Adult Weight Management

AWM: Major Recommendations (2014)

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).

Below, you will find a list of the **Adult Weight Management** Recommendations, organized according to the stage of the Nutrition Care Process and by topic. To see the Recommendation Summary, just click on the Recommendation title. Print the entire recommendation in PDF format.

Nutrition Screening and Referral

AWM: Screening and Referral for MNT

Nutrition Assessment

AWM: Medical Nutrition Therapy

AWM: Duration and Frequency of MNT

AWM: Incorporating Telenutrition Interventions

AWM: Weight Management for Older Adults

AWM: Assess Data to Individualize the Comprehensive Weight Management Program

AWM: Assess Motivation for Weight Management

AWM: Assess Energy Needs

AWM: Assess Energy Intake and Nutrient Content of the Diet

Nutrition Intervention

AWM: Realistic Weight Goal Setting

AWM: Components of a Comprehensive Weight Management Program

AWM: Caloric Reduction and Nutrient Adequacy

AWM: Dietary Approaches for Caloric Reduction

AWM: Eating Frequency and Meal Patterns

AWM: Portion Control and Meal Replacements/Structured Meal Plans

AWM: Encourage Physical Activity

AWM: Multiple Behavior Therapy Strategies

AWM: Coordination of Care

Nutrition Monitoring and Evaluation

AWM: Monitor and Evaluate the Effectiveness of the Comprehensive Weight Management Program

AWM: Monitor and Evaluate Energy Intake and Energy Needs

- Adult Weight Management
- Adult Weight Management (AWM) Guideline (2014)

Recommendations Summary

AWM: Screening and Referral for MNT 2014

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: Annual Screening for Overweight/Obesity

  The registered dietitian nutritionist (RDN), in collaboration with other health care professionals, administrators and public policy decision-makers, should ensure that all adult patients have the following measurements at least annually:

  - Height and weight to calculate BMI, classified as overweight (BMI more than 25.0kg/m^2 to 29.9kg/m^2) or obese
    - Class I obesity: BMI 30kg/m^2 to 34.9kg/m^2
    - Class II obesity: BMI 35kg/m^2 to 39.9kg/m^2
    - Class III (extreme) obesity: 40kg/m^2 or higher.
  - Waist circumference to determine the risk of CVD, type 2 diabetes and all-cause mortality
    - NIH/NHLBI
      - *Men:* More than 102cm (more than 40 inches)
      - *Women:* More than 88cm (more than 35 inches).

  Annual BMI screening will identify adults who are overweight or obese and therefore may be at elevated risk of CVD and all-cause mortality. In addition, the greater the waist circumference, the greater the risk of CVD, type 2 diabetes and all-cause mortality.

  Rating: Fair
  Imperative

  AWM: Referral to RDN for Medical Nutrition Therapy

  The RDN, in collaboration with other health care professionals, administrators and public policy decision-makers, should ensure that overweight or obese adults are referred to an RDN for medical nutrition therapy (MNT). Intensive counseling and behavioral interventions promote sustained weight loss and reduce known risk factors for diet-related chronic disease.

  Rating: Fair
  Imperative

  - Risks/Harms of Implementing This Recommendation

    Adequate evidence indicates that the harms of screening for obesity are small.

  - Conditions of Application

    Body mass index is calculated from the measured weight and height of an individual. Waist circumference may be an acceptable alternative to BMI measurement in some patient sub-populations.

  - Potential Costs Associated with Application

    Costs of MNT sessions vary, however MNT sessions are essential for improved outcomes.

  - Recommendation Narrative

    From Screening for Obesity in Adults (2012)

    The USPSTF recommends screening all adults for obesity. Clinicians should offer or refer patients with a BMI of 30kg/m^2 or higher to intensive, multi-component behavioral interventions. *Grade B*

    From Behavioral Counseling in Primary Care to Promote a Healthy Diet (2003)

    The USPSTF recommends intensive behavioral dietary counseling for adult patients with hyperlipidemia and other known risk factors for cardiovascular and diet-related chronic disease. Intensive counseling can be delivered by primary care clinicians or by referral to other specialists, such as nutritionists or dietitians. *Grade B*

    From AHA/ACC/TOS Guideline for the Management of Overweight and Obesity in Adults (2013)

    Identifying patients who need to lose weight (BMI and waist circumference):

    - 1a. Measure height and weight and calculate BMI at annual visits or more frequently
      - NHLBI Grade E (Expert Opinion)
      - ACC/AHA Level of Evidence Grade C.
    - 1b. Use the current cut-points for overweight (BMI more than 25.0kg/m^2 to 29.9kg/m^2) and obesity (BMI 30kg/m^2 or more) to identify adults who may be at elevated risk of CVD and the current cut-points for obesity (BMI 30 kg/m^2 or more) to identify adults who may be at elevated risk of mortality from all causes
      - NHLBI Grade A (Strong)
      - ACC/AHA Level of Evidence Grade B.
    - 1c. Advise overweight and obese adults that the greater the BMI, the greater the risk of CVD, type 2 diabetes and all-cause mortality
      - NHLBI Grade A (Strong)
      - ACC/AHA Level of Evidence Grade B.
    - 1d. Measure waist circumference at annual visits or more frequently in overweight and obese adults. Advise adults that the greater the waist circumference, the greater the risk of CVD, type 2 diabetes and all-cause mortality. The cut-points currently in common use (from either NIH/NHLBI or WHO/IDF) may continue to be used to identify patients who may be at increased risk until further evidence becomes available.
      - NHLBI Grade E (Expert Opinion)
      - ACC/AHA Level of Evidence Grade B.

  - Recommendation Strength Rationale

    - The Academy of Nutrition and Dietetics Adult Weight Management Work Group concurs with the references cited
    - United States Preventive Services Task Force recommendations both given Grade B
    - ACC/AHA/TOS recommendations given either NHLBI Grade A (Strong) or Grade E (Expert Opinion), ACC/AHA Level of Evidence Grades B and C. Recommendations 1a, 1b, 1c and 1d were based on Critical Question 2, which analyzed systematic reviews and meta-analyses. The literature search included those published from January 2000 to October 2011.

  - 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

    - Jensen MD, Ryan DH, Apovian CM, Loria CM, Ard JD, Millen BE, Comuzzie AG, Nonas CA, Donato KA, Pi-Sunyer FX, Hu FB, Stevens J, Hubbard VS, Stevens VJ, Jakicic

JM, Wadden TA, Kushner RF, Wolfe BM, Yanovski SZ. 2013 AHA/ACC/TOS Guideline for the Management of Overweight and Obesity in Adults. *J Am Coll Cardiol.* 2013 Nov 7. doi: 10.1016/j.jacc.2013.11.004.
- United States Preventive Services Task Force. Screening for and Management of Obesity in Adults. Release date: June 2012. Accessible at: http://www.uspreventiveservicestaskforce.org/uspstf/uspsobes.htm
- United States Preventive Services Task Force. Behavioral counseling in primary care to promote a healthy diet: recommendations and rationale. *Am J Prev Med.* 2003 Jan; 24(1): 93-100.

- Adult Weight Management
- Adult Weight Management (AWM) Guideline (2014)

Quick Links

Recommendations Summary

AWM: Medical Nutrition Therapy 2014

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: Medical Nutrition Therapy

Medical nutrition therapy (MNT) provided by a registered dietitian nutritionist (RDN) is recommended for overweight and obese adults. MNT provided by an RDN results in both statistically significant and clinically meaningful weight loss in overweight and obese adults, as well as reduced risk for diabetes, disorders of lipid metabolism and hypertension.

Rating: Strong
Imperative

- Risks/Harms of Implementing This Recommendation

  None.

- Conditions of Application

  Weight loss may be beneficial for other health conditions as well. In addition, the RDN should assess for appropriateness of weight management in certain populations (eating disorders, pregnancy, receiving chemotherapy, etc.).

- Potential Costs Associated with Application

  Costs of MNT sessions vary, however MNT sessions are essential for improved outcomes.

- Recommendation Narrative

  Recommendation Narrative from MNT Effectiveness

  - MNT provided by an RDN results in both statistically and clinically significant weight loss in otherwise healthy overweight and obese adults
  - Four studies regarding the effectiveness of MNT for under six months reported significant weight losses of approximately one to two pounds per week (Holm et al, 1983; Richardson et al, 2005; Schneider et al, 2005; Raatz et al, 2008)
  - Four studies regarding the effectiveness of MNT from six to 12 months reported significant mean weight losses of up to 10% of body weight (Eilat-Adar et al, 2005; Feigenbaum et al, 2005; Dengel et al, 2006; Digenio et al, 2009)
  - Four studies report maintenance of this weight loss beyond one year. In these studies, both individual and group sessions were employed with weekly and monthly sessions (Melin et al, 2003; Willaing et al, 2004; Ashley et al, 2007; Sacks et al, 2009).

  Recommendation Narrative from Diabetes

  - In randomized clinical trials, approximately half report improvement in A1C values with weight loss; whereas, approximately half report no improvement in A1C values despite fairly similar weight losses
  - A total of 12 studies with more than one diet arm (Hollander et al, 1998; Manning et al, 1998; Hanefeld et al, 2002; Miles et al, 2002; Kelley et al, 2003; Redmon et al, 2003; Brinkworth et al, 2004; Metz et al, 2004; Wolf et al, 2004; Li et al, 2005; Berne et al, 2005; Redmon et al, 2005) reported weight loss and A1C values at 12 months
  - Seven studies in diet arms reported no improvement in A1C (Hollander et al, 1998; Manning et al, 1998; Redmon et al, 2003; Brinkworth et al, 2004; Wolf et al, 2004; Li et al, 2005; Redmon et al, 2005) despite weight loss (range, -0.8kg to -4.4kg) in all but one study, which reported no weight loss (Manning et al, 1998)
  - Five studies in diet arms reported improvement in A1C ranging from -0.2% to -0.6% (Hanefeld et al, 2002; Miles et al, 2002; Kelley et al, 2003; Mertz et al, 2004; Berne et al, 2005) with fairly similar weight losses (range, -1.3kg to -5.1kg)
  - Studies using weight loss medications (orlistat and lifestyle, sibutramine) report consistent improvement in A1C. Six studies with an orlistat arm (Hollander et al, 1998; Hanefeld et al, 2002; Miles et al, 2002; Kelley et al, 2003; Derosa et al, 2004; Berne et al, 2005) reported improvements in A1C values (range, -0.3% to -1.1%) with orlistat and lifestyle intervention with weight loss (range, -3.9kg to -6.2kg).
  - Five studies (McNulty et al, 2003; Redmon et al, 2003; Derosa et al, 2004; Sanchez-Reyes et al, 2004; Redmon et al, 2005) reported improvements in A1C values (range, -0.3% to -6.0%) with sibutramine with weight loss (range, -4.1kg to -8.0kg)
  - A total of 10 studies reported significant improvements in at least one lipid value, generally in triglycerides and HDL-cholesterol from weight loss either by diet alone or with weight loss medications (Hollander et al, 1998; Hanefeld et al, 2002; Miles et al, 2002; Paisey et al, 2002; Ash et al, 2003; Kelley et al, 2003; McNulty et al, 2003; Metz et al, 2004; Berne et al, 2005; Li et al, 2005)
  - Seven studies reported improvement in blood pressure with weight loss (Miles et al, 2002; Redmon et al, 2003; Brinkworth et al, 2004; Derosa et al, 2004; Metz et al, 2004; Li et al, 2005; Redmon et al, 2005), however one study using sibutramine reported increases in blood pressure (McNulty et al, 2003) and one study using sibutramine reported no change in blood pressure (Derosa et al, 2004).

  Recommendation Narrative from Disorders of Lipid Metabolism

  - A total of 10 studies provide evidence that:
    - An increased BMI and waist circumference are associated with increased risk of metabolic syndrome
    - In the metabolic syndrome patient, a cardioprotective dietary pattern (low in saturated fat, trans fat and cholesterol, limited in simple sugar intake and increased in consumption of fruits, vegetables and whole grains) provides the background for modifying the energy balance to achieve weight loss. Extremes in intakes of carbohydrate or fats should be avoided.
    - Physical activity at any level, light, moderate or vigorous, is associated with reduced incidence of metabolic syndrome
    - Food patterns emphasizing a diet high in fruits and vegetables and whole grains is associated reduced incidence of metabolic syndrome
    - Lifestyle modification resulting in weight reduction and increased physical activity has been shown to improve risk factors associated with metabolic syndrome. Caloric restriction combined with daily activity of at least 30 minutes at moderate intensity resulted in weight loss of at least 7% and improved components of the metabolic syndrome.
  - Studies included two positive-quality cross-sectional studies (Ford et al, 2003; Irwin et al, 2002), one positive-quality systematic review/evidence report (Adult Treatment Panel III, 2002), two positive-quality cohort studies (Case et al, 2002; Lakka et al, 2003), one

positive-quality case-controlled study (Pitsavos et al, 2003), one positive-quality before/after study (Katzmarzyk et al, 2003), one neutral-quality cross-sectional study (Panagiotakos et al, 2004) and two negative-quality consensus statements (Grundy, Brewer et al, 2004; Grundy, Hansen et al, 2004):

- One positive-quality retrospective cohort study (Case et al, 2002) found weight loss obtained by calorie restriction and physical activity improved risk factors of the metabolic syndrome
- One positive-quality before/after study (Katzmarzyk et al, 2003) of Caucasian and black men and women found an aerobic exercise training program improved risk factors of the metabolic syndrome
- Five epidemiological studies [(four positive-quality (Ford et al, 2003; Irwin et al, 2002; Lakka et al, 2003; Pitsavos et al, 2003) and one neutral-quality (Panagiotakos et al, 2004)] support an inverse relationship between physical activity (and inactivity) and the metabolic syndrome. One study included three different ethnic groups (Irwin et al, 2002).
- Reports of the American Heart Association, the National Heart, Lung, and Blood Institute and the American Diabetes Association (Grundy, Brewer et al, 2004; ATP III, 2002; Grundy, Hansen, et al, 2004) concluded that lifestyle modification leading to weight reduction and increased physical activity represent first-line clinical therapy for the metabolic syndrome. Nutritional therapy calls for a low intake of saturated fat, trans-fatty acids and cholesterol; reduced consumption of simple sugars; and increased fruits and vegetables and whole grains. Extremes in intakes of either carbohydrate or fats should be avoided.

Recommendation Narrative from Hypertension

Based on the JNC 7 report, a weight loss of as little as 10 lbs (4.5kg) reduces blood pressure and prevents hypertension in a large proportion of overweight persons.

- Recommendation Strength Rationale

Recommendation Strength Rationale from MNT Effectiveness

Conclusion statement in support of the recommendation received Grade I.

Recommendation Strength Rationale from Diabetes

Conclusion statement from diabetes in support of the recommendation received Grade II.

Recommendation Strength Rationale from Disorders of Lipid Metabolism

- Research findings were across men and women of different ethnic groups residing in the United States
- This recommendation is supported by a consensus of three organizations interested in the prevention and treatment of metabolic syndrome
- Conclusion statements are Grade II, except conclusion statement on *Dietary Pattern to Achieve Weight Loss and Reduce Components of the Metabolic Syndrome,* which is a Grade IV
- Conclusion statements were based on:
  - Two positive-quality cross-sectional studies
  - One positive-quality systematic review/evidence report
  - Two positive-quality cohort studies
  - One positive-quality case-control study
  - One positive-quality before/after study
  - One neutral-quality cross-sectional study
  - Two negative-quality consensus statements.

Recommendation Strength Rationale from Hypertension

The ADA Hypertension Expert Work Group concurs with the recommendations from the JNC 7 regarding weight management.

- 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).

What is the evidence to support effectiveness of MNT provided by a Registered Dietitian for overweight/obesity in otherwise healthy adults?

What is the long-term effect (1 year or greater) of weight management on metabolic outcomes in persons with type 1 and type 2 diabetes?

Is obesity associated with the metabolic syndrome?

In metabolic syndrome patients, what dietary pattern will achieve weight loss and reduce components of the metabolic syndrome?

Is physical activity associated with the metabolic syndrome?

What food patterns are associated with reduced incidence of metabolic syndrome?

In patients with the metabolic syndrome, what lifestyle practices have reduced the risk factors and components of the metabolic syndrome?

- References

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Lakka TA, Laaksonen DE, Lakka HM, Männikkö N, Niskanen LK, Rauramaa R, Salonen JT. Sedentary lifestyle, poor cardiorespiratory fitness, and the metabolic syndrome. *Med Sci Sports Exerc.* 2003 Aug; 35 (8): 1,279-1,286.

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Pitsavos C, Panagiotakos DB, Chrysohoou C, Papaioannou I, Papadimitriou L, Tousoulis D, Stefanadis C, Toutouzas P. The adoption of Mediterranean diet attenuates the development of acute coronary syndromes in people with the metabolic syndrome. *Nutr J.* 2003 Mar 19; 2: 1.

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- Adult Weight Management
- Adult Weight Management (AWM) Guideline (2014)

Recommendations Summary

AWM: Duration and Frequency of MNT 2014

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: Duration and Frequency of MNT for Weight Loss

  For weight loss, the registered dietitian nutritionist (RDN) should schedule at least 14 medical nutrition therapy (MNT) encounters (either individual or group) over a period of at least six months. High-frequency comprehensive weight loss interventions result in weight loss.

  Rating: Strong
  Imperative

  AWM: Duration and Frequency of MNT for Weight Maintenance

  For weight maintenance, the registered dietitian nutritionist (RDN) should schedule at least monthly medical nutrition therapy (MNT) encounters over a period of at least one year. High-frequency comprehensive weight maintenance interventions result in maintenance of weight loss.

  Rating: Strong
  Imperative

  - Risks/Harms of Implementing This Recommendation

    None.

  - Conditions of Application

    An example of a weight loss schedule would be weekly encounters for the first six to 12 weeks, with less frequent encounters over the remaining months, individualized as needed.

  - Potential Costs Associated with Application

    Costs of medical nutrition therapy (MNT) sessions vary; however, MNT sessions are essential for improved outcomes.

  - Recommendation Narrative

    From AHA/ACC/TOS Guideline for the Management of Overweight and Obesity in Adults (2013)

    Lifestyle intervention and counseling (comprehensive lifestyle intervention):

    - 4a. Advise overweight and obese individuals who would benefit from weight loss to participate for six or more months in a comprehensive lifestyle program that assists participants in adhering to a lower-calorie diet and in increasing physical activity through the use of behavioral strategies. NHLBI Grade A (Strong). ACC/AHA Level of Evidence Grade A.
    - 4b. Prescribe onsite, high-intensity (i.e., 14 or more sessions in six months) comprehensive weight loss interventions provided in individual or group sessions by a trained interventionist. NHLBI Grade A (Strong). ACC/AHA Level of Evidence Grade A.
    - 4f. Advise overweight and obese individuals who have lost weight to participate long-term (more than one year) in a comprehensive weight loss maintenance program. NHLBI Grade A (Strong). ACC/AHA Level of Evidence Grade A.
    - 4g. For weight loss maintenance, prescribe face-to-face or telephone-delivered weight loss maintenance programs that provide regular contact (monthly or more frequent) with a trained interventionist who helps participants engage in high levels of physical activity (i.e., 200 to 300 minutes per week), monitor body weight regularly (i.e., weekly or more frequent), and consume a reduced-calorie diet (needed to maintain lower body weight). NHLBI Grade A (Strong). ACC/AHA Level of Evidence Grade A.

  - Recommendation Strength Rationale

    ACC/AHA/TOS recommendations all given NHLBI Grade A (Strong), ACC/AHA Level of Evidence Grade A. Recommendations 4a, 4b, 4f and 4g were based on Critical Question 4, which analyzed systematic reviews and meta-analyses (the literature search included those published from January 2000 to October 2011) and added major RCTs published after 2009 with greater than 100 people per treatment arm.

  - 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

    Jensen MD, Ryan DH, Apovian CM, Loria CM, Ard JD, Millen BE, Comuzzie AG, Nonas CA, Donato KA, Pi-Sunyer FX, Hu FB, Stevens J, Hubbard VS, Stevens VJ, Jakicic JM, Wadden TA, Kushner RF, Wolfe BM, Yanovski SZ. 2013 AHA/ACC/TOS Guideline for the management of overweight and obesity in adults, *J Am Coll Cardiol*. 2014 Jul; 63(25 Pt B): 2, 985-3, 023.

- Adult Weight Management
- Adult Weight Management (AWM) Guideline (2014)

Quick Links

Recommendations Summary

AWM: Incorporating Telenutrition Interventions 2014

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: Incorporating Telenutrition Interventions for Weight Loss

  If the registered dietitian nutritionist (RDN) incorporates telenutrition interventions for weight loss, medical nutrition therapy (MNT) should consist of both in-person and non-in-person encounters. Research on telenutrition interventions involving an RDN reported that hybrid interventions (containing both in-person and non-in-person components) were more effective for weight loss than using telenutrition interventions (only non-in-person components).

  Rating: Strong
  Conditional

  AWM: Incorporating Telenutrition Interventions for Weight Maintenance

  If the registered dietitian nutritionist (RDN) incorporates telenutrition interventions for weight maintenance, medical nutrition therapy (MNT) may consist of either in-person or non-in-person encounters. Research on telenutrition interventions involving an RDN reported that either hybrid interventions (containing both in-person and non-in-person components) or telenutition interventions (only non-in-person components) were effective for weight maintenance.

  Rating: Strong
  Conditional

  - Risks/Harms of Implementing This Recommendation

    None.

  - Conditions of Application

    These recommendations apply when the registered dietitian nutritionist (RDN) incorporates telenutrition interventions, depending on the technological skills, access and knowledge of everyone involved.

    Examples of telenutrition interventions involve, but are not limited to, the following delivery methods:

    - Web
    - Telephone
    - Video
    - Text
    - Podcast.

  - Potential Costs Associated with Application

    - Costs of medical nutrition therapy (MNT) sessions vary; however, MNT sessions are essential for improved outcomes
    - Costs associated with implementing preferred technology.

  - Recommendation Narrative

    - For weight loss, hybrid telenutrition interventions (containing both face-to-face and non-face-to-face components) involving an RDN are effective (Gleason et al, 2002; Krukowski et al, 2008; Djuric et al, 2009; Harvey-Berino, West et al, 2010; Izquierdo et al, 2010; Rossi et al, 2010; Touger-Decker et al, 2010)
    - The use of solely non-face-to-face telenutrition interventions for weight loss is not adequately researched (Turner-McGrievy et al, 2009)
    - Due to the variation in telenutrition interventions in this emerging area of research, further studies on specific telenutrition interventions for weight loss are needed
    - For weight maintenance, the use of both hybrid (containing both face-to-face and non-face-to-face components) and solely non-face-to-face telenutrition interventions involving the RDN are effective (Harvey-Berino, Pintauro, Buzzell et al, 2002; Harvey-Berino, Pintauro and Gold, 2002; Harvey-Berino, Pintauro et al, 2004; Haugen et al, 2007; Krukowski et al, 2008; Djuric et al, 2009; Donaldson et al, 2013)
    - Due to the variation in telenutrition interventions in this emerging area of research, further studies on specific telenutrition interventions for weight maintenance are needed.

    From AHA/ACC/TOS Guideline for the Management of Overweight and Obesity in Adults (2013)

    Lifestyle Intervention and Counseling (Comprehensive Lifestyle Intervention)
    - 4c. Electronically delivered weight loss programs (including by telephone) that include personalized feedback from a trained interventionist can be prescribed for weight loss but may result in smaller weight loss than face-to-face interventions. NHLBI Grade B (Moderate). ACC/AHA Level of Evidence Grade A.
    - 4g. For weight loss maintenance, prescribe face-to-face or telephone-delivered weight loss maintenance programs that provide regular contact (monthly or more frequent) with a trained interventionist who helps participants engage in high levels of physical activity (i.e., 200 to 300 minutes per week), monitor body weight regularly (i.e., weekly or more frequent) and consume a reduced-calorie diet (needed to maintain lower body weight). NHLBI Grade A (Strong). ACC/AHA Level of Evidence Grade A.

  - Recommendation Strength Rationale

    - The Conclusion Statements in support of this recommendation both received Grade I
    - ACC/AHA/TOS recommendation given either NHLBI Grades A (Strong) or B (Moderate), ACC/AHA Level of Evidence Grade A. Recommendations 4c and 4g were based on Critical Question 4, which analyzed systematic reviews and meta-analyses (the literature search included those published from January 2000 to October 2011) and added major RCTs published after 2009 with greater than 100 people per treatment arm.

  - 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).

  For weight loss, what is the effectiveness of telenutrition interventions involving an RDN?

  For weight maintenance, what is the effectiveness of telenutrition interventions involving an RDN?

  - References

    Djuric Z, Mirasolo J, Kimbrough L, Brown DR, Heilbrun LK, Canar L, Venkatranamamoorthy R, Simon MS. A pilot trial of spirituality counseling for weight loss maintenance in African American breast cancer survivors. *J Natl Med Assoc.* 2009; 101(6): 552-564.

    Gleason JA, Bourdet KL, Koehn K, Holay SY, Schaefer EJ. Cardiovascular risk reduction and dietary compliance with a home-delivered diet and lifestyle modification program. *J Am Diet Assoc.* 2002 Oct; 102 (10): 1,445-1,451. PMID: 12396164

    Harvey-Berino J, West D, Krukowski R, Prewitt E, Van Biervliet A, Ashikaga T, Skelly J. Internet delivered behavioral obesity treatment. *Prev Med.* 2010; 51 (2): 123-128.

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Touger-Decker R, Denmark R, Bruno M, O'Sullivan-Maillet J, Lasser N. Workplace weight loss program; comparing live and internet methods. *J Occup Environ Med.* 2010; 52(11): 1112-1118.

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

  Jensen MD, Ryan DH, Apovian CM, Loria CM, Ard JD, Millen BE, Comuzzie AG, Nonas CA, Donato KA, Pi-Sunyer FX, Hu FB, Stevens J, Hubbard VS, Stevens VJ, Jakicic JM, Wadden TA, Kushner RF, Wolfe BM, Yanovski SZ. 2013 AHA/ACC/TOS Guideline for the management of overweight and obesity in adults. *J Am Coll Cardiol.* 2014 Jul 1; 63(25 Pt B): 2, 985-3, 024.

- Adult Weight Management
- Adult Weight Management (AWM) Guideline (2014)

Recommendations Summary

AWM: Weight Management for Older Adults 2014

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: Weight Management for Older Adults

  For older adults (aged 65 years and older) who are overweight or obese, the registered dietitian nutritionist (RDN) should provide medical nutrition therapy (MNT) for weight loss and weight maintenance. Research has reported reduced risk of mortality, reduced development of type 2 diabetes and improved cardiovascular risk factors with intentional weight loss in older persons and weight gain produces increased risk for several health outcomes.

  Rating: Fair
  Conditional

  - Risks/Harms of Implementing This Recommendation

    None.

  - Conditions of Application

    This recommendation applies to older adults who are overweight or obese.

  - Potential Costs Associated with Application

    Costs of MNT sessions vary, however MNT sessions are essential for improved outcomes.

  - Recommendation Narrative

    From the 2010 Dietary Guidelines Advisory Committee (DGAC) Nutrition Evidence Library (NEL) Evidence-Based Systematic Reviews

    For older adults (age older than 65), what is the effect of weight loss vs. weight maintenance on health outcomes (cardiovascular disease, type 2 diabetes, cancer and mortality?
    - Weight loss in older adults has been associated with an increased risk of mortality, but because most studies have not differentiated between intentional and unintentional weight loss, recommending intentional weight loss has not been possible. Recently however, moderate evidence of a reduced risk of mortality with intentional weight loss in older persons has been published. Intentional weight loss among overweight and obese older adults, therefore is recommended. In addition, with regard to morbidity, moderate evidence suggests that intentional weight loss in older adults has been associated with reduced development of type 2 diabetes and improved cardiovascular risk factors. There are insufficient data on cancer to come to a conclusion. Weight gain produces increased risk for several health outcomes.

  - Recommendation Strength Rationale

    The Conclusion Statement for Energy Balance and Weight Management, Older Adults in support of this recommendation received a grade of Moderate.

  - 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

    2010 Dietary Guidelines Advisory Committee (DGAC) Nutrition Evidence Library (NEL) Evidence-Based Systematic Reviews. Available at http://www.nutritionevidencelibrary.gov/category.cfm?cid=21.

- Adult Weight Management
- Adult Weight Management (AWM) Guideline (2014)

Recommendations Summary

AWM: Assess Data to Individualize the Comprehensive Weight Management Program 2014

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: Assess Data to Individualize the Comprehensive Weight Management Program

  The registered dietitian nutritionist (RDN) should assess the following data in order to individualize the comprehensive weight management program for overweight and obese adults:

  - Food- and nutrition-related history, including but not limited to:
    - Beliefs and attitudes, including food preferences and motivation
    - Food environment, including access to fruits and vegetables
    - Dietary behaviors, including eating out and screen time
    - Diet experience, including food allergies and past dieting history
    - Medications and supplements
    - Physical activity.
  - Anthropometric measurements, including but not limited to:
    - Height, weight, body mass index (BMI)
    - Waist circumference
    - Weight history
    - Body composition (if available).
  - Biochemical data, medical tests and procedures, including but not limited to:
    - Glucose and endocrine profile
    - Lipid profile.
  - Nutrition-focused physical findings, including but not limited to:
    - Ability to communicate
    - Affect
    - Amputations
    - Appetite
    - Blood pressure
    - Body language
    - Heart rate.
  - Client history, including but not limited to:
    - Appropriateness of weight management in certain populations (such as eating disorders, pregnancy, receiving chemotherapy)
    - Client and family medical and health history
    - Social history, including living or housing situation and socio-economic status.

  Moderately strong evidence indicates that the food environment is associated with dietary intake, especially less consumption of vegetables and fruits and higher body weight. Strong and consistent evidence indicates that adults who eat fast food often are at increased risk of weight gain, overweight and obesity and that screen time, especially television screen time, is directly associated with increased overweight and obesity.

  Rating: Strong
  Imperative

  - Risks/Harms of Implementing This Recommendation

    None.

  - Conditions of Application

    If BMI is 35kg/m^2 or more, waist circumference will likely be elevated and will add no additional risk information.

  - Potential Costs Associated with Application

    - Costs of medical nutrition therapy (MNT) sessions vary, however MNT sessions are essential for improved outcomes
    - Costs of laboratory tests may be additional.

  - Recommendation Narrative

    From the 2010 Dietary Guidelines Advisory Committee (DGAC) Nutrition Evidence Library (NEL) Evidence-Based Systematic Reviews

    - What is the relationship between the environment, body weight and fruit and vegetable consumption?
      - An emerging body of evidence has documented the impact of the food environment and select behaviors on body weight in both children and adults. Moderately strong evidence now indicates that the food environment is associated with dietary intake, especially less consumption of vegetables and fruits and higher body weight. The presence of supermarkets in local neighborhoods and other sources of vegetables and fruits are associated with lower BMI, especially for low-income Americans, while lack of supermarkets and long distances to supermarkets are associated with higher BMI. Finally, limited but consistent evidence suggests that increased geographic density of fast food restaurants and convenience stores is also related to increased BMI.
    - What is the relationship between eating out and body weight?
      - Strong and consistent evidence indicates that children and adults who eat fast food are at increased risk of weight gain, overweight and obesity. The strongest documented relationship between fast food and obesity is when one or more fast food meals are consumed per week. There is not enough evidence at this time to similarly evaluate eating out at other types of restaurants and risk of weight gain, overweight and obesity.
    - What is the relationship between screen time and body weight?
      - Strong and consistent evidence in both children and adults shows that screen time is directly associated with increased overweight and obesity. The strongest association is with television screen time.

  - Recommendation Strength Rationale

    The Conclusion Statements for Energy Balance and Weight Management, Food Environment and Dietary Behaviors in support of this recommendation received grades of Moderate and Strong.

  - 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

  2010 Dietary Guidelines Advisory Committee (DGAC) Nutrition Evidence Library (NEL) Evidence-Based Systematic Reviews. Available at http://www.nutritionevidencelibrary.gov/category.cfm?cid=21.

- Adult Weight Management
- Adult Weight Management (AWM) Guideline (2014)

Quick Links

Recommendations Summary

AWM: Assess Motivation for Weight Management 2014

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: Assess Motivation for Weight Management

  The registered dietitian nutritionist (RDN) should assess motivation, readiness and self-efficacy for weight management, based on behavior change theories and models (such as cognitive-behavioral therapy, transtheoretical model and social cognitive theory/social learning theory). While research supports cognitive-behavioral therapy as an effective method of overweight and obesity treatment, there is limited research in the areas of the transtheoretical model and social cognitive theory and social learning theory.

  Rating: Fair
  Imperative

  - Risks/Harms of Implementing This Recommendation

    None.

  - Conditions of Application

    Behavior change theories or models are used to design and implement nutrition interventions. Theories and theoretical models consist of principles, constructs and variables, which offer systematic explanations of the human behavior change process. Behavior change theories and models provide a research-based rationale for designing and tailoring nutrition interventions to achieve the desired effect. Theories and models guide determination of:

    - The information patients or clients need at different points in the behavior change process
    - The tools and strategies that may be best applied to facilitate behavior change
    - Outcome measures to assess effectiveness in interventions or components of interventions.

    The ADA Nutrition Counseling Evidence Analysis Project explored the evidence related to the following theories or models and nutrition therapy:

    - *Cognitive-behavioral therapy (CBT):* Based on the assumption that all behavior is learned and is directly related to internal factors (e.g., thoughts and thinking patterns) and external factors (e.g., environmental stimulus and reinforcement) that are related to the problem behaviors. Application involves use of both cognitive and behavioral change strategies to effect behavior change.
    - *Transtheoretical model*: A theoretical model of intentional health behavior change that describes a sequence of cognitive (attitudes and intentions) and behavioral steps people take in successful behavior change. The model, developed by Prochaska and DiClemente, is composed of a core concept known as Stages of Change, a series of independent variables, the Processes of Change and outcome measures including decision balance and self-efficacy. The model has been used to guide development of effective interventions for a variety of health behaviors.
    - *Social cognitive theory and social learning theory:* Provides a framework for understanding, predicting and changing behavior. The theory identifies a dynamic, reciprocal relationship between environment, the person and behavior. The person can be both an agent for change and a responder to change. It emphasizes the importance of observing and modeling behaviors, attitudes and emotional reactions of others. Determinants of behavior include goals, outcome expectations and self-efficacy. Reinforcements increase or decrease the likelihood that the behavior will be repeated.

  - Potential Costs Associated with Application

    Costs of medical nutrition therapy (MNT) sessions vary; however, MNT sessions are essential for improved outcomes.

  - Recommendation Narrative

    From the Nutrition Counseling Project

    - Two small positive-quality RCTs provide evidence that short-term (10-week) cognitive-behavioral therapy is an effective method of overweight and obesity treatment (Kalodner and DeLucia, 1991; Stahre and Hallstrom, 2005)
    - One neutral-quality six-month randomized controlled trial (86 obese adults) provides evidence that intermediate-duration (six to 12 months) behavioral therapy and behavioral therapy combined with a personalized system of skill-acquisition targeting weight loss is more effective than weight-loss education alone in facilitating weight loss, decreasing both total energy intake and percentage of calories from fat and increasing physical activity (Fuller et al, 1998)
    - Two positive randomized controlled trials (65 participants received behavior therapy and a very-low-calorie diet, Melin et al, 2003; Kajaste et al, 2004) and one neutral quasi-experimental study (84 participants received behavior therapy, Dornelas et al, 1998) evaluated behavior therapy as a component of a weight-loss program of long-term duration (at least 12 months). Behavior therapy was not always the variable of randomization. Participants receiving behavior therapy lost weight at the conclusion of treatments. Upon follow-up, there was some weight regain, but participants remained at a lower weight than baseline. Studies that included a very-low-calorie diet (VLCD) to initiate rapid initial weight-loss, combined with behavior therapy, also appeared to produce long-term weight loss. *[Note: This is not a statement recommending VLCDs or suggesting that VLCDs are more beneficial than low-calorie diets.]*
    - One positive-quality intervention study strongly supported application of the Transtheoretical Model or Stages of Change in improving health and food behavior change (Jones et al, 2003). Much research has been accomplished to validate instruments used to measure stage of change in the dietary context. Additional research is needed to support its effective application in nutrition counseling.
    - One RCT, a positive-quality study, evaluated the effect of six telephone-delivered counseling sessions targeting increased self-efficacy outcome expectancy (Social Learning Theory constructs) in 65 hyperlipidemic patients not adherent to their cholesterol-lowering diet (Burke et al, 2005). The intervention involved goal-setting, self-monitoring, self-reinforcement and verbal persuasion. The intervention group significantly reduced saturated fat and cholesterol intake and had significantly decreased LDL-cholesterol levels relative to the control group. There was no increase in perceived self-efficacy in the intervention group vs. the usual care group. Outcome expectancy significantly increased in the intervention group, but was not correlated to the improvements in dietary adherence or decreased LDL-cholesterol. Despite positive behavioral and clinical outcomes, researchers failed to show a specific relationship between self-efficacy or outcome expectancy and change in behavior.
    - One randomized controlled trial of neutral-quality evaluated a five-week nutrition education (NE) and a nutrition education plus social learning (NE+SL) intervention in 78 patients with type 2 diabetes (Glasgow et al, 1989). In addition to nutrition education, the social learning intervention group received information on goal-setting based on individual barriers to adherence, modeling of strategies used successfully by other individuals with type 2 diabetes and was taught a problem-solving method. This five-week study failed to show a significant advantage of social learning intervention over nutrition education alone. RCTs of longer duration are needed to further explore the effect of social learning theory on diabetes management.
    -

  - Recommendation Strength Rationale

    The six Conclusion Statements from the Nutrition Counseling project in support of this recommendation received:

    - What is the evidence that cognitive-behavioral therapy of short-term duration (less than six months) for weight loss, results in health or food behavior change in adults

counseled in an outpatient or clinic setting? Grade III
- What is the evidence that cognitive behavioral therapy of intermediate duration (six to 12 months) for weight loss results in health or food behavior change in adults counseled in an outpatient or clinic setting? Grade III
- What is the evidence that cognitive-behavioral therapy of long-term duration (more than 12 months) for weight loss, results in health and food behavior change in adults counseled in an outpatient or clinic setting? Grade II
- What is the evidence that nutrition counseling based on the Transtheoretical model results in health or food behavior change in adults counseled in an outpatient or clinic setting? Grade III
- What is the evidence that nutrition counseling, based on social learning theory targeted to reduce cardiovascular disease risk factors results in health or food behavior change in adults counseled in an outpatient or clinic setting? Grade III
- What is the evidence that nutrition counseling based on social learning theory for diabetes management results in health or food behavior change in adults counseled in an outpatient or clinic setting? 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).

  What is the evidence that cognitive-behavioral therapy of short-term duration (< six months) for weight loss, results in health/food behavior change in adults counseled in an outpatient/clinic setting?

  What is the evidence that cognitive behavioral therapy of intermediate duration (six to 12 months) for weight loss results in health or food behavior change in adults counseled in an outpatient or clinic setting?

  What is the evidence that cognitive-behavioral therapy of long-term duration (>12 months) for weight loss, results in health/food behavior change in adults counseled in an outpatient/clinic setting?

  What is the evidence that nutrition counseling based on the Transtheoretical Model results in health or food behavior change in adults counseled in an outpatient or clinic setting?

  What is the evidence that nutrition counseling, based on social learning theory targeted to reduce cardiovascular disease risk factors results in health or food behavior change in adults counseled in an outpatient or clinic setting?

  What is the evidence that nutrition counseling based on social learning theory for diabetes management results in health or food behavior change in adults counseled in an outpatient or clinic setting?

  - References

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    Stahre L, Hallstrom T. A short-term cognitive group treatment program gives substantial weight reduction up to 18 months from the end of treatment. A randomized controlled trial. *Eating Weight Disord.* 2005; 10: 51-58.

    Fuller PR, Perri MG, Leermakers EA, Guyer LK. Effects of a personalized system of skill acquisition and an educational program in the treatment of obesity. *Addictive Behaviors,*1998, 23 (1): 97-100.

    Dornelas EA, Wylie-Rosett J, Swencionis C. The DIET study: long-term outcomes of a cognitive-behavioral weight-control intervention in independent-living elders. Dietary Intervention: Evaluation of Technology. *J Am Diet Assoc.* 1998 Nov; 98 (11): 1,276-1,281.

    Kajaste S, Brander PE, Telakivi T, Partinen M, Mustajoki P. A cognitive-behavioral weight reduction program in the treatment of obstructive sleep apnea syndrome with or without initial nasal CPAP: a randomized study. *Sleep Medicine.* 2004; 5: 125-131.

    Melin I, Karlström B, Lappalainen R, Berglund L, Mohsen R, Vessby B. A program of behavior modification and nutrition counseling in the treatment of obesity: A randomized two-year clinical trial. *Int J Obes Relat Metab Disord.* 2003 Sep; 27 (9): 1,127-1,135.

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    Burke LE, Dunbar-Jacob J, Orchard TJ, Sereika Susan M. Improving adherence to a cholesterol-lowering diet: A behavioral intervention study. *Patient Education and Counseling.* 2005; 57: 134-142.

    Glasgow RE, Toobert DJ, Mitchell DL, Donnelly JE, Calder D, Nutrition Education and Social Learning Interventions for Type II Diabetes. *Diabetes Care.* 1989; 12 (2): 150-152.

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

    Tuah NA, Amiel C, Qureshi S, Car J, Kaur B, Majeed A. Transtheoretical model for dietary and physical exercise modification in weight loss management for overweight and obese adults. *Cochrane Database Syst Rev.* 2011; (10): CD008066.

- Adult Weight Management
- Adult Weight Management (AWM) Guideline (2014)

Quick Links

Recommendations Summary

AWM: Assess Energy Needs 2014

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: Measure Resting Metabolic Rate (RMR)

  If indirect calorimetry is available, the registered dietitian nutritionist (RDN) should use a measured resting metabolic rate to determine energy needs in overweight or obese adults. Measurement of resting metabolic rate using indirect calorimetry is more accurate than estimating resting metabolic rate using predictive equations.

  Rating: Consensus
  Conditional

  AWM: Use Mifflin-St. Jeor Equation to Estimate RMR

If indirect calorimetry is not available, the registered dietitian nutritionist (RDN) should use the Mifflin-St. Jeor equation using actual weight to estimate resting metabolic rate (RMR) in overweight or obese adults. The majority of research reviewed supports the use of the Mifflin-St. Jeor equation (using actual body weight) to predict RMR in overweight or obese adults because it demonstrated good accuracy and correlation with indirect calorimetry.

Rating: Strong
Conditional

AWM: Estimate Total Energy Needs

The registered dietitian nutritionist (RDN) should multiply the resting metabolic rate (RMR, measured or estimated) by one of the following physical activity factors to estimate total energy needs:

- *Sedentary:* 1.0 or more to less than 1.4
- *Low active:* 1.4 or more to less than 1.6
- *Active:* 1.6 or more to less than 1.9
- *Very active:* 1.9 or more to less than 2.5.

The Dietary Reference Intakes (DRI) Physical Activity Levels (PAL) represent the ratio of total energy expenditure to basal energy expenditure and are defined as sedentary, low active, active or very active.

Rating: Consensus
Imperative

- Risks/Harms of Implementing This Recommendation

  None.

- Conditions of Application

  The application of these recommendations depends on the availability of indirect calorimetry.

  Mifflin-St. Jeor Equations

  - *Males:* RMR (kcal per day) = 10 X Weight (kg) + 6.25 X Height (cm) - 5 X age (years) + 5
  - *Females:* RMR (kcal per day) = 10 X Weight (kg) + 6.25 X Height (cm) - 5 X age (years) – 161.

  Dietary Reference Intake (DRI) Physical Activity Levels (PAL)
  - *Sedentary:* Typical daily living activities (e.g., household tasks, walking to the bus)
  - *Low active:* Typical daily living activities plus 30 to 60 minutes of daily moderate activity (e.g., walking at 5km to 7km per hour or 3mph to 4mph)
  - *Active:* Typical daily living activities plus at least 60 minutes of daily moderate activity
  - *Very active:* Typical daily living activities plus at least 60 minutes of daily moderate activity plus an additional 60 minutes of vigorous activity or 120 minutes of moderate activity.

- Potential Costs Associated with Application

  - Costs of medical nutrition therapy (MNT) sessions vary; however, MNT sessions are essential for improved outcomes.
  - If applicable, costs of equipment and staff time with the use of indirect calorimetry may be additional.

- Recommendation Narrative

  - The majority of research reviewed supports the use of the Mifflin-St. Jeor equation (using actual body weight) to predict resting metabolic rate (RMR) in overweight or obese adults because it demonstrated good accuracy and correlation with indirect calorimetry (Scalfi et al, 1993; Frankenfield et al, 2003; St. Jeor et al, 2004; Weijs, 2008; Skouroliakou et al, 2009; Weijs and Vansant, 2010; Ruiz et al, 2011; de Oliveira et al, 2012; Faria et al, 2012)
  - Other equations evaluated did not predict resting metabolic rate as accurately as the Mifflin-St. Jeor equation (Heshka et al, 1993; Scalfi et al, 1993; Siervo et al, 2003; Livingston and Kohlstadt, 2005; Lazzer, Agosti, Resnik et al, 2007; Lazzer, Agosti, Silvestri et al, 2007; Skouroliakou et al, 2009; Spears et al, 2009; Weijs and Vansant, 2010; Horie et al, 2011; Ruiz et al, 2011; de Oliveira et al, 2012).

- Recommendation Strength Rationale

  The Conclusion Statement in support of these recommendations received 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 overweight or obese adults, which predictive equation for estimating resting metabolic rate should be used?

- References

de Oliveira FC, Alves RD, Zuconi CP, Ribeiro AQ, Bressan J. Agreement between different methods and predictive equations for resting energy expenditure in overweight and obese Brazilian men. *J Acad Nutr Diet.* 2012; 112(9): 1,415-1,420.

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Heshka S, Feld K, Yang MU, Allison DB, Heymsfield SB. Resting energy expenditure in the obese: A cross-validation in the obese: A cross-validation and comparison of prediction equations. *J Am Diet Assoc.* 1993; 93 (9): 1,031-1,036.

Horie LM, Gonzalez MC, Torrinhas RS, Cecconello I, Waitzberg DL. New specific equation to estimate resting energy expenditure in severely obese patients. *Obesity (Silver Spring).* 2011; 19(5): 1,090-1,094.

Lazzer S, Agosti F, Silvestri P, Derumeaux-Burel H, Sartorio A. Prediction of resting energy expenditure in severely obese Italian women. *J Endocrinol Invest.* 2007; 30 (1): 20-27.

Lazzer S, Agosti F, Resnik M, Marazzi N, Mornati D, Sartorio A. Prediction of resting energy expenditure in severely obese Italian males. *J Endocrinol Invest.* 2007; 30 (9): 754-761.

Livingston EH, Kohlstadt I. Simplified resting metabolic rate - predicting formulas for normal-sized and obese individuals. *Obes Res.* 2005; 13 (7): 1,255-1,262.

Ruiz JR, Ortega FB, Rodriguez G, Alkorta P, Labayen I. Validity of resting energy expenditure predictive equations before and after an energy-restricted diet intervention in obese women. *PLoS One.* 2011; 6(9): e23759.

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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.

Skouroliakou M, Giannopoulou I, Kostara C, Vasilopoulou M. Comparison of predictive equations for resting metabolic rate in obese psychiatric patients taking olanzapine. *Nutrition.* 2009; 25(2): 188-193.

Spears KE, Kim H, Behall KM, Conway JM. Hand-held indirect calorimeter offers advantages compared with prediction equations, in a group of overweight women, to determine resting energy expenditures and estimated total energy expenditures during research screening. *J Am Diet Assoc* 2009; 109 (5): 836-845.

St. Jeor ST, Cutter GR, Perumean-Chaney SE, Hall SJ, Herzog H, Bovee V. The practical use of charts to estimate resting energy expenditure in adults. *Topics in Clinical Nutrition* 2003;19:51-56.

Weijs PJ. Validity of predictive equations for resting energy expenditure in US and Dutch overweight and obese class I and II adults aged 18-65 years. *Am J Clin Nutr.* 2008; 88(4): 959-970.

Weijs PJ, Vansant GA. Validity of predictive equations for resting energy expenditure in Belgian normal weight to morbid obese women. *Clin Nutr.* 2010; 29(3): 347-351.

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

Ainsworth BE, Haskell WL, Herrmann SD, Meckes N, Bassett DR Jr, Tudor-Locke C, Greer JL, Vezina J, Whitt-Glover MC, Leon AS. 2011 Compendium of Physical Activities: A second update of codes and MET values. *Med Sci Sports Exerc.* 2011; 43(8): 1, 575-1, 581.

Otten JJ, Hellwig JP, Meyers LD, editors. Institute of Medicine/National Academy of Sciences. *Dietary DRI Reference Intakes: The Essential Guide to Nutrient Requirements, 2006.* Accessed at http://www.nal.usda.gov/fnic/DRI/Essential_Guide/DRIEssentialGuideNutReq.pdf.

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- Adult Weight Management
- Adult Weight Management (AWM) Guideline (2014)

Quick Links

Recommendations Summary

AWM: Assess Energy Intake and Nutrient Content of the Diet 2014

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: Assess Energy Intake and Nutrient Content of the Diet

The registered dietitian nutritionist (RDN) should assess the energy intake and nutrient content of the diet. Any nutrient inadequacy and the nutrients affected are dependent on the composition of the diet followed, as well as on the nutritional needs of the individual.

Rating: Strong
Imperative

- Risks/Harms of Implementing This Recommendation

None.

- Conditions of Application

Energy intake and nutrient content may be assessed through the use of one of the following tools, for example:

  - Three-day, four-day or seven-day food records (including weekdays and weekend days)
  - Food frequency questionnaires
  - 24-hour dietary recalls
  - Typical daily dietary intake.

- Potential Costs Associated with Application

Costs of medical nutrition therapy (MNT) sessions vary, however MNT sessions are essential for improved outcomes.

- Recommendation Narrative

  - Several studies report changes in nutrient adequacy with caloric restriction, however the extent of nutrient inadequacy and the nutrients affected are dependent on the composition of the diet followed, as well as on the nutritional needs of the individual (Ma et al, 2007; Truby et al, 2008)
  - Limited research reports reductions in nutrient adequacy with weight loss through an energy restriction of at least 500kcal per day or daily consumption below 1, 200kcal per day (Ashley et al, 2007; Noakes et al, 2004; Gardner et al, 2010)
  - Additional long-term studies in this area are needed.

- Recommendation Strength Rationale

The Conclusion Statement in support of this recommendation received Grade II.

- 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).

What is the relationship between nutrient adequacy and caloric restriction (assuming a food-based diet without vitamin or mineral supplementation)?

- References

Ashley JM, Herzog H, Clodfelter S, Bovee V, Schrage J, Pritsos C. Nutrient adequacy during weight loss interventions: A randomized study in women comparing the dietary intake in a meal replacement group with a traditional food group. *Nutrition Journal* 2007; 6: 12.

Gardner CD, Kim S, Bersamin A, Dopler-Nelson M, Otten J, Oelrich B, Cherin R. Micronutrient quality of weight-loss diets that focus on macronutrients: results from the A TO Z study. *Am J Clin Nutr.* 2010; 92 (2): 304-312.

Ma Y, Pagoto SL, Griffith JA, Merriam PA, Ockene IS, Hafner AR, Olendzki BC. A dietary quality comparison of popular weight-loss plans. *J Am Diet Assoc.* 2007; 107 (10): 1,786-

1,791.

Noakes M, Foster PR, Keogh JB, Clifton PM. Meal replacements are as effective as structured weight-loss diets for treating obesity in adults with features of metabolic syndrome. J Nutr 2004; 134(8): 1894-1899.

Truby H, Hiscutt R, Herriot AM, Stanley M, Delooy A, Fox KR, Baic S, Robson PJ, Macdonald I, Taylor MA, Ware R, Logan C, Livingstone M. Commercial weight loss diets meet nutrient requirements in free living adults over 8 weeks: a randomised controlled weight loss trial. *Nutr J.* 2008; 7: 25.

- Adult Weight Management
- Adult Weight Management (AWM) Guideline (2014)

Quick Links

Recommendations Summary

AWM: Realistic Weight Goal Setting 2014

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 Goal Setting

  The registered dietitian nutritionist (RDN) should collaborate with the individual regarding a realistic weight loss goal, such as one of the following:

  - Up to two pounds per week
  - Up to 10% of baseline body weight
  - A total of 3% to 5% of baseline body weight if cardiovascular risk factors (hypertension, hyperlipidemia and hyperglycemia) are present.

  Studies regarding the effectiveness of medical nutrition therapy (MNT) for under six months reported significant weight losses of approximately one to two pounds per week, and six to 12 months of MNT resulted in significant mean weight losses of up to 10% of body weight. While a sustained weight loss of 3% to 5% is likely to result in clinically meaningful reductions in triglycerides, blood glucose, HbA1c, and the risk of developing type 2 diabetes, greater amounts of weight loss will also reduce blood pressure, improve LDL-C and HDL-C, and reduce the need for medications.

  Rating: Strong
  Imperative

  - Risks/Harms of Implementing This Recommendation

    None.

  - Conditions of Application

    None.

  - Potential Costs Associated with Application

    Costs of medical nutrition therapy (MNT) sessions vary; however, MNT sessions are essential for improved outcomes.

  - Recommendation Narrative

    Recommendation Narrative from MNT Effectiveness

    - Medical nutrition therapy (MNT) provided by a registered dietitian nutritionist (RDN) results in both statistically and clinically significant weight loss in otherwise healthy overweight and obese adults
    - Four studies regarding the effectiveness of medical nutrition therapy for under six months reported significant weight losses of approximately one to two pounds per week (Holm et al, 1983; Richardson et al, 2005; Schneider et al, 2005; Raatz et al, 2008)
    - Four studies regarding the effectiveness of MNT from six to 12 months reported significant mean weight losses of up to 10% of body weight (Eilat-Adar et al, 2005; Feigenbaum et al, 2005; Dengel et al, 2006; Digenio et al, 2009)
    - Four studies report maintenance of this weight loss beyond one year. In these studies, both individual and group sessions were employed with weekly and monthly sessions (Melin et al, 2003; Willaing et al, 2004; Ashley et al, 2007; Sacks et al, 2009).

    From AHA/ACC/TOS Guideline for the Management of Overweight and Obesity in Adults (2013)

    Matching Treatment Benefits with Risk Profiles (Reduction in Body Weight Effect on CVD Risk Factors, Events, Morbidity and Mortality)

    - Counsel overweight and obese adults with CV risk factors (high BP, hyperlipidemia and hyperglycemia) that lifestyle changes that produce even modest, sustained weight loss of 3% to 5% produce clinically meaningful health benefits, and greater weight loss produces greater benefits:
      - Sustained weight loss of 3% to 5% is likely to result in clinically meaningful reductions in triglycerides, blood glucose, HbA1C and the risk of developing type 2 diabetes
      - Greater amounts of weight loss will reduce BP, improve LDL-C and HDL-C, and reduce the need for medications to control BP, blood glucose and lipids, as well as further reduce triglycerides and blood glucose.
    - NHLBI Grade A (Strong). ACC/AHA Level of Evidence Grade A.

  - Recommendation Strength Rationale

    - Recommendation strength rationale from MNT effectiveness: Conclusion statement in support of the recommendation received Grade I
    - ACC/AHA/TOS recommendation given NHLBI Grade A (Strong), ACC/AHA Level of Evidence Grade A. Recommendation Two was based on Critical Question One, which analyzed systematic reviews and meta-analyses; the literature search included those published from January 2000 to October 2011.

  - 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).

  What is the evidence to support effectiveness of MNT provided by a Registered Dietitian for overweight/obesity in otherwise healthy adults?

  - References

    Ashley JM, Herzog H, Clodfelter S, Bovee V, Schrage J, Pritsos C. Nutrient adequacy during weight loss interventions: A randomized study in women comparing the dietary intake in a meal replacement group with a traditional food group. *Nutrition Journal* 2007; 6: 12.

    Dengel DR, Kelly AS, Olson TP, Kaiser DR, Dengel JL, Bank AJ. Effects of weight loss on insulin sensitivity and arterial stiffness in overweight adults. *Metabolism* 2006; 55: 907-

911.

Digenio AG, Mancuso JP, Gerber RA, Dvorak RV. Comparison of methods for delivering a lifestyle modification program for obese patients: A randomized trial. *Ann Intern Med* 2009; 150 (4): 255-262.

Eilat-Adar S, Eldar M, Goldbourt U. Association of intentional changes in body weight with coronary heart disease event rates in overweight subjects who have an additional coronary risk factor. *Am J Epidemiol* 2005; 161: 352-358.

Feigenbaum A, Pasternak S, Zusk E, Sarid M, Vinker S. Influence of intense multidisciplinary follow-up and orlistat on weight reduction in a primary care setting. *BMC Fam Pract.* 2005; 6(1): 5.

Holm RP, Taussig MT, Carlton E. Behavioral modification in a weight-reduction program. *J Am Diet Assoc.* 1983; 83(2): 170-174.

Melin I, Karlstrom B, Lappalainen R, Berglund L, Mohsen R, Vessby B. A programme of behaviour modification and nutrition counselling in the treatment of obesity: a randomized 2-y clinical trial. *Int J Obesity* 2003;27:1127-1135.

Raatz SK, Wimmer JK, Kwong CA and Shalamar DS. Intensive diet instruction by registered dietitians improves weight-loss success. *J Am Diet Assoc.* 2008; 108 (1): 110-113.

Richardson CR, Brown BB, Foley S, Dial KS, Lowery JC. Feasibility of adding enhanced pedometer feedback to nutritional counseling for weight loss. *J Med Internet Res.* 2005; 7 (5): e56.

Sacks FM, Bray GA, Carey VJ, Smith SR, Ryan DH, Anton SD, McManus K, Champagne CM, Bishop LM, Laranjo N, Leboff MS, Rood JC, de Jonge L, Greenway FL, Loria CM, Obarzanek E, Williamson DA. Comparison of weight-loss diets with different compositions of fat, protein, and carbohydrates. *N Engl J Med.* 2009; 360 (9): 859-873.

Schneider R, Golzman B, Turkot S, Kogan J, Oren S. Effect of weight loss on blood pressure, arterial compliance, and insulin resistance in normotensive obese subjects. *Am J Med Sci.* 2005; 330(4): 157-160.

Willaing I, Ladelund S, Jorgensen T, Simonsen T, Nielsen LM. Nutritional counselling in primary health care: a randomized comparison of an intervention by general practitioner or dietician. *European Journal of Cardiovascular Prevention and Rehabilitation*, 2004; 11: 513-520.

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

  Jensen MD, Ryan DH, Apovian CM, Loria CM, Ard JD, Millen BE, Comuzzie AG, Nonas CA, Donato KA, Pi-Sunyer FX, Hu FB, Stevens J, Hubbard VS, Stevens VJ, Jakicic JM, Wadden TA, Kushner RF, Wolfe BM, Yanovski SZ. 2013 AHA/ACC/TOS Guideline for the management of overweight and obesity in adults. *J Am Coll Cardiol.* 2014 Jul 1; 63(25 Pt B): 2, 985-3, 023.

- Adult Weight Management
- Adult Weight Management (AWM) Guideline (2014)

Recommendations Summary

AWM: Components of a Comprehensive Weight Management Program 2014

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: Components of a Comprehensive Weight Management Program

  For weight loss and weight maintenance, the registered dietitian nutritionist (RDN) should include the following components as part of a comprehensive weight management program:

  - Reduced calorie diet
  - Increasing physical activity
  - Use of behavioral strategies.

  Adequate evidence indicates that intensive, multi-component behavioral interventions for overweight and obese adults can lead to weight loss as well as improved glucose tolerance and other physiologic risk factors for cardiovascular disease.

  Rating: Strong
  Imperative

  - Risks/Harms of Implementing This Recommendation

    Adequate evidence indicates that the harm of screening and behavioral interventions for obesity is small. Possible harm of behavioral weight-loss interventions include:

    - Decreased bone mineral density and increased fracture risk
    - Serious injuries resulting from increased physical activity
    - Increased risk for eating disorders.

  - Conditions of Application

    None.

  - Potential Costs Associated with Application

    Costs of medical nutrition therapy (MNT) sessions vary; however, MNT sessions are essential for improved outcomes.

  - Recommendation Narrative

    From Screening for Obesity in Adults (2012)

    - The United States Preventive Services Task Force (USPSTF) recommends screening all adults for obesity. Clinicians should offer or refer patients with a body mass index (BMI) of 30 kg/m^2 or higher to intensive, multi-component behavioral interventions.
    - Intensive, multi-component behavioral interventions for obese adults include the following components:
      - Behavioral management activities such as setting weight-loss goals
      - Improving diet or nutrition and increasing physical activity
      - Addressing barriers to change
      - Self-monitoring
      - Strategizing how to maintain lifestyle changes.

    From Behavioral Counseling in Primary Care to Promote a Healthy Diet (2003)

    The USPSTF recommends intensive behavioral dietary counseling for adult patients with hyperlipidemia and other known risk factors for cardiovascular and diet-related chronic disease. Intensive counseling can be delivered by primary care clinicians or by referral to other specialists such as nutritionists or dietitians.

From AHA/ACC/TOS Guideline for the Management of Overweight and Obesity in Adults (2013)

- Lifestyle Intervention and Counseling (Comprehensive Lifestyle Intervention):
  - 4a. Advise overweight and obese individuals who would benefit from weight loss to participate for six or more months in a comprehensive lifestyle program that assists participants in adhering to a lower calorie diet and in increasing physical activity through the use of behavioral strategies. NHLBI Grade A (Strong); ACC/AHA Level of Evidence Grade A.
  - 4b. Prescribe onsite, high-intensity (i.e., 14 or more sessions in six months) comprehensive weight loss interventions provided in individual or group sessions by a trained interventionist. NHLBI Grade A (Strong); ACC/AHA Level of Evidence Grade A.
  - 4f. Advise overweight and obese individuals who have lost weight to participate long-term (more than one year) in a comprehensive weight loss maintenance program. NHLBI Grade A (Strong); ACC/AHA Level of Evidence Grade A.
  - 4g. For weight loss maintenance, prescribe face-to-face or telephone-delivered weight loss maintenance programs that provide regular contact (monthly or more frequent) with a trained interventionist who helps participants engage in high levels of physical activity (i.e., 200 to 300 minutes per week), monitor body weight regularly (i.e., weekly or more frequent) and consume a reduced-calorie diet (needed to maintain lower body weight). NHLBI Grade A (Strong); ACC/AHA Level of Evidence Grade A.

- Recommendation Strength Rationale

  - The ADA Adult Weight Management Work Group concurs with the references cited
  - United States Preventive Services Task Force recommendations both are given Grade B
  - ACC/AHA/TOS recommendations all given NHLBI Grade A (Strong), ACC/AHA Level of Evidence Grade A. Recommendations 4a, 4b, 4f and 4g were based on Critical Question 4, which analyzed systematic reviews and meta-analyses (the literature search included those published from January 2000 to October 2011) and added major RCTs published after 2009 with greater than 100 people per treatment arm.

- 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

  Jensen MD, Ryan DH, Apovian CM, Loria CM, Ard JD, Millen BE, Comuzzie AG, Nonas CA, Donato KA, Pi-Sunyer FX, Hu FB, Stevens J, Hubbard VS, Stevens VJ, Jakicic JM, Wadden TA, Kushner RF, Wolfe BM, Yanovski SZ. 2013 AHA/ACC/TOS Guideline for the management of overweight and obesity in adults. *J Am Coll Cardiol.* 2014; 63(25 Pt B): 2, 985-3, 023.

  United States Preventive Services Task Force. Screening for and management of obesity in adults. Release date: June 2012. Accessible at: http://www.uspreventiveservicestaskforce.org/uspstf/uspsobes.htm.

  United States Preventive Services Task Force. Behavioral counseling in primary care to promote a healthy diet: recommendations and rationale. *Am J Prev Med.* 2003 Jan; 24(1): 93-100.

- Adult Weight Management
- Adult Weight Management (AWM) Guideline (2014)

Quick Links

Recommendations Summary

AWM: Caloric Reduction and Nutrient Adequacy 2014

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: Achieve Nutrient Adequacy During Weight Loss

  During weight loss, the registered dietitian nutritionist (RDN) should prescribe an individualized diet, including patient preferences and health status, to achieve and maintain nutrient adequacy and reduce caloric intake, based on one of the following caloric reduction strategies:

  - 1, 200kcal to 1, 500kcal per day for women and 1, 500kcal to 1, 800kcal per day for men (kcal levels are usually adjusted for the individual's body weight)
  - Energy deficit of approximately 500kcal per day or 750kcal per day
  - One of the evidence-based diets that restricts certain food types (such as high-carbohydrate foods, low-fiber foods, or high-fat foods) in order to create an energy deficit by reduced food intake.

  Several studies report changes in nutrient adequacy with caloric restriction, however the extent of nutrient inadequacy and the nutrients affected are dependent on the composition of the diet followed, as well as on the nutritional needs of the individual. Limited research reports reductions in nutrient adequacy with weight loss through an energy restriction of at least 500kcal per day or daily consumption below 1, 200kcal per day.

  Rating: Strong
  Imperative

  AWM: Maintain Nutrient Adequacy during Weight Maintenance

  During weight maintenance, the RDN should prescribe an individualized diet (including patient preferences and health status) to maintain nutrient adequacy and reduce caloric intake for maintaining a lower body weight. Several studies report changes in nutrient adequacy with caloric restriction, however the extent of nutrient inadequacy and the nutrients affected are dependent on the composition of the diet followed, as well as on the nutritional needs of the individual. Limited research reports reductions in nutrient adequacy with weight loss through an energy restriction of at least 500kcal per day or daily consumption below 1, 200kcal per day.

  Rating: Strong
  Imperative

  - Risks/Harms of Implementing This Recommendation

    None.

  - Conditions of Application

    The RDN should consider patient preferences, health status, medications, socioeconomic status and individual factors (such as age, sex, actual body weight) when individualizing the diet. Strategies to achieve nutrient adequacy may include:

    - Consider including a variety of foods

- Consider a vitamin and mineral supplement when appropriate
- Consider increasing physical activity rather than further caloric restriction
- Consider extending the weight loss timeframe to reach goal weight.

- Potential Costs Associated with Application

  Costs of medical nutrition therapy (MNT) sessions vary, however MNT sessions are essential for improved outcomes.

- Recommendation Narrative

  - Several studies report changes in nutrient adequacy with caloric restriction, however the extent of nutrient inadequacy and the nutrients affected are dependent on the composition of the diet followed, as well as on the nutritional needs of the individual (Ma et al, 2007; Truby et al, 2008)
  - Limited research reports reductions in nutrient adequacy with weight loss through an energy restriction of at least 500kcal per day or daily consumption below 1, 200kcal per day (Ashley et al, 2007; Noakes et al, 2004; Gardner et al, 2010)
  - Additional long-term studies in this area are needed.

  From AHA/ACC/TOS Guideline For the Management of Overweight and Obesity in Adults (2013)

  - Diets for weight loss (dietary strategies for weight loss)
    - 3a. Prescribe a diet to achieve reduced calorie intake for obese or overweight individuals who would benefit from weight loss as part of a comprehensive lifestyle intervention. Any one of the following methods can be used to reduce food and calorie intake
      - a. Prescribe 1, 200kcal to 1, 500kcal per day for women and 1, 500kcal to 1, 800kcal per day for men (kcal levels are usually adjusted for the individual's body weight)
      - b. Prescribe 500kcal per day or 750kcal per day energy deficit
      - c. Prescribe one of the evidence-based diets that restricts certain food types (such as high-carbohydrate foods, low-fiber foods, or high-fat foods) in order to create an energy deficit by reduced food intake.
      - NHLBI Grade A (Strong). ACC/AHA Level of Evidence, Grade A.
    - 3b. Prescribe a calorie-restricted diet, for obese and overweight individuals who would benefit from weight loss, based on the patient's preferences and health status and preferably refer to a nutrition professional for counseling. A variety of dietary approaches can produce weight loss in overweight and obese adults, as presented in CQ3, ES2. NHLBI Grade A (Strong). ACC/AHA Level of Evidence, Grade A.
  - Lifestyle Intervention and Counseling (Comprehensive Lifestyle Intervention)
    - 4d. Some commercial-based programs that provide a comprehensive lifestyle intervention can be prescribed as an option for weight loss, provided there is peer-reviewed published evidence of their safety and efficacy. NHLBI Grade B (Moderate). ACC/AHA Level of Evidence, Grade A.
    - 4e. Use a very-low-calorie-diet (defined as less than 800kcal per day) only in limited circumstances and only when provided by trained practitioners in a medical care setting where medical monitoring and high-intensity lifestyle intervention can be provided. Medical supervision is required because of the rapid rate of weight loss and potential for health complications. NHLBI Grade A (Strong). ACC/AHA Level of Evidence, Grade A.
    - 4g. For weight loss maintenance, prescribe face-to-face or telephone-delivered weight loss maintenance programs that provide regular contact (monthly or more frequent) with a trained interventionist who helps participants engage in high levels of physical activity (i.e., 200 to 300 minutes per week), monitor body weight regularly (i.e., weekly or more frequent) and consume a reduced-calorie diet (needed to maintain lower body weight). NHLBI Grade A (Strong). ACC/AHA Level of Evidence, Grade A.

- Recommendation Strength Rationale

  - The Conclusion Statement in support of this recommendation received *Grade II*
  - ACC/AHA/TOS recommendations either given NHLBI Grade A (Strong) or Grade B (Moderate), ACC/AHA Level of Evidence Grade A. Recommendations 3a, 3b, 4d, 4e and 4g were based on Critical Questions 3 and 4, which analyzed systematic reviews and meta-analyses (the literature search included those published from January 2000 to October 2011) and added major RCTs published after 2009 with greater than 100 people per treatment arm.

- 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).

  What is the relationship between nutrient adequacy and caloric restriction (assuming a food-based diet without vitamin or mineral supplementation)?

  - References

    Ashley JM, Herzog H, Clodfelter S, Bovee V, Schrage J, Pritsos C. Nutrient adequacy during weight loss interventions: A randomized study in women comparing the dietary intake in a meal replacement group with a traditional food group. *Nutrition Journal* 2007; 6: 12.

    Gardner CD, Kim S, Bersamin A, Dopler-Nelson M, Otten J, Oelrich B, Cherin R. Micronutrient quality of weight-loss diets that focus on macronutrients: results from the A TO Z study. *Am J Clin Nutr.* 2010; 92 (2): 304-312.

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- Adult Weight Management
- Adult Weight Management (AWM) Guideline (2014)

Recommendations Summary

AWM: Dietary Approaches for Caloric Reduction 2014

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: Dietary Approaches for Caloric Reduction in Weight Loss

For weight loss, the registered dietitian nutritionist (RDN) should advise overweight or obese adults that as long as the target reduction in calorie level is achieved, many different dietary approaches are effective. There is strong and consistent evidence that when calorie intake is controlled, macronutrient proportion, glycemic index and glycemic load of the diet are not related to losing weight.

Rating: Strong
Imperative

AWM: Dietary Approaches for Caloric Reduction in Weight Maintenance

For weight maintenance, the registered dietitian nutritionist (RDN) should advise overweight and obese adults that as long as the target reduction in calorie level is achieved, many different dietary approaches are effective. A moderate body of evidence provides no data to suggest that any one macronutrient is more effective than any other for avoiding weight re-gain in weight-reduced persons. Strong and consistent evidence shows that glycemic index and glycemic load are not associated with body weight and do not lead to better weight maintenance.

Rating: Strong
Imperative

- Risks/Harms of Implementing This Recommendation

  None.

- Conditions of Application

  Several dietary approaches were shown to be effective for weight loss, however the nutrient adequacy of these diets was not evaluated:

  - Dietary patterns that are low in dietary energy density
  - Dietary Reference Intakes (DRI): 20% to 35% of calories from fat, 45% to 65% of calories from carbohydrate and 10% to 35% of calories from protein
  - European Association for the Study of Diabetes Guidelines, which focuses on targeting food groups, rather than the formal prescribed energy restriction while still achieving an energy deficit
  - Higher protein: 25% of total calories from protein, 30% of total calories from fat, 45% of total calories from carbohydrate; with provision of foods that realized energy deficit
  - Higher protein Zone™-type diet (five meals per day, each with 40% of total calories from carbohydrate, 30% of total calories from protein, 30% of total calories from fat) without formal prescribed energy restriction but realized energy deficit
  - Ovolactovegetarian-style diet with prescribed energy restriction
  - Low-calorie diet with prescribed energy restriction
  - Low-carbohydrate (initially less than 20g per day carbohydrate) diet without formal prescribed energy restriction but realized energy deficit
  - Low-fat (10% to 25% of total calories from fat) vegan style diet without formal prescribed energy restriction but realized energy deficit
  - Low-fat (20% of total calories from fat) diet without formal prescribed energy restriction but realized energy deficit
  - Low-glycemic load diet, either with formal prescribed energy restriction or without formal prescribed energy prescription but with realized energy deficit
  - Lower fat (less than 30% fat), high dairy (four servings per day) diets with or without increased fiber and low-glycemic index or load foods (low-glycemic load) with prescribed energy restriction
  - Macronutrient-targeted diets (15% or 25% of total calories from protein; 20% or 40% of total calories from fat; 35%, 45%, 55% or 65% of total calories from carbohydrate) with prescribed energy restriction
  - Mediterranean-style diet with prescribed energy restriction
  - Moderate protein (12% of total calories from protein, 58% of total calories from carbohydrate, 30% of total calories from fat) with provision of foods that realized energy deficit
  - Provision of high-glycemic load or low-glycemic load meals with prescribed energy restriction
  - The AHA-style Step 1 diet (with prescribed energy restriction of 1, 500kcal to 1, 800kcal per day; less than 30% of total calories from fat; less than 10% of total calories from saturated fat).

- Potential Costs Associated with Application

  Costs of medical nutrition therapy (MNT) sessions vary, however MNT sessions are essential for improved outcomes.

- Recommendation Narrative

  From AHA/ACC/TOS Guideline for the Management of Overweight and Obesity in Adults (2013)

  Diets for Weight Loss (Dietary Strategies for Weight Loss)
  - 3a. Prescribe a diet to achieve reduced calorie intake for obese or overweight individuals who would benefit from weight loss, as part of a comprehensive lifestyle intervention. Any one of the following methods can be used to reduce food and calorie intake:
    - Prescribe 1, 200kcal to 1, 500kcal per day for women and 1, 500kcal to 1, 800kcal per day for men (kcal levels are usually adjusted for the individual's body weight)
    - Prescribe a 500-kcal-per-day or 750-kcal-per-day energy deficit
    - Prescribe one of the evidence-based diets that restricts certain food types (such as high-carbohydrate foods, low-fiber foods or high-fat foods) in order to create an energy deficit by reduced food intake.
  - NHLBI Grade A (Strong). ACC/AHA Level of Evidence Grade A.

  From the 2010 Dietary Guidelines Advisory Committee (DGAC) Nutrition Evidence Library (NEL) Evidence-Based Systematic Reviews

  - What is the optimal proportion of dietary fat, carbohydrate and protein to lose weight if overweight and obese?
    - There is strong and consistent evidence that when calorie intake is controlled, macronutrient proportion of the diet is not related to losing weight.
  - What is the optimal proportion of dietary fat, carbohydrate and protein to avoid regain in weight-reduced persons?
    - A moderate body of evidence provides no data to suggest that any one macronutrient is more effective than any other for avoiding weight regain in weight-reduced persons.
  - Are low-carbohydrate (less than 45%) hypocaloric diets safe and effective for long-term (more than six months) weight loss or maintenance?
    - A moderate body of evidence demonstrates that diets with less than 45% of calories as carbohydrates are not more successful for long-term weight loss (12 months). There is also some evidence that they may be less safe. In shorter-term studies, low-calorie, high-protein diets may result in greater weight loss, but these differences are not sustained over time.
  - Are high-protein (more than 35%) hypocaloric diets safe and effective for long-term (more than six months) weight loss or maintenance?
    - A moderate amount of evidence demonstrates that intake of dietary patterns with less than 45% calories from carbohydrate or more than 35% calories from protein are not more effective than other diets for weight loss or weight maintenance, are difficult to maintain over the long-term and may be less safe.
  - Is energy density associated with weight loss and weight maintenance in adults (NEL)?
    - Strong and consistent evidence indicates that dietary patterns that are relatively low in energy density improve weight loss and weight maintenance among adults.
  - What is the relationship between glycemic index or glycemic load and body weight?
    - Strong and consistent evidence shows that glycemic index and glycemic load are not associated with body weight and do not lead to greater weight loss or better weight maintenance.

- Recommendation Strength Rationale

  - The four conclusion statements for Energy Balance and Weight Management, Macronutrient Proportion in support of this recommendation received grades of *strong* and *moderate*
  - The conclusion statement for Energy Balance and Weight Management, Energy Density in support of this recommendation received a grade of *strong*
  - The conclusion statement for Carbohydrates, Glycemic Index/Load in support of this recommendation received a grade of *strong*
  - ACC/AHA/TOS recommendations either given NHLBI Grade A (strong) or Grade B (moderate), ACC/AHA Level of Evidence Grade A. Recommendation 3a was based on Critical Question Three, which analyzed systematic reviews and meta-analyses (the literature search included those published from January 2000 to October 2011) and added major RCTs published after 2009 with greater than 100 people per treatment arm.

- 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

    - 2010 Dietary Guidelines Advisory Committee (DGAC) Nutrition Evidence Library (NEL) Evidence-Based Systematic Reviews. Available at http://www.nutritionevidencelibrary.gov/category.cfm?cid=21.
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- Adult Weight Management
- Adult Weight Management (AWM) Guideline (2014)

Quick Links

Recommendations Summary

AWM: Eating Frequency and Meal Patterns 2014

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 Meal Patterns for Weight Loss and Weight Maintenance

  For weight loss and weight maintenance, the registered dietitian nutritionist (RDN) should individualize the meal pattern to distribute calories at meals and snacks throughout the day, including breakfast. Research reports inconsistent results regarding the association between eating frequency and body weight, which may be due to the role of portion size, energy density or compensation of energy intake at subsequent eating occasions. The majority of observational research reported that breakfast consumption is associated with a lower BMI and decreased obesity risk, while omitting breakfast is associated with a higher BMI and increased obesity risk. Several studies suggest that cereal-based breakfasts are associated with lower BMI, while breakfasts that are very high in energy are associated with higher BMI.

  Rating: Fair
  Imperative

  - Risks/Harms of Implementing This Recommendation

    None.

  - Conditions of Application

    None.

  - Potential Costs Associated with Application

    Costs of medical nutrition therapy (MNT) sessions vary; however, MNT sessions are essential for improved outcomes.

  - Recommendation Narrative

    From the Adult Weight Management Project

    - Research reports inconsistent results regarding the association between eating frequency and body weight (Basdevant et al, 1993; Kant et al, 1995; Ma et al, 2003; Forslund et al, 2005; Kant and Graubard, 2006; Howarth et al, 2007; Keski-Rahkonen et al, 2007; Nonino-Borges et al, 2007; Piexoto Mdo et al, 2007; Uchigata et al, 2007; Whybrow et al, 2007; Carels et al, 2008; Marin-Guerrero et al, 2008; Kent and Worsley, 2009; Zaveri and Drummond, 2009; Al-Rethaiaa et al, 2010; Bes-Rastrollo et al, 2010; Holmback et al, 2010; Schusdziarra et al, 2010). This may be due to the role of portion size, energy density or compensation of energy intake at subsequent eating occasions. In addition, the majority of observational research reports an association between higher evening energy intake and increased body weight (Andersson and Rossner, 1996; Summerbell et al, 1996; Forslund et al, 2002; de Zwaan et al, 2006; Morse et al, 2006; Gluck et al, 2008; Berg et al, 2009; Tholin et al, 2009; Lundgren et al, 2010). However, this has not been confirmed in a limited number of intervention studies (Keim et al, 1997; Vander Wal et al, 2006). Further intervention studies are needed on the distribution of calories consumed at meals and snacks throughout the day and its effect on body weight.
    - The majority of observational research reported that breakfast consumption is associated with a lower BMI and decreased obesity risk, while omitting breakfast is associated with a higher BMI and increased obesity risk (Cho et al, 2003; Ma et al, 2003; Song et al, 2005; Crossman et al, 2006; Malinauskas et al, 2006; Niemeier et al, 2006; van der Heijden et al, 2007; Kant et al, 2008; Marin-Guerrero et al, 2008; Raynor et al, 2008; Berg et al, 2009; Grujic et al, 2009; Merten et al, 2009; Huang et al, 2010; Perusse-Lachance et al, 2010). Several studies suggest that cereal-based breakfasts are associated with lower BMI (Wyatt et al, 2002; Bazzano et al, 2005; Song et al, 2005), while breakfasts that are very high in energy are associated with higher BMI (Martin et al, 2000; Cho et al, 2003; Kant et al, 2008; Kent and Worsley, 2009). Further research is needed on the relative energy contribution and composition of breakfast.

    From the 2010 Dietary Guidelines Advisory Committee (DGAC) Nutrition Evidence Library (NEL) Evidence-Based Systematic Reviews

    - What is the relationship between breakfast and body weight?
      - Moderate evidence suggests that children who do not eat breakfast are at increased risk of overweight and obesity. The evidence is stronger for adolescents. There is inconsistent evidence that adults who skip breakfast are at increased risk for overweight and obesity.
    - What is the relationship between snacking and body weight?
      - Limited and inconsistent evidence suggests that snacking is associated with increased body weight.
    - What is the relationship between eating frequency and body weight?
      - Evidence is insufficient to determine whether frequency of eating has an effect on overweight and obesity in children and adults.

  - Recommendation Strength Rationale

    The Conclusion Statements from the Adult Weight Management project in support of this recommendation received:

    - What is the relationship between eating frequency and weight change (weight loss, weight gain and weight maintenance)? Grade II.
    - What is the relationship between breakfast consumption and weight change (weight loss, weight gain and weight maintenance)? Grade II.

    The three Conclusion Statements for Energy Balance and Weight Management, Food Environment and Dietary Behaviors in support of this recommendation received grades of Moderate and Limited.

  - 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).

What is the relationship between eating frequency and weight change (weight loss, weight gain and/or weight maintenance)?

What is the relationship between breakfast consumption and weight change (weight loss, weight gain and/or weight maintenance)?

- References

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- Adult Weight Management
- Adult Weight Management (AWM) Guideline (2014)

Quick Links

Recommendations Summary

AWM: Portion Control and Meal Replacements/Structured Meal Plans 2014

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 and Meal Replacements/Structured Meal Plans

  For weight loss and weight maintenance, the registered dietitian nutritionist (RDN) should recommend portion control and meal replacements or structured meal plans as part of a comprehensive weight management program. Strong evidence documents a positive relationship between portion size and body weight and research reports that the use of various types of meal replacements or structured meal plans was helpful in achieving health and food behavior change.

  Rating: Strong
  Imperative

  - Risks/Harms of Implementing This Recommendation

    None.

  - Conditions of Application

    None.

  - Potential Costs Associated with Application

    Costs of medical nutrition therapy (MNT) sessions vary, however MNT sessions are essential for improved outcomes.

  - Recommendation Narrative

    From the Nutrition Counseling Project

    Four RCT studies (three positive-quality and one neutral-quality) assessed the efficacy of various types of meal replacement or structured meal plan strategies, as compared to self-selected diets in middle aged-adults and found the use of various types of meal replacements or structured meal plans helpful in achieving health and food behavior change in middle-aged adults (Wing et al, 1996; Metz et al, 1997; Ditschuneit et al, 1999; Flechter-Mors et al, 2000; Ashley et al, 2001; Ditschuneit and Flechter-Mors, 2001). Additional research is needed to determine if benefits derived from temporary use of these behavioral strategies can be sustained over time.

    From the 2010 Dietary Guidelines Advisory Committee (DGAC) Nutrition Evidence Library (NEL) Evidence-Based Systematic Reviews

    What is the relationship between portion size and body weight?
    - Strong evidence documents a positive relationship between portion size and body weight.

  - Recommendation Strength Rationale

    The Conclusion Statement from the Nutrition Counseling project in support of this recommendation received:

    - What is the evidence that the behavioral strategy of meal replacements or structured meal plans, used as a component of a behavioral program, will result in health or food behavior change in adults counseled in an outpatient or clinic setting? **Grade I.**

    The Conclusion Statement for Energy Balance and Weight Management, Food Environment and Dietary Behaviors in support of this recommendation received a grade of Strong.

  - 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).

  What is the evidence that the behavioral strategy of meal replacements or structured meal plans, used as a component of a behavioral program, will result in health or food behavior change in adults counseled in an outpatient or clinic setting?

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    Ditschuneit HH, Flechter-Mors M. Value of structured meals for weight management: risk factors and long-term weight maintenance. Obes Res 2001; 9: 284-289S.

    Ditschuneit HH, Flechter-Mors M, Johnson TD, Adler G. Metabolic and weight-loss effects of a long-term dietary intervention in obese patients. Am J Clin Nutr 1999; 69(2): 198-204.

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  2010 Dietary Guidelines Advisory Committee (DGAC) Nutrition Evidence Library (NEL) Evidence-Based Systematic Reviews. Available at http://www.nutritionevidencelibrary.gov/category.cfm?cid=21

- Adult Weight Management
- Adult Weight Management (AWM) Guideline (2014)

Recommendations Summary

AWM: Encourage Physical Activity 2014

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: Encourage Physical Activity for Weight Loss

  For weight loss, the registered dietitian nutritionist (RDN) should encourage physical activity as part of a comprehensive weight management program, individualized to gradually accumulate 150 to 420 minutes or more of physical activity per week, depending on intensity, unless medically contraindicated. Physical activity less than 150 minutes per week promotes minimal weight loss, physical activity more than 150 minutes per week results in modest weight loss of approximately 2kg to 3kg, and physical activity of more than 225 to 420 minutes per week results in 5kg to 7.5kg weight loss, and a dose–response exists.

  Rating: Consensus
  Imperative

  AWM: Encourage Physical Activity for Weight Maintenance

  For weight maintenance, the registered dietitian nutritionist (RDN) should encourage physical activity as part of a comprehensive weight management program, individualized to accumulate 200 to 300 minutes or more of physical activity per week, depending on intensity, unless medically contraindicated. Some studies support the value of approximately 200 to 300 minutes per week of physical activity during weight maintenance to reduce weight regain after weight loss.

  Rating: Consensus
  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

    Unless medically contraindicated.

  - Potential Costs Associated with Application

    Costs of medical nutrition therapy (MNT) sessions vary; however, MNT sessions are essential for improved outcomes.

  - Recommendation Narrative

    From the American College of Sports Medicine Position Stand (2009)

    - *Physical activity to prevent weight gain:* Physical activity of 150 to 250 minutes per week with an energy equivalent of 1, 200kcal to 2000kcal per week will prevent weight gain greater than 3% in most adults. Evidence Category A.
    - *Physical activity for weight loss:* Physical activity less than 150 minutes per week promotes minimal weight loss, physical activity greater than 150 minutes per week results in modest weight loss of approximately 2kg to 3kg, physical activity greater than 225 to 420 minutes per week results in 5kg to 7.5kg weight loss and a dose–response exists. Evidence Category B.
    - *Physical activity for weight maintenance after weight loss:* Some studies support the value of approximately 200 to 300 minutes per week of physical activity during weight maintenance to reduce weight regain after weight loss, and it seems that "more is better." However, there are no correctly designed, adequately powered, energy balance studies to provide evidence for the amount of physical activity to prevent weight regain after weight loss. Evidence Category B.
    - Lifestyle physical activity is an ambiguous term and must be carefully defined to evaluate the literature. Given this limitation, it seems lifestyle physical activity may be useful to counter the small energy imbalance responsible for obesity in most adults. Evidence Category B.
    - *Physical activity and diet restriction:* Physical activity will increase weight loss if diet restriction is modest but not if diet restriction is severe
    - Resistance training for weight loss: Research evidence does not support resistance training as effective for weight loss with or without diet restriction. There is limited evidence that resistance training promotes gain or maintenance of lean mass and loss of body fat during energy restriction and there is some evidence resistance training improves chronic disease risk factors (i.e., HDL-C, LDL-C, insulin, blood pressure). Evidence Category B.

    From the Physical Activity Guidelines for Americans Regarding Energy Balance (2008)

    For Weight Maintenance (Less than 3% Change in Weight)

    - There is a favorable and consistent effect of aerobic PA on achieving weight maintenance (Strong). The evidence is less consistent for resistance training, in part, because of the compensatory increase in lean mass (Moderate), and the smaller volumes of exercise employed.
    - Aerobic PA has a consistent effect on achieving weight maintenance (Strong); resistance training has a moderate effect (Limited)
    - There is no evidence for a dose-response effect for PA and weight maintenance, as it has not been specifically tested
    - The optimal amount of physical activity needed for weight maintenance over the long term is unclear. However, there is clear evidence that physical activity provides benefit for weight stability. There is a great deal of inter-individual variability with physical activity and weight stability, and many persons may need more than 150 minutes of moderate-intensity activity per week to maintain weight. Data from recent well-designed RCTs lasting up to 12 months indicate that aerobic physical activity performed to achieve a volume of 13 to 26 MET-hours per week is associated with approximately a 1% to 3% weight loss, which is generally considered to represent weight stability. A total of 13 MET-hours per week is approximately equivalent to walking at four miles per hour for 150 minutes per week or jogging at six miles per hour for 75 minutes per week.
    - Accumulation of energy expenditure due to PA is what is important to achieving energy balance (Strong). Accumulation of PA can be obtained in short multiple bouts or one long bout to meet PA expenditure goals for weight maintenance (Moderate).

    For Weight Loss (At Least 5% Loss of Weight)

    - The amount of weight lost due to PA (alone) is dependent on the volume of activity, and few studies have used a volume of PA large enough to achieve a 5% weight loss. If an isocaloric diet is maintained throughout the PA intervention, weight loss is similar to what is observed for dietary interventions and clearly exceeds 5% (Strong).
    - PA alone has no effect on achieving a 5% weight loss, except at very large volumes of PA or when an isocaloric diet is maintained throughout the PA intervention (Strong)
    - There is a clear, consistent dose-response effect of aerobic PA on weight loss (Strong)
    - There are clear, consistent data that a large volume of physical activity is needed for weight loss in the absence of concurrent dietary changes. Physical activity equivalent to 26kcal per kg (1, 560 MET-minutes) or more per week is needed for weight loss of 5% or greater (Moderate); less amounts of weight loss are seen with smaller amounts of physical activity. This relatively high volume of physical activity is equivalent to walking about 45 minutes per day at four miles per hour or about 70 minutes per day at three miles per hour, or jogging 22 minutes per day at six miles per hour.
    - There is evidence that accumulation of PA independent of distribution of PA bouts is what is important for weight loss (Limited); however, it is difficult accumulate large volumes of PA without concentrated bouts.

For Weight Maintenance Following Weight Loss

- PA promotes less weight regain after a period of significant weight loss (Moderate)
- Aerobic PA has a reasonably consistent effect on weight maintenance following weight loss (Moderate)
- A dose-response is present; those performing the larger volumes of aerobic PA had less weight regain (Moderate)
- PA equivalent to 30kcal per kg per week or more. This is equivalent to walking about 50 minutes per day at about four miles per hour, 80 minutes per day at about three miles per hour or jogging for 25 minutes per day at six miles per hour (Moderate)
- There is reasonable evidence that accumulation of PA independent of distribution of bouts is what is important for weight stability following weight loss (Limited); however, it is difficult accumulate large volumes of PA without concentrated bouts.

For Abdominal Obesity

- A decrease in total abdominal adiposity and intra-abdominal adiposity is associated with aerobic PA (Moderate to Strong). The effect is less well described for resistance training (Weak).
- Aerobic PA has a consistent effect on total abdominal adiposity and a smaller effect on intra-abdominal adiposity (Strong). Resistance training has a small and less consistent effect on total abdominal and intra-abdominal adiposity (Limited).
- Larger, well-designed studies report a dose-response relationship for aerobic PA related to abdominal obesity measures (Moderate)
- Aerobic physical activity in the range of 13kcal to 26kcal per kg per week results in decreases in total and abdominal adiposity consistent with improved metabolic function. A total of 13 MET-hours per week is approximately equivalent to walking at four miles per hour for 150 minutes per week or jogging at six miles per hour for 75 minutes per week. However, larger volumes of physical activity (e.g., 42kcal per kg per week) result in decreases in intra-abdominal adipose tissue that are three to four times that seen with 13kcal to 26kcal per kg per week of physical activity.

- Recommendation Strength Rationale

  - The ADA Adult Weight Management Work Group concurs with the references cited
  - The American College of Sports Medicine Position Stand evidence statements given are Evidence Categories A and B
  - The Physical Activity Guidelines Advisory Committee recommendations given are Strong, Moderate, Weak and Limited.

- 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

  Carpenter RA, Schwartz J. *A Physical Activity Toolkit for Registered Dietitians: Utilizing Resources of Exercise is Medicine.* Academy of Nutrition and Dietetics, 2013. Accessed at: http://wmdpg.org/wp-content/uploads/2013/06/WMDPG-Navigating-an-Essential-Resource-Article.pdf.

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  Physical Activity Guidelines Advisory Committee. *Physical Activity Guidelines Advisory Committee Report, 2008.* Washington, DC: U.S. Department of Health and Human Services, 2008.

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- Adult Weight Management
- Adult Weight Management (AWM) Guideline (2014)

Quick Links

Recommendations Summary

AWM: Multiple Behavior Therapy Strategies 2014

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

  For weight loss and weight maintenance, the registered dietitian nutritionist (RDN) should incorporate one or more of the following strategies for behavior therapy:

  - *Self monitoring:* Strong evidence shows that for adults who need or desire to lose weight or for adults who are maintaining body weight following weight loss, self-monitoring of food intake improves nutrition-related outcomes related to weight loss and weight maintenance
  - *Motivational interviewing:* Research demonstrated that motivational interviewing significantly enhanced adherence to program recommendations and improved targeted diet-related outcomes including glycemic control, percentage of energy intake from fat, fruit and vegetable intake and weight loss
  - *Structured meal plans and meal replacements and portion control:* Research reports that the use of various types of meal replacements or structured meal plans was helpful in achieving health and food behavior change and strong evidence documents a positive relationship between portion size and body weight
  - *Goal-setting:* Clients' active participation in selecting and setting goals led to the selection of a goal from the area that could use the most improvement and the goal that was most personally appropriate
  - *Problem-solving:* Studies based on the use of problem-solving strategies resulted in improvements in key outcome measures, including maintenance of weight loss and in subjects with diabetes, was linked to improvements in fat consumption, self-efficacy and physical activity.

  Rating: Strong
  Imperative

  AWM: Consider Use of Additional Behavior Therapy Strategies

  For weight loss and weight maintenance, the RDN may consider using the following behavior therapy strategies:

  - Cognitive restructuring
  - Contingency management
  - Relapse prevention techniques
  - Slowing the rate of eating
  - Social support
  - Stress management
  - Stimulus control and cue reduction.

  These strategies are not well researched and there is limited evidence demonstrating their effectiveness.

  Rating: Fair
  Imperative

- Risks/Harms of Implementing This Recommendation

  None.

- Conditions of Application

  None.

- Potential Costs Associated with Application

  Costs of medical nutrition therapy (MNT) sessions vary, however MNT sessions are essential for improved outcomes.

- Recommendation Narrative

  From the Nutrition Counseling Project

  - Three RCTs (two positive-quality and one neutral-quality) provide evidence that self-monitoring of food intake improves nutrition-related outcomes related to weight loss (Boutelle et al, 1999; Tate et al, 2003) and compliance with renal diets (Milas et al, 2002). Three observational studies of neutral quality revealed that clients enrolled in cognitive behavioral weight-loss programs that were successful in losing weight were significantly more consistent with self-monitoring (Baker et al, 1998; Mattfeldt-Beman et al, 1999; Streit et al, 1991).
  - Four RCTs (three positive-quality and one neutral-quality) assessed the efficacy of various types of meal replacement or structured meal plan strategies, as compared to self-selected diets in middle aged-adults and found the use of various types of meal replacements or structured meal plans helpful in achieving health and food behavior change in middle-aged adults (Wing et al, 1996; Metz et al, 1997; Ditschuneit et al, 1999; Flechter-Mors et al, 2000; Ashley et al, 2001; Ditschuneit and Flechter-Mors, 2001). Additional research is needed to determine if benefits derived from temporary use of these behavioral strategies can be sustained over time.
  - Two positive-quality (one RCT and one meta-analysis) and one neutral-quality RCT found monetary rewards or reinforcement had no treatment effect (Jeffery and Wing, 1995; Fuller et al, 1998; Paul-Ebhohimhen and Avenell, 2007)
  - Two positive-quality RCTs, one in overweight and obese women and the other in post-menopausal women with diabetes, utilized interventions that incorporated problem-solving strategies (Perri et al, 2001; Glasgow et al, 2004). In both studies, use of problem-solving strategies resulted in improvements in key outcome measures, including maintenance of weight loss and in subjects with diabetes, was linked to improvements in fat consumption, self-efficacy and physical activity.
  - One highly intense lifestyle change study found social support was helpful and four traditional lifestyle change programs did not find it helpful (Wing et al, 1991; Wing et al, 1999; Barrera et al, 2002; Barrera et al, 2006; Toobert et al, 2007). The definition of social support has evolved to include multiple dimensions of social support measured pre- and post-treatment. Two RCTs conducted in the 1990s manipulated social support and found no significant treatment effect. In an RCT published in 2006, multiple dimensions of social support were measured pre- and post-treatment and use of social resources was shown to mediate intervention effects on physical activity, fat consumption and HgA1C change. Additional studies are needed to measure impact of social support interventions on outcomes.
  - One positive-quality RCT found a 30-minute motivational interviewing session, based on self-selected diabetic self-management goals, followed by three 10-minute phone calls at one week, three weeks and seven weeks, was significantly more effective than usual care in reducing dietary fat intake and increasing physical activity at one year in 100 adults with type 2 diabetes (Clark et al, 2004). A positive-quality RCT showed similar results regarding the value of clients' self-selected behavior change goals and demonstrated the effectiveness of goal-attainment training in realizing dietary improvements (Berry et al, 1989). One neutral-quality observational study found 422 clients with diabetes who used computer technology to self-select a behavior-change goal in an area of diet or exercise and received brief (eight to 10 minutes) counseling related to the goal, were successful in reducing fat intake two months later (Estabrook et al, 2005). Clients' active participation in selecting and setting goals led to the selection of a goal from the area that could use the most improvement and the goal that was most personally appropriate.
  - One neutral-quality RCT assessed the additive effect of a cognitive restructuring component to a 10-week strictly behavioral weight-loss program in 63 middle-aged overweight subjects and found no significant difference between the treatment group and control group in any physiological, behavioral or cognitive measures at baseline, post-treatment and at three-month follow-up (DeLucia and Kalodner, 1990). Additional research is needed on the isolated effect of cognitive restructuring as part of a behavioral intervention on nutrition-related outcomes.
  - Four RCTs of positive quality assessed the effect of motivational interviewing as an added component to cognitive-behavioral programs [three studies (Smith et al, 1997; Bowen et al, 2002; West et al, 2007)] or a self-help intervention (Resnicow et al, 2001) and found motivational interviewing significantly enhanced adherence to program recommendations and improved targeted diet-related outcomes including glycemic control, percentage of energy intake from fat, fruit and vegetable intake and weight loss.

  From the 2010 Dietary Guidelines Advisory Committee (DGAC) Nutrition Evidence Library (NEL) Evidence-Based Systematic Reviews

  - What is the relationship between diet self-monitoring and body weight?
    - Strong evidence shows that for adults who need or desire to lose weight or who are maintaining body weight following weight loss, self-monitoring of food intake improves outcomes.
  - What is the relationship between portion size and body weight?
    - Strong evidence documents a positive relationship between portion size and body weight.

- Recommendation Strength Rationale

  - The eight Conclusion Statements from the Nutrition Counseling project in support of this recommendation received the following grades:
    - What is the evidence that the behavioral strategy of self-monitoring, used as a component of a behavioral program, will result in health or food behavior change in adults counseled in an outpatient or clinic setting? **Grade I**
    - What is the evidence that the behavioral strategy of meal replacements or structured meal plans, used as a component of a behavioral program, will result in health or food behavior change in adults counseled in an outpatient or clinic setting? **Grade I**
    - What is the evidence that the behavioral strategy of reward and reinforcement (contingency management), used as a component of a behavioral intervention, will result in health or food behavior change in adults counseled in an outpatient or clinic setting? **Grade I**
    - What is the evidence that the behavioral strategy of problem-solving will result in health or food behavior change in adults counseled in an outpatient or clinic setting? **Grade II**
    - What is the evidence that the behavioral strategy of social support will result in health or food behavior change in adults counseled in an outpatient or clinic setting? **Grade II**
    - What is the evidence that the behavioral strategy of goal-setting will result in health or food behavior change in adults counseled in an outpatient or clinic setting? **Grade II**
    - What is the evidence that the behavioral strategy of cognitive restructuring will result in health or food behavior change in adults counseled in an outpatient or clinic setting? **Grade III**
    - What is the evidence that Motivational Interviewing, used as an adjunct to a cognitive-behavioral program, results in health or food behavior change in adults counseled in an outpatient or clinic setting? **Grade I**
  - The Conclusion Statements for Energy Balance and Weight Management, Food Environment and Dietary Behaviors in support of this recommendation both received a grade of Strong.

- 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).

  What is the evidence that the behavioral strategy of self-monitoring, used as a component of a behavioral program, will result in health or food behavior change in adults counseled in an outpatient or clinic setting?

  What is the evidence that the behavioral strategy of meal replacements or structured meal plans, used as a component of a behavioral program, will result in health or food behavior change in adults counseled in an outpatient or clinic setting?

  What is the evidence that the behavioral strategy of reward and reinforcement (contingency management), used as a component of a behavioral intervention, will result in health/food behavior change in adults counseled in an outpatient/clinic setting?

What is the evidence that the behavioral strategy of problem-solving will result in health or food behavior change in adults counseled in an outpatient or clinic setting?

What is the evidence that the behavioral strategy of social support will result in health/food behavior change in adults counseled in an outpatient/clinic setting?

What is the evidence that the behavioral strategy of goal-setting will result in health or food behavior change in adults counseled in an outpatient or clinic setting?

What is the evidence that the behavioral strategy of cognitive restructuring will result in health or food behavior change in adults counseled in an outpatient or clinic setting?

What is the evidence that Motivational Interviewing, used as an adjunct to a cognitive-behavioral program, results in health/food behavior change in adults counseled in an outpatient/clinic setting?

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- Adult Weight Management
- Adult Weight Management (AWM) Guideline (2014)

Recommendations Summary

AWM: Coordination of Care 2014

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: Coordinate Care with Interdisciplinary Team

For weight loss and weight maintenance, the registered dietitian nutritionist (RDN) should implement medical nutrition therapy (MNT) and coordinate care with an interdisciplinary team of health professionals (may include specialized RDNs, nurses, nurse practitioners, pharmacists, physicians, physician assistants, physical therapists, psychologists, social workers, and so on), especially for patients with obesity-related co-morbid conditions. Coordination of care may include collaboration on:

- Use of FDA-approved weight-loss medications
- Appropriateness of bariatric surgery for people who have not achieved weight loss goals with less invasive weight loss methods.

Coordination of care with an interdisciplinary team of health professionals promotes the greatest effectiveness of MNT.

Rating: Consensus
Imperative

AWM: Recommend Use of Community Resources

The registered dietitian nutritionist (RDN) should recommend use of community resources, such as local food sources, food assistance programs, support systems and recreational facilities. Moderately strong evidence indicates a relationship between the food environment and dietary intake.

Rating: Strong
Imperative

- Risks/Harms of Implementing This Recommendation

  Surgery is associated with complications such as pulmonary embolism and post-operative death.

- Conditions of Application

  None.

- Potential Costs Associated with Application

  Costs of medical nutrition therapy (MNT) sessions vary; however, MNT sessions are essential for improved outcomes.

- Recommendation Narrative

  Behavioral Counseling in Primary Care to Promote a Healthy Diet

  The United States Preventive Services Task Force (USPSTF) recommends intensive behavioral dietary counseling for adult patients with hyperlipidemia and other known risk factors for cardiovascular and diet-related chronic disease. Intensive counseling can be delivered by primary care clinicians or by referral to other specialists such as nutritionists or dietitians.

  From the 2010 Dietary Guidelines Advisory Committee (DGAC) Nutrition Evidence Library (NEL) Evidence-Based Systematic Reviews

  What is the relationship between the environment, body weight and fruit and vegetable consumption?

  - An emerging body of evidence has documented the impact of the food environment and select behaviors on body weight in both children and adults. Moderately strong evidence now indicates that the food environment is associated with dietary intake, especially less consumption of vegetables and fruits and higher body weight.
  - The presence of supermarkets in local neighborhoods and other sources of vegetables and fruits are associated with lower body mass index (BMI), especially for low-income Americans, while lack of supermarkets and long distances to supermarkets are associated with higher BMI
  - Limited but consistent evidence suggests that increased geographic density of fast-food restaurants and convenience stores is also related to increased BMI.

  AHA/ACC/TOS Guideline for the Management of Overweight and Obesity in Adults (2013)

  Selecting Patients for Bariatric Surgical Treatment for Obesity (Bariatric Surgical Treatment for Obesity)

  - 5a. Advise adults with a BMI 40kg/m^2 or more or BMI 35kg/m^2 or more with obesity-related co-morbid conditions, who are motivated to lose weight and who have not responded to behavioral treatment with or without pharmacotherapy with sufficient weight loss to achieve targeted health outcome goals, that bariatric surgery may be an appropriate option to improve health and offer referral to an experienced bariatric surgeon for consultation and evaluation. NHLBI Grade A (Strong). ACC/AHA Level of Evidence Grade A.
  - 5b. For individuals with a BMI less than 35kg/m^2, there is insufficient evidence to recommend for or against undergoing bariatric surgical procedures. NHLBI Grade N (No Recommendation). ACC/AHA Level of Evidence Grade is not applicable.
  - 5c. Advise patients that the choice of a specific bariatric surgical procedure may be affected by patient factors, including age, severity of obesity and BMI, obesity-related co-morbid conditions, other operative risk factors, risk of short- and long-term complications, behavioral and psychosocial factors and patient tolerance for risk as well as provider factors (surgeon and facility). NHLBI Grade E (Expert Opinion). ACC/AHA Level of Evidence Grade C.

- Recommendation Strength Rationale

  - The Conclusion Statements for Energy Balance and Weight Management, Food Environment and Dietary Behaviors in support of this recommendation received a grade of Moderate
  - ACC/AHA/TOS recommendations given either NHLBI Grade A (Strong), Grade E (Expert Opinion) or Grade N (No Recommendation), ACC/AHA Level of Evidence Grades A, C and Not Applicable. Recommendations 5a, 5b, and 5c were based on Critical Question 5, which analyzed systematic reviews and meta-analyses (the literature search included those published from January 2000 to October 2011) and added some major studies published after 2009.

- 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
- Adult Weight Management (AWM) Guideline (2014)

Recommendations Summary

AWM: Monitor and Evaluate the Effectiveness of the Comprehensive Weight Management Program 2014

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: Monitor and Evaluate the Effectiveness of the Comprehensive Weight Management Program

  The registered dietitian nutritionist (RDN) should monitor and evaluate the effectiveness of the comprehensive weight management program for overweight or obese adults, through the following data

  - Food and nutrition-related history, including but not limited to:
    - Beliefs and attitudes, including motivation
    - Food environment, including access to fruits and vegetables
    - Dietary behaviors, including eating out and screen time
    - Medications and supplements
    - Physical activity.
  - Anthropometric measurements, including but not limited to:
    - Weight and BMI
    - Waist circumference
    - Body composition (if available).
  - Biochemical data, medical tests and procedures, including but not limited to:
    - Glucose/endocrine profile
    - Lipid profile.
  - Nutrition-focused physical findings, including but not limited to:
    - Affect
    - Appetite
    - Blood pressure
    - Body language
    - Heart rate.

  Moderately strong evidence indicates that the food environment is associated with dietary intake, especially less consumption of vegetables and fruits and higher body weight. Strong and consistent evidence indicates that adults who eat fast food often are at increased risk of weight gain, overweight and obesity and that screen time, especially television screen time, is directly associated with increased overweight and obesity.

  Rating: Strong
  Imperative

  - Risks/Harms of Implementing This Recommendation

    None.

  - Conditions of Application

    If BMI is 35kg/m^2 or higher, waist circumference will likely be elevated and will add no additional risk information.

  - Potential Costs Associated with Application

    - Costs of medical nutrition therapy (MNT) sessions vary, however MNT sessions are essential for improved outcomes
    - Costs of laboratory tests may be additional.

  - Recommendation Narrative

    From the 2010 Dietary Guidelines Advisory Committee (DGAC) Nutrition Evidence Library (NEL) Evidence-Based Systematic Reviews

    - What is the relationship between the environment, body weight and fruit and vegetable consumption?
      - An emerging body of evidence has documented the impact of the food environment and select behaviors on body weight in both children and adults. Moderately strong evidence now indicates that the food environment is associated with dietary intake, especially less consumption of vegetables and fruits and higher body weight. The presence of supermarkets in local neighborhoods and other sources of vegetables and fruits are associated with lower BMI, especially for low-income Americans, while lack of supermarkets and long distances to supermarkets are associated with higher BMI. Finally, limited but consistent evidence suggests that increased geographic density of fast food restaurants and convenience stores is also related to increased BMI.
    - What is the relationship between eating out and body weight?
      - Strong and consistent evidence indicates that children and adults who eat fast food are at increased risk of weight gain, overweight and obesity. The strongest documented relationship between fast food and obesity is when one or more fast food meals are consumed per week. There is not enough evidence at this time to similarly evaluate eating out at other types of restaurants and risk of weight gain, overweight and obesity.
    - What is the relationship between screen time and body weight?

- Strong and consistent evidence in both children and adults shows that screen time is directly associated with increased overweight and obesity. The strongest association is with television screen time.

- Recommendation Strength Rationale

  The Conclusion Statements for Energy Balance and Weight Management, Food Environment and Dietary Behaviors in support of this recommendation received grades of *moderate* and *strong*.

- 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

    2010 Dietary Guidelines Advisory Committee (DGAC) Nutrition Evidence Library (NEL) Evidence-Based Systematic Reviews. Available at http://www.nutritionevidencelibrary.gov/category.cfm?cid=21.

- Adult Weight Management
- Adult Weight Management (AWM) Guideline (2014)

Quick Links

Recommendations Summary

AWM: Monitor and Evaluate Energy Intake and Energy Needs 2014

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: Monitor and Evaluate Energy Intake and Nutrient Content

  For weight loss and weight maintenance, the registered dietitian nutritionist (RDN) should monitor and evaluate energy intake and nutrient content and consider adjusting the selected caloric reduction strategy (if necessary):

  - Prescribe 1, 200kcal to 1, 500kcal per day for women and 1, 500kcal to 1, 800kcal per day for men (kcal levels are usually adjusted for the individual's body weight)
  - Prescribe 500kcal per day or 750kcal per day energy deficit
  - Prescribe one of the evidence-based diets that restricts certain food types (such as high-carbohydrate foods, low-fiber foods or high-fat foods) in order to create an energy deficit by reduced food intake.

  Several studies report changes in nutrient adequacy with caloric restriction. However, the extent of nutrient inadequacy and the nutrients affected are dependent on the composition of the diet followed, as well as on the nutritional needs of the individual. Limited research reports reductions in nutrient adequacy with weight loss through an energy restriction of at least 500kcal per day or daily consumption below 1, 200kcal per day.

  Rating: Strong
  Imperative

  AWM: Monitor and Evaluate Total Energy Needs

  For weight loss and weight maintenance, the RDN should monitor and evaluate total energy needs and consider one of the following (if necessary):

  - Re-measure resting metabolic rate (RMR) using indirect calorimetry, since measurement of RMR using indirect calorimetry is more accurate than estimating resting metabolic rate using predictive equations
  - Re-calculate Mifflin-St. Jeor, since the majority of research reviewed supports the use of the Mifflin-St. Jeor equation (using actual body weight) to predict RMR in overweight or obese adults because it demonstrated good accuracy and correlation with indirect calorimetry
  - Re-apply a new physical activity factor to RMR (measured or estimated) to estimate total energy needs:
    - *Sedentary:* 1.0 to 1.4
    - *Low active:* 1.4 to 1.6
    - *Active:* 1.6 to 1.9
    - *Very active:* 1.9 to 2.5.

  The Dietary Reference Intakes (DRI) Physical Activity Levels (PAL) represent the ratio of total energy expenditure to basal energy expenditure and are defined as sedentary, low active, active or very active.

  Rating: Consensus
  Imperative

  - Risks/Harms of Implementing This Recommendation

    None.

  - Conditions of Application

    Monitoring and evaluation of energy intake and energy needs may take place if goals have not been met, after 15 lbs to 20 lbs of weight loss or if physical activity level changes.

    Energy intake and nutrient content may be assessed through the use of one of the following tools

    - Food frequency questionnaires
    - Three-day, four-day or seven-day food records (including weekdays and weekend days)
    - 24-hour dietary recalls
    - Typical daily dietary intake.

    Strategies to achieve nutrient adequacy may include
    - Consider including a variety of foods
    - Consider a vitamin and mineral supplement when appropriate
    - Consider increasing physical activity rather than further caloric restriction
    - Consider extending the weight loss timeframe to reach goal weight.

    The application of the recommendation may depend on the availability of indirect calorimetry.

    Mifflin-St. Jeor Equations

- *Males:* RMR (kcal per day) = 10 x weight (kg) + 6.25 x height (cm) - 5 x age (years) + 5
- *Females:* RMR (kcal per day) = 10 x weight (kg) + 6.25 x height (cm) - 5 x age (years) - 161.

Dietary Reference Intake Physical Activity Levels

- *Sedentary:* Typical daily living activities (e.g., household tasks, walking to the bus)
- *Low active:* Typical daily living activities plus 30 to 60 minutes of daily moderate activity (e.g., walking at 5.0km to 7.0km per hour or 3.0mph to 4.0mph)
- *Active:* Typical daily living activities plus at least 60 minutes of daily moderate activity
- *Very active:* Typical daily living activities plus at least 60 minutes of daily moderate activity plus an additional 60 minutes of vigorous activity or 120 minutes of moderate activity.

- Potential Costs Associated with Application

  - Costs of medical nutrition therapy (MNT) sessions vary, however, MNT sessions are essential for improved outcomes.
  - If applicable, costs of equipment and staff time with the use of indirect calorimetry may be additional.

- Recommendation Narrative

  - Several studies report changes in nutrient adequacy with caloric restriction, however the extent of nutrient inadequacy and the nutrients affected are dependent on the composition of the diet followed as well as on the nutritional needs of the individual (Ma et al, 2007; Truby et al, 2008)
  - Limited research reports reductions in nutrient adequacy with weight loss through an energy restriction of at least 500kcal per day or daily consumption below 1, 200kcal per day (Ashley et al, 2007; Noakes et al, 2004; Gardner et al, 2010)
  - Additional long-term studies in this area are needed
  - The majority of research reviewed supports the use of the Mifflin-St. Jeor equation (using actual body weight) to predict RMR in overweight or obese adults because it demonstrated good accuracy and correlation with indirect calorimetry (Scalfi et al, 1993; Frankenfield et al, 2003; St. Jeor et al, 2004; Weijs, 2008; Skouroliakou et al, 2009; Weijs and Vansant, 2010; Ruiz et al, 2011; de Oliveira et al, 2012; Faria et al, 2012)
  - Other equations evaluated did not predict resting metabolic rate as accurately as the Mifflin-St. Jeor equation (Heshka et al, 1993; Scalfi et al, 1993; Siervo et al, 2003; Livingston and Kohlstadt, 2005; Lazzer, Agosti, Resnik et al, 2007; Lazzer, Agosti, Silvestri et al, 2007; Skouroliakou et al, 2009; Spears et al, 2009; Weijs and Vansant, 2010; Horie et al, 2011; Ruiz et al, 2011; de Oliveira et al, 2012)

  From AHA/ACC/TOS Guideline for the Management of Overweight and Obesity in Adults (2013)

  Diets for Weight Loss (Dietary Strategies for Weight Loss)
  - 3a. Prescribe a diet to achieve reduced calorie intake for obese or overweight individuals who would benefit from weight loss as part of a comprehensive lifestyle intervention. Any one of the following methods can be used to reduce food and calorie intake:
    - a. Prescribe 1, 200kcal to 1, 500kcal per day for women and 1, 500kcal to 1, 800kcal per day for men (kcal levels are usually adjusted for the individual's body weight)
    - b. Prescribe a 500kcal per day or 750kcal per day energy deficit
    - c. Prescribe one of the evidence-based diets that restrict certain food types (such as high-carbohydrate foods, low-fiber foods or high-fat foods) in order to create an energy deficit by reduced food intake.
  - NHLBI Grade A (Strong). ACC/AHA Level of Evidence Grade A.

- Recommendation Strength Rationale

  - The Conclusion Statement in support of this recommendation received Grades I and II
  - ACC/AHA/TOS recommendations either given NHLBI Grade A (strong), ACC/AHA Level of Evidence Grade A. Recommendation 3a was based on Critical Question 3, which analyzed systematic reviews and meta-analyses (the literature search included those published from January 2000 to October 2011) and added major RCTs published after 2009 with greater than 100 people per treatment arm.

- 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).

  What is the relationship between nutrient adequacy and caloric restriction (assuming a food-based diet without vitamin or mineral supplementation)?

  In overweight or obese adults, which predictive equation for estimating resting metabolic rate should be used?

  - References

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