Recommendations for growth monitoring, and prevention and management of overweight and obesity in children and youth in primary care

Canadian Task Force on Preventive Health Care*

CMAJ Podcasts: author interview at soundcloud.com/cmajpodcasts/child-obesity-guideline

See also pages 387 and 389 as well as www.cmaj.ca/lookup/doi/10.1503/cmaj.150117, www.cmaj.ca/lookup/doi/10.1503/cmaj.150259, *CMAJ Open* www.cmajopen.ca/content/3/1/E23 and www.cmajopen.ca/content/3/1/E35

The prevalence of obesity in Canadian children has risen dramatically from the late 1970s, more than doubling among both boys and girls.[1] Based on growth curves generated by the World Health Organization, the prevalence of overweight and obesity in Canadian children aged 2 to 17 years in 2004 was about 35%.[1,2] More recent estimates from 2009 to 2011 based on measured weight and height for children aged 5 to 17 years suggest that 32% are overweight (20%) or obese (12%), with the prevalence of obesity almost twice as high in boys (15%) than in girls (8%)[3] (Appendix 1, available at www.cmaj.ca/lookup/suppl/doi:10.1503/cmaj.141285/-/DC1). Studies suggest that excess weight in children often persists into adulthood.[4–6] Childhood obesity is associated with an increased risk of cardiovascular disease and diabetes in adolescence[7] and later in life.[8,9]

It is now recognized that obesity is a complex problem that will require action from multiple sectors and "systems thinking."[10] Within primary care, the chronic disease model has been proposed as a framework for managing obesity, supporting children and families to manage body weight over time.[10] For childhood obesity, the complexity may include parents' knowledge, parenting style and the family activity environment.[11] Whereas options for management of childhood obesity include behavioural, pharmacologic and surgical approaches offered or referred by primary care,[10] it is recognized that interventions must be family-centred and may involve services delivered by an interdisciplinary team.[11]

The 2006 Canadian Clinical Practice Guidelines on the Management and Prevention of Obesity in Adults and Children provided recommendations for the prevention and management of obesity in Canadians of all ages.[12] The last task force guidance specifically on childhood obesity was in 1994; it focused on screening for and treatment of obesity in children, but did not address primary prevention.[13]

The current guideline provides recommendations for growth monitoring and prevention of overweight and obesity in healthy-weight children and adolescents aged 17 years and younger in primary care settings, and guidance for primary care practitioners on the effectiveness of overweight and obesity management in children and youth aged 2 to 17 years.

Methods

The Canadian Task Force on Preventive Health Care is an independent panel of clinicians and methodologists that makes recommendations about clinical manoeuvres aimed at primary and secondary prevention (www.canadiantaskforce.ca). Work on each set of recommendations is led by a workgroup of two to six members of the task force. Each workgroup establishes the research questions and analytical framework for the guideline, which are incorporated into the search protocol (Appendix 2, available at www.cmaj.ca/lookup/suppl/doi:10.1503/cmaj.141285/-/DC1).

The development of these recommendations was led by a task force workgroup, in collaboration with scientific staff from the Public Health Agency of Canada (authors of the guideline are listed at the end of the article.) A clinical expert (pediatric endocrinologist) was consulted throughout the process.

The task force used the Grading of Recommendations Assessment, Development and Evaluation (GRADE) system to determine the quality of evidence and strength of recommendations (Box 1).[14] The recommendations were revised and approved by the entire task force

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and underwent external review by experts in the area and by stakeholders. More information about task force methods, including the process to update this guideline and the systematic reviews that support the new task force recommendations, can be found elsewhere.[15–18]

Prevention of overweight and obesity in healthy-weight children

For prevention, the task force chose to focus on weight outcomes: change in body mass index (BMI), BMI *z* score, or prevalence of overweight and obesity. Secondary outcomes of interest included changes in total cholesterol, triglycerides, high-density–lipoprotein (HDL) cholesterol, low-density–lipoprotein (LDL) cholesterol, systolic blood pressure, diastolic blood pressure, overall quality of life and physical fitness.

The Evidence Review and Synthesis Centre at McMaster University[17] updated a 2011 Cochrane review examining interventions for preventing obesity in children,[19] which served as the basis for the prevention section of this guideline. The search was updated to August 2013. The systematic review[17] was conducted in accordance with the final, peer-reviewed protocol (Prospero #CRD42012002753). The search for the key and supplemental questions included only randomized controlled trials (RCTs), conducted in primary care settings or settings where primary care practitioners may refer patients.

After initial screening of the literature, there were insufficient RCTs with a study population of only healthy-weight children and youth. Yet, the evidence review centre identified numerous RCTs with a goal of prevention of overweight and obesity, but with study participants recruited from mixed-weight (healthy-weight, overweight and obese) populations, which reflects clinical practice. The task force had the option to search for observational studies to examine the effectiveness of preventive interventions in healthy-weight children or to use the evidence from the RCTs with mixed-weight populations. Given the potential for bias with lower-quality study designs, the task force decided to use the indirect evidence from the RCTs to formulate the recommendations. A targeted literature update for RCTs addressing only the key questions (Appendix 2) was performed up to Jan. 10, 2015. Any evidence found, if relevant, was incorporated into the recommendations for the prevention of overweight and obesity in healthy-weight children.

Management of overweight and obesity

For management of overweight and obesity, the task force chose to focus on the following outcomes: change in BMI, BMI *z* score, and prevalence of overweight and obesity, as well as secondary outcomes of total cholesterol, triglycerides, HDL cholesterol, LDL cholesterol, two-hour fasting blood glucose, systolic blood pressure, diastolic blood pressure, overall quality of life and physical fitness.

The Evidence Review and Synthesis Centre updated the search[18] from a 2010 systematic review of the United States Preventive Services Task Force[20] that examined evidence on screening for obesity and the effectiveness of weight-management programs. The search was updated to August 2013. Only RCTs were used to address the questions of the effectiveness of interventions; there were no restrictions on study design for the questions relating to adverse effects. Studies on pharmacologic interventions were limited to those using orlistat, which is the only medication in Canada approved for weight management in children. For bariatric surgery, studies were included if they had a control group receiving usual care. A targeted literature update for RCTs addressing only the key questions (Appendix 2) was performed up to Jan. 10, 2015. Any evidence found, if relevant, was

Key points

Growth monitoring

- To monitor growth, primary care practitioners should measure height or length, and weight, and calculate body mass index (BMI) or weight-for-length, according to age using the World Health Organization Growth Charts for Canada.

Prevention of overweight and obesity

- The quality of evidence for obesity prevention in primary care settings is weak, with interventions showing only modest benefits to BMI in studies of mixed-weight populations, with no evidence of long-term effectiveness.
- Trials are needed to determine whether obesity and associated health conditions can be prevented in primary care settings among healthy-weight and overweight children.
- The current recommendations are based on the evidence supporting interventions aimed at achieving healthy weight goals in children; the effectiveness of promoting other health behaviours in primary care was not evaluated.

Management of overweight and obesity

- Behavioural interventions have shown short-term effectiveness in reducing BMI in overweight or obese children and youth, and are the preferred option, because the benefit-to-harm ratio appears more favourable than for pharmacologic interventions.
- Pharmacologic interventions in addition to a healthy nutrition and exercise intervention show modest short-term benefit for adolescents, but have frequent harms.
- We found no randomized clinical trials to support the use of pharmacologic interventions in children under 12 years of age, or surgical interventions in children and adolescents of any age.
- The most effective behavioural structured interventions were those that were delivered by a specialized interdisciplinary team, involved group sessions, and incorporated family and parent involvement.
- Where structured behavioural interventions for weight management in children and youth are not yet available in Canada, primary care practitioners and policy makers should consider their development a priority.

incorporated into the recommendations for the management of overweight and obesity in children.

Recommendations

Box 2[21,22] contains a summary of the recommendations. A summary of the GRADE decision tables can be found in Appendix 3 (available at www.cmaj.ca/lookup/suppl/doi:10.1503/cmaj.141285/-/DC1), with detailed tables provided in the accompanying evidence reviews.[17,18]

Growth monitoring

Recommendations apply to all children and youth aged 17 years and younger who present to primary care.

For children and youth aged 17 years and younger, we recommend growth monitoring at all appropriate primary care visits using the World Health Organization (WHO) Growth Charts for Canada (www.whogrowthcharts.ca).[21] (Strong recommendation; very low-quality evidence)

No identified studies evaluated screening for overweight and/or obesity in primary care. However, growth monitoring is a long-standing practice in primary care to identify disturbances in children's health and nutrition and is recommended by other organizations. The 2010 Collaborative Public Policy Statement of the Dietitians of Canada, Canadian Paediatric Society, The College of Family Physicians of Canada and Community Health Nurses of Canada recommends measuring height or length, and weight, and calculating BMI or weight-for-length according to age using the WHO growth charts adapted for Canadian children.[22] This collaborative group has developed a self-directed WHO Growth Chart Training Program[23] and a fact sheet for parent education in several languages.[24] In 2014, the group expanded to include the Canadian Pediatric Endocrine Group and released new growth charts to address design issues that had emerged since the growth charts were first put into practice in 2010.[21] Recommended cut-offs by the WHO for screening for undernutrition and overnutrition are listed in Table 1.[21,22]

A recent systematic review found that parents frequently underestimate their children's overweight or obese status, further supporting the role of primary care practitioners in monitoring direct measures of growth.[25] In the judgment of the task force, growth monitoring is a long-standing, feasible, low-cost intervention that is unlikely to result in harms, and likely to be valued by parents and clinicians in identifying children and youth at risk of weight-related health conditions that may benefit from early identification, such as hypertension, dyslipidemia, diabetes and nonalcoholic fatty liver disease.

Prevention of overweight and obesity in healthy-weight children

Recommendations apply to all children and youth aged 17 years and younger who have a healthy weight (i.e., who maintain a healthy BMI trajectory according to the WHO growth charts for Canada).[21] These recommendations do not apply to children and youth with eating disorders, or who are underweight, overweight or obese (Table 1).[21,22]

We recommend that primary care practitioners not routinely offer structured interventions aimed at preventing overweight and obesity in healthy-weight children and youth aged 17 years and younger. (Weak recommendation; very low-quality evidence)

No studies were found that evaluated the prevention of overweight and/or obesity in exclusively healthy-weight populations, which was the original focus of the recommendations on prevention. Therefore, we used indirect evidence from studies that included children and youth of mixed weights (underweight, healthy weight, overweight and obese) to develop these recommendations. Studies that focused on only overweight or obese children were considered to be focused on management and were therefore excluded for the development of recommendations on prevention.

Box 1: Grading of recommendations

- Recommendations are graded according to the GRADE system,[14] which offers two strengths of recommendation: strong and weak. The strength of recommendations is based on the quality of supporting evidence, the degree of uncertainty about the balance between desirable and undesirable effects, the degree of uncertainty or variability in values and preferences, and the degree of uncertainty about whether the intervention represents a wise use of resources.
- Strong recommendations are those for which the task force is confident that the desirable effects of an intervention outweigh its undesirable effects (strong recommendation for an intervention) or that the undesirable effects of an intervention outweigh its desirable effects (strong recommendation against an intervention). A strong recommendation implies that most individuals will be best served by the recommended course of action.
- Weak recommendations are those for which the desirable effects probably outweigh the undesirable effects (weak recommendation for an intervention) or undesirable effects probably outweigh the desirable effects (weak recommendation against an intervention) but appreciable uncertainty exists. A weak recommendation implies that most people would want the recommended course of action but that many would not. For clinicians this means they must recognize that different choices will be appropriate for each individual, and they must help each person arrive at a management decision consistent with his or her values and preferences. Policy-making will require substantial debate and involvement of various stakeholders. Weak recommendations result when the balance between desirable and undesirable effects is small, the quality of evidence is lower, or there is more variability in the values and preferences of patients.
- Evidence is graded as high, moderate, low or very low, based on how likely further research is to change our confidence in the estimate of effect.

Note: GRADE = Grading of Recommendations Assessment, Development and Evaluation.

Children and youth who are overweight or obese may be candidates for interventions (see "Management of overweight and obesity").

The review by Peirson and colleagues,[17] which was focused on prevention in primary care–relevant settings, including schools, found 76 RCTs that examined change in BMI (standardized and unstandardized) and could be pooled for analysis, and 30 RCTs that examined the change in the prevalence of overweight and obesity before and after the interventions. Studies ranged in duration from less than six months to four years. There were 57 studies that had unstandardized BMI data available for analysis; of these, only participants in interventions that included diet and exercise components (n = 20) had a significant decrease in BMI (–0.15, 95% confidence interval [CI] –0.26 to 0.03). Body mass index in healthy-weight children should increase with age, yet the pooled analyses found that mean BMI decreased over time among children in the intervention groups — presumably because these studies included mixed-weight (healthy-weight, overweight and obese) groups. In other words, although the interventions examined in these studies were focused on children maintaining healthy BMI trajectories, it seems most likely that some overweight and obese children lost weight during the interventions, which decreased the mean BMI for the intervention group as a whole.

In studies that provided data on the change in prevalence of overweight and obesity (n = 30), all types of interventions appeared to reduce the prevalence, as well as the risk of overweight and obesity, compared with control participants over a duration of up to 36 months (40% and 33% overweight or obese preintervention to 35% and 31% overweight or obese postintervention, in intervention and control groups, respectively; absolute risk reduction of 1.96%). The number needed to treat to prevent one child from becoming overweight or obese was 5 (95% CI 28 to 289), with a pooled relative risk reduction of

Box 2: Summary of recommendations for clinicians and policy makers[21,22]

Growth monitoring

This recommendation applies to all children and youth aged 17 years and younger who present to primary care.

- We recommend growth monitoring* at all appropriate† primary care visits using the 2014 WHO Growth Charts for Canada.[21] (*Strong recommendation; very low-quality evidence*)

Prevention of overweight and obesity in healthy-weight children

This recommendation applies to all children and youth aged 17 years and younger who have a healthy weight (i.e., who maintain a healthy BMI trajectory according to the WHO Growth Charts for Canada[21]). It does not apply to children and youth with eating disorders, or who are underweight, overweight or obese (Table 1).[21,22]

- We recommend that primary care practitioners not routinely offer structured interventions‡ aimed at preventing overweight and obesity in healthy-weight children and youth aged 17 years and younger. (*Weak recommendation; very low-quality evidence*)

Management of overweight and obesity

These recommendations apply to children and youth 2 to 17 years of age who are overweight or obese. Children and youth with health conditions for which weight management is inappropriate are excluded.

- We recommend that primary care practitioners offer or refer to structured behavioural interventions‡ aimed at healthy weight management. (*Weak recommendation; moderate quality evidence*)
- We recommend that primary care practitioners not offer orlistat aimed at healthy weight management for children aged 2 to 11 years. (*Strong recommendation; very low-quality evidence*)
- We recommend that primary care practitioners not routinely offer orlistat aimed at healthy weight management for youth aged 12 to 17 years. (*Weak recommendation; moderate-quality evidence*)
- We recommend that primary care practitioners not routinely refer for surgical interventions. (*Strong recommendation; very low-quality evidence*)

Note: BMI = body mass index, WHO = World Health Organization.

*Growth monitoring consists of measurement of height or length, weight, and BMI calculation or weight-for-length according to age.

†Appropriate primary care visits include scheduled health supervision visits, visits for vaccinations or medication renewal, episodic care or acute illness, and other visits where the primary care practitioner deems it appropriate. Primary care visits are completed by primary care practitioners at primary care settings, including those outside of a physician's office (e.g., public health nurses carrying out a well-child visit at a community setting).

‡Structured behavioural interventions are intensive behavioural modification programs that involve several sessions that take place over weeks to months, follow a comprehensive approach delivered by a specialized interdisciplinary team, involve group sessions, and incorporate family and parent involvement. Interventions examined included behaviourally based prevention interventions focused on diet, increasing exercise, making lifestyle changes or any combination of these. These can be delivered by a primary care team in the office or through a referral to a formal program within or outside of primary care, such as hospital-based, school-based or community programs.

0.94 (95% CI 0.89 to 0.99). Whereas these benefits were statistically significant, their clinical importance and sustainability over the longer term is unknown. A meta-analysis of eight trials that provided postintervention follow-up (to 24 mo in some studies) did not find sustained improvements in BMI over time.[17]

The most effective interventions were highly intensive. Duration ranged from three months to three years, and provider skills and intervention formats varied widely. Therefore, additional research is needed to determine key features of effective and feasible interventions in team-based primary care settings.

A subset of studies that evaluated secondary outcomes found that interventions had no clinically important effects on total cholesterol, LDL or HDL cholesterol, triglycerides, or systolic or diastolic blood pressure. Six studies did, however, show improved performance on physical fitness testing. No identified studies examined improvements in overall quality of life.

When the BMI results were examined by subgroup, the review by Peirson and colleagues[17] found that interventions that took place in educational settings (e.g., schools) in children aged 6 to 17 years appeared to be the most effective (standardized mean difference [SMD] –0.09, 95% CI –0.13 to –0.04). A meta-analysis showed no effects for interventions conducted in noneducational settings, such as primary care, homes or community centres (SMD –0.04, 95% CI –0.15 to 0.08).[17]

The available evidence was indirect and insufficient to determine whether these interventions are associated with clinically important harms. There was insufficient evidence to determine patient values and preferences regarding these preventive interventions.

In making this recommendation, the task force is placing a high value on the lack of evidence for clinically important benefit of current interventions to prevent overweight and obesity in the target population, the lack of evidence that any benefits are sustained in the long term, and the lack of evidence for the use of such interventions in primary care settings. It is important to note that the review did not identify any studies examining the effectiveness of providing brief counselling on promotion of healthy lifestyle behaviours. Practitioners should discuss the potential benefits of overweight and obesity prevention programs with parents or children who inquire about prevention of adiposity.

Parents and children who are more interested in a small uncertain reduction in the risk of overweight and obesity, and are less concerned about the time commitment required may choose to participate in such interventions. Advice for parents of children who are already overweight or obese should be guided by task force recommendations on management.

Management of overweight and obesity

Recommendations apply to children and youth 2 to 17 years of age who are overweight or obese. Children and youth with health conditions where weight management is inappropriate are excluded.

Behavioural interventions

For children and youth aged 2 to 17 years who are overweight or obese, we recommend that primary care practitioners offer or refer to formal, structured behavioural interventions aimed at healthy weight management. (Weak recommendation; moderate quality evidence)

In the systematic review on management of overweight and obesity, 19 RCTs were identified that examined change in BMI.[18] The pooled reduction in BMI was 1.15 greater in the intervention group than in the control group (mean difference [MD] –1.15, 95% CI –1.59 to –0.72). Three studies reported on the prevalence of overweight and obesity. These data could not be pooled, but all studies found that the prevalence of obesity did not significantly differ between groups at end of study.

Mean systolic and diastolic blood pressure were significantly lower in intervention participants than in controls (MD –4.64, 95% CI –7.46 to –1.82, mm Hg, and MD –4.08, 95% CI –6.07 to –2.09, mm Hg, respectively). There were also greater increases in self-reported quality of life for intervention compared with control participants in studies (MD 2.10, 95% CI 0.60 to 3.60.) The magnitude of these improvements was small. There were no effects on other secondary outcomes such as total cholesterol, HDL or LDL cholesterol, or triglycerides, and no data available on glucose levels or physical fitness. There were no identified harms associated with the behavioural interventions.

Table 1: Recommended cut-offs by the World Health Organization for screening for undernutrition and overnutrition[21,22]

	Age		
Variable	Birth to 2 yr	2 to 5 yr	5 to 19 yr
Measure	Weight-for-length	BMI-for-age	BMI-for-age
Wasted	< 3rd centile	< 3rd centile	< 3rd centile
Overweight	> 97th centile	> 97th centile	> 85th centile
Obese	99.9th centile	99.9th centile	97th centile

Note: BMI = body mass index.

In the systematic review, no studies were identified that could assess whether weight-management programs help children and adolescents who are overweight or obese to maintain their BMI, weight or adiposity improvements for more than one year after an intervention is completed.[17] However, four of the trials included in the review[18] followed participants after the intervention concluded (median 9.5 months) and found no significant difference in weight loss between the intervention and control groups at the end of the follow-up period (SMD 0.08, 95% CI –0.07 to 0.23.)

A qualitative assessment of the studies in the systematic review indicated that effective behavioural interventions tended to include exercise, healthy nutrition and lifestyle components (i.e., broad-based strategies that focus on diet and/or exercise plus use of other approaches such as counselling, education, support or environmental changes to address nutrition and physical activity), and involve multiple sessions for varying periods (between three months and two years), although most lasted six months or less.[18] Most effective behavioural interventions were comprehensive, delivered by a specialized interdisciplinary team, involved group sessions, and incorporated parent and family involvement.[18] The systematic review did not identify any studies examining the effectiveness of counselling provided independently by primary care physicians.[18] However, our analysis suggests that counselling by trained primary care practitioners is most likely to be effective when it is provided as part of an integrated comprehensive approach and delivered by an interdisciplinary specialized team.

The systematic review looked for evidence on interventions specifically targeting other factors such as sleep, sedentary behaviour and mental health, but it did not find any RCT data on these specific interventions.[18]

This recommendation places a high value on the modest, short-term benefits of interventions for weight management and the lack of identified harms. In the judgment of the task force, the weight loss and associated health benefits warrant a recommendation in favour of these interventions. The recommendation is weak because of the lack of data that such weight loss is sustained or has health benefits over time. The implications of a weak recommendation are that most children and youth would want the recommended course of action, but that many would not (Box 1).

Clinicians should discuss the limited evidence showing a short-term benefit with their patients and must help each family to make a decision that is consistent with their values and preferences. As some effective interventions involve a commitment on the part of the entire family over time, those who are not able to commit to a behavioural program may choose not to participate. Children with a higher BMI may be more inclined to benefit from (or be willing to commit to) the lifestyle changes associated with weight management programs.

Pharmacologic interventions

For children aged 2 to 11 years who are overweight or obese, we recommend that primary care practitioners not offer orlistat aimed at healthy weight management. (Strong recommendation; very low-quality evidence)

For youth aged 12 to 17 years who are overweight or obese, we recommend that primary care practitioners not routinely offer orlistat aimed at healthy weight management. (Weak recommendation; moderate-quality evidence)

The systematic review on management of overweight and obesity found no RCTs that compared pharmacologic interventions (i.e., orlistat) with placebo controls and no pharmacologic trials (i.e., involving orlistat) that included children aged 2 to 11 years.[18] However, two RCTs examined the use of orlistat (120 mg, three times daily) in addition to a healthy nutrition and exercise intervention in adolescents (aged 13 to 18 years) compared with placebo control. One trial (duration six months)[26] found no effect, whereas a second trial (duration one year)[27] found that orlistat was beneficial. Meta-analysis of these two studies found that intervention participants decreased BMI by an additional 0.86 (95% CI –1.19 to –0.52) more than control groups. This reduction is not significantly different from the benefit observed with behavioural interventions. No effects were seen on total cholesterol, HDL or LDL cholesterol, triglycerides, systolic blood pressure or glucose levels, and neither study assessed physical fitness or self-reported quality of life. One of the studies found greater decreases in diastolic blood pressure for intervention participants (MD –1.81, 95% CI –3.61 to –0.01, mm Hg).[27]

No identified studies assessed whether pharmacologic programs for weight management help children and youth who were initially overweight or obese to maintain BMI, weight or adiposity improvements after the completion of an intervention. Participants in combined pharmacologic and behavioural interventions were more likely to experience gastrointestinal harms such as oily, watery stools, abdominal pain and fecal incontinence (relative risk 3.77, 95% CI 2.56 to 5.55; absolute risk increase of 37%, with a number needed to harm of 3, 95% CI 2 to 5.)[18]

The systematic review that supports the new

task force recommendations did not include metformin, because this agent is not approved for weight management for children in Canada. However, a recent systematic review examining the effectiveness of metformin identified 14 RCTs in children whose mean age ranged from 10 to 16 years.[28] The authors concluded that metformin provides a statistically significant but clinically modest short-term reduction in BMI, when combined with lifestyle interventions.

For children aged 2 to 11 years, this recommendation places a high value on the lack of studies examining pharmacologic interventions. In the absence of evidence that intervention is effective, the task force recommends against pharmacologic treatment in this population.

For youth aged 12 to 17 years, this recommendation places a high value on the lack of trials that examine pharmacologic interventions versus control with no behavioural intervention, and the fact that both pharmacologic studies that examined the use of orlistat included a combination of behavioural and pharmacologic interventions and yet were not more effective than the behavioural interventions on their own. Given the potential for harm associated with orlistat treatment, most patients would choose behavioural interventions, rather than a combination of behavioural and pharmacologic therapy. However, youth and their families who value weight-management programs and are less concerned about the harms of pharmacologic interventions may choose to supplement behavioural interventions with orlistat treatment.

Surgical interventions

For children and youth who are overweight or obese, we recommend that primary care practitioners not routinely refer for surgical interventions. (Strong recommendation; very low-quality evidence)

The systematic review on management of overweight and obesity did not identify any studies on surgical interventions that met our inclusion criteria (i.e., comparing surgical interventions with an untreated control group).[18] Therefore, the task force has issued a strong recommendation against routinely referring for surgical interventions. This recommendation places a high value on the absence of RCTs showing that this intervention is effective, the potential for harm and the irreversibility of the procedure, and on the fact that primary care practitioners do not normally refer directly to a clinic for bariatric surgery. Surgery may be best considered by interdisciplinary teams that specialize in obesity.

The systematic review on which these recommendations are based only searched for studies comparing surgical interventions with an untreated control group as indicated in the original protocol.[18] However, during the peer-review process, the task force was made aware of recent evidence comparing surgical interventions with behavioural interventions suggesting that in youth with a BMI greater than 35, bariatric surgery may be more effective than behavioural interventions in reducing weight and metabolic syndrome, and improving quality of life.[29] Guideline development groups should consider including RCTs examining the effectiveness of bariatric surgery in comparison to behavioural interventions to inform future recommendations.

Considerations for implementation

The task force has developed a series of tools to help practitioners interpret these recommendations for their patients, which can be found at canadiantaskforce.ca/ctfphc-guidelines/2015-obesity-children. The task force uses a rigorous and collaborative usability testing process to develop knowledge translation tools targeting various end-user groups (e.g., clinicians and patients) to accompany its guidelines. All tools are informed by feedback from clinicians (for clinician and patient tools) and patients (for patient tools) obtained through interviews and/or focus groups.

Values and preferences

No information was identified that discussed the values and preferences of parents or children and youth for receiving preventive interventions. The evidence review on prevention of overweight and obesity suggests that understanding barriers to participation in physical activities can help practitioners to devise effective strategies for engaging children and youth in such activities.[17]

There was insufficient evidence to assess patient values and preferences regarding interventions for weight management. The evidence review on management of overweight and obesity highlighted the importance of supportive relationships between practitioners and families to help patients achieve healthy weight goals and the need for practitioners to understand barriers to participation in weight-management activities.[18]

Other considerations

There is increasing interest in opportunities for preventive interventions in a child's early period of growth and development, which coincides with frequent contact with primary care.[30] The evidence review on prevention of overweight and obesity[17] identified three studies that focused on interventions initiated in the first year of

life.[31–33] Wen and colleagues[32] conducted a trial of eight home visits by community nurses (education sessions on healthy infant-feeding practices and active play) beginning antenatally through to 24 months after birth, with outcomes reported at 24 months. Daniels and colleagues[31] conducted a trial of multiple group sessions co-led by a dietitian and psychologist (comprehensive skills-based program on feeding and parenting practices) beginning at four to six months, with outcomes reported at 13 to 15 months. Campbell and colleagues[33] conducted a trial of multiple group sessions led by a dietitian (diet counselling) beginning at four months, with outcomes reported at 20 months. Two studies showed a statistically significant reduction in BMI and BMI *z* scores in the intervention groups,[31,32] and one study did not.[33] A meta-analysis of the three studies, with a total sample of 857, showed a statistically significant lower BMI and BMI *z* score (SMD –0.13, 95% CI –0.25 to –0.02) in the intervention participants as compared with the control participants, but the magnitude of the effect was very small. The results of this meta-analysis will be included in an addendum to the full technical report that will be published on www.canadiantaskforce.ca the day of this guideline's publication.

In the literature update to Jan. 10, 2015, the Evidence Review and Synthesis Centre identified 18 new RCTs that examined the effectiveness of preventive interventions and could be pooled for analysis. The updated analysis showed a statistically significant reduction in BMI in children five years of age and younger who participated in the intervention group (SMD –0.12, 95% CI –0.21 to –0.02), but the magnitude of the effect was very small. The first five years of life in a child, and in particular the first 12 months, may provide an opportunity for targeted interventions for obesity prevention, although further research is needed.

The task force recognizes the importance of growth monitoring in early childhood, and the as-yet unproven potential for primary preventive interventions in children less than two years of age. Our guideline did not examine the management of overweight and obesity in this age group.

We sought but found no evidence that the benefits and harms of intervention for overweight and obesity varied in accordance with patient and parent characteristics, including age, sex and socioeconomic status. Additionally, provider skills and intervention formats varied widely. Therefore, only general aspects of the effective interventions could be identified. Resources for offering the most effective interventions are more likely to be found in team-based primary care settings. Emphasis should be placed on the delivery of comprehensive weight-management programs by a specialized interdisciplinary team. Primary care practitioners who wish to partake in the delivery of such programs should receive adequate training.

Finally, the task force recognizes that implementation of these recommendations is in part dependent on the availability of formal, structured behavioural interventions for weight management in children and youth in Canadian settings, and that regional differences in availability of health services may exist. Canada's federal, provincial and territorial governments are coordinating efforts with health services organizations and various sectors to deliver joint initiatives that will help address child obesity. These initiatives target children, families, communities, and the broader environmental and social determinants of childhood obesity.[34] Clinicians interested in learning more about the type of interventions that are currently available in each region may consult the 2013 Progress Report on Advancing the Federal /Provincial/Territorial Framework on Healthy Weights (www.phn-rsp.ca/thcpr-vcpsre-2013 /images/Compilation-of-Initiatives-EN.pdf). Where such interventions are not yet available, primary care practitioners and policy makers should consider their development a priority.

Economic implications

We did not consider the economic implications of these interventions in the development of this guideline.

Other guidelines

Although the potential benefits of preventing overweight and obesity are clear, few organizations have systematically examined the effectiveness of preventive interventions or developed evidence-based recommendations addressing how obesity prevention should be implemented in primary care and other settings. Table 2[12,13,20,35–37] outlines recommendations of other international organizations on prevention. Some groups focus on screening,[20] whereas others[12] discuss the importance of multisectoral approaches to preventing obesity. The National Institute for Health and Care Excellence in the United Kingdom[35] has the broadest guidelines with a focus on the role of primary care, as well as the role of schools, early learning centres and local health authorities in preventing obesity. Although the task force agrees with the general principle of promoting healthy behaviours (e.g., increasing physical activity, healthy eating and sleep) to improve children's health, we are

Table 2: Summary of recommendations on prevention and management of overweight and obesity in children and youth in Canada and elsewhere[12,13,20,35–37]

Organization	Recommendation
Prevention of overweight and obesity	
CTFPHC (2015)	We recommend that practitioners not routinely offer interventions aimed at preventing weight gain.
CTFPHC (1994)[13]	Insufficient evidence to support screening; physicians should plot height and weight. Regular physical activity is recommended for all Canadians to maintain healthy weight.
USPSTF (2010)[20]	No guideline on prevention; recommend screening children aged six years and older for obesity.
NICE (2006)[35]	A variety of recommendations aimed at health professionals in all primary care settings should ensure that preventing and managing obesity is a priority; interventions should aim to improve diet and increase physical activity. Discuss weight, diet and activity at times when weight gain is more likely.
SIGN (2010)[36]	Focus is on school-based interventions to prevent obesity (as that is where most trials have been undertaken) with parent and family involvement.
Obesity Canada (2007)[12]	Multisectoral approach, including programs that combine a low-fat or energy-reduced diet for obesity prevention. Discussion of the prevention of childhood obesity with the pregnant mother is encouraged, as is exclusive breastfeeding for the first six months.
Management of overweight and obesity	
CTFPHC (2015)	Offer or refer to formal, structured behavioural interventions aimed at modest weight loss in ages 2 to 17 years; do not offer pharmacologic or surgical interventions.
CTFPHC (1994)[13]	Insufficient evidence to recommend for or against screening for or treatment of childhood obesity; recommend against very low kilojoule diets for preadolescents; insufficient evidence to recommend for or against exercise programs or intensive family-based programs for most obese children.
USPSTF (2010)[20]	Screen children aged six years and older for obesity, and offer them or refer them to intensive counselling and behavioural interventions to promote improvements in weight status.
NICE (2006)[35]	Offer multicomponent interventions that include behavioural change strategies to increase physical activity levels, decrease inactivity, and improve eating behaviour and diet quality. Consider drugs treatment only if multicomponent diet, exercise and behavioural strategies have been tried and evaluated (not recommended under 12 years, only recommended over 12 years if severe comorbidities are present). Surgery is not recommended.
SIGN (2010)[36]	Incorporate behavioural change components, be family-based and aim to change the whole family's lifestyle. Programs should target decreasing overall dietary energy intake, increasing levels of physical activity and decreasing time spent in sedentary behaviours. Orlistat should only be prescribed for severely obese adolescents with comorbidities or those with very severe to extreme obesity attending a specialist clinic. Bariatric surgery can be considered for postpubertal adolescents with very severe to extreme obesity and severe comorbidities.
Obesity Canada (2007)[12]	Comprehensive healthy lifestyle intervention, including an energy-reduced diet and regular physical activity, is the first treatment option. Consider orlistat to aid in weight reduction and weight maintenance when added to a regimen of lifestyle intervention among adolescents. The use of pharmacologic agents in prepubertal children should be considered only within the context of a supervised clinical trial. Bariatric surgery in adolescents should be limited to exceptional cases.
National Health and Medical Research Council (Australia) (2013)[37]	Lifestyle change including reduced energy intake and sedentary behaviour, increased physical activity and measures to support behavioural change.

Note: CTFPHC = Canadian Task Force on Preventive Health Care, NICE = National Institute for Health and Care Excellence (UK), SIGN = Scottish Intercollegiate Guideline Network, USPSTF = U.S. Preventive Services Task Force.

unable to recommend specific interventions because we only examined the effectiveness of interventions that lead to short-term or sustained healthy BMI trajectories.

The last task force guidance on childhood obesity concluded that there was insufficient evidence to recommend for or against screening for or treatment of childhood obesity.[9] A great deal of research has been published on the management of childhood obesity since that time, and the current guidance reflects the most up-to-date literature. Our recommendations on treatment are consistent with those of other international guideline groups who recommend that behavioural interventions be used to address overweight and obesity in children and adolescents (Table 2).

Gaps in knowledge

This guideline highlights an important gap in the research literature on the prevention of obesity in primary care–relevant settings. No identified trials focused exclusively on helping healthy-weight children and youth to maintain their healthy weight status or exploring the potential harms and unintended consequences of preventive interventions. More research is needed in primary care settings to determine the best way for primary care practitioners to be involved in obesity-prevention efforts. In particular, the first year of a child's life, when frequent primary care contact occurs, may provide an opportunity for targeted interventions for obesity prevention. Existing limited evidence highlights the potential for developing effective interventions in this area, but more research is needed. Further research is also needed examining the long-term effect of interventions delivered in a school-based setting and the potential involvement of primary care practitioners.

More studies are also needed to better understand the preferences of parents and children regarding preventive interventions for those currently at a healthy weight, including the most effective and least harmful method for discussing with the parents the health risks of interventions for overweight and obesity prevention. Given the limitations of the evidence, no performance indicators were developed.

More research is needed on the long-term benefits or harms of programs for weight management in children and adolescents. Research examining the effectiveness of weight-management programs based on patient and parent characteristics, including age, sex, BMI classification and socioeconomic status are also needed. Future studies should test for effect modifiers of the benefits of behavioural and pharmacologic treatment on weight management, especially characteristics that can be identified easily in clinical practice.

Although monitoring height, weight and BMI will continue to be common practices for growth monitoring, studies examining the effectiveness of BMI measurement as a screening practice should be conducted.

Conclusion

We recommend growth monitoring at all appropriate visits to identify children and youth with growth disturbances, including overweight and obesity. Because the long-term effectiveness of primary care–focused interventions is unknown, we recommend that primary care practitioners not routinely offer structured interventions aimed at preventing overweight and obesity.

For the management of overweight and obesity, the task force recommends in favour of behavioural interventions in children and youth aged 2 to 17 years and does not recommend offering pharmacologic interventions or referring for surgical interventions because of lack of data showing effectiveness and potential harms. Although statistically significant, the clinical benefits of behavioural interventions are small, and long-term data are needed to determine whether these benefits are maintained over time.

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