



## NATIONAL GUIDELINE CLEARINGHOUSE™ (NGC) GUIDELINE SYNTHESIS

### ASSESSMENT AND TREATMENT OF OBESITY AND OVERWEIGHT IN ADULTS

#### Guidelines

1. American College of Physicians (ACP). [Pharmacologic and surgical management of obesity in primary care: a clinical practice guideline from the American College of Physicians](#). Ann Intern Med. 2005 Apr 5;142(7):525-31. [43 references]
2. Finnish Medical Society Duodecim. [Treatment of obesity](#). In: EBM Guidelines. Evidence-Based Medicine [Internet]. Helsinki, Finland: Duodecim Medical Publications Ltd.; 2006 Sep 20 [various].
3. Singapore Ministry of Health (MOH). [Obesity](#). Singapore Ministry of Health - National Government Agency [Non-U.S.] 2004
4. United States Preventive Services Task Force (USPSTF). [Screening for obesity in adults: recommendations and rationale](#). Ann Intern Med 2003 Dec 2;139(11):930-2. [5 references]

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### **INTRODUCTION**

A direct comparison of the American College of Physicians (ACP), Finnish Medical Society Duodecim (FMSD), Singapore Ministry of Health (Singapore MOH), and the United States Preventive Services Task Force (USPSTF) recommendations for assessment/screening and treatment of overweight and obesity in adults is provided in the tables, below.

[Table 1](#) provides the scope of the guidelines, [Table 2](#) and [Table 3](#) compare the major recommendations, and [Table 4](#) compares the potential benefits and harms of implementing the recommendations. Definitions for the levels of evidence used to support the guideline recommendations for FMSD, USPSTF, and Singapore MOH are given in [Table 5](#).

The comparisons given in the tables are restricted to recommendations for assessment and management of overweight and obesity in the adult population only. Recommendations concerning overweight and obesity in children and adolescents are compared in a separate synthesis [Overweight and Obesity in Children and Adolescents: Assessment, Prevention, and Management](#).

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

- ACP, American College of Physicians
- BMI, body mass index
- FMSD, Finnish Medical Society Duodecim
- LCD, low calorie diet
- MOH, Ministry of Health (Singapore)
- USPSTF, United States Preventive Services Task Force
- VLCD, very low calorie diet

**TABLE 1: COMPARISON OF SCOPE AND CONTENT**

<b>Objective and Scope</b>	
<b>ACP (2005)</b>	<ul style="list-style-type: none"> <li>To provide recommendations based on a review of the evidence on pharmacologic and surgical treatments of obesity</li> <li>To complement the guidelines on screening for obesity developed by the U.S. Preventive Services Task Force</li> </ul>
<b>FMSD (2006)</b>	Evidence-Based Medicine Guidelines collect, summarize, and update the core clinical knowledge essential in general practice. The guidelines also describe the scientific evidence underlying the given recommendations.
<b>SINGAPORE MOH (2004)</b>	<ul style="list-style-type: none"> <li>To assist health care professionals who have a role in managing overweight or obese patients</li> <li>To provide current evidence-based clinical practice recommendations on various aspects of obesity management found across various medical disciplines</li> <li>To provide a framework to assist doctors in the management of overweight and obesity without restricting the physician's individual judgment</li> <li>To provide a review of the various medical, surgical, and ancillary intervention modalities in the management of obesity</li> <li>To aid primary care physicians in basic management of obesity and subsequent referrals to specialists for more resistant cases</li> </ul>
<b>USPSTF (2003)</b>	<ul style="list-style-type: none"> <li>To summarize the USPSTF recommendations on screening for obesity in adults based on the USPSTF's examination of evidence specific to obesity and overweight in adults</li> <li>To update the 1996 recommendations contained in the Guide to Clinical Preventive Services, Second Edition</li> </ul>
<b>Target Population</b>	
<b>ACP (2005)</b>	<ul style="list-style-type: none"> <li>United States</li> <li>Patients with a body mass index (BMI) <math>\geq 30</math> kg/m<sup>2</sup></li> </ul> <p><b>Note:</b> The target patient populations vary according to the intervention under consideration, since pharmacologic and surgical trials have used different selection criteria with differing BMIs and comorbid conditions. This guideline does not apply to patients with BMIs below 30 kg/m<sup>2</sup></p>
<b>FMSD (2006)</b>	<ul style="list-style-type: none"> <li>Finland</li> </ul>

	<ul style="list-style-type: none"> <li>• Patients who are obese</li> </ul>
<b>SINGAPORE MOH (2004)</b>	<ul style="list-style-type: none"> <li>• Singapore</li> <li>• Adults in Singapore who are obese or overweight, or who are at risk of obesity</li> </ul> <p><b>Note:</b> Children and adolescents are also considered in this guideline; recommendations concerning these younger age groups are covered in a separate synthesis, <a href="#">Overweight and Obesity in Children and Adolescents: Assessment, Prevention, and Management</a>.</p>
<b>USPSTF (2003)</b>	<ul style="list-style-type: none"> <li>• United States</li> <li>• Adults seen in primary care settings</li> </ul>
<b>Intended Users</b>	
<b>ACP (2005)</b>	Advanced Practice Nurses Allied Health Personnel Nurses Physician Assistants Physicians
<b>FMSD (2006)</b>	Dietitians Health Care Providers Nurses Physicians
<b>SINGAPORE MOH (2004)</b>	Advanced Practice Nurses Allied Health Personnel Dietitians Nurses Physician Assistants Psychologists/Non-Physician Behavioral Health Clinicians Public Health Departments Respiratory Care Practitioners
<b>USPSTF (2003)</b>	Advanced Practice Nurses Allied Health Personnel Dietitians Nurses Physician Assistants Physicians Psychologists/Non-physician Behavioral Health Clinicians
<b>Interventions and Practices Considered</b>	
<b>ACP (2005)</b>	<b>Counseling</b>

	<ol style="list-style-type: none"> <li>1. Dietary and physical activity counseling</li> </ol> <p><b>Management/Treatment</b></p> <ol style="list-style-type: none"> <li>1. Determination of weight loss and other therapeutic goals (for BMI <math>\geq</math> 30 kg/m<sup>2</sup>)</li> <li>2. Pharmacotherapy (drugs considered: sibutramine, orlistat, phentermine, diethylpropion, fluoxetine, bupropion) (for BMI <math>\geq</math> 30 kg/m<sup>2</sup>)</li> <li>3. Lifestyle modifications such as diet and exercise</li> <li>4. Surgery (for BMI <math>\geq</math> 40 kg/m<sup>2</sup>)</li> </ol>
<p><b>FMSD (2006)</b></p>	<p><b>Assessment</b></p> <ol style="list-style-type: none"> <li>1. Assess the need for treatment using BMI</li> </ol> <p><b>Counseling/Treatment</b></p> <ol style="list-style-type: none"> <li>1. Basic treatment (lifestyle counseling regarding behaviour, diet, and exercise)</li> <li>2. Goal setting</li> <li>3. Dietary modifications including VLCD</li> <li>4. Behavior therapy</li> <li>5. Pharmacotherapy (orlistat, sibutramine, rimonabant)</li> <li>6. Surgical treatment (gastroplasty, gastric banding, or gastric bypass)</li> <li>7. Follow-up</li> </ol> <p><b>Note:</b> Guideline developers considered but did not specifically recommend guar gum, ephedrine, ephedrine plus caffeine, dietary supplements containing ephedra, or chitosan.</p>
<p><b>SINGAPORE MOH (2004)</b></p>	<p><b>Assessment</b></p> <ol style="list-style-type: none"> <li>1. BMI</li> <li>2. Waist circumference</li> <li>3. Evaluation of risk factors for, and secondary causes of, obesity</li> <li>4. Screening for comorbid conditions</li> <li>5. Evaluation of patient motivation</li> </ol> <p><b>Management/Treatment</b></p> <ol style="list-style-type: none"> <li>1. Goal setting</li> <li>2. Dietary therapy (decrease in calorie intake, macronutrient composition, meal size and distribution of food intake during day, low-calorie and very-low calorie diets)</li> <li>3. Physical activity and exercise</li> <li>4. Behavior therapy</li> </ol>

	<ol style="list-style-type: none"> <li>5. Pharmacotherapy (e.g., orlistat, sibutramine, phentermine, mazindol, metformin)</li> <li>6. Non-prescription and off-label weight loss supplements</li> <li>7. Surgery (including, gastric bypass, vertical banded gastroplasty, or laparoscopic banding)</li> <li>8. Weight loss maintenance</li> </ol> <p><b>Referrals</b></p> <p>Evaluation for depression and binge-eating disorders with referrals</p> <p><b>Note:</b> Interventions for assessment and treatment of overweight and obesity in adolescents and children were also considered in this guideline. These interventions are addressed in a separate synthesis <a href="#">Overweight and Obesity in Children and Adolescents: Assessment, Prevention, and Management</a>.</p>
<p><b>USPSTF (2003)</b></p>	<p><b>Assessment/Screening</b></p> <ol style="list-style-type: none"> <li>1. BMI</li> <li>2. Waist circumference</li> </ol> <p><b>Management</b></p> <p><i>Combined counseling and behavioral interventions including:</i></p> <ol style="list-style-type: none"> <li>1. Low-, moderate- and high-intensity counseling</li> <li>2. Nutritional education</li> <li>3. Behavioral strategies including the 5-A framework (Assess, Advise, Agree, Assist, and Arrange)</li> </ol> <p><b>Note:</b> Treatment interventions such as medications (orlistat and sibutramine) and surgery (gastric bypass, vertical banded gastroplasty, and adjustable gastric banding) were considered.</p>

<p align="center"><b>TABLE 2: COMPARISON OF RECOMMENDATIONS FOR ASSESSMENT OF OVERWEIGHT AND OBESITY, MOTIVATION TO LOSE WEIGHT, AND PREVENTIVE COUNSELING</b></p>	
<p align="center"><b>Key Measures (Weight, BMI, Waist Circumference) Overweight/Obesity Classification</b></p>	
<p><b>ACP (2005)</b></p>	<p>No recommendations offered. ACP refers to the USPSTF guidelines for screening for obesity in adults.</p>
<p><b>FMSD (2006)</b></p>	<p><b>Assessment of the Need of Treatment</b></p>

	<ul style="list-style-type: none"> <li>• Overweight (mild obesity): BMI 25 to 30 kg/m<sup>2</sup> <ul style="list-style-type: none"> <li>• Usually no treatment is indicated.</li> <li>• Treatment (Glenny &amp; O'Meara, 1997; Avenell et al., 2004) [<b>A</b>] is indicated in central obesity, metabolic syndrome (see Finnish Medical Society Duodecim guideline "Metabolic Syndrome [MBS]"), or non-insulin-dependent diabetes.</li> </ul> </li> <li>• Moderate obesity: BMI 30 to 35 kg/m<sup>2</sup> <ul style="list-style-type: none"> <li>• Treatment (Glenny &amp; O'Meara, 1997; Avenell et al., 2004) [<b>A</b>] is always indicated if the patient has diabetes, hypertension, hyperlipidaemia, or other associated disease (Douketis et al., 1999) [<b>B</b>].</li> <li>• A young obese person with good health should be treated. The treatment of middle-aged persons is decided individually according to the available resources.</li> </ul> </li> <li>• Severe obesity: BMI &gt;35 kg/m<sup>2</sup> <ul style="list-style-type: none"> <li>• Must always be treated</li> </ul> </li> </ul>
<p><b>SINGAPORE MOH (2004)</b></p>	<ul style="list-style-type: none"> <li>• BMI is the recommended index to define overweight and obesity. It is minimally correlated with height and highly correlated with body fat percentage and levels of disease risk of comorbidities. Body weight alone can be used to follow weight loss and to determine efficacy of therapy. (<b>Grade B, Level III</b>)</li> <li>• Current World Health Organization (WHO) and international guidelines recommend BMI cutoffs of 25 and 30 kg/m<sup>2</sup> to define overweight and obesity, respectively. Based on body fat equivalence and comorbid disease risk, BMIs of 23 and 27.5 kg/m<sup>2</sup>, respectively have been recommended as cutoff points for public health action in Asians. (<b>Grade C, Level IV</b>) <i>Note:</i> BMI cutoff points are currently being reviewed in the light of new data.</li> <li>• Waist circumference is the most practical anthropometric measurement for assessing a patient's abdominal fat content before and during weight loss treatment. Gender-specific waist circumference cutoffs should be used in conjunction with BMI to identify increased disease risk. (<b>Grade B, Level III</b>)</li> <li>• Current international guidelines recommend waist circumference cutoffs of 102 and 88 cm to define excess risk in males and females, respectively. Based on an Asian-Pacific consensus and our National Health Survey and comorbid disease risk, cutoffs of 90 and 80 cm, respectively, are probably more appropriate for Asians. (<b>Grade C, Level IV</b>)</li> </ul>
<p><b>USPSTF (2003)</b></p>	<p>The USPSTF found good evidence that BMI, calculated as weight in kilograms divided by height in meters squared, is reliable and valid for identifying adults at increased risk for mortality and</p>

	<p>morbidity due to overweight and obesity.</p> <p>Persons with a BMI between 25 and 29.9 are overweight, and those with a BMI of <math>\geq 30</math> are obese. There are 3 classes of obesity: class I (BMI 30 to 34.9), class II (BMI 35 to 39.9), and class III (BMI 40 and above).</p> <p>Central adiposity increases the risk for cardiovascular and other diseases independent of obesity. Clinicians may use the waist circumference as a measure of central adiposity. Men with waist circumferences <math>&gt;102</math> cm (<math>&gt;40</math> inches) and women with waist circumferences <math>&gt;88</math> cm (<math>&gt;35</math> inches) are at increased risk for cardiovascular disease. The waist circumference thresholds are not reliable for patients with a BMI <math>&gt;35</math>.</p>
<b>Assessment of Other Risk Factors or Comorbidities</b>	
<b>ACP (2005)</b>	<p>No specific recommendations offered.</p> <p>However, the assessment of comorbid conditions is indicated in an algorithm contained in the original guideline for the suggested management of obesity. Obesity-related comorbid conditions such as hypertension, impaired glucose tolerance, diabetes mellitus, hyperlipidemia, and obstructive sleep apnea are noted in the original guideline.</p>
<b>FMSD (2006)</b>	<p><b>Assessment of the Need of Treatment</b></p> <ul style="list-style-type: none"> <li>• Overweight (mild obesity): BMI 25 to 30 kg/m<sup>2</sup> <ul style="list-style-type: none"> <li>• Treatment (Glenny &amp; O'Meara, 1997; Avenell et al., 2004) [<b>A</b>] is indicated in central obesity, metabolic syndrome (see Finnish Medical Society Duodecim guideline "Metabolic Syndrome [MBS]"), or non-insulin-dependent diabetes.</li> </ul> </li> <li>• Moderate obesity: BMI 30-35 kg/m<sup>2</sup> <ul style="list-style-type: none"> <li>• Treatment (Glenny &amp; O'Meara, 1997; Avenell et al., 2004) [<b>A</b>] is always indicated if the patient has diabetes, hypertension, hyperlipidaemia, or other associated disease (Douketis et al., 1999) [<b>B</b>].</li> </ul> </li> </ul>
<b>SINGAPORE MOH (2004)</b>	<ul style="list-style-type: none"> <li>• In clinical evaluation of patients, practitioners should consider and exclude predisposing factors for, and secondary causes of, obesity. (<b>GPP</b>)</li> <li>• Overweight and obese adults should be screened for comorbid conditions and should be stratified according to their health risks, in particular for cardiovascular disease, prior to the commencement of treatment. (<b>Grade C, Level IV</b>)</li> <li>• The presence of depression and binge eating disorders in</li> </ul>



	obese patients must be evaluated for, with appropriate referral for psychiatric treatment. <b>(Grade B, Level IIa)</b>
<b>USPSTF (2003)</b>	No recommendations offered.
<b>Assessment of Patient Motivation to Lose Weight</b>	
<b>ACP (2005)</b>	No recommendations offered.
<b>FMSD (2006)</b>	No recommendations offered.
<b>SINGAPORE MOH (2004)</b>	Patient motivation is an important prerequisite of weight loss management and should be relatively high before initiating therapy. Proper evaluation of issues related to motivation should be undertaken. <b>(Grade C, Level IV)</b>
<b>USPSTF (2003)</b>	No recommendations offered.
<b>Screening and General Preventive Counseling for Overweight and Obesity</b>	
<b>ACP (2005)</b>	<ul style="list-style-type: none"> <li>• Clinicians should counsel all obese patients (defined as those with a body mass index [BMI] <math>\geq 30</math> kg/m<sup>2</sup>) on lifestyle and behavioral modifications such as appropriate diet and exercise.</li> <li>• ACP also refers to the USPSTF guidelines for screening for obesity in adults, where a recommendation is made for clinicians to offer intensive counseling and behavioral interventions to promote sustained weight loss for obese adults.</li> </ul>
<b>FMSD (2006)</b>	The guideline offers specific counseling/education interventions for the following topics: knowledge and attitudes, changes in meals, changes in physical exercise, and changes in eating behavior. Refer to the individual sections of this synthesis for discussion of these topics.
<b>SINGAPORE MOH (2004)</b>	No recommendations offered.
<b>USPSTF (2003)</b>	<ul style="list-style-type: none"> <li>• The USPSTF recommends that clinicians screen all adult patients for obesity and offer <i>intensive</i> counseling and behavioral interventions to promote sustained weight loss for</li> </ul>

obese adults. **B recommendation**

The USPSTF concluded that the benefits of screening and behavioral interventions outweigh potential harms.

- The USPSTF concludes that the evidence is insufficient to recommend for or against the use of *moderate- or low-intensity counseling* together with behavioral interventions to promote sustained weight loss in obese adults. **I recommendation**

The USPSTF found limited evidence to determine whether moderate- or low-intensity counseling with behavioral interventions produces sustained weight loss in obese (as defined by BMI >30 kg/m<sup>2</sup>) adults. The relevant studies were of fair to good quality but showed mixed results. In addition, studies were limited by small sample sizes, high drop-out rates, potential for selection bias, and reporting the average weight change instead of the frequency of response to the intervention. As a result, the USPSTF could not determine the balance of benefits and potential harms of these types of interventions.

- The USPSTF concludes that the evidence is insufficient to recommend for or against the use of counseling of any *intensity* and behavioral interventions to promote sustained weight loss in overweight adults. **I recommendation.**

The USPSTF found limited data that addressed the efficacy of counseling-based interventions in overweight adults (as defined by BMI from 25 to 29.9 kg/m<sup>2</sup>). As a result, the USPSTF could not determine the balance of benefits and potential harms of counseling to promote sustained weight loss in overweight adults.

Counseling interventions include a variety of approaches aimed at promoting change in diet and/or physical activity. Behavioral interventions include strategies that assist patients to acquire skills, improve motivation, and develop supports. The 5-A framework (*Assess, Advise, Agree, Assist, and Arrange*) has been used in behavioral counseling interventions and may be a useful tool to help clinicians guide interventions for weight loss.

**Note:** The USPSTF defined intensity of counseling by the frequency of the intervention. A high intensity intervention is more than 1 person-to-person (individual or group) session per month for at least the first 3 months of the intervention. A medium intensity intervention is a monthly intervention and anything less frequent is a low-intensity intervention.

**TABLE 3. COMPARISON OF RECOMMENDATIONS FOR**

<b>TREATMENT/MANAGEMENT OF OVERWEIGHT AND OBESITY</b>	
<b>Setting Goals for Weight Loss Management</b>	
<b>ACP (2005)</b>	<ul style="list-style-type: none"> <li>Clinicians should counsel all obese patients (defined as those with a body mass index [BMI] <math>\geq 30</math> kg/m<sup>2</sup>) on lifestyle and behavioral modifications such as appropriate diet and exercise, and the patient's goals for weight loss should be individually determined (these goals may encompass not only weight loss but also other parameters, such as decreasing blood pressure or fasting blood glucose levels).</li> </ul>
<b>FMSD (2006)</b>	<p><b>Goals that Can Be Measured</b></p> <ul style="list-style-type: none"> <li><b>The optimal rate of weight reduction is 0.5 kg/week.</b> As the adipose tissue contains about 30 MJ (7,000 kcal)/kg, a daily reduction of 2,100 kJ (500 kcal) in the energy intake will result in this rate of weight reduction.</li> <li>The goal is to reduce weight by 5 to 10%, which already results in significant benefit in the treatment of diseases associated with obesity.</li> <li>A permanent result is always aimed at. This means that the changes in living habits must be permanent.</li> <li>There are many treatments with no proven efficacy. Appetite-suppressant drugs may result in a moderate weight reduction but the effect is transient.</li> </ul>
<b>SINGAPORE MOH (2004)</b>	<ul style="list-style-type: none"> <li>It is important to set realistic goals for weight loss and provide sound advice on lifestyle modification. Modest weight loss (e.g., 10% body weight over 6 months) is more realistic and attainable than aiming for weight reduction to ideal body weight, and does result in a reduction in obesity morbidity. <b>(Grade C, Level IV)</b></li> </ul>
<b>USPSTF (2003)</b>	No recommendations offered
<b>Basic Treatment Strategy</b>	
<b>ACP (2005)</b>	<p>ACP recommends that all clinicians refer to the USPSTF recommendations on screening for obesity as part of an overall strategy for managing overweight and obesity, which should always included appropriate diet and exercise for all patients who are overweight or obese.</p> <p>ACP also presents an algorithm for the suggested management of obesity, including assessment of comorbid conditions and</p>

	<p>determination of weight loss goals, recommendations for weight loss through diet, exercise and lifestyle modifications, followed by pharmacologic and/or surgical treatment options. The algorithm also emphasizes the need for patients continue weight and lifestyle management with diet and exercise.</p>
<p><b>FMSD (2006)</b></p>	<p><b>Selecting the Method of Treatment</b></p> <ol style="list-style-type: none"> <li>1. Basic treatment consisting of a gradual and permanent change in living habits by counselling and guidance <ul style="list-style-type: none"> <li>• Well suited for patients with mild and moderate obesity and for the majority of patients with severe obesity; should always be included in other forms of conservative treatment</li> </ul> </li> <li>2. Basic treatment and a very low calorie diet <ul style="list-style-type: none"> <li>• Well suited for morbid and severe obesity</li> <li>• A choice in moderate obesity if the basic treatment has been unsuccessful and there is a strong indication for reducing weight (associated diseases)</li> </ul> </li> <li>3. Drugs (orlistat, sibutramine, rimonabant) <ul style="list-style-type: none"> <li>• Do not automatically help all patients</li> <li>• An alternative especially if other approaches have been failed</li> <li>• Life-style counselling must also be included</li> </ul> </li> <li>4. Surgical treatment <ul style="list-style-type: none"> <li>• Suitable only for selected patients with morbid obesity (see criteria in the "Obesity Surgery" section, below).</li> </ul> </li> </ol> <p><b>Basic Treatment</b></p> <p><i>Organisation</i></p> <ul style="list-style-type: none"> <li>• <b>Group treatment</b> is less costly and as effective as individualised treatment <ul style="list-style-type: none"> <li>• At least 10 meetings are arranged with about one-week intervals.</li> <li>• The group leader is a nurse or a dietician with special training in the treatment of obesity.</li> </ul> </li> </ul>
<p><b>SINGAPORE MOH (2004)</b></p>	<ul style="list-style-type: none"> <li>• A multifaceted or multidisciplinary strategy should be utilized to achieve and maintain weight loss. Depending on patient response, this could be adequately achieved at the primary health care level or tertiary level. <b>(Grade C, Level IV)</b></li> <li>• The combination of dietary caloric restriction, physical activity and behavioural modification results in greater and more sustained weight loss than the individual modalities. <b>(Grade</b></li> </ul>

	<b>A, Level Ib)</b>
<b>USPSTF (2003)</b>	<ul style="list-style-type: none"> <li>• There is fair to good evidence that high-intensity counseling--about diet, exercise, or both--together with behavioral interventions aimed at skill development, motivation, and support strategies produces modest, sustained weight loss (typically 3 to 5 kg for 1 year or more) in adults who are obese (as defined by BMI <math>\geq 30</math> kg/m<sup>2</sup>).</li> </ul>
<b>Dietary Restriction</b>	
<b>ACP (2005)</b>	Dietary restriction recommendations are not specifically offered in the guideline, as the guideline focuses on pharmacologic and surgical management. However the developer does refer to the USPSTF guideline on screening for obesity and notes that clinicians should counsel all obese patients (defined as those with a body mass index [BMI] $\geq 30$ kg/m <sup>2</sup> ) on lifestyle and behavioral modifications such as appropriate diet and exercise.
<b>FMSD (2006)</b>	<p><b>Aims and Contents of Counseling</b></p> <ul style="list-style-type: none"> <li>• Changes in meals (Miller, Koceja, &amp; Hamilton, 1997) [<b>A</b>] <ul style="list-style-type: none"> <li>• Find out the present contents of meals.</li> <li>• Reduce intake by about 2,000 kJ (500 kcal) daily.</li> <li>• The main emphasis is on the reduction of fat intake (Pirozzo et al., 2002) [<b>B</b>].</li> <li>• Remember alcohol as a cause of obesity.</li> <li>• Small daily changes are effective in the long run.</li> <li>• Keep three daily meals.</li> </ul> </li> </ul> <p><b>VLCD</b></p> <ul style="list-style-type: none"> <li>• Reference: (Anderson, Hamilton, &amp; Brinkman-Kaplan, 1992)</li> <li>• Constituents <ul style="list-style-type: none"> <li>• 1,700 to 2,100 kJ (400 to 500 kcal) of energy, a maximum of 3,300 kJ (800 kcal) daily</li> <li>• Protein as needed (at least 50 g daily)</li> <li>• Essential fatty acids, trace elements, and vitamins as needed</li> </ul> </li> <li>• Schedule <ul style="list-style-type: none"> <li>• Ready-made commercial formulas should be used as the only food continuously for 8 to 10 weeks in severe obesity and for a shorter period in milder obesity, but usually for a minimum of 6 weeks.</li> <li>• The patient is followed up at 1 to 2 week intervals.</li> <li>• Suitable for patients with non-insulin-dependent (type 2) diabetes and hypertension. Insulin treatment is stopped or the dose is reduced considerably, and the</li> </ul> </li> </ul>

	<p>dose of sulphonylureas is halved (risk of hypoglycaemia) before starting VLCD. The doses of other drugs need not be reduced.</p> <ul style="list-style-type: none"> <li>• The rate of weight reduction is about 1.5 to 2 kg/week, and the short-term weight reduction is 2 to 2.5 times that on basic treatment.</li> <li>• A VLCD alone does not yield permanent results. Basic treatment for permanent life-style changes is applied in the normal fashion.</li> </ul>
<p><b>SINGAPORE MOH (2004)</b></p>	<ul style="list-style-type: none"> <li>• The most important dietary component of weight loss and maintenance is a decrease in caloric intake. Typically, a 500 to 1,000 kcal per day reduction produces the recommended 0.5 to 1 kg per week weight loss. In the absence of physical activity, a diet that contains 1,400 to 1,500 kcal/day, regardless of macronutrient content, results in weight loss. Sustained dietary modification is necessary to maintain weight loss. <b>(Grade A, Level Ib)</b></li> <li>• Diets containing different proportions of the major macronutrients, such as moderate-fat balanced nutrient-reduction diets; high-fat, low-carbohydrate diets; and low- or very-low-fat, high-carbohydrate diets have all been shown to reduce weight. Weight loss appears to be more associated with reduced caloric intake and increased diet duration, rather than the macronutrient content per se. A diet moderately restricted in total fat, moderate to high in complex carbohydrates, and moderate in protein is the most widely recommended diet. <b>(Grade C, Level IV)</b></li> <li>• The distribution of food intake should be as even as possible throughout the day, and meals should not be skipped as a weight control method. Meals should be adequately sized so that snacks are not needed between meals. <b>(Grade C, Level IV)</b></li> <li>• LCDs and VLCDs may be useful shorter term adjuncts (up to 6 months) for weight loss, but sustained modification of food intake is necessary to maintain weight loss. The use of these diets as part of a meal replacement strategy appears useful. The combination of a controlled energy diet (LCD or VLCD), increased physical activity, and behaviour therapy appears to provide the most successful outcome for weight loss and maintenance. <b>(Grade A, Level Ib)</b></li> </ul>
<p><b>USPSTF (2003)</b></p>	<p>The most effective interventions combine nutrition education and diet and exercise counseling with behavioral strategies to help patients acquire the skills and supports needed to change eating patterns and to become physically active.</p> <p><i>No specific recommendations are given concerning dietary restriction.</i></p>

<b>Physical Activity</b>	
<b>ACP (2005)</b>	Exercise and/or physical activity recommendations are not specifically offered in the guideline, as the guideline focuses on pharmacologic and surgical management. However the developer does refer to the USPSTF guideline on screening for obesity and notes that clinicians should counsel all obese patients (defined as those with a body mass index [BMI] $\geq 30$ kg/m <sup>2</sup> ) on lifestyle and behavioral modifications such as appropriate diet and exercise
<b>FMSD (2006)</b>	<p><b>Aims and Contents of Counselling</b></p> <ul style="list-style-type: none"> <li>• Changes in physical exercise (Miller, Koceja, &amp; Hamilton, 1997) [<b>A</b>] <ul style="list-style-type: none"> <li>• The advice depends on the degree of obesity.</li> <li>• Exercise during daily activities should be encouraged (climbing up stairs, walking or cycling to work).</li> </ul> </li> </ul>
<b>SINGAPORE MOH (2004)</b>	<ul style="list-style-type: none"> <li>• Current physical activity contributes to weight loss, reduces cardiovascular risk factors (e.g., hypertension and diabetes mellitus) and the risk for coronary heart disease, increases cardiorespiratory fitness independent of weight loss, and decreases body and abdominal fat. (<b>Grade A, Level Ib</b>)</li> </ul> <p>The current recommendation of moderate-intensity physical activity for 30 min, 3 to 5 days per week is largely aimed at reducing cardiovascular disease and overall mortality. (<b>Grade C, Level IV</b>)</p> <ul style="list-style-type: none"> <li>• To prevent unhealthy weight gain, moderate-intensity physical activity for 45 to 60 min on most days or every day has been recommended. Preventing weight gain after substantial weight loss probably requires about 60 to 90 minutes per day. Starting at low-to-moderate physical activity for 30 to 45 min, 3 to 5 days per week, the intensity, duration, and frequency should be increased gradually. (<b>Grade C, Level IV</b>)</li> <li>• A program of diet plus non-structured, moderate-intensity lifestyle activity appeared as effective as diet plus structured aerobic activity for reducing weight in obese women. Any increase in daily physical activity is likely to have some benefit in obese women. (<b>Grade A, Level Ib</b>)</li> </ul>
<b>USPSTF (2003)</b>	The most effective interventions combine nutrition education and diet and exercise counseling with behavioral strategies to help patients acquire the skills and supports needed to change eating patterns and to become physically active.

	<i>No specific recommendations are given concerning physical activity</i>
<b>Behavior Modification</b>	
<b>ACP (2005)</b>	Recommendations for behavior modification are not specifically offered in the guideline as the guideline focuses on pharmacologic and surgical management. However the developer does refer to the USPSTF guideline on screening for obesity and notes that clinicians should counsel all obese patients (defined as those with a body mass index [BMI] $\geq 30$ kg/m <sup>2</sup> ) on lifestyle and behavioral modifications such as appropriate diet and exercise
<b>FMSD (2006)</b>	<p><b>Aims and Contents of Counselling</b></p> <ul style="list-style-type: none"> <li>• Changes in knowledge and attitudes <ul style="list-style-type: none"> <li>• Human energy consumption is reduced if the body weight is reduced. In order to sustain the weight that has been achieved the changes in living habits must be permanent.</li> </ul> </li> <li>• Changes in eating behaviour <ul style="list-style-type: none"> <li>• The most common goal is to change behaviour, not to "hunt kilograms."</li> <li>• Identify the circumstances that trigger eating.</li> <li>• Grocery shopping with a pre-planned list.</li> <li>• Reduce temptations (no food in sight!).</li> <li>• Do nothing else when eating (such as watch TV, read magazines).</li> <li>• Eat slowly.</li> </ul> </li> </ul>
<b>SINGAPORE MOH (2004)</b>	<ul style="list-style-type: none"> <li>• Weight loss programs incorporating cognitive behavioural interventions are helpful in achieving weight loss and weight maintenance in the range of up to 10% for between 1 to 5 years of follow-up. (<b>Grade A, Level Ib</b>)</li> </ul>
<b>USPSTF (2003)</b>	<ul style="list-style-type: none"> <li>• The USPSTF recommends that clinicians screen all adult patients for obesity and offer intensive counseling and <i>behavioral interventions</i> to promote sustained weight loss for <u>obese</u> adults. <b>B recommendation</b></li> </ul> <p>Although the USPSTF did not find direct evidence that behavioral interventions lower mortality or morbidity from obesity, the USPSTF concluded that changes in intermediate outcomes, such as improved glucose metabolism, lipid levels, and blood pressure, from modest weight loss provide indirect evidence of health benefits.</p> <p>The USPSTF concluded that the benefits of screening and</p>



	<p>behavioral interventions outweigh potential harms.</p> <ul style="list-style-type: none"> <li>The USPSTF concludes that the evidence is insufficient to recommend for or against the use of moderate- or low-intensity counseling together with behavioral interventions to promote sustained weight loss in <u>obese</u> adults. <b>I recommendation</b></li> </ul> <p>The USPSTF found limited evidence to determine whether moderate- or low-intensity counseling with <i>behavioral interventions</i> produces sustained weight loss in obese (as defined by BMI &gt;30 kg/m<sup>2</sup>) adults. The relevant studies were of fair to good quality but showed mixed results. In addition, studies were limited by small sample sizes, high drop-out rates, potential for selection bias, and reporting the average weight change instead of the frequency of response to the intervention. As a result, the USPSTF could not determine the balance of benefits and potential harms of these types of interventions.</p> <ul style="list-style-type: none"> <li>The USPSTF concludes that the evidence is insufficient to recommend for or against the use of counseling of any intensity and <i>behavioral interventions</i> to promote sustained weight loss in <u>overweight</u> adults. <b>I recommendation.</b></li> </ul> <p>The USPSTF found limited data that addressed the efficacy of counseling-based interventions in overweight adults (as defined by BMI from 25 to 29.9 kg/m<sup>2</sup>). As a result, the USPSTF could not determine the balance of benefits and potential harms of counseling to promote sustained weight loss in overweight adults.</p> <p>Behavioral interventions include strategies that assist patients to acquire skills, improve motivation, and develop supports. The 5-A framework (<u>Assess, Advise, Agree, Assist, and Arrange</u>) has been used in behavioral counseling interventions and may be a useful tool to help clinicians guide interventions for weight loss.</p>
<b>Pharmacotherapy</b>	
<b>ACP (2005)</b>	<ul style="list-style-type: none"> <li>Pharmacologic therapy can be offered to obese patients who have failed to achieve their weight loss goals through diet and exercise alone. However, there needs to be a doctor/patient discussion of the drugs' side effects, the lack of long-term safety data, and the temporary nature of the weight loss achieved with medications before initiating therapy.</li> <li>For obese patients who choose to use adjunctive drug therapy, options include sibutramine, orlistat, phentermine, diethylpropion, fluoxetine, and bupropion. The choice of agent will depend on the side effects profile of each drug and the patient's tolerance of those side effects.</li> </ul>

	<p>There are no data to determine whether one drug is more efficacious than another, and there is no evidence for increased weight loss with combination therapy. There are no data about weight regain after medications are withdrawn, underscoring the need for sustained lifestyle and behavioral modifications. There are no long-term (&gt;12 months) studies of efficacy or safety to inform the decision to continue treatment beyond 1 year; thus, the decision to continue should be a shared discussion between the physician and patient.</p>
<p><b>FMSD (2006)</b></p>	<p><b>Drug Treatment for Obesity</b></p> <ul style="list-style-type: none"> <li>• Drugs are not a universal remedy in the management of obesity. They can be tried for patients who have the metabolic syndrome or some other "obesity disease" when lifestyle changes alone have not given sufficient results.</li> <li>• When prescribing a weight-reducing drug, the patient should also be provided with guidance in lifestyle changes.</li> <li>• A drug indicated for the treatment of obesity may be used when the patient has body mass index over 30 kg/m<sup>2</sup> (or over 27 to 28 kg/m<sup>2</sup>, if the patient has diabetes or some other disease requiring weight reduction).</li> <li>• The patient should be informed that the drug treatment for obesity is aimed to last for several years. After discontinuation of the drug, weight will increase again in most cases.</li> <li>• Stop the drug, if there has not been a significant weight reduction in 3 months (at least 5% of the baseline weight).</li> </ul> <p><b>Orlistat</b></p> <ul style="list-style-type: none"> <li>• Orlistat is a lipase inhibitor acting in the digestive tract. It partly prevents the absorption of dietary fat. The drug is not absorbed in the bloodstream.</li> <li>• Weight reduction in patients who have taken 120 mg of orlistat before main meals has been on the average 3 kg more than with placebo at one year (Padwal, Li, &amp; Lau, 2003) [B]. The proportion of patients who have lost more than 10% of the baseline weight has been 12 percentage points greater with orlistat than with placebo.</li> <li>• Due to the mode of action of the drug, low-density lipoprotein (LDL) cholesterol concentration will reduce more than would be achieved with the weight reduction alone.</li> <li>• When using the drug, a concomitant aim is to limit the proportion of dietary energy intake coming from fat to no more than 30%. The snacks should be low-fat. The patient should receive sufficient dietary counselling.</li> <li>• Common adverse effects include fatty or oily stools, faecal urgency, and oily faecal spotting (&gt;1/10 users).</li> </ul>

	<p><b>Sibutramine</b></p> <ul style="list-style-type: none"> <li>• A centrally acting appetite suppressant that inhibits the reuptake of serotonin and noradrenalin</li> <li>• Weight reduction in patients who have taken 15 mg of sibutramine daily has been on the average 4 kg more than with placebo at one year (Padwal, Li, &amp; Lau, 2003) [<b>B</b>]. The proportion of patients who have lost more than 10% of the baseline weight at one year has been 15 percentage points greater with sibutramine than with placebo.</li> <li>• The most common adverse effects include insomnia, nausea, dry mouth, and constipation. These have occurred in 7 to 20% of patients using sibutramine.</li> <li>• Because of the effects on blood pressure and heart rate, the drug is not recommended for patients with cardiovascular diseases.</li> </ul> <p><b>Rimonabant</b></p> <ul style="list-style-type: none"> <li>• A centrally acting appetite suppressant that blocks the endocannabinoid receptor 1. CB1-receptors are also found in fat cells and in the digestive tract.</li> <li>• Brought to market during the year 2006.</li> <li>• Weight reduction in patients who have taken 20 mg of rimonabant daily has been on the average 6 kg more than with placebo at one year (Despres, Golay, &amp; Sjostrom, 2005; Pi-Sunyer et al., 2006; Curioni &amp; Andre, 2006) [<b>A</b>]. The proportion of patients who have lost more than 10% of the baseline weight at one year has varied between 17% and 26% with rimonabant compared to placebo, depending on the study.</li> <li>• The most common adverse effects include nausea, vertigo, diarrhoea, anxiety, depression, fatigue, and insomnia.</li> </ul> <p><b>Related Evidence</b></p> <ul style="list-style-type: none"> <li>• Guar gum is not effective in weight reduction and causes adverse effects (Pittler &amp; Ernst, 2001) [<b>A</b>].</li> <li>• Ephedrine, ephedrine plus caffeine, or dietary supplements containing ephedra may be effective in producing a modest short-term weight loss as compared to placebo (Shekelle et al., 2003; HTA-20030424, 2004) [<b>C</b>].</li> <li>• Chitosan may be more effective than placebo in the short-term treatment of overweight and obesity, but the evidence comes mainly from poor quality studies (Ni Mhurchu et al., 2005)</li> </ul>
<p><b>SINGAPORE MOH</b></p>	<ul style="list-style-type: none"> <li>• Drug therapy may be effective if given without lifestyle modification, but is most effective when combined with diet,</li> </ul>

<p><b>(2004)</b></p>	<p>physical activity, and behaviour modification. <b>(Grade A, Level Ib)</b></p> <ul style="list-style-type: none"> <li>• Drug therapy should be considered when BMI <math>\geq 30</math> kg/m<sup>2</sup>, or when BMI is 27 to 29.9 kg/m<sup>2</sup> in patients with comorbidities or complications of obesity such as hypertension, type 2 diabetes mellitus, hyperlipidemia, coronary artery disease, and sleep apnea. Commensurate BMI thresholds for action among Asians may be 27.5 and 25 to 27.4 kg/m<sup>2</sup>, respectively. <b>(Grade C, Level IV)</b></li> </ul> <p><b>Note:</b> BMI cutoff points are currently being reviewed in the light of new data.</p> <ul style="list-style-type: none"> <li>• The drugs with the widest efficacy and safety data are orlistat (up to 4 years) and sibutramine (up to 2 years). Other drugs which appear relatively safe and effective for 6 to 12 month therapy include phentermine and mazindol. There is little data on the effectiveness of combining anti-obesity agents. Metformin is the drug of choice in obese diabetics and has been effectively combined with either sibutramine or orlistat for 1 year. <b>(Grade A, Level Ib)</b></li> </ul>
<p><b>USPSTF (2003)</b></p>	<p>Orlistat and sibutramine, approved for weight loss by the Food and Drug Administration, can produce modest weight loss (2.6 to 4.8 kg) that can be sustained for at least 2 years if the medication is continued.</p> <p>There are no data on the long-term (longer than 2 years) benefits or adverse effects of these drugs. Experts recommend that pharmacological treatment of obesity be used only as part of a program that also includes lifestyle modification interventions, such as intensive diet and/or exercise counseling and behavioral interventions.</p> <p><i>No specific recommendations are given concerning pharmacotherapy.</i></p>
<p><b>Obesity Surgery</b></p>	
<p><b>ACP (2005)</b></p>	<ul style="list-style-type: none"> <li>• Surgery should be considered as a treatment option for patients with a BMI of 40 kg/m<sup>2</sup> or greater who instituted but failed an adequate exercise and diet program (with or without adjunctive drug therapy) and who present with obesity-related comorbid conditions, such as hypertension, impaired glucose tolerance, diabetes mellitus, hyperlipidemia, and obstructive sleep apnea. A doctor/patient discussion of surgical options should include the long-term side effects, such as possible need for reoperation, gall bladder disease, and malabsorption.</li> <li>• Patients should be referred to high-volume centers with</li> </ul>

	surgeons experienced in bariatric surgery.
<p><b>FMSD (2006)</b></p>	<p><b>Surgical Treatment</b></p> <p><b>Criteria</b></p> <ul style="list-style-type: none"> <li>• Age below 60 years</li> <li>• BMI at least 35 to 40 kg/m<sup>2</sup></li> <li>• An efficient conservative treatment strategy has been tried.</li> <li>• The patient is cooperative.</li> <li>• There is no abuse of alcohol or drugs.</li> </ul> <p><b>Method</b></p> <ul style="list-style-type: none"> <li>• Gastroplasty, gastric banding (Schneider, 2000; Chapman et al., 2002; HTA-20030005, 2004; "Newer techniques," 2003; HTA-20031130, 2004) [<b>B</b>], or gastric bypass so that the patient can eat only slowly and small amounts at a time. There are several surgical techniques, including laparoscopic procedures.</li> <li>• The operation is not sufficient alone. Adequate preoperative investigations, patient counselling, and organized follow-up are mandatory.</li> <li>• The outcome of successful surgical treatment is much better than that of conservative treatment (Colquitt et al., 2005; Clegg et al., 2002; "Special report," 2003; "Gastric restrictive surgery," 2000; "Newer techniques," 2003; Nilsen, 2003) [<b>A</b>]: the patients reduce 30 to 40 kg of their weight, and the result is long lasting (Glenny &amp; O'Meara, 1997; Avenell et al., 2004) [<b>A</b>].</li> <li>• Some patients experience complications after surgery.</li> </ul>
<p><b>SINGAPORE MOH (2004)</b></p>	<ul style="list-style-type: none"> <li>• Bariatric surgery is the most effective method to reduce weight and maintain weight loss in the severely or morbidly obese. (<b>Grade A, Level Ib</b>)</li> <li>• Because surgery has significant technical issues, complications, and cost, and requires extensive pre- and peri-operative preparation, it is usually considered in those with more severe obesity who have failed to control weight by other means and who remain at high risk of medical comorbidities. Post-operative lifestyle modifications, as well as follow-up for complications of surgery, are life-long. (<b>Grade C, Level IV</b>)</li> <li>• Indications for considering bariatric surgery are: <ul style="list-style-type: none"> <li>• Extreme or morbid obesity (BMI <math>\geq 40</math> kg/m<sup>2</sup>) or severe obesity (BMI <math>\geq 35</math> kg/m<sup>2</sup>) with medical comorbidities or complications of obesity</li> <li>• Commensurate BMI thresholds for action among</li> </ul> </li> </ul>

	<p>Asians may be 37.5 and 32.5 kg/m<sup>2</sup>, respectively.</p> <ul style="list-style-type: none"> <li>• Failure of significant non-surgical attempts at weight reduction</li> </ul> <p><b>(Grade B, Level III)</b></p>
<b>USPSTF (2003)</b>	<p>There is fair to good evidence to suggest that surgical interventions such as gastric bypass, vertical banded gastroplasty, and adjustable gastric banding can produce substantial weight loss (28 to &gt;40 kg) in patients with class III obesity. Clinical guidelines developed by the National Heart, Lung, and Blood Institute (NHLBI) Expert Panel on the identification, evaluation, and treatment of overweight and obesity in adults recommend that these procedures be reserved for patients with class III obesity and for patients with class II obesity who have at least 1 other obesity-related illness. The postoperative mortality rate for these procedures is 0.2%. Other complications include wound infection, re-operation, vitamin deficiency, diarrhea, and hemorrhage. Re-operation may be necessary in up to 25% of patients. Patients should receive a psychological evaluation prior to undergoing these procedures. The long-term health effects of surgery for obesity are not well characterized.</p> <p><i>No specific recommendations are given concerning surgery for obesity.</i></p>
<b>Maintenance of Weight Loss</b>	
<b>ACP (2005)</b>	<p>Lifestyle modification through diet and exercise should always be recommended for all obese patients. In addition, patients need to be continuously educated regarding diet and exercise, and it should be clear that after a surgical procedure patients cannot resume their previous eating habits.</p>
<b>FMSD (2006)</b>	<p><b>Goals that Can Be Measured</b></p> <ul style="list-style-type: none"> <li>• A permanent result is always aimed at. This means that the changes in living habits must be permanent.</li> </ul> <p><b>Aims and Contents of Counselling</b></p> <ul style="list-style-type: none"> <li>• Changes in knowledge and attitudes <ul style="list-style-type: none"> <li>• Human energy consumption is reduced if the body weight is reduced. In order to sustain the weight that has been achieved <b>the changes in living habits must be permanent.</b></li> </ul> </li> </ul> <p><b>VLCD</b></p> <ul style="list-style-type: none"> <li>• Schedule</li> </ul>

	<ul style="list-style-type: none"> <li>• A VLCD alone does not yield permanent results. Basic treatment for permanent life-style changes is applied in the normal fashion.</li> </ul>
<b>SINGAPORE MOH (2004)</b>	<ul style="list-style-type: none"> <li>• It is recommended that subjects continue with up to 12 months of the weight maintenance program combining behaviour therapy, a low calorie diet, and exercise, after the initial weight loss treatment. <b>(Grade A, Level Ib)</b></li> <li>• Common behavioral strategies which may enhance successful long-term weight loss maintenance include eating a calorie-restricted, low-to-moderate fat diet, frequent self-monitoring of body weight, recording food intake and physical activity, and maintaining high levels of regular physical activity. <b>(Grade B, Level III)</b></li> </ul>
<b>USPSTF (2003)</b>	Initial interventions paired with maintenance interventions help ensure that weight loss will be sustained.

**TABLE 4. BENEFITS AND HARMS**

<b>Benefits</b>	
<b>ACP (2005)</b>	Appropriate pharmacologic and surgical management of obesity in primary care
<b>FMSD (2006)</b>	Appropriate assessment and treatment of obesity
<b>SINGAPORE MOH (2004)</b>	<p>General approaches and overall benefits:</p> <ul style="list-style-type: none"> <li>• Successful weight loss reduces risk of obesity-related morbidity and mortality, including cardiovascular diseases, hypertension, diabetes mellitus, sleep apnea, arthritis, cancer, and gall bladder disease. Weight loss has a beneficial effect on glucose tolerance, lipid profile, and blood pressure</li> <li>• Weight loss reduces obesity-related social pressures, including ridicule, discrimination, and job bias, which can result in loss of self-esteem and motivation, depression, and other mental health problems</li> <li>• Successful weight loss reduces obesity-related health costs, both those directly attributable to treatment of associated chronic complications, and indirect costs associated with lost productivity, absenteeism, and loss of future earnings</li> </ul>

## **The Effectiveness of Interventions on Weight Loss**

### *Counseling and Behavioral Interventions*

Counseling and behavioral interventions showed small to moderate degrees of weight loss sustained over at least 1 year. Counseling interventions led to weight changes in the range of +1 to -6 kg or from -4 to -8% of body weight. Although several trials were of good quality, most were judged only fair, with limitations such as small sample size, potential selection bias (trials often enrolled volunteers), and high drop-out rates. Studies tended to report mean group weight change and not frequency of response to the interventions. Trials of higher-intensity interventions (defined by the USPSTF as person-to-person meetings more than once a month for at least the first 3 months) and combinations of interventions appeared to promote greater weight loss than trials of lower-intensity interventions. Among 11 RCTs evaluating high-intensity interventions, only 3 explicitly stated the location of the interventions: 2 were conducted in large research clinics and 1 was conducted in a primary physician's office. The 11 RCTs used a variety of health professionals to deliver the interventions, including physicians, psychologists, dieticians, behavioral therapists, exercise instructors, and multidisciplinary teams. Four RCTs using high-intensity interventions achieved significant reductions in weight or prevention of weight gain in the treatment groups (average loss: 2.7 to 5.5 kg at 12 months to more than 2 years of follow-up). Trials with follow-up beyond 1 year tended to show a loss of effect, but several studies showed a modest weight loss maintained at 24 to 36 months. Weight loss methods may need to be paired with longer-term maintenance interventions for sustained improvement.

### *The Effectiveness of Weight Loss on Intermediate Outcomes*

Weight reduction of 5 to 7% body weight is associated with lower incidence of diabetes, reduced blood pressure, and improved dyslipidemia. Greater weight loss has been linked with more dramatic improvements in glycemic control and lipids in limited surgical (non-RCT) outcomes data. Surgical cohort studies suggest that large amounts of weight loss may be linked with dramatic improvements in glucose metabolism. Surgically treated patients are more likely to have resolution of diabetes, hypertension, and certain dyslipidemias than patients who do not undergo surgery.

### *The Effectiveness of Weight Loss on Clinical Outcomes*

The USPSTF searched for evidence that weight loss can affect mortality, morbidity, mental health, and daily functioning, but found the evidence severely limited. There are no strong data to demonstrate that weight loss reduces mortality. Moderate



	<p>intentional weight loss (5 to 10% of initial body weight) has been shown to reduce the severity of comorbidities associated with obesity, and limited observational data suggest that intentional weight loss in the obese can lead to reduced mortality. Two recent trials provide strong evidence that behaviorally mediated weight loss can prevent diabetes. One trial evaluating 2 types of behavioral therapy showed borderline improved self-esteem in both treatment groups. The USPSTF found mixed evidence of improvements of secondary health outcomes among the short-term pharmacotherapy trials.</p>
<b>Harms</b>	
<b>ACP (2005)</b>	<p><b>Side Effects of Medications</b></p> <ul style="list-style-type: none"> <li>• <i>Sibutramine</i>: Modest increase in heart rate and blood pressure, nervousness, insomnia</li> <li>• <i>Phentermine</i>: Cardiovascular, gastrointestinal</li> <li>• <i>Diethylpropion</i>: Palpitations, tachycardia, insomnia, gastrointestinal</li> <li>• <i>Orlistat</i>: Diarrhea, flatulence, bloating, abdominal pain, dyspepsia</li> <li>• <i>Bupropion</i>: Paresthesia, insomnia, central nervous system effects</li> <li>• <i>Fluoxetine</i>: Agitation, nervousness, gastrointestinal</li> </ul> <p><b>Surgery</b></p> <ul style="list-style-type: none"> <li>• <i>Mortality</i></li> <li>• <i>Surgical complications</i></li> </ul>
<b>FMSD (2006)</b>	<ul style="list-style-type: none"> <li>• The most common adverse effects of orlistat are fatty or oily stools, faecal urgency, and oily faecal spotting (&gt;1/10 users).</li> <li>• The most common adverse effects of sibutramine are insomnia, nausea, dry mouth, and constipation.</li> <li>• The most common adverse effects of rimonabant include nausea, vertigo, diarrhoea, anxiety, depression, fatigue, and insomnia.</li> <li>• The complications reported from laparoscopic adjustable gastric banding included aspiration pneumonia, band slippage, and rotated or infected access ports. Band migration was more common if the band injections were performed by residents or nurses, rather than senior surgeons.</li> <li>• Some complications of gastric surgery can occur</li> </ul>
<b>SINGAPORE MOH (2004)</b>	<p><b>Nutritional Inadequacy of Diets</b></p> <ul style="list-style-type: none"> <li>• Balanced, moderate-fat diet may result in micronutrient</li> </ul>

	<p>deficiencies if food choices are poor.</p> <ul style="list-style-type: none"> <li>• High-fat, low-carbohydrate diets are high in saturated fat and cholesterol and low in vitamins A, B1, B6, E, folate, calcium, magnesium, iron, potassium, and dietary fibre, and require supplementation.</li> <li>• Very low-fat diets are deficient in B12, E, and zinc.</li> </ul> <p><b>Complications of Bariatric Surgery</b></p> <ul style="list-style-type: none"> <li>• Bariatric surgery has significant technical issues, complications, and cost, and requires extensive pre- and peri-operative preparation; post-operative lifestyle modifications, as well as follow-up for complications of surgery, are life-long</li> </ul> <p><b>Adverse Effects of Medications</b></p> <ul style="list-style-type: none"> <li>• Sibutramine - mild increases in blood pressure and pulse rate, dry mouth, headache, insomnia, and constipation</li> <li>• Phentermine - dry mouth, insomnia, palpitations, euphoria</li> <li>• Mazindol - insomnia, agitation, and dizziness</li> <li>• Ephedrine - adverse psychiatric, autonomic, gastrointestinal, cardiac effects, and death; the easy availability and potential for abuse are major drawbacks</li> <li>• Topiramate - paresthesia, diarrhea, somnolence, and dysgeusia</li> <li>• Zonisamide - fatigue</li> <li>• Orlistat - oily diarrhea with urgency in patients noncompliant with reduced-fat diet</li> </ul>
<p><b>USPSTF (2003)</b></p>	<ul style="list-style-type: none"> <li>• The U.S. Preventive Services Task Force did not find studies evaluating the harms of screening, counseling, or behavioral interventions. Nonetheless, a potential risk does exist, particularly as the stigma of obesity is well established. Possible labeling effects of diagnosis may occur.</li> </ul>

<p><b>TABLE 5: EVIDENCE RATING SCHEMES AND REFERENCES</b></p>	
<p><b>FMSD (2006)</b></p>	<p><b>Classification of the Quality of Evidence</b></p> <p><b>A. Quality of Evidence: High.</b></p> <p>Further research is very unlikely to change our confidence in the estimate of effect.</p>

- Several high-quality studies with consistent results
- In special cases: one large, high-quality multi-centre trial

**B. Quality of Evidence: Moderate.**

Further research is likely to have an important impact on our confidence in the estimate of effect and may change the estimate.

- One high-quality study
- Several studies with some limitations

**C. Quality of Evidence: Low.**

Further research is very likely to have an important impact on our confidence in the estimate of effect and is likely to change the estimate.

- One or more studies with severe limitations

**D. Quality of Evidence: Very Low.**

Any estimate of effect is very uncertain.

- Expert opinion
- No direct research evidence
- One or more studies with very severe limitations

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<p><b>SINGAPORE MOH (2004)</b></p>	<p><b>Grades of Recommendations</b></p> <p><b>Grade A</b> (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</p> <p><b>Grade B</b> (evidence levels IIa, IIb, III): Requires availability of well conducted clinical studies but no randomised clinical trials on the topic of recommendation</p> <p><b>Grade C</b> (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.</p> <p><b>GPP</b> (good practice points): Recommended best practice based on the clinical experience of the guideline development group</p> <p><b>Levels of Evidence</b></p> <p><b>Level Ia:</b> Evidence obtained from meta-analysis of randomised controlled trials</p> <p><b>Level Ib:</b> Evidence obtained from at least one randomised controlled trial</p> <p><b>Level IIa:</b> Evidence obtained from at least one well-designed controlled study without randomisation</p> <p><b>Level IIb:</b> Evidence obtained from at least one other type of well-designed quasi-experimental study</p> <p><b>Level III:</b> Evidence obtained from well-designed non-experimental descriptive studies, such as comparative studies, correlation studies, and case studies</p> <p><b>Level IV:</b> Evidence obtained from expert committee reports or opinions and/or clinical experiences of respected authorities</p>
<p><b>USPSTF (2003)</b></p>	<p><b>Strength of Recommendations</b></p> <p>The Task Force grades its recommendations according to one of 5 classifications (A, B, C, D, I) reflecting the strength of evidence and magnitude of net benefit (benefits minus harms):</p> <p><b>A</b></p> <p>The USPSTF strongly recommends that clinicians routinely provide</p>

[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 routinely 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 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,

	<p>or consistency of the individual studies, generalizability to routine practice, or indirect nature of the evidence on health outcomes.</p> <p><b>Poor</b></p> <p>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.</p>
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## **GUIDELINE CONTENT COMPARISON**

The American College of Physicians (ACP), Finnish Medical Society Duodecim (FMSD), Singapore Ministry of Health (Singapore MOH), and the United States Preventive Services Task Force (USPSTF) present recommendations for assessment/screening and treatment of overweight and obesity in adults and provide explicit reasoning behind their judgments. Singapore MOH and USPSTF rate the quality of their recommendations and the type of evidence supporting them. FMSD rates the quality of its evidence and offers literature citations to support its recommendations. USPSTF includes a review of the evidence supporting their recommendations, and also compares their recommendations with those from other national organizations. ACP specifically refers clinicians to the 2003 USPSTF guideline for screening and counseling recommendations. ACP and USPSTF provide technical/evidence reviews to accompany their guideline recommendations, while the Singapore MOH guideline includes an extensive discussion of the evidence in the guideline document. All of the developers (excluding ACP) rely heavily on the 1998 National Heart, Lung, and Blood Institutes guideline titled "Clinical guidelines on the identification, evaluation, and treatment of overweight and obesity in adults."

Although all the organizations address the issues of assessment/screening and treatment of overweight and obesity in adults, there are some differences among the guidelines in scope. Recommendations from the Singapore MOH, for example, focus on the Asian population, and therefore ethnic differences have been taken into account in calculating BMI cutoffs for overweight and obesity. Singapore MOH also provides guidelines for management of obesity in children and adolescents; the pediatric population is not considered by the other guideline groups. The USPSTF guideline focuses primarily on screening/counseling and behavioral interventions, although the guideline does review evidence for drug therapy and bariatric surgery for obese individuals. The ACP guideline focuses primarily on the pharmacologic and surgical management of obesity, intending to compliment the USPSTF's screening and counseling recommendations. The FMSD guideline addresses behavioral, dietary, pharmacological, and surgical interventions.

### **Areas of Agreement**

*Key Measures of Overweight and Obesity*



The FMSD, Singapore MOH, and USPSTF guidelines are in general agreement that measurement of BMI, defined as weight in kilograms/height in meters<sup>2</sup> (kg/m<sup>2</sup>), is the most reliable and valid method for gauging overweight and obesity in adults (ACP does not address this issue, instead referring to USPSTF recommendations). BMI is also well correlated with degree of risk for obesity-related complications, such as cardiovascular disease. Each of these groups, with the exception of FMSD, also acknowledge World Health Organization (WHO), National Heart, Lung, and Blood Institute (NHLBI), and other national and international guidelines for classification of overweight and obesity: a BMI of 25.0 to 29.9 is classified as overweight; obesity is categorized as Class I (BMI > 30 to 34.9), Class II (BMI 35 to 39.9), and Class III (BMI >40). The Singapore MOH guidelines also provide lower cutoffs for the Asian population for all BMI classifications. The classification values provided by FMSD are slightly different than those of the other groups: overweight (mild obesity) (BMI 25 to 30 kg/m<sup>2</sup>), moderate obesity (BMI 30 to 35 kg/m<sup>2</sup>), and severe obesity (BMI >35 kg/m<sup>2</sup>).

The importance of waist circumference as an indicator of cardiovascular and other disease risk is also emphasized by two of the groups (Singapore MOH and USPSTF). A waist circumference of >88 cm (>35 inches) in women and >102 (>40 inches) in men indicates increased risk, independent of BMI. Lower values of waist circumference should be used for Asians (see Singapore MOH guidelines in Table 2 above).

#### *Assessment of Other Risk Factors or Comorbidities*

Singapore MOH recommends screening for comorbid conditions, particularly obesity-related health risks, as part of the medical evaluation. The presence or absence of such conditions is helpful in determining the intensity of therapy. FMSD acknowledges that the presence of comorbidities is a determining factor in a patient's need for treatment. ACP refers to the assessment of comorbid conditions as part of an algorithm that is provided for the suggested management of obesity. Singapore MOH also recommends screening for psychiatric disorders, such as depression and binge eating, which may affect the success of therapy.

#### *Treatment/Management of Overweight and Obesity in Adults*

There is concordance within all of the guidelines that the basic treatment strategy for weight loss should be multifaceted, combining dietary restriction, behavior modification, and increased physical activity. ACP, FMSD, and Singapore MOH emphasize the need for setting realistic and modest weight-loss goals and for maintaining the loss over the long term. Singapore MOH states that the aggressiveness of the dietary restriction should correlate with BMI and the presence of any comorbid conditions (i.e., those with higher BMIs or more risk factors should aim for a higher daily energy deficit in their diets). The total calorie intake, rather than the composition of the diet in terms of macronutrients (total fat, carbohydrates, protein), is the most important factor for weight loss. FMSD differs slightly in recommending that the main emphasis be on the reduction of fat intake.

All of the groups agree that the use of pharmacotherapy (e.g., orlistat, sibutramine, appetite suppressants) should generally be reserved for patients with at least class I obesity (BMI  $\geq$ 30\*). FMSD and Singapore MOH, however, state

that patients with BMIs  $\geq 27^*$  with comorbid conditions might also be considered for drug therapy.

**\*Note:** BMI thresholds for drug therapy in Asians are lower, at 27.5 and 25-27.4 with comorbid conditions, respectively; see Table 2 above under Singapore MOH

All groups emphasize that drug therapy should be used only in combination with diet, exercise, and behavioral interventions. The groups, with the exception of FMSD, also emphasize that drug therapy is not recommended with VLCDs. FMSD states that doses of insulin should be stopped or halved, and doses of sulphonylureas halved, but that the doses of other drugs need not be reduced.

The groups further agree that the use of surgical interventions for obesity should be reserved for patients with extreme obesity (generally BMI  $\geq 40^*$ ) or those with a BMI  $\geq 35^*$  and severe comorbid conditions. ACP further adds that patients should be referred to high-volume centers with surgeons experienced in the surgical procedures.

**\*Note:** BMI thresholds for surgical treatment in Asians are lower, at 37.5 and 32.5 with severe comorbid conditions, respectively; see Table 2 above under Singapore MOH.

### *Maintenance of Weight Loss*

There is also concordance among groups that weight loss maintenance requires a combination of dietary restriction, regular sustained physical activity, and self-monitoring.

### **Areas of Differences**

One difference among the guideline developers concerns the initiation of counseling-based weight-loss interventions for adults who are simply overweight (i.e., BMI of 25.0 to 29.9). USPSTF is the only group that does not recommend for or against use of these interventions for weight loss in "overweight" adults. After examining available evidence, USPSTF concluded that the effectiveness of counseling and behavioral interventions used with obese people may not be generalizable to adults who are only overweight but not obese. The other guideline groups do not specify, but there seems to be overall agreement that individuals at risk should be counseled.

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