Updating the Canadian Clinical Practice Guideline for Managing Pediatric Obesity: A Protocol

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Abstract

Background: The most recent national guideline for managing pediatric obesity in Canada was published more than one decade ago. Since that time, new evidence has emerged and guideline standards have evolved, making it necessary to update national recommendations. Our purpose is to describe the approaches we will use to update the *Canadian Clinical Practice Guideline for Managing Pediatric Obesity.*

Methods: With preliminary work starting in 2019 and working in partnership with Obesity Canada, activities are scheduled to be completed in late 2021 / early 2022. Over this period, we will follow standards established by the *(i)* National Academy of Medicine and *(ii)* Grading, Recommendations, Assessment, Development and Evaluation (GRADE). Guideline development will be informed by five complementary literature reviews. An environmental scan will inform a scoping review that will be used to inform clinical assessment in pediatric obesity management. In addition, we will use systematic review methodology to synthesize evidence regarding families' values and preferences and three intervention modalities (behavioural, pharmacotherapeutic, and surgery). Activities include articulating review questions, developing search strategies, screening citations, extracting data, assessing risk of bias, summarizing evidence and assessing its certainty, and determining recommendation strength. To optimize relevance and reach, conflicts of interest will be managed proactively, diverse stakeholders will be engaged throughout guideline development, and Obesity Canada will optimize dissemination using integrated and end-of-project knowledge translation.

Interpretation: The guideline and accompanying educational resources for end-users will be published in English and French. The guideline will support families and healthcare providers in Canada to make informed, value-sensitive, and evidence-based clinical decisions related to managing pediatric obesity.

Introduction

Pediatric obesity is a dominant global health issue. Internationally, the number of 5 – 19 year olds with obesity increased from 11 million in 1975 to 124 million in 2016.[1] In Canada, levels remain high, with 25.8% of 6 – 11 year olds and 36.8% of 12 – 17 year olds classified as having overweight[a] or obesity.[2] National data are limited, but regional and provincial studies of preschool-aged children (4 – 6 year olds) in Canada revealed that approximately one-in-four have overweight or obesity.[3,4] This high prevalence is concerning as metabolic (*e.g.,* high blood pressure, dyslipidemia), mechanical (*e.g.,* orthopedic problems, sleep apnea), mental health (*e.g.,* anxiety, depression), and social milieu (*e.g.,* home environment) health risks are common in children and adolescents with obesity and tend to become more common as the severity of obesity increases.[5] Obesity often tracks over time,[6,7] so there is an imperative to develop and evaluate interventions that are effective in managing pediatric obesity and obesity-related consequences. Because the length of exposure to obesity is associated with prolonged and enhanced morbidity,[8] addressing obesity sooner rather than later in life has clear value. This imperative is particularly important for families experiencing social and economic hardships, which increase the risk of developing obesity in the first place.[2] Indeed, there is an intimate link between high weight status and economic costs, wherein lifetime costs (*i.e.,* healthcare and productivity losses) increase proportionally with excess weight in childhood.[9] Economically, annual obesity-linked healthcare costs (direct and indirect; adults only) in Canada exceeded $11 billion in 2006,[10] an amount that has likely increased since that point in time.

Recent reviews highlighted the impact of interventions for managing pediatric obesity. Specifically, an overview of six Cochrane reviews concluded that multi-component, lifestyle and behaviour change

[a] The terms *overweight* and *obesity* are used to describe prevalence data. For parsimony, the term *obesity* is used throughout the remainder of the manuscript to denote excess weight that can (often) lead to adverse health consequences and include children classified as having overweight, obesity, or severe obesity.

interventions can lead to modest reductions in body weight.[11] Evidence suggests that reductions in BMI z-score (or standard deviation score) of ≥0.25 and ≥0.50 in children and adolescents with obesity are associated with improved cardiometabolic risk factors.[12-14] From a practical standpoint, evidence also suggests that a moderate-to-high intervention dose (*i.e.,* >25 hours of contact) is associated with a 2 – 3 unit reduction in BMI over 6 – 12 months in children and adolescents with obesity.[15] Pharmacotherapeutic and surgical interventions, which are typically offered in combination with some types of lifestyle, behavioural, and psychological strategy(ies), have the potential to improve pediatric obesity and obesity-related consequences, but the evidence regarding treatment outcomes and safety profiles is limited.[11] Intervention research regarding the effectiveness of pharmacotherapy and surgery for managing pediatric obesity remains an emerging area, especially when considering the need for innovative strategies to manage severe pediatric obesity[16], a subgroup for which obesity-related consequences are commonplace.[5,17] These data highlight the need for and potential value of interventions for managing pediatric obesity and the imperative to synthesize and disseminate this evidence to front-line clinicians to inform their practice.

Since the first Canadian clinical practice guideline on managing and preventing obesity in adults and children was published in 2007,[18] several pediatric-specific guidelines have been published, both in Canada[19] and internationally.[20,21] All of these guidelines were based on evidence regarding the potential benefits and harms of obesity management strategies; however, there is a need to update the existing national guideline since new evidence has accumulated and methodological approaches have evolved and improved over recent years. For instance, existing guidelines focus largely on treatment effects, but with few exceptions,[19] have dedicated less attention to including families in the processes and procedures to develop, refine, and evaluate recommendations. Information from families is valuable by helping to prioritize outcomes that are of greatest interest to them[22] and inform how front-

line clinicians practice day-to-day.[23,24] As highlighted recently in the updated Canadian guideline for managing adult obesity,[25] obesity, both in definition and management, go well beyond BMI to include a host of outcomes (*e.g.,* psychosocial health, physical activity) and issues (*e.g.,* weight-related bias and stigma, values and preferences) for individuals living with obesity as well as clinicians, reflecting a broad view of health and well-being. Currently, there is a need for value sensitive, evidence-based recommendations for managing pediatric obesity in Canada. The purpose of this protocol is to describe the organizational approach and methodological strategies that will be used to update the *Canadian Clinical Practice Guideline for Managing Pediatric Obesity*. Developed in partnership with Obesity Canada – Obésité Canada (OC; obesitynetwork.ca), this clinical practice guideline ('the guideline') will be based on evidence summaries from systematic reviews and Grading, Recommendations, Assessment, Development and Evaluation (GRADE)[24,26,27] methods to create evidence-based recommendations for managing pediatric obesity in Canada. The guideline will be designed for children and adolescents, their families, and healthcare providers in Canada to make informed, value-sensitive, and evidence-based decisions related to managing pediatric obesity. Although the original guideline addressed both the prevention *and* management of pediatric obesity,[18] updating the guideline regarding the prevention of pediatric obesity is beyond the scope of our mandate.

Methods

We will follow established guideline standards set by the Institute of Medicine (Table 1)[28] and GRADE methods (Table 2).[24,26,27] The Institute of Medicine (now the National Academy of Medicine) and GRADE promote transparency of methods, clear and ongoing management of conflicts of interest, engagement of diverse stakeholders, use of systematic review methodology to synthesize all existing evidence addressing the area(s) of inquiry including health-related values and preferences of target guideline users, and explicit methods for determining the strength of recommendations (Table 4).

Guideline Oversight, Leadership Structure, and Activities

The guideline steering committee ('the committee') is responsible for managing activities and providing guidance, overseeing finances, granting final acceptance of the guideline recommendations, and disseminating the recommendations once they are completed. The committee will also determine the research questions, literature reviews, and clinical practice guideline methods, as well as review, approve, and manage any conflicts of interests among members.

In early 2019, the committee was created through informal discussions and existing relationships among individuals with clinical and research expertise in pediatric obesity, systematic review and practice guideline methods, parent and family representative of children with obesity, and administrative/research support. Both financial and organizational resources are needed to update the guideline. Funds from the Alberta Health Services Chair in Obesity Research will be used, in part, to support the series of systematic reviews that will inform the guideline; funds and in-kind resources from Obesity Canada will be used to support knowledge translation and dissemination activities, both during guideline development and upon completion. The committee will meet monthly (formally; by teleconference) with *ad hoc* correspondence (informally; by email and teleconference) as needed. Monthly meetings include formal agendas and minute-taking. To raise awareness and for transparency with stakeholders, regular updates regarding committee progress will be posted regularly on the Obesity Canada website.

The committee chair will be responsible for assembling the committee, coordinating meetings, supporting authors who will be leading or co-leading the systematic reviews with researchers in the McMaster Evidence Review and Synthesis Team (MERST; McMaster University, Hamilton, ON) and the Alberta SPOR Support Unit (ABSPORU), and leading knowledge translation and exchange and

dissemination activities in partnership with Obesity Canada. As an initial step, representatives from ~30 national, health-related stakeholder groups were contacted to raise awareness of the plan to update the guideline and identify potential opportunities for collaboration and partnership. To date, stakeholders have expressed interest in a number of relevant activities (*e.g.,* remaining up to date on guideline development, reviewing draft guideline documents, and disseminating final versions of the guideline and accompanying tools and resources for clinicians and families). Committee members with expertise in evidence syntheses and guideline development will be responsible for creating and refining relevant content (*e.g.,* summary of findings tables based on systematic reviews, guideline recommendations contextualized based on children's, adolescents', and their families' values and preferences). In addition to members of the committee and the MERST team, parents, researchers, clinicians, and trainees with complementary content and methodological experience and expertise will contribute to this work. The guideline and companion documents for families and clinicians will be prepared originally in English, then translated into French, which is intended to optimize uptake across Canada and internationally.

Managing Conflicts of Interest

On an annual basis, each member of the guideline committee will complete a written declaration of potential conflict(s) of interest and statement of confidentiality using the International Committee of Medical Journal Editors' disclosure form. Because circumstances and opportunities can change over time, at the beginning of each monthly teleconference, committee members will be prompted to report any changes to their conflict(s) of interest. The committee will discuss and decide whether any disclosed conflicts are acceptable and, when applicable, how they will be managed relevant to each review and recommendation. In lieu of a formal vote, issues will be discussed (led by the chair) and resolved collaboratively to achieve consensus. If the chair has a conflict of interest that cannot be

resolved through discussion, an *ad hoc* Conflict of Interest Sub-Committee will convene, which will include one clinician scientist, one methods expert, one parent/family representative, and one stakeholder from Obesity Canada, to discuss and determine how the conflict of interest will be addressed. Obesity Canada will maintain all committee documents regarding conflicts of interest, details of which will be reported transparently and fully upon guideline publication.

Research Questions

To inform the guideline, the following five research questions will be addressed through a series of reviews (see Table 3 for details):

1. How should clinicians assess the health and well-being of children, adolescents, and families when managing pediatric obesity?
2. What are children's, adolescents', and parents' values and preferences regarding outcomes related to managing pediatric obesity?
3. Among children and adolescents with obesity, what is the effect of behavioural interventions on the risk of clinically important outcomes and outcomes important to stakeholders, including families, clinicians, and researchers?
4. Among children and adolescents with obesity, what is the effect of pharmacotherapeutic interventions on the risk of clinically important outcomes and outcomes important to stakeholders, including families, clinicians, and researchers?
5. Among children and adolescents with obesity, what is the effect of bariatric surgery interventions on the risk of clinically important outcomes and outcomes important to stakeholders, including families, clinicians, and researchers?

Over the course of several months, which included numerous teleconferences and email discussions, our committee followed an iterative process that led to the development of these five questions, all of which will be addressed through rigorous literature reviews. It is worth noting that the process we followed and the resulting research questions differ from that of the original[18] and updated adult guideline.[25] For example, the original guideline addressed a broad range of issues, including adults and children; screening, prevention, and management; dissemination strategies; public health policy guidance; and future research priorities.[18] The updated guideline also includes a range of topics across 20 chapters that focus on adult obesity. In lieu of a broad approach that also included obesity prevention, we chose to focus the pediatric guideline update on management exclusively. By focusing on a smaller number of research questions and accompanying recommendations, we will focus our effort and resources on providing optimal value and preference sensitive, evidence-based obesity management guidance for front-line healthcare providers and families to manage pediatric obesity. Our intention is to provide guidance for managing pediatric obesity that is complementary to the adult guideline,[25] a value-added activity since some of the topics from the adult guideline have general relevance (*e.g.,* reducing weight bias, science of obesity).

The committee will operationalize the three research questions that focus on interventions (behavioural, pharmacotherapeutic, surgery) in terms of the characteristics of the interventions of interest, accepted comparison interventions, and the ranking of outcomes and subgroups by their relative importance. A detailed description of the scope and characteristics of eligible interventions and studies for each of these three reviews will be determined iteratively through committee member discussions, considering available evidence on child, adolescent, and family relevance, feasibility, and acceptability in the Canadian context. For each of these three reviews, the outcomes of interest will be determined using an online survey that will be completed by stakeholders, including committee

members (n~10) and parents (n~30) of children and adolescents enrolled in multidisciplinary obesity management clinics in several Canadian centres. To our knowledge, this plan to solicit input from diverse stakeholders regarding outcomes of interest is novel in obesity guideline development and will help to ensure that the guideline is relevant and meaningful to our end-users – clinicians and families.[22] Survey participants will rank-order outcomes of interest based on the extent they believe the various outcomes are important to decision-making from their individual perspectives. Outcomes will be ranked using the following rubric: 1 – 3 (*not important for making a decision*), 4 – 6 (*important, but not critical for making a decision*), and 7 – 9 (*critical for making a decision*).[29] In addition to outcomes, as documented in Table 2 specific to each review, existing evidence on clinical rationale on the potential differences in the effects of interventions across specific subgroups (*e.g.,* age, sex, ethnicity, ability) will be used by the committee to evaluate empirical and clinical evidence of effect modification based on subgroup credibility criteria.[30,31]

Review Methods for Summarizing Evidence

MERST will provide support for the systematic reviews for the three research questions related to intervention effects as well as values and preferences; the Knowledge Translation Platform within ABSPORU will lead and support activities related to clinical assessment. We will follow methods presented in the Cochrane Handbook, which ensures a rigorous approach to planning, conducting, and reporting systematic reviews.[32] Each systematic review and meta-analysis, when relevant, will follow the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) guidelines[33] and report on the outcomes ranked as important or critically important based on the voting of the guideline committee and an independent group of Canadian families managing child and adolescent obesity. For each review, we will develop a peer-reviewed and comprehensive search strategy in consultation with expert librarians (from McMaster University and the University of Alberta) to identify all relevant

studies. Our systematic reviews will be registered with the International Prospective Register of Systemaic Reviews (PROSPERO). Using standard approaches/systems such as PRISMA and PROSPERO increase completeness, methodological quality, transparency, and reliability of systematic reviews.[33]

To inform clinical assessment for managing pediatric obesity, we will carry out several sequential steps. First, we will conduct an environmental scan of existing clinical practice guidelines and expert recommendations for managing obesity in pediatrics and adults. From these international sources of data, a table detailing the processes, procedures, and methods used to complete a clinical assessment will be created to identify unique and common elements, identify gaps in the evidence, and lead to the generation of the research question(s) that will guide our scoping review. Second, we will complete a scoping review of the literature. Scoping reviews have been described as a type of review to "map the literature on a particular topic or research area and provide an opportunity to identify key concepts, gaps in the research, and types and sources of evidence to inform practice, policymaking, and research." [34]. Our scoping review will be led methodologically by a team of researchers from ABSPORU, a research methods support unit funded by the Canadian Institutes of Health Research and Alberta Innovates that is housed at the University of Alberta. The team will adhere to established scoping review methods as described by the Joanna Briggs Institute (JBI).[35] Reporting of this review will adhere to the PRISMA-ScR statement checklist.[36] Third, we will evaluate the quality of articles included in our review. This step is completed for descriptive purposes using a mixed methods appraisal tool (MMAT), which can be applied to qualitative, quantitative, and mixed methods study designs.[37,38] Finally, we will complete a stakeholder consultation (*e.g.,* with parents and clinicians) to solicit feedback prior to finalizing and publishing the review. While not recommended explicitly by the JBI, stakeholder consultations are recommended by some scoping review methodologists.[39] Given our

desire to ensure the findings from our scoping review are relevant and useful, we will solicit feedback from guideline end-users (clinicians and parents). To provide a framework for the results of this review, findings will be organized according to health risks conceptualized according to the *4Ms* – *metabolic*, *mental*, *mechanical* health, and social *milieu*.[40] Issues of communication, bias and stigma, and screening and follow up as well as specific subgroups including cultural and ethnic groups, and children with special developmental conditions will be included.

For the review on values and preferences, we will include RCTs, observational studies and qualitative (*e.g.,* semi-structured interviews, focus groups) studies including 0 – 18 year olds and their families, which explore their values, preferences, experiences, attitudes, beliefs, and expectations around the management of pediatric obesity. The types of studies to be included in the three intervention-related reviews (behavioural, pharmacotherapeutic, surgery) will be randomized clinical trials (RCTs) that include 0 – 18 year olds for which the effectiveness of the interventions of interest on the outcomes were assessed at 6 months follow-up or more (see Table 2). For the review on surgical interventions, we will include both RCTs and observational studies (*e.g.,* cohorts, case series, case reports). Based on committee members' experience, it is unlikely that many studies regarding surgery will have randomly assigned participants to one of several study arms; historically, cohorts and case series are more common in this emerging field of pediatric obesity management, so a range of study designs will be included.

The evidence centre team will review titles and abstracts in duplicate; articles marked for inclusion by either team member will go on to full-text relevance testing. Full-text screening will be completed independently by two team members, with consensus required for inclusion or exclusion. Multiple publications for the same primary intervention in the same cohort will be merged. Standardized forms

for data extraction and risk of bias will be developed, piloted, and deployed by the team. Risk of bias (RoB) assessments will be conducted using the Cochrane Collaboration risk-of-bias tool for RCTs[32] and the Risk Of Bias In Non-randomized Studies – Interventions (ROBINS-I) for observational studies.[41] If interventions have multiple treatment arms, only the interventions that meet inclusion criteria will be extracted. Following published GRADE guidance, the team will use data from complete cases in the primary analysis and assess for risk of bias associated with missing outcome data.[42] Conflicts will be resolved through discussion and a statistician will independently verify all data extraction.

Piloted data extraction forms will be used to extract information on study characteristics (*e.g.,* country, setting, year, design, sample size, and duration of follow up), participant characteristics (*e.g.,* age, sex, ethnicity, socioeconomic status, co-morbidities, ability, growth and maturation), intervention and comparison characteristics (*e.g.,* duration, dose, intensity, setting of delivery), outcomes (*e.g.,* definition and measurement), and results (*e.g.,* number of events, number of participants or mean scores and their corresponding measure of variance). All extracted study characteristics, population, intervention, outcome, results and risk of bias data will be independently verified by a second reviewer, with the outcome data (sample size, number of patients, events, mean, and variance data) verified by a third person, a biostatistician. To synthesize findings for the intervention reviews, data will be summarized and random effects meta-analyses will be conducted when at least two studies that are sufficiently homogenous have defined and reported an outcome similarly; depending on number and types of studies and intervention arms, we may also consider conducting network meta-analysis.[43,44] Estimates of effect, namely pooled relative risks (RR) and risk differences (RD) for dichotomous outcomes, and weighted or standardized mean difference (WMD or SMD) for continuous outcomes will be generated, all with 95% confidence intervals. To optimize interpretability of our results for

stakeholders, in addition to presenting SMD for studies that report different outcomes that measure the construct (*e.g.,* weight loss, BMI, quality of life), we will consider supplementary methods of presenting effect estimates, including the presentation of results in relation to the minimal important difference (MID) (*e.g.,* 5% weight loss, ≥0.25 reduction in BMI z-score) when credible MIDs exist.[45-47]

For all meta-analyses with ≥10 studies, potential for publication bias will be assessed using a funnel plot.[48] Statistical heterogeneity in effect estimates across studies will be assessed by visual inspection of forest plots and assessment of the I^2 statistic, using thresholds recommended by Cochrane to determine degree of heterogeneity.[49] Clinical heterogeneity will be assessed by conducting subgroup analyses using *a priori* determined subgroups that may help to explain observed effects. Sensitivity analyses comparing studies rated as 'lower' *versus* 'higher' risk of bias will also be conducted. It is possible that effect estimates of interventions at higher risk of bias will be larger, exaggerating estimates of effect.[50]

Further, given the likelihood of variability in reported time-points and the use of the term 'follow-up' (some may refer to follow-up after baseline measures; others may use it to refer to the change data at the completion of intervention; while others may refer to follow-up after an intervention is done and report changes in the absence of an intervention), we will *(i)* use bins to avoid multiplicity of reporting, where we will use the longest reported data point for the outcome of interest for 6 month follow-up (+/- 3 months) and 12 month follow-up (+/- 3 months) and *(ii)* standardize our use of language so that 'follow-up' refers to the longest reported data point regardless of intervention duration. If there are studies that report, for example, 16 month data or longer (for which, based on our knowledge of the literature, we suspect very few studies exist with longer term follow-up data), we will conduct a

sensitivity analysis (12 month data with and without longer term data). Further, we will also conduct sensitivity analyses if there is a discrepancy ≥5 months between the end of the intervention and the longest reported data point for the outcome of interest.

Assessment of Certainty in Body of Evidence

For the first four reviews, we will use the GRADE approach to rate the certainty of the overall body of evidence for each outcome summarized.[24,26,27] For example, to assess the certainty of evidence for pharmacological therapy to reduce body weight at 6-months follow-up, data will be presented as one independent assessment. For a body of evidence based on RCTs, the GRADE approach starts at high quality evidence and considers the presence of the following factors as potential reasons to reduce certainty (on an outcome by outcome basis): risk of bias, inconsistency of results, indirectness of evidence, imprecision, and publication bias. On the other hand, evidence derived from observational studies starts at low quality, and unsystematic clinical observations start at very low quality. However, certainty may increase when a large effect or a credible dose-response gradient exist, or when all plausible confounding or other biases may be working against the observed effect. While the certainty of a body of evidence will often represent a continuum, GRADE ultimately categorizes the certainty into one of four categories as presented in Table 3.[27] The category selected will reflect certainty in the estimate of the effect for each outcome.

Moving from Evidence to Recommendations

The committee will use *Evidence to Decision* (EtD) frameworks to move from evidence to recommendations.[51] The purpose of the EtD frameworks is to enable guideline developers to consider all relevant criteria and use evidence in a structured and transparent manner to inform decisions related to individual or public health care recommendations. The frameworks encourage guideline committees

to examine the perspective (individual *vs* public health) that they are taking to determine the criteria that will be considered when making recommendations. As such, the *Canadian Clinical Practice Guideline for Managing Pediatric Obesity* will take an individual patient-level (child, adolescent, and family) perspective. The following criteria will be considered by committee members for each intervention for which a recommendation will be made: overall certainty of the evidence, desirable effects of intervention (*e.g.,* benefits), undesirable effects of intervention (*e.g.,* harms), the balance between benefits and harms, the values and preferences of children, adolescents, and their families, any incurred costs for the individual and their families, and intervention acceptability and feasibility.

Committee members will follow a process of assessing the evidence for each criterion and making judgements as shown in Figure 1. To do so, in advance of the final guideline committee meeting, guideline committee members will be asked to complete a GRADE EtD Framework survey, which will be completed electronically. The electronic survey will help committee members use the GRADE evidence summaries in a structured and transparent way to develop the final recommendations.[51] Committee members will be asked to consider the evidence summaries for health outcomes, values and preferences, as well as the acceptability, feasibility, and cost of a recommendation to change lifestyle, begin medication or undergo surgery. During the final committee meeting, panel members will review the results of the EtD Framework survey and be asked to consider the implications of those judgments for their recommendations. This process will inform the committee in making final recommendations for or against the relevant interventions and for labeling the recommendations as strong or weak (also called conditional, discretionary, or qualified).[26] The strength of a recommendation will reflect the level of certainty within the guideline committee that desirable consequences will outweigh undesirable consequences when the recommendation is adhered to across the range of patients for whom the recommendation is intended. A recommendation is less likely to be

strong when desirable and undesirable consequences are closely balanced or when the certainty in estimates of effects is low. Similarly, when uncertainty exists in estimates of values and preferences, or when resource use is high, the strength of a recommendation is likely to be weaker rather than stronger. When relevant, the guideline committee may formulate recommendations tailored for specific subgroups. The implications of strong and weak recommendations for different end-users are presented in Table 4.[51] The recommendations will be stated in a concise, clear, and actionable manner, with justification provided by the committee for each recommendation. A discussion will be provided with each recommendation that will consider pertinent subgroups, implementation, evaluation and monitoring, and evidence gaps or research priorities, when relevant. An executive summary, along with supplemental tools and resources for guideline implementation, which will be prepared in both English and French languages to optimize national relevance and uptake.

Interpretation

Knowledge Translation

Knowledge translation (KT) is defined as putting knowledge into action.[52] End of project KT extends beyond passive dissemination, ensuring knowledge is tailored to specific audiences and packaged and delivered in ways that facilitate its implementation and effective use in practice.[53] End of project KT will be fundamental to the success of the guideline recommendations. Practice guidelines and their integration in clinical practice are recognized as important KT opportunities. The sponsor of this guideline (Obesity Canada) aims to fully integrate KT in guideline development by collaborating with KT experts as well as decision-makers, including patients, families, and community members from study onset. Obesity Canada has an established KT network (created under the Networks of Centres of Excellence Program in 2006) composed of obesity researchers, clinicians, persons living with obesity, and strategic partners that have a shared goal to improve the lives of Canadians living with obesity

through research, KT, and advocacy. In 2015, Obesity Canada launched its first public engagement initiative which helped integrate the patient voice throughout its strategic initiatives and operations. For instance, as of 2020, Obesity Canada disseminates scientific evidence to individuals affected by obesity through a community of public supporters that exceeds 35,000 members. Mechanisms to translate science to the public include a plain language, bilingual website, blog series, infographics and whiteboard videos, public workshops, webinars, social media, and a growing online support community for persons living with obesity. Further, Obesity Canada has prominent leaders with expertise in integrated KT and patient engagement and will seek guidance from and establish collaborations with these individuals.

Within the Obesity Canada community, in addition to dissemination platforms and informal collegiality and support, several examples of formal interdisciplinary KT projects exist (*e.g.,* the 5As of Obesity Management framework designed to support primary care providers deliver evidence-based care to people living with obesity was developed by Obesity Canada in collaboration with obesity experts, clinicians, and patients living with obesity; the 2020 Canadian Clinical Practice Guideline for the Management of Obesity in Adults published in the *Canadian Medical Association Journal* (August 2020); and the Canadian Summits on Weight Bias and Discrimination organized by Obesity Canada in 2011, 2015, and 2016). Most recently, for example, Obesity Canada released a call to action on Weight Bias, Obesity Stigma & COVID-19, which was supported by twenty leading Canadian and international organizations.

Through the Obesity Canada public engagement initiative (supported by the Canadian Institutes of Health Research [CIHR] Strategy for Patient-Oriented Research) and KT expertise (grounded in the CIHR Research Integrated and end-of-grant knowledge translation framework), Obesity Canada will

continue to support the update of this guideline from the outset and will share the guideline with its network of over 35,000 health professionals and persons living with obesity, integrate the guideline into its education programs designed to develop skills among clinicians and families affected by obesity, and disseminate the key findings to health care decision makers across the country through its ongoing advocacy activities.

Conclusion

An updated, national guideline for managing pediatric obesity in Canada is needed due to the publication of relevant new evidence and the evolution of methods and standards for the development of trustworthy guidelines over the past decade. We present methods for guideline development that adhere to the standards set by leading medical and methodological groups and describe the guideline oversight and leadership structure, the approach to strict management of conflict of interest, the engagement of a diverse panel of stakeholders, and the methods that will be used to synthesize existing evidence and to move from evidence to recommendations. Once published, the guideline will support children and adolescents, their families, and clinicians in Canada in making informed, value-sensitive, and evidence-based clinical decisions related to the management of pediatric obesity.

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Table 1: Institute of Medicine Standards for Generating Trustworthy Guidelines

- Transparency: Details on guideline development and funding are explicit and publicly accessible
- Management of conflicts of interest: Prior to finalizing guideline, committee members being considered for membership should declare all interests and activities potentially resulting in conflicts, and all conflicts should be minimized
- Guideline group composition is multidisciplinary with methodological expertise and including patient and community involvement
- Use of systematic reviews for guideline questions
- Establishing evidence foundations for and rating strength of recommendations
- Clear articulation of recommendations
- External review by a full spectrum of stakeholders (*e.g.,* scientific and clinical experts, patients, and community representatives)

Table 2: Certainty of Evidence

GRADE*	Definition
High	*We are very confident that the true effect lies close to that of the estimate of the effect.*
Moderate	*We are moderately confident in the effect estimate: The true effect is likely to be close to the estimate of the effect, but there is a possibility that it is substantially different.*
Low	*Our certainty in the effect estimate is limited: The true effect may be substantially different from the estimate of the effect.*
Very Low	*We have very little certainty in the effect estimate: The true effect is likely to be substantially different from the estimate of effect.*

*GRADE (Grading of Recommendations Assessment, Development and Evaluation); although certainty of evidence is a continuum, GRADE uses discrete categorization, which introduces a degree of subjectivity. Nevertheless, the advantages of simplicity and transparency outweigh these limitations.

Table 3: Overview of Literature Reviews that will Address Research Questions to Inform the Guideline

Questions	Review Type	Study Designs Included	Comparison	Follow Up Duration (Post-Baseline)	Potential Outcomes*	Potential Subgroups & Sensitivity Analysis[1]
1. How should clinicians assess the health and well-being of children, adolescents, and families when managing pediatric obesity?	Scoping review, including stakeholder consultation	Any	N/A	N/A	Edmonton Obesity Staging System for Pediatrics (EOSS-P), including the 4Ms (metabolic health, mental health, mechanical health, and social milieu)	1. Communication and terminology 2. Weight bias and stigma 3. Screening, enrollment, and follow-up 4. Children, adolescents, and parents 5. Sex/Gender 6. Ethnicity/Culture/SES 7. Typical/Atypical growth and maturation (physical/cognitive delay or disability)
2. What are children's, adolescents', and parents' values and preferences regarding outcomes and related risk reductions related to managing pediatric obesity?	Systematic review	Any	N/A	N/A	Perceptions, experiences, attitudes, beliefs, and expectations	1. Children, adolescents, and parents 2. Sex/Gender 3. Ethnicity/Culture/SES 4. Typical vs atypical growth and development (physical/cognitive delay or disability)
3. Among children and adolescents with obesity, what is the effect of behavioural interventions on the risk of clinically important outcomes and outcomes important to stakeholders, including families, clinicians, and researchers?	Systematic review and meta-analysis	Randomized controlled trials	Any non-active (*e.g.,* wait list control) or active (*e.g.,* standard care) alternative management strategies	≥6 and ≥12 months (+/- 3 months)	1. Anthropometry (*e.g.,* body weight, BMI, WC) 2. Cardiometabolic risk factors (*e.g.,* blood pressure, insulin resistance, HDL-C) 3. Patient- or proxy-(caregiver) reported outcomes (*e.g.,* anxiety, depression, health-related quality of life) 4. Adverse events	1. Age 2. Weight status 3. Sex/Gender 4. Risk of bias 5. If we identify studies that reported data at ≥16 months, we will assess the 12-month estimate with and without these data

4. Among children and adolescents with obesity, what is the effect of pharmacotherapeutic interventions on the risk of clinically important outcomes and outcomes important to stakeholders, including families, clinicians, and researchers?	Systematic review and meta-analysis	Randomized controlled trials	Any non-active (*e.g.,* wait list control) or active (*e.g.,* standard care) alternative management strategies	≥6 and ≥12 months (+/- 3 months)	1. Anthropometry (*e.g.,* body weight, BMI, WC) 2. Cardiometabolic risk factors (*e.g.,* blood pressure, insulin resistance, HDL-C) 3. Patient- or proxy-(caregiver) reported outcomes (*e.g.,* anxiety, depression, health-related quality of life) 4. Adverse events	1. Age 2. Weight status 3. Sex/Gender 4. Risk of bias 5. If we identify studies that reported data at ≥16 months, we will assess the 12-month estimate with and without these data
5. Among children and adolescents with obesity, what is the effect of bariatric surgery interventions on the risk of clinically important outcomes and outcomes important to stakeholders, including families, clinicians, and researchers?	Systematic review and meta-analysis	Randomized controlled trials, prospective or retrospective cohort studies, and other observational studies	Any non-active (*e.g.,* wait list control) or active (*e.g.,* standard care) alternative management strategies	≥6 and ≥12 months (+/- 3 months)	1. Anthropometry (*e.g.,* body weight, BMI, WC) 2. Cardiometabolic risk factors (*e.g.,* blood pressure, insulin resistance, HDL-C) 3. Patient- or proxy-(caregiver) reported outcomes (*e.g.,* anxiety, depression, health-related quality of life) 4. Adverse events	1. Age 2. Weight status 3. Sex/Gender 4. Risk of bias 5. If we identify studies that reported data at ≥16 months, we will assess the 12-month estimate with and without these data

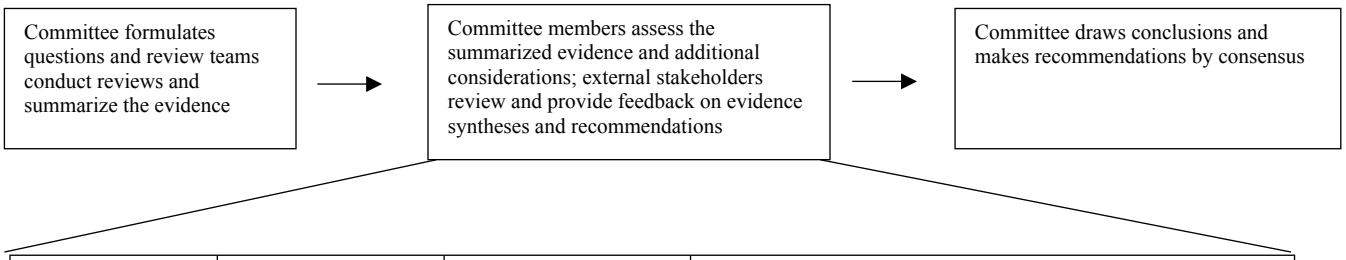
* Potential outcomes and sub-groups will be determined based on data derived from surveys with stakeholders (parents, clinicians, and researchers)

BMI (body mass index), N/A (not applicable), SES (socioeconomic status), WC (waist circumference)

Table 4: Implications of Strong *versus* Weak Recommendations Among End-users

Implications	Strong Recommendation	Weak Recommendation
For Patients	Most individuals in this situation would want the recommended course of action and only a small proportion would not.	Most individuals in this situation would want the suggested course of action, but many would not.
For Clinicians	Most individuals should receive the recommended course of action. Adherence to this recommendation according to the guideline could be used as a quality criterion or performance indicator. Formal decision aids are not likely to be needed to help individuals make decisions consistent with their values and preferences.	Recognize that different choices will be appropriate for different patients, and that you must help each patient arrive at a management decision consistent with her or his values and preferences. Decision aids may be useful to help individuals making decisions consistent with their values and preferences. Clinicians should expect to spend more time with patients when working towards a decision.
For Policy-Makers	The recommendation can be used to develop policy (*e.g.,* tax on products high in sugar or salt)	Policy-making will require substantial debates and involvement of many stakeholders. Policies are also more likely to vary between regions. Performance indicators would have to focus on the fact that adequate deliberation about the management options has taken place.

Figure 1: Evidence-to-Decision (EtD) Framework*



Criteria	**Research Evidence**	**Additional Considerations**	**Committee's Judgement**
Desirable effects (benefits)			**How substantial are the *desirable* anticipated effects?** ○ Trivial ○ Small ○ Moderate ○ Large ○ Varies ○ Don't know
Undesirable effects (harms)			**How substantial are the *undesirable* anticipated effects?** ○ Large ○ Moderate ○ Small ○ Trivial ○ Varies ○ Don't know
Certainty of the evidence			**What is the overall certainty of the evidence of effects?** ○ Very low ○ Low ○ Moderate ○ High ○ No included studies
Balance of desirable *vs* undesirable effects			**Does the balance between desirable and undesirable effects favor the intervention or the comparison?** ○ Favors the comparison ○ Probably favors the comparison ○ Does not favor either the intervention or the comparison ○ Probably favors the intervention ○ Favors the intervention ○ Varies ○ Don't know

Values and preferences			**Is there important uncertainty about or variability in how much people value and prefer the main outcomes?** ○ Important uncertainty or variability ○ Possibly important uncertainty or variability ○ Probably no important uncertainty or variability ○ No important uncertainty or variability
Cost			**Are there any additional incurred costs to patients?** ○ No ○ Probably no ○ Probably yes ○ Yes ○ Varies ○ Don't know
Acceptability			**Is the intervention acceptable to key stakeholders?** ○ No ○ Probably no ○ Probably yes ○ Yes ○ Varies ○ Don't know
Feasibility			**Is the intervention feasible to implement?** ○ No ○ Probably no ○ Probably yes ○ Yes ○ Varies ○ Don't know

*The EtD Framework is relevant to the three reviews on intervention effects (behavioural, pharmacotherapeutic, and surgical)