

Assessment and Management of Obesity and Comorbid Conditions

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ABSTRACT

To better understand obesity, its related conditions and risk factors, and the best assessment and management approaches for the adult population, the Disease Management Association of America and the National Committee for Quality Assurance partnered to conduct a literature review that could inform future initiatives of both organizations as well as others. The goals of the literature review were to: (1) describe the prevalence of obesity and related conditions and their health and financial impacts; (2) illustrate the clinical importance and interrelatedness of the conditions; and, the focus of this article, (3) describe the evidence supporting the different assessment and management options for obesity and comorbid conditions. (*Disease Management* 2007;10:252–265)

INTRODUCTION

OBESITY AND ITS RELATED COMORBID CONDITIONS have been garnering increased attention as updated information on the financial costs and the impact on health, families, and communities have made it to the forefront of scientific and mainstream media. Consumers, health plans, public health agencies, disease management (DM) vendors, and arguably the entire US health care system are now recognizing the need for more robust strategies and interventions to better assess and manage obesity.

To gain a better understanding of obesity, its related conditions and risk factors, and the best assessment and management approaches for the adult population, the Disease Management Association of America (DMAA) and the National Committee for Quality Assurance

(NCQA) partnered to conduct a literature review that could inform future initiatives of both organizations and others as well. The goals of the literature review were to: (1) describe the prevalence of obesity and related conditions and their health and financial impacts; (2) illustrate the clinical importance and interrelatedness of the conditions; and, the focus of this article, 3) describe the evidence supporting the different assessment and management options for obesity and comorbid conditions.

BACKGROUND

Obesity is the fastest-growing health problem in the United States, and one of the most serious chronic conditions of our time. During the past 2 decades, obesity prevalence has increased dramatically. Approximately 64% of

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the adult population is either overweight or obese. These statistics herald potentially devastating health, economic, and social consequences for the United States. People who are overweight or obese have a greater probability of developing high blood pressure, high blood cholesterol or other lipid disorders, type 2 diabetes, heart disease, stroke, and certain cancers. In fact, overweight and obesity soon may cause as much preventable disease and death as cigarette smoking. It is estimated that 300,000 preventable deaths occur each year in the United States due to diet and physical inactivity, both of which contribute to obesity—only tobacco use causes more preventable deaths in the country. The total direct and indirect costs attributed to obesity amounted to \$117 billion in the year 2000.¹

Causes of obesity in the United States are complex and multifactorial. Increasing evidence suggests that obesity is not a simple problem of willpower or self-control, but a complex disorder involving appetite regulation and energy metabolism that is associated with a variety of comorbid conditions. Although its etiology is not firmly established, genetic, metabolic, biochemical, cultural, and psychosocial factors contribute to obesity. Some individuals may become overweight or obese partly because they have a genetic or biologic predisposition to gain weight readily. In most cases, however, the increasing prevalence of overweight and obesity reflects changes in society and behaviors over the past 20 to 30 years.²

Much of the burden of obesity and related comorbidities (eg, cancer, cardiovascular disease, diabetes) is preventable. Physical inactivity and unhealthy eating directly contribute to these conditions, yet if these behaviors were modified to promote a healthier lifestyle they could significantly reduce the obesity epidemic. Despite the proven benefits of physical activity, more than 50% of US adults do not get enough physical activity to provide health benefits and 24% are not active at all in their leisure time. The role of physical activity is further impacted by eating behaviors. A large gap remains between recommended dietary patterns and what Americans actually eat. Only about one fourth of US adults eat the

recommended 5 or more servings of fruits and vegetables each day. In addition, calorie intake has increased for both men and women in the last 30 years.³

While the goals of the project between NCCQA and the DMAA are multifaceted and resulted in a more comprehensive report, which will later be published on the DMAA Web site and online Obesity Resource Center, the focus of the remainder of this article is to describe the evidence supporting the various assessment and management options for obesity in adults. The following summaries were derived from a review of the published literature and clinical guidelines on obesity and comorbid condition assessment and management published prior to May 2006. While the incidence and prevalence of overweight and obesity is also rising in children and is a significant population health concern, the focus of this article is on adults.

ASSESSMENT

Published clinical guidelines on obesity and related comorbidities are consistent in their recommendations for weight assessment. The National Heart, Lung, and Blood Institute (NHLBI), American College of Physicians (ACP), American Heart Association (AHA), and U.S. Preventive Services Task Force (USPSTF) all recommend screening for obesity and indicate that height and weight should be determined in order to calculate a body mass index (BMI). The USPSTF found good evidence that BMI is reliable and valid for identifying adults at increased risk for mortality and morbidity due to overweight and obesity.

The most common clinical method for detecting obesity is the evaluation of body weight and height based on a table of suggested or “desirable” weights. An alternative measure to using weight-for-height tables or growth charts is BMI, a weight-height index that is calculated by dividing the body weight in kilograms by the square of the height in meters (kg/m^2). The BMI is easy to measure, highly reliable, and highly correlated with percentage of body fat and body fat mass. However, in the elderly, who generally have a higher propor-

tion of internal fat than younger people, BMI correlates less strongly with percentage of body fat.⁴

In addition, there are a number of other techniques that can measure body fat, such as bioelectrical impedance, dual-energy X-ray absorptiometry, and total body water, but it is considered impractical to use them routinely. Other anthropometric methods that may be useful in the clinical setting include the measurement of skinfold thickness and the indirect assessment of body fat distribution. Skinfold thickness is a more direct measure of adiposity than BMI and correlates well with body fat content in both adults and children. But this technique requires training and has lower intra- and interobserver reliability than the height and weight measurements used to calculate BMI. The waist hip ratio (WHR), the circumference of the waist divided by the circumference of the hips, may be a better predictor of the sequelae associated with adult obesity than BMI and also can be measured in the clinical setting. The reliability of the WHR is comparable to that of BMI.

In addition to assessing weight, the various clinical guidelines support assessing patients for total risk and risk of comorbid conditions. According to the NHLBI, overall risk must take into account the potential presence of other risk

factors. Some diseases or risk factors associated with obesity place patients at a high absolute risk for subsequent mortality.⁵ Table 1 details the various levels of risk for obese patients.

A key component of behavior change theory is understanding a patient's readiness for change; thus clinical guidelines also recommend that clinicians assess treatment readiness. According to the NHLBI Practical Guide, clinicians should perform an evaluation of readiness that should include the following: (1) reasons and motivation for weight loss, (2) previous attempts at weight loss, (3) support expected from family and friends, (4) understanding of risks and benefits, (5) attitudes toward physical activity, (6) time availability, and (7) potential barriers to the patient's adoption of change.⁵

MANAGEMENT

The public health burden of chronic disease related to suboptimal diet and physical activity is enormous. It has been estimated that these lifestyle factors contribute to approximately 20% of deaths in the United States.⁶ Whereas little evidence exists from prospective studies showing that weight loss by obese individuals improves long-term morbidity and mortality,

TABLE 1. OBESITY COMORBIDITY CATEGORIES

<i>High absolute risk</i>	<i>Increased risk (Non life threatening)</i>	<i>Three or more of the following risk factors = High Absolute Risk</i>
<ul style="list-style-type: none"> • Established coronary heart disease <ul style="list-style-type: none"> ◦ History of myocardial infarction ◦ History of angioplasty ◦ History of coronary artery bypass graft ◦ History of acute coronary syndrome • Other atherosclerotic diseases • Type 2 diabetes • Sleep apnea • Stroke • Cancer 	<ul style="list-style-type: none"> • Osteoarthritis • Gallstones • Stress incontinence • Gynecological abnormalities: amenorrhea and menorrhagia 	<ul style="list-style-type: none"> • Hypertension (blood pressure $\geq 140/90$) or current use of antihypertensives • Cigarette smoking • High low-density lipoprotein cholesterol (>130 mg/dL) • Low high-density lipoprotein cholesterol (<40 mg/dL) • Impaired fasting glucose/pre-diabetes • Family history of early cardiovascular disease • Age (male ≥ 45 years; female ≥ 55 years)

strong evidence from epidemiologic studies suggests that obesity is associated with increased morbidity and mortality and that weight loss in obese persons reduces important disease risk factors.^{4,5} There is a paucity of evidence demonstrating the effectiveness of interventions leading to weight loss in individuals who are obese.

According to a 2004 systematic review of the long-term effects and economic consequences of treatments for obesity and implications for health improvement, current interventions that promote weight loss also impact risk factors. Pharmacotherapy and diet are associated with weight loss and beneficial changes in risk factors; low-fat diets are associated with the prevention of type 2 diabetes and improved control of hypertension; and studies combining low-fat diets and exercise, with or without behavior therapy, suggest improved control of hypertension and type 2 diabetes. In addition, women with obesity-related illnesses who had intentional weight loss had an associated reduced risk of death, cardiovascular disease death, and cancer- and diabetes-related death. The review also concludes that long-term weight loss is associated with reduced risk of developing type 2 diabetes and improved glucose tolerance.⁷

Standard treatment approaches for overweight and obesity must be tailored to the needs of various patients or patient groups. Large individual variation exists within any social or cultural group; furthermore, substantial overlap occurs among subcultures within the larger society. There is, therefore, no standardized set of rules to optimize weight reduction for a given type of patient. However, obesity treatment programs that are culturally sensitive and incorporate a patient's characteristics must do the following:

- Adapt the setting and staffing for the program.
- Understand how the obesity treatment program integrates into other aspects of the patient's health care and self-care.
- Expect and allow modifications to a program based on a patient's response and preferences.

The following sections provide a summary of recommendations and evidence related to various obesity management approaches.

Brief counseling/Advice from health care professional

According to the American College of Preventive Medicine (ACPM), health education and dietary counseling have the capacity to influence dietary behaviors in obese patients, although the effect of such counseling is subject to debate. There is limited evidence from cross-sectional and nonrandomized trials that counseling patients to lose weight is efficacious. However, the benefits of gradual intentional weight loss appear to far exceed associated risks under most circumstances, especially when professional guidance is provided. Thus, the ACPM recommends that all adult patients should consistently receive counseling about healthful dietary and physical activity patterns in the context of primary care. Such counseling should be reinforced in the context of specialty care as dictated by clinical judgment and discretion.⁸

Brief counseling can be effectively integrated in routine primary care to address the most common and important risk behaviors. Data from the Behavioral Risk Factor Surveillance System for 1994, 1996, 1998, and 2000 was examined for the following: (1) trends from 1994 to 2000 in the proportion of obese patients who received advice to lose weight from a health care professional, (2) characteristics of obese adults receiving advice to lose weight in 2000, and (3) the association between advice and attempts to lose weight among obese adults. The authors reported that in 1994, 42.3% of obese persons who had visited their physician during the last 12 months reported that a health care professional had given them advice to lose weight. The percentage dropped to 40.3% in 2000. A substantial difference was seen by advice status in the prevalence of obese persons who were trying to lose weight. The prevalence of trying to lose weight among those who did not receive advice was 58.6%, while the prevalence of trying to lose weight among those who did receive advice was 79.8%.⁹

Although those patients receiving advice to lose weight might be more inclined to try to lose weight, it is also possible that patients who are trying to lose weight would be more likely to initiate discussion about weight problems, thereby prompting their physicians to offer advice. The authors were unable to evaluate the quality of the advice or whether advice was associated with successful weight loss.⁹

Although little is known about the barriers to delivering advice about weight, studies involving nutrition and physical activity counseling provide some insights. For example, one study found that barriers to nutrition counseling included lack of time, perception of patient noncompliance, inadequate teaching materials, lack of counseling training, lack of knowledge, inadequate reimbursement, and low physician confidence.¹⁰

Intensive counseling and behavioral interventions

The USPSTF recommends that, in addition to screening all adult patients for obesity, clinicians offer intensive counseling and behavioral interventions to promote sustained weight loss for obese adults. The review panel found 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 3-5 kg for 1 year or more) in adults who are obese (as defined by BMI ≥ 30 kg/m²). Although the USPSTF did not find direct evidence that behavioral interventions lower mortality or morbidity from obesity, they concluded that changes in intermediate outcomes from modest weight loss provide indirect evidence of health benefits. No evidence of substantial harms from counseling and behavioral interventions was found.⁴

Behavioral counseling focuses on analyzing and modifying eating and activity behaviors that increase body weight, and provides techniques to help patients change their lifestyle habits and overcome barriers to compliance with dietary or physical activity goals. Behavioral interventions include stimulus control, reinforcement techniques, self-monitoring, behavioral contracting, and social support.¹¹ The

NHLBI Practical Guide indicates that behavior therapy is a useful adjunct to planned adjustments in food intake and physical activity and that it helps with compliance.⁵ The AHA guidelines recommend that in clinical practice, formal behavior therapy can be provided through group sessions or individual meetings with a health care professional who is skilled in the delivery of behavioral techniques used to modify lifestyle habits. Contact should be regular, preferably once every 1 to 2 weeks during the initial 6-month phase of a treatment program. In their evidence review to support this recommendation, the AHA panel found that comprehensive group behavior therapy, in conjunction with diet and physical activity, results in ~9% body weight loss within 26 weeks of treatment.¹²

Dietary modification can generally achieve modest, short-term weight reduction. The American Diabetes Association, North American Association for the Study of Obesity, and the American Society for Clinical Nutrition released a rationale and strategies document focused on weight management through lifestyle modification for the prevention and management of type 2 diabetes in 2004. This joint document indicates that a moderate decrease in caloric intake (500–1,000 kcal/day) will result in a slow but progressive weight loss (1–2 lb per week). They further note that a low-fat diet (eg, 25%–30% of calories from fat) is considered the conventional therapy for treating obesity. Data obtained from obese persons who were successful at maintaining long-term weight loss through diet intervention trials designed to decrease the risk of cardiovascular disease and randomized control trials that evaluated diet therapy for obesity indicated that decreasing dietary fat intake results in decreased energy intake and weight loss.¹³ Average weight loss on a low-calorie diet (1200 kcal/day) of 8.5 kg in 20 weeks has been reported, as has 20 kg over 16 weeks on a very low-calorie diet (800 kcal/day). One meta-analysis suggests that, although dieting alone is associated with significant weight loss in the short term, the chance of long-term maintenance of weight loss is significantly increased when diet is combined with exercise.¹⁴

The guidelines included in this review were consistent in noting that the key to successful

weight management is to provide patients with a dietary regimen that results in long-term compliance. The available data suggest that it is unlikely that one dietary approach is appropriate or optimal for all patients. Dietary guidance should be individualized to allow for specific food preferences and individual approaches to reducing energy intake.¹³

Pharmacotherapy

Experts recommend that pharmacological treatment of obesity be used cautiously and only as part of a program that also includes lifestyle modification interventions such as intensive diet and/or exercise counseling and behavioral interventions.⁴ Weight-loss drugs approved by the Food and Drug Administration (FDA) may be used as part of a comprehensive weight-loss program that includes diet and physical activity for patients with a BMI of ≥ 30 with no concomitant obesity-related risk factors or diseases and for patients with a BMI of ≥ 27 with concomitant obesity-related risk factors or diseases.⁵

However, the BMI threshold is only 1 part of the criteria for medication treatment. For patients who meet BMI criteria, pharmacotherapy should be considered only if they:

- will be taking the medication in conjunction with an overall weight management program, including a reduced-calorie diet and increased physical activity;
- have realistic expectations of medication therapy; and
- do not have other medical conditions or take other medications that are a contraindication for obesity drugs.¹

Successful use of antiobesity medications requires that patients deliberately and consciously alter their behavior in a manner that promotes weight loss. In this way, there is a bidirectional, mutually beneficial relationship between antiobesity medications and lifestyle management, each therapy enhancing the efficacy of the other. The importance of adding lifestyle modification therapy and a portion-controlled diet to pharmacological treatment has been demonstrated in a prospective 1-year

randomized study. After 12 months of treatment, subjects in the medication-alone group lost only 4.1% of initial body weight compared to 16.5% weight loss in the group that received medication in addition to behavior modification therapy and a 1000 kcal/day portion-controlled diet for the first 4 months.¹

Three general classes of medications are currently approved by the FDA for treating obesity. They are:

1. sympathomimetic medications approved for long-term use,
2. gastrointestinal (GI) lipase inhibitors, and
3. sympathomimetic medications approved for short-term use.

According to the *ACP Clinical Guidelines on the Pharmacologic and Surgical Management of Obesity in Primary Care*, options for obese patients who choose to use adjunctive drug therapy 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. The amount of weight loss attributable to weight-loss medications is modest (<5 kg at 1 year). However, in trials studying the effects of diet and exercise in obese patients with impaired glucose tolerance, similar amounts of weight loss significantly decreased progression to type 2 diabetes. In other studies, similar amounts of weight loss positively influenced other obesity-associated risk factors such as lipid levels and hypertension. There is no evidence of mortality benefits from this level of modest weight loss. The guidelines also stress that prior to initiating therapy it is important to have 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.¹⁵

According to the Institute for Clinical Systems Improvement (ICSI) *Obesity Guideline*, pharmacotherapy, when used for 6 months to 1 year along with lifestyle modification including nutrition and physical activity, can produce weight loss in obese adults. The average weight loss is 4%–12%. The guideline indicates that sibutramine and orlistat are safe for

most patients when carefully monitored by a physician and may be part of a program for weight management or maintenance that should include nutrition and physical activity changes when indicated.¹⁶

In deciding whether to start, continue, or discontinue medication therapy, it is important to remember that obesity is a long-term chronic disease similar to other conditions commonly treated in the physician's office. According to the report of the National Task Force on the Prevention and Treatment of Obesity on Long-term Pharmacotherapy in the Management of Obesity, "The major promise of pharmacotherapy lies not in its ability to improve the amount of weight lost during the initial months of treatment, but in its potential to enhance longer term maintenance of weight lost with conventional therapies."¹⁷ For many patients, weight maintenance after an initial weight loss may be enough to justify continued medication use.

Surgical interventions

Clinical guidelines on the treatment of obesity in adults recommend that surgical interventions, such as gastric bypass, vertical banded gastroplasty, and adjustable gastric banding 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 guidelines recommend that patients receive a psychological evaluation prior to undergoing these procedures.⁵

Guidelines are fairly consistent in reporting that there is evidence that surgery improves health outcomes for patients with morbid obesity; however, the evidence is based on few randomized studies. Case-controlled studies are reported to support bariatric surgery over non-surgical methods in patients with morbid obesity. In addition, various guidelines recommend that surgery be reserved for those carefully selected patients with a BMI ≥ 40 or those with BMI ≥ 35 who are at a very high risk for increased morbidity or premature mortality, and for whom less-invasive weight-loss methods have failed.⁵ For these patients, the benefits of a more invasive intervention should outweigh the risks. Although there is no de-

finer criteria for a specified length of time or description of what constitutes an eligible less-invasive treatment, many consider formal participation in a medically supervised diet and physical activity program for 6 months or longer a standard gauge. Patients who elect to undergo bariatric surgery often have previously engaged in multiple weight-loss attempts, including commercial and professional programs and self-imposed diets. These approaches may result in short-term success but eventually result in weight regain.¹

According to the American Medical Association,¹ in addition to these selection criteria, the following patient factors should be taken into account when considering surgery:

- realistic expectations about what the surgical procedure entails,
- ability/desire to follow the surgically-imposed dietary changes,
- good social support system,
- no active substance abuse or clinically significant and unstable psychopathology, such as untreated psychosis, uncontrolled depression, borderline personality disorder, or bulimia nervosa;
- demonstrated adherence to medical recommendations (eg, taking medication, keeping follow-up appointments, agreeing to laboratory testing).

Patient and physician consideration of the risks and potential complications of surgery is essential. Bariatric surgery was first performed in the early 1960s and its use has increased dramatically, particularly in recent years. With this escalation in the number of procedures, there also have been reports of high postoperative complication rates.¹⁵ The following summarizes outcomes as reported by the American Society for Bariatric Surgery:¹⁸

- Gastric bypass is currently the most popular procedure for treating obesity in adults performed in the United States and worldwide. Operative (30-day) mortality for gastric bypass when performed by skilled surgeons is about 0.5%. Operative morbidity is about 5%. Weight loss after a standard gastric bypass usually exceeds 100 lb, or about 65% to

- 70% of the excess body weight (EBW) and about 35% of the BMI.
- Gastric banding is the least invasive of the restrictive bariatric surgery procedures, and was first introduced in the early 1990s. Operative (30-day) mortality for laparoscopic adjustable gastric banding when performed by skilled surgeons is about 0.1%. Operative morbidity is about 5%. Weight loss is about 50% of the EBW and about 25% of the BMI at 2 years.
 - Vertical banded gastroplasty was introduced in the 1970s, but the percentage of patients undergoing the procedure since 1991 has decreased. Operative mortality when performed by skilled surgeons is about 0.1% and operative morbidity is about 5%. Weight loss after vertical banded gastroplasty is about 50% to 60% of EBW and about 25% to 30% of BMI.
 - Biliopancreatic diversion and duodenal switch are primarily malabsorptive procedures used sparingly in the United States. Operative mortality is higher for these procedures—estimated at 1% when performed by skilled surgeons — and operative morbidity is estimated at 5%. However, weight loss potential is substantial—about 70% of EBW and about 35% of BMI.

Although complications are common, current research indicates there are potential long-term health benefits to bariatric surgery. In the prospective Swedish Obese Subjects (SOS) Study which involved matching obese patients who underwent gastric surgery with those who were conventionally treated, the authors concluded that bariatric surgery appears to be a viable option for the treatment of severe obesity, resulting in long-term weight loss, improved lifestyle, and except for hypercholesterolemia, amelioration of risk factors that were elevated at baseline. The authors indicated that the surgically treated subjects had greater weight loss, more physical activity, and lower energy intake than the control subjects over a 10-year period.¹⁹

The SOS Study also reported on death and other adverse events of bariatric surgery. In their study of 2010 surgery patients, 5 died postoperatively. In addition, of the population with complications (n = 1164), 151 patients

(13%) had 193 postoperative complications (bleeding in 0.5%, embolism or thrombosis in 0.8%, wound complications in 1.8%, deep infections in 2.1%, pulmonary complications in 6.1%, and other complications in 4.8%). In 26 patients (2.2 percent), the postoperative complications were serious enough to require re-operation.¹⁹

In a recent study published in *Medical Care*, Encinosa et al utilized insurance claims data from 45 large employers nationwide, with over 5.6 million privately insured covered lives under age 65, to examine in-hospital mortality and complication rates, readmission rates, and postoperative emergency room rates within 180 days after bariatric surgery in 2001 and 2002. Banding or gastroplasty without gastric bypass accounted for only 5.5% of surgeries, the remaining 94.5% were gastric bypass surgeries. Overall, 85% of the patients were women. The 180-day death rate was very low (0.2%); however, 39.6% of the patients had a complication within 6 months of discharge. In comparison, 21.9% of patients had a complication before discharge. Thus, complications increased 81% over the 6 months after discharge. The 5 most common complications were dumping syndrome (19.5%), complications of the anastomosis (12.3%), abdominal hernias (7.1%), infections (5.7%), and pneumonia (4.1%). Overall, 18.2% of the patients had some type of postoperative visit to the hospital with a complication, through readmission, outpatient hospital visit, or emergency room visit, within 180 days.²⁰

Postoperative complications and additional services result in higher expenditures for bariatric surgery patients. The mean total for health expenditures for bariatric surgery and the next 6 months of care was \$29,921 in the Encinosa sample. Patients with complications had significantly higher risk-adjusted 180-day health care payments of \$36,542 for patients with complications versus \$25,337 for patients without complications. The most costly aspect of bariatric surgery was readmission. Total 6-month risk-adjusted inpatient and outpatient health care payments were \$65,031 for patients with 180-day readmission with complications compared with \$27,125 for patients without readmissions with complications.²⁰

Multidisciplinary care

Due to the multifactorial facets of obesity management, multidisciplinary care and systematic approaches are integral to the care of obese patients. According to the American Society of Bariatric Surgeons, patients seeking therapy for severe obesity for the first time should be considered for treatment in a non-surgical program with integrated components of a dietary regimen, appropriate exercise, and behavioral modification and support. In addition, the society suggests that patients who are candidates for surgical procedures be selected carefully after evaluation by a multidisciplinary team with medical, surgical, psychiatric, and nutritional expertise.¹⁸

Given the alarming increase in the prevalence of overweight and obesity during the past several decades an urgent need exists for cost-effective weight management interventions that have the potential to reach large numbers of individuals and to provide ongoing support. A large, not-for-profit managed care organization serving approximately 700,000 members has created a system for population health improvement that applies to multiple health risks and chronic disease conditions and reaches individuals in multiple settings. The system is designed to be proactive, to reach a large number of people, to facilitate behavior change, and to document interactions for communication, tracking, and evaluation. Early results of the system's effectiveness in addressing overweight and obesity have been promising. Telephone-based counseling services implemented as a part of this system consistently result in significant weight loss for up to 8 months in a pre-post evaluation (average weight loss of 6.1 kg).²¹

BEYOND THE MEDICAL SETTING

Commercial weight-loss programs

Commercial weight-loss programs (eg, Weight Watchers, Jenny Craig) use a combination of behavioral interventions. Every year, millions of Americans enroll in commercial weight-loss programs, but very little was found on the efficacy of such programs in this review

of the published literature. Due to this dearth of information, Tsai and Wadden performed an evaluation of the largest commercial and organized self-help weight-loss programs in the United States by using criteria that was proposed by an expert panel convened by the Federal Trade Commission. The panel recommended that commercial weight-loss programs disclose information about 4 aspects of their interventions: key components of the program, qualifications of staff, costs, and risk of treatment. The authors found that Weight Watchers is the only commercial weight-loss program whose efficacy has been demonstrated in a large, multisite, randomized controlled trial. It produces a mean loss of approximately 5% of initial weight, which may be sufficient to prevent or ameliorate weight-related health complications. The program is moderately priced but is still beyond the financial reach of many persons. The authors also noted that scientific evidence is insufficient to recommend Internet-based commercial programs.²²

Worksite interventions

Worksites provide access to 65% of the population aged ≥ 16 years, making them potential settings to implement strategies for reducing the prevalence and burden of overweight and obesity.²³ Worksites provide access to employees in a controlled environment through existing channels of communication and social support networks. Opportunities for environmental and policy change to foster healthy dietary practices and increase activity are readily available.²⁴ The incentive for ongoing support of weight maintenance and other health promoting activities in worksites is substantial, especially when considering that such programs may translate into cost savings for employers.^{25,26}

The Task Force on Community Preventive Services recommends a combination of nutrition and physical activity programs. This recommendation is based on literature supporting an emphasis on interventions that combine instruction in healthier eating with a structured approach to increasing physical activity in the worksite setting. Evidence of effectiveness of workplace efforts to control overweight and

obesity might encourage employers to provide such programs.²⁷

Growing numbers of employers are recognizing that obesity affects not only health care costs, but also productivity, absenteeism, workforce turnover, disability program use, workers' compensation costs, and family medical leave. Workplace policies to address obesity, therefore, have the potential to affect many different outcomes that employers and employees care about. As a result, employer coalitions such as the National Business Group on Health have begun to pay more attention to workplace interventions. Employers can take a wide range of actions to address obesity, from the easy "no brainer" policies to more difficult and costly options. These include:

- Stocking vending machines with healthier offerings and subsidizing these offerings to encourage consumption.
- Mandated obesity prevention education sessions offered as part of mandatory Occupational Safety and Health Administration training. These sessions can be integrated into an employer's existing training structure to make participation automatic.
- Fitness-for-duty requirements that establish maximum BMI levels for certain job functions that could be unsafe for obese employees to perform.
- Coverage for obesity prevention and treatment services as part of the employer's health plan benefit structure. This may involve treating obesity as a disease. Possible examples include the use of "step therapy" for obesity, which involves requiring patients to try nutritional and physical activity interventions before more aggressive and expensive treatments are utilized (eg, drug therapy or bariatric surgery).
- Mandatory physical activity breaks for employees, such as 2 10-minute breaks per day. A drawback is that there is no way to ensure that employees use these breaks for physical activity.
- Health insurance premium differentials for individuals who engage in obesity-prevention activities.
- Employee compensation arrangements linked to participation in obesity prevention activities such as bonuses, gain-sharing, and other variable compensation strategies.

TREATMENT ALGORITHM

A key component of this project was the development a treatment algorithm to provide clinicians and organizations a pathway to follow when assessing and managing obesity and comorbid conditions in adult patients. The algorithm is also an opportunity to identify processes of care where there is an opportunity to fill a gap in quality or in evidence. While obesity and comorbid conditions have a considerable impact on the US population and health care system, there are a number of clinical guidelines with consistent recommendations to follow to ensure appropriate assessment and management of adults. This consistency provides opportunities for health care providers, DM vendors, health plan providers, and others to coordinate approaches to improve the quality of care for persons who are obese and/or affected by conditions related to obesity. As a result of the review of clinical guidelines published or released between 2000 and 2006, and the input of a workgroup and steering committee, a treatment algorithm for the assessment and management of adult obesity and comorbid conditions was developed. (Fig. 1) This treatment algorithm was adapted from those published by the NHLBI and the ICSI and expanded to show appropriate treatment options and decision points for Obesity Classifications I, II, and III (see Table 2).

The development and implementation of performance measures at the health plan and physician level have led to decreasing gaps in the quality of care in many areas. Identifying and promoting processes of care that can be measured, lead to improved outcomes, and hold the health care system accountable are opportunities to affect the quality of care for persons who are overweight and obese. Knowledge gained from this study is being utilized to inform NCQA initiatives to develop performance measures for health plans

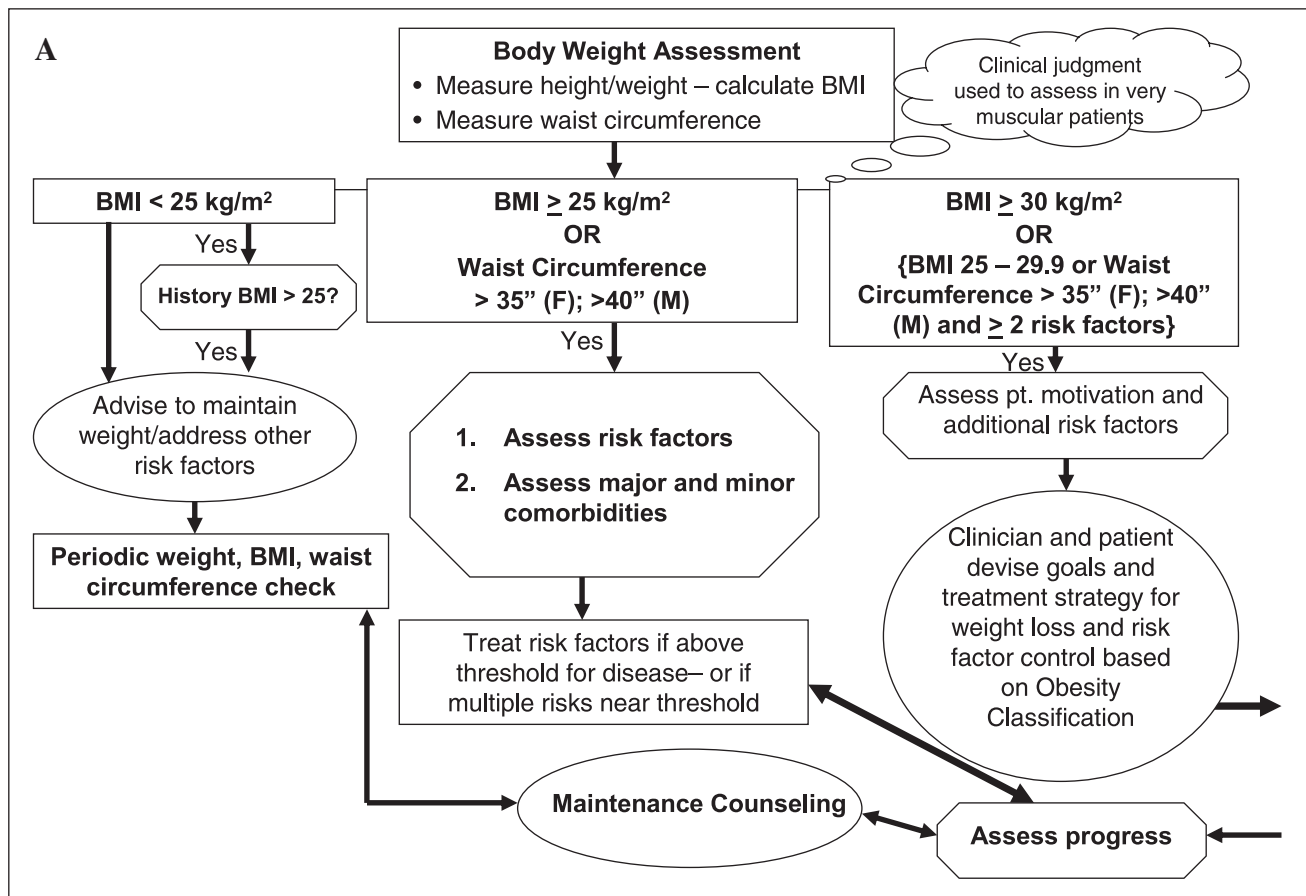


FIG. 1. A. Assessment and Management of Adult Obesity and Comorbid Conditions. **B.** Treatment Pathway by Obesity Classification. Adapted from the following sources: 1. U.S. Department of Health and Human Services. 2001. The Practical Guide: Identification, Evaluation, and Treatment of Overweight and Obesity in Adults. Public Health Service, National Institutes of Health, National Heart, Lung, and Blood Institute. NIH Pub No. 00-4084. 2. Institute for Clinical Systems Improvement. 2005. Health Care Guideline: Prevention and Management of Obesity (Mature Adolescents and Adults). Accessed via www.icsi.org

and providers. Since its inception in 1990, NCQA has been a leader in health care quality assessment and reporting. NCQA's experience with evaluating health plans and physicians, developing and implementing the Health Plan Employer and Data Information Set (HEDIS®), and reporting performance information provides a depth and breadth of expertise to bring to the development and implementation of valid and reliable measures related to obesity. Although measures have not yet been finalized for inclusion in HEDIS or physician-level recognition programs, NCQA's Obesity Measurement Advisory Panel has recommended the development of the following metrics:

- BMI documentation: children and adults
- If BMI > "X"—documentation of risk assessment/intervention: adults
- Documentation of weight classification (based on weight/height percentile): children
- Survey of parental awareness of weight classification: children

CONCLUSIONS

Combating the rising prevalence of obesity and related comorbid conditions will require effort at all levels of the health care system and should include initiatives focused on adults as

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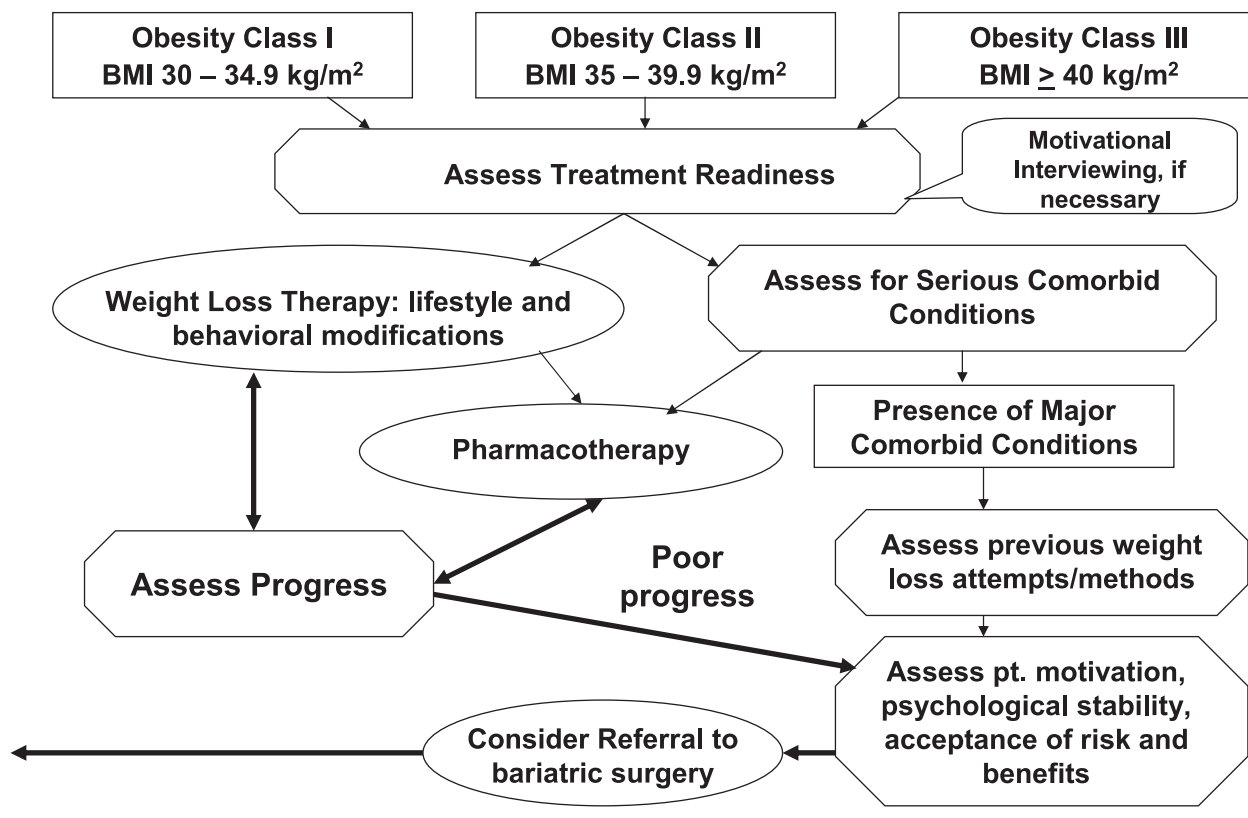


FIG. 1. (Continued).

well as prioritize the importance of normal weight and reducing risk factors in children and adolescents. Various public health (state and national) campaigns are under way, and health plans, physician organizations, DM vendors, and others are identifying initiatives to improve the quality of care for persons with obesity and impact assessment and management practices.

A key opportunity is to identify mechanisms to overcome physician barriers to the evaluation and treatment of obesity. However, barriers are not limited to physicians, there are also numerous patient-level obstacles that make it difficult to lose weight, prevent weight gain, and increase physical activity. These obstacles include, but are not limited to, lack of time, support, and motivation; aggressive marketing of

TABLE 2. CLASSIFICATIONS OF OVERWEIGHT AND OBESITY BY BMI, WAIST CIRCUMFERENCE, AND ASSOCIATED DISEASE RISKS

	BMI	Obesity class	Men 102 cm (40 in) or less Women 88 cm (35 in) or less	Men >102 cm (40 in) Women >88 cm (35 in)
Underweight	<18.5 kg/m ²			
Normal weight	18.5–24.9 kg/m ²			
Overweight	25–29.9 kg/m ²			
Obesity	30–34.9 kg/m ²	I	Increased High	High Very high
Obesity	35–39.9 kg/m ²	II	Very high	Very high
Extreme obesity	≥40 kg/m ²	III	Extremely high	Extremely high

Source: National Heart, Lung, and Blood Institute

high-calorie foods; and environmental barriers. Even though physicians are sought out and respected for their advice and recommendation, many do not even assess body mass and risk factors that could in turn lead to better condition management. Clinicians can play a key role in combating the epidemics of excess body weight and physical inactivity.²⁸

Acknowledging barriers and obstacles is a preliminary step toward identifying solutions to overcome them. While physicians and other health care personnel are at the front line in working with patients, their efforts will require support from health insurance and purchaser stakeholders, including DM vendors. DM firms have an opportunity to focus efforts on high-risk patients they may already be interacting with as well as to develop programs that will supplement interventions in other areas of the health care system and community. In addition to potential policy changes (eg, health plan coverage for physician counseling on diet, physical activity), health plans are in a position to drive improvements in quality of care for patients who are overweight, obese, and suffering from comorbid conditions.

ACKNOWLEDGMENTS

The literature and clinical guideline review was completed with the support of the Disease Management Association of American (DMAA), a non-profit, voluntary membership organization that represents all aspects of the DM community. Among the goals of the DMAA is to educate consumers, payors, providers, physicians, health care professionals, and accreditation bodies on the value and role DM can play in the enhancement of individual and population-based health for the treatment of chronic illnesses. While there are currently a number of conditions acknowledged and addressed by the DM community, DMAA recognizes the need to ensure that obesity receives the same treatment and attention. The incorporation of obesity and obesity with comorbidities into the list of other chronic conditions demonstrates DMAA's commitment to apply principles of DM to its treatment. This commitment has resulted in DMAA's Obesity with Co-morbidities initiative.

REFERENCES

1. Kushner RF. *Roadmaps for Clinical Practice: Case Studies in Disease Prevention and Health Promotion—Assessment and Management of Adult Obesity: A Primer for Physicians*. Chicago, IL: American Medical Association; 2003.
2. Lyznicki JM, Young DC, Riggs JA, et al. Obesity: Assessment and Management in Primary Care. *Am Fam Physician*. 2001;63:2185-2196.
3. Centers for Disease Control and Prevention. Physical activity and good nutrition: essential elements to prevent chronic diseases and obesity. 2007. Available at: <<http://www.cdc.gov/nccdphp/publications/aag/dnpa.htm>>.
4. US Preventive Services Task Force. Screening for obesity in adults: recommendations from the U.S. Preventive Services Task Force Annals. *Ann Intern Med*. 2003;139:1-57.
5. National Heart, Lung, and Blood Institute. *The Practical Guide: Identification, Evaluation, and Treatment of Overweight and Obesity*. U.S. Department of Health and Human Services. Public Health Service. National Institutes of Health. 2001. NIH Pub No: 00-4084.
6. Mokdad AH, Marks JS, Stroup DF, Gerberding JL. Actual causes of death in the United States, 2000. *JAMA*. 2004;291:1238-1245.
7. Avenell A, Broom J, Brown TJ, et al. Systematic review of the long-term effects and economic consequences of treatment for obesity and implications for health improvement. *Health Tech Assess*. 2004;8:1-182.
8. Nawaz H, Katz DL. American College of Preventive Medicine Practice Policy Statement: weight management counseling of overweight adults. *Am J Prev Med*. 2001;21:3-78.
9. Abid O, Galuska D, Kettel Kahn L. Are healthcare professionals advising obese patients to lose weight? A trend analysis. *MedscapeGeneralMedicine*. October 12, 2005. Available at: <<http://www.medscape.com/viewarticle/514048>>.
10. Heywood A, Firman D, Sanson-Fisher R, Mudge P, Ring I. Correlates of physician counseling associated with obesity and smoking. *Prev Med*. 1996;25:268-276.
11. Williamson D, Perrin L. Behavioral therapy for obesity. *Endocrinol Metab Clin North Am*. 1996;25:943-954.
12. Klein S, Sheard N, Pi-Sunyer X, et al. Weight management through lifestyle modification for the prevention and management of type 2 diabetes: rationale and strategies: a statement of the American Diabetes Association, the North American Association for the Study of Obesity, and the American Society for Clinical Nutrition. *Diabetes Care*. 2004;27:2067-2073.
13. Klein S, Burke LE, Bray GA, et al. Clinical implications of obesity with specific focus on cardiovascular disease: a statement for professionals from the American Heart Association Council on Nutrition, Physical Activity, and Metabolism endorsed by the American College of Cardiology Foundation. *Circulation*. 2004;110:2952-2967.
14. Miller W, Koceja D, Hamilton E. A meta-analysis of the past 25 years of weight loss research using diet,

- exercise or diet plus exercise intervention. *Int J Obes Relat Metab Disord.* 1997;21:941-947
15. Snow V, Barry P, Fitterman N, et al. Pharmacologic and surgical management of obesity in primary care: a clinical practice guideline from the American College of Physicians. *Ann Intern Med.* 2005;142:525-531.
 16. Institute for Clinical Systems Improvement. *Obesity (Mature Adolescents and Adults), Prevention & Management of (for patients & families)*. Available at: [www.icsi.org/guidelines and more/guidelines order sets protocols/for patients families/obesity mature adolescents and adults prevention management of for patients families.html](http://www.icsi.org/guidelines%20and%20more/guidelines%20order%20sets%20protocols/for%20patients%20families/obesity%20mature%20adolescents%20and%20adults%20prevention%20management%20of%20patients%20families.html)>. Accessed on July 12, 2007.
 17. National Task Force on the Prevention and Treatment of Obesity. Long-term pharmacotherapy in the management of obesity. *JAMA.*1996;276:1907-1915.
 18. Buchwald H. Consensus Conference Statement: Bariatric surgery for morbid obesity: health implications for patients, health professionals and third-party payers. *J Am Coll Surg.* 2005;200:593-604.
 19. Sjostrom L, Lindroos AK, Peltonen M, et al. Lifestyle, diabetes and cardiovascular risk factors 10 years after bariatric surgery. *N Engl J Med.* 2004;351:2683-2693.
 20. Encinosa WE, Bernard DM, Chen CC, Steiner CA. Healthcare utilization and outcomes after bariatric surgery. *Med Care.* 2006;44:706-712.
 21. Pronk N, Boucher JL, Gehling E, Boyle RG, Jeffery RW. A platform for population-based weight management: description of a health plan-based integrated systems approach. *Am J Manag Care.* 2002;8:847-857.
 22. Tsai AG, Wadden TA. Systematic review: an evaluation of major commercial weight loss programs in the United States. *Ann Intern Med.* 2005;142:56-66.
 23. Clark SL, Iceland J, Palumbo T, et al. *Comparing employment, income and poverty: Census 2000 and the current population survey*. Available at: www.census.gov/hhes/www/laborfor/final2_b8_nov6.pdf>. Accessed on July 12, 2007.
 24. Catlin TK, Simoes EJ, Rownson RC. Environmental and policy factors associated with overweight among adults in Missouri. *Am J Health Promot.* 2003;17:249-258.
 25. Aldana SG. Financial impact of health promotion programs: a comprehensive review of the literature. *Am J Health Promot.* 2001;15:296-320.
 26. Goetzel, RZ, Jacobson BH, Aldana SG, Vardell K, Yee L. Health care costs of worksite health promotion participants and non-participants. *J Occup Environ Med.* 1998;40:341-346.
 27. Centers for Disease Control and Prevention. 2005. Public health strategies for preventing and controlling overweight and obesity in school and worksite settings: a report on recommendations of the Task Force on Community Preventive Services. *Morbidity and Mortality Weekly Report.* October 7, 2005;54:RR-10. Available at: www.cdc.gov/mmwr/preview/mmwrhtml/rr5410a1.htm>. Accessed on July 12, 2007.
 28. Manson JE, Skerrett PJ, Greenland P, VanItallie TB. The escalating pandemics of obesity and sedentary lifestyle: a call to action for clinicians. *Arch Intern Med.* 2004;164:249-258.

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