Screening and Interventions for Overweight in Children and Adolescents: Recommendation Statement

U.S. Preventive Services Task Force

Summary of Recommendation

The USPSTF concludes that the evidence is insufficient to recommend for or against routine screening for overweight in children and adolescents as a means to prevent adverse health outcomes. **I recommendation.**

Approximately 15% of children and adolescents aged 6 to 19 years are overweight and are at risk for diabetes, elevated blood lipids, increased blood pressure and their sequelae, as well as slipped capital femoral epiphysis, steatohepatitis, sleep apnea, and psychosocial problems. The USPSTF found fair evidence that body mass index (BMI) is a reasonable measure for identifying children and adolescents who are overweight or are at risk for becoming overweight. There is fair evidence that overweight adolescents and children aged 8 years and older are at increased risk for becoming obese adults. The USPSTF found insufficient evidence for the effectiveness of behavioral counseling or other preventive interventions with overweight children and adolescents that can be conducted in primary care settings or to which primary care clinicians can make referrals. There is insufficient evidence to ascertain the magnitude of the potential harms of screening or prevention and treatment interventions. The USPSTF was, therefore, unable to determine the balance between potential benefits and harms for the routine screening of children and adolescents for overweight.

Clinical Considerations

- It is important to measure and monitor growth over time in all children as an indicator of health and development. The number of children and adolescents who are overweight has more than doubled since the early 1970s, with the prevalence of overweight (BMI $\geq$ 95th percentile for age and sex) for children aged 6 to 19 years now at approximately 15%. The conclusion that there is insufficient evidence to recommend for or against screening for overweight in children and adolescents reflects the paucity of good-quality evidence on the effectiveness of interventions for this problem in the clinical setting. There is little evidence for effective, family-based or individual approaches for the

treatment of overweight in children and adolescents in primary care settings. The Centers for Disease Control and Prevention's (CDC's) *Guide to Community Preventive Services* has identified effective population-based interventions that have been shown to increase physical activity, which may help reduce childhood overweight.[4]

- BMI (calculated as weight in kilograms divided by height in meters squared) percentile for age and sex is the preferred measure for detecting overweight in children and adolescents because of its feasibility, reliability, and tracking with adult obesity measures.[5] BMI values are CDC population-based references for comparison of growth distribution to those of a larger population. Being at risk for overweight is defined as a BMI between the 85th and 94th percentile for age and sex, and overweight as a BMI at or above the 95th percentile for age and sex.[6,7] Disadvantages of using BMI include the inability to distinguish increased fat mass from increased fat-free mass, and reference populations derived largely from non-Hispanic whites, potentially limiting its applicability to non-white populations. Indirect measures of body fat, such as skinfold thickness, bio-electrical impedance analysis, and waist-hip circumference, have potential for clinical practice, treatment, research, and longitudinal tracking, although there are limitations in measurement validity, reliability, and comparability between measures.

- Childhood overweight is associated with a higher prevalence of intermediate metabolic consequences and risk factors for adverse health outcomes, such as insulin resistance, elevated blood lipids, increased blood pressure, and impaired glucose tolerance. Severe childhood overweight is associated with immediate morbidity from conditions such as slipped capital femoral epiphysis, steatohepatitis, and sleep apnea. Medical conditions new to this age group, such as type 2 diabetes mellitus, represent "adult" morbidities that are now seen more frequently among overweight adolescents. For most overweight children, however, medical complications do not become clinically apparent for decades.

Discussion

Overweight refers to increased body weight in relation to height when compared with an acceptable weight standard,[8] and can be related to health risks and problems in children and adolescents. National data that track BMI show an increasing proportion of overweight children and adolescents, as well as an increasing degree of overweight.[9] In 1999-2000, the prevalence of overweight (BMI ≥ 95th percentile for age and sex) for children aged 2 to 19 years ranged from 9.9% to 15.5%. Prevalence increases with age and is higher in racial-ethnic minorities than in non-Hispanic whites. For example, Mexican American children are significantly more overweight (23.7%) than non-Hispanic white children (11.8%) beginning at age 6.[10] Representative national data are unavailable to reliably estimate the prevalence of overweight in Asian children and adolescents.

Severe childhood overweight is associated with relatively rare immediate morbidity from conditions such as pseudotumor cerebri, slipped capital femoral epiphysis, steatohepatitis, cholelithiasis, and sleep apnea.[11,12] Perhaps the most significant morbidities for overweight children and adolescents are psychosocial.[13] Overweight is also associated with a higher prevalence of intermediate metabolic consequences, such as insulin resistance, elevated blood lipids, increased blood pressure, and impaired glucose tolerance. These conditions, which are often asymptomatic, increase the long-term risk for developing diabetes and heart disease in adulthood, and are associated with persistent obesity into adulthood. However, the recent emergence of medical conditions "new" to overweight children, such as type 2 diabetes mellitus, represents the increasing prevalence of more serious shorter-term morbidity.[12,14]

The USPSTF examined the evidence to determine the benefits and harms of screening and earlier treatment of overweight in children and adolescents in clinical settings for reducing both childhood and adult morbidity and mortality. The USPSTF found no direct evidence that screening for overweight, in children and adolescents, improves age-appropriate behavioral or physiological measures or health outcomes.

BMI is the most commonly used index of overweight and obesity in childhood and adolescence. Single BMI measures track reasonably well from childhood and adolescence (aged 6-18 years) into young adulthood (aged 20-37 years) as evidenced by longitudinal studies showing low to moderate ($r = 0.3$-0.4) or moderate to high ($r = 0.5$-0.9) correlations between childhood BMI and adult BMI measures. Increased tracking ($r \geq 0.5$) is seen in older children (after age 12-13 years, and particularly after sexual maturity); in younger children (aged 6-12 years) and older children who are more overweight (usually above the 95% or 98%); and in younger children with 1 or more obese parents. Sex differences in tracking are not consistent across ages or within age categories, and limited data are available to compare white and black children.[15-21]

There are several fair- to good-quality longitudinal studies that have examined the risks associated with childhood overweight and various adult health outcomes, including mortality, morbidity, socioeconomic status, and cardiovascular risk factors.[18,22-27] These data are useful in demonstrating health outcomes that may occur when childhood overweight persists into adulthood. However, few of these studies controlled for adult BMI, thereby limiting the independent predictive value of childhood weight measures. One good-quality, longitudinal study controlling for adult BMI eliminated the association of childhood BMI with adult cardiovascular risk factors.[28]

Insufficient evidence is available on the effectiveness of interventions for overweight children and adolescents that can be conducted in primary care settings or to which primary care clinicians can make referrals. Most research has investigated intensive group and individual family-based behavioral counseling interventions conducted by specialists in multidisciplinary obesity clinics involving small, selected groups of children aged 8 to12 years with variable completeness of follow-up. Twelve to 24 months after intensive treatment, these studies have shown 7% to 26% decreases in the mean percentage of overweight, which may be maintained or improved after 5 to 10

years in a subset of patients.[29,30] One fair-quality randomized controlled trial (RCT) compared a reduced-glycemic-load diet with a conventional-reduced-fat diet in adolescents in an intensive 6-month educational and behavioral weight-control program. At 12 months, mean BMI decreased in the reduced glycemic load diet group (-1.2 +/- 0.7 kg/m^2) and increased in the reduced-fat diet group (0.6 +/- 0.5 kg/m^2; $p < 0.02$).[31] A fair- to poor-quality RCT examined 3 physical activity interventions consisting of behavioral modification and general nutrition education components. Lifestyle education only was compared with lifestyle education plus moderate or high-intensity physical activity. No differences were seen between the groups in their percentage of body fat or visceral adipose tissue.[32] In a good-quality RCT with predominantly white adolescents, investigators compared an intervention group who received a single, computer-based, individually tailored counseling session followed by 9 to 12 follow-up phone calls with a control group that received a single, non-tailored counseling session in a primary care setting. At 7 months' follow-up, those in the intervention group reported no more physical activity (kcal/kg/day), no less sedentary behavior (minutes/day), and no decrease in kilocalories or percentage of calories from fat than the control group. Changes in mean BMI-z scores were not different between groups ($p < 0.09$).[33]

A fair-quality RCT compared weight loss differences of children aged 8 to12 years in an intervention group receiving a comprehensive, family-based behavior change program plus an increased physical activity and decreased sedentary behavior component, with a control group receiving a comprehensive, family-based behavior change program plus an increased physical activity component. At the12-month follow-up, BMI decreased significantly more in boys in the intervention group (-1.76 +/- 1.86 kg/m^2) than in boys in the control group or girls in either the intervention or control group ($p < 0.05$). Girls in the intervention group showed a slight BMI increase from baseline, while girls in the control group showed a modest decrease in BMI (-0.27 +/- 1.37 kg/m^2).[29]

A good-quality RCT compared BMI loss differences of adolescents in an intervention group treated with sibutramine to a control group treated with a placebo; both groups were in a comprehensive behavioral treatment program. Outcomes, limited to a 12-month follow-up, showed a significantly greater mean BMI loss (4.6 kg; 95% CI, 2.0-7.4) among the adolescents in the intervention group than among those in the control group. Open-label medication that continued for 6 months resulted in weight maintenance in the intervention group and in weight loss in the control group, such that both groups had similar reductions (6.4% to 8.6%) from initial BMI at 12 months. A large number of patients in the control group had their sibutramine dosage reduced or discontinued because of adverse events.[34] No acceptable quality evidence is available for children or adolescents to be able to evaluate the effectiveness of surgical approaches to reducing overweight.

There is insufficient evidence on the harms of screening. Potential harms include labeling, induced self-managed dieting with negative sequelae, poor self-concept, poor health habits, disordered eating, or negative impact from parental concerns. These theoretical harms are inferred from studies of limited design. There also is insufficient evidence on the harms of interventions. Among 4 recent behavioral intervention trials,

adverse effects were reported in 1 trial.[33] Among those who completed an intervention (37/44) in a good-quality RCT in a primary care setting, no problematic eating was detected in the adolescent participants after treatment. During the placebo-controlled phase of the sibutramine trial, 19 of 43 patients (44%) in the group receiving sibutramine had their dosage reduced or discontinued because of elevated blood pressure, pulse rate, or both. No other adverse events were reported.[34]

The direct health costs of childhood overweight can only be estimated, particularly since the major impact is likely to be felt in the next generation of adults.[11] One recent study estimated that hospital costs for overweight-related disorders in children and adolescents have more than tripled in the last 2 decades based on the doubling of children hospitalized for overweight-related asthma, diabetes, sleep apnea, and gall bladder disease and on lengthened hospital stays for overweight children.[35]

Future Research

There are several gaps in the research evidence on screening and interventions for overweight children and adolescents in the primary care setting. Research needed to improve the definition of overweight in children includes refinement of BMI measurement for use in children, longitudinal studies from childhood to adulthood that control for risk factors and sociodemographics, and continued investigation of growth trajectories and susceptible periods for the development of overweight and their role as predictors of adult overweight and obesity. Research is needed to provide well-defined and effective approaches to medical and psychological screening in children. Research is also needed on effective clinical approaches for the prevention and treatment of overweight in children that can be implemented by primary care clinicians, as well as on whether screening and intensive management of cardiovascular disease, diabetes, or other disease risk factors in overweight adolescents is beneficial. Research is needed to examine changes in morbidity among children and adolescents who lose weight and maintain their weight loss and those who regain weight in adulthood. Lastly, research is needed to help us understand whether preventing current or future excess costs associated with overweight is cost-effective, given different scenarios for treatment reimbursement and intervention effectiveness.[36]

Recommendations of Other Groups

The American Academy of Pediatrics and the Expert Committee from the Maternal and Child Health Bureau, Health Resources and Services Administration [37, 38] recommend using BMI to follow the weight status of children and adolescents. Both groups recommend identifying familial risk factors and possible health complications associated with childhood overweight (eg, hypertension, dyslipidemias, and insulin resistance). In 2004, the Institute of Medicine (IOM) developed a prevention-focused action plan, *Preventing Childhood Obesity: Health in the Balance*, which calls for

"immediate action" and provides recommendations that are "based on the best available evidence--as opposed to waiting for the best possible evidence." The IOM action plan also recommends that health professionals routinely track BMI in children and adolescents, in addition to other community-based recommendations.[39]

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This statement summarizes the U.S. Preventive Services Task Force (USPSTF) recommendations on screening and interventions for overweight in children and adolescents and the supporting scientific evidence, and updates the 1996 recommendations contained in the *Guide to Clinical Preventive Services,* second edition.[1] Explanations of the ratings and of the strength of overall evidence are given in Appendix A and Appendix B, respectively. The complete information on which this statement is based, including evidence tables and references, is included in the summary of evidence[2] and evidence synthesis[3] on this topic, available on the USPSTF Web site (www.preventiveservices.ahrq.gov). The recommendation is also posted on the Web site of the National Guideline Clearinghouse™ (www.guideline.gov).

Recommendations made by the USPSTF are independent of the U.S. Government. They should not be construed as an official position of AHRQ or the U.S. Department of Health and Human Services.

This recommendation statement was first published in *Pediatrics*. 2005;116(1):205-209.

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Appendix A

U.S. Preventive Services Task Force Recommendations and Ratings

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The Task Force grades its recommendations according to one of 5 classifications (A, B, C, D, I) reflecting the strength of evidence and magnitude of net benefit (benefits minus harms):

A. The USPSTF strongly recommends that clinicians provide [the service] to eligible patients. *The USPSTF found good evidence that [the service] improves important health outcomes and concludes that benefits substantially outweigh harms.*

B. The USPSTF recommends that clinicians provide [the service] to eligible patients. *The USPSTF found at least fair evidence that [the service] improves important health outcomes and concludes that benefits outweigh harms.*

C. The USPSTF makes no recommendation for or against routine provision of [the service]. *The USPSTF found at least fair evidence that [the service] can improve health outcomes but concludes that the balance of benefits and harms is too close to justify a general recommendation.*

D. The USPSTF recommends against routinely providing [the service] to asymptomatic patients. *The USPSTF found at least fair evidence that [the service] is ineffective or that harms outweigh benefits.*

I. The USPSTF concludes that the evidence is insufficient to recommend for or against routinely providing [the service]. *Evidence that [the service] is effective is lacking, of poor quality, or conflicting, and the balance of benefits and harms cannot be determined.*

Appendix B

U.S. Preventive Services Task Force Strength of Overall Evidence

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The USPSTF grades the quality of the overall evidence for a service on a 3-point scale (good, fair, poor):

Good: Evidence includes consistent results from well-designed, well-conducted studies in representative populations that directly assess effects on health outcomes.

Fair: Evidence is sufficient to determine effects on health outcomes, but the strength of the evidence is limited by the number, quality, or consistency of the individual studies, generalizability to routine practice, or indirect nature of the evidence on health outcomes.

Poor: Evidence is insufficient to assess the effects on health outcomes because of limited number or power of studies, important flaws in their design or conduct, gaps in the chain of evidence, or lack of information on important health outcomes.

AHRQ Publication No. 05-0574-A
July 2005