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Lipid Panel Screening for Adults Living With Chronic Conditions

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Rapid Review

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Abbreviations

CCS	Canadian Cardiovascular Society
CVD	cardiovascular disease
GRADE	Grading of Recommendations, Assessment, Development, and Evaluation
HDL	high-density lipoprotein
LDL	low-density lipoprotein
NICE	National Institute for Health and Care Excellence

Key Messages

- Abnormal blood lipid levels are associated with increased risk of cardiovascular disease, and lipid panel screening can help health care providers make treatment decisions for adults living with chronic conditions.
- We did not find any studies that met our inclusion criteria on the diagnostic test accuracy or clinical utility of nonfasting lipid panel screening for adults living with chronic conditions.
- Two guidelines recommend a nonfasting lipid panel for the initial screening for cardiovascular disease risk. A fasting lipid panel is recommended if triglyceride levels are high.
- One guideline recommends either fasting or nonfasting lipid panel screening before starting lipid modification therapy in people at risk of cardiovascular disease.

Context and Policy Issues

What Is Dyslipidemia?

Dyslipidemia refers to abnormal blood lipid values that are associated with disease or increased risk of disease, such as cardiovascular disease (CVD).[1] Dyslipidemia is a risk factor for the development of atherosclerosis (i.e., the hardening or thickening of arteries due to plaque buildup).[2] In patients with premature coronary heart disease (i.e., those younger than 60 years), the prevalence of dyslipidemia may be as high as 75% to 85% of patients.[2]

What Is Lipid Panel Screening?

Lipid panels will typically measure total cholesterol, low-density lipoprotein (LDL) cholesterol, high-density lipoprotein (HDL) cholesterol, and triglycerides.[3] They are frequently used to screen for lipid disorders (including familial lipid disorders) and for risk of CVD.[3]

Care providers can input the results from lipid panel screening into CVD risk calculators to estimate a patient's risk of CVD, which can be used to initiate treatment to improve cardiovascular outcomes.[1] Lipid panel screening can be conducted in the fasting and nonfasting state.[1] While there are only small, clinically insignificant differences in total and HDL cholesterol levels between fasting and nonfasting states, triglyceride levels are influenced by recent food intake, particularly high-fat meals.[3] Although LDL cholesterol can be measured directly, in clinical practice the value is usually calculated using equations (e.g., the Friedewald equation). As these equations rely on other lipid values, sources of error can be introduced based on lipid levels (e.g., the Friedewald formula is not valid if total triglycerides are greater than 4.5mmol/L).[3]

Why Is It Important to Do This Review?

Traditionally, when screening for cardiovascular risk, lipid profiles have been measured in the fasted state.[4] The reasons for this include: the potential change in some lipid components after eating; the limitations of the calculations to estimate LDL cholesterol; uncertainty in the cut-off values for nonfasted samples; and

because fasting is the standard by which the testing has always been done.[4] However, nonfasting lipid panel screening may be more suitable for some people, and many cardiovascular societies are moving toward changing their guidelines and recommending nonfasting lipids to assess for cardiovascular risk.[4,5]

There may be practical advantages of not requiring patients to fast before a lipid panel screening, as patients can present at any time for the blood sample, including immediately following their appointment with their care provider, which may increase the timeliness and convenience of lipid testing[6] and result in fewer patients lost to follow-up.[5] Requiring fasting samples may result in extended wait times while fasting if many people present to the laboratory early in the morning for testing,[6] and nonfasting lipid testing may relieve the strain on collection centres in the morning.[5] Removing the requirement to fast before lipid testing can also remove the risks associated with fasting due to the risk of hypoglycemia, including in patients living with diabetes.[6] However, if there is a possibility that a patient may have high triglyceride levels, care providers may wish to consider starting with a fasting sample, as this would prevent having to return for a second test if a nonfasting test reveals high triglyceride levels.[1]

Assuming adequate test performance, assessing the risk of CVD using nonfasting lipid panel screening can help guide treatment decisions in adults living with chronic health conditions. The increased convenience of nonfasting lipid panel screening may be especially useful for people who may have increased risks associated with fasting (e.g., people with diabetes)[6] or people who may have difficulty with attending a health care facility while fasted (e.g., people without access to reliable transportation, people living in rural or remote areas).

Objective

To support decision-making about lipid panel screening for dyslipidemia in adults living with chronic conditions, this Rapid Review summarizes and critically appraises available studies on the diagnostic test accuracy and clinical utility of nonfasting lipid panel screening, and evidence-based guidelines on lipid panel screening in these populations.

Research Questions

1. What is the diagnostic test accuracy of nonfasting lipid panel screening for dyslipidemia in adults living with chronic conditions?
2. What is the clinical utility of nonfasting lipid panel screening for adults living with chronic conditions?
3. What are the evidence-based guidelines regarding lipid panel screening for adults living with chronic conditions?

Methods

Literature Search Methods

An information specialist conducted a literature search on key resources including MEDLINE, the Cochrane Database of Systematic Reviews, the International HTA Database, and the websites of Canadian and major international health technology agencies, as well as a focused internet search. The search approach was customized to retrieve a limited set of results, balancing comprehensiveness with relevancy. The search strategy comprised both controlled vocabulary, such as the National Library of Medicine's MeSH (Medical Subject Headings), and keywords. Search concepts were developed based on the elements of the research questions and selection criteria. The main search concepts were dyslipidemia, lipid panels, and chronic conditions (type 1 and type 2 diabetes, hypertension, and coronary artery disease). CADTH-developed search filters were applied to limit retrieval to diagnostic test accuracy, health technology assessments, systematic reviews, meta-analyses, indirect treatment comparisons, any types of clinical trials, or observational studies. Clinical trials and observational studies retrieval was limited to the human population. A second search was completed with the main search concepts lipid panels and chronic conditions (type 1 and type 2 diabetes, hypertension, and coronary artery disease). CADTH-developed search filters were applied to limit retrieval to guidelines. Searches were completed on June 27, 2023, and limited to English-language documents published since January 1, 2018.

Selection Criteria and Methods

One reviewer screened citations and selected studies. In the first level of screening, titles and abstracts were reviewed and potentially relevant articles were retrieved and assessed for inclusion. The final selection of full-text articles was based on the inclusion criteria presented in Table 1.

Table 1: Selection Criteria

Criteria	Description
Target condition	Q1: Dyslipidemia Q2, Q3: Not applicable
Population	Adults living with chronic conditions, including: • coronary artery disease • hypertension • type 1 and type 2 diabetes
Intervention	Q1, Q2: Nonfasting lipid panel screening Q3: Lipid panel screening
Reference standard	Q1: Fasting lipid panel screening Q2, Q3: Not applicable
Comparator	Q1, Q3: Not applicable Q2: Fasting lipid panel screening

Criteria	Description
Outcomes	Q1: Diagnostic test accuracy (e.g., sensitivity, specificity, positive predictive value, negative predictive value) Q2: Clinical utility (e.g., time to treatment, morbidity, incidence of disease, mortality, quality of life, cardiovascular-related outcomes) Q3: Recommendations regarding lipid panel screening (e.g., fasting vs. nonfasting)
Study designs	Health technology assessments, systematic reviews, randomized controlled trials, nonrandomized studies, evidence-based guidelines

Exclusion Criteria

Articles were excluded if they did not meet the selection criteria outlined in Table 1, if they were duplicate publications, or if they were published before 2018. Guidelines with unclear methodology were also excluded.

Critical Appraisal of Individual Studies

The included publications were critically appraised by 1 reviewer using the Appraisal of Guidelines for Research and Evaluation (AGREE) II instrument[7] as a guide. Summary scores were not calculated for the included studies; rather, the strengths and limitations of each included publication were described narratively.

Summary of Evidence

Quantity of Research Available

This report includes 3 evidence-based guidelines.[8-10] Study selection details are presented in Appendix 1. Additional references of potential interest are provided in Appendix 5.

Summary of Study Characteristics

Detailed characteristics of included publications are provided in in Appendix 2.

Included Studies for Question 1: Diagnostic Test Accuracy

No relevant studies were identified for question 1; therefore, no summary can be provided.

Included Studies for Question 2: Clinical Utility

No relevant studies were identified for question 2; therefore, no summary can be provided.

Included Studies for Question 3: Guidelines

Three evidence-based guidelines[8-10] provided recommendations regarding lipid panel screening for adults living with chronic conditions. These guidelines about CVD risk assessment and reduction and lipid management were developed by the National Institute for Health and Care Excellence (NICE) (2023),[8] the Canadian Cardiovascular Society (CCS) (2021),[9] and the Endocrine Society (2020).[10] The guidelines were developed for adults at risk of CVD[8,9] and with endocrine disorders, including diabetes.[10] The NICE and CCS guidelines are both updates, and the recommendations relevant to this Rapid Review were developed in the previous iterations of the guidelines (2014 for NICE,[11] and 2016 for CCS[12]) and carried forward as

ongoing recommendations in the updated guidelines.[8,9] The NICE guideline did not report the strength of the recommendation or quality of the evidence for the recommendations relevant to this Rapid Review, as a specific review was not conducted to inform these recommendations.[8] The CCS and the Endocrine Society guidelines both used the Grading of Recommendations, Assessment, Development, and Evaluation (GRADE) framework to rate the quality of the evidence informing the recommendations (ranging from very low-quality to high-quality evidence) and the strength of the recommendations (i.e., strong versus weak or conditional).[9,10]

Summary of Critical Appraisal

All 3 guidelines[8-10] had clear objectives, described the population and target users of the guideline, included individuals from relevant professional groups in the guideline development group, and had specific and unambiguous recommendations that were easily identifiable in the guidelines.

The CCS guideline[9] reported the research questions addressed in the guideline (including the population, intervention, comparators, and outcomes covered), and considered patient values and preferences when developing the recommendations, although it was unclear how this information was collected (e.g., from the literature or from consultations with patients). The NICE guideline[8] and the Endocrine Society guideline[10] did not report the research questions that were used to develop the recommendations that were relevant to this Rapid Review, nor did they include the views and preferences of the target population when developing these recommendations.

None of the guidelines reported using systematic methods to search the literature for evidence for the recommendations relevant to this Rapid Review, which increases the likelihood that relevant literature was missed. The NICE guideline[8] explicitly stated that a specific literature review was not conducted to develop the recommendations relevant to this report, and rather the evidence collected to develop other recommendations was used to inform these recommendations. While the method used to formulate these consensus-based recommendations was described in the NICE guideline,[8] there was no explicit link between the supporting evidence and the recommendations, and the quality of the evidence was not assessed nor was the strength of the recommendation reported, limiting our confidence in these recommendations. Neither the CCS guideline[9] nor the Endocrine Society guideline[10] reported any details of their literature search, but they provide explicit links between the recommendations and the supporting evidence, and evaluate the quality of the evidence and the strength of the recommendations using the GRADE framework, which increases our confidence in these recommendations.

The guidelines were funded internally by their respective organizations (i.e., NICE, the CCS, and the Endocrine Society) and none received external funding. However, there were no explicit statements that the funding bodies did not influence the content of the guidelines; thus, it is unclear whether editorial independence was obtained between the guideline development groups and the funding organizations. The competing interests of the guideline development group members were disclosed and addressed in all 3 guidelines.

Additional details regarding the strengths and limitations of included publications are provided in Appendix 3.

Summary of Findings

Appendix 4 presents the main study findings.

Diagnostic Accuracy of Nonfasting Lipid Panel Screening

No relevant evidence was identified regarding the diagnostic test accuracy of nonfasting lipid panel screening dyslipidemia in adults living with chronic conditions; therefore, no summary can be provided.

Clinical Utility of Nonfasting Lipid Panel Screening

No relevant evidence was identified regarding the clinical utility of nonfasting lipid panel screening dyslipidemia in adults living with chronic conditions; therefore, no summary can be provided.

Guidelines Regarding Lipid Panel Screening for Adults Living With Chronic Conditions

When screening for CVD risk in adults living with diabetes, hypertension, or clinical evidence of atherosclerosis, the following guidance is available:

- Nonfasting lipid and lipoprotein testing is recommended (strong recommendation based on high-quality evidence; 1 guideline).[9]
- A lipid panel to assess triglyceride and LDL cholesterol levels is recommended (strong recommendation based on moderate-quality evidence; 1 guideline), and a nonfasting sample is acceptable for initial screening (included in the technical remarks for the recommendation).[10]
- For people with or a history of elevated triglyceride levels, it is recommended that lipid and lipoprotein levels be measured fasting (conditional recommendation in 1 guideline based on low-quality evidence,[9] and included in the technical remarks accompanying a recommendation in 1 guideline).[10]

For adults at risk of CVD, the following is recommended:

- Screen with a full lipid profile before starting lipid modification therapy, using either a fasting or nonfasting blood sample (strength of the recommendation and the quality of evidence informing the recommendation not reported; 1 guideline).[8]
    - If triglyceride levels from this test are between 10 mmol/L and 20 mmol/L, repeat with a fasting test sample within 5 to 14 days of the original sample (strength of the recommendation or the quality of evidence informing the recommendation not reported; 1 guideline).[8]

Limitations

No evidence was found on the following; therefore, no conclusions can be formed on these research questions:

- the diagnostic test accuracy of nonfasting lipid panel screening for dyslipidemia in adults living with chronic conditions
- the clinical utility of nonfasting lipid panel screening for dyslipidemia in adults living with chronic conditions.

None of the guidelines reported using systematic literature search methods to inform recommendations relevant to this Rapid Review, which limits the quality of these guidelines, and some of the recommendations were based on evidence that was of low or moderate quality, or not assessed for quality, which reduces the certainty of the recommendations summarized in this report.

None of the guidelines described the populations for the evidence from which the recommendations were developed, thus it is unclear whether the guidelines had representative populations with respect to factors that may affect the development of CVD (e.g., sex, race, comorbidities).

Conclusions and Implications for Decision- or Policy-Making

This report comprises 3 evidence-based guidelines[8-10] regarding lipid panel screening for adults living with chronic conditions. No relevant evidence was identified regarding the diagnostic test accuracy or clinical utility of fasting versus nonfasting lipid panel screening in these populations.

Recommendations for Lipid Panel Screening

When screening for CVD risk, a nonfasting lipid panel is recommended (2 guidelines).[9,10] A fasting lipid panel is recommended for people with a history of elevated triglyceride levels or if the initial nonfasting lipid screening results in high triglyceride levels.[9,10] In adults at risk of CVD, fasting or nonfasting lipid panel screening should be conducted before starting lipid modification therapy (1 guideline).[8] If a nonfasting sample returns high triglyceride levels, it is recommended to repeat with a fasting sample.[8]

The recommendations included in this Rapid Review were informed in part by evidence demonstrating little to no difference in lipid values between the fasting samples and nonfasting samples after eating normal meals.[9] Similar findings were reported in a 2020 study in adults living with and living without type 2 diabetes, where small and insignificant changes in total, HDL, and LDL cholesterol were observed between fasting and nonfasting lipid panels, but statistically significant differences were observed in triglyceride levels.[13] However, as this study did not report diagnostic test accuracy outcomes (e.g., sensitivity, specificity) nor did it report clinical utility findings (e.g., time to treatment, incidence of CVD), it was not directly relevant to the research questions of this review.[13]

Screening for CVD risk using either a fasting or nonfasting lipid panel, and repeating with a fasting sample if the initial nonfasting sample results in high triglyceride levels, is also recommended for other populations outside the scope of this review, including adults aged 20 years or older,[14] and in some consensus-based guidelines.[15]

Generalizability

The recommendations summarized are generalizable to the Canadian health care context; the guidelines are meant to apply to Canada,[9] the UK,[8] and globally,[10] and the target populations include people at risk of CVD[8,9] and people with endocrine disorders.[10]

Considerations for Future Research

To better inform decisions around fasting versus nonfasting lipid panel screening, researchers should consider looking at the clinical utility of nonfasting lipid panel screening (e.g., cardiovascular-related outcomes, morbidity, quality of life, and time to treatment associated with receiving the results of the screening).

Implications for Clinical Practice

For adults living with chronic conditions, it is recommended that a fasting or nonfasting lipid panel be used for initial screening of CVD risk (3 guidelines).[8-10] If the initial nonfasting sample reveals high triglyceride levels, or in people with a history of hypertriglyceridemia, a fasting lipid panel can be conducted.[8-10]

Decision-makers may wish to consider that fasting may be a barrier for lipid panel screening for some people, and that a nonfasting sample may be more convenient for patients, especially when sample collection can occur at the point-of-care at the time the care provider requests the lipid panel screening. However, decision-makers should consider the possibility that a patient with high triglyceride levels would require a second test if a nonfasting sample is used initially, and whether starting with a fasting or nonfasting sample would best suit each individual's circumstances.

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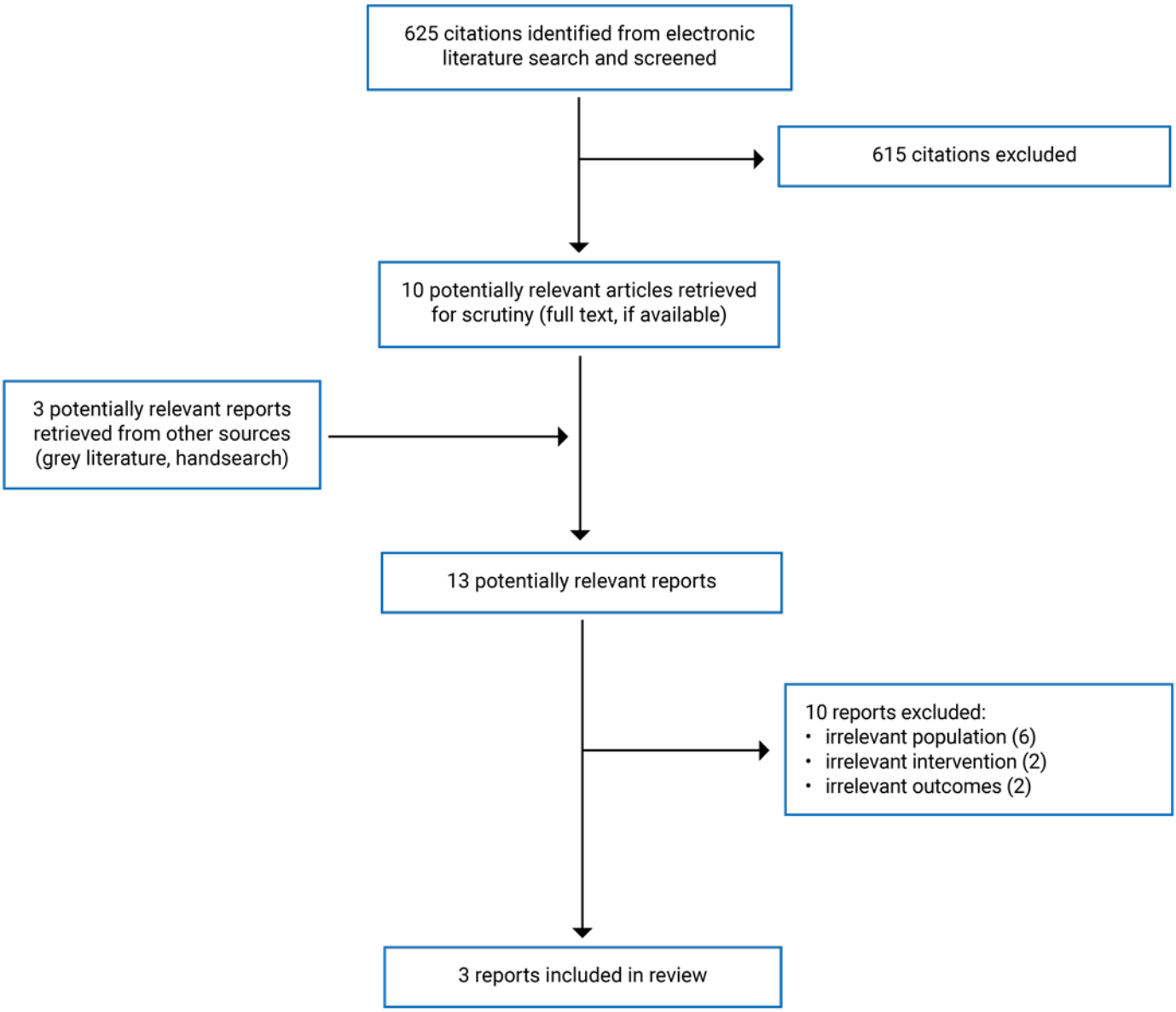
Appendix 1: Selection of Included Studies

Figure 1: Selection of Included Studies



Appendix 2: Characteristics of Included Publications

Note that this appendix has not been copy-edited.

Table 2: Characteristics of Included Guidelines

Intended users, target population	Intervention(s) and major outcomes considered	Evidence collection, synthesis, and quality assessment	Recommendations development and evaluation	Guideline validation
NICE (2023)[8]				
Intended users: Health care professionals, people at risk or who have cardiovascular disease **Target population**: Adults at risk of cardiovascular disease	Not applicable for relevant consensus-based recommendations.	Update to the 2014 version of the guideline,[11] to review evidence on risk assessment tools, cardioprotective diets, and statin treatment. Includes recommendations that have not been updated from previous versions.[a] Recommendations relevant to this report were consensus-based (using information collected via systematic searches conducted for other evidence reviews). Quality of the evidence was not assessed in the recommendations relevant to this report.	Consensus-based recommendations were drafted by the guideline development group and agreed upon through discussions. Considerations included balancing potential benefits and harms, the economic costs compared to economic benefits, current practices, recommendations in other guidelines, patient preferences, and equality issues. Strength of the recommendation was not assessed in the recommendations relevant to this report.	Six-week public consultation and feedback. All comments from registered stakeholders are responded to and posted on the NICE website.
Canadian Cardiovascular Society (2021)[9]				
Intended users: Clinicians and patients **Target population**: People at risk of atherosclerotic cardiovascular disease, including people with diabetes	Fasting and nonfasting lipid panels. Change in triglycerides, and total, LDL, or HDL cholesterol levels. Risk of cardiovascular disease.	Update to the 2016 guideline.[12] Ongoing recommendations from the 2016 guideline were included (i.e., insufficient evidence to require major changes to the recommendation).[b] Developed following standardized guideline development procedures.[16] Literature was reviewed for each PICO question, but search details were not reported. GRADE framework[17] was used to rate the quality of evidence.	Primary and secondary panel members with topic expertise write the guideline and provide feedback, respectively. Recommendations are developed based on a review of evidence and finalized by consensus using a voting system. A voting majority of at least two-thirds was required for recommendations to go forward. GRADE framework[17] was used to rate the strength of recommendations. Recommendations can	Draft guideline is reviewed by secondary panel for initial feedback. Manuscript is then reviewed by the Guidelines Committee, followed by the Canadian Cardiovascular Society Council or Executive.

Intended users, target population	Intervention(s) and major outcomes considered	Evidence collection, synthesis, and quality assessment	Recommendations development and evaluation	Guideline validation
		The quality of the evidence can be high, moderate, low, or very low; based on the certainty of the effect estimate (ranging from very uncertain to unlikely to change).	be strong or weak,[c] based on: quality of the evidence, the difference between the desirable and undesirable effects, patient values and preferences, and cost.	
Endocrine Society (2020)[10]				
Intended users: Endocrinologists **Target population**: People with endocrine disorders, including diabetes	Interventions for the assessment and treatment of dyslipidemia. Change in triglycerides, and LDL or HDL cholesterol levels. Risk of cardiovascular disease.	Nonsystematic review of the literature was conducted for the recommendations relevant to this report. Methods not reported. GRADE framework applied to classify the quality of the evidence (from very low to high quality).	Recommendations based on expert review of the limited data (process not further described) where evidence is extremely limited and/or not systematically analyzed. GRADE framework was used to classify the strength of the recommendations (strong or conditional). Considerations include study design and risk of bias.	1 month review period (approximately 18 months into the process) during which internal and external stakeholders provide feedback on draft guidelines.

GRADE = Grading of Recommendations, Assessment, Development, and Evaluation; HDL = high-density lipoprotein; LDL = low-density lipoprotein; PICO = population, intervention, comparator, and outcomes; NICE = National Institute for Health and Care Excellence.

[a]Both recommendations that are relevant to this Rapid Review were developed in the 2014 version of the NICE guideline and carried forward as ongoing recommendations in the 2023 update.

[b]Both recommendations that are relevant to this Rapid Review were developed in the 2016 version of the Canadian Cardiovascular Society[12] guideline and carried forward as an ongoing recommendations in the 2021 version of the guideline.

[c]Prior to November 2016, the term "conditional" was used instead of "weak."

Appendix 3: Critical Appraisal of Included Publications

Note that this appendix has not been copy-edited.

Table 3: Strengths and Limitations of Guidelines Using AGREE II[7]

Item	NICE (2023)[8]	Canadian Cardiovascular Society (2021)[9]	Endocrine Society (2020)[10]
Domain 1: Scope and purpose			
1. The overall objective(s) of the guideline is (are) specifically described.	Yes	Yes	Yes
2. The health question(s) covered by the guideline is (are) specifically described.	No	Yes	No
3. The population (patients, public, etc.) to whom the guideline is meant to apply is specifically described.	Yes	Yes	Yes
Domain 2: Stakeholder involvement			
4. The guideline development group includes individuals from all relevant professional groups.	Yes	Yes	Yes
5. The views and preferences of the target population (patients, public, etc.) have been sought.	No	Unclear	No
6. The target users of the guideline are clearly defined.	Yes	Yes	Yes
Domain 3: Rigour of development			
7. Systematic methods were used to search for evidence.	No	Unclear	No
8. The criteria for selecting the evidence are clearly described.	No	Yes	No
9. The strengths and limitations of the body of evidence are clearly described.	No	No	No
10. The methods for formulating the recommendations are clearly described.	Yes	Yes	No
11. The health benefits, side effects, and risks have been considered in formulating the recommendations.	No	Yes	Yes
12. There is an explicit link between the recommendations and the supporting evidence.	No	Yes	Yes
13. The guideline has been externally reviewed by experts before its publication.	Yes	No	Yes
14. A procedure for updating the guideline is provided.	Yes	Yes	No
Domain 4: Clarity of presentation			
15. The recommendations are specific and unambiguous.	Yes	Yes	Yes
16. The different options for management of the condition or health issue are clearly presented.	Yes	Yes	Yes
17. Key recommendations are easily identifiable.	Yes	Yes	Yes

Item	NICE (2023)[8]	Canadian Cardiovascular Society (2021)[9]	Endocrine Society (2020)[10]
Domain 5: Applicability			
18. The guideline describes facilitators and barriers to its application.	No	No	No
19. The guideline provides advice and/or tools on how the recommendations can be put into practice.	No	Yes	Yes
20. The potential resource implications of applying the recommendations have been considered.	No	No	No
21. The guideline presents monitoring and/or auditing criteria.	No	No	No
Domain 6: Editorial independence			
22. The views of the funding body have not influenced the content of the guideline.	Unclear	Unclear	Unclear
23. Competing interests of guideline development group members have been recorded and addressed.	Yes	Yes	Yes

AGREE II = Appraisal of Guidelines for Research and Evaluation II; NICE = National Institute for Health and Care Excellence.

Note: Within the guidelines, the methods and information reported varied by specific recommendation. This critical appraisal focuses on the information specific to the recommendations relevant to this Rapid Review, and may not reflect the methods used or the availability of information for the entire guideline.

Appendix 4: Main Study Findings

Note that this appendix has not been copy-edited.

Table 4: Summary of Recommendations in Included Guidelines

Recommendations and supporting evidence	Quality of evidence and strength of recommendations
NICE (2023)[8]	
Lipid modification therapy for the primary and secondary prevention of cardiovascular disease: "Before starting lipid modification therapy for the primary prevention of CVD, take at least 1 blood sample to provide a full lipid profile. Measure total cholesterol, HDL cholesterol, non-HDL cholesterol and triglyceride concentrations. A fasting sample is not needed." (p. 11)[8] Supporting evidence: A specific review was not conducted to inform this recommendation. Considerations by the guideline development group included whether fasting or nonfasting samples are needed for risk calculating tools, and whether samples were likely to be fasting or nonfasting.[11]	Not applicable. These consensus-based recommendations were based on information gathered to address other questions in the guideline and the guideline development group consensus; thus, the quality of evidence was not graded (e.g., lipid panel use in risk calculation tools).
"In people with a triglyceride concentration between 10 and 20 mmol/litre: • repeat the triglyceride measurement with a fasting test (after an interval of 5 days, but within 2 weeks) and • review for potential secondary causes of hyperlipidaemia and • seek specialist advice if the triglyceride concentration remains over 10 mmol/L." (p. 12)[8] Supporting evidence: A specific review was not conducted to inform this recommendation. Considerations by the guideline development group included that triglycerides may be subject to variation in postprandial samples.[11]	
Canadian Cardiovascular Society (2021)[9]	
"We recommend nonfasting lipid and lipoprotein testing which can be performed in adults in whom screening is indicated as part of a comprehensive risk assessment to reduce CVD events" (Supplemental Appendix, p. 17). Screening is indicated in adults who are aged 40 years or older or postmenopausal, or who have at least 1 of the at-risk conditions (regardless of age), including (but not limited to): clinical evidence of atherosclerosis, diabetes, and hypertension. Supporting evidence: There is minimal change in triglyceride and LDL cholesterol levels after eating normal meals, and no appreciable difference in total or HDL cholesterol after eating.[12] Data from the National Health and Nutrition Survey show that the ability to predict cardiovascular disease events was identical between nonfasting and fasting LDL cholesterol levels.[12]	High-quality evidence (i.e., further research is unlikely to change the confidence in the estimate of effect). Strong recommendation.

Recommendations and supporting evidence	Quality of evidence and strength of recommendations
"We suggest that for individuals with a history of triglyceride levels > 4.5 mmol/L that lipid and lipoprotein levels be measured fasting." Supporting evidence: There is an absence of studies on people with triglyceride levels > 4.5 mmol/L (previous studies excluded this population) comparing fasting to nonfasting lipid levels.	Low-quality evidence (i.e., further research is likely to change the estimate and is very likely to impact the confidence in the estimate). Conditional recommendation.
Endocrine Society (2020)[10]	
Screening for cardiovascular disease risk: "In adults with endocrine disorders, we recommend a lipid panel for the assessment of TG levels and for calculating low-density lipoprotein cholesterol. Technical remarks: • Non-fasting lipid panels are acceptable for initial screening. • If TG levels are elevated or if genetic dyslipidemia is suspected, repeat a fasting lipid panel. • If lipoprotein(a) levels are measured, fasting or non-fasting samples can be obtained" (p. 3,621). Supporting evidence: Narrative summary of 6 studies suggests that nonfasting and fasting lipid panels may offer similar cardiovascular disease risk prediction.	Moderate-quality evidence. Strong recommendation.

HDL = high-density lipoprotein; LDL = low-density lipoprotein; NICE = National Institute for Health and Care Excellence; TG = triglyceride.

Appendix 5: References of Potential Interest

Note that this appendix has not been copy-edited.

Non-Randomized Studies

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