SODIUM-CONTROLLED DIET

Description
The Sodium-Controlled Diet limits sodium intake to a prescribed level determined by the requirements of a specific disease state. Foods and condiments high in sodium are eliminated or restricted.

The average dietary sodium intake is approximately 4,100 mg/day for American men and 2,750 mg/day for American women; the consumption of processed foods accounts for 75% of the daily sodium intake (1). The minimum daily sodium requirement for healthy adults is estimated to be 500 mg (2). The Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure and the National Research Council recommend that the daily intake of sodium be limited to 2,400 mg (1,2). This recommendation provides guidelines for menu planning and offers direction for preparing healthful alternatives.

Indications
The Sodium-Controlled Diet is used in the treatment of conditions characterized by edema (water retention), including the following:

- cirrhosis of the liver with ascites
- congestive heart failure
- hypertension
- renal disease

Under normal physiologic conditions, the body responds to an increase in sodium consumption with an increase in sodium excretion, generally eliminating the excess sodium within 24 hours (2,3). However, certain diseases or conditions impair the body's ability to maintain a normal sodium and water balance, necessitating a reduction in sodium intake. Excess sodium in the body caused by one of the conditions listed above can lead to edema, increased blood pressure, thirst, and shortness of breath.

Cirrhosis of the liver with ascites: Ascites, an accumulation of nutrient-rich fluid in the peritoneal cavity, often occurs as a result of hepatic cirrhosis. A small percentage of patients with this condition lose weight and reduce their fluid volume by adhering to a sodium-controlled diet (4). Almost 90% of patients respond to combination therapy consisting of a sodium-controlled diet and diuretics, whereas the other 10% of patients are resistant to combination therapy and require further medical intervention (5). Although fluid restrictions often accompany sodium-controlled diets, the efficacy of this practice in the treatment of patients with ascites has been challenged. Fluid restriction may not be necessary unless the serum sodium level drops below 120 mEq/L (4). In patients with ascites, the treatment goal is to achieve a negative sodium balance and a weight loss of 0.5 kg/day (4). Sodium-controlled diets that provide 500 to 2,000 mg of sodium per day, depending on the patient's fluid volume, are recommended (4).

Congestive heart failure: In patients with congestive heart failure, the kidneys respond to a decrease in systemic blood flow by increasing the absorption of sodium and fluids, leading to edema and worsening heart failure. To promote diuresis, a sodium-controlled diet accompanied by diuretic use is the preferred method of treatment (1,2). A 2,000-mg sodium diet is sufficient for patients to respond to diuretic therapy. National clinical practice guidelines for mild to moderate congestive heart failure suggest limiting sodium to 2,000 mg/day and to not exceed 3,000 mg/day(6). (See Section III, Clinical Nutrition Management of Congestive Heart Failure.)

Hypertension: Sodium-sensitive individuals have an impaired ability to excrete large concentrations of sodium, leading to increased serum sodium levels, hypervolemia, and hypertension. Between 20% and 50% of individuals with hypertension, particularly the elderly and African Americans, respond to an increase in sodium consumption with an increase in blood pressure (3). The most recent guidelines from the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure recommend that patients with stage 1 and stage 2 hypertension be treated with a 2,400-mg (100-mmol) or less sodium-controlled diet accompanied by other lifestyle modifications. These lifestyle modifications include losing excess body weight, following the Dietary Approaches to Stopping Hypertension (DASH) eating plan, increasing physical activity, and avoiding excess alcohol intake (1). The DASH collaborative intervention

studies have demonstrated that a reduced sodium diet (<2,400 mg/day) that includes increased intakes of fruits, vegetables, potassium-rich foods, and low-fat dairy foods and decreased intakes of total fat (27%), saturated fat (6%), and cholesterol (<150 mg) has a significant effect on lowering blood pressure (7,8). Patients who followed the DASH eating plan experienced an 8- to 14-mm Hg reduction in systolic blood pressure (7,9). The greatest blood pressure reductions were observed in patients who followed the DASH eating plan at a sodium intake level of 1,500 mg/day (7,9). Sodium-controlled diets also enhance the effectiveness of diuretic therapy (1,2) and may help individuals remain normotensive after the cessation of pharmacologic therapy (1,10).

If a potassium-wasting diuretic, such as thiazide or a loop diuretic, is prescribed, a diet containing increased amounts of potassium may be necessary to avoid hypokalemia (2). (See Nutrition Management of Potassium Intake later in this section and Clinical Nutrition Management of Hypertension and DASH Eating Plan in Section III.)

Renal disease: See Section IG: Medical Nutrition Therapy for Chronic Kidney Disease.

Contraindications
Under normal conditions, the dietary restriction of sodium intake should not cause sodium depletion. However, a sodium-controlled diet is contraindicated in the presence of the following:

- conditions that promote sodium depletion (profuse perspiration, vomiting, and diarrhea)
- impaired mechanisms of sodium conservation (colectomy and ileostomy in the postoperative period)
- conditions that conserve sodium as a normal physiologic adjustment (pregnancy)
- lithium carbonate therapy*

*The kidney does not always discriminate between sodium and lithium. Therefore, with a low sodium intake, the kidney may conserve both sodium and lithium, causing an elevated serum lithium level and the potential for lithium toxicity (3).

Nutritional Adequacy
Sodium-controlled diets can be planned to meet the Dietary Reference Intakes as outlined in the *Statement on Nutritional Adequacy* in Section IA.

How to Order the Diet
- Order the diet in terms of sodium, not salt.
- Order the amount of sodium that should not be exceeded in the diet. Different levels of sodium-controlled diets limit the daily sodium intake to 2,000 mg (87 mEq), 3,000 mg (130 mEq), or 4,000 mg (174 mEq).
- The dietitian may allow certain higher sodium foods to be added to the patient's diet if the patient's sodium intake falls below the prescribed range due to low energy intake.

Note: Diets containing less than 2,000 mg of sodium per day are difficult to sustain outside of the hospital environment for reasons of palatability and convenience (2, 6).

Planning the Diet
Salt substitutes: Salt substitutes will not be offered unless a physician, standing order, or an organization's policy designates their use. Salt substitutes may contain potassium chloride, which could be contraindicated under certain conditions. Some salt substitutes also contain various amounts of sodium.

Sodium in medications: Patients on a sodium-restricted diet should be made aware that certain over-the-counter medications (eg, seltzers and some antacids) contain high quantities of sodium and that they should consult their physician if the medications are used on a regular basis.

See Section III: Clinical Nutrition Management
CONGESTIVE HEART FAILURE
CORTICOSTEROID THERAPY
HYPERTENSION
NEPHROTIC SYNDROME

References

1. Chobanian AV, Bakris GL, Black HR, Cushman WC, Green LA, Izzo JL Jr, Jones DW, Materson BJ, Oparil S, Wright JT Jr, Roccella EJ, and the National High Blood Pressure Education Program Coordinating Committee. Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure. *Hypertension*. 2003;42:1206-1252.
2. Whitmere S. Water, electrolytes, and acid-base balance. In Mahan KL, Escott-Stump S. *Krause's Food, Nutrition and Diet Therapy.* 10th ed. Philadelphia, Pa: WB Saunders; 2000;159.
3. Haddy FJ, Pamnani MB. Role of dietary sodium in hypertension. *J Am Coll Nutr.* 1995;14:428-438.
4. Runyon BA. Care of patients with ascites. *N Engl J Med.* 1994;330:337-342.
5. Aiza I, Perez GO, Schiff ER. Management of ascites in patients with chronic liver disease. *Am J Gastroenterol.* 1994;89:1949-1956.
6. Konstam MA, Dracup K, Bottorff MB, Brook H, Dacey RA, Dunbar SB, Jackson AB, Jessup M, Johnson JC, Jones RH, Luchi RJ, Massie M, Pitt B, Rose EA, Rubin LJ, Wright RF, Baker DW, Born DC. *Heart Failure: Evaluation and Care of Patients With Left Ventricular Systolic Dysfunction*. Clinical Practice Guideline No. 11. Rockville, Md: Agency for Health Care Policy and Research, Public Health Service, US Department of Health and Human Services; 1994. AHCPR Publication No. 94D617.
7. Sacks FM, Svetkey LP, Vollmer WM, Obarzanek E, Conlin PR, Miller ER 3rd, Simons-Morton DG, Karanja N, Lin PH. DASH-Sodium Collaborative Research Group. Effects on blood pressure of reduced dietary sodium and the Dietary Approaches to Stop Hypertension (DASH) diet. *N Engl J Med*. 2001;344:3-10.
8. Svetkey LP, Simons-Morton D, Vollmer WM, Appel LJ, Conlin PR, Ryan DH, Ard J, Kennedy BM, for the DASH Research Group. Effects of dietary patterns on blood pressure: subgroup analysis of the Dietary Approaches to Stop Hypertension (DASH) randomized clinical trial. *Arch Intern Med*. 1999;159:285-293.
9. Vollmer WM, Sacks FM, Ard J, Appel LJ, Bray GA, Simons-Morton DG, Conlin PR, Svetkey LP, Erlinger TP, Moore TJ, Karanja N. Effects of diet and sodium intake on blood pressure: subgroup analysis of the DASH-sodium trial. *Ann Intern Med*. 2001;135:1019-1028.
10. Alderman MH. Non-pharmacological treatment of hypertension. *Lancet.* 1994;344:307-311.

NO ADDED SALT DIET
(4,000-mg Sodium Diet)

FOODS EXCLUDED

Bacon*
Barbecue sauce*
Buttermilk, cultured (limit to 1 cup/day)
Ketchup (limit to 1 tbsp/day)
Cheese, processed
Chili sauce
Commercially canned products, frozen products, or convenience products (unless <600 mg of sodium per entree or <350 mg of sodium per single food items)
Corned beef*
Fish, salty or smoked (eg, anchovies, salted cod, herring, sardines)
Frankfurters*
Ham*
Meat extracts
Meat, luncheon*
Meat, smoked, cured, canned, or pickled
Meat tenderizers
Olives
Party spreads and dips
Salted potato chips, corn chips
Salt pork
Salted bouillon cubes
Salted crackers
Salted nuts
Soups, canned, frozen, or dehydrated (unless reduced-sodium)
Sauerkraut or pickled vegetables
Sausage*
Spices and herbs that contain salt (eg, garlic salt, celery salt, onion salt, and lemon pepper)
Soy sauce
Tuna canned in oil (tuna can be used if rinsed)

*May be calculated into the diet. Select only one serving daily from the entire list.

Note: Foods with sodium contents greater than 350 mg per serving should be calculated into the diet.

FOOD GUIDE — 3,000-MG SODIUM DIET

FOOD GROUP	FOODS ALLOWED	FOODS EXCLUDED
Beverages	Low-sodium carbonated beverages Coffee, tea	
Breads, Cereals, Grain Products	Enriched white, wheat, rye, and pumpernickel bread Hard rolls, dinner rolls Muffins, corn bread Waffles, pancakes Most dry and hot cereals Crackers and breadsticks with unsalted tops Tortillas Enriched unsalted rice, barley, noodles, spaghetti, macaroni, and other pastas Unsalted tortilla chips, pretzels, potato chips, or popcorn Homemade bread stuffing	Breads, rolls, and crackers with salted tops Commercially prepared rice and pasta mixes Salty snack foods Stuffing mixes
Vegetables	All fresh and frozen vegetables Canned, drained vegetables White and sweet potatoes Squash Low-sodium tomato sauce and tomato paste	Sauerkraut, pickled vegetables, and others prepared in brine Vegetables seasoned with ham, bacon, salt pork, cheese, or cheese sauces Commercially prepared potato mixes Regular tomato sauce and puree
Fruits and Juices	All fruits and fruit juices Low-sodium or salt-free vegetable juices	Fruits dried with sodium sulfate Regular vegetable juices
Milk	Milk, buttermilk (limit to 1 cup/day), chocolate milk Yogurt, frozen yogurt	Instant milk beverages, instant cocoa mix, malted milk
Meats and Meat Substitutes	Fresh or frozen beef, lamb, pork, and poultry Fish and most shellfish; canned tuna or salmon, rinsed Eggs and egg substitutes Low-sodium cheese Regular peanut butter (3 times weekly) Dried peas and beans Frozen dinners (<600 mg sodium) *Limit to one serving per day:* Regular cottage cheese or ricotta (½ cup); Swiss or mozzarella cheese (1 oz)	Smoked, cured, salted, koshered, or canned fish, poultry, or meat, including bacon, chipped beef, cold cuts, ham, hot dogs, sausage, sardines, anchovies, marinated herring, and pickled meats Frozen breaded meats Pickled eggs Processed cheese; cheese spreads and sauces
Fats	Butter or margarine Vegetable oils Salad dressings in limited amounts (2 tbsp) Light, sour, and heavy cream Mayonnaise Unsalted nuts	Bacon, salad dressings containing bacon fat, bacon bits, and salt pork Snack dips made with instant soup mixes or processed cheese Salted nuts Olives Canned gravy and mixes

FOOD GROUP	FOODS ALLOWED	FOODS EXCLUDED
Soups	Homemade broth Soups without added salt and made with allowed vegetables Reduced-sodium canned soups and broths	Regular canned or dehydrated soups Bouillon cubes
Desserts and Sweets	All	None
Miscellaneous	Limit added salt to ¼ tsp/day used at the table or in cooking Use a salt substitute with physician's approval Pepper, herbs, spices Vinegar Ketchup (1 tbsp), mustard (1 tbsp) Lemon or lime juice Hot pepper sauce, low-sodium soy sauce (1 tsp), Worcestershire sauce (1 tsp) Salsa (¼ cup)	Seasonings made with salt, including garlic salt, celery salt, onion salt, and seasoned salt; sea salt; rock salt; kosher salt; lemon pepper Meat tenderizers Monosodium glutamate Olives Regular soy sauce, teriyaki sauce, barbecue sauce Most flavored vinegars Cooking wine

SAMPLE MENU

Breakfast	Noon	Evening
Orange Juice	Honey Glazed Chicken	Unsalted Beef Tips and Noodles
Unsalted Cream of Wheat	Steamed Rice	Seasoned Green Beans
Unsalted Scrambled Egg	Steamed Broccoli	Sliced Tomato Salad
Wheat Toast	Fruited Gelatin	French Dressing
Margarine, Jelly	Dinner Roll	Dinner Roll
Milk (1 cup)	Margarine	Margarine
Coffee	Frosted Banana Cake	Peach Halves
Sugar, Creamer	Milk (1 cup)	Iced Tea
	Tea, Sugar	Sugar

FOOD GUIDE — 2,400-MG SODIUM Modified DASH Eating Plan

According to the Dietary Approaches to Stopping Hypertension (DASH) collaborative intervention studies, a diet that reduces sodium (<2,400 mg/day) and includes increased intakes of fruits, vegetables, potassium-rich foods, and low-fat dairy foods and lower intakes of total fat (27%), saturated fat (6%), and cholesterol (<150 mg) has significant blood pressure–lowering effects (1-4). The following food guide combines the DASH recommendations with the sodium guidelines for the treatment of hypertension (≤2,400 mg of sodium) from the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (5). The number of recommended servings in the fruit and vegetable groups may be unrealistic in the hospital setting because of the high fiber content. However, incorporating the low-fat component into the diet and encouraging an increased intake of fruits and vegetables in this setting will start the self-management training process with the patient. (See Section III, DASH Eating Plan.)

FOOD GROUP	FOODS ALLOWED	FOODS EXCLUDED
Beverages	Low-sodium carbonated beverages Coffee, tea Limit caffeine to less than 300 mg/day	
Breads, Cereals, Grain Products	Hot cereal without salt Puffed rice, puffed wheat, shredded wheat, and low-sodium dry cereals Low-sodium crackers Tortillas Enriched unsalted rice, barley, noodles, spaghetti, macaroni, and other pastas Unsalted tortilla chips, pretzels, potato chips, or popcorn *Limit to six servings per day:* Enriched white, wheat, rye, and pumpernickel bread; hard rolls and dinner rolls; low-fat muffins; pancakes; most dry and instant hot cereals; crackers and breadsticks with unsalted tops; homemade bread stuffing	Breads, rolls, and crackers with salted tops; corn bread Frozen waffles Commercially prepared rice, pasta mixes, and bread stuffing Salty snack foods
Vegetables	*Eat four or five servings per day. In the hospital setting, this quantity may be unrealistic, as patients may not easily digest this amount of fiber.* All fresh and frozen vegetables Canned, drained, and rinsed vegetables Unsalted tomato paste, low-sodium tomato sauce	Sauerkraut, pickled vegetables, and others prepared in brine Vegetables seasoned with ham, bacon, or salt pork Regular tomato sauce, puree, and paste Vegetables in cream or cheese sauce Commercially prepared potato mixes
Fruits and Juices	*Eat four or five servings per day. In the hospital setting, this quantity may be unrealistic, as patients may not easily digest this amount of fiber.* All fruits and fruits juices Low-sodium, salt-free vegetable juices	Regular vegetable juices Fruits processed with salt or sodium-containing compounds
Milk	*Eat three servings per day:* Low-fat or nonfat milk, chocolate milk (1 cup) Low-fat yogurt, frozen yogurt (8 oz)	Buttermilk, whole, or reduced-fat milk Instant hot chocolate/cocoa mixes Malted milk

FOOD GROUP	FOODS ALLOWED	FOODS EXCLUDED
Meats and Meat Substitutes	*Limit to 5-6 oz/day:* Fresh or frozen lean beef, lamb, pork, and poultry Fish and most shellfish; canned tuna or salmon, rinsed Egg substitutes Low-sodium, low-fat cheese Dried peas and beans Frozen dinners (<600 mg sodium) *Limit to one serving per day*: Regular cottage cheese or ricotta (½ cup); Swiss or mozzarella cheese (1 oz)	Smoked, cured, salted, koshered, or canned fish, poultry, or meat, including bacon, chipped beef, cold cuts, ham, hot dogs, sausage, sardines, anchovies, marinated herring, imitation seafood, and pickled meats Fatty meat Peanut butter Frozen breaded meats Pickled eggs Processed cheese; cheese spreads and sauces
Fats	*Limit to 6 tsp or portions per day:* Unsaturated vegetable oils: canola, safflower, sunflower, corn, peanut, olive, soybean Margarine in which the first ingredient is "liquid oil"; diet margarine Unsalted nuts (1 oz) *Limit to one serving per day:* Regular or fat-free salad dressings or mayonnaise (1 tbsp); fat-free cream cheese	Butter, bacon, salad dressings containing bacon fat, bacon bits, and salt pork Snack dips made with instant soup mixes or processed cheese Tartar sauce Salted nuts Olives Gravy Mixes Mayonnaise
Note: Fat-free dressings and cream cheese do not count as a fat, but are limited because of sodium content.		
Soups	Homemade broth without salt Soups without added salt and made with allowed vegetables Reduced-sodium canned soups and broths	Regular canned or dehydrated soups
Desserts and Sweets	Sherbet Low-fat frozen yogurt (½ cup) Flavored gelatin Angel food cake Jam, jelly Syrup Hard candy Fat-free frozen desserts, cakes, and cookies	Commercially baked pies, cakes, cookies, doughnuts, pastries, brownies, cheesecake Ice cream Commercially prepared fudge, caramel, or butterscotch toppings Instant pudding mix
Miscellaneous	*Limit to one serving per day (because of sodium content):* Salt substitute with physician's approval Pepper, herbs, spices Vinegar Ketchup (1 tsp/day), mustard (1 tsp/day) Lemon or lime juice Hot pepper sauce, Worcestershire sauce (1 tsp/day) Low-sodium condiments Salsa (¼ cup)	Seasonings made with salt, including garlic salt, celery salt, onion salt, and seasoned salt; sea salt; rock salt; kosher salt Meat tenderizers Monosodium glutamate Relish Regular soy sauce, chili sauce, steak sauce, teriyaki sauce, barbecue sauce Most flavored vinegars Cooking wine

SAMPLE MENU

Breakfast	Noon	Evening
Orange Juice	Honey Glazed Chicken	Unsalted Beef Tips and Noodles
Stewed Prunes	Steamed Rice	Seasoned Green Beans
Unsalted Cream of Wheat	Steamed Broccoli	Seasoned Carrots
Unsalted Scrambled Egg	Tossed Salad with Fat-Free Dressing	Sliced Tomato Salad
Wheat Toast	Dinner Roll	Dinner Roll
Margarine, Jelly	Margarine	Margarine
Nonfat Milk (1 cup)	Fresh Banana	Peach Halves
Coffee	Nonfat Milk (1 cup)	Iced Tea
Sugar, Creamer	Tea, Sugar	Sugar

References

1. Appel LJ, Moore T, Obarzanek E, Vollmer W, for the DASH Collaborative Research Group. A clinical trial of the effects of dietary patterns on blood pressure. *N Engl J Med*. 1997;336:1117-1123.
2. Sacks FM, Svetkey LP, Vollmer WM, Obarzanek E, Conlin PR, Miller ER 3rd, Simons-Morton DG, Karanja N, Lin PH. DASH-Sodium Collaborative Research Group. Effects on blood pressure of reduced dietary sodium and the Dietary Approaches to Stop Hypertension (DASH) diet. *N Engl J Med*. 2001;344:3-10.
3. Svetkey LP, Simons-Morton D, Vollmer WM, Appel LJ, Conlin PR, Ryan DH, Ard J, Kennedy BM, for the DASH Research Group. Effects of dietary patterns on blood pressure: subgroup analysis of the Dietary Approaches to Stop Hypertension (DASH) randomized clinical trial. *Arch Intern Med*. 1999;159:285-293.
4. Vollmer WM, Sacks FM, Ard J, Appel LJ, Bray GA, Simons-Morton DG, Conlin PR, Svetkey LP, Erlinger TP, Moore TJ, Karanja N. Effects of diet and sodium intake on blood pressure: subgroup analysis of the DASH-sodium trial. *Ann Intern Med*. 2001;135:1019-1028.
5. Chobanian AV, Bakris GL, Black HR, Cushman WC, Green LA, Izzo JL Jr, Jones DW, Materson BJ, Oparil S, Wright JT Jr, Roccella EJ, and the National High Blood Pressure Education Program Coordinating Committee. Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure. *Hypertension*. 2003;42:1206-1252.

FOOD GUIDE — 2,000-MG SODIUM DIET

FOOD GROUP	FOODS ALLOWED	FOODS EXCLUDED
Beverages	Coffee, tea Low-sodium carbonated beverages	
Breads, Cereals, Grain Products	Hot cereal without salt Puffed rice, puffed wheat, shredded wheat, and low-sodium dry cereals Low-sodium crackers Tortillas Enriched unsalted rice, barley, noodles, spaghetti, macaroni, and other pastas Unsalted tortilla chips, pretzels, potato chips, or popcorn *Limit to six servings per day:* Enriched white, wheat, rye and pumpernickel bread; hard rolls and dinner rolls; muffins; pancakes; most dry and instant hot cereals; crackers and breadsticks with unsalted tops; homemade bread stuffing	Breads, rolls, and crackers with salted tops Corn bread Frozen waffles Commercially prepared rice, pasta mixes, or bread stuffing Salty snack foods
Vegetables	All fresh and frozen vegetables Canned, drained, and rinsed vegetables White or sweet potatoes Squash Unsalted tomato paste, low-sodium tomato sauce	Sauerkraut, pickled vegetables, and others prepared in brine Vegetables seasoned with ham, bacon, or salt pork Regular tomato sauce, puree, and paste Commercially prepared potato mixes
Fruits and Juices	All fruits and fruit juices Low-sodium, salt-free vegetable juices	Regular vegetable juices Fruits processed with salt or sodium-containing compounds
Milk	*Limit to two servings per day:* Milk, chocolate milk, yogurt, frozen yogurt	Buttermilk
Meats and Meat Substitutes	Fresh or frozen beef, lamb, pork, and poultry Fish and most shellfish; canned tuna or salmon, rinsed Eggs and egg substitutes Low-sodium cheese Regular peanut butter (3 times per week) Dried peas and beans Frozen dinners (<600 mg sodium) *Limit to one serving per day*: Regular cottage cheese or ricotta (½ cup); Swiss or mozzarella cheese (1 oz)	Smoked, cured, salted, koshered, or canned fish, poultry, or meat, including bacon, chipped beef, cold cuts, ham, hot dogs, sausage, sardines, anchovies, marinated herring, imitation seafood, and pickled meats Frozen breaded meats Pickled eggs Processed cheese; cheese spreads and sauces
Fats	Butter or margarine Vegetable oils Unsalted nuts *Limit to one serving per day:* Regular or fat-free salad dressings or mayonnaise (1 tbsp); fat-free cream cheese *Note: Fat-free dressings and cream cheese do not count as a fat, but are limited because of sodium content.*	Bacon, salad dressings containing bacon fat, bacon bits, and salt pork Snack dips made with instant soup mixes or processed cheese Tartar sauce Salted nuts Canned gravy and mixes Olives

FOOD GROUP	FOODS ALLOWED	FOODS EXCLUDED
Soups	No-added-salt broths and soups made with allowed vegetables; reduced-sodium canned soups and broths	Regular canned or dehydrated soups
Desserts and Sweets	Ice cream, sherbet, flavored gelatin, jam, jelly, syrup *Limit to one serving per day:* Homemade pie (⅛ of 9-inch); non-instant or low-sodium pudding or custard (½ cup); cookies (2); cake (1/16 of 9-inch)	Cheesecake or instant pudding mixes
Miscellaneous	Salt substitute with physician's approval Pepper, herbs, spices Vinegar Ketchup (1 tsp/day), mustard (1 tsp/day) Lemon or lime juice Hot pepper sauce, Worcestershire sauce (1 tsp/day) Low-sodium condiments Salsa (¼ cup)	Seasonings made with salt, including garlic salt, celery salt, onion salt, and seasoned salt; kosher salt Meat tenderizers Monosodium glutamate Relish Soy sauce, chili sauce, steak sauce, teriyaki sauce, barbecue sauce Most flavored vinegar Cooking wine

SAMPLE MENU

Breakfast	Noon	Evening
Orange Juice	Honey Glazed Chicken	Unsalted Beef Tips and Noodles
Unsalted Cream of Wheat	Steamed Rice	Seasoned Green Beans
Unsalted Scrambled Egg	Steamed Broccoli	Sliced Tomato Salad
Wheat Toast	Fruited Gelatin	French Dressing
Margarine, Jelly	Dinner Roll	Dinner Roll
Milk (1 cup)	Margarine	Margarine
Coffee	Frosted Banana Cake	Peach Halves
Sugar, Creamer	Milk (1 cup)	Iced Tea
	Tea, Sugar	Sugar

FOOD GUIDE — 1,000-MG SODIUM DIET

FOOD GROUP	FOODS ALLOWED	FOODS EXCLUDED
Beverages	Coffee; tea Low-sodium carbonated beverages	Gatorade
Breads, Cereals, Grain Products	Hot cereal without salt Puffed rice, puffed wheat, shredded wheat, and low-sodium dry cereals Low-sodium bread Low-sodium crackers, melba toast, and matzo Tortilla Enriched unsalted rice, barley, and pastas Unsalted tortilla chips, pretzels, potato chips, or popcorn *Limit to 2 servings per day:* Enriched white, wheat, rye, and pumpernickel bread or breadsticks; hard rolls and dinner rolls; homemade bread stuffing	Breads, rolls, and crackers with salted or unsalted tops Quick breads; biscuits; cornbread; muffins Frozen waffles; pancakes Regular dry cereal; instant hot cereals Self-rising flour Commercially prepared rice or pasta mixes Potato chips; salty snack foods
Vegetables	All fresh, unsalted frozen vegetables Low-sodium canned vegetables White or sweet potatoes Squash Unsalted tomato paste	Regular canned vegetables, sauerkraut, pickled vegetables, and others prepared in brine Vegetables seasoned with ham, bacon, or salt pork Tomato sauce, puree, and regular paste Commercially prepared potato mixes Frozen peas, lima beans, and mixed vegetables All frozen vegetables in sauce
Fruits and Juices	All fruits and fruits juices Low-sodium, salt-free vegetable juices	Regular vegetable juices Fruits processed with salt or sodium compounds, eg, some dried fruits
Milk	*Limit to 2 servings per day* Milk Yogurt	Malted milk; milk shake; buttermilk; chocolate milk
Meats and Meat Substitutes	Any fresh or frozen beef, lamb, pork, and poultry Fish and most shellfish; low-sodium canned tuna or salmon Eggs Low-sodium cheese, cottage cheese, and ricotta cheese Low-sodium peanut butter Dried peas and beans	Any smoked, cured, salted, koshered, or canned meat, fish, poultry including bacon, chipped beef, cold cuts, ham, hot dogs, sausage, sardines, anchovies, marinated herring, and pickled meats Frozen breaded meats Egg substitutes; pickled eggs Regular hard and processed cheese; cottage cheese; cheese spreads and sauces Regular peanut butter Frozen dinners
Fats	Unsalted butter or margarine Vegetable oils Low-sodium salad dressing; low-sodium mayonnaise Nondairy creamer (≤1 oz/day) Unsalted nuts Low-sodium cream cheese	Bacon, bacon bits, and salt pork; regular salad dressings; snack dips made with instant soup mixes or processed cheese; canned gravies and mixes; tartar sauce, salted nuts; olives

FOOD GROUP	FOODS ALLOWED	FOODS EXCLUDED
Soups	No-added-salt broths and soups made with allowed vegetables Low-sodium canned soups and broths Low-sodium cream soups made with milk allowance	Regular canned or dehydrated regular soups
Desserts and Sweets	Ice cream Low-sodium pudding Frozen yogurt (count as part of milk allowance) Fruit ice Gelatins and sherbet (not to exceed ½ cup/day) Jam; jelly Syrup	Instant puddings Commercial cake, cookie, and brownie mixes Cheesecake
Miscellaneous	Salt substitute with physician's approval Pepper; herbs; spices Vinegar Low-sodium condiments (ketchup, mustard) Lemon or lime juice Hot pepper sauce Fresh ground horseradish Salsa (¼ cup)	Any seasoning made with salt, including garlic salt, celery salt, onion salt, and seasoned salt; kosher salt Meat tenderizers Monosodium glutamate Worcestershire sauce; regular and low-sodium soy sauce; chili sauce, teriyaki sauce; barbecue sauce Most flavored vinegars Regular condiments Commercial salsa Cooking wine

SAMPLE MENU

Breakfast	Noon	Evening
Orange Juice	Honey Glazed Chicken	Unsalted Beef Tips & Noodles
Unsalted Cream of Wheat	Steamed Rice	Unsalted Green Beans
Unsalted Scrambled Egg	Steamed Broccoli	Sliced Tomato Salad
Melba Toast	Fruited Gelatin	Dinner Roll
Margarine, Jelly	Dinner Roll	Unsalted Margarine
Milk (1 cup)	Unsalted Margarine	Peach Halves
Coffee	Fresh Banana	Iced Tea
Sugar, Creamer	Milk (1 cup)	Sugar
	Tea, Sugar	

NUTRITION MANAGEMENT OF POTASSIUM INTAKE

Description
The medical condition and nutritional requirements of the patient influence whether the dietary intake of potassium is adequate. The amount of potassium in the diet may need to be either increased or decreased, depending on the patient's condition.

Indications
A diet with an increased potassium content is prescribed to retain body potassium stores in the following:

- patients whose long-term use of potassium-losing diuretics, combined with a marginal potassium intake, contributes to potassium depletion
- patients who have increased urinary and gastrointestinal potassium losses resulting from certain diseases or conditions, eg, edema associated with certain cardiac or hepatic disorders, dehydration, the diuretic stage of nephritis

A potassium-supplemented diet may be used in conjunction with pharmaceutical potassium supplements, or alone, in individuals with a mild potassium depletion who are not able to tolerate potassium supplements. However, without supplements, it may be difficult for a patient to consistently increase dietary potassium intake over his or her usual level of intake.

A diet restricting potassium intake is usually required for patients with hyperkalemia, which commonly is caused by renal disease or certain medications. See Medical Nutrition Therapy for Renal Disease in Section IG. For patients requiring a Simplified Renal Diet, refer to Simplified Renal Diet in Section IG.

Nutritional Adequacy
Increased potassium intake: The diet is planned as a Regular Diet with an increase in foods that are high in potassium. The diet is planned to meet the Dietary Reference Intakes (DRIs) as outlined in the *Statement on Nutritional Adequacy* in Section IA.

Decreased potassium intake: See Dietary Management with the Renal Choice System in Section IG.

How to Order the Diet
To increase potassium intake: Order the diet as "Regular Diet with high potassium foods." If a specific potassium level is desired, specify the level in grams.

Individual potassium intake varies. To determine the patient's current potassium intake, the physician should order a nutrition consult, including a diet recall of the patient's intake of potassium. From this evaluation, the dietitian can make appropriate recommendations for the patient to increase potassium intake.

To decrease potassium intake: See Dietary Management with Renal Choice System and Simplified Renal Diet in Section IG.

Planning the Diet
To increase potassium intake, refer to the Table F-1: Potassium Content of Common Foods.

See Section IG: Modification of Protein
MEDICAL NUTRITION THERAPY FOR RENAL DISEASE

POTASSIUM CONTENT OF COMMON FOODS

FOOD ITEM	SERVING SIZE	POTASSIUM (mg)
Dairy Products		
Cheese, American	1 oz	101
Cheese, Cheddar	1 oz	127
Ice Cream	¾ cup	192
Milk	1 cup	422
Yogurt, Fruited	1 cup	441
Dried Beans and Peas		
Great Northern Beans	½ cup	344
Lima Beans	½ cup	369
Pinto Beans	½ cup	397
Peas	½ cup	216
Fruits		
Apricots, Dried	5	241
Banana	½ medium	226
Cantaloupe	1 cup of pieces	494
Dates	¼ cup	290
Grapefruit	½ small	156
Honeydew Melon	1 cup of pieces	461
Orange Juice	½ cup	236
Orange	1 small, 2½-inch diameter	237
Prune Juice	½ cup	353
Strawberries	¾ cup	185
Watermelon	1 cup	185
Vegetables		
Broccoli	½ cup	227
Brussels Sprouts	½ cup	247
Mushrooms, Cooked	½ cup	278
Potato, Baked in Skin	1-2 1/3 × 4 ¾ inches	609
Potato, Mashed With Margarine	½ cup	244
Spinach	½ cup	419
Sweet Potatoes	½ cup	348
Tomato, Fresh	2 slices	109
Tomato Sauce	¼ cup	226
Breads and Cereals		
Bran Buds	1/3 cup	421
Bran Flakes	½ cup	123
Oatmeal, Cooked	½ cup	200
Raisin Bran	1¼ oz (1 box)	184
Wheat Germ	1 tbsp	134
Whole Wheat Bread	1 slice	26
Meats, Fish, Poultry		
Beef; Chicken	1 oz	79 (average)
Tuna	¼ cup	89
Nuts		
Peanut Butter	2 tbsp	91
Peanuts, Dry Roasted	1 oz	230
Pecans	1 oz	105

Source: USDA Handbook No. 8. Washington, DC: US Dept of Agriculture; 1986.

NUTRITION MANAGEMENT OF PHOSPHORUS INTAKE

Description
Phosphorus intake is limited to the prescribed level.

Indications
Hyperphosphatemia can lead to secondary hyperparathyroidism, resulting in bone disease. To prevent hyperphosphatemia, a phosphorus-restricted diet may be adjunctive to the use of agents that bind phosphorus in the gastrointestinal tract for individuals with chronic renal failure. Generally, phosphorus is restricted to 600 to 1200 mg/day. However, when a simultaneous restriction of protein is ordered, such as in renal disease, the phosphorus level is generally lowered enough to be within the desired range. With a glomerular filtration of 25 mL/min, phosphate binding substances alone are usually sufficient to control the serum phosphorus level. See Diet in Renal Disease in Section IG.

Nutritional Adequacy
If the phosphorus level is restricted to a level below 800 mg, the Dietary Reference Intakes (DRIs) for phosphorus will not be met. If milk products are restricted in order to achieve this level of phosphorus, the DRI for calcium, vitamin D, and riboflavin may not be met; calcium supplementation may be indicated. See Medical Nutrition Therapy for Renal Disease in Section IG for a discussion of nutritional adequacy for patients with renal disease.

How to Order the Diet
Specify the desired intake of phosphorus in milligrams and any other restrictions, eg, _____ Diet, ___ mg phosphorus.

Planning the Diet
Generally, the phosphorus restriction can be met by:

- limiting the intake of foods containing milk
- eliminating legumes, nuts, chocolate, and cola from the diet
- substituting refined grains for whole grains

Refer to Table F-2: Phosphorus Content of Common Foods, for additional foods that may warrant restriction.

See Section IG: Moderation of Protein
MEDICAL NUTRITION THERAPY FOR RENAL DISEASE

PHOSPHOROUS CONTENT OF COMMON FOODS

FOOD ITEM	SERVING SIZE	PHOSPHORUS (mg)
Dairy Products		
Cheese, American	1 oz	112
Cheese, Cheddar	1 oz	143
Cheese, Cottage	½ cup	69
Ice Cream	¾ cup	101
Milk	1 cup	250
Yogurt, Fruited	1 cup	271
Dried Beans and Peas		
Great Northern Beans	½ cup	145
Lima Beans	½ cup	100
Pinto Beans	½ cup	136
Peas	½ cup	94
Breads and Cereals		
Bran Buds	1/3 cup	218
Bran Flakes	½ cup	96
Oatmeal, Cooked	½ cup	122
Raisin Bran	1 ¼ oz (1 box)	132
Wheat Germ	1 tbsp	162
Whole Wheat Bread	1 slice	64
Meats, Fish, Poultry		
Beef; Chicken	1 oz	65 (average)
Egg	1	90
Tuna	¼ cup	53
Nuts		
Peanut Butter	2 tbsp	103
Peanuts, Dry Roasted	1 oz	100
Pecans	1 oz	86
Miscellaneous		
Cola	12 oz	45
Chocolate	1 oz	40

Source: USDA Handbook No. 8. Washington, DC: US Dept of Agriculture; 1986.

NUTRITION MANAGEMENT OF CALCIUM INTAKE

Description
The medical condition and nutritional requirements of the patient influence whether the dietary intake of calcium is adequate. The amount of calcium in the diet may need to be either increased or decreased, depending on the patient's condition.

Indications
Calcium restriction may be indicated for the following:

- to control hypercalciuria
- in conjunction with overall treatment for urolithiasis

An adequate intake of calcium has been associated with a reduced risk of osteoporosis. The Dietary Reference Intakes (DRIs) includes the amount of calcium needed to reduce the risk of osteoporosis (1). However, it is difficult for many women to consume these levels without supplementation. In addition, after gastric bypass procedures, calcium supplementation will be required to maintain serum levels and prevent metabolic bone disease.

Nutritional Adequacy
Calcium-Restricted Diet: The diet is inadequate in calcium, vitamin D, and riboflavin.

Calcium-Enhanced Diet: The diet meets the DRIs as stated in the *Statement on Nutritional Adequacy* in Section IA.

How to Order the Diet
To decrease calcium in the diet: Specify the desired level of calcium intake in milligrams. Include any other necessary restrictions. Order _____Diet, _____ mg calcium.

To increase calcium in the diet above the DRI: Specify the desired level of calcium in milligrams. The DRI for calcium for males and females is as follows (1):

Age (years)	**Calcium (mg/day)**
9 to 18	1300
19 to 50	1000
≥51	1200

Planning the Diet
To restrict calcium: Eliminate milk and all milk products.

To encourage increase in calcium intake: Refer to Table F-3: Calcium Content of Common Foods, for additional foods to encourage eating. If supplementation is required, recommend supplements with calcium carbonate, since this form contains the most available amount of elemental calcium. Refer to the supplement's label to determine the actual amount of calcium, which usually is referred to as elemental calcium (2,3) Elemental calcium is highest in calcium carbonate (40%). Other calcium supplements contain lesser amounts of elemental calcium, eg, calcium phosphate (38%), calcium citrate (21%), calcium lactate (13%), and calcium gluconate (9%). To calculate the amount of elemental calcium in a supplement, identify the number of milligrams the supplement contains. For example: 1 pill of 650 mg of calcium carbonate [650 mg x 40%] provides 260 mg of elemental calcium (2). Approximately 4 tablets per day of calcium carbonate are needed to meet the RDI for most age-groups. Calcium supplements of 1200 to 1500 mg/day should be provided to all patients after gastric bypass surgery (Roux-en-Y and bilio-pancreatic diversion (BPD)) (4). In the cases of gastric bypass, calcium citrate with vitamin D is the preferred preparation because it is more soluble than calcium carbonate in the absence of gastric acid production (5). For patients with the BPD procedure who have clinical steatorrhea, a high dose calcium supplementation regimen (2000 mg/day) along with monthly intramuscular vitamin D is recommended to reduce the risk of metabolic bone disease (1)..

Adequate intake or synthesis of vitamin D is critical to ensure adequate absorption of calcium. The DRI for vitamin D for men and women is as follows (1):

Age (years)	Vitamin D (IU)
19 to 50	200
51 to 70	400
≥71	600

Although vitamin D is synthesized in the skin from exposure to sunlight, studies have shown that older adults usually do not have adequate exposure to sunlight to synthesize the necessary vitamin D. This problem is compounded by increased use of sunscreens with high sun protection factors and an inefficiency of the skin to manufacture vitamin D as adults age. For adults over 50 years of age and younger adults who spend little time outside, it may be advised to take a daily multivitamin with vitamin D (which typically contains 400 IU of vitamin D) (6-8).

CALCIUM CONTENT OF COMMON FOODS

FOOD ITEM	SERVING SIZE	CALCIUM (mg)
Milk and Dairy Products		
Cheese		
American	1 oz	174
Cheddar	1 oz	204
Cottage, Creamed	1 oz	68
Mozzarella, Part Nonfat	1 oz	183
Parmesan Cheese	1 tbsp	70
Swiss	1 oz	272
Hot Cocoa	1 cup	106-300
Ice Cream	½ cup	88
Ice Milk	½ cup	102
Milk, Whole, Nonfat, Chocolate	1 cup	287-300
Pudding	½ cup	125-187
Sherbet	½ cup	52
Yogurt, Fat-Free	8 oz	314
Yogurt, Frozen	4 oz	105
Yogurt, Fruit-Flavored	8 oz	415
Yogurt, Plain	8 oz	415
Fish		
Sardines, Canned With Bones	1 oz	101
Salmon, Canned With bones	1 oz	74
Vegetables		
Broccoli	½ cup cooked	89
Collard Greens	½ cup cooked	178
Kale	½ cup cooked	90
Turnip Greens	½ cup cooked	125
Legumes		
Great northern beans	1 cup cooked	121
Navy beans	1 cup cooked	128
Pinto beans	1 cup cooked	82
Fruits		
Dried figs	5	258
Calcium-fortified orange juice	1 cup	300

Sources: USDA Handbook No. 8. Washington DC: US Dept of Agriculture; 1986.
Position of The American Dietetic Association and Dietitians of Canada: vegetarian diets. *J Am Diet Assoc*. 003;103(6):748-765.

References

1. Institute of Medicine, Food and Nutrition Board. *Dietary Reference Intakes for Calcium, Phosphorus, Magnesium, Vitamin D and Fluoride.* Washington, DC: National Academy Press; 1997.
2. Calcium Supplements (Systemic). MedlinePlus Health Information Available at http://www.nlm.nih.gov/medlineplus/druginfo/uspdi/202108.html. Accessed September 16, 2002.
3. National Osteoporosis Foundation. How calcium helps. Available at: http://www.nof.org/other/calcium.html. Accessed April, 27, 1998.
4. Kushner R. Managing the obese patient after bariatric surgery: a case report of severe malnutrition and review of the literature. *JPEN*. 2000;24:126-132.
5. Levenson DI, Bockman RS. A review of calcium preparations. *Nutr Rev*. 1994;52:221-232.
6. National Osteoporosis Foundation. How can I prevent osteoporosis? Available at: http://www.nof.org/PreventOsteo.html. Accessed April 27, 1998.
7. Thomas MK, Lloyd-Jones DM, Thadhani RI, Shaw AC, Deraska DJ, Kitch BT, Vamvakas EC, Dick IM, Prince RL, Finkelstein JS *N Engl J Med*. 1998;338:777-783.
8. Malabanan A, Veronikis IE, Holick MF. *Lancet*. 1998;351:805-806. Letter.

