NATIONAL GUIDELINE CLEARINGHOUSE™ (NGC) GUIDELINE SYNTHESIS

OVERWEIGHT AND OBESITY IN CHILDREN AND ADOLESCENTS: ASSESSMENT, PREVENTION, AND MANAGEMENT

Guidelines

1. American Academy of Pediatrics (AAP). Prevention of pediatric overweight and obesity. Pediatrics 2003 Aug;112(2):424-30. [88 references]
2. American Heart Association (AHA). Overweight in children and adolescents: pathophysiology, consequences, prevention, and treatment. Circulation 2005 Apr 19;111(15):1999-2012. [103 references]
3. Registered Nurses Association of Ontario (RNAO). Primary prevention of childhood obesity. Toronto (ON): Registered Nurses Association of Ontario (RNAO); 2005 Mar. 88 p. [143 references]
4. Scottish Intercollegiate Guidelines Network (SIGN). Management of obesity in children and young people. A national clinical guideline. Edinburgh (Scotland): Scottish Intercollegiate Guidelines Network (SIGN); 2003 Apr. 24 p. (SIGN publication; no. 69). [117 references]
5. Singapore Ministry of Health (MOH). Obesity. Singapore Ministry of Health - National Government Agency [Non-U.S.] 2004 Apr. 108 p. [253 references]
6. U.S. Preventive Services Task Force (USPSTF). Screening and interventions for overweight in children and adolescents: recommendation statement. Rockville (MD): Agency for Healthcare Research and Quality (AHRQ); 2005. 11 p. [39 references]

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INTRODUCTION:

A direct comparison of the American Academy of Pediatrics (AAP), American Heart Association (AHA), Registered Nurses Association of Ontario (RNAO), Scottish Intercollegiate Guidelines Network (SIGN), Singapore Ministry of Health (Singapore MOH), and U.S. Preventive Services Task Force (USPSTF) recommendations for overweight and obesity in children and adolescents is provided in the tables, below. Table 1 provides the scope of the guidelines, Table 2 compares the major recommendations, and Table 3 compares the potential benefits and harms of implementing the guideline recommendations. Definitions for the levels of evidence used to support the guideline recommendations for RNAO, SIGN, Singapore MOH, and USPSTF are given in Table 4.

Following the content and recommendation comparison tables, the areas of agreement and differences among the guidelines are identified.

Abbreviations used in the text and table

- AAP, American Academy of Pediatrics
- AHA, American Heart Association
- BMI, body mass index
- CDC, Centers for Disease Control and Prevention
- MOH, Ministry of Health (Singapore)
- RNAO, Registered Nurses Association of Ontario
- SIGN, Scottish Intercollegiate Guidelines Network
- USPSTF, U.S. Preventive Services Task Force

TABLE 1: COMPARISON OF SCOPE AND CONTENT	
Objectives and Scope	
AAP (2003)	• To propose strategies to foster prevention and early identification of overweight and obesity in children
AHA (2005) **New**	• To examine the pathophysiology and epidemiology of overweight in children and adolescents • To present updated information on the adverse outcomes associated with childhood overweight and discuss approaches for the prevention and treatment of overweight in young individuals
RNAO (2005)	• To provide best practice guidelines focused on the primary prevention of obesity in children from birth to age 18 years • To provide direction for nurses who work with children and families across diverse practice settings and at population,

	family, and/or individual levels **Note**: Treatment of obesity is not within the scope of this guideline.
SIGN (2003)	• To provide recommendations based on current evidence for best practice in the management of obesity in children and young people, up to the age of 18 • To review the definition of childhood obesity and information on prevalence of childhood obesity in the United Kingdom and recent trends in the prevalence of obesity • To identify the immediate consequences of obesity in childhood and possible consequences in adulthood • To identify subgroups of children at high risk for developing obesity • To review preventive interventions for childhood obesity • To discuss the treatment of childhood obesity and the goals of therapy, particularly management in the community and management beyond primary care, including advice on healthy eating • To make recommendations for research for systematic evaluation of childhood obesity **Note**: Appraising the role of screening for obesity in children was not within the remit of this guideline.
SINGAPORE MOH (2004)	• To assist health care professionals who have a role in managing overweight or obese patients • To provide current evidence-based clinical practice recommendations on various aspects of obesity management found across various medical disciplines • To provide a framework to assist doctors in the management of overweight and obesity without restricting the physician's individual judgment • To provide a review of the various medical, surgical, and ancillary intervention modalities in the management of obesity • To aid primary care physicians in basic management of obesity and subsequent referrals to specialists for more resistant cases
USPSTF (2005) **New**	• To summarize the USPSTF recommendations on screening for overweight in children and adolescents and the supporting scientific evidence
Target Population	
AAP (2003)	• United States

	• Children
AHA (2005) **New**	• United States • Infants, children, and adolescents in the general population *(prevention)* • Overweight or obese children and adolescents with or without comorbidities *(prevention and treatment)*
RNAO (2005)	• Canada • Children from birth to age 18 years
SIGN (2003)	• Scotland • Children and young people up to the age of 18 who are suspected of having obesity
SINGAPORE MOH (2004)	• Singapore • Children and adolescents who are obese or overweight, or who are at risk of obesity **Note**: The guideline also targets adults who are obese or overweight or who are at risk for obesity. This target group is addressed in a companion synthesis, Assessment and Treatment of Obesity and Overweight in Adults.
USPSTF (2005) **New**	• United States • Asymptomatic children and adolescents (aged 6 to 19 years) seen in primary care
Intended Users	
AAP (2003)	Health Care Providers; Physicians
AHA (2005) **New**	Health Care Providers; Physicians
RNAO (2005)	Advanced Practice Nurses; Nurses
SIGN (2003)	Advanced Practice Nurses; Allied Health Personnel; Dietitians; Nurses; Physician Assistants; Physicians; Psychologists/Non-physician Behavioral Health Clinicians
SINGAPORE	Advanced Practice Nurses; Allied Health Personnel; Dietitians;

MOH (2004)	Nurses; Physician Assistants; Psychologists/Non-physician Behavioral Health Clinicians; Public Health Departments; Respiratory Care Practitioners
USPSTF (2005) **New**	Advanced Practice Nurses; Allied Health Personnel; Dietitians; Health Care Providers; Health Plans; Managed Care Organizations; Nurses; Physician Assistants; Physicians
Interventions And Practices Considered	
AAP (2003)	**Assessment** 1. BMI percentile (for age and sex) 2. Routine assessment of eating and physical activity patterns for early recognition 3. Assessment of risk factors (including genetic, biological, psychologic, socioeconomic, and environmental factors) **Prevention** 1. Promoting healthy eating patterns and breastfeeding, encouraging physical activity, and limiting television and video time 2. Parent and caregiver involvement 3. Recognizing and monitoring changes in obesity-associated risk factors for adult chronic disease **Note**: Physician advocacy interventions directed at parents, teachers, and policy makers/legislators, etc. are also provided.
AHA (2005) **New**	**Assessment** 1. Evaluation of growth, including height, weight, and BMI percentile for age and sex 2. Medical evaluation for comorbidities, including medical history, blood pressure, physical assessment for orthopedic abnormalities, laboratory studies, as indicated, and echocardiography **Prevention** *Population-specific Approaches* 1. Breast-feeding (infants) 2. Establishing behavior targets (toddlers) • Increased consumption of fruits and vegetables • Increased consumption of fiber-containing grain products • Switching from full-fat to 1% or fat-free dairy products after 2 years of age

	• Preparing and eating family meals at home • Increasing daily physical activity • Limiting sedentary time 3. Theory-based interventions including classroom curricula, physical education curricula, changes in school meals, vending machines, and cafeterias, and after-school programs (school-age children and adolescents) 4. Implementation of tailored strategies that are well matched to the social and cultural contexts of children in ethnic minority populations *Setting-specific Approaches* 1. Targeting institutions that provide access to groups of children (e.g., schools, Head Start programs, healthcare settings, homes, community and government programs) 2. Community-wide approaches including coordinated interventions in multiple settings 3. Providing social and physical environments where healthful choices are available **Treatment** 1. Age-specific dietary modification 2. Physical activity (30 to 60 minutes of regular exercise daily) 3. Pharmacological treatment 4. Surgical treatment (reserved for full-grown adolescents with the severest obesity-related morbidity)
RNAO (2005)	**Assessment** 1. Lifestyle history, including discussing/documenting dietary and physical activity patterns, and identifying individual and family risk factors for childhood obesity 2. Monitoring growth, including accurate height and weight measurement 3. Calculating and plotting BMI percentile, and monitoring for changes over time **Prevention** 1. Promotion of healthy eating and physical activity at population, community, family, and individual levels 2. Support of exclusive breastfeeding until 6 months of age 3. Referral to allied healthcare professionals as needed **Note**: Other interventions and practices addressed in the guideline but not considered here include recommendations for nursing academic and continuing education programs, research studies, and implementation planning.

SIGN (2003)	**Assessment and Preventive Counseling** 1. BMI percentile (for age and sex) 2. Recognition of risk factors for obesity, including parental obesity 3. School, family, and societal interventions for obesity prevention **Treatment/Management** 1. Healthier eating 2. Increased habitual physical activity (e.g., brisk walking) to a minimum of 30 minutes/day 3. Reduction in physical inactivity (e.g., watching television and playing computer games) to <2 hours/day or 14 hours/week 4. Weight maintenance 5. Referral to hospital or community paediatric consultants 6. Modest weight loss of no more than 0.5 kg/month* *For obese children over 7 years who can demonstrate prolonged weight maintenance and who are cared for by secondary services
SINGAPORE MOH (2004)	**Assessment** 1. Full clinical evaluation including BMI percentile (for age and sex) 2. Consideration of predisposing risk factors and secondary causes of obesity **Management of Obesity in Children and Adolescents** 1. Nutritionally balanced diet designed to meet growth requirement 2. Age-appropriate physical activity 3. Weight loss programs that include behavior therapy 4. Family involvement in weight loss efforts 5. Bariatric surgery (only in high-risk adolescents) **Note**: Interventions for assessment and management of overweight and obesity in adults are also considered in this guideline. These interventions are addressed in another synthesis entitled Assessment and Treatment of Obesity and Overweight in Adults.
USPSTF (2005) **New**	Routine screening for overweight in children and adolescents using BMI percentile (not specifically recommended). The evidence for effectiveness of behavioral, pharmacologic, and surgical interventions is discussed.

TABLE 2: COMPARISON OF RECOMMENDATIONS FOR ASSESSMENT, PREVENTION, AND MANAGEMENT OF OVERWEIGHT AND OBESITY IN CHILDREN AND ADOLESCENTS	
Assessment and Classification of Overweight/Obesity	
AAP (2003)	Calculate and plot BMI once a year in all children and adolescents. Use change in BMI to identify rate of excessive weight gain relative to linear growth. • BMI between 85th and 95th percentile for age and sex is considered at risk of overweight • BMI at or above the 95th percentile is considered overweight or obese
AHA (2005) **New**	For children in the United States, overweight is defined using CDC age- and sex-specific nomograms for BMI. A BMI percentile >5th and <85th is considered normal weight for height; the 85th to the 95th percentile is considered at risk for overweight; and $\geq$95th percentile is defined as overweight. By late adolescence, these percentiles approach those used for adult definitions; the 95th percentile is approximately 30 kg/m^2. A recent report from the Institute of Medicine has specifically used the term "obesity" to characterize BMI $\geq$95th percentile in children and adolescents. The term obesity was used in this report in part to more effectively convey the seriousness, urgency, and medical nature of this problem. Thus, the terms overweight and obesity are often used interchangeably in pediatric patients. • Children <85th percentile with no other health risk factors should be screened (weight, height, and BMI percentile calculated and plotted) every year. Identification of risk for overweight before adolescence is encouraged so that health habits can be improved at a stage of increased parental influence and control. • Primary care providers should assess diet and activity habits at annual well-child visits; this should be routinely integrated into the overall care plan.
RNAO (2005)	Nurses assess physical growth and development of children and adolescents which includes: • Discussing and documenting basic dietary patterns **(Level IV)** • Discussing and documenting physical activity patterns including sedentary activity (e.g., television and computer time) **(Level IV)**

	• Identifying individual and family risk factors for childhood obesity • Accurately measuring and recording height and weight **(Level IV)** • Calculating BMI for children two years of age and older **(Level IV)** • Plotting BMI for age on appropriate CDC pediatric growth charts **(Level IV)** • Monitoring changes in BMI, dietary and physical activity patterns over time and noting important variations **(Level IV)** **Definitions** • Overweight: Classification of overweight children is currently a BMI (age and gender specific) >85th percentile and <95th percentile. Research studies often use recently recommended international cut-offs corresponding to a BMI of 25-29.9 used in adults. • Obesity: A condition of excess body fat. There is no direct measure of body fat in childhood that is readily applicable in the clinical setting. The current recommendation is for use of BMI for age and gender above 95th percentile using CDC growth curves to define those at increased health risk because of overweight. A new international cut-off for BMI which corresponds to the adult levels of 25 and 30 for overweight and obesity respectively are recommended for population studies.
SIGN (2003)	• Obesity should be identified by objective (anthropometric) means. **(Recommendation Grade: D)** • The BMI percentile should be used to identify childhood obesity. **(Recommendation Grade: C)** For clinical use: • Obese children are those with a BMI $\geq$98th centile of the United Kingdom (UK) 1990 reference chart for age and sex. **(Recommendation Grade: D)** • Overweight children are those with a BMI $\geq$91st centile for the 1990 reference chart for age and sex. For epidemiological (research) purposes: • Overweight should be defined as BMI $\geq$85th centile of the 1990 reference data • Obesity should be defined as BMI $\geq$95th centile of the 1990 reference data for age and sex

	(Recommendation Grade: D)
SINGAPORE MOH (2004)	• Historically, weight-for-height charts have been used to classify weight status in children. BMI-for-age and gender charts are recommended for use in children. **(Grade B, Level III)** • A full clinical evaluation and possible treatment should be considered in children with a BMI $\geq$95th percentile or a BMI $\geq$85th percentile and complications of obesity. Alternatively, BMIs-for-age and gender equivalent to adult World Health Organization (WHO) BMI cut-offs for obese and overweight (at $\geq$30.0 or $\geq$25.0 kg/m^2) respectively can be used as thresholds, although BMI cut-offs for action among Asians of 27.5 and 23.0 kg/m^2 respectively may eventually be used. **(Grade C, Level IV)**
USPSTF (2005) **New**	• It is important to measure and monitor growth over time in all children as an indicator of health and development. • 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. 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. 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.
Assessment of Other Risk Factors	
AAP (2003)	• Genetic, environmental, or combinations of risk factors predisposing children to obesity can and should be identified. • Identify and track patients at risk by virtue of family history, birth weight, or socioeconomic, ethnic, cultural, or environmental factors. It has long been recognized that obesity "runs in families"-high

	birth weight, maternal diabetes, and obesity in family members all are factors-but there are likely to be multiple genes and a strong interaction between genetics and environment that influence the degree of adiposity. For young children, if 1 parent is obese, the odds ratio is approximately 3 for obesity in adulthood, but if both parents are obese, the odds ratio increases to more than 10. Before 3 years of age, parental obesity is a stronger predictor of obesity in adulthood than the child's weight status.
AHA (2005) **New**	Identification of risk for overweight before adolescence is encouraged so that health habits can be improved at a stage of increased parental influence and control
RNAO (2005)	• Identify individual and family risk factors for childhood obesity **(Level IV)** The nurse's assessment should include questions and observations related to individual or familial obesity risk factors. Studies have shown that children who have a genetic propensity for weight gain are more likely to become obese if they grow up in an environment that promotes overeating and inactivity. Numerous studies confirm that when parents are obese, the risk of persistent obesity in their children increases three-fold. Monogenic (single gene) causes of obesity are being described with increasing frequency; this familial link to obesity, however, continues to represent only a minority of children with obesity. From a prevention perspective, it is more important to note that lifestyle patterns relating to nutrition and physical activity develop within the context of the family. Dietary energy and fat intake and physical activity profiles in children closely reflect those of their parents. Physical activity in pre-school children can be related to parental BMI. Reduced physical activity and increased sedentary behaviours in childhood are associated with higher levels of overweight and obesity. Rates of overweight and obesity also vary by family income. The importance of a number of additional risk factors including gestational diabetes and maternal smoking during pregnancy, reduced fetal growth, and bottle-feeding during infancy on the development of overweight in childhood remains to be fully elucidated.
SIGN (2003)	• Parental obesity should be recognised as a risk factor for childhood obesity to persist into adulthood. **(Recommendation Grade: C)** In the UK, the prevalence of obesity increases with age through childhood and adolescence, and there is no evidence of any marked difference in prevalence between boys and girls. Limited

	survey data suggest that the prevalence of obesity rises with increasing socioeconomic deprivation. No study has appropriately examined specific environmental factors, such as low habitual physical activity and inappropriately high habitual energy intake, which are believed to have causal roles in the current epidemic of childhood obesity.
SINGAPORE MOH (2004)	Overweight in a child under 3 years of age does not predict future obesity, unless at least one parent is also obese. After 3 years, the likelihood that obesity persists increases with advancing age of the child, and is higher in children with severe obesity in all age groups. The presence of obesity in at least one parent increases the risk of persistence in children at every age. In clinical evaluation of patients, practitioners should consider and exclude predisposing factors for, and secondary causes of, obesity. **(Good Practice Point)**
USPSTF (2005) **New**	No recommendations offered.
Strategies for Prevention of Obesity	
AAP (2003)	• Early recognition of excessive weight gain relative to linear growth should become routine in pediatric ambulatory care settings. BMI (kg/m^2) should be calculated and plotted periodically. • Families should be educated and empowered through anticipatory guidance to recognize the impact they have on their children's development of lifelong habits of physical activity and nutritious eating. • Dietary practices should be fostered that encourage moderation rather than overconsumption, emphasizing healthful choices rather than restrictive eating patterns. • Regular physical activity should be consciously promoted, prioritized, and protected within families, schools, and communities. • Optimal approaches to prevention need to combine dietary and physical activity interventions. • Advocacy is needed in the areas of physical activity and food policy for children; research into pathophysiology, risk factors, and early recognition and management of overweight and obesity; and improved insurance coverage and third-party reimbursement for obesity care. *Health Supervision* • Encourage, support, and protect breastfeeding. • Encourage parents and caregivers to promote healthy eating

	patterns • Routinely promote physical activity, including unstructured play at home, in school, in child care settings, and throughout the community. • Recommend limitation of television and video time to a maximum of 2 hours per day. • Recognize and monitor changes in obesity-associated risk factors for adult chronic disease, such as hypertension, dyslipidemia, hyperinsulinemia, impaired glucose tolerance, and symptoms of obstructive sleep apnea syndrome. *Advocacy* • Help parents, teachers, coaches, and others who influence youth to discuss health habits, not body habitus, as part of their efforts to control overweight and obesity. • Enlist help and support from public and private policy makers and organizations for programs that promote healthy eating and physical activity in children
AHA (2005) **New**	**Population-specific Interventions** For a public health approach, the most desirable prevention goal is to prevent children with a normal, desirable BMI (<85th percentile) from becoming at risk of overweight or overweight. Other levels of prevention also apply to a lesser degree: primary prevention, aimed at preventing at-risk-of-overweight children from becoming overweight (BMI $\geq$95th percentile), and secondary prevention, aimed at the treatment of overweight children to reduce comorbidities, reduce the severity of the problem, and normalize weight, if possible. Success is most likely to occur if appropriate prevention strategies and interventions are initiated throughout the life course, beginning in infancy. Strategies tailored to children in ethnic minority populations with a disproportionate risk of becoming obese are also needed. *Infants* Promoting breast-feeding is a promising prevention strategy given its potential protective effect on later obesity and overall benefits for nutrition. Such efforts require more attention to the incentives and barriers that affect rates of breast-feeding by different subgroups within the population, including the social and environmental variables that support or discourage women's decisions to breast-feed. *Toddlers* Strategies to achieve an optimal rate of pounds gained per inch

might help families and children acquire the critical life skills to enable them to better balance energy intake (diet) with energy expenditure (physical activity). Goals are to work toward establishing healthy environments at home, at school and in the community that encourage families and children to practice and maintain the life skills that are conducive to maintaining a healthy weight.

The important role of parenting skills and teacher training in helping young children learn and practice healthful behaviors has increasingly been recognized. Behavior targets include increasing consumption of fruits and vegetables ("5-a-day"), increasing consumption of fiber-containing grain products, switching from full-fat to 1% or fat-free dairy products after 2 years of age, preparing and eating family meals at home, increasing daily physical activity (e.g., active play 1 h/d), and limiting sedentary time (e.g., watching television $\leq$2 h/d).

School-Age Children and Adolescents

Most efforts to prevent obesity among school-age children and adolescents have been implemented in school settings. There is ample evidence that theory-based interventions that include classroom curricula, physical education curricula, changes in school meals, vending machines, and cafeterias, and after-school programs, can increase physical activity and improve dietary patterns in children and adolescents. Additional attention paid to applying theoretical models to develop interventions that are more relevant and motivating to children has produced a growing body of theory-based interventions in schools that have successfully reduced weight gain and obesity.

Exposure to various media may be important in considering population-based prevention efforts. For example, a substantial proportion of the advertising on children's television promotes food, and there is a direct relationship between television viewing and obesity. Furthermore, reducing television viewing has reduced weight gain and the prevalence of obesity in experimental trials.

Children in Ethnic Minority Populations

The challenge of obesity prevention includes the need to develop tailored strategies that are well matched to the social and cultural contexts of children in ethnic minority populations with a high risk of obesity. Eating, activity, and perceptions of weight and health are strongly influenced by cultural norms and culturally influenced attitudes and values. The relevant variables can be considered from programmatic, child, familial, and environmental perspectives that are then each specified along multiple related dimensions such as ethnic identification and related cultural

	attitudes, beliefs, and values; family and household characteristics; and socioeconomic status variables. Theoretical guidance to inform systematic approaches to developing culturally specific prevention strategies is available but not yet fully used or developed in relation to the specifics of obesity prevention. **Setting-specific Approaches** Setting-specific approaches target institutions that provide access to groups of children. Potential childhood obesity prevention settings include schools, Head Start programs, and other centers where preschoolers participate in groups; homes, where preschool children are cared for by parents and other caregivers; healthcare settings, where growth and weight status are routinely monitored; industries that develop television programs and other media, print books, and toys for preschoolers; and community and government programs and policies that affect families with young children. Typical interventions in physical settings are based on individual behavioral theories and designed to enhance motivation and teach behavior-change skills in large groups. In group settings, hands-on experiences with food or activity are often provided on site. Interventions in health care that teach providers effective counseling or deliver additional services can be effective, but there are significant barriers to implementation in such settings. Community-wide approaches include coordinated interventions in multiple settings and may include mass media components. Environmental and policy approaches are based on the concept that education and motivational interventions will be more effective in social and physical environments where healthful choices are the easier choices. Relevant environments include physical (what is available and promoted; e.g., food choices in homes, fast food advertisements on television, opportunities for or barriers to physical activity); economic (financial factors; e.g., the price of soda versus water, subsidies to sugar farmers); policy (rules; e.g., school food service standards, regulations on marketing that targets young children); and sociocultural (attitudes, perceptions, beliefs, and values such as fast food, everyday food, personal responsibility, and the ethos of governments).
RNAO (2005)	1. Nurses promote healthy eating and physical activity throughout the lifecycle beginning at an early age. **(Level IV)** 2. Nurses advocate for healthy public policies that include: • Monitoring and surveillance data at the population level regarding **(Level IV)**: • Nutrition;

	• Physical activity • Measures of adiposity including obesity and overweight status • Healthy community design. **(Level IV)** • Health promoting school policies. **(Level IIb)** • Legislation to limit advertising directed towards children. **(Level IIb)** • Community-wide campaigns. **(Level Ia)** 3. Nurses promote healthy eating and physical activity at population, community, family, and individual levels by planning, implementing, and evaluating interventions that are: • Tailored to the strengths and needs of the client and are **(Level IV)**: • Developmentally appropriate • Culturally and linguistically relevant • Gender-specific • Affordable and accessible **(Level IV)** • Focused on behaviour change **(Level IIb)** 4. Nurses maximize the effectiveness of their healthy lifestyle interventions through interactions that are of sufficient intensity and duration to effect behaviour change. **(Level Ia)** 5. Nurses support exclusive breastfeeding for infants until six months of age. **(Level III)** 6. Nurses promote healthy eating using Canada's Food Guide to Healthy Eating and focus on: • Using age-appropriate portion sizes • Emphasizing fruits and vegetables • Limiting sugar containing beverages (e.g., soft drinks and fruit juices) • Limiting consumption of energy-dense snack foods high in sugar and fat (e.g., potato chips, french fries, candy) • Breakfast consumption **(Level IV)** 7. Nurses promote healthy eating patterns using interventions with one or more of the following components: • Small group activities • Goal setting • Social support • Interactive food-related activities (e.g., cooking, taste-testing) • Family participation **(Level Ia)** 8. Nurses promote increased physical activity based on Canada's Physical Activity Guides for Children and Youth using interventions with one or more of the following components • Behaviour modification. **(Level Ib)** • Leisure activity of low intensity that is gradually increased to recommended levels. **(Level IV)** • Sustained, repeated interventions. **(Level IV)** 9. Nurses promote a decrease in sedentary activities with emphasis on reducing the amount of time clients spend

	watching TV, playing video games, and engaging in recreational computer use. **(Level Ib)** 10. Nurses work with school communities to implement school-based strategies for the prevention of obesity using a multi-component approach including: • Integrating healthy lifestyle messages into curricula • Advocating for and supporting the implementation of quality daily physical education taught by specialist physical education teachers • Advocating for and supporting the implementation of quality daily physical activity (including vigourous physical activity) • Using youth driven approaches with an information and advocacy component • Offering healthy choices in cafeterias and vending machines • Increasing physical activity opportunities at recess and during lunch breaks • Forming community partnerships and coalitions **(Level Ia)** 11. Nurses support a family-centred approach to promote healthy eating and physical activity. **(Level III)** 12. Nurses assist clients to access community resources and opportunities to engage in healthy eating and physical activity through: • Direct referral of clients to community resources • Dissemination of information about available community resources • Promotion of low and no cost physical activity options (e.g., hiking, walking, active commuting, and subsidized programs) **(Level IIa)** 13. Nurses are aware of, refer to, and collaborate with appropriate allied health providers based on findings from nursing assessment. **(Level IV)**
SIGN (2003)	• School, family, and societal interventions should be considered for the prevention of obesity in children. **(Recommendation Grade: C)** *Obesity in children may be prevented and treated by making lifestyle changes such as:* • *increasing physical activity* • *decreasing physical inactivity (e.g., TV watching)* • *encouraging a well balanced and healthy diet*
SINGAPORE MOH	No recommendations offered.

(2004)	
USPSTF (2005) New	• 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** *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 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 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.
Management of Overweight and Obesity	
AAP (2003)	No recommendations offered.
AHA (2005) New	The principal strategies for the treatment of overweight in children are similar to those for adults (dietary modification and increased physical activity), with treatment goals based on age, severity of obesity, and the results of risk factor assessment.

Guiding Principles

Five guiding principles are important for the treatment of overweight. These guiding principles can be summarized as follows:

1. Establish individual treatment goals and approaches based on the child's age, degree of overweight, and presence of comorbidities.
2. Involve the family or major caregivers in the treatment.
3. Provide assessment and monitoring frequently.
4. Consider behavioral, psychological, and social correlates of weight gain in the treatment plan.
5. Provide recommendations for dietary changes and increases in physical activity that can be implemented within the family environment and that foster optimal health, growth, and development.

Treatment of overweight should rarely be instituted before 2 years of age because of the rapid growth and development that occurs during these early years and lower correlation with overweight in later years.

Family involvement is critical in the treatment of childhood overweight. If treatment is initiated when a family is not ready to support the program, then success is unlikely. The treatment planned should also take into consideration long-term management with the continued assessment of the child for adequate growth and development because overweight is a long-term problem

Dietary Management

- Age-specific dietary modification is the cornerstone of treatment. The major goals in dietary management are to provide appropriate calorie intake, provide optimum nutrition for the maintenance of health and normal growth, and to help the child develop and sustain healthful eating habits.
- Estimated energy requirements vary throughout childhood and reflect large increments with a range of 570 to 3,152 kilocalories/day for boys and 520 to 2,368 kcal for girls from age 3 months to 16 years. In addition, caloric needs may vary widely even for children of the same age because of normal differences in size. Thus, individualizing the calorie-intake recommendation and monitoring weight change are essential. Healthcare professionals must help parents or caregivers recognize and prevent overeating.
- Because it is difficult for parents to judge calorie intake and energy expenditure on a regular basis, it is necessary to help parents guide the diet and physical activity patterns of their children. Counseling and recommendations must be made

within the context of the family's culture, living environment, and socioeconomic status. Involving children in meal planning, shopping, gardening, and preparation of food has been promoted, along with including all caregivers (including grandparents) in helping the child to adhere to recommended consumption patterns and healthier food choices.

Physical Activity

- Regular physical activity is critical for the prevention of abnormal weight gain and weight maintenance. The current recommendation for the amount of physical activity is 30 to 60 minutes of regular exercise daily. "Working up a sweat" during the activity suggests adequate effort expended. These recommendations apply to children of normal weight as well as to children who are overweight.
- Recommended activities must be enjoyable and congruent with the child's and family's lifestyle and be rewarding independent of the health benefit.
- A complementary approach is to restrict sedentary free-time activities to <2 hours/day.

Pharmacological Treatment

- Data supporting the use of pharmacological therapy for pediatric overweight are limited and inconclusive.
- Sibutramine has been studied in a randomized controlled trial of severe obesity. It has been shown to be efficacious as compared with behavior therapy alone, but it may be associated with side effects including increases in heart rate and blood pressure.
- Orlistat is approved for use in adolescence. The efficacy of orlistat has not been tested extensively in young patients. Orlistat is associated with gastrointestinal side effects and requires fat-soluble vitamin supplementation and monitoring.
- For rare genetic and metabolic disorders, pharmacological treatment may be useful. For example, recombinant leptin is useful in hereditary leptin deficiency. Octreotide may be useful in hypothalamic obesity. Metformin, used to treat type 2 diabetes mellitus, has been used in insulin-resistant children and adolescents who are overweight, but long-term efficacy and safety are unknown.

Surgical Treatment

- Surgical approaches to treat severe adolescent obesity are being undertaken by several centers. Indications used include a BMI >40 kilogram/m^2 and severe associated comorbidities, such as obstructive sleep apnea, type 2 diabetes mellitus, and pseudotumor cerebri.
- More severe elevation of BMI (>50 kilogram/m^2) may be an

	indication for surgical treatment in the presence of less severe comorbidities such as hypertension and dyslipidemia, particularly if the degree of overweight hinders performing the activities of daily living. • An experienced team approach including comprehensive medical and psychological evaluation is critical both for selection of appropriate candidates and for postoperative care that is sophisticated and often intense. • Weight loss goals and reduction of morbidity are often achieved with gastric bypass surgery. The rates of short-term mortality appear to be low, but significant complications can occur. Intermediate and long-term outcomes, including information on malabsorption of critical nutrients, are unknown. • Overall, surgical therapy should be reserved for full-grown adolescents with the severest obesity-related morbidity, offered only by experienced multidisciplinary teams, and presented to families with appropriate informed consent procedures.
RNAO (2005)	No recommendations offered.

SIGN (2003)	• Treatment should only be considered where:
	  • A child is defined obese (BMI ≥98th centile) and
	  • The child and family are perceived to be ready and willing to make the necessary lifestyle changes **(Recommendation Grade: D)**
	
	Weight Maintenance
	
	• In most obese children (BMI ≥98th centile) weight maintenance is an acceptable goal. **(Recommendation Grade: D)**
	• Weight maintenance and/or weight loss can only be achieved by sustained behavioural changes, for example:
	  • Healthier eating
	  • Increasing habitual physical activity (e.g., brisk walking) to a minimum of 30 minutes per day. In healthy children, 60 minutes of moderate-vigorous physical activity/day has been recommended
	  • Reducing physical inactivity (e.g., watching television and playing computer games) to <2 hours/day on average or the equivalent of 14 hours/week **(Recommendation Grade: D)**
	• In overweight children (BMI ≥91st centile) weight maintenance is an acceptable goal. Annual monitoring of BMI percentile may be appropriate to help reinforce weight maintenance and reduce the risk of children becoming obese.

	(Recommendation Grade: D)
	
	When to Refer
	
	• The following groups should be referred to hospital or community paediatric consultants before treatment is considered:
	  • Children who may have serious obesity-related morbidity that requires weight loss (e.g., benign intracranial hypertension, sleep apnoea; obesity hypoventilation syndrome, orthopaedic problems, and psychological morbidity)
	  • Children with a suspected underlying medical (e.g., endocrine) cause of obesity including all children under 24 months of age who are severely obese (BMI $\geq$99.6th centile)
	  • All children with BMI $\geq$99.6th centile (who are at higher risk of obesity-related morbidity)
	  (Recommendation Grade: D)
	
	Role of Secondary Care
	
	• For obese children over the age of seven years, who can demonstrate prolonged weight maintenance and who are cared for by secondary care services, modest weight loss (no more than 0.5kg/month) is an acceptable goal.
	  (Recommendation Grade: D)
	
	Note: No evidence on drug or surgical treatment of paediatric obesity met inclusion criteria and no drug is licensed currently for the treatment of obesity in children in the UK.

SINGAPORE MOH (2004)	*Dietary Changes* • In children, less restrictive diets should be used, rather than diets consisting of drastically altered portions of various nutrients, very low calorie diets, or protein sparing modified fast regimens. **(Grade B, Level III)** *Physical Activity* • Appropriately increased physical activity is recommended. Younger children generally need age-appropriate creative activities with generous periods of free play. Weight bearing activities are recommended for overweight children, non-weight bearing activities for obese children, and preferably supervised activities for severely obese children. In the older obese pre-adolescent and adolescent, decreased time on sedentary pursuits and increased activity such as a moderate intensity, progressive exercise program with increasing levels

	of obesity are recommended. **(Grade B, Level III)** *Behaviour Modification* • Behaviour-treatment programs have shown consistent success in weight loss. **(Grade B, Level IIa)** *Family Involvement* • Interventions for obesity in children should be directed at both the parents and the child, rather than the childe alone. **(Grade B, Level III)** *Pharmacotherapy* • There is no data on the long term efficacy and safety of medication in childhood and adolescent obesity. **(Grade C, Level)** *Bariatric Surgery* • Bariatric surgery cannot be recommended for most adolescents, but only for those at the highest risk of mortality from obesity, and with both patient and parental understanding of the consequences of surgery. **(Grade B, Level III)**
USPSTF (2005) **New**	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. *No specific recommendations are given concerning management of overweight and obesity.*

TABLE 3: BENEFITS AND HARMS	
Benefits	
AAP (2003)	Recommendations provide appropriate strategies for prevention of pediatric overweight and obesity.
AHA (2005) **New**	The short- and long-term association of obesity with morbid outcomes raises the level of importance for understanding overweight as a major public health concern for children and

	adolescents. Prevention and treatment of overweight and obesity in children and adolescents may help prevent these adverse outcomes.
RNAO (2005)	Interventions to improve nutrition and physical activity in children may provide children with immediate benefits such as: • Improvements in adult health • Modify chronic disease risks in childhood, thereby lowering rates and risks in adults • Modify children's health behaviours and thereby lead to improved and sustained behaviours in adulthood that could further reduce risks for a variety of chronic diseases
SIGN (2003)	Preventing obesity has many advantages given the limited evidence on the efficacy of treatment, the limited resources available for treatments, and the strong evidence of the adverse effects of child and adolescent obesity.
SINGAPORE MOH (2004)	Successful control of childhood obesity reduces likelihood of obesity in later life and prevalence of obesity-related disorders.
USPSTF (2005) **New**	Appropriate screening for overweight in children and adolescents
Harms	
AAP (2003)	None stated
AHA (2005) **New**	• Sibutramine has been studied in a randomized controlled trial of severe obesity. It has been shown to be efficacious as compared with behavior therapy alone, but it may be associated with side effects including increases in heart rate and blood pressure. • Orlistat is associated with gastrointestinal side effects and requires fat-soluble vitamin supplementation and monitoring. • The rates of short-term mortality appear to be low, but significant complications can occur with surgical treatment of obesity. Intermediate and long-term outcomes, including information on malabsorption of critical nutrients, are unknown.
RNAO (2005)	None stated

SIGN (2003)	The majority of published epidemiological work has used a definition of obesity as BMI >95th centile of the 1990 reference chart for age and sex and for comparative epidemiological purposes it is important to retain this definition. This definition has high specificity (it diagnoses few lean children as obese) but moderate sensitivity (that is, will fail to diagnose many of the fattest children as obese). As a diagnostic tool high specificity has been regarded as paramount since it reduces the likelihood that treatment will be offered to children who are not actually obese. The United Kingdom (UK) 1990 reference charts for BMI centiles for boys and girls give the 91 and 98 centile lines. For routine clinical use, the 98th centile is the recommended cut-off value defining obesity (refer to Annex 1 of the original guideline document). This is a pragmatic choice based on charts that are well accepted and widely available, and in this context means the UK 1990 reference charts for BMI centiles for children. These clinical definitions conflict with the majority of international literature, which has used a definition of BMI >85th centile of reference data for overweight and BMI >95th centile of reference data for obesity. It is important to maintain epidemiological definitions which are consistent with current literature. In future this may include the international cut-off values.
SINGAPORE MOH (2004)	Potential harms associated with the implementation of the guideline are detailed in the NGC summary. No harms are specifically noted regarding the prevention and management of obesity in children and adolescents. Refer to the NGC summary for details.
USPSTF (2005) **New**	There is insufficient evidence on the harms of screening. Potential harms of screening 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. 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.

Table 4: EVIDENCE AND RECOMMENDATION RATING SCHEMES

Rating Schemes	
RNAO (2005)	**Levels of Evidence** Ia - Evidence obtained from meta-analysis or systematic review of randomized controlled trials Ib - Evidence obtained from at least one well-designed randomized controlled trial IIa - Evidence obtained from at least one well-designed trial without randomization IIb - Evidence obtained from at least one other type of well-designed quasi-experimental study, without randomization III - Evidence obtained from well-designed non-experimental descriptive studies, such as comparative studies, correlation studies, and case studies IV - Evidence obtained from expert committee reports or opinions and/or clinical experiences of respected authorities
SIGN (2003)	**Grades of Recommendations** **A** - At least one meta-analysis, systematic review of randomised controlled trials (RCTs), or randomised controlled trial rated as 1++ and directly applicable to the target population; or A body of evidence consisting principally of studies rated as 1+, directly applicable to the target population, and demonstrating overall consistency of results **B** - A body of evidence including studies rated as 2++, directly applicable to the target population, and demonstrating overall consistency of results; or Extrapolated evidence from studies rated as 1++ or 1+ **C** - A body of evidence including studies rated as 2+, directly applicable to the target population and demonstrating overall consistency of results; or Extrapolated evidence from studies rate as 2++ **D** - Evidence level 3 or 4; or Extrapolated evidence from studies rated as 2+

	Levels of Evidence **1++** - High quality meta-analyses, systematic reviews of randomised controlled trials (RCTs), or RCTs with a very low risk of bias **1+** - Well-conducted meta-analyses, systematic reviews of RCTs, or RCTs with a low risk of bias **1-** - Meta-analyses, systematic reviews of RCTs, or RCTs with a high risk of bias **2++** - High quality systematic reviews of case control or cohort studies. High quality case control or cohort studies with a very low risk of confounding or bias and a high probability that the relationship is causal **2+** - Well-conducted case control or cohort studies with a low risk of confounding or bias and a moderate probability that the relationship is causal **2-** - Case control or cohort studies with a high risk of confounding or bias and a significant risk that the relationship is not causal **3** - Non-analytic studies (e.g. case reports, case series) **4** - Expert opinion
SINGAPORE MOH (2004)	**Grades of Recommendations** **Grade A** (evidence levels Ia, Ib): Requires at least one randomised controlled trial as part of the body of literature of overall good quality and consistency addressing the specific recommendation **Grade B** (evidence levels IIa, IIb, III): Requires availability of well conducted clinical studies but no randomised clinical trials on the topic of recommendation **Grade C** (evidence level IV): Requires evidence obtained from expert committee reports or opinions and/or clinical experiences of respected authorities. Indicates absence of directly applicable clinical studies of good quality. **GPP** (good practice points): Recommended best practice based on the clinical experience of the guideline development group

	Levels of Evidence **Level Ia**: Evidence obtained from meta-analysis of randomised controlled trials **Level Ib**: Evidence obtained from at least one randomised controlled trial **Level IIa**: Evidence obtained from at least one well-designed controlled study without randomisation **Level IIb**: Evidence obtained from at least one other type of well-designed quasi-experimental study **Level III**: Evidence obtained from well-designed non-experimental descriptive studies, such as comparative studies, correlation studies, and case studies **Level IV**: Evidence obtained from expert committee reports or opinions and/or clinical experiences of respected authorities
USPSTF (2005) **New**	**Strength of Recommendations** The USPSTF 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. **Strength of Evidence** The U.S. Preventive Services Task Force (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.

GUIDELINE CONTENT COMPARISON

The American Academy of Pediatrics (AAP), American Heart Association (AHA), Registered Nurses Association of Ontario (RNAO), Scottish Intercollegiate Guidelines Network (SIGN), Singapore Ministry of Health (Singapore MOH), and

U.S. Preventive Services Task Force (USPSTF) present recommendations for assessment, management, and prevention of overweight and obesity in children and adolescents. RNAO, SIGN, Singapore MOH, and USPSTF provide explicit reasoning behind their judgments, ranking the level of evidence for each major recommendation; rationale for AAP's and AHA's recommendations is provided in narrative form.

Both AAP and RNAO guidelines focus primarily on identification and prevention of overweight and obesity in the pediatric population, providing recommendations directed at the community, school, family, and individual. Neither addresses management, as do AHA, SIGN, and Singapore MOH. Singapore MOH provides recommendations for assessment and management of overweight and obesity, focusing less on preventive strategies. Singapore also provides recommendations for adult populations, which are considered in a separate synthesis titled Assessment and Treatment of Obesity and Overweight in Adults. USPSTF focuses specifically on screening and prevention, although the guideline also reviews the evidence for treatment interventions. The reader should bear in mind that each guideline group focuses on overweight and obesity within its own population group (i.e., the pediatric populations of the United States, Canada, United Kingdom, and Singapore). Some, but not all, of the recommendations may be generalizable to other populations.

Areas of Agreement

Assessment/Risk Factors

All six guidelines agree that BMI percentile is the key measure for defining overweight and obesity in children and adolescents. The groups acknowledge the standard epidemiological definitions for overweight and obesity in children: a BMI between 85th and 95th percentile for age and sex is considered at risk of overweight, whereas a BMI at or above the 95th percentile is considered overweight or obese. Singapore MOH, however, indicates that BMI cut-offs for Asians might actually be lower, and SIGN references different BMI criteria for "clinical use." These differences are discussed below.

In addition to BMI, AAP, RNAO, SIGN, and Singapore MOH advise health care providers to evaluate other risk factors for obesity. Parental obesity is identified by these 4 groups as being a strong predictor that an obese child will become an obese adult. The evidence for other risk factors, with the exception of certain childhood syndromes (e.g., Praeder-Willi syndrome) or diseases (e.g., hypothyroidism), is less clear. In addition, these 4 groups cite physical inactivity and increased television viewing as probable risk factors for overweight and obesity. AHA, while not identifying specific risk factors to look for, notes that the identification of risk for overweight before adolescence is encouraged so that health habits can be improved at a stage of increased parental influence and control. USPSTF does not provide recommendations regarding other risk factors.

Prevention

AAP, AHA, RNAO, and SIGN all address prevention of obesity in their guidelines, and they all clearly state that successful prevention approaches need the

cooperation of families, schools, and the community. Interventions should emphasize healthy eating and physical activity.

Management

AHA, SIGN, and Singapore MOH provide recommendations on management of pediatric overweight and obesity. All three groups agree that, in general, the goal of obesity interventions is to maintain weight while allowing height growth to continue so that eventually the child's BMI percentile is reduced. Healthful, nutritionally balanced diets and increased physical activity are recommended to accomplish this goal. SIGN recommends weight-loss diets only in obese children over the age of seven who are being managed in secondary care services, and AHA recommends an individualized approach, including weight loss in conjunction with other treatment modalities for overweight children (BMI $\geq$95th percentile. None of the groups routinely recommends drastic dieting or pharmacological or surgical interventions for children. AHA acknowledges that there are times when pharmacological intervention may be useful, but says that the data are limited and inconclusive. Both AHA and Singapore MOH advise against bariatric surgery with the exception of very high-risk adolescents.

Areas of Differences

Assessment - BMI

As mentioned above, there is a difference among groups in the interpretation of BMI percentiles for overweight and obesity in "clinical use." SIGN, in particular, deviates from international standards of overweight and obesity in its guidelines by using the United Kingdom (UK) 1990 reference charts for BMI centiles. This chart gives cut-offs for overweight and obesity at the 91st and 98th centile lines, respectively, rather than the 85th and 95th centiles used in the majority of the international literature. SIGN states that this is "a pragmatic choice based on charts that are well accepted and widely available." The standards have a high specificity, which means that there is little chance that children who are not obese will be treated. SIGN, however, does acknowledge the conflict with standard definitions of overweight and obesity.

Differences in the Singapore MOH guideline for BMI cut-offs reflect differences in the Asian population. Recent studies among Asians have shown that Asians have higher levels of body fat percentage compared to age- and sex-matched Caucasians with the same BMI. Lower BMI cut-offs are thus being proposed.

Screening/Prevention/Management

While USPSTF acknowledges the importance of measuring and monitoring growth over time in children, they differ in their recommendations compared with other groups, in that they could not recommend for or against routine screening for overweight as a means to prevent adverse health outcomes. They found no direct evidence that screening for overweight, in children and adolescents, improves age-appropriate behavioral or psychological measures or health outcomes, and they 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.

This Synthesis was prepared by ECRI on March 2, 2005. The information was verified by SIGN on April 12, 2005. It was updated to include RNAO on June 21, 2005, and to include AHA and USPSTF on July 22, 2005. The information was verified by AHA on August 23, 2005 and by USPSTF on September 19, 2005.

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