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JUNE 2014

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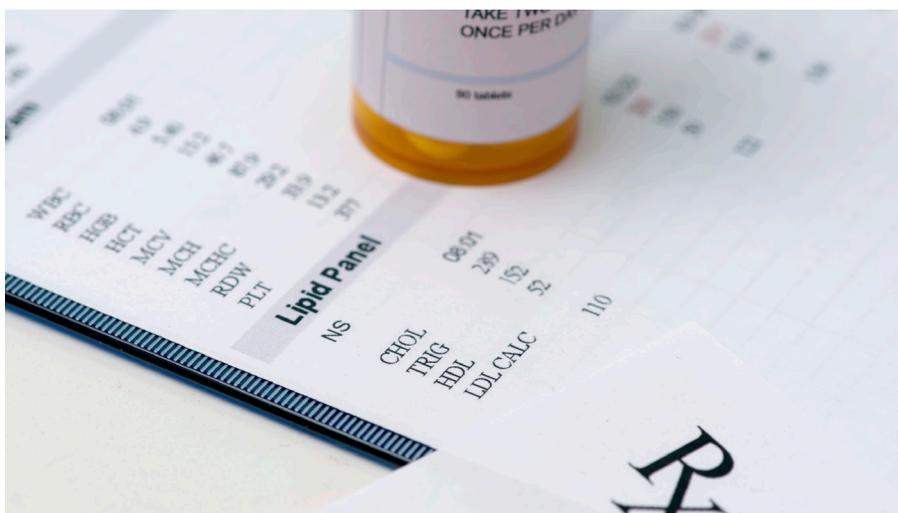
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# Dyslipidemia: Screening, management and the role of the pharmacy technician

by Arden Barry, BSc, BSc(Pharm), PharmD, ACPR



## Learning objectives

Upon completion of this lesson, pharmacy technicians will be able to do the following:

1. Identify patients who should be screened for dyslipidemia and assess their risk using a standardized tool.
2. Become familiar with the dyslipidemia treatment recommendations based on the most recent Canadian Cardiovascular Society guidelines.
3. Gain an understanding of drug therapy for dyslipidemia, with an emphasis on statin therapy.

### Introduction

Dyslipidemia is a common medical condition and an important risk factor for the development of cardiovascular disease (CVD). CVD comprises any type of disease of the cardiovascular system (heart or blood vessels). The term dyslipidemia translates to “abnormal fats in the blood” and is often associated with high blood levels of “bad

cholesterol” (known as low-density lipoprotein cholesterol, or LDL); however, dyslipidemia can also refer to low “good cholesterol” (known as high-density lipoprotein cholesterol, or HDL) or high triglycerides. High blood LDL can lead to the development of plaques in the arteries of the body, a process known as atherosclerosis, which can then narrow or block the arteries. If the blockage occurs in a heart (i.e., coronary)

artery it can result in a heart attack; if the blockage occurs in a brain (i.e., cerebral artery) it can result in a stroke.

There are two different types of dyslipidemia: one is caused by genetics (referred to as primary dyslipidemia) and the other is caused by unhealthy lifestyle choices including poor diet, lack of exercise and cigarette smoking (referred to as secondary or acquired dyslipidemia). Acquired dyslipidemia is the most common cause of dyslipidemia in adults. Some drugs are known to cause or worsen dyslipidemia, such as antipsychotics or medications used to treat HIV infection.

CVD is the leading cause of death and hospitalization in Canada.<sup>(1)</sup> Encouragingly, the number of patients dying from CVD has declined by 75% over the past 60 years. This is primarily due to early detection, advanced treatment strategies (both drug-related and nondrug-related such as stenting and bypass surgery) and increased public awareness. Dyslipidemia is one of the few risk factors for CVD that can be reversed with the adoption of a healthy diet, regular exercise and drug therapy. Therefore, early detection and treatment of dyslipidemia is important to providing good preventive health care.

**TABLE 1 - Medications used to treat dyslipidemia**

	Generic name
Statins	Atorvastatin
	Fluvastatin
	Lovastatin
	Pravastatin
	Rosuvastatin
	Simvastatin
Cholesterol absorption inhibitors	Ezetimibe
Fibrates	Bezafibrate
	Fenofibrate
	Gemfibrozil
Niacin	Niacin extended-release
Bile acid sequestrants	Cholestyramine
	Colestipol
	Colesevelam

### Screening

Screening patients for dyslipidemia is essential, as most patients do not have any symptoms and will often present when it is too late, with either a heart attack or stroke. Screening involves measuring a patient's blood cholesterol parameters including their LDL and HDL. The Canadian Cardiovascular Society (CCS) released guidelines in 2012 for the diagnosis and management of dyslipidemia.<sup>(2)</sup> These guidelines recommend screening all men 40 years of age and older and all women 50 years of age and older, as well as all postmenopausal women. They also recommend screening other patients with certain medical conditions regardless of age. These conditions include high blood pressure, diabetes, chronic lung disease, chronic kidney disease and obesity. Current smokers and all patients with a family history of dyslipidemia or early heart disease should also be screened. Early heart disease is defined as a primary relative (mother, father or sibling) who had a heart attack or stroke early in life (before the age of 55 for men or 65 for women). The guidelines also recommend screening patients with inflammatory diseases (e.g., rheumatoid arthritis), HIV infection or erectile dysfunction. Patients from certain ethnic groups should be screened regardless of age, such as those of South Asian or First Nations descent, as they are at higher risk of heart disease early in life.

### Assessment

A patient's blood cholesterol values can be used to calculate their risk of CVD. This calculation is a valuable step that can be performed by pharmacy technicians. The CCS endorses the use of a risk calculator called the Framingham Risk Score (FRS), which estimates a patient's 10-year risk of total CVD (heart attack, stroke, blockages in the arteries of the legs [known as peripheral arterial disease] and heart failure).<sup>(2)</sup> The FRS takes into account the patient's cholesterol values, age, blood pressure, smoking status and whether or not they have diabetes. The FRS is only applicable for patients who have not been diagnosed with CVD. If a patient has a history of CVD then they are automatically considered to be high risk. Patients over the age of 40 with diabetes are also considered to be high risk.<sup>(2)</sup>

The CCS has multiple resources to help calculate the FRS, including a paper-based version (available at [www.ccs.ca](http://www.ccs.ca)) or a smartphone/tablet app. The app is called "CCS Lipid Guidelines" and is currently only available for Apple products (iPhone, iPad). The benefit of the app is that certain parameters (e.g., cholesterol levels or smoking status) can be easily changed, demonstrating to patients how lifestyle modifications can have a positive impact on their overall CVD risk. It is important to use an FRS that uses International System of Units (SI) for cholesterol (in mmol/L). As the FRS was developed in the United States, many FRS calculators use conventional or US units for cholesterol (mg/dL), which are quite different from the SI units used in Canada.

The FRS calculates a percentage, which is equal to the patient's risk of developing CVD over the next 10 years. For example, an FRS of 18.4% means that the patient has an 18.4% risk of developing CVD over the next 10 years. If a patient has a history of early heart disease in his or her family, then the FRS doubles. Therefore, if a patient has an FRS of 5.6%, it becomes 11.2% if, for example, their father had a heart attack at the age of 52. As well, the FRS includes a "cardiovascular age," which is an estimate of the patient's heart age compared with that of an average Canadian of his or her current age and sex. A 64-year-old patient may have a "cardiovascular age" of 72 years. That means their risk of CVD is shortening their life expectancy by about eight years. The "cardiovascular age" can sometimes be used to help motivate patients to improve their lifestyle.

The FRS then classifies people within one of three risk categories: low, intermediate or high. Low risk is defined as anyone with an FRS of < 10% and high risk is defined as an FRS of ≥ 20%. An intermediate risk patient has an FRS between 10% and 19%. The level of risk helps determine what type of therapy should be recommended. All patients at risk of CVD should receive counselling from their doctor or pharmacist on ways to reduce their CVD risk through lifestyle changes such as a healthy diet, regular exercise and smoking cessation.

The decision to initiate drug therapy can be complex, as there are both benefits and

risks to lipid-lowering drugs. The CCS guidelines recommend using LDL as the determinant as to which patients should receive drug therapy, with the exception of high-risk patients—drug therapy should be recommended for all high-risk patients. Most low-risk patients do not qualify for drug therapy unless their LDL is very high ( $\geq 5$  mmol/L). Intermediate risk patients are usually only recommended drug therapy if their LDL is  $\geq 3.5$  mmol/L. Once patients have started drug therapy, the goal is an LDL  $\leq 2$  mmol/L or at least a 50% reduction from their starting value. For example, if their LDL was 6 mmol/L to start with, then their LDL target would be  $\leq 3$  mmol/L.<sup>(2)</sup>

### Lifestyle recommendations

All patients at risk of CVD should attempt to improve their lifestyle to lower their risk of CVD regardless of whether or not they are taking drug therapy. This involves regular exercise, a heart-healthy diet, limiting alcohol intake and smoking cessation. A simple reminder for patients is the “0-5-30” rule: 0 cigarettes per day, 5 servings of fruits or vegetables per day and 30 minutes of exercise per day. The most important lifestyle change is for patients to stop smoking, as it lowers CVD risk the most compared with other risk factors. Therefore, all current smokers should be referred to a pharmacist for smoking cessation counselling. For exercise, the key is simplicity. Guidelines recommend 150 minutes of moderate to vigorous aerobic activity per week in bouts of 10 minutes or more.

A heart-healthy diet can also have a big impact in reducing CVD risk. Recommendations include reducing caloric intake to maintain a healthy weight; diets rich in fruits, vegetables, whole grains and omega-3 fatty acids; avoiding trans fats; and increasing daily fibre intake. Certain diets have been demonstrated to have a significant impact on reducing CVD, such as the Dietary Approaches to Stop Hypertension (DASH) diet (fruits and vegetables, low-fat dairy products, whole grains, poultry, fish and nuts) and the Mediterranean diet (high in olive oil, legumes, nuts and fish and low in meats). A recent study demonstrated that the Mediterranean diet, as compared with a low-fat diet, reduced heart attacks and strokes by 30%.<sup>(3)</sup> Alcohol consumption should be limited to 1 or 2 standard drinks per day.

### Drug therapy

A variety of drugs are available for the treatment of dyslipidemia, including 3-hydroxy-3-methylglutaryl-coenzyme A (HMG-CoA) reductase inhibitors (statins), cholesterol absorption inhibitors, fibrates, niacin and bile acid sequestrants (Table 1). All of these agents reduce LDL; however, statins have the greatest LDL-lowering effect.

#### Statins

Statins are the first-line therapy for the treatment of dyslipidemia, not just because of their cholesterol-lowering effect, but because many studies show that they reduce heart attacks and strokes. An analysis of multiple statin studies showed a 21% reduction in heart attacks and stroke for every 1 mmol/L reduction in LDL.<sup>(4)</sup> Six statins are currently available in Canada (Table 1). Statins can lower LDL by about 35%–65% depending on the agent. The most potent statins are atorvastatin and rosuvastatin—they can be taken at any time during the day. The other statins should be taken with the evening meal or at bedtime.<sup>(5)</sup>

For most patients, statins are generally safe and well tolerated, with few side effects. The most common side effects include stomach upset (nausea, vomiting, diarrhea), muscle cramping and mild liver inflammation.<sup>(6)</sup> Up to 5% of patients who take a statin can get muscle cramps (known as myalgias), which can occur with any of the statins.<sup>(7)</sup> In general, this side effect usually occurs in the first six months of treatment and primarily affects the large muscle groups (legs, arms and shoulders). Most patients with muscle-related symptoms from statins will be able to tolerate a different statin or the same statin at a reduced dose.<sup>(6)</sup> A rare muscle-related side effect (known as rhabdomyolysis) occurs in about one or two out of every 10,000 patients treated with a statin for a year.<sup>(6)</sup> A mild form of liver inflammation (known as transaminitis) can occur in up to 3% of patients on statin therapy.<sup>(6)</sup> As with muscle cramps, this usually occurs in the first six months but generally does not cause symptoms. If these side effects do occur, they are usually mild and can be managed by lowering the dose or switching to another statin agent. Any patient concerned about statin-related side effects should be referred to the pharmacist for a proper assessment.

#### Adherence

Ensuring patients take their medication every day is an important part of chronic therapy. As dyslipidemia does not usually cause symptoms, patients may easily forget to take their lipid-lowering medication. In other cases, patients may stop their therapy because they feel as though they no longer need it or do not think it is working for them. A Canadian-based study of elderly patients over a two-year period showed that adherence to statins decreases rapidly over time.<sup>(8)</sup> In this study, only 40% of patients continued to take a statin two years after a heart attack. For patients without CVD, only 25% continued to take their statins at two years. Another recent review showed that the most successful way to ensure patients continue their statin therapy is through reminders and reinforcement.<sup>(9)</sup> Pharmacy technicians can play an important role in identifying patients who are nonadherent to their statin therapy.

#### Other lipid-lowering drug therapy

Of the other cholesterol-lowering drugs, only fibrates and niacin have been shown to reduce heart attacks and strokes, but the evidence is not as good as with statins. Fibrates and niacin have modest LDL-lowering effects, but primarily affect other lipid values. Fibrates primarily lower triglycerides and are used to prevent pancreatitis. They can also be used as an alternative to lower LDL in patients who experience side effects with statins. The combination of a statin plus a fibrate should be avoided in most cases, as it increases the risk of muscle problems. Niacin is recommended for patients with high LDL and low HDL, as it raises HDL in addition to lowering LDL. However, two recent studies showed that niacin does not reduce heart attacks and strokes when added to statin therapy.<sup>(10,11)</sup>

With respect to side effects, most people experience an unpleasant flushing effect with niacin that limits its use. Tolerance to this reaction can be achieved over time, but is lost quickly if niacin is stopped for two or three days. A prescription version of extended-release niacin is generally better tolerated than the over-the-counter versions. The flushing reaction is not due to an allergy, but rather is caused by prostaglandin hormones. A pharmacist may recommend that a patient take acetylsalicylic acid, which blocks prostaglandins, before taking niacin.

Some pharmacies carry a version of flush-free niacin that contains inositol. This product should not be recommended, as it is minimally absorbed and has little to no effect on cholesterol values.<sup>(12,13)</sup>

Ezetimibe is the only cholesterol absorption inhibitor available in Canada. It is recommended for the treatment of dyslipidemia in addition to a statin or as an alternative in patients who experience side effects with statins. Ezetimibe is generally well tolerated, but there are emerging reports of muscle- or liver-related side effects.<sup>(14)</sup> Bile acid sequestrants are also potential alternatives for patients who are intolerant to statins; however, they cause multiple unpleasant side effects (nausea, abdominal pain, cramping) and drug interactions.<sup>(15)</sup>

### Role of the pharmacy technician

Pharmacy technicians can play an important role in the collaborative treatment of dyslipidemia. A vital task for pharmacy technicians is identifying patients who should be screened for dyslipidemia based on the CCS guidelines. Other important tasks that pharmacy technicians can perform include the following:

- Calculating the FRS using one of the recommended resources (paper-based version or app)
- Identifying patients who are taking a

cholesterol-lowering medication but have not had their cholesterol levels checked in the past year

- Identifying patients who are nonadherent, or at risk of nonadherence, to their medications by assessing refill and renewal dates
- Identifying patients who are unable to afford their medications
- Identifying patients who express concern regarding medication side effects, particularly those relating to statins
- Referring patients who are smokers to the pharmacist for smoking cessation counselling and support
- Ensuring the pharmacy has patient educational materials regarding positive lifestyle choices, such as smoking cessation, healthy eating (e.g., Canada's Food Guide) and exercise
- Removing flush-free niacin from your inventory if it is currently stocked in your pharmacy

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## QUESTIONS

Please select the best answer for each question or answer online at [www.CanadianHealthcareNetwork.ca](http://www.CanadianHealthcareNetwork.ca) for instant results.

1. Dyslipidemia is defined as

- a) High bad cholesterol
- b) Low good cholesterol
- c) High triglycerides
- d) Abnormal fats in the blood
- e) All of the above

2. Dyslipidemia is often associated with the following symptoms:

- a) Chest pain
- b) Muscle cramping
- c) Nausea and/or vomiting
- d) Most patients do not have any symptoms

3. Cardiovascular disease is the leading cause of death and hospitalization in Canada.

- a) True
- b) False

4. Based on the most recent Canadian Cardiovascular Society guidelines, the following patient population should be screened for dyslipidemia:

- a) All men regardless of age
- b) Men aged 30 years or older
- c) Men aged 40 years or older
- d) Men aged 50 years or older

5. Based on the most recent Canadian Cardiovascular Society guidelines, the following patient population should be screened for dyslipidemia:

- a) All women regardless of age
- b) Women aged 50 years or older and postmenopausal women
- c) Women aged 50 years or older and premenopausal women

d) Women aged 40 years or older and postmenopausal women

6. Based on the most recent Canadian Cardiovascular Society guidelines, patients with the following medical condition(s) should be screened for dyslipidemia regardless of age:

- a) Diabetes
- b) Smoking addiction
- c) High blood pressure
- d) All of the above

7. The Framingham Risk Score estimates the following:

- a) A patient's 10-year risk of developing cardiovascular disease
- b) A patient's 20-year risk of developing

- cardiovascular disease
- c) A patient's 10-year risk of having a heart attack
- d) A patient's lifetime risk of having a heart attack or stroke

8. Patients who are at intermediate risk of cardiovascular disease have a Framingham Risk Score of

- a) 5% to 15%
- b) 10% to 19%
- c) 20% to 30%
- d) 30% to 40%

9. The following patient population(s) is/are considered at high risk of cardiovascular disease:

- a) Family history of early heart disease
- b) History of cardiovascular disease
- c) Smokers
- d) All of the above

10. The "0-5-30" rule for lifestyle modifications to reduce the risk of cardiovascular disease refers to the following:

- a) 0 trans fats, 5 alcoholic drinks per week, 30 servings of fruits or vegetables per week
- b) 0 alcoholic drinks, 5 servings of nuts per week, 30 grams of fibre per day
- c) 0 cigarettes, 5 servings of fruits or vegetables per day, 30 minutes of exercise per day
- d) 0 fast food, 5 days of aerobic exercise per week, 30 minutes of weight training per week

11. The first-line therapy for the treatment of dyslipidemia is

- a) A statin
- b) A fibrate
- c) Niacin
- d) All of the above

12. Common side effect(s) of statins include

- a) Muscle breakdown
- b) Liver dysfunction
- c) Nausea and/or vomiting
- d) Rash

13. All statins have to be taken with the evening meal or at bedtime.

- a) True
- b) False

14. For patients who are intolerant to statins, the following are potential alternatives EXCEPT

- a) Fenofibrate
- b) Ezetimibe
- c) Cholestyramine
- d) Flush-free niacin

15. The role of pharmacy technicians in the collaborative treatment of dyslipidemia include

- a) Calculating the Framingham Risk Score
- b) Identifying patients who are nonadherent to statin therapy based on refill/renewal dates
- c) Referring smokers to the pharmacist for smoking cessation counselling
- d) All of the above

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