

**CLINICAL PRACTICE GUIDELINES FOR HEALTHY EATING FOR
THE PREVENTION AND TREATMENT OF METABOLIC
AND ENDOCRINE DISEASES IN ADULTS:
COSPONSORED BY
THE AMERICAN ASSOCIATION OF CLINICAL ENDOCRINOLOGISTS/
THE AMERICAN COLLEGE OF ENDOCRINOLOGY
AND THE OBESITY SOCIETY**

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Rationale:

- The American Association of Clinical Endocrinologists (AAACE) and The Obesity Society (TOS) are professional organizations dedicated to improve the lives of patients with endocrine and metabolic disorders
- To date there is no evidence-based clinical practice guideline (CPG) to define the standards of care for healthy eating in the management and prevention of metabolic and endocrine disorders



Purpose of the guidelines

- For most clinical endocrinologists, nutrition education is not structured and many of the endocrinology training programs in the United States lack a dedicated nutrition curriculum
- Nutritional counseling and management for our patients is often delegated to other health care professionals

This CPG proposes an evidence-based, standardized context for healthy eating recommendations



Section 1: What is healthy eating?



General recommendations for healthy eating and disease prevention

- Patients should be instructed on healthy eating and proper meal planning by qualified health care professionals
- Macronutrients should be recommended in the context of a calorie-controlled meal plan
- Patients should also be counseled on other ways to achieve a healthy lifestyle



Healthy macronutrient intake - carbohydrates

- Carbohydrates should provide 45-65% of ingested energy
- Total caloric intake must be appropriate for individual weight management goals
- 6-8 servings of carbohydrates (one serving = 15 g of carbohydrate) are recommended per day
- Fruits (especially berries) and vegetables (especially raw; ≥ 4.5 cups per day) will increase fiber and phytonutrient intake, as well as facilitate calorie control



Healthy macronutrient intake - proteins

- 15-35% of calories should be provided by plant and animal sources depending on total intake
- Reduced-fat animal protein is recommended to increase the nutrient-to-calorie ratio (6 ounces per day maximum)
- Reduced-fat dairy (2-3 servings per day) is recommended for patients not intolerant or allergic to lactose
- Beans, lentils, and some nuts; and certain vegetables including broccoli, kale and spinach, may confer health benefits



Gonzalez-Campoy JM et al. *Endocr Pract.* 2013;19 Suppl 3:1-82.

Appel LJ et al. *JAMA.* 2005;294:2455-2464.

Hilpert KF et al. *J Am Coll Nutr.* 2009;28:142-149.

Xu JY et al. *Nutrition.* 2008;24:933-940.



Healthy macronutrient intake - fats

- 25-35% of daily calories should be provided by unsaturated fats from liquid vegetable oils, seeds, nuts, and fish (including omega-3 fatty acids) to reduce the risk for cardiovascular disease
- Natural foods high in monounsaturated fat, such as olive oil in the Mediterranean dietary pattern, should be recommended
- At least two servings of cold-water, fatty fish (like salmon or mackerel) every week are recommended



Healthy micronutrient intake - supplemental vitamin intake

- There are insufficient data to recommend supplemental vitamin intake above recommended dietary allowances
- Vitamin E supplementation to decrease cardiovascular events or cancer is not recommended
- Lifelong regular follow-up and individualized therapy is recommended for those with diseases known to cause intestinal malabsorption to detect and treat vitamin and mineral deficiencies



Gonzalez-Campoy JM et al. *Endocr Pract.* 2013;19 Suppl 3:1-82.

Lee IM et al. *JAMA.* 2005;294:56-65.

Lippman SM et al. *JAMA.* 2009;301:39-51.

Miller ER, 3rd et al. *Ann Intern Med.* 2005;142:37-46.



Healthy micronutrient intake – vitamin B₁₂

- Levels should be checked periodically in older adults and in patients on metformin therapy
- Patients with vitamin B₁₂ deficiency can generally be treated with daily oral vitamin B₁₂ (1000 micrograms oral crystalline cobalamin) and may benefit from increasing the intake of vitamin B₁₂ in food

B12 1000mcg
Directions: Take 1 tablet per day.

Supplement Facts
Serving Size 1 tablet (veg)
Servings Per Container 100

	Amount Per Serving	% Daily Value
Vitamin B-12 (as cobalamin)	1000mcg	16,667%

* Daily Value not established

Other Ingredients: Calcium stearate (veg source), cellulose, calcium phosphate, silica, stearic acid (veg. source), whey (milk).

Contains NO artificial colors, flavors or preservatives; NO wheat, gluten, eggs, peanuts, tree nuts, soy, crustacean shellfish or fish. Suitable for lactovegetarian.

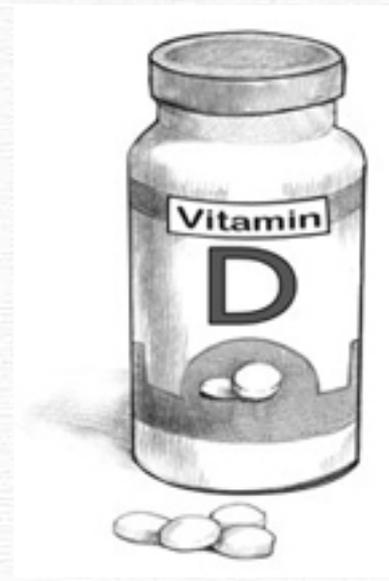
Made according to US Pharmacopeia (USP) standards. ING070611

Gonzalez-Campoy JM et al. *Endocr Pract.* 2013;19 Suppl 3:1-82.
de Jager J et al. *BMJ.* 2010;340:c2181.



Healthy micronutrient intake – vitamin D

- The prevalence of vitamin D deficiency and insufficiency warrants case finding by measurement of 25-OH vitamin D levels in populations at risk
- Increased vitamin D intake from vitamin D-fortified foods and/or supplements to at least 800-1000 international units is recommended daily for those at risk



Section 2: What nutritional recommendations are appropriate for weight management?



Approach to overweight and obesity – management of adiposity and adiposopathy

- Overweight and obesity should be treated as any other chronic disease
- Nutrition counseling for overweight and obesity is recommended
- Adult feeding behavior is solidly rooted from childhood
- Nutrition counseling should meet individual patient needs



Approach to overweight and obesity – weight loss goal

- The weight loss goal for patients with overweight or obesity is 5 – 10% of current body weight over the ensuing 6 to 12 months
- Combined therapy is considered the most successful intervention for weight loss and weight maintenance



Gonzalez-Campoy JM et al. *Endocr Pract.* 2013;19 Suppl 3:1-82.
Perri MM et al. *J Consult Clin Psychol.* 1998;56:529-534.
Ramirez EM, Rosen JC. *J Consult Clin Psychol.* 2001;69:440-446.



Approach to overweight and obesity – behavior modification

- Behavior modification must be achieved and sustained for long term success with weight management
- Group therapy should be incorporated into weight management treatment programs
- Caloric intake can be lowered using portion-controlled prepackaged meals



Gonzalez-Campoy JM et al. *Endocr Pract.* 2013;19 Suppl 3:1-82.
Hannum SM et al. *Diabetes Obes Metab.* 2006;8:146-155.
Metz JA et al. *Arch Intern Med.* 2000;160:2150-2158.



Approach to overweight and obesity – low calorie meal plans

- Initial treatment should emphasize maintaining a healthy meal plan, avoiding fad diets, and including food choices from all major food groups
- The program should be aimed at achieving a total weight loss rate of 1 to 2 lbs./week
- Meal plans of <1200 kcal/day should be carefully selected to meet nutrient requirements



Approach to overweight and obesity – very low calorie meal plans

- ≤ 800 kcal/day or $\sim 6-10$ kcal/kg ($\sim 2.72-4.54$ kcal/lb) may be recommended for certain patients
- Can produce weight losses up to 1.5 to 2.5 kg/week (3.5 to 5.8 lbs/week); up to 20 kg (44 lbs) in 12 to 16 weeks
- Require nutritional supplementation and medical monitoring for complications



Section 3: What nutritional recommendations are appropriate for cardiovascular health?



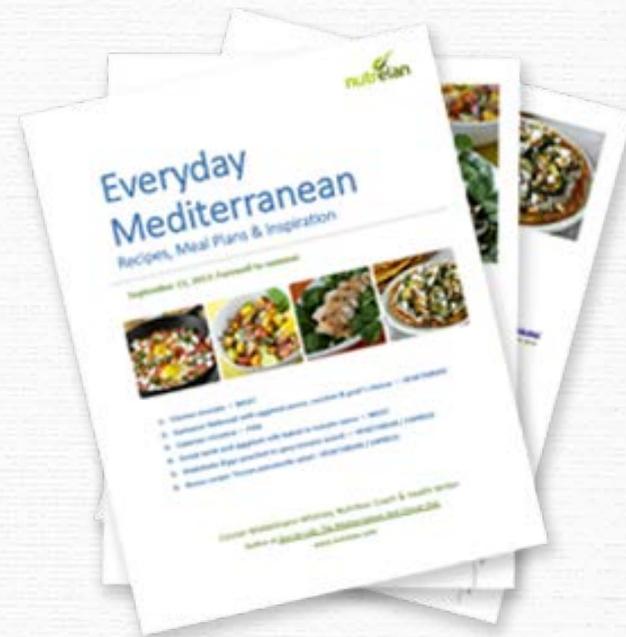
Nutritional strategies for excess fat mass and adiposopathy

- Those at risk for cardiovascular disease should implement healthy eating patterns
- Meals should be low in energy density to help control calorie intake
- An increase in caloric expenditure to at least 150 minutes of moderate-, or 75 minutes of vigorous-intensity activity weekly is recommended
- Both changes in meal plans and frequent physical activity are required



Nutritional strategies for dyslipidemia

- The Therapeutic Lifestyle Changes meal plan is recommended for individuals with elevated low density lipoprotein cholesterol (LDL-C)
- The Mediterranean meal plan is recommended for individuals who have high non-LDL-C lipid values
- Alternatively, the Therapeutic Lifestyle Changes meal plan, which provides 30-35% of calories from total fat and places emphasis on mono- and polyunsaturated fatty acids (PUFA) is recommended

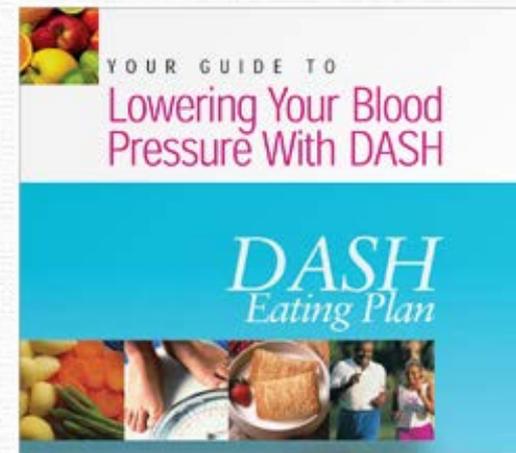


Gonzalez-Campoy JM et al. *Endocr Pract.* 2013;19 Suppl 3:1-82.
Jenkins DJ et al. *JAMA.* 2003;290:502-510.



Nutritional strategies for hypertension

- Attaining and maintaining a healthy body weight is recommended to prevent and treat hypertension
- A 10% weight loss is necessary for individuals with overweight or obesity to decrease blood pressure
- Adherence to the Dietary Approaches to Stop Hypertension (DASH) meal plan is recommended
- Sodium intake should be reduced to <2300 mg/d and potassium intake should be increased to >4700 mg/d
- Sodium intake should be further reduced (<1500 mg/d; or 3800 mg/day of table salt) for high risk populations



Gonzalez-Campoy JM et al. *Endocr Pract.* 2013;19 Suppl 3:1-82.

Neter JE et al. *Hypertension.* 2003;42:878-884.

Appel LJ et al. *N Engl J Med.* 1997;336:1117-1124.

Sacks FM et al. *N Engl J Med.* 2001;344:3-10.



Section 4: What nutrient sources should be *limited* for cardiovascular health?



CV Health - Nutrient sources to limit

- Added sugars should be limited to:
 - <100 calories per day for women and
 - <150 calories per day for men
- Reduced sugar-sweetened beverage intake is recommended instead of sweetened alternatives
- Saturated fat intake should be limited to <7%
- Limit processed red meat intake to less than 2 servings per week
- Lean or very lean red meat cuts are recommended for control of saturated fat intake
- Whole grain products used be used instead of refined grain products
- At least one-half of daily servings of grains should be from whole-grains



Section 5: What nutritional recommendations are appropriate for diabetes mellitus?



Nutrition education for patients with DM

- Medical nutrition therapy is recommended for patients with DM
- Those having difficulty achieving glycemic targets should keep a personal food diary



Caloric and protein intake for patients with DM

- Consume total daily calories at amounts to attain or maintain a normal body mass index of 18.5 to 24.9 kg/M²
- Consume protein in the 0.8 – 1.0 g/kg/day (.013 – .016 oz/lb/day) range



Carbohydrate intake for patients with DM

- Medical nutrition therapy should be implemented to control the glycemic response to meals, and to achieve hemoglobin A_{1c} (A_{1c}) and blood glucose levels as close to the target range as possible without risk to the patient
- Carbohydrate should account for about 45 – 65% of the total calorie consumption for the day, including low-fat dairy products and sucrose
- Patients with DM should consume carbohydrate primarily from unprocessed carbohydrates, which are provided by a target of 8 to 10 servings per day of vegetables (particularly raw), fruits, and legumes, with due diligence to limit simple sugars or foods that have a high glycemic index



Carbohydrate intake for patients with DM(con't)

- Patients with DM should consume 20 - 35 g of fiber from raw vegetables and unprocessed grain (or about 14 g fiber per 1000 kcal ingested) per day
- Patients with type 1 DM (T1DM), or insulin-treated type 2 DM (T2DM) should synchronize insulin dosing with carbohydrate intake
- Patients with T2DM treated with short-acting oral hypoglycemic agents should synchronize carbohydrate intake with administration of these medications
- Patients with DM may safely consume artificial sweeteners within the guidelines of the Food and Drug Administration (FDA)



Gonzalez-Campoy JM et al. *Endocr Pract.* 2013;19 Suppl 3:1-82.
The DCCT Research Group. *N Engl J Med.* 1993;329:977-986.
Giugliano D et al. *Diabetes Care.* 2011;34:510-517



Fat intake for patients with DM

- Total fat intake should account for about 30% of the total daily calories
- Consumption of saturated fat should be less than 7% of total daily calories
- PUFA should be up to 10% of the total daily calories
- n-3 PUFA are most desirable



Fat intake for patients with DM (con't)

- Monounsaturated fatty acids (MUFA) should be up to 15 – 20% of the total daily calories
- Dietary cholesterol should be less than 200 mg per day
- Avoid consumption of *trans* fats



Other nutritional recommendations for patients with DM – glycemic index and antioxidants

- There is insufficient evidence to recommend a “low glycemic index” meal plan
- There is insufficient evidence to support routine antioxidant use



low-GI diet

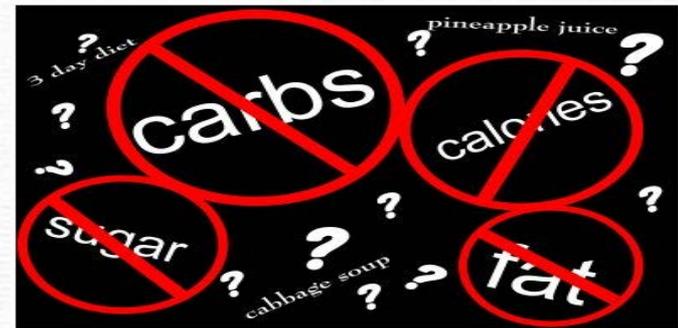
CHROMIUM

VANADIUM

MAGNESIUM

Other nutritional recommendations for patients with DM – alcohol and fad diets

- Alcohol should be ingested with food
- Limit alcohol intake to 2 servings per day for men, or 1 serving per day for women.
- There is insufficient evidence, based on long-term risks and benefits, to support use of fad diets



Diabetes Mellitus prevention

- There is insufficient evidence to support nutrition changes to prevent T1DM
- The use of infant formula derived from cow's milk in the first 6 months of life increases a baby's risk of T1DM



Diabetes Mellitus prevention (con't)

Those at high risk for developing T2DM should implement lifestyle interventions to:

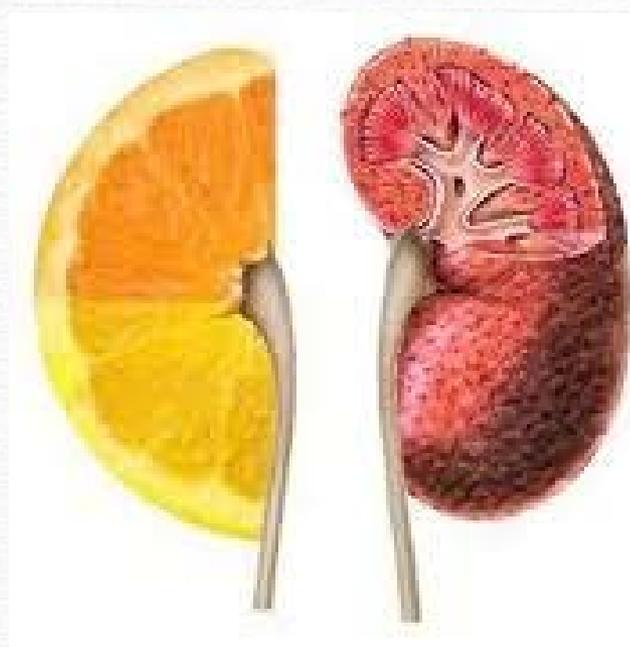
- achieve a minimum of 7% weight loss followed by weight maintenance
- achieve a minimum of 150 min of weekly physical activity



Gonzalez-Campoy JM et al. *Endocr Pract.* 2013;19 Suppl 3:1-82.
Knowler WC et al. *N Engl J Med.* 2002;346:393-403.

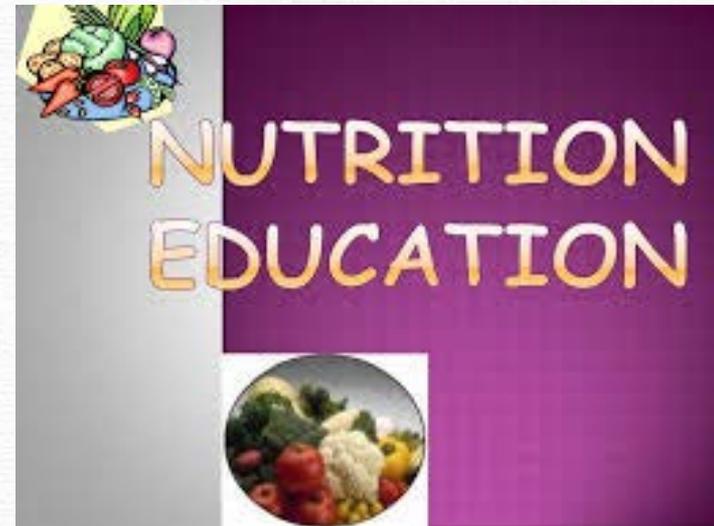


Section 6: What nutritional recommendations are appropriate for chronic kidney disease (CKD)?



CKD - General approach

- A meal plan should be low in protein, sodium, potassium, and phosphorous
- People should receive nutrition education from qualified health care professionals



Protein requirements - restriction dictated by stage of CKD

- Protein intake should be
 - limited to 12-15% of daily calorie intake; 0.8 g high-biological value protein/kg body weight/day (.013 oz/lb body weight/day) (chronic kidney disease [CKD] stage 1, 2 or 3)
 - reduced to 10% of daily calorie intake; 0.6 g high quality protein/kg body weight/day (.001 oz/lb body weight/day) (CKD stage 4)

Ingredient	Biological Value
Eggs	100
Fish Meal	92
Beef	78
Milk	78
Wheat	60
Corn	54
Wheat Gluten	40



Protein requirements - restriction dictated by stage of CKD (con't)

- For patients with chronic kidney disease stage 5 or those patients on renal replacement therapy, protein intake should be increased to 1.3 g/kg/day (.021 oz/lb/day) (peritoneal dialysis) or 1.2 g/kg/day (.019 oz/lb/day)(hemodialysis).
- Urinary protein losses in the nephrotic syndrome should be replaced.



Gonzalez-Campoy JM et al. *Endocr Pract.* 2013;19 Suppl 3:1-82.

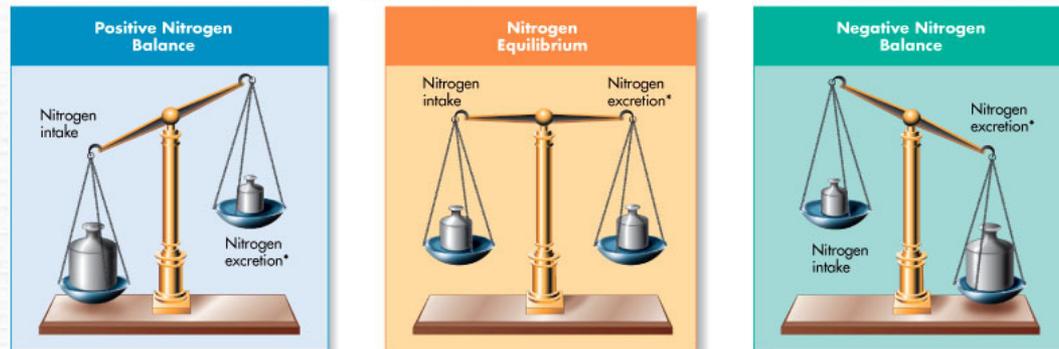
The National Kidney Foundation Kidney Disease Outcomes Quality Initiative. *Am J Kidney Dis.* 2000;35:S1-140.

The National Kidney Foundation Kidney Disease Outcomes Quality Initiative. *Am J Kidney Dis.* 2002;39:S1-266.



Energy intake in CKD

- Patients with CKD stages 1, 2 or 3 should ingest 35 kcal/kg body weight/day (15.88 kcal/lb body weight/day) to maintain neutral nitrogen balance, and to prevent catabolism of stored proteins for energy needs
- Patients with CKD and a GFR < 25 ml/min should ingest 35 kcal/kg body weight/day (15.88 kcal/lb body weight/day) if younger than 60 years old, or 30-35 kcal/kg body weight/day (13.61-15.88 kcal/lb body weight/day) if 60 years old or older



Gonzalez-Campoy JM et al. *Endocr Pract.* 2013;19 Suppl 3:1-82.

The National Kidney Foundation Kidney Disease Outcomes Quality Initiative. *Am J Kidney Dis.* 2000;35:S1-140.



CKD – sodium and potassium

- Limit sodium intake to 2.0 g per day
- If potassium levels are elevated, limit potassium intake to 2-3 g per day
- When diarrhea or vomiting is present, potassium intake should be liberalized and provided with meals that include a variety of fruits, vegetables, and grains



Gonzalez-Campoy JM et al. *Endocr Pract.* 2013;19 Suppl 3:1-82.

The National Kidney Foundation Kidney Disease Outcomes Quality Initiative. *Am J Kidney Dis.* 2000;35:S1-140.



CKD – phosphorous and calcium

- Hyperphosphatemia may precipitate calcium in patients with CKD, and therefore, oral intake of phosphorus should be limited
- The major intervention to prevent hyperphosphatemia is decreased protein intake
- The use of phosphate binders (mostly calcium) is recommended to decrease intestinal phosphate absorption



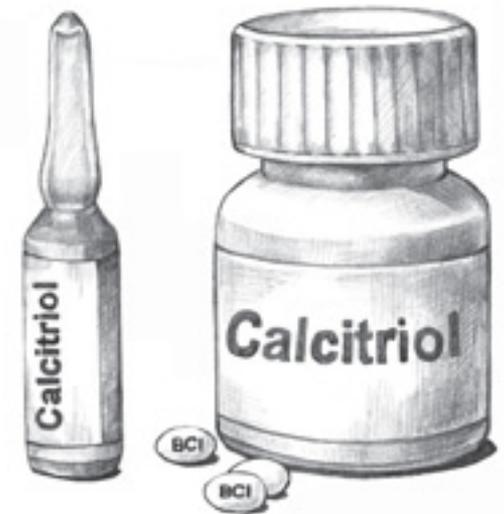
Gonzalez-Campoy JM et al. *Endocr Pract.* 2013;19 Suppl 3:1-82.

The National Kidney Foundation Kidney Disease Outcomes Quality Initiative. *Am J Kidney Dis.* 2003 42:S1-201.



CKD – vitamin D

- Treatment with oral vitamin D is recommended to bring the total serum 25(OH)D level to greater than 30 ng/mL (patients with CKD and hyperphosphatemia with secondary hyperparathyroidism)
- Treatment with the active form of vitamin D is indicated if the intact parathyroid hormone (PTH) level is elevated above goal despite a serum 25(OH)D level > 30 ng/mL



Gonzalez-Campoy JM et al. *Endocr Pract.* 2013;19 Suppl 3:1-82.
The National Kidney Foundation Kidney Disease Outcomes Quality Initiative. *Am J Kidney Dis.* 2003 42:S1-201.



CKD – anemia

- 325 mg of oral ferrous sulfate three times a day is recommended to maintain transferrin saturation $>20\%$ and the serum ferritin >100 ng/mL (patients with CKD stages 3, 4, or 5)



Renal replacement therapy

- For patients with end-stage kidney disease on renal replacement therapy, potassium intake should be limited to 3-4 g/d (peritoneal dialysis) or 2-3 g/d (hemodialysis)
- Patients with DM and end-stage kidney disease who are on renal replacement therapy should be routinely queried regarding their eating habits, home glucose monitoring, and frequency and severity of hypoglycemia



Section 7: What nutritional recommendations are appropriate for bone health?



Bone health: calcium intake recommendations

- Total elemental calcium intake should be 1000 mg per day for premenopausal women and men and 1200 – 1500 mg per day for post-menopausal women
- Excessive amounts of elemental calcium intake (2000 mg/day) may increase risk of kidney stones and other side effects
- Intake > 1500 mg per day is associated with an increased risk of advanced prostate cancer

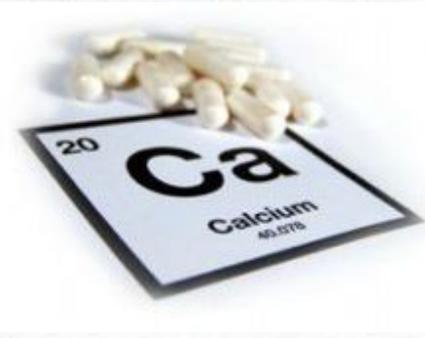


Gonzalez-Campoy JM et al. *Endocr Pract.* 2013;19 Suppl 3:1-82.
Institute of Medicine. Accessed at: <http://www.iom.edu/Reports/2010/Dietary-Reference-Intakes-for-calcium-and-vitamin-D.aspx>. 2011.
Jackson RD et al. *N Engl J Med.* 2006;354:669-683.



Bone health: calcium intake recommendations (con't)

- Supplements should be used if patient's meal plan does not provide adequate calcium intake
- Calcium citrate is recommended instead of calcium carbonate for certain patients
- Calcium supplements should be limited to no more than 500 mg of elemental calcium per dose for best absorption
- Measure 24-hour urine calcium collection in certain patients to check calcium adequacy and test for hypercalciuria or malabsorption



Gonzalez-Campoy JM et al. *Endocr Pract.* 2013;19 Suppl 3:1-82.

Heaney RP et al. *J Am Diet Assoc.* 2005;105:807-809.

Heller HJ et al. *J Clin Pharmacol.* 2000;40:1237-1244.



Bone health: vitamin D intake recommendations

- Measure serum 25(OH)D in those at risk for vitamin D deficiency (elderly, institutionalized, and malnourished individuals) and those with known osteopenia or osteoporosis
- Daily vitamin D supplementation of at least 1,000 to 2000 IU of ergocalciferol (D₂) or cholecalciferol (D₃) should be dosed to keep the plasma 25(OH)D level greater than 30 ng/ml
- Calcitriol should be dosed to allow for adequate intestinal absorption of calcium in patients with advanced renal failure in whom renal activation of vitamin D is impaired



Section 8: What nutritional recommendations are appropriate for pregnancy and lactation?



Pregnancy planning

- Women are encouraged to achieve a normal body mass index prior to pregnancy
- Elevated fasting blood glucose prior to pregnancy should prompt screening for DM
- Elevated fasting blood glucose prior to pregnancy should also prompt a healthy eating meal plan and lifestyle modification
- Chronic diseases should be optimally controlled prior to conception



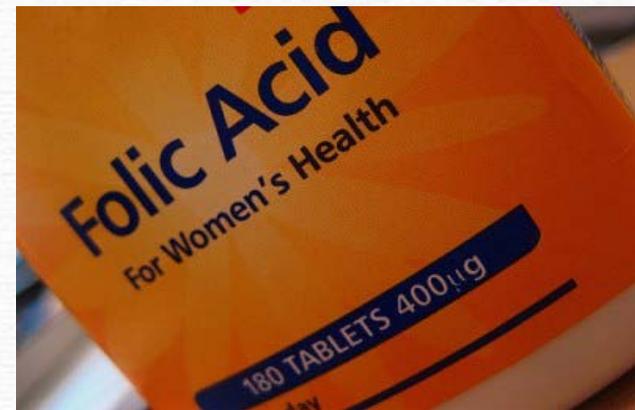
Macronutrient needs during pregnancy

- Individual caloric intake should be calculated based on pre-pregnancy and current (pregnant) body mass index
- Pregnant women who are vegetarian or vegan must be referred to a registered dietician specializing in pregnancy to assist in meal planning and appropriate use of dietary supplements
- Consumption of 1.1 g/kg of protein per day in the second and third trimesters is recommended
- < 10% of calories should be derived from saturated fats and < 10% of calories should be derived from PUFAs



Micronutrient needs during pregnancy

- Daily ingestion of a prenatal multivitamin is recommended
- Consume 400 μg /day of folic acid in childbearing years; and 600 μg /day during pregnancy
- Intake of vitamin A $> 10,000$ IU a day is teratogenic
- Ingest a minimum of 250 μg iodine daily



Pregnancy and diabetes

- Women who have DM and/or are insulin resistant should adjust the percentage of ingested carbohydrate during pregnancy to obtain proper glycemic control
- Those with gestational DM (GDM) should adhere to the recommendations for healthy eating, allow for appropriate weight gain, and avoid concentrated sweets and “fast foods”
- Women with DM should eat small frequent meals with protein, having only one starch with breakfast, and choosing high fiber foods with lower fat content



Pregnancy and caffeine

- Consume less than 300 mg of caffeine (3 cups of coffee) per day during pregnancy



Pregnancy and lactation

- Exclusive breastfeeding is recommended for at least the first six months
- All women should be instructed on breastfeeding, made aware of community resources about breast feeding, and counseled to adjust their meal plans to meet nutritional needs during lactation
- Ingest a minimum of 250 μg iodine daily
- Women who breastfeed should be advised to either lower their basal insulin dose (or basal insulin infusion rate if on an insulin pump), or eat a carbohydrate-containing snack, prior to breastfeeding



Gonzalez-Campoy JM et al. *Endocr Pract.* 2013;19 Suppl 3:1-82.

World Health Organization. Accessed at:

http://www.who.int/maternal_child_adolescent/documents/nhd_01_08/en/. 2001.

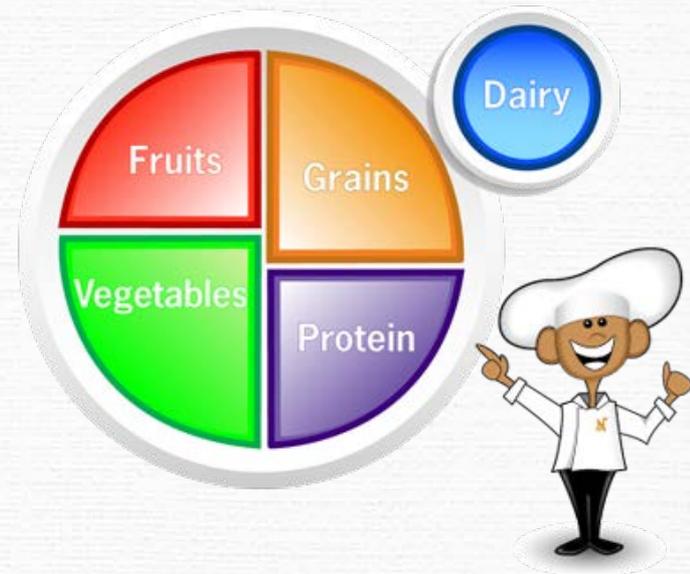


Section 9: What nutritional recommendations are appropriate for the elderly?



Healthy eating for the elderly - energy balance and toward an ideal body weight

- Implement healthy eating to maintain an ideal body weight
- A meal plan should include caloric reduction to maintain energy balance and prevent fat weight gain in those with sarcopenia and a decreased basal metabolic rate
- Routinely ingest quality foods low in calories, containing adequate amounts of high biological value protein sources rich in micronutrients and fibers



Healthy eating for the elderly - energy balance and toward an ideal body weight

- Quality food high in proteins, minerals and vitamins, low in saturated fat, cholesterol, and *trans* fat recommended for overweight or obese elderly patients
- To constrain caloric over-consumption in the elderly, while ensuring micronutrient adequacy, quality foods low in calories and containing adequate amounts of high biological value protein sources to provide essential amino acids and essential fatty acids (EFA), and rich in micronutrients and fibers, should be ingested routinely
- Habitual fluid intake (about two quarts per day, or eight 8 ounce glasses) is recommended



Gonzalez-Campoy JM et al. *Endocr Pract.* 2013;19 Suppl 3:1-82.
Jenkins DJ et al. *Am J Clin Nutr.* 2005;81:380-387.



Healthy eating for the elderly - energy balance and toward an ideal body weight (con't)

- Ingestion of nutrition supplements between meals is recommended for those who are undernourished
- Energy and nutrient-dense foods, or manipulation of energy and nutrient density of the meal plan, is recommended for the frail elderly
- Food safety, including the prevention of food spoilage, should be provided



Gonzalez-Campoy JM et al. *Endocr Pract.* 2013;19 Suppl 3:1-82.

Barton AD et al. *Clin Nutr.* 2000;19:451-454.

Parrott MD et al. *J Am Geriatr Soc.* 2006;54:1382-1387.

Young KW et al. *J Gerontol A Biol Sci Med Sci.* 2005;60:1039-1045.



Healthy eating for the elderly – prevention of micro-nutrient deficiency

- A daily mix of nutrient-dense foods is recommended
- Pills are not to be used as substitutes for meals
- The elderly should consume at least three daily servings of calcium-rich foods
- For those who cannot achieve adequate micronutrient intake, a daily multivitamin (MVI) is recommended to complement food intake
- Surveillance to prevent toxicity from excess ingestion of vitamin pills is appropriate for the elderly



Gonzalez-Campoy JM et al. *Endocr Pract.* 2013;19 Suppl 3:1-82.
Chapuy MC et al. *N Engl J Med.* 1992;327:1637-1642.
Reid IR et al. *Am J Med.* 1995;98:331-335.
Dawson-Hughes B et al. *N Engl J Med.* 1997;337:670-676.



Healthy eating for the frail elderly

- Community nutrition assistance programs that provide individuals with home-delivered meals should be recommended for frail elderly patients still living independently
- Barriers to healthy eating in the elderly should be actively found and addressed

