General

Guideline Title

Prevention and management of obesity for children and adolescents.

Bibliographic Source(s)

Fitch A, Fox C, Bauerly K, Gross A, Heim C, Judge-Dietz J, Kaufman T, Krych E, Kumar S, Landin D, Larson J, Leslie D, Martens N, Monaghan-Beery N, Newell T, O'Connor P, Spaniol A, Thomas A, Webb B. Prevention and management of obesity for children and adolescents. Bloomington (MN): Institute for Clinical Systems Improvement (ICSI); 2013 Jul. 94 p. [110 references]

Guideline Status

This is the current release of the guideline.

Regulatory Alert

FDA Warning/Regulatory Alert

Note from the National Guideline Clearinghouse: This guideline references a drug(s) for which important revised regulatory and/or warning information has been released.

- April 8, 2016 – Metformin-containing Drugs : The U.S. Food and Drug Administration (FDA) is requiring labeling changes regarding the recommendations for metformin-containing medicines for diabetes to expand metformin's use in certain patients with reduced kidney function. The current labeling strongly recommends against use of metformin in some patients whose kidneys do not work normally. FDA concluded, from the review of studies published in the medical literature, that metformin can be used safely in patients with mild impairment in kidney function and in some patients with moderate impairment in kidney function.

Recommendations

Major Recommendations

Note from the National Guideline Clearinghouse (NGC) and the Institute for Clinical Systems Improvement (ICSI): The recommendations for prevention and management of obesity for children and adolescents are presented in the form of a table with a list of evidence-based recommendations and an algorithm with 12 components, accompanied by detailed annotations. An algorithm is provided in the original guideline document for Prevention and Management of Obesity for Children and Adolescents; clinical highlights and selected annotations (numbered to correspond with the algorithms) follow.

Quality of evidence (Low Quality, Moderate Quality, and High Quality) and strength of recommendation (Weak or Strong) definitions are repeated at the end of the "Major Recommendations" field.

Clinical Highlights

- Childhood obesity has risen at an alarming pace over the past decade, making obesity the most prevalent health problem in the majority of the developed countries. (*Introduction*)
- Obesity prevention messages should be targeted at all families, starting at the time of the child's birth. (*Annotation #1; Aim #2*)
- Body mass index (BMI) should be calculated and documented in the medical record on all children ages 2 to 18 at least annually, ideally at a well child visit. (*Annotation #2; Aim #1*)
- Clinicians should conduct a focused review of systems and physical examination assessing for obesity-related comorbid conditions. (*Annotation #3*)
- Management intervention strategies are available and include nutrition, physical activity, behavior and lifestyle changes, medication and surgical considerations. (*Annotations # 5, 6, 7, 8, 9, 10, 11; Aim #2*)
- Clinicians should use motivational interviewing techniques as a tool for encouraging behavior change. (*Annotations #4, 5, 6, 7, 8, 9, 10; Aim #2*)
- Pediatric patients and their families should be counseled on nutritional interventions including limiting sugar-sweetened beverages, eating nutrient-dense breakfasts, limiting eating out at fast food restaurants, and families eating together, among other nutritional strategies. (*Annotations #1, 6; Aim #2*)
- Clinicians should identify barriers the child, youth or parent might have against increasing physical activity such as time constraints, fear of injury, financial constraints and safety. (*Annotation #7; Aim #2*)
- Lifestyle interventions should be provided for overweight and obese youth, and their primary adult caregiver (PAC). (*Annotation #8; Aim #2*)
- Weight management requires a team approach. Be aware of clinical and community resources. The patient needs to have an ongoing therapeutic relationship and follow-up with a health care team. Weight management is a life-long commitment and the health care team can assist with the setting of specific goals with the patient. (*Annotation #5*)

Prevention and Management of Obesity for Children and Adolescents Algorithm Annotations

1. Prevention
   Recommendations:

   - Obesity prevention messages should be targeted at all families, starting at the time of the child's birth (*Strong Recommendation, High Quality Evidence*) (Barlow & Expert Committee, 2007).
   - An assessment of diet, physical activity and sedentary behaviors should be done annually, preferably at a well child visit. This assessment should be used to target appropriate messages to each family (*Strong Recommendation, High Quality Evidence*) (Barlow & Expert Committee, 2007).
   - Clinicians may suggest that children get at least 60 minutes of moderate exercise daily (*Strong Recommendation, High Quality Evidence*) (Barlow & Expert Committee, 2007).
   - Clinicians should counsel children and families to:
     - Limit their child's consumption of sugar-sweetened beverages
     - Eat a diet with the recommended quantities of fruits and vegetables
     - Eat breakfast daily
     - Eat meals together as much as possible
     - Limit eating out, especially eating at fast food restaurants
     - Adjust portion sizes appropriately for age
     - Avoid television for children under the age of two
     - Limit television and "screen time" to less than two hours per day

     (*Strong Recommendation, High Quality Evidence*) (Barlow & Expert Committee, 2007)

   The following counseling messages should be directed to all parents, regardless of the weight status of their child.

   Healthy Diet

   Breastfeeding: Studies suggest that exclusive breastfeeding to six months of age is associated with decreased rates of obesity later in childhood *[High Quality Evidence]*. See ICSI guideline Preventive services for children and adolescents for further information.

Milk: The American Academy of Pediatrics recommends that children be started on cow's milk at 1 year of age. Whole milk is recommended for most children ages 12 months to two years. However, if the child is at risk for overweight or if there is a family history of obesity or cardiovascular disease, 2% milk is recommended. For children ages two years and up, a low-fat (skim or 1%) milk should be used.

Sugar-sweetened beverages: Families should limit their child's consumption of sugar-sweetened beverages *[High Quality Evidence]*. Current evidence indicates a strong association between sugar-sweetened beverage consumption and total daily energy intake. Decreasing consumption of sugar-sweetened beverages is one strategy to decrease total daily energy intake *[Reference]*.

Refer to the original guideline document for information regarding fruit juice and fruits and vegetables.

Meal Structure

- Children should eat breakfast daily *[High Quality Evidence]*. Evidence shows that skipping breakfast decreases the nutritional quality of the diets of both children and adults *[Reference]*. Families should eat meals together at the table as much as possible. Family meals are associated with a higher quality diet *[High Quality Evidence]*.
- Snacking should be neither encouraged nor discouraged. The current data on meal frequency and snacking are inconclusive *[Reference]*. It is the opinion of the work group that if this issue is addressed with families, the focus should be on the quality of meals and snacks, not on the quantity.

Eating out: Eating out at restaurants, especially fast food restaurants, should be limited. Restaurants, especially fast food restaurants, serve energy-dense food that can contribute significantly to a child's daily energy intake *[High Quality Evidence]*. The frequency of eating out is associated with body fatness in children and adults *[Reference]*.

Refer to the original guideline document for information about portion sizes, child self-regulation, physical exercise, sleep, television, and the importance of the community in promoting a healthy lifestyle.

For a detailed review of age appropriate "well care," including screening, assessment and anticipatory guidance, the work group recommends http://www.brightfutures.org.

2. Screening and Diagnosis
Recommendations:

- BMI should be calculated and documented in the medical record on all children ages 2 to 18 at least annually, ideally at a well child visit (*Strong Recommendation, High Quality Evidence*) (Barlow & Expert Committee, 2007).
- The Centers for Disease Control and Prevention (CDC) growth charts should be used for children ages 2 to 18; World Health Organization (WHO) growth curves should be used from birth through 23 months of age (*Strong Recommendation, High Quality Evidence*) (Barlow & Expert Committee, 2007).
- Appropriate terminology should be used to classify pediatric overweight and obesity. (*Strong Recommendation, High Quality Evidence*) (Barlow & Expert Committee, 2007).

Definitions

Body mass index (BMI) is a useful tool to assess body fat. It is defined as weight (in kilograms) divided by the square of height (in meters). BMI levels correlate with body fat and with concurrent health risks *[High Quality Evidence]*.

In children, an absolute scale for BMI is not used. Instead, a percentile scale is used, based on the child's age and sex.

Waist circumference measurements are a measure visceral adiposity. In children, they are not currently recommended for clinical use. Reference values that identify risk beyond that already identified by BMI are not available for children *[High Quality Evidence]*, *[Reference]*.

Terminology

It is recommended that appropriate terminology be used when evaluating children's BMI.

The appropriate terminology for children ages 2 to 18 is as follows:

- "Underweight" for children with a BMI at less than the 5th percentile
- "Healthy weight" for children with a BMI from the 5th to the 84th percentile
- "Overweight" for children with a BMI from the 85th to the 94th percentile
- "Obesity" for children with a BMI greater than or equal to the 95th percentile

Other Medical Screening

Recommendations:

- All children should have blood pressure checked annually starting at age 3 (*Strong Recommendation, High Quality Evidence*) (Barlow & Expert Committee, 2007).
- All children ages 9 to 11 should be universally screened for dyslipidemia, using either a non-fasting non-high density lipoprotein (HDL) cholesterol or a fasting lipid profile. At other ages, a fasting lipid profile should be done if indicated by family history and/or risk factors (*Strong Recommendation, High Quality Evidence*) (Barlow & Expert Committee, 2007).
- Health risks that increase the likelihood of obesity and/or related comorbidities should be assessed for at least annually (*Strong Recommendation, High Quality Evidence*) (Barlow & Expert Committee, 2007).

Refer to the original guideline document for additional information on blood pressure, cholesterol, and health risk assessment.

3. Assess for Major and Minor Comorbid Conditions
   Recommendations:

- Clinicians should obtain a focused family history of obesity, type 2 diabetes mellitus (DM) and cardiovascular disease (CVD) in first- and second-degree relatives to assess the risks of current or future comorbidities associated with the patient's weight status (*Strong Recommendation, High Quality Evidence*) (Barlow & Expert Committee, 2007).
- Clinicians should conduct a focused review of systems and physical examination to identify potential weight-related comorbid conditions (*Strong Recommendation, High Quality Evidence*) (Barlow & Expert Committee, 2007).
- Clinicians should obtain laboratory and radiographic evaluations depending on age, BMI, physical and historical findings. Clinicians should also consider the likely impact on treatment strategies of the results obtained. If results are unlikely to alter treatment, then the value of the testing may be limited (*Strong Recommendation, Moderate Quality Evidence*) (Barlow & Expert Committee, 2007).

Refer to the original guideline for information about major and minor comorbid conditions associated with obesity and review of systems for weight-related problems.

Physical Examination in Primary Care Settings

System or Condition Assessed	Assessment
Anthropometric features	Calculation of body mass index (BMI) (weight in kilograms and height in centimeters)
Vital signs	Pulse and blood pressure (use correct cuff size; often must be checked manually because of "white coat hypertension")
General	Body fat distribution and affect
Skin	Acanthosis nigricans, keratosis pilaris, skin tags, intertrigo, excessive acne, hirsutism, or violaceous striae of Cushing syndrome
Eyes	Papilledema
Throat	Tonsillar size and abnormal breathing
Neck	Goiter
Chest	Auscultation for rhythm and sounds (heart) and rhonchi, rales, and wheezes (lungs)
Abdomen	Palpation for liver size, right upper quadrant tenderness, and epigastric tenderness
Secondary sexual characteristics	Premature/abnormal appearance of pubic hair, breast development, testicular enlargement, acne or comedones, axillary odor, appearance of microphallus because penis is buried in fat, or gynecomastia
Extremities	Abnormal gait, hip or knee tenderness, limited range of motion in hip (slipped capital femoral epiphyses), Blount disease, joint and foot pain, small hands and feet, polydactyly, lower back pain or limited motion, deep tendon reflexes, or edema
Prader-Willi syndrome	Short stature, acromicria, characteristic facies, hypotonia, and development delay
POMC mutation	Red hair, pale skin, low blood pressure or rapid pulse, and corticotropin deficiency/adrenal insufficiency
Albright hereditary	Developmental delay, short stature, and short fourth and fifth metacarpals

System or Condition Assessed	Assessment
osteodystrophy	
Laurence-Moon or Bardet-Biedl syndrome	Short stature, developmental delay, retinitis pigmentosa , and polydactyly
MC4R mutation	Tall stature and rapid growth, early onset obesity
Down syndrome	Typical phenotypic features
Fragile X syndrome	Macroorchia and developmental delay

[Reference]

Laboratory Workup

BMI	Tests – Ages 2 to 8	Tests – Ages 9 to 18
>85th-94th percentile with NO risk factors	No lab testing	Fasting lipid level#
>85th-94th percentile with risk factors (e.g., family history of obesity-related diseases, elevated blood pressure, elevated lipid levels or tobacco use)	Fasting lipid panel if family history or dyslipidemia or other high-risk condition	Fasting lipid panel Fasting glucose* AST*, ALT*
≥95th percentile	Fasting lipid panel	Fasting lipid panel Fasting glucose* AST*, ALT*

ALT, alanine transaminase; AST, aspartate transaminase; BMI, body mass index

*Per Krebs, to be performed every two years starting at age 10 years.

#Per American Academy of Pediatrics (AAP), a non-fasting non-HDL cholesterol may be used for screening in this age group, to be followed-up with a fasting lipid panel if the screen is abnormal.

[Reference]

See Appendix D in the original guideline document for acceptable, borderline-high, and high plasma lipid, lipoprotein and apolipoprotein concentrations (mg/dL) for children and adolescents.

Evidence-Based Recommendations for Dietary Management of Elevated Low-density Lipoprotein Cholesterol (LDL-C), non-HDL-C and Triglycerides (TG)

Grades reflect the findings of the evidence review.

Recommendation levels reflect the consensus opinion of the National Heart, Lung and Blood Institute (NHLBI) Expert Panel.

Supportive actions represent expert consensus suggestions from the Expert Panel provided to support implementation of the recommendations; they are not graded.

NOTE: Values given are in mg/dL. To convert to SI units, divide the results for total cholesterol (TC), low-density lipoprotein cholesterol (LDL-C), high-density lipoprotein cholesterol (HDL–C), and non-HDL-C by 38.6; for triglycerides (TG), divide by 88.6.

Elevated LDL-C: Child 2 – LDL		
2-21 years	Refer to a registered dietician for family medical nutrition therapy: • 25%-30% of calories from fat, ≤7% from saturated fat, ~10% from monounsaturated fat; <200 mg/d of cholesterol; avoid trans fats as much as possible.	Grade B strongly recommended
	Supportive actions: • Plant sterol esters and/or plant stanol esters* up to 2 g/d as replacement for usual fat sources can be used after age 2 years in children with familial hypercholesterolemia. • Plant stanol esters as part of a regular diet are marketed directly to the public. Short-term studies show no harmful effects in healthy children. • The water-soluble fiber psyllium can be added to a low-fat, low saturated fat diet as cereal enriched with psyllium at a dose of 6 g/d for children 2-12 years, and 12 g/d for those ≥12 years.	Grade A recommended

	*Can be found added to some foods, such as some margarines	
Elevated TG or Non-HDL-C: Child 2 – TG		
2-21 years	Refer to a registered dietitian for family medical nutrition therapy:	Grade B strongly recommended
	• 25-30% of calories from fat, ≤7% from saturated fat, ~10% from monounsaturated fat; <200 mg/d of cholesterol; avoid trans fats as much as possible	Grade A recommended

	• Decrease sugar intake:
	  • Replace simple with complex carbohydrates
	  • No sugar sweetened beverages
		Grade B recommended

	• Increase dietary fish to increase omega-3 fatty acids	Grade D recommended

[Reference]

Refer to the original guideline document for information on blood pressure (BP) measurement, categorization, and management; type 2 diabetes mellitus; nonalcoholic fatty liver disease; and eating disorder.

4. Readiness to Change – Is Patient Ready to Lose Weight?
   Recommendation:

   - Clinicians should use motivational interviewing techniques as a tool for encouraging behavior change (*Strong Recommendation, Moderate Quality Evidence*) (Rollnick, Mason, & Butler, 2000).

   Introduction to Weight Management/Lifestyle Change

   Weight management is a skill. Patients need to set realistic, achievable goals and to be held accountable to practicing the new behaviors that produce and maintain weight loss. Record keeping or self-monitoring (either by the patient or their family) of progress on specific behaviors is key to successful weight management.

   The ICSI Patient Advisory Council reviewed the latest revision of the Prevention and Management of Obesity for Adults guideline and supports the value of the physician initiating the conversation and suggested that patients were more likely to act on the recommendations of his/her clinician. Because obesity can be an overwhelming condition for the patient and family, creating small achievable goals and celebrating those achievements are important for continued success and healthy choices. The Working Group recommends that clinicians guide goals using the acronym "SMART" (specific, measurable, action based, realistic, and time-based).

   Refer to the original guideline document for information about stages of change model, overview of motivational interviewing, and 5210 toolkit for Healthy Habit Action Plans.

5. Intervention Management Strategy
   BMI is the initial screen for all children coming in for a well child visit. BMI should be calculated and plotted on a growth chart. Once calculated:

   - Review BMI with parent and child.
   - Depending on the percentile, an assessment should be done on all patients.

   There are three assessments to be reviewed – medical risk, behavior risk and attitudes for change:

   - Medical risk may include parental obesity or other family members/relatives with obesity.
   - Behavior risk may include inquiry about their physical activity and eating behavior (e.g., family meals) and sedentary times (e.g., screen time).
   - Attitudes for change include assessing both parents' and child's concern for weight and targeting those behaviors that the parent or child may be interested in changing.

   Once the BMI is calculated and assessment is reviewed with parent and child, it is important to acknowledge and praise good behaviors if the child is in a healthy weight category.

   If the child is overweight, the clinician should identify and target specific behaviors to prevent obesity. If there is a health risk such as family history of obesity, then prevention and intervention for treatment should be initiated. If the child's BMI indicates obesity, it is important to target family and child's concerns and motivation for change, and proceed to intervention and treatment stages.

Stages of Obesity Treatment

Stage 1 – Prevention Plus	Primary Care Office Focus on promoting healthy lifestyle eating (i.e., 5210) 5 = Five fruits and vegetables per day 2 = Limit screen time to two hours or fewer per day 1 = One hour of moderate physical activity per day 0 = No sugary drinks Outcome: Decreased BMI for child Evaluation: Child and family to be seen each month. If after three months with no improvement, advance to stage two.
Stage 2 – Structured Weight Management	Primary Care Office with Support Focus on targeted behaviors • Eating plans outlined and presented to the child and family by dietician • Structured daily meals • Healthy snacks • Screen time limited to one hour per day or less • Physical activity of one hour per day should be supervised and planned Outcome: No more than one pound of weight loss per month for child 2 to 11 years of age. No more than two pounds of weight loss per week for adolescent. Evaluation: Child and family need monthly assessment. If there is no change in weight or BMI after three to six months then advance to stage three.
Stage 3 – Comprehensive Multidisciplinary Intervention	Pediatric Weight Management Center At this stage there is a requirement for the following: • Increase in intensity of behavior changes • Frequency of visits • Specialist involvement to maximize behavior change *Generally this type of program would exceed the capacity of a primary care provider office. Focus: A structured behavior modification program including: • Food monitoring • Short-term diet plan • Physical activity goal setting • Parental involvement, especially for child 12 years of age and younger • Multidisciplinary team with a provider experienced in childhood obesity, a behavior counselor, registered dietician, and exercise specialist Outcome: Weight loss or change in BMI Evaluation: Frequent office visits should be scheduled for a minimum of 8 to 12 weeks.
Stage 4 – Tertiary Care Intervention (select patients)	Tertiary Care Center Interventions move beyond goal of balanced eating and physical activity. Lack of success with the comprehensive multidisciplinary intervention is not by itself an indication to move to this treatment level. Often times the child receiving this care would receive hospitalized care and often has significant comorbidities. Focus: Continued diet and physical activity counseling as with the other stages. In this stage a child may be offered a very low calorie diet and medications may be offered. In some cases of severe obesity where there is no response to behavioral interventions, there are specialty centers of excellence that may offer bariatric surgery.

[High Quality Evidence]

Community-Based Interventions

Clinic-based weight management centers may not have the availability or capacity to meet the existing demand to treat all obese patients

who require stage three treatment. Further, there are other barriers to families utilizing specialized weight management centers, including the variability of insurance coverage for weight management services *[High Quality Evidence]*, *[Reference]*, physical barriers (scheduling, parking, location), organizational barriers (clinical environment) and participant satisfaction with the type of educational content *[Reference]*.

Health care clinicians should be encouraged to utilize alternative pediatric weight management resources when appropriate (such as community-based interventions), as long as those resources employ key evidence-based elements of successful obesity interventions. These core evidence-based elements are cited in these ICSI guidelines and include combining dietary, physical activity, and behavioral components, a focus on key, evidence-based behavioral changes *[High Quality Evidence]*, family-targeted interventions *[Reference]*, and interventions that achieve a certain threshold of intensity *[Reference]*. Community-based childhood obesity interventions founded on the above principles and other existing evidence represent a promising option for many families and afford unique benefits such as removing transportation as a barrier and scalability.

6. Nutrition Intervention
   Recommendations:

   - Advise pediatric patients and their families to limit their consumption of sugar-sweetened beverages (*Strong Recommendation, High Quality Evidence*) (Barlow & Expert Committee, 2007; Malik, Schulze, & Hu, 2006).
   - Advise pediatric patients and their families to eat a nutrient-dense breakfast daily (*Strong Recommendation, Moderate Quality Evidence*) (Barlow & Expert Committee, 2007; Rampersaud et al., 2005).
   - It is recommended that clinicians counsel pediatric patients and their families to limit eating out at restaurants, particularly fast food restaurants (*Strong Recommendation, Moderate Quality Evidence*) (Rosenheck, 2008; Barlow & Expert Committee, 2007).
   - Advise pediatric patients and their families to eat family meals in which caregivers and children eat together (*Strong Recommendation, Moderate Quality Evidence*) (Barlow & Expert Committee, 2007).
   - It is recommended clinicians educate their pediatric patients and their families to consume an eating pattern low in energy density (*Strong Recommendation, Moderate Quality Evidence*) (Pérez-Escamilla et al., 2012; Barlow & Expert Committee, 2007).
   - Advise pediatric patients and their families to model dietary intake per current U.S. Department of Agriculture (USDA) recommendations (*Strong Recommendation, Moderate Quality Evidence*) (Barlow & Expert Committee, 2007).
   - It is recommended clinicians direct pediatric patients and their families to limit portion sizes (per USDA current recommendations, which may be different than serving sizes on the package label, and products may contain >1 serving) (*Strong Recommendation, High Quality Evidence*) (Barlow & Expert Committee, 2007).
   - Clinicians should continue to promote milk and milk products to pediatric patients and their families for nutritional benefits including calcium, vitamin D and other micronutrients for bone health and potassium for healthy blood pressure with the understanding that current evidence points to consumption of these products as playing no unique role in weight management (*Strong Recommendation, Moderate Quality Evidence*) (Lanou & Barnard, 2008; Barlow & Expert Committee, 2007).
   - Clinicians should continue to promote a high-fiber diet to pediatric patients and their families in order to increase nutrient density, and promote healthy lipid profiles, normal gastrointestinal function and glucose tolerance with the understanding there is insufficient evidence that dietary fiber is protective against obesity at this time (*Strong Recommendation, Low Quality Evidence*) (Barlow & Expert Committee, 2007).

   Dietary interventions should be tailored to each individual child. Fat-free milk is commonly recommended after age 2 years for the benefit of essential nutrients and avoidance of excess saturated fat and calories. The clinician may consider recommending fat-free milk earlier than age 2 years, taking into consideration the child's overall health (i.e., child's growth, risk for obesity, overall nutritional intake, appetite), as long as the child's diet supplies 30% of calories from fat.

   Children who increase their healthy eating showed greater reduction in BMI compared to children who decreased their consumption of high energy-dense food *[Reference]*. Thus, it may be useful for clinicians to teach children and families to focus on adding healthy foods versus telling them to decrease or completely eliminate foods low in nutritional value. The USDA has an online program called Supertracker that can assist children and families increase their health eating habits per USDA guidelines (see https://www.supertracker.usda.gov/default.aspx).

   Refer to the original guideline document for more information on dietary interventions.

7. Physical Activity
   Recommendations:

   - Clinicians should encourage children and adolescents to engage in moderately intense physical activity for at least 60 minutes per day

(*Strong Recommendation, High Quality Evidence*) (Barlow & Expert Committee, 2007).

- Clinicians should identify barriers the child, youth or parent might have against increasing physical activity, such as time constraints, fear of injury, financial constraints and safety (*Strong Recommendation, Moderate Quality Evidence*) (Strong et al., 2005).
- Clinicians should recommend that parents become good role models (*Strong Recommendation, Moderate Quality Evidence*) (Strong et al., 2005).

The work group recognizes the limitations of influence on children's activities outside of the clinical setting and encourages clinicians to advocate for the following:

- Safe recreational venues and opportunities within communities and schools that are open after school hours and areas available to all children at a reasonable cost.
- School curricula that promote health benefits of regular, physical activity as well as the preservation of recess and free play time.

Children who suffer from severe obesity/deconditioning should be advised to begin an exercise program slowly and increase expenditure 10% per week so as to prevent injury. Those individuals with a history of prior injury or predisposing conditions such as generalized laxity, torsional abnormalities or flat feet, may benefit from an evaluation by a sports medicine physician, physical therapist, certified athletic trainer or other knowledgeable clinician.

Infants and Toddlers

There is insufficient evidence to recommend exercise programs or classes for infants and toddlers as a means of promoting increased physical activity or preventing obesity in later years. The AAP recommends that children younger than 2 years not watch any television. Supervised, unstructured free play and activities such as neighborhood walks and other outdoor activities are encouraged.

Preschool Aged Children 4 to 6

Very young children (toddlers to 5 years of age) should have up to 120 minutes of moderate-to-vigorous physical activity (MVPA) per day, with 60 minutes of it as structured activity and 60 minutes as unstructured or free play.

AAP recommends supervised free play with emphasis on fun, playfulness, exploration and experimentation. Appropriate activities include running, swimming, tumbling, throwing and catching. Preschoolers can begin to walk tolerable distances and reduce sedentary transportation by car and stroller. Limit screen time to fewer than two hours per day.

Elementary School-age Children 6 to 9

Older children should perform 60 minutes or more of physical activity each day, and MVPA that is aerobic in nature should make up most of the 60 or more minutes of physical activity. Muscle and bone strengthening activities such as gymnastics, calisthenics (e.g., push-ups, jumping jacks), jumping rope and running should be included at least three days per week as part of the 60 minutes.

Continued free play with more sophisticated movement patterns and fundamental skill acquisition should be encouraged. Organized sports may be initiated but should have flexible rules and short instruction time, with emphasis on enjoyment rather than competition. Co-ed participation is not contraindicated.

Middle School-aged Children 10 to 12

Older children should perform 60 minutes or more of physical activity each day, and MVPA that is aerobic in nature should make up most of the 60 or more minutes of physical activity.

Muscle and bone strengthening activities such as gymnastics, calisthenics (e.g., push-ups, jumping jacks), jumping rope and running should be included at least three days per week as part of the 60 minutes.

Focus on enjoyment with family members and friends. Sports employing more complex coordination and strategy such as football, basketball and hockey are more feasible. Weight training may be initiated if supervised, using small free weights with high repetitions.

Adolescents

Older children should perform 60 minutes or more of physical activity each day, and MVPA that is aerobic in nature should make up most of the 60 or more minutes of physical activity.

Activities that are of interest, fun and include friends are more likely to engage the adolescent. In addition to competitive sports, encourage personal fitness activities such as dance, yoga, running and weight training to include heavier weights once the individual reaches physical maturity. Household chores may also count for physical activity.

The origins of childhood and adolescent obesity are multifactorial and complex. No less so are the possible solutions including the role of physical activity. Numerous studies demonstrate a positive effect of physical activity on general fitness, academic achievement and general well-being. Children exposed to enjoyable physical activity in life tend to be more active as adults. However, while physical activity contributes to a positive energy balance, it alone does not provide a solution to the childhood obesity problem. The answer will likely incorporate increased physical activity with a program employing behavior modification/counseling for the child and family.

8. Behavior Management
   Recommendations:

   - Lifestyle interventions should be provided for overweight and obese youth (*Strong Recommendation, High Quality Evidence*) (Whitlock et al., 2010; Oude Luttikhuis et al., 2009; Spear et al., 2007).
   - Clinicians should help establish target behaviors (*Strong Recommendation, High Quality Evidence*) (Faith et al., 2012).
   - Clinicians should encourage self-monitoring (*Strong Recommendation, Moderate Quality Evidence*) (Faith et al., 2012).
   - Clinicians should work with the child and/or PAC to set goals (*Strong Recommendation, Moderate Quality Evidence*) (Faith et al., 2012).
   - Clinicians should teach children and PACs about stimulus control (*Strong Recommendation, Moderate Quality Evidence*) (Faith et al., 2012).
   - Clinicians should promote self-management and self-efficacy skills for children and PACs (*Strong Recommendation, Moderate Quality Evidence*) (Faith et al., 2012; Barlow & Expert Committee, 2007).
   - PACs should participate in the treatment process (*Strong Recommendation, High Quality Evidence*) ("Obesity in children and adolescents," 2012; Faith et al., 2012; Knowlden & Sharma, 2012; Collins et al., 2011; Barlow & Expert Committee, 2007).
   - PACs should be taught about positive parenting practices and contingency management strategies (*Strong Recommendation, Moderate Quality Evidence*) (Barlow & Expert Committee, 2007; Spear et al., 2007).
   - PACs should model healthy living (*Strong Recommendation, Moderate Quality Evidence*) (Faith et al., 2012; Spear et al., 2007).
   - Youth can be taught cognitive restructuring (*Weak Recommendation, Low Quality Evidence*) (Spear et al., 2007).
   - Youth and PACs can be taught problem-solving skills (*Weak Recommendation, Low Quality Evidence*) (Whitlock et al., 2010; Spear et al., 2007).

   Lifestyle interventions should be provided for overweight and obese youth. Lifestyle interventions (including behavior therapy, diet and physical activity) have been shown to be effective with youth and have minimal to no adverse side effects (e.g., possible injuries related to exercise) *[High Quality Evidence]*.

   Clinicians should help establish target behaviors *[Moderate Quality Evidence]*. Children and families benefit from determining specific target behaviors on which to focus, rather than global aspirations. Target behaviors may be developed with the child or PAC or in collaboration.

   Clinicians should encourage self-monitoring *[Moderate Quality Evidence]*. Self-monitoring for children might include the child, PAC or both recording behavior. The information recoded may vary but will likely include information regarding food and beverage consumption and/or physical activity.

   Clinicians should work with the child and/or PAC to set goals *[Moderate Quality Evidence]*. Clinicians should work with youth and families to set realistic, achievable goals. Rather than discussing global aspirations (e.g., lose 20 pounds), the goals should state the specific behaviors that will be targeted, by whom, and when the changes should occur (e.g., the youth will replace one soda with water at least five days this week [parents will have bottled water available at home]). It is important to consider the developmental stage of the youth when setting goals and determining how much PAC support is required.

   One model of goal setting is SMART goals. SMART stands for specific, measurable, assignable, realistic and time-based. By setting a SMART goal, the goal will be detailed (specific) and able to be evaluated (measurable). It will be provided to those involved in the behavior change (assignable) and it will be attainable (realistic). It is important to consider the developmental stage of the child when determining if the goal is attainable. There will also be a timeline in which the goal is completed (time-based). Another option for a goal-setting framework is provided with the "My Action Plan" handout; see Appendix F, "Pediatric Weight Management Program – My Action Plan," in the original guideline document.

   Clinicians should teach children and PACs about stimulus control *[Moderate Quality Evidence]*. Stimulus control occurs when particular stimuli cue specific behaviors. To use this principle to promote a healthy lifestyle, individuals are often encouraged to eat only at the table; limit the amount of unhealthy food in the home; remove televisions from bedrooms, kitchens and other eating areas; and use smaller dishes. The environment can also be altered to increase the availability of healthy food options and access to activities that involve movement *[Moderate Quality Evidence]*. For children, PACs will likely need to be involved in making these environmental modifications.

PACs should participate in the treatment process *[High Quality Evidence]*. Many intervention approaches use some combination of family and individual therapy. Regardless of the level of involvement, PACs should be part of the process and educated about the intervention strategies. Specific age-based recommendations from the National Heart, Lung, and Blood Institute (NHLBI *[High Quality Evidence]*) include the following *[High Quality Evidence]*:

- 0-2: no recommendations
- 2-5: education of parents
- 6-11: family-centered behavior change program
- 12-21: family-centered behavior change program with adolescent as change agent

Refer to the original guideline document for additional information on behavior management.

9. Weight Loss Medications
   The Work Group suggests weighing the relative risk of adverse events due to medications in children against the long-term potential for obesity-related morbidity and mortality. The long-term effects of these medications on growth and development have not been studied.

   Medications may be considered in obese children with comorbidities or those with severe obesity (BMI >99th percentile) in addition to a lifestyle modification program that includes diet, exercise and behavior modification. The Work Group emphasizes that pharmacotherapy should be offered only by clinicians who are experienced in the use of anti-obesity agents and are aware of the potential for adverse reactions.

   Presently, orlistat is the only medication approved by the U.S. Food and Drug Administration (FDA) for treatment of childhood obesity *[Reference]*. This drug is approved for children ≥12 years of age. No weight-loss medications are approved for use in children <12 years old.

   Side effects of orlistat include abdominal cramping, flatus, oily bowel movements, and oily spotting on underwear caused by unabsorbed fat in the feces. Patients taking orlistat must take a daily multivitamin supplement as it can interfere with the absorption of fat-soluble vitamins. Orlistat has undergone two label changes because of reports of liver injury, cholelithiasis and pancreatitis; however, a cause-and-effect relationship of severe liver injury with orlistat use has not been established. Orlistat has been available for over-the-counter use since 2006.

   Metformin may be useful in combating the weight gain observed in children taking atypical antipsychotic medications and other psychotropic medications (e.g., clozapine, olanzapine, risperidone, quetiapine, aripiprazole and valproate) *[High Quality Evidence]*, *[Reference]*. The main adverse effects of metformin are diarrhea, nausea, vomiting and flatulence, which are usually transient and mild to moderate.

   Octreotide may be of potential benefit in children with hypothalamic obesity who demonstrate insulin hyper secretion *[Reference]*. However, it should be used in tertiary care centers with adequate expertise in care of severely obese children.

   Leptin therapy in patients with mutations of the leptin gene results in extraordinary loss of weight and fat mass along with reduction in hyperphagia, resolution of obesity and induction of puberty. This condition is, however, very rare and is unlikely to be encountered by majority of care clinicians.

   Use of phentermine, a stimulant medication and an appetite suppressant, has been FDA approved for adolescents older than 16 years and for adults only for short-term (usually interpreted as "up to 12 weeks") use, while following non-pharmacological approaches to weight loss such as healthy eating and exercise.

10. Bariatric Surgery
    There is limited information on the long-term efficacy and safety of bariatric surgery in children and adolescents. Consideration for bariatric surgery should be given only under the following conditions *[Reference]*:

    - The child has a BMI >40 kg/m^2 or has BMI above 35 kg/m^2 and significant, severe comorbidities such as type 2 diabetes mellitus, obstructive sleep apnea or pseudotumor cerebri. It is important to note that there is currently no uniformly accepted consensus on the BMI criteria that would make adolescents candidates for bariatric surgery. While some experts suggest the adult BMI criteria of ≥40 or ≥35 with comorbidities be used for the adolescent population *[Reference]*, others recommend more stringent BMI criteria for the pediatric population: BMI ≥50, or ≥40 kg/m^2 in the presence of one or more medical comorbidities *[Reference]*.
    - The child has attained Tanner 4 or 5 pubertal development or has a bone age of ≥13 years in girls or ≥15 years in boys, thereby suggesting that the child has attained final or near-final adult height.
    - Failure of ≥6 months of organized attempts at weight management, as determined by the primary care clinician/weight management program.
    - The adolescents should have decisional capacity and also demonstrate commitment to comprehensive medical and psychological

evaluations both before and after surgery.
- A supportive family environment is extremely crucial and necessitates a complete evaluation of the home environment by trained personnel.

Bariatric surgery should not be performed for preadolescent children, for any patient who has not mastered the principles of healthy dietary and activity habits, and for those with unresolved eating disorder, untreated psychiatric disorder, or Prader-Willi syndrome. Pregnant, breastfeeding adolescents and those planning to become pregnant within two years of surgery should not be considered candidates for bariatric surgery.

Bariatric surgery in adolescents should be performed in regional bariatric centers of excellence with programs equipped to handle the data acquisition, long-term follow-up, and multidisciplinary issues of these difficult patients *[High Quality Evidence]*. A multidisciplinary team with medical (including endocrine, gastrointestinal, cardiovascular, pulmonary and otolaryngological expertise), surgical, nutritional and psychological expertise should carefully select adolescents who are well informed and motivated as potential candidates for bariatric surgery and should provide preoperative care and counseling. Patients and families must be well informed as to the risks and complications of bariatric surgery.

Roux-en-Y gastric bypass (RYGB) is the most common type of procedure performed in adolescents, and it involves stapling and excluding almost all of the stomach. RYGB is both a restrictive procedure, since a small proximal stomach pouch is created, and a minimal malabsorptive procedure, as the duodenum and a portion of the jejunum are bypassed. RYGB is the well-studied procedure in adolescents with the best outcomes regarding weight loss and resolution of comorbidities. Adolescents lose approximately 50% to 85% of their excess body weight with nearly complete resolution of comorbidities. Risks specific to RYBG include anastomotic leak, small bowel obstruction, dumping syndrome (symptoms that may include nausea, bloating, vomiting, cramps, diarrhea and/or other symptoms), protein-calorie malnutrition, and micronutrient deficiency related to malabsorption *[Reference]*. Many of these risks are minimized by close follow-up and providing a vitamin supplement regimen (iron, folate, calcium, vitamin B12 and thiamine) to help prevent nutritional deficiencies.

Laparoscopic adjustable-gastric band (LAGB) procedure is a purely restrictive bariatric procedure that has the added advantages of being reversible and having the least potential for adverse nutritional consequences. However, the LAGB has not been approved by the FDA for use in people <18 years of age, because of a lack of both short-term and long-term safety and efficacy data for adolescent patients.

Sleeve gastrectomy (SG), a purely restrictive procedure, is emerging as a potential alternative bariatric procedure in well-selected adolescents. While short-term outcomes look promising, long-term data in adolescents is lacking *[Reference]*. Possible long-term nutritional risks, sustained weight-loss effectiveness, and durability of resolution of comorbidities in growing children have not been adequately evaluated.

11. Follow-Up and Long Term Management
Follow-up and long-term management strategy:

- Obesity is often a chronic condition and may benefit from using the chronic care model that integrates community resources, health care and patient self-management *[High Quality Evidence]*.
- Current expert guidelines suggest a stepped-care approach to weight management treatment that increases intensity according to the degree of excess weight, age/maturation, health risks and motivation *[Moderate Quality Evidence]*.
- A combined dietary, physical activity and behavioral approach to weight management strategy is supported.
- Parental participation in weight loss and maintenance is needed for children <12 years of age, with progressively less parental oversight with older youth *[High Quality Evidence]*.
- Systematic evaluation of body measurements, diet and physical activity should be performed at baseline and at specified intervals *[High Quality Evidence]*.

12. Genetics
Epigenetic and Genetic Considerations for Obese Children

Epigenetic issues are those that relate to cellular changes during intrauterine development that lead to risk factors for the development of obesity. These factors do not directly cause obesity but rather lead to an increased risk when combined with other environmental and other genetic factors.

Infants of diabetic mothers, especially type 2 and gestational diabetes, are at increased risk for obesity. More and more women are diagnosed with type 2 diabetes at a younger age, leading to an increase in the number of infants born to diabetic mothers.

Infants with intrauterine growth restriction (IUGR) are also at increased risk of developing obesity. The mechanism for this is related to insulin resistance created by the IUGR state that continues throughout life. Infants born to obese mothers are also at increased risk of

developing obesity, as well as are those infants born large for gestational age (LGA). Maternal smoking has also been shown as a risk factor for obesity.

There are several genetic syndromes that are associated with obesity in childhood that need to be considered when evaluating the obese child (see the Table on page 44 in the original guideline document). Genetic testing should be considered in severely obese children, especially at a young age, who are also developmentally delayed as developmental delay goes along with many of these syndromes.

There are also single gene defects that can lead to obesity in childhood referred to as monogenic human obesity syndromes. These are listed in the table on page 45 of the original guideline document. They are not associated with other syndromic characteristics and for the most part do not change management for the patient as they are not currently treatable in a unique fashion. The one exception is severe leptin deficiency. This is treatable with replacement of leptin by injection, with excellent results in weight loss. It is, however, quite rare as a cause for obesity.

Many genes have been identified as playing a role in the development of obesity. The FTO or fat mass and obesity-associated gene has been studied and associated with obesity. Currently there is little clinical application for these genetic associations, but over time this is likely to improve as more and more is understood about the role genes play in relationship to the environment and the development of the obese state. Obesity is a complex chronic disease without one cause or treatment. To be knowledgeable of these genetic issues may someday help to better identify those patients at risk and who might benefit from more intense counseling, as well as develop new and novel treatment strategies.

Definitions:

Quality of Evidence and Strength of Recommendations

Category	Quality Definitions	Strong Recommendation	Weak Recommendation
High Quality Evidence	Further research is very unlikely to change confidence in the estimate of effect.	The work group is confident that the desirable effects of adhering to this recommendation outweigh the undesirable effects. This is a strong recommendation for or against. This applies to most patients.	The work group recognizes that the evidence, though of high quality, shows a balance between estimates of harms and benefits. The best action will depend on local circumstances, patient values or preferences.
Moderate Quality Evidence	Further research is likely to have an important impact on confidence in the estimate of effect and may change the estimate.	The work group is confident that the benefits outweigh the risks, but recognizes that the evidence has limitations. Further evidence may impact this recommendation. This is a recommendation that likely applies to most patients.	The work group recognizes that there is a balance between harms and benefit, based on moderate quality evidence, or that there is uncertainty about the estimates of the harms and benefits of the proposed intervention that may be affected by new evidence. Alternative approaches will likely be better for some patients under some circumstances.
Low Quality Evidence	Further research is very likely to have an important impact on confidence in the estimate of effect and is likely to change. The estimate or any estimate of effect is very uncertain.	The work group feels that the evidence consistently indicates the benefit of this action outweighs the harms. This recommendation might change when higher quality evidence becomes available.	The work group recognizes that there is significant uncertainty about the best estimates of benefits and harms.

Supporting Literature

In addition to evidence that is graded and used to formulate recommendations, additional pieces of literature are used to direct the reader to other topics of interest (see the original guideline document). This literature is not given an evidence grade and is instead used as a reference for its associated topic. These citations are noted by (*author, year*) and are found in the references section of the original guideline document.

Clinical Algorithm(s)

A detailed and annotated clinical algorithm titled "Prevention and Management of Obesity for Children and Adolescents" is provided in the original guideline document.

In addition, the following four algorithms from the National Heart, Lung and Blood Institute Expert Panel on Integrated Guidelines for Cardiovascular Health and Risk Reduction in Children and Adolescents are provided in the original guideline document:

- Dyslipidemia Algorithm: Target LDL Cholesterol
- Dyslipidemia Algorithm: Target Triglycerides
- BP Measurement and Categorization
- BP Management According to Category

Another algorithm from the 2007 report "Expert Committee Recommendations Regarding the Prevention, Assessment and Treatment of Child and Adolescent Overweight and Obesity," titled "Universal Assessment of Obesity Risk and Steps to Prevention and Treatment" is also provided in the original guideline document.

Scope

Disease/Condition(s)

- Obesity
- Overweight

Guideline Category

Counseling

Diagnosis

Evaluation

Management

Prevention

Risk Assessment

Screening

Treatment

Clinical Specialty

Endocrinology

Family Practice

Internal Medicine

Medical Genetics

Nursing

Nutrition

Pediatrics

Preventive Medicine

Psychiatry

Psychology

Surgery

Intended Users

Advanced Practice Nurses

Allied Health Personnel

Dietitians

Health Care Providers

Health Plans

Hospitals

Managed Care Organizations

Nurses

Physician Assistants

Physicians

Psychologists/Non-physician Behavioral Health Clinicians

Guideline Objective(s)

- To increase the percentage of patients ages 2 through 17 years who have an annual screening for obesity using body mass index (BMI) measured and whose BMI percentile status is determined
- To increase the percentage of patients ages 2 through 17 years with an annual BMI screening who have received education and counseling regarding weight management strategies that include nutrition and physical activity
- To increase the percentage of patients ages 2 through 17 years with a BMI screening percentile greater than 85 whose percentile decreased within 12 months of screening

Target Population

Children from birth through 17 years of age

Interventions and Practices Considered

Prevention

1. Annual assessment of diet, physical activity and sedentary behaviors
2. Education of children and families on healthy diet and moderate daily exercise

Diagnosis/Screening

1. Annual calculation and documentation of body mass index (BMI)
2. Use of Centers for Disease Control and Prevention (CDC) growth charts and World Health Organization (WHO) growth curves
3. Other medical screening
    - Blood pressure
    - Dyslipidemia
    - Health risks that increase likelihood of obesity
4. Assessment for major and minor comorbid conditions
    - Focused family history of obesity, type 2 diabetes mellitus (DM) and cardiovascular disease (CVD)
    - Focused review of systems and physical examination to identify potential weight-related comorbid conditions

- Laboratory and radiographic evaluations depending on age, BMI, physical and historical findings

Management

1. Motivational interviewing techniques to encourage behavior change
2. Nutrition intervention
    - Limited consumption of sugar-sweetened beverages
    - Nutrient-dense breakfast daily
    - Limited eating out at restaurants, particularly fast food
    - Eating family meals together
    - Eating pattern low in energy density
    - Modeling dietary intake per current U.S. Department of Agriculture (USDA) recommendations
    - Limited portion sizes
    - Promotion of milk and milk products
    - Promotion of high-fiber diet
3. Physical activity
    - Moderately intense physical activity for at least 60 minutes a day
    - Identification of barriers to physical activity
    - Counseling parents to be good role models
4. Behavior management
    - Lifestyle interventions
    - Establishing target behaviors
    - Encouragement of self-monitoring and stimulus control
    - Participation of primary adult caregivers (PACs), including modeling healthy living
    - Counseling on cognitive restructuring and problem-solving skills
5. Weight loss medications
    - Orlistat
    - Metformin, octreotide, leptin, and phentermine (not U.S. Food and Drug Administration [FDA] approved)
6. Bariatric surgery
7. Follow-up and long term management
8. Evaluation of genetic risk factors

Major Outcomes Considered

- Obesity prevalence rates
- Effectiveness of weight loss interventions (e.g., diet, physical activity, medication, surgery)
- Adverse events of pharmacologic agents and complications of surgery

Methodology

Methods Used to Collect/Select the Evidence

Searches of Electronic Databases

Description of Methods Used to Collect/Select the Evidence

A consistent and defined process is used for literature search and review for the development and revision of Institute for Clinical Systems Improvement (ICSI) guidelines. Literature search terms for the current version of this document included pediatrics, children, childhood obesity published between November 2005 and March 29, 2013, systematic reviews, randomized control trials, meta-analyses, restricted to human studies, limited to pediatrics in the following topic areas: prevention, screening, treatments/drug studies, medications, gastric bypass and/or bariatric surgery, lipid and cholesterol screening, activity recommendations, screen time (TV, computer, video gaming), genetic studies, family-based therapy, readiness for change, motivational interviewing, goal setting, managing chronic conditions, binge eating disorders, binge eating disorder

assessment and scale.

Number of Source Documents

Not stated

Methods Used to Assess the Quality and Strength of the Evidence

Weighting According to a Rating Scheme (Scheme Given)

Rating Scheme for the Strength of the Evidence

Quality of Evidence and Strength of Recommendations

Category	Quality Definitions	Strong Recommendation	Weak Recommendation
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Supporting Literature

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Methods Used to Analyze the Evidence

Review of Published Meta-Analyses

Systematic Review with Evidence Tables

Description of the Methods Used to Analyze the Evidence

Not stated

Methods Used to Formulate the Recommendations

Expert Consensus

Description of Methods Used to Formulate the Recommendations

New Guideline Development Process

A work group consisting of 6 to 12 members that includes physicians, nurses, pharmacists, other healthcare professionals relevant to the topic, and an Institute for Clinical Systems Improvement (ICSI) staff facilitator develops each document. Ordinarily, one of the physicians will be the leader. Most work group members are recruited from ICSI member organizations, but if there is expertise not represented by ICSI members, 1 or 2 members may be recruited from medical groups, hospitals, or other organizations that are not members of ICSI. Patients on occasion are invited to serve on work groups.

The work group will meet for 7 to 8 three-hour meetings to develop the guideline. A literature search and review is performed and the work group members, under the coordination of the ICSI staff facilitator, develop the algorithm and write the annotations and footnotes and literature citations.

Once the final draft copy of the guideline is developed, the guideline goes to the ICSI members for critical review.

Revision Process of Existing Guidelines

ICSI scientific documents are revised every 12 to 24 months as indicated by changes in clinical practice and literature. For documents that are revised on a 24-month schedule, ICSI checks with the work group on an annual basis to determine if there have been changes in the literature significant enough to cause the document to be revised earlier or later than scheduled. For yearly reviewed documents, ICSI checks with every work group 6 months before the scheduled revision to determine if there have been changes in the literature significant enough to cause the document to be revised earlier than scheduled.

Literature Search

ICSI staff, working with the work group to identify any new pertinent clinical trials, systematic reviews, or regulatory statements and other professional guidelines, conduct a literature search.

Revision

The work group will meet for 1 to 2 three-hour meetings to review the literature, respond to member organization comments, and revise the document as appropriate.

A second review by members is indicated if there are changes or additions to the document that would be unfamiliar or unacceptable to member organizations. If a review by members is not needed, the document goes to the appropriate steering committee for approval according to the criteria outlined in the "Description of Method of Guideline Validation" field.

Rating Scheme for the Strength of the Recommendations

See the "Rating Scheme for the Strength of the Evidence" field.

Cost Analysis

The guideline developers reviewed published cost analyses.

Method of Guideline Validation

Internal Peer Review

Description of Method of Guideline Validation

Critical Review Process

The purpose of critical review is to provide an opportunity for the clinicians in the member groups to review the science behind the recommendations and focus on the content of the guideline. Critical review also provides an opportunity for clinicians in each group to come to consensus on feedback they wish to give the work group and to consider changes necessary across systems in their organization to implement the guideline.

All member organizations are expected to respond to critical review guidelines. Critical review of guidelines is a criterion for continued membership within the Institute for Clinical Systems Improvement (ICSI).

After the critical review period, the guideline work group reconvenes to review the comments and make changes, as appropriate. The work group prepares a written response to all comments.

Document Approval

Each document is approved by the Committee for Evidence-Based Practice (CEBP).

The committee will review and approve each guideline/protocol, based on the following criteria:

- The aim(s) of the document is clearly and specifically described.
- The need for and importance of the document is clearly stated.
- The work group included individuals from all relevant professional groups and had the needed expertise.
- Patient views and preferences were sought and included.
- The work group has responded to all feedback and criticisms reasonably.
- Potential conflicts of interest were disclosed and do not detract from the quality of the document.
- Systematic methods were used to search for the evidence to assure completeness and currency.
- Health benefits, side effects, risks and patient preferences have been considered in formulating recommendations.
- The link between the recommendation and supporting evidence is clear.
- Where the evidence has not been well established, recommendations based on community practice or expert opinion are clearly identified.
- Recommendations are specific and unambiguous.
- Different options for clinical management are clearly presented.
- Clinical highlights and recommendations are easily identifiable.
- Implementation recommendations identify key strategies for *health care systems* to support implementation of the document.
- The document is supported with practical and useful tools to ease clinician implementation.
- Where local resource availability may vary, alternative recommendations are clear.
- Suggested measures are clear and useful for quality/process improvement efforts.

Once the document has been approved, it is posted on the ICSI Web site and released to members for use.

Evidence Supporting the Recommendations

References Supporting the Recommendations

Barlow SE, Expert Committee. Expert committee recommendations regarding the prevention, assessment, and treatment of child and adolescent overweight and obesity: summary report. Pediatrics. 2007 Dec;120(Suppl):S164-92. PubMed

Collins CE, Okely AD, Morgan PJ, Jones RA, Burrows TL, Cliff DP, Colyvas K, Warren JM, Steele JR, Baur LA. Parent diet modification, child activity, or both in obese children: an RCT. Pediatrics. 2011 Apr;127(4):619-27. PubMed

Faith MS, Van Horn L, Appel LJ, Burke LE, Carson JA, Franch HA, Jakicic JM, Kral TV, Odoms-Young A, Wansink B, Wylie-Rosett J, American Heart Association Nutrition and Obesity Committees of the Council on, Physical Activity and Metabolism, Council on Clinical Cardiology, Council on Cardiovascular Disease in the Young, Council on Cardiovascular Nursing, Council on Epidemiology and Prevention, Council on the Kidney in Cardiovascular Disease. Evaluating parents and adult caregivers as "agents of change" for treating obese children: evidence for parent behavior change strategies and research gaps: a scientific statement from the American Heart Association. Circulation. 2012 Mar 6;125(9):1186-207. PubMed

Knowlden AP, Sharma M. Systematic review of family and home-based interventions targeting paediatric overweight and obesity. Obes Rev. 2012 Jun;13(6):499-508. PubMed

Lanou AJ, Barnard ND. Dairy and weight loss hypothesis: an evaluation of the clinical trials. Nutr Rev. 2008 May;66(5):272-9. [76 references] PubMed

Malik VS, Schulze MB, Hu FB. Intake of sugar-sweetened beverages and weight gain: a systematic review. Am J Clin Nutr. 2006 Aug;84(2):274-88. [113 references] PubMed

Obesity in children and adolescents. Ipswich (MA): DynaMed; 2012.

Oude Luttikhuis H, Baur L, Jansen H, Shrewsbury VA, O'Malley C, Stolk RP, Summerbell CD. Interventions for treating obesity in children. Cochrane Database Syst Rev. 2009;(1):CD001872. [273 references] PubMed

Perez-Escamilla R, Obbagy JE, Altman JM, Essery EV, McGrane MM, Wong YP, Spahn JM, Williams CL. Dietary energy density and body weight in adults and children: a systematic review. J Acad Nutr Diet. 2012 May;112(5):671-84. PubMed

Rampersaud GC, Pereira MA, Girard BL, Adams J, Metzl JD. Breakfast habits, nutritional status, body weight, and academic performance in children and adolescents. J Am Diet Assoc. 2005 May;105(5):743-60. [172 references] PubMed

Rollnick S, Mason P, Butler C. Health behavior change: a guide for practitioners. Educ Health. 2000;13:415-8.

Rosenheck R. Fast food consumption and increased caloric intake: a systematic review of a trajectory towards weight gain and obesity risk. Obes Rev. 2008 Nov;9(6):535-47. [45 references] PubMed

Spear BA, Barlow SE, Ervin C, Ludwig DS, Saelens BE, Schetzina KE, Taveras EM. Recommendations for treatment of child and adolescent overweight and obesity. Pediatrics. 2007 Dec;120(Suppl):S254-88. [284 references] PubMed

Strong WB, Malina RM, Blimkie CJ, Daniels SR, Dishman RK, Gutin B, Hergenroeder AC, Must A, Nixon PA, Pivarnik JM, Rowland T, Trost S, Trudeau F. Evidence based physical activity for school-age youth. J Pediatr. 2005 Jun;146(6):732-7. [314 references] PubMed

Whitlock EP, O'Connor EA, Williams SB, Beil TL, Lutz KW. Effectiveness of weight management interventions in children: a targeted systematic review for the USPSTF. Pediatrics. 2010 Feb;125(2):e396-418. [64 references] PubMed

Type of Evidence Supporting the Recommendations

The type of supporting evidence is classified for selected recommendations (see the "Major Recommendations" field).

Benefits/Harms of Implementing the Guideline Recommendations

Potential Benefits

Effective prevention and appropriate management of obesity in children and adolescents

Potential Harms

Physical Activity

Possible injuries related to exercise

Weight Loss Medications

- Side effects of orlistat include abdominal cramping, flatus, oily bowel movements, and oily spotting on underwear caused by unabsorbed fat in the feces. Patients taking orlistat must take a daily multivitamin supplement as it can interfere with the absorption of fat-soluble vitamins. Orlistat has undergone two label changes because of reports of liver injury, cholelithiasis and pancreatitis; however, a cause-and-effect relationship of severe liver injury with orlistat use has not been established.
- The main adverse effects of metformin are diarrhea, nausea, vomiting and flatulence, which are usually transient and mild to moderate.

Bariatric Surgery

Risks specific to Roux-en-Y gastric bypass (RYBG) include anastomotic leak, small bowel obstruction, dumping syndrome (symptoms that may include nausea, bloating, vomiting, cramps, diarrhea and/or other symptoms), protein-calorie malnutrition, and micronutrient deficiency related to malabsorption.

Contraindications

Contraindications

Pregnant, breastfeeding adolescents and those planning to become pregnant within two years of surgery should not be considered candidates for bariatric surgery.

Qualifying Statements

Qualifying Statements

- The information contained in this Institute for Clinical Systems Improvement (ICSI) Health Care Guideline is intended primarily for health professionals and other expert audiences.
- This ICSI Health Care Guideline should not be construed as medical advice or medical opinion related to any specific facts or circumstances. Patients and families are urged to consult a health care professional regarding their own situation and any specific medical questions they may have. In addition, they should seek assistance from a health care professional in interpreting this ICSI Health Care Guideline and applying it in their individual case.
- This ICSI Health Care Guideline is designed to assist clinicians by providing an analytical framework for the evaluation and treatment of patients, and is not intended either to replace a clinician's judgment or to establish a protocol for all patients with a particular condition.

Implementation of the Guideline

Description of Implementation Strategy

Once a guideline is approved for general implementation, a medical group can choose to concentrate on the implementation of that guideline. When four or more groups choose the same guideline to implement and they wish to collaborate with others, they may form an action group.

In the action group each medical group sets specific goals they plan to achieve in improving patient care based on the particular guideline(s). Each medical group shares its experience and supporting measurement results within the action group. This sharing facilitates a collaborative learning environment. Action group learnings are also documented and shared with interested medical groups within the collaborative.

Currently, action groups may focus on one guideline or a set of guidelines such as hypertension, lipid treatment, and tobacco cessation.

Implementation Recommendations

Prior to implementation, it is important to consider current organizational infrastructure that address the following:

- System and process design
- Training and education
- Culture and the need to shift values, beliefs and behaviors of the organization

The following system changes were identified by the guideline work group as key strategies for health care systems to incorporate in support of the implementation of this guideline:

- Establish a system for using a Patient Readiness Scale to determine if the patient is ready to talk about weight loss and/or would like information.
- Establish a system for staff to efficiently calculate body mass index (BMI) prior to the clinician entering the clinic examination room. The BMI may provide more health risk information than traditional vital signs and should be built into the patient assessment protocol. A BMI chart should be placed by each scale in the clinic. All organizations with electronic medical records should build BMI calculators as a component for immediate calculation and review.
- Develop a tracking system that periodically reviews patient charts to identify patients who are overweight or obese so that clinicians are aware of the need to discuss the issue with the patient.
- Establish a system for staff and clinician training around skills and knowledge in the areas of motivational interviewing; brief, focused advice on nutrition, physical activity and lifestyle changes; and evaluation of evidence of effectiveness of treatment options.
- Establish a system for continuing education on evidence-based obesity management for clinicians, nurses and ancillary clinic staff.
- Remove barriers to referral programs for weight loss by understanding where programs are and what process is required for referrals.
- Develop medical record systems to track status of patients under the clinician's care with the capability to produce an outpatient tracking system for patient follow-up by clinician/staff.
- Use tools such as posters and brochures throughout the facility to assist with identifying and notifying patients about health risk related to obesity. Promote a healthy lifestyle around nutrition and activity while encouraging patient and parent knowledge of his or her BMI.
- Develop patient- and family-centered education and self-management programs, which may include self-monitoring, self-management and skills such as journaling.
- Build systems to track outcomes measures, as well as ongoing process measures. Track the response rate to various treatments/strategies.
- Systems to coordinate care ensure continuity and keep clinicians informed of progress:
    - Develop electronic tracking systems for panel or population management.
    - Educate patients and families to foster awareness and knowledge of BMI for self-monitoring and reporting.
    - Structure follow-up visits with patient per guideline recommendations.

Implementation Tools

Chart Documentation/Checklists/Forms

Clinical Algorithm

Patient Resources

Quick Reference Guides/Physician Guides

For information about availability, see the *Availability of Companion Documents* and *Patient Resources* fields below.

Related NQMC Measures

Prevention and management of obesity for children and adolescents: percentage of patients who have an annual BMI measured.

Prevention and management of obesity for children and adolescents: percentage of patients with BMI screening whose BMI percentile is between 85 and 94.

Prevention and management of obesity for children and adolescents: percentage of patients with BMI screening whose BMI percentile is greater

than or equal to 95.

Prevention and management of obesity for children and adolescents: percentage of patients with BMI screening who have received education regarding weight management strategies that include nutrition and physical activity.

Prevention and management of obesity for children and adolescents: percentage of patients with BMI screening percentile greater than or equal to 85 who have cholesterol screening.

Prevention and management of obesity for children and adolescents: percentage of patients with BMI screening percentile greater than or equal 85 whose BMI percentile decreased within 12 months of screening.

Institute of Medicine (IOM) National Healthcare Quality Report Categories

IOM Care Need

Getting Better

Living with Illness

Staying Healthy

IOM Domain

Effectiveness

Patient-centeredness

Identifying Information and Availability

Bibliographic Source(s)

Fitch A, Fox C, Bauerly K, Gross A, Heim C, Judge-Dietz J, Kaufman T, Krych E, Kumar S, Landin D, Larson J, Leslie D, Martens N, Monaghan-Beery N, Newell T, O'Connor P, Spaniol A, Thomas A, Webb B. Prevention and management of obesity for children and adolescents. Bloomington (MN): Institute for Clinical Systems Improvement (ICSI); 2013 Jul. 94 p. [110 references]

Adaptation

Not applicable: The guideline was not adapted from another source.

Date Released

2013 Jul

Guideline Developer(s)

Institute for Clinical Systems Improvement - Nonprofit Organization

Guideline Developer Comment

The Institute for Clinical Systems Improvement (ICSI) is comprised of 50+ medical group and hospital members representing 9,000 physicians in Minnesota and surrounding areas, and is sponsored by five nonprofit health plans. For a list of sponsors and participating organizations, see the ICSI Web site.

Source(s) of Funding

- The Institute for Clinical Systems Improvement (ICSI) provided the funding for this guideline. The annual dues of the member medical groups and sponsoring health plans fund ICSI's work. Individuals on the work group are not paid by ICSI, but are supported by their medical group for this work.
- ICSI facilitates and coordinates the guideline development and revision process. ICSI, member medical groups, and sponsoring health plans review and provide feedback, but do not have editorial control over the work group. All recommendations are based on the work group's independent evaluation of the evidence.

Guideline Committee

Committee on Evidence-based Practice

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Financial Disclosures/Conflicts of Interest

The Institute for Clinical Systems Improvement (ICSI) has long had a policy of transparency in declaring potential conflicting and competing interests of all individuals who participate in the development, revision and approval of ICSI guidelines and protocols.

In 2010, the ICSI Conflict of Interest Review Committee was established by the Board of Directors to review all disclosures and make recommendations to the board when steps should be taken to mitigate potential conflicts of interest, including recommendations regarding removal of work group members. This committee has adopted the Institute of Medicine Conflict of Interest standards as outlined in the report Clinical Practice Guidelines We Can Trust (2011).

Where there are work group members with identified potential conflicts, these are disclosed and discussed at the initial work group meeting. These members are expected to recuse themselves from related discussions or authorship of related recommendations, as directed by the Conflict of Interest committee or requested by the work group.

The complete ICSI policy regarding Conflicts of Interest is available at the ICSI Web site.

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Research Grants: Farm to School Grant – Food & Nutrition - USDA
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Financial/non-financial Conflicts of Interest: None

Guideline Status

This is the current release of the guideline.

Guideline Availability

Electronic copies: Available from the Institute for Clinical Systems Improvement (ICSI) Web site .

Print copies: Available from ICSI, 8009 34th Avenue South, Suite 1200, Bloomington, MN 55425; telephone, (952) 814-7060; fax, (952) 858-9675; Web site: www.icsi.org ; e-mail: icsi.info@icsi.org.

Availability of Companion Documents

The following is available:

- Prevention and management of obesity for children and adolescents. Executive summary. Bloomington (MN): Institute for Clinical Systems Improvement; 2013 May. 1 p. Electronic copies: Available in Portable Document Format (PDF) from the Institute for Clinical Systems Improvement (ICSI) Web site .

Print copies: Available from ICSI, 8009 34th Avenue South, Suite 1200, Bloomington, MN 55425; telephone, (952) 814-7060; fax, (952) 858-9675; Web site: www.icsi.org ; e-mail: icsi.info@icsi.org.

In addition, the appendices to the original guideline document contain the following:

- CDC/WHO growth charts
- Blood pressure levels for children by age and height
- Motivational interviewing sample scripting for pediatrics
- Lipids table

Patient Resources

A patient action plan is available in Appendix F of the original guideline document .

Please note: This patient information is intended to provide health professionals with information to share with their patients to help them better understand their health and their diagnosed disorders. By providing access to this patient information, it is not the intention of NGC to provide specific medical advice for particular patients. Rather we urge patients and their representatives to review this material and then to consult with a licensed health professional for evaluation of treatment options suitable for them as well as for diagnosis and answers to their personal medical questions. This patient information has been derived and prepared from a guideline for health care professionals included on NGC by the authors or publishers of that original guideline. The patient information is not reviewed by NGC to establish whether or not it accurately reflects the original guideline's content.

NGC Status

This NGC summary was completed by ECRI Institute on November 21, 2013. This summary was updated by ECRI Institute on April 15, 2016 following the U.S. Food and Drug Administration advisory on Metformin-containing Drugs.

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