

# **OVERWEIGHT AND OBESITY IN ADULTS**

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UWS care pathways and protocols provide evidence-informed, consensus-based guidelines to support clinical decision making. To best meet a patient's healthcare needs, variation from these guidelines may be appropriate based on more current information, clinical judgment of the practitioner, and/or patient preferences.

These pathways and protocols are informed by currently available evidence and developed by UWS personnel to guide clinical education and practice. Although individual procedures and decision points within the pathway may have established validity and/or reliability, the pathway as a whole has not been rigorously tested and therefore should not be adopted wholesale for broader use.

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## Search Strategy

An expert panel review and consensus report, published in 1998,<sup>1</sup> and a focused clinical update, published in 2013,<sup>2</sup> were used to obtain background information and references on etiology, incidence, diagnosis and prognosis. The same reports, with the addition of recent recommendations from a preventive health authority,<sup>3</sup> also provided evaluation and conservative treatment plans that form the backbone of this care pathway. Evidence-based position papers endorsed by professional organizations,<sup>4</sup> recent review articles, and newer trials of specific conservative interventions were identified through Medline searches. These articles provided reference lists whereby additional studies could be accessed as needed. Additional conservative therapies and their references were obtained from commercial and public health databases<sup>5 6 7 8</sup> on complementary and alternative medicine.

# BACKGROUND

*Overweight and obesity are disorders of excessive accumulation of body fat associated with increased risk for a number of serious diseases. This care pathway targets assessment and management in adults.*

## Definitions

Overweight and obesity imply excessive accumulation of body fat. Increases in fat-free components of body composition (i.e. lean body mass) are not considered unhealthy and should be distinguished from overweight and obesity. Body weight in terms of changes in body fat is a function of calorie balance. Calorie intake and absorption interact with metabolic energy expenditure and physical activity, resulting in either weight loss, weight maintenance, or weight gain.

Overweight is currently defined as a Body Mass Index (BMI) of 25 or higher in adults. BMI is calculated by dividing weight in kilograms by height in meters squared. Obesity in adults is defined as a BMI of 30 or higher, and extreme obesity is defined as a BMI of 40 or higher.<sup>1 2</sup> Note: Pediatric BMIs are calculated differently, see [http://www.cdc.gov/healthyweight/assessing/bmi/childrens\\_bmi/about\\_childrens\\_bmi.html](http://www.cdc.gov/healthyweight/assessing/bmi/childrens_bmi/about_childrens_bmi.html)

## Overcoming BMI Limitations

BMI is not a perfect correlate to body fat. Therefore, additional information is necessary to determine the likelihood of significant excesses of body fat. While many techniques of body composition analysis exist (for example, skin calipers, hydrostatic weighing, or bioelectric impedance), there are drawbacks to their use in evaluating overweight and obesity. These drawbacks may include: cost, lack of availability, technical challenges to obtaining accurate measurements, and

absence of clear definitions of excess body fat relative to important health risks.

To improve the reliability of body weight assessment for the prediction of health risks, two additional evaluations appear to complement the BMI value:

1. assessment for abdominal fat
2. assessment for cardiovascular risk factors

### ABDOMINAL FAT

Abdominal fat correlates better with several measures of health risk than overall body fat, at least within the range of mild to moderate overweight. Abdominal fat appears to confer a physiologic burden distinct from body fat at other sites. Precise quantification of body fat requires three-dimensional diagnostic imaging such as computed tomography (CT) or magnetic resonance imaging (MRI). As an alternative to these expensive procedures, measurement of abdominal girth has been found to provide additional evidence of unhealthy body fat accumulation, especially in conjunction with BMI.<sup>1 2</sup>

### CARDIOVASCULAR RISK FACTORS

Cardiovascular risk factors (including current coronary or cerebrovascular disease, hypertension, diabetes, dyslipidemia, and family history of premature cardiovascular disease) are some of the most serious health correlates of overweight and obesity. These risk factors can also be assessed to predict the likelihood of serious health consequences of mild to moderate overweight.<sup>1 2</sup>

## Etiology

The essential cause of weight gain is positive calorie balance. However, many complex factors contribute to calorie imbalance. These can be broadly categorized as genetic, physiological, environmental, behavioral and/or psychological.<sup>9</sup> See Risk Factors on the next page for further discussion.

## Epidemiology

Overweight and obesity are major public health problems, and are increasing at an alarming rate in most population segments. Tables 1 and 2 illustrate the changes measured in the US population since 1960. Most striking are the dramatic increases in overweight and obesity since 1980.

**Table 1. Prevalence (in %) of Overweight (BMI 25+), Obesity (BMI 30+) and Extreme Obesity (BMI 40+) in Adult US Population.**<sup>10 11</sup>

	1960-1962 <sup>a</sup>	1971-1974 <sup>b</sup>	1976-1980 <sup>c</sup>	1988-1994 <sup>d</sup>	1999-2000 <sup>e</sup>	2003-2004 <sup>e</sup>	2009-2010 <sup>e</sup>
<b>Overweight &amp; Obesity</b>	44.9%	46.8%	47.1%	55.9%	64.5%	66.3%	68.8%
<b>Obesity</b>	13.4%	14.5%	15.0%	23.3%	30.9%	32.2%	35.7%
<b>Extreme Obesity</b>	0.9%	1.3%	1.4%	2.9%	4.7%	4.8%	6.3%

<sup>a</sup> National Health Examination Survey, cycle 1 (NHES 1, 1960-1962)

<sup>b</sup> First National Health and Nutrition Examination Survey (NHANES I, 1971-1974)

<sup>c</sup> Second National Health and Nutrition Examination Survey (NHANES II, 1976-1980)

<sup>d</sup> Third National Health and Nutrition Examination Survey (NHANES III, 1988-1994)

<sup>e</sup> Continuous National Health and Nutrition Examination Survey (NHANES Continuous, 1999-2010)

**Table 2. Prevalence (in %) of Obesity in US Children by Age Group.**<sup>12 13</sup>

	1963-1970 <sup>a</sup>	1971-1974 <sup>b</sup>	1976-1980 <sup>c</sup>	1988-1994 <sup>d</sup>	1999-2000 <sup>e</sup>	2003-2004 <sup>e</sup>	2009-2010 <sup>e</sup>
<b>2-5 years</b>		5.0%	5.0%	7.2%	10.4%	13.9%	12.1%
<b>6-11 years</b>	4.2%	4.0%	6.5%	11.3%	15.3%	18.8%	18.0%
<b>12-19 years</b>	4.6%	6.1%	5.0%	10.5%	15.5%	17.4%	18.4%

<sup>a</sup> National Health Examination Survey, cycles 2 and 3 (NHES 2, 1963-1965; NHES 3, 1966-1970)

<sup>b</sup> First National Health and Nutrition Examination Survey (NHANES I, 1971-1974)

<sup>c</sup> Second National Health and Nutrition Examination Survey (NHANES II, 1976-1980)

<sup>d</sup> Third National Health and Nutrition Examination Survey (NHANES III, 1988-1994)

<sup>e</sup> Continuous National Health and Nutrition Examination Survey (NHANES Continuous, 1999-2000)

## Natural History

Overweight and obesity can begin at almost any age, but childhood and adolescence is a time of high risk, as is young adulthood. Physical activity often declines with entry into an often sedentary workforce. Women may gain weight as a result of pregnancy and menopause.

There appears to be an association with aging and weight gain. This correlation is most likely due to a reduction in activity levels, changes in body composition, and other physiological variables that impact metabolic rate.

## Health Correlates of Overweight and Obesity

Overweight and obesity, measured by BMI, have been compared with disease outcomes in numerous studies. Risk estimates vary according to age, race, and gender, but systematic reviews find substantial risks from obesity for the following health outcomes (risks associated with overweight are less consistent for some conditions):<sup>14 15</sup>

- Overall mortality
- Cardiovascular disease<sup>16</sup>
- Diabetes mellitus Type 2
- Several cancers: strongest associations (RR > 1.20) are for esophageal, thyroid, colon, and renal cancer in men, and endometrial, gallbladder, esophageal, and renal cancer in women. Weaker positive associations exist with many other cancers in both sexes.<sup>17</sup>
- Dementia<sup>18</sup>
- Biliary tract disease<sup>19</sup>
- Gastroesophageal reflux disease<sup>20</sup>
- Asthma<sup>21</sup>
- Pregnancy Complications<sup>22 23 24 25</sup>
- Renal disease<sup>26</sup>
- Low back pain<sup>27</sup>
- Osteoarthritis of the knee<sup>28</sup> and hip

## Risk Factors for the Development of Obesity

Genetics, environment and behavioral/psychological variables all play significant roles in determining the risk of overweight and obesity. Certain clinical conditions may also occasionally contribute to the risk of these disorders.

### GENETICS<sup>29</sup>

Humans are physiologically predisposed to conserve calories to guard against future starvation. When calories are consumed in excess of daily needs, increases in fat storage are very likely.

Individual genetic differences may influence several variables that impact calorie balance and fat storage. These may include:

- appetite patterns
- activity patterns
- metabolic rate
- adipose cell development
- hormonal effects
- psychological factors.

Studies of twins reared apart by non-biological parents suggest that genetics is an important determinant of obesity risk. However, multiple genes are clearly involved, and these will interact with the environment, discussed next.

### ENVIRONMENT<sup>30 31</sup>

Overconsumption of calories is facilitated by the abundance of high fat, high sugar foods that are available anywhere and anytime. Factors contributing to this situation include:

- Dominance of fast food and convenience stores over supermarkets in many communities
- Aggressive marketing of high-calorie foods

Modern civilization has resulted in increasingly sedentary lifestyles due to many factors, including:

- Tendency for technology to reduce the calorie expenditure required in daily activities.
- More sedentary occupations and hobbies.
- Low leisure time physical activity resulting from increasingly passive entertainment choices.

### **BEHAVIORAL/PSYCHOLOGICAL VARIABLES<sup>32 33</sup>**

Eating behavior can be influenced by social, cultural and psychological factors, which may encourage overeating. These include:

- Cues (sights, smells, sounds, situations) that trigger habitual eating behaviors and consequences (feeling satisfied, comforted) that reinforce those behaviors
- The entertainment value of food, and the effect of variety on food intake (more variety → more food consumed)
- Social eating opportunities and pressures (parties, entertaining customers)
- Using eating to reduce stress, or to satisfy unmet psychological or emotional needs
- Common psychological disorders (e.g. depression, binge eating disorder).

### **CLINICAL CONDITIONS**

Some endocrine disorders, such as hypothyroidism, Cushing's disease, and insulin resistance, are known to affect resting energy expenditure and/or fat storage.

## **Contraindications and Alternatives to Weight Loss**

### **CONTRAINDICATIONS TO WEIGHT LOSS**

Before recommending a weight loss program, it is prudent to consider potential risks. Weight loss attempts have a high failure rate and may actually be followed by regain of more weight than was lost.<sup>34 35</sup> A firm commitment to a long-term plan for lifestyle changes by both patient and doctor is essential before proceeding.

There also is evidence that some patients may be harmed by continued failed attempts to lose weight. Repeated weight-loss and regain, known as weight cycling, is common, and may have detrimental health effects according to some,<sup>36 37</sup> though not all studies.<sup>38</sup> Strongest associations with weight cycling have been found for:

- Osteoporosis and related fractures<sup>39 40 41</sup>
- Gallbladder disease<sup>42 43</sup>
- Hypertension<sup>44 45 46 47</sup>
- Some cancers<sup>48</sup>

When there is evidence of weight cycling, the practitioner may wish to consider referral or consultation with a specialist skilled in behavioral therapy.

In addition, rapid weight loss is contraindicated due to increased risks of electrolyte and cardiac disturbances,<sup>49</sup> loss of bone density and lean body mass,<sup>50 51</sup> gallstones,<sup>52</sup> and reduced metabolic rate.<sup>53</sup> If weight-loss is attempted, it should be gradual.

Finally, repeated futile attempts to overcome genetics, environment, and other fixed obstacles to weight loss can be psychologically damaging and/or can impede the pursuit of other life goals.<sup>54 55</sup>

## ALTERNATIVES TO WEIGHT LOSS

Many authorities advocate the concepts of “metabolic fitness” or “health at every size,” which de-emphasize body weight, focusing instead directly on risk factor reduction and a healthy lifestyle, including optimal diet and exercise.<sup>56 57 58</sup> Arguments in favor of this approach include the following:

- Not all obese patients have increased health risks.<sup>59 60</sup>

- Successful long-term weight loss is elusive; even short-term success typically results in only 5-10 pounds of weight loss, which will often be short of a patient’s goals.<sup>61</sup>
- Lifestyle changes that bring about only small amounts of weight loss nonetheless often result in risk factor reduction and other important health benefits.<sup>62</sup> Weight need not become “normal” for health benefits of interventions to be significant.<sup>63 64 65</sup>

# EVALUATION

Evaluation strategy shall primarily conform to the recommendations of the recent clinical update<sup>2</sup> to the original Clinical Guidelines on the Identification, Evaluation and Treatment of Overweight and Obesity in Adults, developed through a collaboration between the American College of Cardiology/American Heart Association Task Force on Practice Guidelines and The Obesity Society (AHA/ACC/TOC).<sup>1</sup> These recommendations are similar, but more detailed, than those recently released by the US Preventive Services Task Force (USPSTF)<sup>3</sup>

## Evaluation Steps

1. Measure Body Mass Index (BMI). If BMI is 25 or above, proceed with the steps below.
2. Assess for elevated waist circumference and the presence or increased risk of cardiovascular and other obesity-related diseases
3. Evaluate weight history and personal history for genetic, dietary and lifestyle factors that may have influenced current weight or may influence future weight-loss success.
4. Determine need for weight loss. If weight loss is indicated, proceed with the step below.
5. Assess readiness to take on lifestyle changes to achieve long-term success. Identify barriers to success

### **STEP 1: MEASURE BODY MASS INDEX (BMI) AND WAIST CIRCUMFERENCE.**

Measure body weight in kilograms or pounds. Measure height in meters or inches.

- BMI = kilograms body weight/(height in meters squared)
- BMI = (703 x pounds body weight)/(height in inches squared) (or use chart in Appendix K.)

- Optimal BMI is less than 25.
- BMI 25-29 indicates overweight.
- BMI 30 or more indicates obesity.

If patient is overweight or obese, proceed with the next steps.

*Rationale: BMI correlates with several long-term health outcomes (see Health Correlates of Overweight and Obesity above).*

### **STEP 2: ASSESS FOR ELEVATED WAIST CIRCUMFERENCE AND THE PRESENCE OR INCREASED RISK OF CARDIOVASCULAR AND OTHER OBESITY-RELATED DISEASES**

This includes any of the following:

- Atherosclerotic cardiovascular disease (ASCVD)
- Type 2 diabetes
- Metabolic syndrome
- Hypertension
- Dyslipidemia
- Gallbladder disease
- Osteoarthritis
- Adult asthma
- Sleep apnea
- Cancer of the esophagus, pancreas, colon and rectum, breast, endometrium, and kidney and other sites
- Reproductive disorders

Measure waist circumference in the upright relaxed position at the level of the iliac crest with normal minimal respiration.

High-risk waist circumference is defined as beginning at:<sup>66</sup>

- 94 cm (37 inches) for non-Asian men
- 90 cm (35 inches) for Asian men
- 80 cm (31 inches) for all women

See Dyslipidemia Care Pathway for evaluation of ASCVD risk and for diagnosis of Metabolic Syndrome.

### **Rationale**

*The presence of cardiometabolic and other weight-related risk factors increases the likelihood that mild elevations of BMI are detrimental to health.<sup>1,2</sup> Waist circumference is a practical measurement of abdominal fat, which is associated with health risks to a greater degree than fat in peripheral body regions.<sup>1</sup> When elevations of BMI are mild, waist circumference provides additional information on health risks.<sup>2</sup>*

### **STEP 3: EVALUATE WEIGHT HISTORY AND PERSONAL HISTORY FOR GENETIC, DIETARY AND LIFESTYLE FACTORS THAT MAY HAVE INFLUENCED CURRENT WEIGHT OR MAY INFLUENCE FUTURE WEIGHT-LOSS SUCCESS.**

Using a questionnaire (see Appendix A) and/or direct interview, assess the patient's history for important contributors to weight gain, obstacles to weight loss, and risk factors, including:

- Family history of obesity
- Personal health history (including eating disorders, medications with weight gain side effects, endocrine disorders such as hypothyroidism)
- Weight history (gains and losses, details of dieting attempts)
- Diet history (typical intake, eating habits; social, behavioral, and medical influences on food choices)
- Exercise history

### **STEP 4: DETERMINE NEED FOR WEIGHT LOSS.**

BMI can help guide the decision for regarding the need to engage in a weight loss program. In addition, diabetes and cardiovascular risk factors should be measured, including blood pressure and laboratory assessment of blood lipids and glucose.

Based on these considerations, the patient can be triaged into one of the following action categories.

1. **BMI  $\geq$  30:** Weight loss is recommended for all patients with BMI of 30 or more.
2. **BMI 25-29 + CVD risk factor:** Weight loss is recommended for patients with BMI from 25 to 29 who have at least one of the following risk factors.
  - Type 2 diabetes
  - Metabolic syndrome
  - Hypertension
  - Dyslipidemia
  - High-risk waist circumference
  - Other obesity-related conditions (see Step 2 above)
3. **Other patients:** Patients not falling into one of the above criteria should be advised to adopt healthy lifestyle habits and avoid weight gain in the future.

Patients who desire to lose weight but do not fit the above criteria should be advised that their current weight is not a health risk and weight loss attempts. However, it is appropriate to encourage lifestyle changes for the purpose of promoting overall better health.

**STEP 5: ASSESS READINESS TO TAKE ON LIFESTYLE CHANGES TO ACHIEVE LONG-TERM SUCCESS. IDENTIFY BARRIERS TO SUCCESS**

Ask the patient “How prepared are you to make changes in your diet, to be more physically active, and to use behavior change strategies such as recording your weight and food intake?”

Some patients may have competing priorities (e.g. smoking cessation) that take

precedence over weight loss or may have current life events that may make weight loss attempts futile right now.

A questionnaire such as in Appendix B may be used to further explore readiness to change, barriers to success, and other patient-centered issues.

# MANAGEMENT

Management strategy shall primarily conform to the recommendations of the recent clinical update<sup>2</sup> to the original Clinical Guidelines on the Identification, Evaluation and Treatment of Overweight and Obesity in Adults, developed through a collaboration between the American College of Cardiology/American Heart Association Task Force on Practice Guidelines and The Obesity Society (AHA/ACC/TOC).<sup>1</sup> These recommendations are similar, but more detailed, than those recently released by the US Preventive Services Task Force (USPSTF)<sup>3</sup>

## Overview

Management of weight problems, as well as most other healthcare interventions, involves not only choosing the best treatment plan, but also delivering that plan in a way that results in compliance. Research has shown that interventions requiring changes in health behaviors by the patient need to incorporate psychological components to increase the chances of success.<sup>67</sup>

Several models and techniques have been developed to help primary care practitioners incorporate psychological components into the patient encounter, keeping in mind the often limited time available during that encounter. One technique that has been successful for improving the results of weight loss programs is Motivational Interviewing.<sup>68 69</sup> A model recommended for facilitating dietary change and other health behavior changes is the 5-A Framework (Assess, Advise, Agree, Assist, Arrange follow-up).<sup>67 70</sup> Both of these tools emphasize that the first step in delivering health behavior change interventions is to assess the patient's readiness to change before giving advice or explaining a treatment plan. If the patient is not ready to change, the practitioner must first assist him/her to move towards readiness without creating further resistance to change.<sup>71</sup> This understanding is incorporated into the management strategy of this section.

In a chiropractic setting where most patients present with musculoskeletal

problems, the opportunity to first raise concerns about body weight might arise when discussing a musculoskeletal problem, such as osteoarthritis of a weight-bearing joint, in which weight control is an important part of the treatment plan. Another opportunity may arise from discovering a health condition during patient assessment, such as hypertension or family history of diabetes, in which weight control is important to the prognosis.

## Specific Therapeutic Objectives

The primary therapeutic objective is to improve overall obesity-related health risks in a manner consistent with good health practices. Weight loss may be a specific goal, but may be subordinated to other priorities such as smoking cessation or drug dependency treatment, or to improvement in blood pressure, blood lipids, glucose tolerance and other primary health goals.

The primary healthcare practitioner can choose between three approaches for delivering a weight-loss program.

- Coordinate a multi-component weight loss program delivered within the practitioner's primary healthcare practice that replicates the services provided in professional, community-based comprehensive weight loss programs.

- Coordinate a multi-component weight loss program in the community by referring the patient to individual professionals or programs in the community that together will deliver all of the components of a multidisciplinary weight loss program.
- Refer the patient to a comprehensive, professionally-delivered, multidisciplinary weight loss program that is available to the patient in their community. This approach currently has the best evidence for long-term efficacy.<sup>2 3</sup>

## Management Steps

1. Assess patient's readiness for making diet and lifestyle changes and consider contraindications to weight loss attempts.
2. Set realistic initial weight-management goals or other relevant goals
3. Recommend a comprehensive lifestyle intervention incorporating a calorie-controlled diet, physical activity program, and behavior-change strategies (see steps 4-6 for details).
4. Recommend a diet that will reduce calorie intake.
5. Recommend a program of physical activity.
6. Recommend behavior-change strategies.
7. Consider meal replacement products, nutritional and other dietary supplements
8. Consider need for co-management of related disorders.
9. Reevaluate treatment plan and results at regular intervals and plan for long-term maintenance.
10. Consider referral for more intensive intervention when weight or health goals have not been met.

## STEP 1: ASSESS PATIENT'S READINESS FOR MAKING DIET AND LIFESTYLE CHANGES AND CONSIDER CONTRAINDICATIONS TO WEIGHT LOSS ATTEMPTS

The practitioner must assess where the patient is on the "stages of change continuum." (See Appendix H). Utilizing motivational interviewing techniques can be helpful.

There will be circumstances when weight loss is relatively contraindicated:

- History of repeated weight loss and regain (weight cycling), which carries known health risks. New weight-loss attempts must be designed to overcome past obstacles to long-term success.
- Presence of an eating disorder
- Strong genetic, developmental, physiological, environmental, or psychological obstacles to successful long-term weight loss
- History of gallbladder disease. Rapid weight loss can aggravate cholecystitis and must be avoided.
- History of significant bone loss or osteoporosis

In these cases, consultation with or referral to an appropriate specialist may be indicated (see step 9).

### **Rationale**

*There are known health risks associated with weight loss dieting, especially when weight loss is rapid or when repeated attempts are followed by regain or even an increase in weight.*<sup>72 73 74 75 76 77</sup>

## **STEP 2: SET REALISTIC INITIAL WEIGHT-MANAGEMENT GOALS OR OTHER RELEVANT GOALS.**

Five to ten percent reduction from current weight within six months, with a weekly loss of no more than 2 pounds is a reasonable initial goal. Preventing further weight gain is another reasonable goal if health risks are mild to moderate. However, no weight goal needs to be set if other metabolic fitness goals (e.g. healthier eating, improved physical fitness, risk factor reduction) are preferred.

### **Rationale**

*Easily achievable goals provide a sense of accomplishment, setting the stage for additional goals. Even the first 5% of weight loss can have important impact on health conditions, such as hypertension, dyslipidemia, and type 2 diabetes.<sup>1 2 4</sup>*

## **STEP 3: RECOMMEND A COMPREHENSIVE LIFESTYLE INTERVENTION INCORPORATING A CALORIE-CONTROLLED DIET, PHYSICAL ACTIVITY PROGRAM, AND BEHAVIOR-CHANGE STRATEGIES (SEE STEPS 4-6 FOR DETAILS)**

Comprehensive weight-loss programs incorporating diet changes, increased activity, and behavior change strategies achieve better results than more limited programs.

To initiate this step, the practitioner must first decide how much direct responsibility to take in delivering this intervention:

- Create and manage a comprehensive weight loss program within the primary healthcare practice.
- Partner with individual referral resources in the community to achieve a coordinated multicomponent program
- Refer to an established comprehensive weight loss program

## **Create and initiate a comprehensive management plan**

This will be the most challenging option for the individual primary care practitioner. To successfully treat obesity, specialized training in delivering interventions and motivating behavior change will be required, and recruiting additional staff is likely to be necessary to accomplish an intensive intervention.

This option may be most appropriate for overweight patients with a BMI < 30 who have no major cardiovascular risks and for those patients who simply wish to adopt a healthy lifestyle and mitigate the weight gain that comes with aging. Obese patients and those with significant health risks who nonetheless cannot access a formal program, may also find some success with a program managed entirely by the chiropractic physician and his/her staff.

When the practitioner intends to participate partly or wholly in designing a comprehensive weight loss or health maintenance plan, he/she will choose among Steps 4 through 11 as appropriate. Frequent contact with patients (i.e. more than once a month) is recommended since this is associated with better outcomes.<sup>78 79 80</sup>

Several authorities<sup>3 81</sup> have suggested management strategies to be considered by primary care practitioners intending to deliver diet and lifestyle recommendations to their patients. These include:

- use motivational interview techniques
- set specific short term goals
- provide strategies for self-monitoring
- help the patient identify obstacles to success

- discuss strategies to deal with eating at restaurants, stress and relapses
- help the patient build a sense of self-efficacy
- establish a plan for frequency and duration of follow-up
- provide continual feedback on progress

A number of applications for personal digital devices are available which may aid patients in motivating, monitoring and adhering to a weight loss program. [See Appendix I].

### **Partner with individual referral resources in the community**

Creating an intensive comprehensive weight loss program within the primary care setting is challenging, given the need for specialized training and frequent intervention sessions. Alternatively, the practitioner may choose to use one or more individual referrals to provide essential services outside the chiropractic office setting. Referrals may be for dietary counseling, personal training, behavioral therapy, or medical treatment. Use of specialist referrals may also be required for patients who are morbidly obese, have significant health problems, or require more specialized support. See Step 9.

### **Referral to an established weight loss program**

In most cases for patients with BMI above 30 or between 25-30 with cardiovascular risk factors, referral to an established comprehensive program should be the first choice. This is consistent with current recommendations by the AHA/ACC/TOC expert panel and the USPSTF.

The most effective comprehensive programs are delivered intensively (at least 14 sessions over six months) by trained interventionists (health professionals such as dietitians, counseling psychologists, exercise specialists, etc.).<sup>2 82</sup> These may be available through patients' health plans (including Medicare), workplace, local universities, or community organizations. These programs offer a level of expertise, resources, and support difficult to duplicate in a primary care setting. As far as possible, the choice of program should be tailored to the individual patient's preferences and abilities.

The best programs will also have the following features:<sup>83</sup>

- Tailors advice to the individual client's goals and needs
- Provides ongoing feedback, monitoring, and support
- Provides a maintenance plan to prevent regain.
- Face-to-face programs have the best evidence, but programs using the internet or other technologies may also be effective.<sup>84</sup>
- More questions to ask about a comprehensive weight loss program can be found in the NIH publication [Choosing a Safe and Successful Weight-loss Program](http://win.niddk.nih.gov/publications/choosing.htm) at <http://win.niddk.nih.gov/publications/choosing.htm>

Even when delivery of a comprehensive weight loss program is delegated to an outside organization, practitioners still play an important role in assessing the patient's health status, the need to lose weight, the change stage the patient is in, facilitating the patient's referral, and monitoring results. Providers can continue to play an important role in supporting patients after the initial referral. While in the process of treating the patients' musculoskeletal complaints, chiropractors can monitor and

encourage the patient throughout the program and help them identify obstacles and solutions. Besides offering encouragement on a visit to visit basis, the practitioner should capture this health problem on the problem list, include a management plan and perform regular re-evaluations.

### **Rationale**

*Comprehensive interventions have achieved better weight loss results compared to minimal interventions or no treatment in numerous studies.<sup>2</sup> Adding an exercise<sup>85</sup> and/or a behavior-change component<sup>86</sup> to a prescribed diet is more effective than dieting alone.<sup>87 88</sup> The effectiveness of the less intensive approach suitable in a primary care setting has not been adequately studied, but is recommended as a general preventive healthcare practice by many authorities.<sup>2 3</sup>*

### **STEP 4: RECOMMEND A DIET THAT WILL REDUCE CALORIE INTAKE**

Help the patient choose a reasonable, evidenced-based diet and facilitate their access to resources that that will guide them through the diet and that will offer them meal selections and eating strategies. A number of apps are available to help patients with various diet plans. (See Appendix I.)

Examples of such diets include the following:

#### **Balanced diet of healthy foods**

- Weight Watchers<sup>89</sup>
- Healthy Eating Plate (Harvard School of Public Health)<sup>90</sup>
- USDA MyPlate<sup>91</sup>
- DASH Diet<sup>92 93</sup>
- Mediterranean Diet<sup>94</sup>

#### **Reduced carbohydrate or glycemic load diets**

- Atkins Diet<sup>95</sup>
- South Beach Diet<sup>96</sup>
- Paleo Diet<sup>97</sup>
- Glycemic Index Diet<sup>98</sup>
- Zone Diet<sup>99</sup>

#### **Reduced fat diets**

- Pritikin Diet<sup>100</sup>
- Ornish Diet<sup>101</sup>

For more information on some of these diets, see Appendix D.

Although calorie counting and setting calorie intake goals are not necessarily a formal part of most weight loss programs, all weight-loss, weight maintenance diets, as well as many diets aimed at improving overall health, result in reduced calorie intake, whether this is a stated objective of the diet or not. Some diets (e.g. either high-fiber or low carbohydrate) may also reduce calorie intake by affecting appetite and satiety signals. To a limited extent, some diets may also increase resting metabolic rate by emphasizing calorie sources (e.g. protein) having a slightly higher metabolic energy cost.

Since many types of diet can be considered for weight loss, the individual preferences of the patient should be incorporated whenever possible. Long-term safety must also be a consideration if the diet is intended as a permanent change.

Some diet prescriptions begin with an estimation of daily energy requirement, based on the patient's age, gender, weight, height, and activity level. This is easily done using validated on-line calculators -- see <http://fnic.nal.usda.gov/fnic/interactiveDRI/>.

## **Rationale**

*It appears that many different types of dietary changes can lead to temporary weight loss, primarily because food choices become more limited, habitual behaviors are interrupted, and motivation is initially high.<sup>102 103</sup> In general, trials comparing different weight loss strategies find little difference in the amount of weight loss after one year.<sup>104 105</sup> One small, short term 2014 study did report that patients on a low carb diet lost an average 3.5 more kg [95% CI, 5.6 to 1.4 kg] than those on a low fat diet. (Lydia 2014) Successful long-term dietary changes should be selected for each patient based on 1) long-term safety of the diet, 2) appropriateness of the diet for treating concurrent health conditions and risk factors, and 3) compatibility with the patient's culture, personal tastes, budget, and food availability.<sup>106</sup>*

## **STEP 5: RECOMMEND A PROGRAM OF PHYSICAL ACTIVITY<sup>107</sup>**

To match the protocols of successful comprehensive weight-loss programs, physical activity should consist of at least 30 to 40 minutes of continuous or intermittent, moderate intensity exercise, for 3 to 5 days per week, or a weekly total of at least 150 minutes.

More activity will likely improve results further, and exercise will prevent additional weight gain and improve many health risk factors even if weight loss is not significant.

Physical activity should be tailored to the individual patient:

### **Work up to a full exercise program gradually.**

Some patients will find it easier and as effective to perform several short exercise sessions (as little as 10 minutes each) rather than single, long sessions.<sup>108</sup> Such

regular “micro-bouts” of exercise are also associated with reduced cardiovascular risk and mortality.<sup>109 110</sup> Patients who are very obese or have low tolerance for exercise may need to slowly build up to even a moderately brisk 15 minute walk.

**Evaluate exercise tolerance.** A number of tools are available to do an initial assessment of a patient's current activity, readiness, and potential contraindications such as the Rapid Assessment of Physical Activity (RAPA),<sup>111</sup> the Physical Activity Assessment Tool (PAAT),<sup>112</sup> PACE,<sup>113</sup> and PARmed-X.<sup>114</sup> (See Appendix J.) When there is evidence of potential risk from exercise, stress-testing may be considered.

### **Work with the patient to discover alternatives to formal exercise programs.**

Help patients choose activities that are suitable for their abilities and that they find enjoyable. Compliance often increases when the activities involve other people. Examples include hiking, light gardening/yard work, dancing, golf (walking and carrying clubs), and bicycling (<10 mph). Even simply increasing lifestyle activity (using stairs, wearing a pedometer) can contribute to significant weight loss and weight maintenance.<sup>115</sup>

See also Appendix G.

A number of apps are available to help patients with various exercise plans. (See Appendix I.)

## **Rationale**

*Exercise increases calorie expenditure, and long-term studies find exercise improves weight loss and weight maintenance results.<sup>85</sup> Surveys of successful long-term dieters indicate they*

*incorporate regular exercise into their lifestyle.*<sup>116 117</sup> *Expert advice regarding the need for pre-clearance with stress testing is mixed: The American College of Sports Medicine recommends exercise stress testing should be performed before high risk patients initiates an exercise program while the CDC and American College of Preventive Medicine suggest that most patients can participate in moderate physical activity without a medical clearance.*<sup>118</sup>

### **STEP 6: RECOMMEND BEHAVIOR-CHANGE STRATEGIES\***

Behavior-change strategies should follow an organized framework such as the 5-A framework (Assess, Advise, Agree, Assist, Arrange follow-up):<sup>67 70</sup>

- **Assess** the patient behaviors and attitudes.
  - Knowledge about the problem and its contributors
  - Past experience with weight control
  - Motivation and readiness to change and confidence that they can make a change
  - Current eating behaviors and attitudes about their diet and lifestyle
  - Current activity levels, readiness to help family members or friends become more active, and any contraindications to an exercise program (Meriwether 2008)
- Give clear, specific, personalized **advice** and connect suggested behavior changes to the patient's

- goals, motivations, and personal preferences.
- Achieve **agreement** on behavior changes consistent with the patient's readiness
  - If patient is not ready to change, explore their attitudes to change (e.g. pros and cons) and help them build confidence towards committing to change
  - If patient is ready to change, help them set measurable behavioral goals involving dietary change and exercise.
- Provide **assistance** using methods known to help achieve behavior-change goals
  - Teach self-monitoring (eating, physical activity, thoughts/feelings/concerns, etc.)
  - Collaborate on specific behavioral goals (meal ideas, exercise planning, etc.)
  - Teach problem-solving skills (identifying obstacles and high risk situations, brainstorming solutions)
  - Provide information and build skills related to food choices and preparation, exercise performance, staying motivated, managing social situations, etc.
- **Arrange** follow-up
  - Check on progress
  - Identify persistent obstacles
  - Revise the treatment plan as necessary

See Appendix I for community and professional services available locally or online, and for patient self-help resources on the topic of behavioral self-management.

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\* See Appendix H for additional behavioral strategies

## Rationale

*Behavioral approaches, when combined with other weight-loss approaches, improve results of weight-loss attempts for as long as intervention continues.*<sup>1 119 120</sup>

*While most of the available research has investigated professionally-delivered behavioral therapies and educational services used alone or as part of a comprehensive lifestyle program, initially providing the patient with lower-cost resources (books, websites, support groups) that would help them learn and practice behavioral self-management techniques may also be valuable as a cost-effective way to sustain their use into the long-term.*

## **STEP 7: CONSIDER MEAL REPLACEMENT PRODUCTS, NUTRITIONAL AND OTHER DIETARY SUPPLEMENTS.**<sup>121 122</sup>

Dietary supplements are promoted for weight loss based on one or more of the following rationales

- Improve compliance
  - Meal-replacement products
- Prevent nutrient deficiencies
  - Multivitamin-mineral supplements
  - Some meal-replacement products
  - Fiber products
- Reduce calorie intake
  - Fiber products
  - CNS appetite suppressants
- Reduce calorie absorption
  - Fiber products
  - Enzyme inhibitors
- Increase energy expenditure
  - Thermogenic agents

In addition to showing efficacy in controlled research, a dietary supplement must also be free of major side effects and be safe for long-term use when used for weight maintenance.<sup>123</sup>

**Meal replacement products** (e.g., diet shakes and snack bars) must be evaluated for nutritional adequacy and safety before recommending them to patients. While they can facilitate short-term weight loss, there is no evidence that these products contribute to long-term weight management. They are best used as convenient alternatives to normal, healthy meals when such meals are not available.

## Rationale

*There is abundant evidence that meal replacement products can significantly contribute to the short-term success of a weight-loss program.*<sup>124 125</sup> *Such products improve compliance with a diet and may improve nutritional intake if they are fortified with essential nutrients. They may also help with weight maintenance when used regularly.*<sup>126 127</sup> *However, their cost may be prohibitive, and their use does not promote the learning of optimal eating habits.*

**A multivitamin/mineral combination** may be a useful strategy for ensuring nutritional adequacy during weight-loss diets. Dieting patients may not consume sufficient calories to obtain recommended amounts of essential nutrients. Dietary supplements designed to facilitate weight loss can only be considered when their use is deemed safe for an individual patient. While some have been shown to be effective for short-term weight loss, there is no evidence that such supplements contribute to long-term weight control. Supplements with short-term evidence of effectiveness include: [are we missing information here?]

## Rationale

*Low calorie and restrictive diets can be deficient in many vitamins and minerals.*<sup>128</sup> *Using a multivitamin/mineral combination is an inexpensive way to prevent this complication.*

**Dietary fiber supplements.** The following types and doses taken with meals may help increase satiety.

- Psyllium, up to 3.5 grams per meal
- Glucomannan, 1 gram per meal
- Chitosan, 1-1.5 grams per meal
- Guar gum fiber supplements are not recommended.

Many of these products will also be beneficial to blood lipid and blood sugar control.<sup>130</sup> Note: when fiber is taken as a supplement, be sure there will be adequate water intake (recommend 2 cups of water for every dose of fiber).

*Cautions: Side effects can include flatulence; contraindicated in patients with esophageal or intestinal obstruction.*

### **Rationale**

*Dietary fiber adds bulk to the diet, which can help provide a feeling of fullness after a meal that is, nonetheless, low in calories.<sup>131</sup> While research on high fiber weight-loss diets has not always demonstrated superiority over other diets, there is agreement that increasing fiber intake can improve weight loss results.<sup>132</sup> Fiber supplements may be useful for patients who cannot consistently eat high fiber foods. Several controlled trials have found these supplements, in amounts listed above, helpful for enhancing weight loss as part of a calorie-controlled diet, although some systematic reviews report inconsistent effects and small magnitudes of benefit.<sup>133 134</sup> Guar gum<sup>135 136</sup> has not been effective in most studies.*

**Tea/Coffee Extracts/Caffeine.** Each of the following may have effects on body weight when used as indicated:

- Green tea or extracts containing at least 500 mg/day catechins and up to 300 mg/day caffeine

- Green coffee bean extract containing 400-450 mg chlorogenic acids

*Cautions: no adverse effects have been associated with green tea or green coffee products. Caffeine consumption over 300 mg/day may result in tremors, insomnia, dizziness, and other symptoms.*

### **Rationale**

*Green tea catechins in sufficient amounts may increase energy expenditure and alter fat metabolism, effects that may be potentiated by caffeine.<sup>137</sup> A systematic review reported that supplements containing at least 500 mg catechins along with variable amounts of caffeine produced an average additional weight loss of almost three pounds over a twelve week period, and was also helpful for weight maintenance.<sup>138</sup> However, another meta-analysis of fewer studies did not find significant effects on weight loss or weight maintenance.<sup>139</sup> Green tea extracts are considered safe when properly formulated, but hepatotoxicity from specific products has been reported.<sup>140</sup>*

*Green coffee bean contains chlorogenic acids and related compounds that affect energy metabolism in various ways.<sup>141 142</sup> Three RCTs<sup>143 144 145</sup> showed significant weight loss with extracts containing 180-480 mg/day chlorogenic acids. Weight loss averaged between 11 and 18 pounds in these short-term (6-12 weeks) trials compared to 4-5 pound losses in control groups. No serious side effects were reported, but no long-term studies of efficacy or safety have been done.*

*Caffeine may have effects on weight loss by several mechanisms,<sup>146</sup> and some observational studies have found associations between drinking caffeinated beverages and lower body weight.<sup>147 148</sup>*

However, one systematic review of green tea catechin and caffeine trials found no significant effects on weight loss from using caffeine alone.<sup>149</sup> Therefore, it appears that caffeine may only be helpful in combination with green tea extracts.

### **Natural or synthetic ephedrine/caffeine combinations and similar-acting herbal formulas.**

These popular weight-loss aids have been recommended up to 60-90 mg/day ephedrine or other alkaloids, and up to 240 mg/day caffeine. Alkaloid sources include

- Ephedra (*ma huang*)
- Ephedrine USP
- Bitter orange (*citrus aurantium*)

Because of potentially dangerous side effects, supplements containing ephedra alkaloids have been banned in the US and some other countries. However, other botanical sources of similar alkaloids, such as bitter orange, are available.<sup>150</sup>

Nonetheless, this option is generally not recommended either.

*Cautions: Side effects may include increased heart rate, dry mouth, insomnia, and headache; contraindicated in patients with hypertension, kidney or heart disease, neurological disorders, or who are taking monoamine oxidase inhibitors or ephedrine-like medications. Should not be used by anyone younger than 18 years.*

### **Rationale**

*Ephedrine is a central nervous system stimulant of the beta-adrenergic type. It is available as a synthetic compound or as the principle active ingredient of the herb Ephedra sinica or ma huang. In combination with caffeine, ephedrine increases metabolic rate in humans,<sup>151 152 153</sup> while Ephedra alone failed to influence metabolic rate in one study.<sup>154</sup> Both synthetic ephedrine/caffeine combinations<sup>155 156 157</sup><sup>158</sup> and herbal combinations of Ephedra and caffeine-containing herbs (guarana<sup>159</sup>*

*or kola nut<sup>160</sup>) have been shown to improve weight-loss results in controlled trials. A meta-analysis found these combinations resulted in additional weight loss of 1 kg/month compared to placebo in short-term studies, while ephedrine/Ephedra alone was less effective – 0.6-0.8 kg/month.<sup>161</sup> Effective doses appear to range from 72-90 mg/day of ephedrine or Ephedra alkaloids, combined with at least 200 mg/day of caffeine. However, significant side effects including increased heart rate, insomnia, dry mouth and headache were frequently reported in most trials. Other adverse reactions include elevated blood pressure, nervousness, irritability, urination disturbances, vomiting, muscle disturbances, stroke, and even death due to heart failure.<sup>162 163</sup>*

*Bitter orange has been much less extensively studied and only in combination with other herbs. A small double-blind trial tested a product containing approximately 60 mg/day synephrine from bitter orange extract, plus 528 mg/day caffeine and 900 mg/day of St. John's wort extract (0.3% hypericin). Treatment and placebo groups also followed a calorie-restricted diet and a supervised exercise program. After six weeks, all groups lost similar amounts of weight, but the herbal combination group lost significantly more body fat.<sup>164 165</sup> No research has investigated the effects of bitter orange extract either alone or in combination only with caffeine. Available research suggests bitter orange has low side effect risks compared to ephedra,<sup>166</sup> but there is a potential for increasing blood pressure and cardiovascular risk when used in large amounts.<sup>167 168</sup>*

**5-hydroxytryptophan**, 600-900 mg/day.

***Cautions: Side effects may include nausea, other gastrointestinal symptoms, headache, sleepiness, muscle pain, and/or anxiety.***

***Rationale***

5-hydroxytryptophan (5-HTP) is the direct precursor to the neurotransmitter serotonin. In four short-term controlled trials, 5-HTP was shown to reduce appetite and to promote weight loss with a dose range of 600-900 mg/day.<sup>169 170 171 172</sup> In these trials, reported side effects included gastro-intestinal upset (such as nausea) and, less often, headache, sleepiness, muscle pain, or anxiety. Contraindications to 5-HTP include use of medications that alter serotonin activity, such as the antidepressants known as selective serotonin reuptake inhibitors (SSRIs), and the Parkinson's disease drug carbidopa.

**Pyruvate**, 6-10 grams/day along with regular exercise. **Cautions: Side effects may include diarrhea and other gastro-intestinal symptoms, higher LDL and lowered HDL cholesterol.**

#### **Rationale**

Pyruvate, a product of glycolysis, is an abundant substance in human catabolism. Animal studies suggest pyruvate supplementation may increase metabolic rate and reduce insulin resistance.<sup>173</sup> Some controlled trials found that supplementation with 6-10 grams/day of pyruvate combined with an exercise program led to greater weight and body fat loss compared to placebo plus exercise.<sup>174 175 176</sup> However, a meta-analysis of six trials reported the magnitude of the effect was small (less than 1 kg) and of little clinical relevance.

**Chromium**, 200-600 mcg/day. **Cautions:** Patients taking blood-sugar-related medications may experience hypoglycemia when taking chromium supplements. Supplements in excess of 500 mcg/day may be unsafe for long-term use.

#### **Rationale**

Chromium is an essential trace mineral known to affect carbohydrate and lipid metabolism, presumably by promoting insulin sensitivity.<sup>177 178</sup> The effects of chromium on weight loss and body composition has received much research attention, but results have been mixed.<sup>179 180 181 182</sup> Meta-analyses have estimated the average benefit of chromium picolinate supplementation (200-600 mcg/day) was small, about 0.5-1.0 pounds? of weight loss over a period of 10-13 weeks.<sup>183 184</sup>

Some concerns about the safety of chromium picolinate have been reported. Three suspected cases of possible toxic reactions to large (600 mcg/day or more) doses of chromium have been reported.<sup>185-187</sup> Since some of these cases involved kidney and/or liver dysfunction, such pre-existing disorders may contraindicate chromium supplementation in large doses.

The following dietary supplements are not recommended for weight loss due either to the absence of convincing evidence, clinically-irrelevant effects, and/or the presence (\*) of safety concerns:

- 7-KETO
- Calcium<sup>188</sup>
- Cayenne
- Coleus
- Conjugated linoleic acid (CLA)<sup>189</sup>
- \* DHEA
- Guaraná
- Guggul
- Hydroxycitric acid (HCA) from *Garcinia cambogia*<sup>190</sup>
- HMB (beta-hydroxy beta-methylbutyrate)
- *Irvingia gabonensis* (African Bush Mango)<sup>191</sup>
- L-carnitine
- Spirulina
- Starch-blockers (bean pod extract)<sup>192</sup>
- \* Yohimbe

## **STEP 8: CONSIDER NEED FOR CO-MANAGEMENT OF RELATED DISORDERS.**

Additional therapies may be indicated along with weight loss to achieve the best results when the following clinical conditions exist:

- Osteoarthritis
- Hypertension
- Dyslipidemia
- Glucose intolerance
- Other related disorders

### ***Rationale***

*Weight loss is not likely to be sufficient by itself to treat these conditions successfully. Other available therapies may offer additional benefits and should be considered. Also, coexisting conditions may dictate important choices in diet and exercise recommendations.*

## **STEP 9: REEVALUATE TREATMENT PLAN AND RESULTS AT REGULAR INTERVALS AND PLAN FOR LONG-TERM MAINTENANCE.**

Six months is a reasonable length of time to allow changes in diet and lifestyle to achieve their full effect on body weight and other clinical goals. However, more frequent reevaluations of compliance with diet, exercise and behavioral goals can be helpful.

If weight loss or health goals are met, or progress towards them is acceptable, recommend continuing the current program for up to two years with regular contact of at least twice monthly to support compliance and weight-loss maintenance. If progress toward goals has plateaued, consider recommending intensifying the program with additional calorie restriction, physical activity, or behavioral interventions. Also consider referral for specialist intervention(s) as discussed below.

## **STEP 10: CONSIDER REFERRAL FOR MORE INTENSIVE INTERVENTION WHEN WEIGHT OR HEALTH GOALS HAVE NOT BEEN MET.**

Face-to-face counseling by specially trained professionals may be useful for the following purposes:

- Nutrition professional to design a more effective diet and/or teach specific dieting skills (e.g. appetite awareness, proper meal planning)
- Personal trainer to increase appropriate physical activity and improve exercise habits
- Psychology professional to employ intensive behavior therapy or to address emotional or psychological issues that impact eating behaviors.
- Medical specialist to consider weight-loss medications or bariatric surgery

See Appendix I for resources for locating available professional services.

### ***Rationale***

*Some patients may have a history of failed weight-loss attempts, suggesting that similar attempts have little hope of success. While professional help can be expensive, there is evidence that better results are achievable with more intensive intervention.<sup>2 193</sup> Emotional or psychological issues can lead to overeating and other self-destructive behaviors that are best addressed with intervention by qualified professionals.<sup>194 195</sup>*

*A thorough assessment of the evidence for the benefits and risks of medical interventions is beyond the scope of this document, but are available in a number of authoritative reviews.<sup>196 197 198 199</sup>*

# APPENDICES

## APPENDIX A. WEIGHT HISTORY QUESTIONNAIRE

The following questionnaire can be administered by interview or self-administered with follow-up interview to ensure thoroughness.

### Family history

- Who in your immediate family (parents, siblings) is overweight? Who is not overweight?
- Has anyone in your family suffered from any of the following health problems: depression, seasonal affective disorder (SAD), substance abuse, eating disorders, or other psychological disorders?

### Personal health history

- Have you been diagnosed with any of the following health problems: diseases of the endocrine glands (thyroid, adrenals, pituitary), blood sugar disorders, insulin resistance?
- Do you now have or have you ever had any problems with depression, seasonal affective disorder (SAD), substance abuse, or other psychological disorders?
- Do you now have or have you ever had an eating disorder, or have you felt compelled to binge eat, purge (by vomiting or with laxatives or diuretics), or over-exercise to help control your weight?
- List all of the medications you are taking.

### Weight history

- At what age did you first become overweight?
- What was your height and weight at that time?
- What do you think might have been the reason why you became overweight at this time?
- Since you became overweight, how has your weight changed and what circumstances do you think led to these changes?
- How many times, if ever, have you attempted to lose weight? What results did you experience?
- Do you think you know what it is you are doing that is keeping your weight higher than you want it to be? If so, please explain.

### Diet history

- How often do you eat out?
- How often do you eat fast food?
- How often do you use alcohol?
- Describe a typical day's diet during a workday.
- Describe a typical day's diet during a day off.
- Who cooks and who shops for food you have at home?
- In your home, is there any lack of cooking and refrigeration equipment?
- Does your household have enough money for food?
- Do any other members of your household have weight problems?

## **Exercise history**

- Do you have a regular exercise program? If so, please describe the type of exercise, how often and how long you do it, and whether you exercise alone or with partners or a group.
- If you don't have a regular exercise program, describe any physical activity you do that feels like exercise.
- How have your exercise habits varied between now and the past?
- Describe what exercise means to you in your current lifestyle.

## **Social history**

- Describe your living situation, including with whom you share your residence.
- Describe your usual work and activity schedule, and explain any effects this schedule has on your food choices.
- Describe how much stress you think you have in your life.
- Is anybody in your life talking to you about your weight, giving advice, criticizing, etc?

## **Sources**

Mindful Eating: A Guide to Rediscovering a Healthy and Joyful Relationship with Food by Jan Chozen Bays. Shambhala; PAP/COM edition (February 3, 2009).

Intuitive Eating: A Recovery Book for the Chronic Dieter: Rediscover the Pleasures of Eating and Rebuild Your Body Image by Evelyn Tribole, Elyse Resch. St. Martin's Press; 5th edition (February 1996).

The Learn Program for Weight Control: Lifestyle, Exercise, Attitudes, Relationships, Nutrition by Kelly D. Brownell. Amer Health Pub Co; 10th edition (January 2004).

The Cooper Clinic Solution to the Diet Revolution: Step Up to the Plate by Georgia G. Kostas, Carol Stertzer (Editor). Good Health Press; Revised edition (March 1, 2009)

Maximize Your Body Potential: Lifetime Skills for Successful Weight Management by Joyce D. Nash. Bull Publishing; 3rd edition (April 2003)

The 9 Truths About Weight Loss: The No-Tricks, No-Nonsense Plan for Lifelong Weight Control by Daniel S. Kirschenbaum. Owl Books; (April 2001)

## **APPENDIX B. WEIGHT LOSS ISSUES QUESTIONNAIRE**

1. Why do you want to lose weight?
2. Describe how your weight has changed over the years since you were young.
3. List all of the reasons you can think of that may explain why you are overweight.
4. How have you tried to lose weight in the past, and what were the short-term and long-term results?
5. List the enjoyable things that will likely happen and the unpleasant things that will not happen, if you do lose weight.
6. What will trying to lose weight cost you in terms of giving up things you like and experiencing things you don't like?
7. For better or worse, how do other people influence your weight loss goals?
8. What do you think is your biggest challenge regarding weight loss?
9. What will need to change in your life situation to make losing weight easier?
10. In a typical week, how many times do you eat a meal you have prepared for yourself, and how many times do you eat a meal prepared by others (including meals at home and eating out)?
11. Describe the amount and type of any physical activity you get in a typical week.
12. List tempting foods that are the hardest for you to resist.

13. In what situations are you most likely to overeat?
14. List the reasons why now might be a good time for you to try to lose weight.
15. List the reasons why now might not be a good time for you to try to lose weight.
16. How do changes in your mood or level of stress influence your eating?

17. Cost Benefit Analysis

What will it cost you to lose weight?

How will losing weight benefit you?

What will it cost you to not lose weight?

How will not losing weight benefit you?

## APPENDIX C. DAILY EATING DIARY

Use this diary to write down when, what, and where you eat and drink at each meal and snack, including details such as portion sizes, and what spreads, sauces, dressings, and beverages you use. Also comment on how hungry you were, how fast you ate, what outside influences may have affected your eating, what inner thoughts or feelings you were having, and how you felt after eating.

WHEN (day, time, meal)	WHAT (amount)	HUNGER LEVEL:	EATING SPEED	WHERE DID YOU EAT	OUTSIDE INFLUENCES	INNER THOUGHT/ FEELINGS	SENSATIO N AFTER EATING (30 min- 3 hrs)

Hunger: rate on a 0 (not hungry) – 5 (very hungry) scale; Speed: rate as slow, average, fast; Where: location and circumstances.

## APPENDIX D. WEIGHT-LOSS DIETS

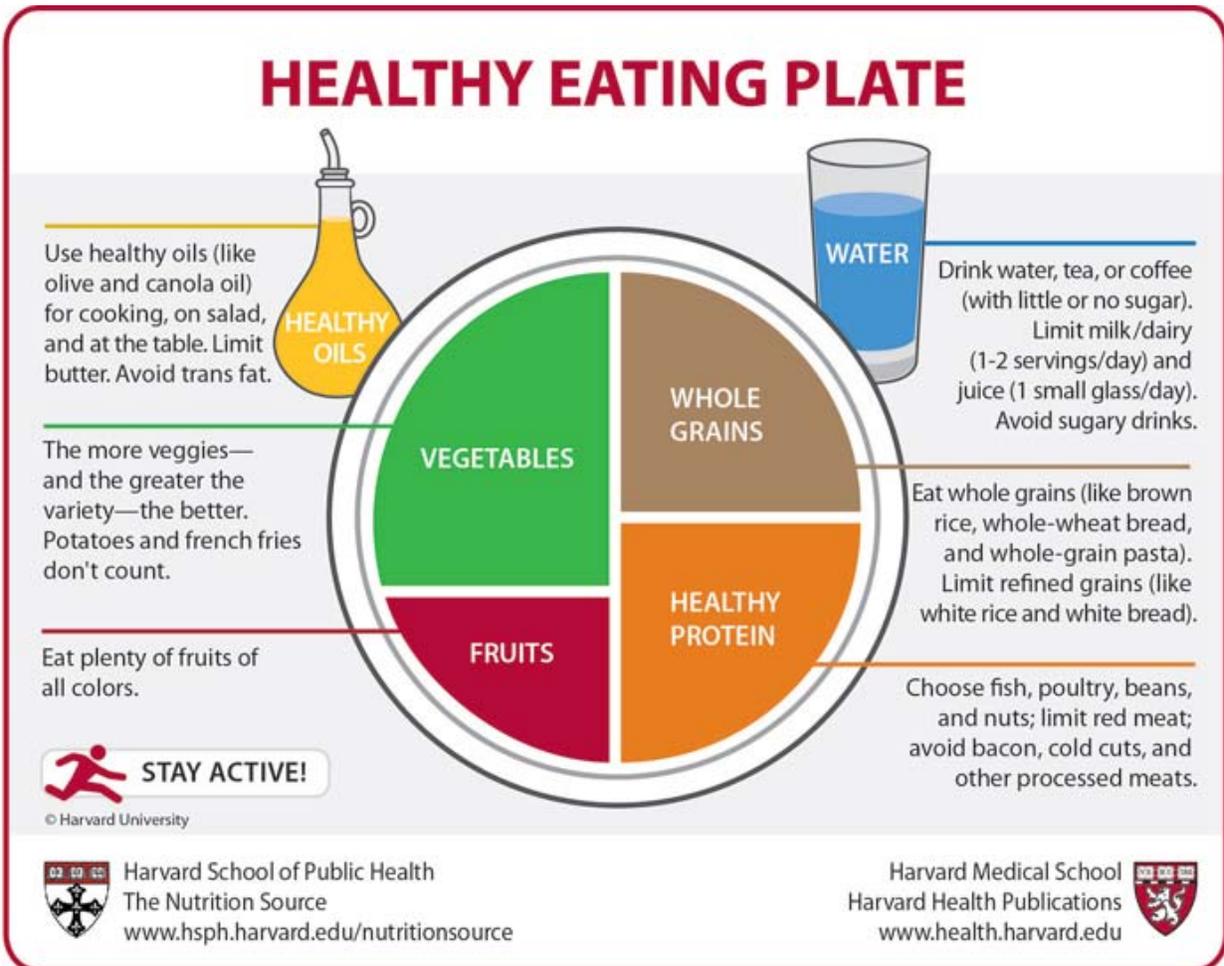
Many diets are suitable for weight loss. Not all of the following have been tested for efficacy in weight loss in clinical research but they resemble others in the same category that have evidence of effectiveness.

- **Balanced diet of healthy foods**
  - Weight Watchers (<http://www.weightwatchers.com>)<sup>200</sup>
  - Healthy Eating Plate (Harvard School of Public Health)<sup>201</sup>
  - USDA MyPlate (<http://www.choosemyplate.gov>)<sup>202</sup>
  - DASH Diet<sup>203 204</sup>
  - Mediterranean Diet<sup>205</sup>
- **Reduced carbohydrate or glycemic load diets**
  - Atkins Diet<sup>206</sup>
  - South Beach Diet<sup>207</sup>
  - Paleo Diet<sup>208</sup>
  - Glycemic Index Diet<sup>209</sup>
  - Zone Diet<sup>210</sup>
- **Reduced fat diets**
  - Pritikin Diet<sup>211</sup>
  - Ornish Diet<sup>212</sup>

Some of the above diets are elaborated upon on the following pages:

# HARVARD HEALTHY EATING PLATE

This eating guide was developed by researchers at the Harvard School of Public Health in order to incorporate the latest results of research relating diet to disease risk. The researchers believe it reflects the current state of knowledge better than the USDA guidelines.



Source: [HTTP://WWW.HSPH.HARVARD.EDU/NUTRITIONSOURCE/PYRAMIDS.HTML](http://www.hsph.harvard.edu/nutritionsource/pyramids.html)

## USDA DIETARY GUIDELINES AND MYPLATE

THESE RECENTLY UPDATED GUIDELINES INCLUDE WEIGHT CONTROL STRATEGIES AND REPRESENT A HEALTHY APPROACH TO MEAL PLANNING.



Balance calorie intake from foods and beverages with calories expended.

Engage in regular physical activity and reduce sedentary activities.

Eat amounts of the following food groups based on daily calorie requirements:\*

- Grains
- Vegetables
- Fruits
- Milk and other calcium-rich products
- Meat, poultry, fish, dry beans, eggs and nuts
- Oils
- Extra calories

Make at least half of the total grains eaten whole grains.

Eat more dark-green vegetables, orange vegetables, and dry beans and peas. Keep the amounts of starchy vegetables (potatoes, corn, green peas) to the minimum amount needed each week.

Keep the amounts of fruit juice consumed to less than half of total fruit intake.

Consume 3 cups of fat-free or low-fat (1%) milk, or an equivalent amount of yogurt, cheese or other calcium-rich foods per day.

Choose low-fat or lean when selecting meats and poultry. Consider fish, nuts and seeds rich in essential fatty acids as alternatives to meat and poultry. Consider dry beans and peas as an alternative to meat or poultry as well as a vegetable choice.

Choose most fats from sources of monounsaturated and polyunsaturated fatty acids, such as fish, nuts, seeds and vegetable oils. Choose fat-free, low-fat or lean meat, poultry, dry beans, milk and milk products. Choose grain products and prepared foods that are low in saturated and trans fat. Limit the amount of solid fats consumed.

Choose and prepare foods and beverages with little added sugars or caloric sweeteners.

Choose and prepare foods with little salt. Keep sodium intake to less than 2300 mg per day. At the same time, consume potassium-rich foods, such as fruits and vegetables.

If one chooses to drink alcohol, consume it in moderation. Some people, or people in certain situations, should not drink.

\*Calculate recommended servings based on age, gender, and physical activity level at <http://www.choosemyplate.gov/weight-management-calories.html>

## **LOW GLYCEMIC LOAD DIET**<sup>213</sup>

Choose foods from the lists below, which emphasize low-carbohydrate foods or low-glycemic index carbohydrate foods that are also low in unhealthy fats. For more guidance, the following diet resources are available:

- The Low GI Diet Revolution: The Definitive Science-Based Weight Loss Plan by Jennie Brand-Miller, et al. New York: Marlowe & Company; 2005.
- GlycemicIndex.com at the University of Sydney, <http://www.glycemicindex.com/>
- The South Beach Diet: The Delicious, Doctor-Designed, Foolproof Plan for Fast and Healthy Weight Loss by Arthur Agatston, MD. New York: Rodale Press, 2003.
- The South Beach Diet Cookbook by Arthur Agatston, MD. New York: Rodale Press, 2004.
- Official web site for the South Beach Diet, <http://www.southbeachdiet.com>

### **Protein** (meat, poultry, fish, eggs, nuts and beans)

- Lean beef and pork, chicken and turkey breasts (without skin)
- Eggs (sparingly), egg whites, egg substitutes
- Seafood and fish, not fried
- Dried beans and peas
- Soy food products
- Nuts and seeds
- Protein powders and meal replacement products low in animal fats

### **Dairy products and dairy substitutes**

- Fat-free or 1% milk and milk products
- Unsweetened low-fat or nonfat yogurt
- Light soy beverages
- Fat-free or low-fat cheeses

### **Vegetables and Fruits**

- All vegetables except potatoes
- All fruits except raisins and overripe bananas

### **Fats, oils, and sweets**

- Non-hydrogenated olive oil, canola oil, peanut oil, corn oil, flaxseed oil, hemp oil, pumpkin seed oil, safflower oil, sesame oil, soybean oil, sunflower oil
- Desserts and candy sweetened with fructose or other low glycemic index sweeteners or artificial sweeteners that are also low in animal and trans fats
- Sports (energy) bars and drinks sweetened primarily with fructose or other low glycemic sweeteners

### **Bread, cereal, rice, and pasta**

- Grainy wheat breads (e.g. cracked wheat, sprouted wheat, 100% stone-ground wheat, etc.), breads containing whole, intact grains and seeds, whole grain pumpernickel bread
- Unleavened breads (pita, chapatti), especially when made with whole grain flours or legumes
- 100% bran breakfast cereals, muesli
- Oatmeal and other oat-containing foods
- Basmati rice, parboiled (converted)<sup>†</sup> rice
- Barley, buckwheat, bulgur
- Pasta and noodles<sup>‡</sup>

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<sup>†</sup> Parboiled rice is produced by a process of soaking, pressure steaming and drying prior to milling. This modifies the starch, resulting in a lower glycemic index

<sup>‡</sup> The ingredients and processing used to make pasta modifies the starch, resulting in a lower glycemic index.

## **ATKINS DIET**<sup>214 215</sup>

The Atkins diet is divided into four phases beginning with a very low carbohydrate diet that gradually adds more carbohydrate-containing foods as the diet progresses:

**Kick-Start or Induction Phase** (minimum of two weeks up to as long as it takes to approach 15 pounds from goal weight)

- Carbs are limited to no more than 20 grams per day.
- Eggs and most seafood, poultry, and meat are allowed freely; exceptions are oysters, mussels, and sugar-cured meats.
- Cheese is allowed up to 4 ounces per day
- Several cups of vegetables are allowed up to a total carbohydrate intake of 12-15 grams from vegetables. An online guide to carbohydrate content of vegetables is available.<sup>§</sup>
- Fats, oils, and sugar-free beverages are allowed freely; similar items that have small amounts of carbohydrate (e.g. sour cream, salad dressings, low-calorie beverages) may be used if their carbohydrate content is tracked,<sup>§</sup> and does not make daily totals exceed the 20 gram carbohydrate limit.
- No fruit, bread, grains, or starchy vegetables
- Frequent small meals less than four hours apart and at least 8 glasses of water daily are recommended.

### **Balancing or Ongoing Weight Loss Phase**

- Dieters experiment with adding foods with low carbohydrate content until they find a level of intake that permits a broader selection of foods with continued weight loss until weight approaches within 10 pounds of goal weight.
- Foods are added in 5 gram increments of additional carbohydrate content. An online guide to acceptable foods is available.<sup>††</sup> Some examples are:
  - Dairy products: cottage cheese, unsweetened yogurt
  - Nuts and seeds
  - Fruit: berries, melon
  - Juices: lemon, lime, tomato

<sup>§</sup> <http://www.atkins.com/Program/Phase-1/What-You-Can-Eat-in-this-Phase.aspx>

<sup>††</sup> <http://www.atkins.com/Program/Phase-2/What-You-Can-Eat-in-this-Phase.aspx>

### **Fine-Tuning or Premaintenance Phase**

- As dieters approach their goal weight, they continue to experiment with adding foods with low to moderate carbohydrate content until they find a level of intake that permits a broader selection of foods with continued weight loss until weight approaches within 10 pounds of goal weight.
- Foods are added in 10 gram increments per week of additional carbohydrate content. An online guide to acceptable foods is available.<sup>††</sup> Some examples are:
  - Starchy vegetables: winter squash, carrots, baked potato
  - Legumes: chickpeas, great northern beans, kidney beans
  - Fruit: apple, cherries, grapefruit, kiwi, peach, watermelon

### **Lifetime Maintenance Phase**

- Dieters continue to experiment with adding low to moderate carbohydrate foods to determine the level of carbohydrate intake that allows them to maintain their weight.
- Acceptable foods are the same as for the Premaintenance Phase.

A vegan version of the Atkins Maintenance diet is called the Eco-Atkins Diet and has been shown effective for short-term weight loss and reduction in cardiovascular risk factors.<sup>216</sup>

- 30% protein from soy products, vegan meat substitutes, and nuts
- At least 40% fat from unprocessed vegetable oils, avocado, and nuts
- Less than 30% carbohydrates from protein sources, low-starch vegetables, fruit, and limited amounts of whole grains

Mobil device apps for carbohydrate tracking are available on the Atkins.com website, along with troubleshooting guides and many other tools and products.<sup>217</sup>

<sup>††</sup> <http://www.atkins.com/Program/Phase-3/What-You-Can-Eat-in-this-Phase.aspx>

## APPENDIX E. CALORIE-DENSE FOODS AND THEIR ALTERNATIVES

Calorie-dense foods	Alternatives (emphasize natural foods)
Red meats - corned beef, prime rib, sausage, ribs, lunchmeats, frankfurters	Lean beef (round, sirloin flank, tenderloin), wild game, ham, Canadian bacon, pork tenderloin, veal chops and roasts, 95+% lean lunchmeat, low-fat vegetarian meat substitutes
Poultry - fried chicken, frankfurters, duck, goose	Skinless chicken, turkey, Cornish hen
Seafood - fried seafood, oil-pack tuna	Non-fried seafood, water-pack tuna
Dairy products - most cheeses, whole milk/yogurt, regular and premium dairy desserts	Cottage cheese, parmesan cheese, low/non-fat cheeses/milk/yogurt/desserts or dairy alternatives (soy, rice, etc.)
Eggs and egg dishes	Dishes prepared with egg whites only or low-calorie egg substitutes
Fats - butter, margarine, mayonnaise, oil, cream products, non-dairy creamer, rich sauces/gravies/ salad dressings, nuts, seeds, peanut butter, olives, avocado, coconut	Low-calorie mayonnaise, spray oil for cooking, low-fat/condensed non-fat milk, low-fat sauces/gravies/salad dressings
Breakfast breads and cereals - doughnuts, pastries, croissants, gourmet muffins, high-fat cereals and granola, pancakes, waffles, French toast	Toast/bagel/English muffin, low-fat muffins and pastries, cooked cereals, low sugar/low fat breakfast cereals and granola, low-fat/sugar recipe pancakes and waffles
Lunch/dinner entrees - casseroles/noodle dishes/stews/soups with meat/cheese/cream/eggs, many fast food sandwiches, many Mexican/Asian/Italian dishes, fried foods	Tomato-based or other dishes without meat/cheese/fat, low-calorie salad entrees, broth soups, lean meat sandwiches w/o cheese, low-fat international dishes, broiled/baked/steamed foods
Starchy snacks - Fried chips, rich crackers, regular popcorn, French fries, onion rings	Pretzels, bread sticks, low/non-fat crackers, chips and popcorn
Sweet snacks - Regular cookies, cakes, pies, frozen desserts, granola bars, candy, soda pop	Fresh fruit, flavored nonfat yogurt, nonfat frozen desserts, sherbet/fruit ices, gelatin desserts, angel food cake, animal crackers, low-fat fig/fruit Newtons, low/nonfat cookies/cakes, sugarless candy, diluted unsweetened fruit juices
Alcoholic beverages - beer, wine, wine coolers, mixed drinks, liqueurs	Light beer, low-calorie non-alcoholic beverages

## APPENDIX F. PROS AND CONS OF POPULAR DIETS

### High fat, high protein, low carbohydrate diets

Exemplified by the popular Atkins and Paleo diets, this approach has the following advantages in most cases:

- Probable increased satiety plus small increases in metabolic energy expenditure.
- Faster initial weight loss; however, this is due to greater loss of body water.<sup>218</sup>
- Recent short-term studies found this diet was more effective at six months compared to a low-fat diet.<sup>219 220 221</sup>

However, this type of diet may have several disadvantages:

- May be deficient in Vitamins E, A, thiamin, B6, folate, calcium, magnesium, potassium and dietary fiber.
- Ketogenic effects: May increase blood uric acid and result in symptoms of fatigue, nausea, dehydration, constipation or diarrhea.<sup>222</sup>
- Cardiovascular effects: May worsen cardiovascular risk factors, including LDL, HDL, triglycerides, homocysteine, lipoprotein(a), fibrinogen, and myocardial perfusion, even if weight loss is successful.<sup>223 224</sup>
- Renal effects: May increase risk of kidney stones and bone loss due to effects on renal and plasma acid-base balance.<sup>225 226 227 228</sup> However, a high (25% of calories) protein diet that was moderate in fat (30%) produced no adverse bone changes after six months compared to a similar but lower protein diet.<sup>229</sup> *Note:* since the higher protein diet allowed low-fat dairy products, it contained more calcium and Vitamin D than the lower protein diet.
- High protein intake is contraindicated in patients with kidney disease. However, the high protein, moderate fat diet described above produced no evidence of adverse effects on kidney function after six months.<sup>230</sup>
- Diabetes effects: High protein diets, even though they usually have a low glycemic index, may be detrimental to glucose control or insulin sensitivity in diabetics due to unclear mechanisms. This effect does not occur in non-diabetics, however.<sup>231</sup>
- Cancer risk effects: Long-term high intake of red meat and pork may increase the risk of some cancers, including cancer of the colon,<sup>232</sup> prostate,<sup>233</sup> breast,<sup>234 235</sup> and non-Hodgkin's lymphoma.<sup>236</sup>
- Many dieters who try this diet abandon it within a few months.<sup>219 220 221</sup>
- Long-term results appear no better than from low-fat diets.<sup>219</sup>

## **Low fat, high carbohydrate/fiber diets**<sup>237</sup>

Long championed as a sensible diet for reducing heart disease and other risks, this approach has the following advantages in most cases:

- Weight loss can occur even when allowed foods are eaten as much as desired (ad libitum).<sup>238 239</sup>
- Successful long-term dieters report that choosing low-fat foods was a key strategy in their success.<sup>240</sup>
- Diet is consistent with recommendations for chronic disease prevention.<sup>1 241 242</sup>
- Pritikin. In combination with an aerobic exercise program, has reduced blood pressure, improved blood lipids, and improved heart function.<sup>243 244 245 246</sup> In diabetics, the program has improved glucose tolerance and reduced need for diabetic medications.<sup>247 248</sup>
- Ornish. As part of an intensive lifestyle change program that included aerobic exercise, stress management training, smoking cessation, and group psychosocial support, reversal of coronary atherosclerosis and relief from symptomatic coronary heart disease without medication was demonstrated after one and five years.<sup>249</sup>

However, this type of diet may have some disadvantages:

- May be deficient in vitamins E, B12, and zinc.
- May increase plasma triglycerides and lower HDL cholesterol in some individuals.<sup>250</sup> Poor choices of carbohydrate (e.g. high glycemic index) may result in detrimental effects on glucose control and insulin function.
- Short-term studies find no greater effectiveness of low-fat diets compared to other diets.<sup>251</sup>

Attention to glycemic index may improve outcome and reduce risks of high carbohydrate diets.<sup>252 253</sup>

## APPENDIX G. PRESCRIBING AN EXERCISE PROGRAM

### Guidelines for exercise stress testing

Expert advice regarding the need for pre-clearance with stress testing is mixed: The American College of Sports Medicine recommends exercise stress testing should be performed before high risk patients initiates an exercise program while the CDC and American College of Preventive Medicine suggest that most patients can participate in moderate physical activity without a medical clearance.<sup>254</sup>

A number of tools are available to do an initial assessment of a patient's current activity, readiness, and potential contraindications such as the Rapid Assessment of Physical Activity (RAPA),<sup>255</sup> the Physical Activity Assessment Tool (PAAT),<sup>256</sup> PACE,<sup>257</sup> and PARmed-X.<sup>258</sup>

Patients with known or suspected cardiac, pulmonary or metabolic disease are candidates for exercise stress testing if moderate exercise\* is considered. If a vigorous exercise\* program is contemplated, consider exercise stress testing for patients over 40 years old who have never exercised before, or have at least one of the following major coronary risk factors: history of blood pressure above 145/95, cigarette smoking, abnormal ECG, family history of coronary or other atherosclerotic disease prior to the age of 50, or diabetes mellitus. If stress testing is not a viable option, then a slow introduction of low intensity exercises can be introduced and gradually increased based on the patient's tolerance.

Possible contraindications to exercise outside of a monitored environment include MI within 6 months, angina, physical signs and symptoms of congestive heart failure (e.g., bilateral rales, shortness of breath with or without pedal edema), or a resting systolic pressure of 200 mmHg or higher or diastolic of 110 or higher.

In elderly patients, cardiac reserves can be tested in the office by getting up and down from the examination table, walking 15 meters, climbing one flight of stairs, and/or cycling in the air for 1 minute. A patient who develops chest pain or substantial shortness of breath would not be a good candidate for exercise outside of a controlled environment. Patients over the age of 75 should have their resting ECG reviewed for new Q-waves, ST-segment depressions, or T-wave inversions.

### Starting a program

Patients should start slowly with activities that they can tolerate, like walking. For elderly patients, start with low intensity exercises such as self-paced walking, gait training, balance exercises, Tai chi, or lower extremity resistance training with elastic tubing or ankle weights.

In the case of elderly patients, consider supervising a brief 5-10 minute session (for example, the patient could walk a circuit through the building).

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\* The American Heart Association (1995) and American College of Sports Medicine (1995), while not identical in their definitions, suggest that moderate exercise is between 40-60% of maximal oxygen consumption or well within a person's current capacity (i.e., one which could be comfortably sustained for an hour), has a gradual initiation and progression and is generally non-competitive. Vigorous exercise represents a substantial cardiorespiratory challenge and results in fatigue within 20 minutes, such as running and jogging.

Most patients and even some elderly patients will progress onto more intensive programs such as strength training using weight machines, fast walking, swimming or bicycle. Except in young, healthy adults, it is prudent to monitor blood pressure and heart rate at the start of more intensive exercise programs. Patients who have an abnormal cardiac response, such as a decrease in systolic pressure of more than 20 mmHg, an increase to 250 mmHg systolic or 120 mmHg diastolic, or a repeated increase to 90% or more of age specific maximum beats per minute, would be poor candidates for a moderate program.

### **Frequency**

4 times a week or more. If 3 days elapse between exercise bouts, the benefits accrued in increased metabolic rate and insulin sensitivity return to baseline.<sup>118</sup>

### **Duration**

30-40 minutes, even broken into 10-15 minute sessions within the same day. Sedentary patients should start out with brief sessions, as little as 5-10 minutes. Try not to progress too quickly.

### **Intensity**

For a low intensity program, the patient should exercise hard enough to breathe faster, but still be able to carry on a conversation. Heart rate can also be monitored for specific training targets. Elevate heart rate to at least 60% of maximum (maximum = 220 – age in years).

Up to 60 minutes of moderate- to vigorous-intensity physical activity per day may be needed to prevent weight gain. As much as 60-90 minutes of moderate-intensity physical activity per day is recommended to sustain weight loss for previously overweight people.

### **Type**

The patient should choose an activity that s/he will enjoy and have ready access to. Walking briskly is safe. Benefits increase especially after one mile. The distance may be more important than the speed. Patients should wear appropriate shoes. Other activities that are also suitable, even for the elderly if falling risk is managed appropriately, include low impact aerobic exercises, cycling, jogging and swimming.

#### **Moderate Activities: Common Chores**

Washing and waxing a car for 45-60 minutes  
Washing windows or floors for 45-60 minutes  
Gardening for 30-45 minutes  
Wheeling self in wheelchair 30-40 minutes  
Pushing a stroller 1½ miles in 30 minutes  
Raking leaves for 30 minutes  
Walking 2 miles in 30 minutes (15min/mile)  
Shoveling snow for 15 minutes  
Stairwalking for 15 minutes

#### **Moderate Activities: Sporting Activities**

Playing volleyball for 45-60 minutes  
Playing touch football for 45 minutes  
Walking 1¾ miles in 35 minutes (20min/mile)  
Basketball (shooting baskets) 30 minutes  
Bicycling 5 miles in 30 minutes  
Dancing fast (social) for 30 minutes  
Water aerobics for 30 minutes  
Swimming laps for 20 minutes  
Basketball (playing game) for 15-20 minutes  
Bicycling 4 miles in 15 minutes  
Jumping rope for 15 minutes  
Running 1½ miles in 15 min. (10min/mile)

Adapted from: Department of Health and Human Services, National Institutes of Health National Heart, Lung, and Blood Institute, Obesity Education Initiative Guide to Physical Activity [www.nhlbi.nih.gov/health/public/heart/obesity/lose\\_wt/phy\\_act.htm](http://www.nhlbi.nih.gov/health/public/heart/obesity/lose_wt/phy_act.htm)

## Activities & Calories

<b>Moderate Physical Activity</b>	<b>Approximate Calories/Hr for a 154 lb Person</b>
Hiking	370
Light gardening/yard work	330
Dancing	330
Golf (walking and carrying clubs)	330
Bicycling (<10 mph)	290
Walking (3.5 mph)	280
Weight lifting (general light workout)	220
Stretching	180

<b>Vigorous Physical Activity</b>	<b>Approximate Calories/Hr for a 154 lb Person</b>
Running/jogging (5 mph)	590
Bicycling (>10 mph)	590
Swimming (slow freestyle laps)	510
Aerobics	480
Walking (4.5 mph)	460
Heavy yard work (chopping wood)	440
Weight lifting (vigorous effort)	440
Basketball (vigorous)	440

Calories burned per hour will be higher for persons who weigh more than 154 lbs (70 kg) and lower for persons who weigh less. Adapted from the Dietary Guidelines for Americans 2005.<sup>143</sup>

## Structure

The patient should be encouraged to keep a record. Exercise programs should include warm-up period (5-10 minutes) at a rate lower than the exercise rate. Likewise, a cool-down period should be included, usually 5-10 minutes.

## Precautions

Dress warmly and keep hydrated (especially for patients over 65 years old). Never take an extremely hot bath or shower after exercising (especially older patients). Stop immediately if in case of

- tightness or severe pain in chest, arms or legs,
- severe breathlessness (can only speak one or two word at a time),
- lightheadedness or dizziness,
- nausea or vomiting.

**Note:** Some shortness of breath is expected after exercise. Within 10 minutes breathing should be comfortable again, at a rate of 12-16 breaths per minute.

## Relapse prevention

- Regular follow-up and modification are critical to the long-term success.
- Emphasize the specific benefits to the patient.
- Clearly outline the commitment required of the patient.
- If possible, provide both group and individual support.

## Reference

Gill TM, DiPietro L, Krumholz HM. Role of exercise stress testing and safety monitoring for older persons starting an exercise program. JAMA 2000 Jul 19;284(3):342-9.

## APPENDIX H. BEHAVIOR CHANGE STRATEGIES

Specific examples include:<sup>259 260 261</sup>

- Using “Stages of Change” to assess patient readiness for change and to help move them to action.<sup>71</sup>
  - **PRECONTEMPLATION STAGE:** Patient has not even considered changing or has given up after previous unsuccessful attempts. Help the patient understand the reasons for change and encourage them to consider change, but do not expect them to be ready to receive instructions. Listen to them with empathy as they begin to think about changing.
  - **CONTEMPLATION STAGE:** Patients are ambivalent about changing. Help patient explore their ambivalence and work through issues of loss of enjoyment, inconvenience, fears, etc. versus the benefits of change.
  - **PREPARATION STAGE:** Patient prepares to make a specific change. Encourage patient, ask when change will begin, and explore what is needed for success.
  - **ACTION STAGE:** Patient begins to make changes. Reinforce and praise any action taken and any successes achieved no matter how small. Ask what help is needed and what problems appear
  - **MAINTENANCE AND RELAPSE PREVENTION:** Patient incorporates changes into daily lifestyle for the long-term. Continue reinforcement and use occasional “slips” to re-engage the patient in the change process. Remind patient that change is a process that may need to be repeated before it becomes permanent.
- Addressing barriers to change
  - Current life stressors
  - Time management issues
  - Lack of support (see below)
  - Psychological issues, including mood and eating disorders, and substance addiction
- Self-monitoring: systematic observation and recording of target behaviors and progress toward goals
  - Examples: weight monitoring, food intake diary, exercise journal)
  - Use of websites or apps for personal electronic devices (e.g. MyFitnessPal, FitDay, Loselt) is often helpful for self-monitoring
- Stimulus control techniques: identifying conditions and triggers associated with overeating and inactivity
  - Food temptations
  - Dining out challenges
  - Portion control issues
  - Screen time activities
- Recruiting social support
  - Family and friends
  - Diet and fitness clubs, groups, and organizations (see Appendix I)
- Strategizing how to maintain lifestyle changes<sup>262</sup>

These behavior-change strategies have been used in successful multicomponent weight-management programs. Specific examples fall into the following categories.<sup>263 264 265</sup>

- Eating habits

- Choose small portions and eat slowly and mindfully
- Eat regularly, don't skip meals
- Drink water, unsweetened tea, and other non-caloric beverages instead of calorie-containing beverages
- Add a source of fiber to every meal
- Reduce dining out
- Environment
  - Remove tempting food from the home or workplace
  - Get enough sleep
  - Work on avoiding or reducing stress
- Activity habits
  - Wear a pedometer and seek to accumulate at least 2000 additional steps a day
  - Reduce screen time
- Support and self-management
  - Use a journal (see Appendix C), or download a smartphone app such as MyFitnessPal or SparkPeople to track weight, calories, and/or activity.
  - Join an in-person or online support group such as Weight Watchers

# Appendix I. Patient Resources for Group Support, Self Help, and Professional Services

## Comprehensive Weight-Loss Management Programs

- Oregon Medical Weight Loss, <http://oregonmedicalweightloss.com/>, 503-LOSE-NOW
- Monarch Medical Weight Loss Center, <http://www.monarchmedical.net/>, 866-731-5673.
- Kaiser Permanente Medical Weight-Loss Program, <http://www.kphealthyweight.com/>

## Group Support

- Weight Watchers, <http://www.weightwatchers.com/index.aspx>
- Take Off Pounds Sensibly (TOPS), <http://www.tops.org/>
- Overeater's Anonymous, <http://www.oa.org/>
- Meetup Groups for weight-loss, <http://weightloss.meetup.com/cities/us/or/portland>
- PEERtrainer, <http://www.peertrainer.com/local/Portland Weight Loss Group.htm>

Patients may have access to support groups through their individual healthcare insurance plan.

## Self-Help Resources

Providence Weight Management resources, <http://oregon.providence.org/our-services/w/weight-management/>

Patients may have access to classes through their individual healthcare insurance plan.

- Mindful Eating: A Guide to Rediscovering a Healthy and Joyful Relationship with Food by Jan Chozen Bays. Shambhala; PAP/COM edition (February 3, 2009).
- Intuitive Eating: A Recovery Book for the Chronic Dieter: Rediscover the Pleasures of Eating and Rebuild Your Body Image by Evelyn Tribole, Elyse Resch. St. Martin's Press; 5th edition (February 1996).
- The Learn Program for Weight Control: Lifestyle, Exercise, Attitudes, Relationships, Nutrition by Kelly D. Brownell. Amer Health Pub Co; 10th edition (January, 2004).
- The Cooper Clinic Solution to the Diet Revolution: Step Up to the Plate by Georgia G. Kostas, Carol Stertzer (Editor). Good Health Press; Revised edition (March 1, 2009)
- Maximize Your Body Potential: Lifetime Skills for Successful Weight Management by Joyce D. Nash. Bull Publishing; 3rd edition (April 2003)
- The 9 Truths About Weight Loss: The No-Tricks, No-Nonsense Plan for Lifelong Weight Control by Daniel S. Kirschenbaum. Owl Books; (April 2001)

## Professional Services

- Adventist Health/Wellness Services, (503) 257-2500.  
<https://www.adventisthealth.org/nw/pages/health-and-wellness.aspx>
- Oregon Counseling: Non-Profit Consumer Protection Information, Education, Referral & Research, <http://www.oregoncounseling.org/>, 888-706-9933
- Oregon Academy of Nutrition and Dietetics, <http://www.eatrightoregon.org/>, 206-935-5104
- Psychology Today Therapists [http://therapists.psychologytoday.com/rms/prof\\_results.php?city=Portland&state=OR&spec=262](http://therapists.psychologytoday.com/rms/prof_results.php?city=Portland&state=OR&spec=262)

Patients may have access to professional services through their individual healthcare insurance plan.

### Internet Resources and Applications (Apps) for Personal Digital Devices

- MyFitnessPal, <http://www.myfitnesspal.com/>
- SparkPeople, <http://www.sparkpeople.com/>
- FitDay, <http://www.fitday.com/>
- LoseIt, <https://www.loseit.com/>
- Runtastic, <https://www.runtastic.com/>

### Activity Trackers

Review at

<http://www.pcmag.com/article2/0,2817,2404445,00.asp>

- Wrist bands, Clip-ons (e.g. FitBit, Runtastic)
- Smart watches (e.g. Magellan Echo)
- Smart Clothing (e.g. Athos Smart Workout Pants)

## Appendix J. Resources for Professional Training and Office Procedures

### Behavioral Intervention

Motivational Interviewing:

- <http://www.motivationalinterview.org/>
- <http://www.motivationalinterviewing.org/motivational-interviewing-training>

Institute for Healthcare Communication

- <http://healthcarecomm.org/training/>

Link to motivation scripts for Weight loss pathway

[http://www.cellinteractive.com/ucla/physician\\_ed/scripts\\_for\\_change.html](http://www.cellinteractive.com/ucla/physician_ed/scripts_for_change.html)

### Tools for Evaluating Exercise Readiness and Safety

- Physical Activity Assessment Tool (PAAT),<sup>266</sup>  
<http://www.aafp.org/afp/2008/0415/afp20080415p1129-f1.pdf>
- Physical Activity Readiness Medical Examination (PARmed-X),<sup>267</sup>  
<http://www.banffcentre.ca/sbb/forms/pdf/parmedx.pdf>

### Exercise Prescription

Appropriate Physical Activity Intervention Strategies for Weight Loss and Prevention of Weight Regain for Adults. ACSM Position Stand.

[http://journals.lww.com/acsm-msse/Fulltext/2009/02000/Appropriate\\_Physical\\_Activity\\_Intervention.26.aspx](http://journals.lww.com/acsm-msse/Fulltext/2009/02000/Appropriate_Physical_Activity_Intervention.26.aspx)

## **Appendix K. Examination Procedures for the Overweight/Obese Patient**

### **Physical Examination**

- Height and weight
- Waist circumference
- Blood Pressure
- Peripheral arterial pulses
- Auscultation of carotid arteries and heart
- Regional examination of symptomatic weight-bearing joints

### **Laboratory examination**

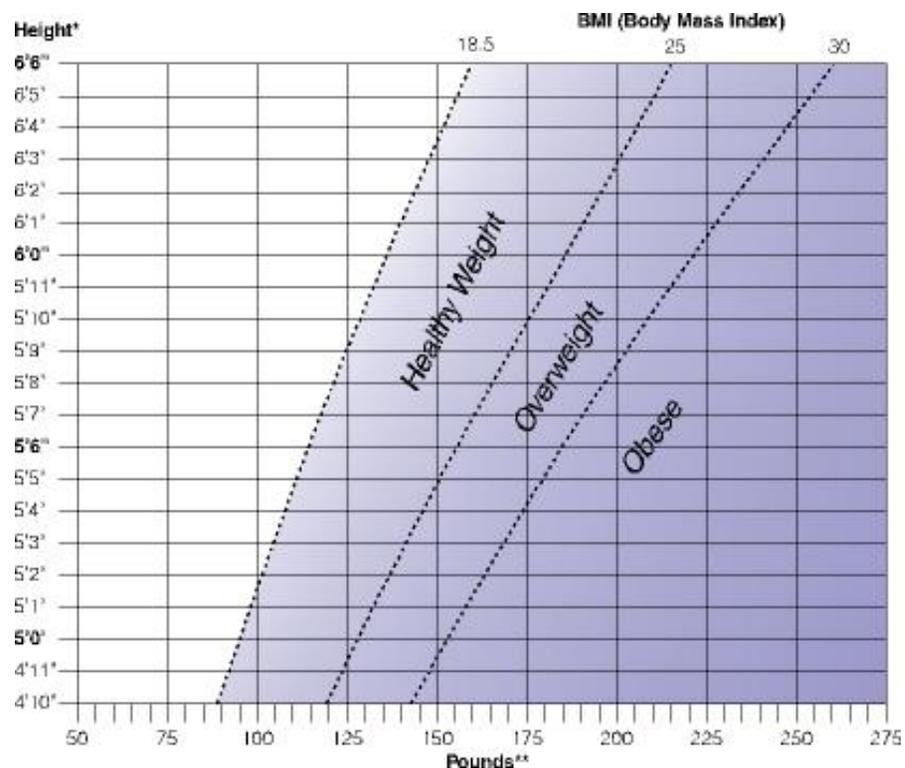
- Fasting plasma glucose, HgbA1c
- Lipid panel
- TSH to screen for hypothyroidism

### **Radiological examination**

- X-ray evaluation of symptomatic weight-bearing joints if indicated

## APPENDIX L. BMI CHART IN POUNDS/INCHES

BMI	19	20	21	22	23	24	25	26	27	28	29	30	35	40
Height (in.)	Weight (lb.)													
58	91	96	100	105	110	115	119	124	129	134	138	143	167	191
59	94	99	104	109	114	119	124	128	133	138	143	148	173	198
60	97	102	107	112	118	123	128	133	138	143	148	153	179	204
61	100	106	111	116	122	127	132	137	143	148	153	158	185	211
62	104	109	115	120	126	131	136	142	147	153	158	164	191	218
63	107	113	118	124	130	135	141	146	152	158	163	169	197	225
64	110	116	122	128	134	140	145	151	157	163	169	174	204	232
65	114	120	126	132	138	144	150	156	162	168	174	180	210	240
66	118	124	130	136	142	148	155	161	167	173	179	186	216	247
67	121	127	134	140	146	153	159	166	172	178	185	191	223	255
68	125	131	138	144	151	158	164	171	177	184	190	197	230	262
69	128	135	142	149	155	162	169	176	182	189	196	203	236	270
70	132	139	146	153	160	167	174	181	188	195	202	207	243	278
71	136	143	150	157	165	172	179	186	193	200	208	215	250	286
72	140	147	154	162	169	177	184	191	199	206	213	221	258	294
73	144	151	159	166	174	182	189	197	204	212	219	227	265	302
74	148	155	163	171	179	186	194	202	210	218	225	233	272	311
75	152	160	168	176	184	192	200	208	216	224	232	240	279	319
76	156	164	172	180	189	197	205	213	221	230	238	246	287	328



BMI uses a mathematical formula based on a person's height and weight. BMI equals weight in kilograms divided by height in meters squared ( $BMI = kg/m^2$ ). The BMI table above has already calculated this information.

Although the BMI ranges shown in the table are not exact ranges of healthy and unhealthy weight, they are useful guidelines. A BMI of 25 to 29.9 indicates a person is overweight. A person with a BMI of 30 or higher is considered obese.

Like the weight-to-height table, BMI does not show the difference between excess fat and muscle. BMI, however, is closely associated with measures of body fat. It also predicts the development of health problems related to excess weight. For these reasons, BMI is widely used by health care providers.

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