Interventions for High Body Mass Index in Children and Adolescents

US Preventive Services Task Force Recommendation Statement

US Preventive Services Task Force

**Importance**
Approximately 19.7% of children and adolescents aged 2 to 19 years in the US have a body mass index (BMI) at or above the 95th percentile for age and sex, based on Centers for Disease Control and Prevention growth charts from 2000. The prevalence of high BMI increases with age and is higher among Hispanic/Latino, Native American/Alaska Native, and non-Hispanic Black children and adolescents and children from lower-income families.

**Objective**
The US Preventive Services Task Force (USPSTF) commissioned a systematic review to evaluate the evidence on interventions (behavioral counseling and pharmacotherapy) for weight loss or weight management in children and adolescents that can be provided in or referred from a primary care setting.

**Population**
Children and adolescents 6 years or older.

**Evidence Assessment**
The USPSTF concludes with moderate certainty that providing or referring children and adolescents 6 years or older with a high BMI to comprehensive, intensive behavioral interventions has a moderate net benefit.

**Recommendation**
The USPSTF recommends that clinicians provide or refer children and adolescents 6 years or older with a high BMI (≥95th percentile for age and sex) to comprehensive, intensive behavioral interventions. (B recommendation)

The USPSTF makes recommendations about the effectiveness of specific preventive care services for patients without obvious related signs or symptoms to improve the health of people nationwide.

It bases its recommendations on the evidence of both the benefits and harms of the service and an assessment of the balance. The USPSTF does not consider the costs of providing a service in this assessment.

The USPSTF recognizes that clinical decisions involve more considerations than evidence alone. Clinicians should understand the evidence but individualize decision-making to the specific patient or context.
The USPSTF concludes with moderate certainty that providing or referring children and adolescents 6 years or older with a high BMI to comprehensive, intensive behavioral interventions has a moderate net benefit. The USPSTF found adequate evidence to bound the harms of comprehensive, intensive behavioral interventions in children and adolescents as no greater than small, based on the absence of reported harms in the evidence and the noninvasive nature of the interventions. The USPSTF found adequate evidence to bound the harms of pharmacotherapy as no greater than small, based on the absence of reported harms in the evidence and the noninvasive nature of the interventions. The USPSTF found adequate evidence that comprehensive, intensive (≥26 contact hours) behavioral interventions for up to 1 year result in weight loss in children and adolescents. The USPSTF found adequate evidence of benefits of pharmacotherapy interventions. The USPSTF found adequate evidence that pharmacotherapy interventions have a moderate net benefit when referred for a year or more.

**Table 1. Summary of USPSTF Rationale**

<table>
<thead>
<tr>
<th>Rationale</th>
<th>Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benefits of behavioral and pharmacotherapy interventions</td>
<td>• The USPSTF found adequate evidence that comprehensive, intensive (&gt;26 contact hours) behavioral interventions in children and adolescents 6 years or older with a high BMI can lead to improvements in weight status and quality of life. The magnitude of this benefit is moderate. • The USPSTF found inadequate evidence on the benefits of pharmacotherapy due to small number of studies and limited evidence on long-term treatment harms.</td>
</tr>
<tr>
<td>Harms of behavioral and pharmacotherapy interventions</td>
<td>• The USPSTF found adequate evidence to bound the harms of comprehensive, intensive behavioral interventions in children and adolescents as no greater than small, based on the absence of reported harms in the evidence and the noninvasive nature of the interventions. • The USPSTF found adequate evidence to bound the harms of pharmacotherapy as no greater than small, based on the absence of reported harms in the evidence and the noninvasive nature of the interventions.</td>
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<td>The USPSTF concludes with moderate certainty that providing or referring children and adolescents 6 years or older with a high BMI to comprehensive, intensive behavioral interventions has a moderate net benefit.</td>
</tr>
</tbody>
</table>

Abbreviations: BMI, body mass index; USPSTF, US Preventive Services Task Force.

**Practice Considerations**

**Patient Population Under Consideration**

This recommendation applies to children and adolescents 6 years or older.

**Definitions**

BMI (weight in kilograms divided by the square of height in meters) is the currently accepted clinical standard measure of excess fat in the US, and childhood and adolescent weight status is usually obtained by calculating BMI. Traditionally, children and adolescents are categorized as having “overweight” when their BMI is between the 85th and 95th percentile and as having “obesity” when their BMI is at or above the 95th percentile on CDC growth charts. In this recommendation, the USPSTF will use the general term “high BMI” when referring to youth considered to be above “normal” body weight status (≥95th percentile for age and sex) according to CDC standards. Specific BMI cutoffs (“≥95th percentile for age and sex” rather than “obese” and “85th to 95th percentile for age and sex” rather than “overweight”) will also be used when feasible. BMI is an imperfect measure of adiposity and is not an equivalent measure of adiposity across all racial and ethnic populations. However, most children with a BMI-for-age at or above the 95th percentile have high adiposity, while few children with a BMI-for-age below the 85th percentile have high adiposity.

**Behavioral Counseling Interventions and Implementation Considerations**

Comprehensive, intensive behavioral interventions with at least 26 contact hours or more that include supervised physical activity sessions for up to 1 year result in weight loss in children and adolescents. Effective, high-intensity (>26 contact hours) behavioral interventions result in greater weight loss than less intense interventions and result in some improvements in cardiometabolic risk factors. These behavioral interventions consist of multiple components, and although components vary across interventions, many of the studied interventions include sessions targeting both the parent and child (separately, together, or both); offer group sessions in addition to individual or single-family sessions; provide...
The USPSTF recognizes that clinical decisions involve more considerations than evidence alone. Clinicians should understand the evidence but individualize decision-making to the specific patient or situation.
maintenance after pharmacotherapy discontinuation suggests that weight rebound starts soon after discontinuation, implying that long-term use will be needed to maintain weight loss. However, there is no evidence on the harms of long-term medication use. In addition, pharmacotherapy is associated with moderate harms due to gastrointestinal symptoms (eg, nausea, vomiting, diarrhea, fecal incontinence, flatus, and gallstones). Therefore, the USPSTF encourages clinicians to promote behavioral interventions as the primary effective intervention for weight loss in children and adolescents.

**Additional Tools and Resources**

The Community Preventive Services Task Force recommends several youth interventions promoting physical activity and healthy eating, access to affordable healthy food and beverages, healthy food and beverage choices, and fostering physical activity among children, reducing sedentary screen time, and using digital health interventions for weight management [https://www.thecommunityguide.org/pages/task-force-findings-obesity.html].

The US Department of Health and Human Services published the "Physical Activity Guidelines for Americans," which provides recommendations for how physical activity can help promote health and reduce the risk of chronic disease for Americans 3 years or older [https://health.gov/our-work/nutrition-physical-activity/physical-activity-guidelines].

The CDC has resources available for families and clinicians addressing high BMI at [https://www.cdc.gov/obesity/].

**Other Related USPSTF Recommendations**

The USPSTF has issued recommendations on screening for high blood pressure in children and adolescents, screening for lipid disorders in children and adolescents, and screening for prediabetes and type 2 diabetes in children and adolescents. Current versions of these and other related USPSTF recommendations are available at [https://www.uspreventiveservicestaskforce.org/uspstf/].

**Update of Previous USPSTF Recommendation**

This recommendation updates the 2017 USPSTF recommendation statement on screening for obesity in children and adolescents 6 years or older (B recommendation).

**Supporting Evidence**

**Scope of Review**

The USPSTF commissioned a systematic evidence review to update its 2017 recommendation on screening for obesity in children and adolescents. Because assessing BMI is now part of routine clinical practice, it was not a focus of this review. The USPSTF reviewed evidence on interventions (behavioral counseling and pharmacotherapy) for weight loss or weight management that can be provided in or referred from a primary care setting. Interventions that did not include a weight loss or weight management component were not eligible for inclusion in this review. Surgical weight loss interventions are generally not first-line preventive interventions and are outside the scope of the review.

**Effectiveness of Behavioral Counseling and Pharmacotherapy Interventions**

Fifty randomized clinical trials (RCTs) (N = 8798) examined behavioral interventions. Twenty-eight trials were conducted in the US; the remaining 22 were conducted in Europe, Canada, Australia, New Zealand, Israel, and Turkey. Twenty-seven trials were conducted in primary care settings, and the remaining 23 were conducted in other health care settings (eg, various specialty outpatient clinics or research facilities). Most trials (41/50) included study participants who had a BMI at or above the 85th percentile or at or above the 95th percentile for their age or sex according to CDC growth charts, country-specific norms, or International Obesity Task Force norms. The mean BMI percentile was 93 (range, 84.9-99.2). Trials included children and adolescents aged 2 to 19 years. Eighteen trials were limited to elementary school-aged children (aged 6 to 8 years, up to age 12 years); 13 trials included preschool-aged or elementary school-aged children to adolescents; 12 trials evaluated adolescents only; and 7 trials targeted preschool-to-kindergarten-aged children.

Most trials did not report on race or ethnicity or included predominantly White study participants. Trials conducted in the US had a more diverse study population; trials were mostly composed of White (52.4%), Black (20.5%), and Hispanic/Latino (25%) study participants. There was limited inclusion of Asian or Native American/Alaska Native participants. Most trials described the level of patient participation in interventions. In the included trials, 31% to 93% of participants completed all sessions. The average percentage of sessions completed generally ranged from 60% to 80%.

Trials rarely reported health outcomes (eg, depression or social adjustment). However, pooled analyses demonstrated a statistically significant increase in global quality of life after 6 to 12 months (mean difference in change, 1.9 [95% CI, 0.2 to 3.5]; 11 RCTs; n = 1922). Among studies with more contact hours (≥26 contact hours), the mean difference in change in quality-of-life measures was 3.8 points (95% CI, 3.6 to 4.1) (most scales ranged from 0-100). No studies reported longer-term benefits on health outcomes. Studies suggest that 4.4- to 5.4-point differences in the Pediatric Quality of Life Inventory (PedsQL) represent a minimal clinically important difference, and some of the included trials of higher-contact interventions did report improvement in this range on the PedsQL among children participating in the interventions.

Behavioral interventions were associated with reductions in BMI and other weight-related outcomes after 6 to 12 months (mean difference in change between groups, −0.7 [95% CI, −1.0 to −0.3]; 28 RCTs [n = 4494]; I² = 86.8%). Larger effects were seen in interventions with more contact hours (≥26) and physical activity sessions (1.4-point reduction in BMI [95% CI, −2.2 to −0.6]; 11 RCTs [n = 1087]; I² = 87.8%; and 2.6-kg loss in weight [95% CI, −3.8 to −1.3 kg]; 10 RCTs [n = 907]; I² = 58.2%).

Other weight and adiposity outcomes showed similar patterns.

Cardiometabolic risk factors (eg, lipid levels, blood pressure, and fasting plasma glucose level) were reported by 16 trials (n = 1700). Pooled analyses of trials providing 26 or more contact hours and physical activity sessions showed improvements in blood pressure (eg, mean difference in systolic blood pressure, −3.6 mm Hg [95% CI, −5.7 to −1.5 mm Hg]; 8 RCTs [n = 773];
Semaglutide improved low-density lipoprotein cholesterol levels (mean difference in percent change, −7.1 [95% CI, −11.9 to −1.8]), and phentermine/topiramate improved high-density lipoprotein cholesterol levels (eg, mean difference in percent change, 8.8 [95% CI, 2.2 to 15.4] for 15/92-mg/d dose); other medications did not demonstrate statistically significant improvements. None of the pharmacotherapy trials found improvements in glucose-related parameters.\(^\text{1,10}\)

**Potential Harms of Behavioral Counseling and Pharmacotherapy Interventions**

Eighteen trials (n = 2539) examined the harms of behavioral interventions. Outcomes were reported 6 to 12 months after baseline assessments. None of the trials found an increased risk of any adverse event or serious adverse events, including disordered eating, or decreases in self-esteem or body satisfaction.\(^\text{1,10}\)

Eight trials (n = 1345) examined the adverse effects of pharmacotherapy. More than 60% of youth taking liraglutide, semaglutide, or orlistat experienced gastrointestinal adverse effects (eg, nausea, vomiting, diarrhea, gallstones, flatus with discharge, and fecal incontinence). For example, in the largest trial of liraglutide, gastrointestinal adverse effects occurred in 65% of study participants in the intervention group vs 36% in the placebo group (relative risk, 3.20 [95% CI, 1.91 to 5.36]).\(^\text{1,10}\)

Musculoskeletal and psychiatric adverse effects were most reported with phentermine/topiramate (at doses of 15/92 mg/d) (8.8% with intervention vs 1.8% with placebo for both categories of adverse effects).\(^\text{1,10}\)

Serious adverse effects were rare in all of the pharmacotherapy trials. No evidence was available on adverse effects beyond 1 month after medication discontinuation or longer than 17 months for any medication.\(^\text{1,10}\)

**Response to Public Comment**

A draft version of this recommendation statement was posted for public comment on the USPSTF website from December 12, 2023, to January 16, 2024. In response to comments, the USPSTF clarified the type of studies eligible for inclusion in the Scope of Review section. The USPSTF incorporated language in the Practice Considerations section regarding the harms associated with having a high BMI and the use of BMI for assessment/screening. The USPSTF also listed additional resources to help clinicians in the Additional Tools and Resources section.

**Research Needs and Gaps**

See Table 2 for research needs and gaps related to interventions for high BMI in children and adolescents.

**Recommendations of Others**

The American Academy of Pediatrics recommends plotting BMI on a growth chart at all pediatric visits for all patients 2 years or older. It also recommends comprehensive treatment of high BMI with improved nutrition, physical activity, behavioral therapy, and consideration of pharmacotherapy according to US Food and Drug Administration indications for children 12 years or older and consideration of bariatric surgery for adolescents.\(^\text{14,15}\)

The Canadian Task Force on...
Table 2. Research Needs and Gaps in Interventions for High BMI in Children and Adolescents

To fulfill its mission to improve health by making evidence-based recommendations for preventive services, the USPSTF routinely highlights the most critical evidence gaps for making actionable preventive services recommendations. We often need additional evidence to create the strongest recommendations for everyone and especially for persons with the greatest burden of disease.

In this table, we summarize key bodies of evidence needed for the USPSTF to make recommendations for interventions for high BMI in children and adolescents. For each of the evidence gaps listed below, research must be inclusive of populations with a high prevalence of high BMI, including Hispanic/Latino, Native American/Alaska Native, and non-Hispanic Black children and adolescents. For additional information on research needed to address these evidence gaps, see the Research Gaps Taxonomy table on the USPSTF website (https://www.uspreventiveservicestaskforce.org/home/getfilebytoken/d8DvQhw6JgjWeBED97s6).

Interventions for high BMI in children and adolescents

Research is needed on long-term health outcomes (at least 2 years) and the benefits of behavioral and pharmacotherapy interventions. Studies should include outcomes such as improvement in weight/BMI, cardiometabolic outcomes, psychosocial outcomes (eg, global quality of life, weight-related quality of life, psychosocial functioning outcomes, and improved depressive symptoms), and dietary patterns. Trials should include populations with a higher prevalence of high BMI (eg, Hispanic/Latino, Native American/Alaska Native, and non-Hispanic Black children and adolescents).

Research is needed on long-term (at least 2 years) psychosocial harms (eg, quality of life) of pharmacotherapy.

Research is needed on the benefits and harms of healthy lifestyle, or weight-neutral, interventions in children and adolescents with a high BMI.

Research is needed on the best timing for interventions for weight management. Research is needed to understand whether there are certain ages in childhood and adolescence when interventions might provide a higher likelihood of treatment benefit.

Research is needed on the maintenance of weight loss after behavioral interventions and assessment of long-term (>5 y) benefits and harms.

Research is needed on the best practices for weight-related discussions with children and adolescents and their families.

Preventive Health recommends growth monitoring for all children and adolescents 17 years or younger at primary care visits. It also recommends that primary care clinicians offer or refer children and adolescents with high BMI to structured behavioral interventions aimed at healthy weight management. The American Psychological Association recommends family-based multicomponent behavioral interventions with a minimum of 26 contact hours, initiated at an early age for children and adolescents with overweight or obesity. The American College of Obstetricians and Gynecologists recommends screening for adolescent overweight and obesity and that adolescents with overweight or obesity be screened for depression and bullying and appropriately referred. It also recommends that clinicians initiate behavioral counseling or other multidisciplinary management as necessary. It does not recommend metformin for adolescent weight loss alone and recommends that bariatric surgery should only be considered after careful patient selection by a multidisciplinary team.

Additionally, it recommends that clinicians caution against the use of weight loss supplements. The Society for Adolescent Health and Medicine recommends calculating BMI percentile for all adolescents, reinforcing healthy behaviors, and counseling regarding body image, inappropriate dieting, and weight stigmatization, when indicated. For patients with a high BMI, it also recommends behavioral counseling or, if needed, referral to more intensive treatment options such as weight loss surgery.

The National Association of Pediatric Nurse Practitioners recommends measuring BMI in children 2 years or older and assessing family eating patterns, physical activity, sedentary time, and daily screen time in all children. It further recommends that weight loss programs be multicomponent and accessible within clinical, school, or community settings.

**ARTICLE INFORMATION**

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REFERENCES