hydrogenated or partially hydrogenated oil</p> <p>Palm oil</p> <p>Coconut oil</p>	<p>Cholesterol-rich foods in moderation</p> <p>Some foods may be high in cholesterol, yet low in fat and high in nutrition</p>	<p>Egg yolks – 4 per week; unlimited egg whites</p> <p>Lean red meat – 3 – 4 times per week</p> <p>Shellfish – once per week</p> <p>Liver – once per month</p>
		<p>Soluble Fibre</p> <p>Eating more soluble fibre encourages your body to produce less cholesterol</p>	<p>Oat bran</p> <p>Oatmeal</p> <p>Oat-based cereals (Cheerios, Oat Squares, muesli)</p> <p>Barley</p> <p>Barley Flour</p> <p>Rye bread</p> <p>Rye Crackers</p> <p>Legumes (beans, split peas, lentils and chick peas)</p> <p>Fruits and vegetables</p> <p>Substitute peanut butter for margarine</p> <p>Sprinkle nuts and seeds on salads, cereal and yogurt</p> <p>Psyllium-containing cereal (1 – 2 tbsp All Bran Buds daily)</p>
		<p>Vegetables</p> <p>Excellent antioxidant benefit – the antioxidant vitamins in fruits and vegetables may help prevent LDL cholesterol in the blood from converting into artery-clogging plaque</p>	

	Recommendations	Benefits	Other
Physical Activity	<ul style="list-style-type: none"> Regular physical activity is an important aspect of good health for all people including those with dyslipidemia Any increase in physical activity is a good increase! Recommend increasing duration and intensity gradually to help avoid injury Consult with your doctor prior to initiating a strenuous (more exertion than moderate walking) exercise program Goal: be active for 30-45 minutes most days of the week Activity may include jogging, swimming, walking, cycling, or any other type of activity that appeals to you Note: higher intensities of activity are no more effective than moderate levels 	<ul style="list-style-type: none"> helps with weight loss / weight maintenance helps control blood glucose lowers the level of bad blood fats (LDL and TG's) increases the level of good blood fats (HDL) helps lower blood pressure decreases the risk for heart disease helps improve sleep quality increases circulation in the body improves wellbeing 	<ul style="list-style-type: none"> Important tips to prevent injury: <ul style="list-style-type: none"> ➤ start exercise with a gentle warm up or stretching session ➤ gradually increase the duration and intensity of exercise (start with 5 min per day and gradually increase to 30-45 min per day) ➤ finish with gentle stretching to help prevent muscle stiffness
Alcohol	<p>Canadian low risk drinking guidelines are appropriate for all lipid patients and include the following:</p> <ul style="list-style-type: none"> Limit alcohol consumption to < 2 standard servings per day Weekly consumption for men should not exceed 14 standard drinks Weekly consumption for women should not exceed 9 standard drinks 		<p>Important:</p> <p>If you have increased triglycerides, alcohol has a significant impact on increasing triglycerides even further. If triglyceride levels are above 8.0 mmol/L, consider abstinence due to the high risk of pancreatitis.</p>
Stress	<ul style="list-style-type: none"> If stress is a contributing factor to hypertension or may be an implicated factor, consider stress management interventions There are various approaches to stress management including: cognitive behavioral therapy, relaxation techniques, exercise, etc. Combination therapy is most likely to yield successful reductions in blood pressure 		
Smoking Cessation	<ul style="list-style-type: none"> Is essential for reducing cardiovascular risk in any individual with CV risks 		

Client Checklist for Dyslipidemia

What to expect to discuss at each office visit with your family physician:



	Monitor Cholesterol levels (you must fast for 12 – 14 hours)
	Review Medications
	Check Liver enzymes
	Discuss Cholesterol goals
	Measure weight
	Measure waist circumference
	Body Mass Index
	Discuss tobacco use
	Discuss alcohol use
	Discuss activity
	Review nutrition (i.e. low-fat, low cholesterol)

Tests & Measurements that should be done or discussed on a yearly basis, or as recommended by your health care team:



	Update family history
	Referral for further education (BHL)

6. Referral to Specialists/Specialty Programs

For a medical specialist, the primary care physician would have to refer their patient to the medical specialist. An appointment would be made with the medical specialist and the patient would follow up with the specialist at their clinic.

Medical Specialists in the CHR:

Dr. Eric Wilde	Respirologist	Phone: (403) 320-0633	Fax: (403) 320-0353
Dr. Chi-Cheong Au	Internal Medicine	Phone: (403) 328-6641	
Dr. Gordon Hunt	Internal Medicine	Phone: (403) 394-7100	Fax: (403) 380-4024
Dr. Ernest Janzen	Internal Medicine	Phone: (403) 328-8101	Fax: (403) 328-8150
Dr. Richard Schuld	Internal Medicine	Phone: (403) 320-0633	Fax: (403) 320-0353
Dr. Morley Wong	Internal Medicine	Phone: (403) 320-0633	Fax: (403) 320-0353
Dr. David Koegler	Internal Medicine	Phone: (403) 328-2326	Fax: (403) 327-0123

7. References

a. Evidence

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5. Gotto, A. (2000). Blood Lipids and Coronary Heart Disease (2nd ed.). International Lipid Information Bureau, ILIB.
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7. NCEP 2003
8. Stone, J. A. (ed. 2004) Canadian Guidelines for Cardiac Rehabilitation and Cardiovascular Disease Prevention - Enhancing the Science, Refining the Art (2nd ed.). Canadian Association of Cardiac Rehabilitation, Winnipeg, MB, Canada.

b. On-line Resources

Pfizer Canada

www.pfizer.ca

For general information, contact Building Healthy Lifestyles at 388-6654 or 1-866-506-6654