# Adult Weight Management

## AWM: Major Recommendations (2006)

Major Recommendations

Recommendations are categorized in terms of either conditional or imperative statements. While conditional statements clearly define a specific situation, imperative statements are broadly applicable to the target population and do not impose restraints on their application.

Conditional recommendations are presented in an if, then format, such that:

> If **condition,** then **action(s),** because **reason(s).**

Fulfillment of the condition triggers one or more guideline-specified actions. In contrast, imperative recommendations include terms such as "require, " "must" and "should" and do not contain conditional text that would limit their applicability to specified circumstances.

**Resources Available with Each Recommendation**

In addition to the recommendation statement and strength rating, you will find on each recommendation page:

- A brief narrative summary of the evidence, analyzed to reach the recommendation
- A statement of justification, or reason for the strength of the recommendation
- Detailed information on the evidence supporting the recommendations and background narrative (available in the Supporting Evidence section, toward the bottom of each recommendation page)
- A reference list at the end of each recommendation page that includes all the sources used in the evidence analysis for the particular recommendation (each reference is hyperlinked to a summary of the article analyzed in the evidence analysis).

Recommendations By Topic

Below you will find a list of **Adult Weight Management** Recommendations organized by Topic. To see the Recommendation Summary, just click on the Recommendation title. Also view the Executive Summary of Recommendations or print the guideline features under Print Reports.

There is no independent recommendation regarding nutritional counseling as this is a practitioner skill that cuts across all recommendations.

**Note: to print out all of the major recommendations in a single pdf document, select the Print Reports tab above.**

### Adult Weight Management (AWM) Major Recommendations

**Nutritional Assessment and Treatment**

AWM: Classification of Overweight and Obesity

AWM: Comprehensive Weight Management Program

AWM: Optimal Length of Weight Management Therapy

AWM: Realistic Weight Goal Setting

AWM: Determination of Resting Metabolic Rate

**Dietary Interventions**

AWM: Reduced Calorie Diets

AWM: Eating Frequency and Patterns

AWM: Portion Control

AWM: Meal Replacements

AWM: Nutrition Education

**Selected Dietary Approaches**

The work group examined the existing literature on some specific diets based on the availability of research as well as interest

AWM: Low Glycemic Index Diets

AWM: Dairy/Calcium and Weight Management

AWM: Low Carbohydrate Diet

**Physical Activity Interventions**

AWM: Physical Activity

**Behavioral Interventions**

AWM: Multiple Behavior Therapy Strategies

**FDA-Approved Medications for Weight Loss**

AWM: Medication as Part of a Comprehensive Program

**Bariatric Surgery**

AWM: Bariatric Surgery for Weight Loss

- Adult Weight Management
- Adult Weight Management (AWM) Guideline (2006)

# Recommendations Summary

## Adult Weight Management (AWM) Classification of Overweight and Obesity

*Click here to see the explanation of recommendation ratings (Strong, Fair, Weak, Consensus, Insufficient Evidence) and labels (Imperative or Conditional). To see more detail on the evidence from which the following recommendations were drawn, use the hyperlinks in the Supporting Evidence Section below.*

- Recommendation(s)

**AWM: BMI-Classification of Overweight and Obesity**

Body mass index (BMI) and waist circumference should be used to classify overweight and obesity, estimate risk for disease, and to identify treatment options. BMI and waist circumference are highly correlated to obesity or fat mass and risk of other diseases (NHLBI report).

**Rating: Fair**
Imperative

**AWM: Body Weight-Classification of Overweight and Obesity**

Body weight and waist circumference should be used to determine the effectiveness of therapy in the reassessment. BMI and waist circumference are highly correlated to obesity or fat mass (NHLBI report).

**Rating: Fair**
Imperative

- Risks/Harms of Implementing This Recommendation

  If a patient is very short (under 5 feet) or has a BMI above the 25 to 34.9 range, waist cutpoints used for the general population may not be applicable. In addition, BMI may overestimate body fat in athletes and others who have a muscular build and those with edema. BMI may underestimate body fat in older persons and others who have lost muscle mass.

- Conditions of Application

  Recommendation applies to adult men and adult nonpregnant women, and generally for all racial/ethnic groups.

- Potential Costs Associated with Application

  None.

- Recommendation Narrative

  - The same BMI cutpoints can be used to classify the level of overweight and obesity for adult men and adult nonpregnant women, and generally for all racial/ethnic groups. NHLBI Evidence Category C.
  - Practitioners should use the BMI to assess overweight and obesity. Body weight alone can be used to follow weight loss, and to determine efficacy of therapy. NHLBI Evidence Category C.
  - The waist circumference should be used to assess abdominal fat content. NHLBI Evidence Category C.
  - Waist circumference cutpoints can generally be applied to all ethnic or racial groups. On the other hand, if a patient is very short (under 5 feet) or has a BMI above the 25 to 34.9 range, waist cutpoints used for the general population may not be applicable. NHLBI Evidence Category D.

- Recommendation Strength Rationale

  - NHLBI Evidence Categories of C and D

- Minority Opinions

Consensus reached.

- Supporting Evidence

  *The recommendations were created from the evidence analysis on the following questions. To see detail of the evidence analysis, click the blue hyperlinks below (recommendations rated consensus will not have supporting evidence linked).*

  - References
  - References not graded in Academy of Nutrition and Dietetics Evidence Analysis Process

    *The Clinical Guidelines on the Identification, Evaluation, and Treatment of Overweight and Obesity in Adults: The Evidence Report*, NIH Publication No. 98-4083, September 1998, produced by the National Heart, Lung, and Blood Institute in cooperation with the National Institute of Diabetes and Digestive and Kidney Diseases.

    Available at: http://www.nhlbi.nih.gov/guidelines/obesity/e_txtbk/txgd/40.htm

    To access the pdf of the NHLBI Clinical Guidelines click here: http://www.nhlbi.nih.gov/guidelines/obesity/e_txtbk/index.htm

- Adult Weight Management
- Adult Weight Management (AWM) Guideline (2006)

## Recommendations Summary

### Adult Weight Management (AWM) Comprehensive Weight Management Program

*Click here to see the explanation of recommendation ratings (Strong, Fair, Weak, Consensus, Insufficient Evidence) and labels (Imperative or Conditional). To see more detail on the evidence from which the following recommendations were drawn, use the hyperlinks in the Supporting Evidence Section below.*

- Recommendation(s)

  **AWM: Comprehensive Weight Management Program**

  Weight loss and weight maintenance therapy should be based on a comprehensive weight management program including diet, physical activity, and behavior therapy. The combination therapy is more successful than using any one intervention alone.

  **Rating: Strong**
  Imperative

  - Risks/Harms of Implementing This Recommendation

    None.

  - Conditions of Application

    No conditions specified.

  - Potential Costs Associated with Application

    None.

  - Recommendation Narrative

    - The combination of a reduced calorie diet and increased physical activity produces greater weight loss than diet alone or physical activity alone. NHLBI Evidence Category A.
    - The combination of a reduced calorie diet and increased physical activity is recommended since it produces weight loss that may also result in decreases in abdominal fat and increases in cardiorespiratory fitness. NHLBI Evidence Category A.
    - Weight loss and weight maintenance therapy should employ a combination of low calorie diets, increased physical activity, and behavior therapy. NHLBI Evidence Category A.

  - Recommendation Strength Rationale

    - NHLBI Evidence Category of A

  - Minority Opinions

    Consensus reached.

- Supporting Evidence

  *The recommendations were created from the evidence analysis on the following questions. To see detail of the evidence analysis, click the blue hyperlinks below (recommendations rated consensus will not have supporting evidence linked).*

- References
- References not graded in Academy of Nutrition and Dietetics Evidence Analysis Process

*The Clinical Guidelines on the Identification, Evaluation, and Treatment of Overweight and Obesity in Adults: The Evidence Report*, NIH Publication No. 98-4083, September 1998, produced by the National Heart, Lung, and Blood Institute in cooperation with the National Institute of Diabetes and Digestive and Kidney Diseases.

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- Adult Weight Management (AWM) Guideline (2006)

# Recommendations Summary

### Adult Weight Management (AWM) Optimal Length of Weight Management Therapy

*Click here to see the explanation of recommendation ratings (Strong, Fair, Weak, Consensus, Insufficient Evidence) and labels (Imperative or Conditional). To see more detail on the evidence from which the following recommendations were drawn, use the hyperlinks in the Supporting Evidence Section below.*

- Recommendation(s)

**AWM: Optimal Length of Therapy**

Medical Nutrition Therapy for weight loss should last at least 6 months or until weight loss goals are achieved, with implementation of a weight maintenance program after that time. A greater frequency of contacts between the patient and practitioner may lead to more successful weight loss and maintenance.

**Rating: Strong**
Imperative

- Risks/Harms of Implementing This Recommendation

None.

- Conditions of Application

No conditions specified.

- Potential Costs Associated with Application

None.

- Recommendation Narrative

  - Optimally, dietary therapy should last at least 6 months. NHLBI Evidence Category A.
  - A weight maintenance program should be a priority after the initial 6 months of weight loss therapy. NHLBI Evidence Category B.
  - During dietary therapy, frequent contacts between professional counselors and patients promote weight loss and maintenance. NHLBI Evidence Category C.
  - The amount of time spent with the patient favorably affects weight loss change in overweight or obese adults given dietary therapy. NHLBI Evidence Category D.
  - The literature suggests that weight loss and weight maintenance therapies that provide a greater frequency of contacts between the patient and the practitioner and are provided over the long term should be utilized whenever possible. This can lead to more successful weight loss and weight maintenance. NHLBI Evidence Category C.

- Recommendation Strength Rationale

  - NHLBI Evidence Categories of A, B, C, and D

- Minority Opinions

Consensus reached.

- Supporting Evidence

*The recommendations were created from the evidence analysis on the following questions. To see detail of the evidence analysis, click the blue hyperlinks below (recommendations rated consensus will not have supporting evidence linked).*

- References
- References not graded in Academy of Nutrition and Dietetics Evidence Analysis Process

*The Clinical Guidelines on the Identification, Evaluation, and Treatment of Overweight and Obesity in Adults: The Evidence Report*, NIH Publication No. 98-4083, September 1998, produced by the National Heart, Lung, and Blood Institute in cooperation with the National Institute of Diabetes and Digestive and Kidney Diseases.

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- Adult Weight Management (AWM) Guideline (2006)

# Recommendations Summary

### Adult Weight Management (AWM) Realistic Weight Goal Setting

*Click here to see the explanation of recommendation ratings (Strong, Fair, Weak, Consensus, Insufficient Evidence) and labels (Imperative or Conditional). To see more detail on the evidence from which the following recommendations were drawn, use the hyperlinks in the Supporting Evidence Section below.*

- Recommendation(s)

**AWM: Realistic Weight Goals**

Individualized goals of weight loss therapy should be to reduce body weight at an optimal rate of 1-2 lbs per week for the first 6 months and to achieve an initial weight loss goal of up to 10% from baseline. These goals are realistic, achievable, and sustainable.

**Rating: Strong**
Imperative

- Risks/Harms of Implementing This Recommendation

None.

- Conditions of Application

No conditions specified.

- Potential Costs Associated with Application

None.

- Recommendation Narrative

  - Overweight and obese patients in well-designed programs can achieve a weight loss of as much as 10% of baseline weight, a weight loss that can be maintained for a sustained period of time (1 year or longer). NHLBI Evidence Category A.
  - Weight loss at the rate of 1-2 lbs per week (calorie deficit of 500 to 1000 kcal/day) commonly occurs for up to 6 months, at which point weight loss begins to plateau unless a more restrictive regimen is implemented. NHLBI Evidence Category B.
  - The initial goal of weight loss therapy should be to reduce body weight by approximately 10% from baseline. With success, further weight loss can be attempted if indicated through further assessment. NHLBI Evidence Category A.
  - Weight loss should be 1-2 lbs/week for a period of 6 months, with the subsequent strategy based on the amount of weight lost. NHLBI Evidence Category B.

- Recommendation Strength Rationale

  - NHLBI Evidence Categories of A and B

- Minority Opinions

Consensus reached.

- Supporting Evidence

*The recommendations were created from the evidence analysis on the following questions. To see detail of the evidence analysis, click the blue hyperlinks below (recommendations rated consensus will not have supporting evidence linked).*

- References
- References not graded in Academy of Nutrition and Dietetics Evidence Analysis Process

*The Clinical Guidelines on the Identification, Evaluation, and Treatment of Overweight and Obesity in Adults: The Evidence Report*, NIH Publication No. 98-4083, September 1998, produced by the National Heart, Lung, and Blood Institute in cooperation with the National Institute of Diabetes and Digestive and Kidney Diseases.

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- Adult Weight Management (AWM) Guideline (2006)

# Quick Links

## Recommendations Summary

### Adult Weight Management (AWM) Determination of Resting Metabolic Rate

*Click here to see the explanation of recommendation ratings (Strong, Fair, Weak, Consensus, Insufficient Evidence) and labels (Imperative or Conditional). To see more detail on the evidence from which the following recommendations were drawn, use the hyperlinks in the Supporting Evidence Section below.*

- Recommendation(s)

**AWM: Determining Energy Needs**

Estimated energy needs should be based on RMR. If possible, RMR should be measured (e.g., indirect calorimetry). If RMR cannot be measured, then the Mifflin-St. Jeor equation using **actual** weight is the most accurate for estimating RMR for overweight and obese individuals.

**Rating: Strong**
Conditional

**Mifflin-St Jeor Equations**
Men: RMR = (9.99 X weight) + (6.25 X height) – (4.92 X age) + 5
Women: RMR = (9.99 X weight )+ (6.25 X height) – (4.92 X age) – 161
Equations use weight in kilograms (kg), height in centimeters (cm).

- Risks/Harms of Implementing This Recommendation

  The Mifflin-St. Jeor equation was not tested on racial groups other than Caucasian and so may not be accurate for these groups. Research separating obese from non-obese subjects is limited.

- Conditions of Application

  Equations to estimate RMR should be used when RMR cannot be measured.

- Potential Costs Associated with Application

  Costs vary by RMR measurement method.

- Recommendation Narrative

  - Nine cross-sectional studies reported the evaluation of the Mifflin-St. Jeor equation in overweight and obese populations, however, only one separated obese from non-obese subjects. The Mifflin-St. Jeor equation predicted RMR within 10% of measured RMR in 70% of obese individuals; up to 9% were overestimations and up to 21% were underestimations (Arciero et al, 1993; De Lorenzo et al, 2001; Frankenfield et al, 2003; Garrel et al, 1996; Heshka et al, 1993; Liu et al, 1995; Mifflin et al, 1987; Scalfi et al, 1993; Taaffe et al, 1995)
  - Eleven cross-sectional studies reported the evaluation of the Harris-Benedict equation in overweight and obese U.S. and Canadian populations, however, only five separated obese from non-obese subjects. In studies using actual weight, the Harris-Benedict equation predicted RMR within 10% of measured RMR in 39 - 64% of obese individuals; up to 43% were overestimations and up to 35% were underestimations. In studies using adjusted body weight, the Harris-Benedict equation predicted RMR within 10% of measured RMR in 0% - 60% of obese individuals; up to 25% were overestimations and up to 100% were underestimations (De Lorenzo et al, 2001; Feurer et al, 1983; Forman et al, 1998; Foster et al, 1988; Frankenfield et al, 2003; Heshka et al, 1993; Hirano et al, 2001; Mifflin et al, 1987; Owen et al, 1986; Owen et al, 1987; Pavlou et al, 1986).
  - Ten cross-sectional studies reported the evaluation of the Owen equations in overweight and obese populations, however, only three separated obese from non-obese subjects. The Owen equations predicted RMR within 10% of measured RMR in 33 - 51% of individuals; up to 22% were overestimations and up to 60% were underestimations (Arciero et al, 1993; De Lorenzo et al, 2001; Frankenfield et al, 2003; Heshka et al, 1993; Mifflin et al, 1990; Owen et al, 1987; Owen et al, 1986; Scalfi et al, 1993; Siervo et al, 2003; Taaffe et al, 1995)

- Recommendation Strength Rationale

  - Conclusion statements were Grade I and II
  - Consistent findings across studies

- Minority Opinions

Consensus reached.

- Supporting Evidence

*The recommendations were created from the evidence analysis on the following questions. To see detail of the evidence analysis, click the blue hyperlinks below (recommendations rated consensus will not have supporting evidence linked).*

In obese adults, what is the prediction accuracy and maximum overestimation and understimation errors compared to measured resting metabolic rate when using the Harris-Benedict formula (actual body weight)?

In obese adults, what is the prediction accuracy and maximum overestimation and understimation errors compared to measured resting metabolic rate when using the Harris-Benedict formula (adjusted body weight)?

In obese adults, what is the prediction accuracy and maximum overestimation and understimation errors compared to measured resting metabolic rate when using the Harris-Benedict formula (ideal body weight)?

In obese adults, what is the prediction accuracy and maximum overestimation and underestimation resting metabolic rate (RMR) errors compared to measured RMR when using the WHO/FAO/UNU formula?

In obese adults, what is the prediction accuracy and maximum overestimation and understimation errors compared to measured resting metabolic rate when using the Owen et al formula?

In obese adults, what is the prediction accuracy and maximum overestimation and understimation errors compared to measured resting metabolic rate when using the Mifflin-St.Jeor formula?

- References


Arciero PJ, Goran MI, Gardner AW, Ades PA, Tyzbir RS, Poehlman ET. A practical equation to predict resting metabolic rate in older men. *Metabolism*. 1993; 42 (8): 950-957.

Case KO, Brahler CJ, Heiss C. Resting energy expenditures in Asian women measured by indirect calorimetry are lower than expenditures calculated from prediction equations. *J Am Diet Assoc.* 1997; 97(11): 1,288-1,292.

Clark HD, Hoffer LJ. Reappraisal of the resting metabolic rate of normal young men. *Am J Clin Nutr*. 1991; 53: 21-26.

Daly JM, Heymsfeld SB, Head A, Harvey LP, Nixon DW, Katzeff H, Grossman GD. Human energy requirements: overestimation by widely used prediction equation. *Am J Clin Nutr* 1985;42:1170-1174.

Feurer ID, Crosby LO Mullen JL. Measured and predicted resting energy expenditure in clinically stable patients. *Clin Nutr.* 1984;3:27-34.

Frankenfield DC, Muth ER, Rowe WA. The Harris-Benedict studies of human basal metabolism: History and limitations. *J Am Diet Assoc.* 1998;98:439-445.

Garrel DR, Jobin N, deJonge LHM. Should we still use the Harris and Benedict equations? *Nutr Clin Prac* 1996; 11: 99-103.

Roza AM, Shizgal HM. The Harris Benedict equation reevaluated: resting energy requirements and the body cell mass. *Am J Clin Nutr*. 1984;40:168-182.

Scalfi L, Coltorti A, Sapio C, DiBiase G, Borrelli R, Contaldo F. Predicted and measured resting energy expenditure in healthy young women. *Clin Nutr*. 1993; 12: 1-7.

Van der Ploeg GE, Withers RT. Predicting the resting metabolic rate of 30- 60-year-old Australian males. *Eur J Clin Nutr* 2002;56:701-708.

Vermeij CG, Feenstra BWA, Oomen MFA, deGraaf EJR, Zillikens MC, Swart GR, Bruining HA. Assessment of energy expenditure by indirect calorimetry in healthy subjects and patients with liver cirrhosis. *J Parenter Enteral Nutr.* 1991; 15: 421-425.

Censi L, Totai E, Pastore G, Ferro-Luzzi A. The basal metabolic rate and energy cost of standardized walking of short and tall men. *Eur J Clin Nutr.* 1998;52(6):441-446.

Ismail MN, Ng KK, Chee SS, Roslee R, Zawiah H. Predictive equations for the estimation of basal metabolic rate in Malaysian adults. *Mal J Nutr.* 1998;4:81-90.

Leung R, Woo J, Chan D, Tang N. Validation of prediction equations for basal metabolic rate in Chinese subjects. *Eur J Clin Nutr.* 2000;54(7):551-554.

Luhrman PM, Herbert BM, Krems C, Neuhauser-Berthold M. A new equation especially developed for predicting resting metabolic rate in the elderly for easy use in practice. *Eur J Nutr.* 2002;41(3):108-113.

Fredrix EWHM, Soeters PB, Deerenberg IM, Kester ADM, vonMeyenfeldt MF, Saris WHM, Resting and sleeping energy expenditure in the elderly. *Eur J Clin Nutr.* 1990; 44: 741-747.

Liu HY, Lu YF, Chen WJ. Predictive equations for basal metabolic rate in Chinese adults: A cross-validation study. *J Am Diet Assoc.* 1995; 95 (12): 1,403-1,408and Liu HY, Lu YF, Chen WJ. Validity of predictive equations for the calculation of basal metabolic rate in healthy Chinese adults. *Chinese Nutr Soc.* 1994; 19 (2): 141-150.

Owen OE, Kavle E, Owen RS, Polansky M, Caprio S, Mozzoli MA, Kendrick ZV, Bushman MC, Boden G. A reappraisal of caloric requirements in healthy women. *Am J Clin Nutr.* 1986; 44: 1-19.

Arciero PJ, Goran MI, Gardner AM, Ades PA, Tyzbir RS, Poehlman ET. A practical equation to predict resting metabolic rate in older females. *J Am Geriatr Soc.* 1993; 41 (4): 389-395.

Siervo M, Boschi V, Falconi C. Which REE prediction equation should we use in normal-weight, overweight and obese women? *Clin Nutr.* 2003; 22(2): 193-204.

- Adult Weight Management
- Adult Weight Management (AWM) Guideline (2006)

## Recommendations Summary

### Adult Weight Management (AWM) Reduced Calorie Diets

*Click here to see the explanation of recommendation ratings (Strong, Fair, Weak, Consensus, Insufficient Evidence) and labels (Imperative or Conditional). To see more detail on the evidence from which the following recommendations were drawn, use the hyperlinks in the Supporting Evidence Section below.*

- Recommendation(s)

**AWM: Reduced Calorie Diet**

An individualized reduced calorie diet is the basis of the dietary component of a comprehensive weight management

program. Reducing dietary fat and/or carbohydrates is a practical way to create a caloric deficit of 500 – 1000 kcals below estimated energy needs and should result in a weight loss of 1 – 2 lbs per week.

**Rating: Strong**
Imperative

- Risks/Harms of Implementing This Recommendation

  Reduction of caloric intake may result in nutritional inadequacies, therefore, special attention should be paid to maintaining adequate intake of vitamins and minerals.

- Conditions of Application

  No conditions specified.

- Potential Costs Associated with Application

  None.

- Recommendation Narrative

  - Low calorie diets are recommended for weight loss in overweight and obese persons. NHLBI Evidence Category A.
  - Low calorie diets can reduce total body weight by an average of 8% over 3 to 12 months. Since this represents an average, an initial weight loss goal of 10% is feasible. NHLBI Evidence Category A.
  - A diet that is individually planned to help create a deficit of 500 to 1000 kcal/day should be an integral part of any program aimed at achieving a weight loss of 1-2 lbs/week. NHLBI Evidence Category A.
  - Reducing fat as part of an LCD is a practical way to reduce calories. NHLBI Evidence Category A.
  - Although lower fat diets without targeted caloric reduction help promote weight loss by producing a reduced caloric intake, lower-fat diets coupled with total caloric reduction produce greater weight loss than lower-fat diets alone. NHLBI Evidence Category A.
  - Reducing dietary fat alone without reducing calories is not sufficient for weight loss. However, reducing dietary fat, along with reducing dietary carbohydrates, can facilitate caloric reduction. NHLBI Evidence Category A.

- Recommendation Strength Rationale

  - NHLBI Evidence Category of A

- Minority Opinions

  Consensus reached

- Supporting Evidence

  *The recommendations were created from the evidence analysis on the following questions. To see detail of the evidence analysis, click the blue hyperlinks below (recommendations rated consensus will not have supporting evidence linked).*

  - References
  - References not graded in Academy of Nutrition and Dietetics Evidence Analysis Process

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- Adult Weight Management (AWM) Guideline (2006)

# Quick Links

## Recommendations Summary

### Adult Weight Management (AWM) Eating Frequency and Patterns

*Click here to see the explanation of recommendation ratings (Strong, Fair, Weak, Consensus, Insufficient Evidence) and labels (Imperative or Conditional). To see more detail on the evidence from which the following recommendations were drawn, use the hyperlinks in the Supporting Evidence Section below.*

- Recommendation(s)

**AWM: Eating Frequency and Patterns**

Total caloric intake should be distributed throughout the day, with the consumption of 4 to 5 meals/snacks per day including breakfast. Consumption of greater energy intake during the day may be preferable to evening consumption.

**Rating: Fair**
Imperative

- Risks/Harms of Implementing This Recommendation

  None.

- Conditions of Application

  No conditions specified.

- Potential Costs Associated with Application

  None.

- Recommendation Narrative

  - One positive-quality RCT, one neutral-quality cohort study and five cross-sectional studies (3 positive-quality, 2 neutral-quality) show that 4 – 5 meals or snacks per day is associated with reduced or no obesity risk, while 3 or fewer and 6 or more meals per day may result in increased risk of obesity, depending on gender. Higher eating frequency is related to lower total daily energy intake and body weights in men, but in women the data is less conclusive (Basdevant et al, 1993; Drummond et al, 1998; Forslund et al, 2002; Forslund et al, 2005; Kant et al, 1995; Ma et al, 2003; Westerterp-Plantenga et al, 2003)
  - One neutral-quality cohort study, one positive-quality nonrandomized crossover trial and three cross-sectional studies (1 positive-quality and 2 neutral-quality) demonstrate that consumption of greater energy intake in the morning versus the evening is associated with lower body weights and results in greater weight loss (Andersson and Rossner, 1996; De Castro, 2004; Forslund et al, 2002; Keim et al, 1997; Summerbell et al, 1996)
  - Three positive-quality cross-sectional studies show an association between skipping breakfast and increased prevalence and risk of obesity, despite lower reported daily energy intakes (Cho et al, 2003; Ma et al, 2003; Song et al, 2005)
  - Two RCTs (one positive-quality, one neutral-quality) show that breakfast eaters had a greater reduction in impulsive snacking and ate less at later meals (Martin et al, 2000; Schlundt et al, 1992)
  - Four cross-sectional studies (3 positive-quality, 1 neutral-quality) report that normal-weight subjects and people maintaining weight loss tend to eat breakfast regularly and generally consume a breakfast contributing approximately 20% of daily energy intake (Ortega et al, 1996; Song et al, 2005; Summerbell et al, 1996; Wyatt et al, 2002)

- Recommendation Strength Rationale

  - Conclusion statements both given a Grade II
  - Consistent findings among a variety of study designs

- Minority Opinions

  Consensus reached.

- Supporting Evidence

*The recommendations were created from the evidence analysis on the following questions. To see detail of the evidence analysis, click the blue hyperlinks below (recommendations rated consensus will not have supporting evidence linked).*

In adults, how effective (in terms of client adherence and weight and loss maintenance) is a regular meal and snack pattern?

In adults, how effective (in terms of client adherence and weight loss and maintenance) is eating breakfast?

- References


Andersson I, Rossner S. Meal patterns in obese and normal weight men: The Gustaf study. *Eur J Clin Nutr* 1996;50:639-46.

Basdevant A, Craplet C, Guy-Grand B. Snacking patterns in obese French women. *Appetite.* 1993;21:17-23.

de Castro JM. The time of day of food intake influences overall intake in humans. *J Nutr*. 2004;134:104-111.

Drummond SE, Crombie NE, Cursiter MC, Kirk TR. Evidence that eating frequency is inversely related to body weight status in male, but not female, non-obese adults reporting valid dietary intakes. *Intl J Obes.* 1998;22:105-12.

Forslund HB, Lindroos AK, Sjostrom L, Lissner L. Meal patterns and obesity in Swedish women - a simple instrument describing usual meal types. *Eur J Clin Nutr* 2002; 56:740-7.

Forslund HB, Torgerson JS, Sjostrom L, Lindroos AK. Snacking frequency in relation to energy intake and food choices in obese men and women compared to a reference population. *Intl J Obes.* 2005;29:711-9.

Kant AF, Schatzkin A, Graubard BI, Ballard-Barbash R. Frequency of eating occasions and weight change in the NHANES I Epidemiologic Follow-up Study. *Intl J Obes*. 1995;19:468-74.

Keim NL, Van Loan MD, Horn WF, Barbieri TF, Mayclin PL. Weight loss is greater with consumption of large morning meals and fat-free mass is preserved with large evening meals in women on a controlled weight reduction regimen. *J Nutr*. 1997;127:75-82.

Ma Y, Bertone ER, Stanek EJ, Reed GW, Hebert JR, Cohen NL, Merriam PA, Ockene IS. Association between eating patterns and obesity in a free-living US adult population. *Am J Epidemiol*. 2003; 158(1):85-92.

Summerbell CD, Moody RC, Shanks J, Stock MJ, Geissler C. Relationship between feeding pattern and body mass index in 220 free-living people in four age groups. Eur J Clin Nutr. 1996;50:513-519.

Westerterp-Plantenga MS, Kovacs EMR, Melanson KJ. Habitual meal frequency and energy intake regulation in partially temporally isolated men. *Intl J Obes* 2002; 26: 102-110.

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Morgan KJ, Zabik ME, Stampley GL. The role of breakfast in diet adequacy of the U.S. adult population. J Am Coll Nutr 1986; 5: 551-563.

Ortega RM, Redondo MR, Lopez-Sobaler AM, Quintas ME, Zamora MJ, Andres P, Encinas-Sotillos A. Associations between obesity, breakfast-time food habits and intake of energy and nutrients in a group of elderly Madrid residents. *J Am Coll Nutr* 1996; 15(1):65-72.

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- Adult Weight Management
- Adult Weight Management (AWM) Guideline (2006)

# Quick Links

## Recommendations Summary

### Adult Weight Management (AWM) Portion Control

*Click here to see the explanation of recommendation ratings (Strong, Fair, Weak, Consensus, Insufficient Evidence) and labels (Imperative or Conditional). To see more detail on the evidence from which the following recommendations were drawn, use the hyperlinks in the Supporting Evidence Section below.*

- Recommendation(s)

**AWM: Portion Control**

Portion control should be included as part of a comprehensive weight management program. Portion control at meals and snacks results in reduced energy intake and weight loss.

**Rating: Fair**
Imperative

- Risks/Harms of Implementing This Recommendation

  None.

- Conditions of Application

  No conditions specified.

- Potential Costs Associated with Application

  None.

- Recommendation Narrative

- Two positive-quality RCTs have shown that portion control results in weight loss (Hannum et al, 2004; Waller et al, 2004)

- Two neutral-quality RCTs and 3 nonrandomized clinical trials (two positive-quality, one-neutral quality) demonstrate that as portion size increases at a meal, energy intake also increases (Levitsky and Youn, 2004; Rolls et al, 2002; Rolls et al, 2004; Wansink and Kim, 2005, Wansink et al, 2005)
- Two positive-quality nonrandomized clinical trials have shown that increased energy intake at one meal does not result in decreased energy intake at subsequent meals, resulting in significant increases in daily energy intake (Kral et al, 2004; Rolls et al, 2004)

- Recommendation Strength Rationale

  - Conclusion statement given a Grade III
  - Consistent findings among a variety of study designs

- Minority Opinions

  Consensus reached.

- Supporting Evidence

  *The recommendations were created from the evidence analysis on the following questions. To see detail of the evidence analysis, click the blue hyperlinks below (recommendations rated consensus will not have supporting evidence linked).*

  In adults, how effective (in terms of client adherence and weight loss and maintenance) is reducing portion size as a strategy?

  - References

    
    Hannum SM, Carson LA, Evans EM, Canene KA, Petr EL, Bui L, Erdman JW. Use of portion-controlled entrees enhances weight loss in women. Obes Res 2004; 12: 538-546.

    Kral TVE, Roe LS, Rolls BJ. Combined effects of energy density and portion size on energy intake in women. *Am J Clin Nutr* 2004;79:962-8.

    Levitsky DA, Youn T. The more food young adults are served, the more they overeat. J Nutr 2004; 134: 2546-2549.

    Rolls BJ, Morris EL, Roe LS. Portion size of food affects energy intake in normal-weight and overweight men and women. Am J Clin Nutr 2002; 76: 1207-1213.

    Rolls BJ, Roe LS, Kral TVE, Meengs JS, Wall DE. Increasing the portion size of a packaged snack increases energy intake in men and women. Appetite 2004; 42: 63-69.

    Rolls BJ, Roe LS, Meengs JS, Wall DE. Increasing the portion size of a sandwich increases energy intake. J Am Diet Assoc 2004; 104: 367-372.

    Waller SM, Vander Wal JS, Klurfeld DM, McBurney MI, Cho S, Bijlani S, Dhurandhar NV. Evening ready-to-eat cereal consumption contributes to weight management. *J Am Coll Nutr*. 2004;23(4):316-21.

    Wansink B, Kim J. Bad popcorn in big buckets: portion size can influence intake as much as taste. J Nutr Educ Behav 2005; 37: 242-245.

    Wansink B, Painter JE, North J. Bottomless bowls: why visual cues of portion size may influence intake. Obes Res 2005; 13(1): 93-100.
    

- Adult Weight Management
- Adult Weight Management (AWM) Guideline (2006)

# Quick Links

## Recommendations Summary

### Adult Weight Management (AWM) Nutrition Education

*Click here to see the explanation of recommendation ratings (Strong, Fair, Weak, Consensus, Insufficient Evidence) and labels (Imperative or Conditional). To see more detail on the evidence from which the following recommendations were drawn, use the hyperlinks in the Supporting Evidence Section below.*

- Recommendation(s)

  **AWM: Nutrition Education**

  Nutrition education should be individualized and included as part of the diet component of a comprehensive weight management program. Short term studies show that nutrition education (e.g. reading nutrition labels, recipe modification, cooking classes) increases knowledge and may lead to improved food choices.

  **Rating: Fair**
  Imperative

  - Risks/Harms of Implementing This Recommendation

None.

- Conditions of Application

  No conditions specified.

- Potential Costs Associated with Application

  None.

- Recommendation Narrative

  - One positive-quality RCT, one positive-quality cohort, and one neutral-quality cross-sectional study demonstrate successful behavior change and improved eating habits based on interventions involving cooking classes (Keller et al, 2004; Masley et al, 2001; Newman et al, 2005)
  - Three cross-sectional studies (1 positive-quality, 2 neutral-quality) report that cooking classes are a highly requested nutrition education program enhancement (Birkett et al, 2004; Cavallaro et al, 2004; Keller-Olaman et al, 2005)
  - Eight cross-sectional studies (3 positive-quality, 5 neutral-quality) report that as many as 80% of healthy people read nutrition information on food labels usually or often, and women generally read labels more than men (Kristal et al, 1998; Lin et al, 2004; Macon et al, 2004; Marietta et al, 1999; Neuhouser et al, 1999; Perez-Escamilla and Haldeman, 2002; Satia et al, 2005; Smith et al, 2000)
  - Two neutral-quality RCTs and three nonrandomized clinical trials (1 positive-quality and 2 neutral-quality) show conflicting results about the effect of nutrition information on food choices; in three trials, subjects used nutrition information in product selection, while in 2 trials, there were no significant differences in food consumption (Bushman, 1998; Kral et al, 2002; Miller et al, 1999; Roefs and Jansen, 2004; Westcombe and Wardle, 1997)

- Recommendation Strength Rationale

  - Conclusion statements both given a Grade III

- Minority Opinions

  Consensus reached.

- Supporting Evidence

  *The recommendations were created from the evidence analysis on the following questions. To see detail of the evidence analysis, click the blue hyperlinks below (recommendations rated consensus will not have supporting evidence linked).*

  In adults, do interventions focused on healthy cooking techniques (including recipe modification) result in improved eating habits?

  In adults, what is the relationship between reading nutrition information (including Nutrition Facts on the food label) and selecting healthier food choices?

  - References

    
    Birkett D, Johnson D, Thompson JR, Oberg D. Reaching low-income families: focus group results provide direction for a behavioral approach to WIC services. J Am Diet Assoc, 2004; 104: 1277-1280.

    Capps O, Cleveland L, Park J. Dietary behaviors associated with total fat and saturated fat intake. J Am Diet Assoc 2002; 102: 490-496, 501-502.

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    Keller HH, Gibbs A, Wong S, Vanderkooy P, Hedley M. Men can cook! Development, implementation, and evaluation of a senior men's cooking group. J Nutr Elderly 2004; 24(1): 71-87.

    Keller-Olaman SJ, Edwards V, Elliott SJ. Evaluating a food bank recipe-tasting program. Can J Diet Pract Res 2005; 66: 183-186.

    Masley S, Phillips S, Copeland JR. Group office visits change dietary habits of patients with coronary artery disease: the dietary intervention and evaluation trial (DIET). J Fam Pract 2001; 50: 235-239.

    Newman VA, Thomson CA, Rock CL, Flatt SW, Kealey S, Bardwell WA, Caan BJ, Pierce JP, for the Women's Healthy Eating and Living (WHEL) Study Group. Achieving substantial changes in eating behavior among women previously treated for breast cancer - an overview of the intervention. J Am Diet Assoc 2005; 105: 382-391.

    Bushman BJ. Effects of warning and information labels on consumption of full-fat, reduced-fat and no-fat products. J Appl Psychol 1998; 83(1): 97-101.

    Kessler H, Wunderlich SM. Relationship between use of food labels and nutrition knowledge of people with diabetes. Diabetes Educ 1999; 25(4): 549-559.

    Kral TVE, Roe LS, Rolls BJ. Does nutrition information about the energy density of meals affect food intake in normal-weight women? Appetite 2002; 39(2): 137-145.

    Kreuter MW, Brennan LK, Scharff DP, Lukwago SN. Do nutrition label readers eat healthier diets? Behavioral correlates of adults' use of food labels. Am J Prev Med 1997; 13(4): 277-283.
    

Kristal AR, Levy L, Patterson RE, Li SS, White E. Trends in food label use associated with new nutrition labeling regulations. Am J Public Health 1998; 88(8): 1212-1215.

Lin CTJ, Lee JY, Yen ST. Do dietary intakes affect search for nutrient information on food labels? Soc Sci Med 2004; 59(9): 1955-1967.

Macon JF, Oakland MJ, Jensen HH, Kissack PA. Food label use by older Americans: data from the Continuing Survey of Food Intakes by Individuals and the Diet and Health Knowledge Survey 1994-1996. J Nutr Elder 2004; 24(1): 35-52.

Marietta AB, Welshimer KJ, Anderson SL. Knowledge, attitudes, and behaviors of college students regarding the 1990 Nutrition Labeling Education Act food labels. J Am Diet Assoc 1999; 99: 445-449.

Miller CK, Jensen GL, Achterberg CL. Evaluation of a food label nutrition intervention for women with type 2 diabetes mellitus. J Am Diet Assoc 1999; 99(3): 323-328.

Miller CK, Probart CK, Achterberg CL. Knowledge and misconceptions about the food label among women with non-insulin-dependent diabetes mellitus. Diabetes Educ 1997; 23(4): 425-432.

Neuhouser ML, Kristal AR, Patterson RE. Use of food nutrition labels is associated with lower fat intake. J Am Diet Assoc 1999; 99: 45-50, 53.

Perez-Escamilla R, Haldeman L. Food label use modifies association of income with dietary quality. J Nutr 2002; 132: 768-772.

Roefs A, Jansen A. The effect of information about fat content on food consumption in overweight/obese and lean people. Appetite 2004; 43: 319-322.

Satia JA, Galanko JA, Neuhouser ML. Food nutrition label use is associated with demographic, behavioral, and pyschosocial factors and dietary intake among African Americans in North Carolina. J Am Diet Assoc 2005; 105: 392-402.

Smith SC, Taylor JG, Stephen AM. Use of food labels and beliefs about diet-disease relationships among university students. Public Health Nutr 2000; 3(2): 175-182.

Westcombe A, Wardle J. Influence of relative fat content information on responses to three foods. Appetite 1997; 28: 49 - 62.

- Adult Weight Management
- Adult Weight Management (AWM) Guideline (2006)

# Quick Links

## Recommendations Summary

### Adult Weight Management (AWM) Low Glycemic Index Diets

*Click here to see the explanation of recommendation ratings (Strong, Fair, Weak, Consensus, Insufficient Evidence) and labels (Imperative or Conditional). To see more detail on the evidence from which the following recommendations were drawn, use the hyperlinks in the Supporting Evidence Section below.*

- Recommendation(s)

**AWM: Low Glycemic Index Diets**

A low glycemic index diet is **not** recommended for weight loss or weight maintenance as part of a comprehensive weight management program, since it has not been shown to be effective in these areas.

**Rating: Strong**
Imperative

- Risks/Harms of Implementing This Recommendation

  None.

- Conditions of Application

  No conditions specified.

- Potential Costs Associated with Application

  None.

- Recommendation Narrative

  - Eight RCTs (5 positive-quality and 3 neutral-quality) report no significant differences in energy intake or body weight after the consumption of low-glycemic-index foods, however, some of these studies report significant improvements in other parameters, such as hunger and body fat mass (Alfenas and Mattes, 2005; Bouche et al, 2002; Carels et al, 2005; Ebbeling et al, 2005; Frost et al, 2004; Pereira et al, 2004;

Sloth et al, 2004; Thompson et al, 2005)
- One neutral-quality cohort study showed significant differences in weight loss and abdominal obesity after following a low-glycemic load diet (LaHaye et al, 2005)

- Recommendation Strength Rationale
  - Conclusion statement is Grade I

- Minority Opinions

  Consensus reached.

- Supporting Evidence

  *The recommendations were created from the evidence analysis on the following questions. To see detail of the evidence analysis, click the blue hyperlinks below (recommendations rated consensus will not have supporting evidence linked).*

  In adults, how effective is the consumption of low glycemic index foods for reducing energy intake and promoting weight loss?

  - References

    
    Alfenas RCG, Mattes RD. Influence of glycemic index/load on glycemic response, appetite, and food intake in healthy humans. Diabetes Care 2005; 28: 2123 - 2129.

    Bouche C, Rizkalla SW, Luo J, Vidal H, Veronese A, Pacher N, Fouquet C, Lang V, Slama G. Five-week, low-glycemic index diet decreases total fat mass and improves plasma lipid profile in moderately overweight nondiabetic men. Diabetes Care 2002; 25: 822-828.

    Carels RA, Darby LA, Douglass OM, Cacciapaglia HM, Rydin S. Education on the glycemic index of foods fails to improve treatment outcomes in a behavioral weight loss program. Eating Behaviors 2005; 6(2): 145-150.

    Ebbeling CB, Leidig MM, Sinclair KB, Seger-Shippee LG, Feldman HA, Ludwig DS. Effects of an ad libitum low-glycemic load diet on cardiovascular disease risk factors in obese young adults. Am J Clin Nutr 2005; 81: 976-982.

    Frost GS, Brynes AE, Bovill-Taylor C, Dornhorst A. A prospective randomised trial to determine the efficacy of a low glycaemic index diet given in addition to healthy eating and weight loss advice in patients with coronary heart disease. Eur J Clin Nutr 2004; 58: 121-127.

    LaHaye SA, Hollett PM, Vyselaar JR, Shalchi M, Lahey KA, Day AG. Comparison between a low glycemic load diet and a Canada Food Guide diet in cardiac rehabilitation patients in Ontario. Can J Cardiol 2005; 21(6): 489-494.

    Pereira MA, Swain J, Goldfine AB, Rifai N, Ludwig DS. Effects of a low-glycemic load diet on resting energy expenditure and heart disease risk factors during weight loss. *JAMA* 2004; 292: 2,482 - 2,490.

    Sloth B, Krog-Mikkelsen I, Flint A, Tetens I, Bjorck I, Vinoy S, Elmstahl H, Astrup A, Lang V, Raben A. No difference in body weight decrease between a low-glycemic-index and a high-glycemic-index diet but reduced LDL cholesterol after 10-week ad libitum intake of the low-glycemic-index diet. *Am J Clin Nutr*. 2004; 80: 337-347.

    Thompson WG, Rostad Holdman N, Janzow DJ, Slezak JM, Morris KL, Zemel MB. Effect of energy-reduced diets high in dairy products and fiber on weight loss in obese adults. Obesity Research 2005; 13(8): 1344-1353.
    

- Adult Weight Management
- Adult Weight Management (AWM) Guideline (2006)

# Quick Links

## Recommendations Summary

### AWM: Dairy/Calcium and Weight Management 2006

*Click here to see the explanation of recommendation ratings (Strong, Fair, Weak, Consensus, Insufficient Evidence) and labels (Imperative or Conditional). To see more detail on the evidence from which the following recommendations were drawn, use the hyperlinks in the Supporting Evidence Section below.*

- Recommendation(s)

  **AWM: Dairy/Calcium and Weight Management**

  In order to meet current nutritional recommendations, incorporate 3-4 servings of low fat dairy foods a day as part of the diet component of a comprehensive weight management program. Research suggests that calcium intake lower than recommended levels is associated with increased body weight. However, the effect of dairy and/or calcium at or above recommended levels on weight management is unclear.

  **Rating: Fair**
  Imperative

**AWM: Dietary Reference Intakes for Calcium**

**USDA Dietary Reference Intakes (DRI) for Calcium:**
Males and Females 19-50 years: 1000mg/dL
Males and Females 50-70 years: 1200mg/dL

- Risks/Harms of Implementing This Recommendation

  None.

- Conditions of Application

  No conditions specified.

- Potential Costs Associated with Application

  None.

- Recommendation Narrative

  - One neutral-quality RCT, four cross-sectional studies (1 positive and 3 neutral-quality) and one neutral-quality meta-analysis demonstrate that low intakes of calcium and dairy products, below recommended levels, are associated with increased body weight, body fat, BMI, waist circumference, and relative risk of obesity in black and white adults, however, it is unclear if this is a result of a poor overall diet (Davies et al, 2000; Jacqmain et al, 2003; Lin et al, 2000; Lovejoy et al, 2001; Pereira et al, 2002; Zemel et al, 2000)
  - One positive-quality cohort study showed no associations at recommended levels of calcium intake (Venti et al, 2005)
  - Six RCTs (1 positive-quality and 5 neutral-quality) show conflicting results with calcium intakes above recommended levels; four neutral-quality RCTs have shown a loss of body weight and body fat (especially from trunk region of the body) both with and without energy restriction, and two RCTs (1 positive-quality, 1 neutral-quality) report no significant difference in weight loss or maintenance (Cifuentes et al, 2004; Davies et al, 2000; Thompson et al, 2005; Zemel et al, 2004; Zemel et al, 2005; Zemel et al, 2005)

- Recommendation Strength Rationale

  - Conclusion statement is Grade III

- Minority Opinions

  Consensus reached.

- Supporting Evidence

  *The recommendations were created from the evidence analysis on the following questions. To see detail of the evidence analysis, click the blue hyperlinks below (recommendations rated consensus will not have supporting evidence linked).*

  In adults, how effective (in terms of client adherence and weight loss and maintenance) is the High Calcium (Dairy) diet?

  - References

    
    Cifuentes M, Riedt CS, Brolin RE, Field MP, Sherrell RM, Shapses SA. Weight loss and calcium intake influence calcium absorption in overweight postmenopausal women. Am J Clin Nutr 2004; 80(1): 123-130.

    Davies KM, Heaney RP, Recker RR, et al. Calcium intake and body weight. *Journal of Clinical Endocrinology & Metabolism* 2000: 85;4635-4638.

    Jacqmain M, Doucet E, Despres J-P, et al. Calcium intake, body composition, and lipoprotein-lipid concentrations in adults. *Am J Clin Nutr* 2003;77:1448-1452.

    Lin Y-C, Lyle RM, McCabe LD, et al. Dairy calcium is related to changes in body composition during a two-year exercise intiervention in young women. *J Am College Nutr* 2000:19;754-760.

    Lovejoy JC, Champagne CM, Smith SR, de Jonge L, Xie H. Ethnic differences in dietary intakes, physical activity, and energy expenditure in middle-aged, premenopausal women: the Healthy Transitions Study. Am J Clin Nutr 2001; 74: 90-95.

    Pereira MA, Jacobs, Jr. DR, Van Horn L, et al. Dairy consumption, obesity, and the insulin resistance syndrome in young adults: The CARDIA study. *JAMA* 287:16:2081-2089.

    Thompson WG, Rostad Holdman N, Janzow DJ, Slezak JM, Morris KL, Zemel MB. Effect of energy-reduced diets high in dairy products and fiber on weight loss in obese adults. Obesity Research 2005; 13(8): 1344-1353.

    Venti CA, Tataranni PA, Salbe AD. Lack of relationship between calcium intake and body size in an obesity-prone population. J Am Diet Assoc 2005; 105: 1401-1407.

    Zemel MB, Richards J, Mathis S, Milstead A, Gebhardt L, Silva E. Dairy augmentation of total and central fat loss in obese subjects. Int J Obes Relat Metab Disord 2005; 29(4): 391-397.

    Zemel MB, Richards J, Milstead A, Campbell P. Effects of calcium and dairy on body composition and weight loss in African-American adults. Obesity Research 2005; 13(7): 1218-1225.
    

Zemel MB, Shi H, Greer B, et al. Regulation of adiposity by dietary calcium. *The FASEB Journal* 2000; 14:1132-1138.

Zemel MB, Thompson W, Milstead A, et al. Calcium and dairy acceleration of weight and fat loss during energy restriction in obese adults. *Obesity Research* 2004:12;582-590.

- Adult Weight Management
- Adult Weight Management (AWM) Guideline (2006)

# Quick Links

## Recommendations Summary

### Adult Weight Management (AWM) Low Carbohydrate Diet

*Click here to see the explanation of recommendation ratings (Strong, Fair, Weak, Consensus, Insufficient Evidence) and labels (Imperative or Conditional). To see more detail on the evidence from which the following recommendations were drawn, use the hyperlinks in the Supporting Evidence Section below.*

- Recommendation(s)

**AWM: Low Carbohydrate Diet**

Having patients focus on reducing carbohydrates rather than reducing calories and/or fat may be a short term strategy for some individuals. Research indicates that focusing on reducing carbohydrate intake (<35% of kcals from carbohydrates) results in reduced energy intake. Consumption of a low-carbohydrate diet is associated with a greater weight and fat loss than traditional reduced calorie diets during the first 6 months, but these differences are not significant after 1 year.

**Rating: Fair**
Conditional

- Risks/Harms of Implementing This Recommendation

Safety has not been evaluated for long term, extreme restrictions of carbohydrates (<35% of kcals from carbohydrates).

Because of the limited research, practitioner should use caution in suggesting a low carbohydrate diets for even short term use for the following groups:

- patients with osteoporosis
- patients with kidney disease
- patients with increased LDL

- Conditions of Application

Recommendation applies to individuals who can more easily reduce carbohydrate in their diets than calories and/or fat.

- Potential Costs Associated with Application

None.

- Recommendation Narrative

- Five RCTs (two positive-quality, three neutral-quality) show that ad libitum low-carbohydrate diets, when compared with reduced-calorie diets, result in significant body weight loss and fat loss during the first 6 months (Brehm et al, 2003; Brehm et al, 2005; Nickols-Richardson et al, 2005; Samaha et al, 2003; Yancy et al, 2004)
- Three RCTs (one positive-quality and two neutral-quality) show that after 1 year, differences between ad libitum low-carbohydrate diets and reduced-calorie diets are not significant (Dansinger et al, 2005; Foster et al, 2003; Stern et al, 2004)

- Recommendation Strength Rationale

- Conclusion statement is Grade II
- Long term safety has not been evaluated, therefore, relative risks and benefits of using this dietary approach in all populations cannot be determined.

- Minority Opinions

Consensus reached.

- Supporting Evidence

*The recommendations were created from the evidence analysis on the following questions. To see detail of the evidence*

*analysis, click the blue hyperlinks below (recommendations rated consensus will not have supporting evidence linked).*

In adults, how effective, in terms of weight loss and maintenance, are low carbohydrate diets (defined as <35% kcals from carbohydrate)?

- References


Aude YW, Agatston AS, Lopez-Jimenez F, Lieberman EH, Almon M, Hansen M, Rojas G, Lamas GA, Hennekens CH. The National Cholesterol Education Program diet vs a diet lower in carbohydrates and higher in protein and monounsaturated fat: a randomized trial. Arch Intern Med 2004; 164(19): 2141-2146.

Brehm BJ, Seeley RJ, Daniels SR, D'Alessio DA. A randomized trial comparing a very low carbohydrate diet and a calorie-restricted low fat diet on body weight and cardiovascular risk factors in healthy women. *J Clin Endocrinol Metab* 2003; 88: 1617-1623.

Brehm BJ, Spang SE, Lattin BL, Seeley RJ, Daniels SR, D'Alessio DA. The role of energy expenditure in the differential weight loss in obese women on low-fat and low-carbohydrate diets. J Clin Endocrinol Metab 2005; 90: 1475-1482.

Dansinger ML, Gleason JA, Griffith JL, Selker HP, Schaefer EJ. Comparison of the Atkins, Ornish, Weight Watchers, and Zone diets for weight loss and heart disease risk reduction. *JAMA* 2005; 293: 43-53.

Foster FD, Wyatt HR, Hill JO, McGuckin BG, Brill C, Mohammed BS, Szapary PO, Rader DJ, Edman JS, Klein S *A Randomized Trial of a Low-Carbohydrate Diet for Obesity*. N Engl J Med 348;21: 2082-90. May 22, 2003.

Landers P, Wolfe MM, Glore S, Guild R, Phillips L. Effect of weight loss plans on body composition and diet duration. *J Okla State Med Assoc*. 2002 May;95(5):329-31.

Lean MEJ, Han TS, Prvan T, Richmond PR, Avenell A. Weight loss with high and low carbohydrate 1200 kcal diets in free living women. Eur J Clin Nutr 1997; 51(4): 243-248.

Luscombe-Marsh ND, Noakes M, Wittert GA, Keogh JB, Foster P, Clifton PM. Carbohydrate-restricted diets high in either monounsaturated fat or protein are equally effective at promoting fat loss and improving blood lipids. Am J Clin Nutr 2005; 81: 762-772.

Meckling KA, O'Sullivan C, Saari D. Comparison of a low-fat diet to a low-carbohydrate diet on weight loss, body composition, and risk factors for diabetes and cardiovascular disease in free-living, overweight men and women. *J Clin Endocrinol Metab.* 2004; 89(6): 2717-2723.

Nickols-Richardson SM, Coleman MD, Volpe JJ, Hosig KW. Perceived hunger is lower and weight loss is greater in overweight premenopausal women consuming a low-carbohydrate/high-protein vs. high-carbohydrate/low-fat diet. *J Am Diet Assoc.* 2005; 105: 1,433-1,437.

Samaha FF, Iqbal N, Seshadri P, Chicano KL, Daily DA, McGrory J, Williams T, Williams M, Gracely EJ, Stern L. A low-carbohydrate as compared with a low-fat diet in severe obesity. N Engl J Med 2003; 348(21): 2074-2081.

Sharman MJ, Volek JS. Weight loss leads to reductions in inflammatory biomarkers after a very-low-carbohydrate diet and a low-fat diet in overweight men. Clin Sci 2004; 107(4): 365-369.

Stern L, Iqbal N, Seshadri P, Chicano KL, Daily DA, McGrory J, Williams M, Gracely EJ, Samaha FF. The effects of low-carbohydrate versus conventional weight loss diets in severely obese adults: one-year follow-up of a randomized trial. Ann Intern Med 2004; 140(10): 778-785.

Yancy WS, Olsen MK, Guyton JR, Bakst RP, Westman EC. A low-carbohydrate, ketogenic diet vs. a low-fat diet to treat obesity and hyperlipidemia: a randomized controlled trial. *Ann Intern Med*, 2004; 140: 769-777.


- Adult Weight Management
- Adult Weight Management (AWM) Guideline (2006)

## Recommendations Summary

### Adult Weight Management (AWM) Physical Activity

*Click here to see the explanation of recommendation ratings (Strong, Fair, Weak, Consensus, Insufficient Evidence) and labels (Imperative or Conditional). To see more detail on the evidence from which the following recommendations were drawn, use the hyperlinks in the Supporting Evidence Section below.*

- Recommendation(s)

**AWM: Physical Activity**

Physical activity should be part of a comprehensive weight management program. Physical activity level should be assessed and individualized long-term goals established to accumulate at least 30 minutes or more of moderate intensity physical activity on most, and preferably, all days of the week, unless medically contraindicated. Physical activity contributes to weight loss, may decrease abdominal fat, and may help with maintenance of weight loss.

**Rating: Strong**
Imperative

- Risks/Harms of Implementing This Recommendation

Intense physical activity in some overweight and obese individuals may contribute to disability or death, thus consultation with a physician prior to beginning an exercise program should be recommended.

- Conditions of Application

None specified.

- Potential Costs Associated with Application

  None.

- Recommendation Narrative

  - Physical activity is recommended as part of a comprehensive weight loss therapy and weight control program because it modestly contributes to weight loss in overweight and obese adults (NHLBI Evidence Category A), may decrease abdominal fat (NHLBI Evidence Category B), increases cardiorespiratory fitness (NHLBI Evidence Category A), and may help with maintenance of weight loss (NHLBI Evidence Category C).
  - Physical activity should be an integral part of weight loss therapy and weight maintenance (NHLBI Category A).
  - Initially, moderate levels of physical activity for 30 – 45 minutes, 3 to 5 days a week, should be encouraged. All adults should set a long-term goal to accumulate at least 30 minutes or more of moderate intensity physical activity on most, and preferable, all days of the week. NHLBI Evidence Category B.
  - Physical activity, i.e. aerobic exercise, in overweight and obese adults, results in modest weight loss independent of the effect of caloric reduction through diet. NHLBI Evidence Category A.

- Recommendation Strength Rationale

  - NHLBI Evidence Categories of A, B and C

- Minority Opinions

  Consensus reached.

- Supporting Evidence

  *The recommendations were created from the evidence analysis on the following questions. To see detail of the evidence analysis, click the blue hyperlinks below (recommendations rated consensus will not have supporting evidence linked).*

  - References
  - References not graded in Academy of Nutrition and Dietetics Evidence Analysis Process

  *The Clinical Guidelines on the Identification, Evaluation, and Treatment of Overweight and Obesity in Adults: The Evidence Report*, NIH Publication No. 98-4083, September 1998, produced by the National Heart, Lung, and Blood Institute in cooperation with the National Institute of Diabetes and Digestive and Kidney Diseases.

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- Adult Weight Management
- Adult Weight Management (AWM) Guideline (2006)

# Recommendations Summary

### Adult Weight Management (AWM) Multiple Behavior Therapy Strategies

*Click here to see the explanation of recommendation ratings (Strong, Fair, Weak, Consensus, Insufficient Evidence) and labels (Imperative or Conditional). To see more detail on the evidence from which the following recommendations were drawn, use the hyperlinks in the Supporting Evidence Section below.*

- Recommendation(s)

  **AWM: Multiple Behavior Therapy Strategies**

  A comprehensive weight management program should make maximum use of multiple strategies for behavior therapy (e.g. self monitoring, stress management, stimulus control, problem solving, contingency management, cognitive restructuring, and social support). Behavior therapy in addition to diet and physical activity leads to additional weight loss. Continued behavioral interventions may be necessary to prevent a return to baseline weight.

  **Rating: Strong**
  Imperative

  - Risks/Harms of Implementing This Recommendation

    None.

  - Conditions of Application

No conditions specified.

- Potential Costs Associated with Application

None.

- Recommendation Narrative

  - Behavior therapy, in combination with an energy deficit, provides additional benefits in assisting patients to lose weight short term (1 year). NHLBI Evidence Category B.
  - Behavior therapy's effectiveness for long term weight maintenance has not been shown in the absense of continued behavioral intervention. NHLBI Evidence Category B.
  - No one behavior therapy appeared superior to any other in its effect on weight loss, rather multimodal strategies appeared to work best and those interventions with the greatest intensity appeared to be associated with the greatest weight loss. NHLBI Evidence Category A.
  - Long term follow up of patients undergoing behavior therapy shows a return to baseline weight in the great majority of subjects in the absence of continued behavioral intervention. NHLBI Evidence Category B.

- Recommendation Strength Rationale

  - NHLBI Evidence Categories of A and B

- Minority Opinions

Consensus reached.

- Supporting Evidence

*The recommendations were created from the evidence analysis on the following questions. To see detail of the evidence analysis, click the blue hyperlinks below (recommendations rated consensus will not have supporting evidence linked).*

- References
- References not graded in Academy of Nutrition and Dietetics Evidence Analysis Process

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- Adult Weight Management
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# Recommendations Summary

### Adult Weight Management (AWM) Multiple Behavior Therapy Strategies

*Click here to see the explanation of recommendation ratings (Strong, Fair, Weak, Consensus, Insufficient Evidence) and labels (Imperative or Conditional). To see more detail on the evidence from which the following recommendations were drawn, use the hyperlinks in the Supporting Evidence Section below.*

- Recommendation(s)

**AWM: Multiple Behavior Therapy Strategies**

A comprehensive weight management program should make maximum use of multiple strategies for behavior therapy (e.g. self monitoring, stress management, stimulus control, problem solving, contingency management, cognitive restructuring, and social support). Behavior therapy in addition to diet and physical activity leads to additional weight loss. Continued behavioral interventions may be necessary to prevent a return to baseline weight.

**Rating: Strong**
Imperative

- Risks/Harms of Implementing This Recommendation

None.

- Conditions of Application

No conditions specified.

- Potential Costs Associated with Application

None.

- Recommendation Narrative

  - Behavior therapy, in combination with an energy deficit, provides additional benefits in assisting patients to lose weight short term (1 year). NHLBI Evidence Category B.
  - Behavior therapy's effectiveness for long term weight maintenance has not been shown in the absense of continued behavioral intervention. NHLBI Evidence Category B.
  - No one behavior therapy appeared superior to any other in its effect on weight loss, rather multimodal strategies appeared to work best and those interventions with the greatest intensity appeared to be associated with the greatest weight loss. NHLBI Evidence Category A.
  - Long term follow up of patients undergoing behavior therapy shows a return to baseline weight in the great majority of subjects in the absence of continued behavioral intervention. NHLBI Evidence Category B.

- Recommendation Strength Rationale

  - NHLBI Evidence Categories of A and B

- Minority Opinions

  Consensus reached.

- Supporting Evidence

  *The recommendations were created from the evidence analysis on the following questions. To see detail of the evidence analysis, click the blue hyperlinks below (recommendations rated consensus will not have supporting evidence linked).*

  - References
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- Adult Weight Management
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# Recommendations Summary

### Adult Weight Management (AWM) Medication as Part of a Comprehensive Program

*Click here to see the explanation of recommendation ratings (Strong, Fair, Weak, Consensus, Insufficient Evidence) and labels (Imperative or Conditional). To see more detail on the evidence from which the following recommendations were drawn, use the hyperlinks in the Supporting Evidence Section below.*

- Recommendation(s)

  **AWM: Use of Weight Loss Medications**

  FDA-approved weight loss medications may be part of a comprehensive weight management program. Dietitians should collaborate with other members of the health care team regarding the use of FDA-approved weight loss medications for people who meet the NHLBI criteria. Research indicates that pharmacotherapy may enhance weight loss in some overweight and obese adults.

  **Rating: Strong**
  Imperative

  - Risks/Harms of Implementing This Recommendation

    Adverse side effects have been observed in some patients receiving pharmacotherapy for weight management. Only those drugs apprpoved by the FDA for long term use have data to support long term safety and efficacy.

  - Conditions of Application

    No conditions specified.

  - Potential Costs Associated with Application

    None.

  - Recommendation Narrative

- Weight loss drugs approved by the FDA may only be used as part of a comprehensive weight loss program, including dietary therapy and physical activity for patients with a BMI of >30 with no concomitant obesity-related risk factors or diseases, and for patients with a BMI of >27 with concomitant obesity-related risk factors or diseases. Weight loss drugs should never be used without concomitant lifestyle modifications. Continual assessment of drug therapy for efficacy and safety is necessary. If the drug is efficacious in helping the patient to lose and/or maintain weight loss and there are no serious adverse effects, it can be continued. If not, it should be discontinued. NHLBI Evidence Category B.
- After successful weight loss, the likelihood of weight loss maintenance is enhanced by a program consisting of dietary therapy, physical activity, and behavior therapy which should be continued indefinitely. Drug therapy can also be used. However, drug safety and efficacy beyond 1 year of total treatment have not been established. NHLBI Evidence Category B.
- Adverse side effects from the use of weight loss drugs have been observed in patients. NHLBI Evidence Category A.
- Using weight loss drugs singly (not in combination) and starting with the lowest effective doses can decrease the likelihood of adverse effects. NHLBI Evidence Category C.
- Pharmacotherapy, which has generally been studied along with lifestyle modification including diet and physical activity, using dexfenfluramine, sibutramine, orlistat or phentermine/fenfluramine, results in weight loss in obese adults when used for 6 months to 1 year. NHLBI Evidence Category B.

- Recommendation Strength Rationale
  - NHLBI Evidence Categories of A, B and C
- Minority Opinions

  Consensus reached.

- Supporting Evidence

  *The recommendations were created from the evidence analysis on the following questions. To see detail of the evidence analysis, click the blue hyperlinks below (recommendations rated consensus will not have supporting evidence linked).*

  - References
  - References not graded in Academy of Nutrition and Dietetics Evidence Analysis Process

  *The Clinical Guidelines on the Identification, Evaluation, and Treatment of Overweight and Obesity in Adults: The Evidence Report*, NIH Publication No. 98-4083, September 1998, produced by the National Heart, Lung, and Blood Institute in cooperation with the National Institute of Diabetes and Digestive and Kidney Diseases.

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- Adult Weight Management
- Adult Weight Management (AWM) Guideline (2006)

# Recommendations Summary

### Adult Weight Management (AWM) Bariatric Surgery for Weight Loss

*Click here to see the explanation of recommendation ratings (Strong, Fair, Weak, Consensus, Insufficient Evidence) and labels (Imperative or Conditional). To see more detail on the evidence from which the following recommendations were drawn, use the hyperlinks in the Supporting Evidence Section below.*

- Recommendation(s)

  **AWM: Bariatric Surgery for Weight Loss**

  Dietitians should collaborate with other members of the health care team regarding the appropriateness of bariatric surgery for people who have not achieved weight loss goals with less invasive weight loss methods and who meet the NHLBI criteria. Separate ADA evidence based guidelines are being developed on nutrition care in bariatric surgery.

  **Rating: Strong**
  Imperative

  - Risks/Harms of Implementing This Recommendation

    None.
  - Conditions of Application

    No conditions specified.
  - Potential Costs Associated with Application

    None.

- Recommendation Narrative
    - Gastrointestinal surgery can result in a substantial weight loss, and therefore is an available weight loss option for well-informed and motivated patients with a BMI >=40 or >=35 with comorbid conditions and acceptable operative risks. NHLBI Category B.
    - Weight loss surgery is an option for carefully selected patients with clinically severe obesity (BMI >=40 or >=35 with comorbid conditions) when less invasive methods of weight loss have failed and the patient is at high risk for obesity-associated morbidity or mortality.  NHLBI Evidence Cateogry B.
- Recommendation Strength Rationale
    - NHLBI Evidence Categories of B
- Minority Opinions

  Consensus reached.

- Supporting Evidence

*The recommendations were created from the evidence analysis on the following questions. To see detail of the evidence analysis, click the blue hyperlinks below (recommendations rated consensus will not have supporting evidence linked).*

- References
- References not graded in Academy of Nutrition and Dietetics Evidence Analysis Process

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