

# Provincial Clinical Knowledge Topic

## *Dyslipidemia, Adult*

### V 1.0

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**Revision History**

<b>Version</b>	<b>Date of Revision</b>	<b>Description of Revision</b>	<b>Revised By</b>

## **Important Information Before You Begin**

The recommendations contained in this knowledge topic have been provincially adjudicated and are based on best practice and available evidence. Clinicians applying these recommendations should, in consultation with the patient, use independent medical judgment in the context of individual clinical circumstances to direct care. This knowledge topic will be reviewed periodically and updated as best practice evidence and practice change.

The information in this topic strives to adhere to Institute for Safe Medication Practices (ISMP) safety standards and align with Quality and Safety initiatives and accreditation requirements such as the Required Organizational Practices. Some examples of these initiatives or groups are: Health Quality Council Alberta (HQCA), Choosing Wisely campaign, Safer Healthcare Now campaign etc.

While there are other published guidelines for the management of Dyslipidemia, the recommendations and suggestions in this document are based on the most updated Canadian Cardiovascular Society (CCS) Dyslipidemia Guidelines.

## **Guidelines**

This Clinical Knowledge Topic is based on the following guidelines:

- The Canadian Cardiovascular Society's Dyslipidemia Guidelines (2016)

## **Keywords**

- Dyslipidemia
- Hyperlipidemia
- Hypocholesteremia

## Decision Making

### Goals

1. Identify patients with dyslipidemia by screening/evaluating the serum lipid profiles of patients at risk.
2. Risk stratify patients and determine their lipid targets according to the CCS dyslipidemia guidelines<sup>3</sup>.
  - [http://ccs.ca/images/Guidelines/PocketGuides\\_EN/Pocket\\_Guides/Lipids%20Pocket%20Guide\\_2016.pdf](http://ccs.ca/images/Guidelines/PocketGuides_EN/Pocket_Guides/Lipids%20Pocket%20Guide_2016.pdf)
3. Initiate appropriate lipid-lowering medication therapy to facilitate the achievement of appropriate lipid goals and reduce cardiovascular (CV) risk.
4. Initiate appropriate health behaviour interventions to facilitate the achievement of appropriate lipid goals and to reduce CV risk.
5. Monitor response to therapy and up-titrate treatment, as required to facilitate the achievement of appropriate lipid goals and reduce CV risk.

### Treatment

1. Patient with any of the following *statin-indicated conditions* should be treated or have their medication dose increased if their LDL-C >2.0 mmol/L:
  - a) Clinical Atherosclerosis (MI, ACS, stable angina, documented CAD by angiography, stroke, TIA, documented carotid disease, PAD, claudication and/or ABI <0.9)
  - b) Abdominal Aortic Aneurysm (abdominal aorta >3.0 cm, or previous aneurysm surgery)
  - c) Diabetes Mellitus (≥40 years old, or >15 years duration and age ≥30 years or microvascular complications)
  - d) Chronic Kidney Disease (>3 months duration and ACR >3.0 mg/mmol or eGFR <60 mL/min/1.73 m<sup>2</sup>)
  - e) LDL-C ≥5.0 mmol/L or documented Familial Hypercholesterolemia (FH) after excluding secondary causes.
2. *Primary prevention*: patients should be treated or have their medication dose increased if:
  - a) They are high risk patients (Framingham Risk Score ≥20%)
  - b) They are intermediate risk patients (Framingham Risk Score 10-19%) **and**
    - i. LDL-C ≥3.5 mmol/L, **or**
    - ii. Non-HDL-C ≥4.3 mmol/L, **or**
    - iii. Apo-B ≥1.2 g/L, **or**
    - iv. a man ≥50 years old or woman ≥60 years old and they have 1 additional CVD risk factor

### Summary of Pharmacological Treatment Indications and Targets

Category	Consider Initiating Pharmacotherapy if:	Target
Primary Prevention	High FRS ( $\geq 20\%$ )	LDL-C $< 2.0$ mmol/L or $> 50\%$ <i>or</i> Apo-B $< 0.80$ g/L <i>or</i> non-HDL-C $< 2.6$ mmol/L
	Intermediate FRS (10-19%)  LDL-C $\geq 3.5$ mmol/L <i>or</i> Non-HDL-C $\geq 4.3$ mmol/L <i>or</i> Apo-B $\geq 1.2$ g/L <i>or</i> men $\geq 50$ years and women $\geq 60$ years and 1 additional CVD risk factor	
Statin Indicated Conditions	Clinical Atherosclerosis*	
	Abdominal Aortic Aneurysm	
	Diabetes mellitus ( $\geq 40$ years old, or $> 15$ years duration and age $\geq 30$ years or microvascular complications)	
	Chronic kidney disease ( $> 3$ months duration and ACR $> 3.0$ mg/mmol or eGFR $< 60$ mL/min/1.73 m <sup>2</sup> )	
	LDL $\geq 5.0$ mmol/L or documented Familial Hypercholesterolemia (FH) after excluding secondary causes	$> 50\%$ ↓ in LDL-C

2016 CCS dyslipidemia guidelines<sup>3</sup>

FRS – modified Framingham Risk Score; ACR – albumin: creatinine ratio; eGFR – estimated glomerular filtration rate.

\* Consider LDL-C  $< 1.8$  mmol/L for subjects with ACS within last 3 months

\*\* Statins indicated as initial therapy

### **Nutritional Therapy**

Primary goals of nutrition therapy are to promote a healthy body weight, improve the lipid profile, and importantly reduce the risk of CV events. There are many dietary pathways to achieve CV risk reduction and adherence is probably the most important determinant of success.

To improve the lipid profile and reduce CV risk, a consultation with a registered dietitian is recommended to provide nutrition counseling and support adherence.

## Scoring and Assessment Tools

### Framingham Risk Score (FRS) - Estimation of 10-year Cardiovascular Disease (CVD) Risk <sup>4</sup>

**Step 1:** In the points column enter the appropriate value according to the patients age, HDL-C, total cholesterol, systolic blood pressure, and if they smoke or have diabetes.

Risk	Risk Points				Points
	Men		Women		
<b>Age</b>					
30 - 34	0		0		
35 - 39	2		2		
40 - 44	5		4		
45 - 49	7		5		
50 - 54	8		7		
55 - 59	10		8		
60 - 64	11		9		
65 - 69	12		10		
70 - 74	14		11		
75+	15		12		
<b>HDL-C (mmol/L)</b>					
>1.6	-2		-2		
1.3 – 1.6	-1		-1		
1.2 – 1.29	0		0		
0.9 – 1.19	1		1		
< 0.9	2		2		
<b>Total Cholesterol</b>					
< 4.1	0		0		
4.1 – 5.19	1		1		
5.2 – 6.19	2		3		
6.2 – 7.2	3		4		
>7.2	4		5		
<b>Systolic Blood Pressure (mmHg)</b>	<b>Not Treated</b>	<b>Treated</b>	<b>Not Treated</b>	<b>Treated</b>	
<120	-2	0	-3	-1	
120 – 129	0	2	0	2	
130 – 139	1	3	1	3	
140 – 149	2	4	2	5	
150 – 159	2	4	4	6	
160+	3	5	5	7	
<b>Smoker</b>	<b>Yes</b>	4		3	
	<b>No</b>	0		0	
<b>Diabetes</b>	<b>Yes</b>	Statin-indicated condition			
	<b>No</b>	0		0	
<b>Total Points</b>					

**Step 2:** using the total points from step 1, determine the 10-year CVC risk\* (%)

Total Points	10-year CVD Risk (%)	
	Men	Women
-3 or less	< 1	<1
-2	1.1	<1
-1	1.4	1.0
0	1.6	1.2
1	1.9	1.5
2	2.3	1.7
3	2.8	2.0
4	3.3	2.4
5	3.9	2.8
6	4.7	3.3
7	5.6	3.9
8	6.7	4.5
9	7.9	5.3
10	9.4	6.3
11	11.2	7.3
12	13.3	8.6
13	15.6	10.0
14	18.4	11.7
15	21.6	13.7
16	25.3	15.9
17	29.4	18.51
18	>30	21.5
19	>30	24.8
20	>30	27.5
21+	>30	>30

**Step 3:** Using total points from step 1, determine heart age (in years).

Heart Age, years	Men	Women
< 30	< 0	<1
30	0	
31		1
32	1	
34	2	2
36	3	3
38	4	
39		4
40	5	
42	6	5
45	7	6
48	8	7
51	9	8
54	10	
55		9
57	11	
59		10
60	12	
64	13	11
68	14	12
72	15	
73		13
76	16	
79		14
>80	≥17	15+

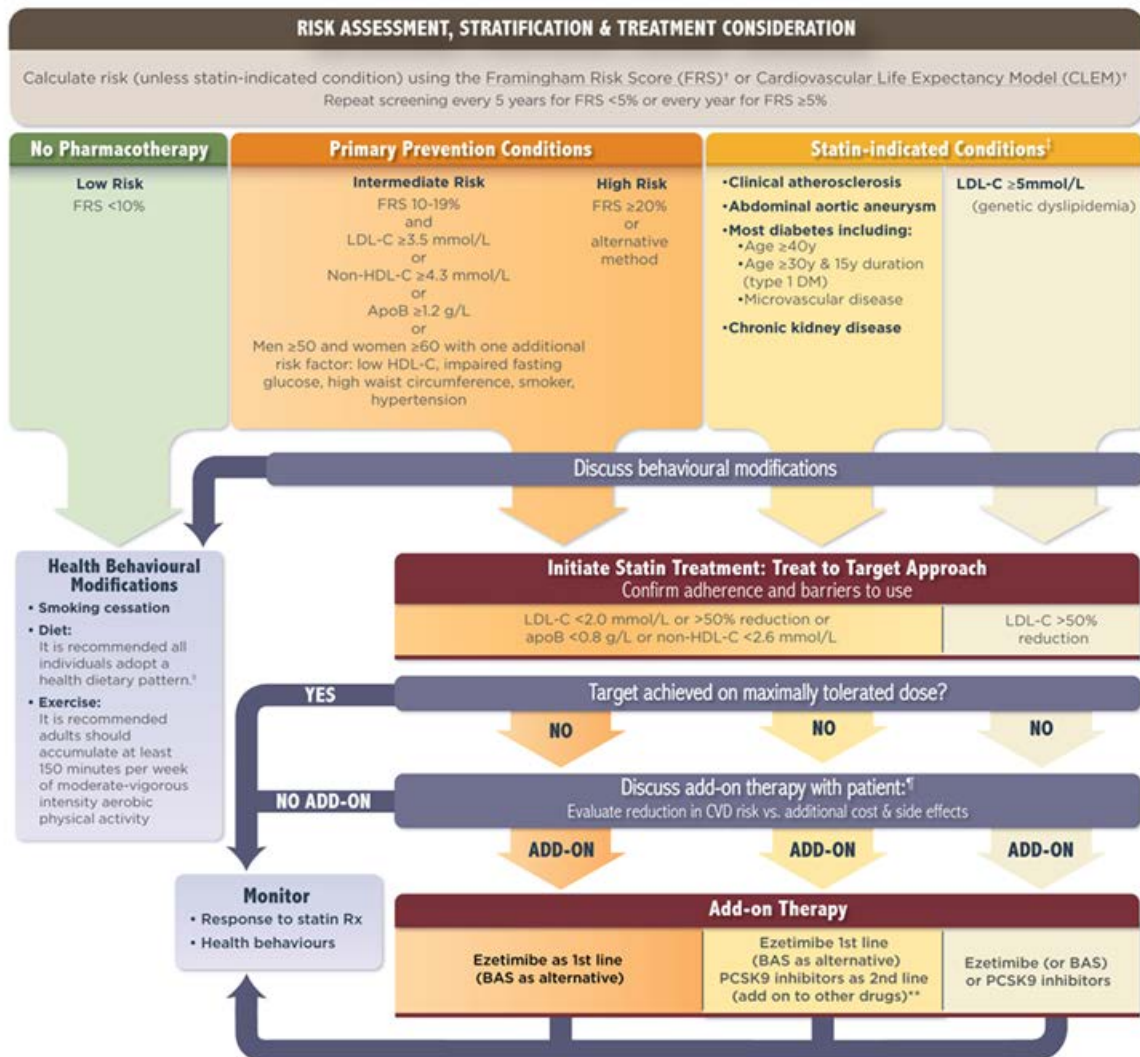
[https://www.ccs.ca/images/Guidelines/Tools\\_and\\_Calculators\\_En/FRS\\_eng\\_2017\\_fnl1.pdf](https://www.ccs.ca/images/Guidelines/Tools_and_Calculators_En/FRS_eng_2017_fnl1.pdf) <sup>4</sup>

\*\*Double cardiovascular disease risk percentage for individuals between the ages of 30 and 59 without diabetes if the presence of a positive history of premature cardiovascular disease is present in a first-degree relative before 55 years of age for men and before 65 years of age for women. This is known as the modified Framingham Risk Score.



## Decision Making Algorithms

The following algorithm from the 2016 CCS Dyslipidemia Guideline provides an overall approach to the management of dyslipidemia.<sup>3</sup>



## Dyslipidemia, Adult Order Set

### Diet and Nutrition

- Healthy Heart Diet

### Laboratory Investigations Routine

*Only individuals with hypertriglyceridemia (TG >4.5 mmol/L) require a fasting lipid panel*

*Screening for type 2 diabetes using a fasting plasma glucose (FPG) and/or glycated hemoglobin (A1C) should be performed every 3 years in individual's  $\geq 40$  years of age or in individuals at high risk using the FRS risk calculator (see above).*

### Hematology

- Lipid Panel (Cholesterol, HDL Cholesterol, Calculated LDL Cholesterol, Triglycerides, non-HDL-cholesterol)

*Patients >40 years old with no HbA1c in past 3 years*

- HbA1c

### Chemistry

*Optional (Indicated for patients who are to be started on statin)*

- CK – Routine
- ALT - Routine

## Medications

### Lipid Lowering Agents

*The choice of statin and dosing should take into consideration many patient-specific factors, including the degree of low-density lipoprotein cholesterol (LDL-C) lowering that is required to achieve the target levels for each patient. Refer to Appendix A within the Clinical Knowledge Topic – Dyslipidemia for: [medication: Statin Range of percent LDL-C lowering from baseline.](#)*

*Atorvastatin and rosuvastatin are high-potency statins and produce the greatest reduction in LDL-C.*

- atorvastatin 10 mg PO once daily
- atorvastatin 20 mg PO once daily
- atorvastatin 40 mg PO once daily
- atorvastatin 80 mg PO once daily
  
- rosuvastatin 40 mg PO once daily
- rosuvastatin 20 mg PO once daily
- rosuvastatin 10 mg PO once daily
- rosuvastatin 5 mg PO once daily
  
- simvastatin 10 mg PO once daily
- simvastatin 20 mg PO once daily
- simvastatin 40 mg PO once daily
  
- pravastatin 10 mg PO once daily
- pravastatin 20 mg PO once daily

- pravastatin 40 mg PO once daily
- pravastatin 80 mg PO once daily
  
- ezetimibe 10 mg PO once daily  
*Restrictions:*
  1. *Patients on ezetimibe prior to admission; **OR***
  2. *Treatment of hypercholesterolemia in patients who are intolerant to statins or in whom a statin is contraindicated and who are at high cardiovascular risk; **OR***
  3. *Treatment of hypercholesterolemia when used in combination with a statin in patients failing to achieve target LDL with a statin given at a maximum tolerable or recommended dose and who are at high cardiovascular risk.*

*High cardiovascular risk is defined by possessing one of the following:*

  - a) *Pre-existing cardiovascular disease and/or cerebrovascular disease; **OR***
  - b) *Diabetes; **OR***
  - c) *Familial hypercholesterolemia; **OR***
  - d) *Three or more of the following risk factors: smoking, hypertension, obesity, glucose intolerance, and renal disease.*

### **Consults/Referrals**

- Consult Dietitian: Provide advice about healthy eating and food choices
- Consult Cardiac Rehab: For patients admitted with MI or unstable angina

### **Discharge**

#### Assistive Devices

- Patient and Family education/discharge instructions
  - My Health Alberta website: <https://myhealth.alberta.ca/>
  - Online FRS Calculator for patients: [www.myhealthcheckup.com](http://www.myhealthcheckup.com)

#### Discharge Labs/Diagnostic Imaging

- Outpatient follow-up lab work 6 to 8 weeks post initial therapy
  - Lipid Panel (Cholesterol, HDL Cholesterol, Calculated LDL Cholesterol, Triglycerides, non-HDL-cholesterol)
  - CK
  - ALT

## Analytics

### Baseline Analytics - Outcome Measure #1

<b>Name of Measure</b>	Number of times the Dyslipidemia order set/protocol is used.
<b>Definition</b>	For all patients with dyslipidemia, the number of times this order set (Dyslipidemia) is used. Overall, by region and by sites.
<b>Rationale</b>	Intended to measure if the order set cited in the knowledge topic is being used and what % of time for the indicated disease or condition. May indicate areas with adoption issues or gaps within the topic.
<b>Notes for Interpretation</b>	N/A
<b>Cited References</b>	N/A

### Analytics – Outcome Measure #2

<b>Name of Measure</b>	Percent of patients who achieve LDL-cholesterol targets
<b>Definition</b>	The percentage of patients who have dyslipidemia achieve the LDL-cholesterol target of :
<b>Rationale</b>	This measure is important as the purpose of managing individuals with dyslipidemia
<b>Notes for Interpretation</b>	Provide any additional details that may assist in understanding the application of the measure.
<b>Cited References</b>	N/A

## Appendix A: Statins

The following table shows the percentage LDL-C reductions produced by each statin agent across the approved dosing range<sup>1</sup>.

Dose (mg)	Statin			
	Range of percent LDL-C lowering from baseline in clinical trials			
	Atorvastatin	Rosuvastatin	Pravastatin	Simvastatin
5	----	39-46 %	----	----
10	29-40%	37-51%	18-24.5%	26-33%
20	38-46%	45-52.4%	23-29%	19-40%
40	45-51%	53.6–58.8%	25-34%	34-43%
80	46-55%	----	----	----

## Appendix B: Lipids iCCS Application

Lipids iCCS app – contains the most up-to-date guideline information

- [www.CCS.CA/apps](http://www.CCS.CA/apps)

## References

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2. The Canadian Diabetes Association 2013 Clinical Practice Guide- lines for the Prevention and Management of Diabetes in Canada, Canadian Journal of Diabetes April 2013 Vol 37 Supplement 1
3. The Canadian Cardiovascular Society's Dyslipidemia Guidelines, 2016 [www.css.ca](http://www.css.ca)
4. Canadian Cardiovascular Society:  
[https://www.ccs.ca/images/Guidelines/Tools\\_and\\_Calculators\\_En/FRS\\_eng\\_2017\\_fnl1.pdf](https://www.ccs.ca/images/Guidelines/Tools_and_Calculators_En/FRS_eng_2017_fnl1.pdf)

## Acknowledgements

We would like to acknowledge the contributions of the clinicians who participated in the development of this topic. Your expertise and time spent are appreciated.

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