

Fat-Controlled Diet (25g or 50g)

PURPOSE - A fat-controlled diet is used to relieve symptoms of diarrhea, steatorrhea, flatulence, abdominal pain, and/or to control nutrient losses caused by the ingestion of excess dietary fat.

USE - This diet may be used in the treatment of diseases of the hepatobiliary tract, pancreas, intestinal mucosa, and the lymphatic system as well as in malabsorption syndromes in which digestion, absorption, or utilization and transport of dietary fat is impaired. The latter include small bowel resection, intestinal lymphangiectasia, abetalipoproteinemia, chronic pancreatitis, Crohn's disease, malabsorption in the elderly, and patients with Acquired Immune Deficiency Syndrome (AIDS). The excretion of more than 6g to 8g of fat (or over 10% of fat consumed) per day over a 3-day period following a fecal fat assay indicates overall fat malabsorption. Further testing is needed to determine whether the steatorrhea is caused by small intestinal, pancreatic, or hepatobiliary disease. This diet is not designed for use in lowering serum lipid levels.

A low-fat diet may also be useful in the treatment of patients with gastroesophageal reflux. A decreased fat intake will increase lower esophageal sphincter pressure, thus reducing symptoms of heartburn and dysphagia. Although steatorrhea is often a presenting symptom in celiac sprue (gluten-sensitive enteropathy), adherence to a strict gluten-free diet often brings about an end to steatorrhea, thus obviating the need for a low-fat diet.

In individuals with cystic fibrosis, generally a low-fat diet is no longer recommended since the advent of enteric-coated pancreatic enzymes. Adequate doses of these supplements can normalize fat excretion in these individuals. Liberalizing fat intake may increase the likelihood that a nutritionally adequate diet will be consumed.

Many persons with malabsorption also may have difficulty tolerating excess dietary fiber and/or lactose.

MODIFICATIONS - In general, the 50-g-fat diet allows 6 oz of lean meat or meat substitutes and three to five fat equivalents per day. A 25-g-fat diet allows 4 oz of lean meat or meat substitutes per day and one fat equivalent per day (*Table 1*). The food plan should be adjusted and individualized based on food preferences and a person's ability to monitor total fat intake. Individual tolerance should be monitored closely and the level of fat restriction adjusted if symptoms persist. Medium-chain triglycerides may be substituted for some fat in the diet. Additional carbohydrates in the form of starches and sugars also may be indicated for some patients to meet caloric requirements. Protein intake can be increased with the use of nonfat dairy products, as tolerated. Low-fat dietary supplements also may prove useful to increase nutrient intake. Pancreatic enzyme replacements may be prescribed by the physician. Mean fat excretion may be significantly decreased when enzymes are given prior to meals.

**RELATED
PHYSIOLOGY -** Various alterations in the intestinal tract due to surgical, therapeutic, genetic, or food sensitivities can contribute to fat malabsorption. Interference with fat digestion or absorption can lead to diarrhea, steatorrhea, and nutrient losses.

Disorders that affect gastric, pancreatic, and hepatobiliary function may cause an impairment in the breakdown and digestion of fat. Lipase or bile acid insufficiencies are the most common causes of maldigestion. The deficiency of pancreatic lipase or the blockage of the pancreatic duct results in reduced hydrolysis of dietary fat. This may occur in pancreatitis, cystic fibrosis, and pancreatic cancer, as well as after a pancreatic resection. Bile acid insufficiency results in reduced emulsification of fats with a subsequent decrease in fat absorption. Hepatobiliary disease, ileal disease or resection, and bacterial overgrowth in the intestines can all result in diminished bile acid activity.

Malabsorption of fat occurs when the structure or function of the small bowel mucosa is altered or damaged (as in Crohn's disease or deliac sprue) and when there is a decrease in the mucosal surface areas (as in short bowel syndrome). Patients with steatorrhea from ileal disease often need to restrict fat and oxalate in their diet and often require monthly injections of vitamin B-12. A fat restriction may also be indicated for patients with defects in the lymphatic transport of fat (as in intestinal lymphangiectasia) and for the management of disorders in which fat utilization is impaired (as in abetailipoproteinemia).

TABLE 1

GUIDELINES FOR FOOD SELECTION FOR FAT-RESTRICTED DIET
(25 G or 50 g of fat)

Food Groups	Foods Recommended	Foods to Avoid
<p>Beverages To be taken as desired (fat/serving: trace)</p>	<p>Cocoa made with cocoa powder and skim milk; coffee; tea; soft drinks; fat-free powdered drinks; juices</p>	<p>Whole-milk beverages; added cream or chocolate</p>
<p>Breads and cereals 6-11 servings/d (fat/serving: ≤ 1g)</p>	<p>Whole-grain breads, enriched breads; saltines, soda crackers, other low-fat crackers; cooked cereals, whole grain cereal except granola type; plain corn or flour tortillas; bagels</p>	<p>Biscuits; breads containing egg or cheese; sweet rolls; pancakes; French toast; doughnuts; waffles; fritters; muffins; granola-type cereals and breads to which extra fat is added; popovers; snack crackers with added fat; snack chips; stuffing; fried tortillas</p>
<p>Desserts In moderation (fat/serving: trace)</p>	<p>Skim-milk sherbet, fruit ice, gelatin; angel food cake; vanilla wafers; graham crackers; meringues; skim-milk pudding; fat-free commercial baked products; nonfat ice cream and frozen yogurt; fruit whips with gelatin</p>	<p>All other cakes, cookies, pies, and pastries; pudding made with whole milk or eggs; cream puffs and eclairs; ice cream</p>
<p>Fats Amounts listed equals 1 at equivalent; 3-5 equivalents/d allowed for 50g fat; 1 equivalent/d allowed for 25 g fat. Unsaturated fats are recommended (fat/serving: 5 g)</p>	<p><i>Unsaturated Fats</i></p> <p>Margarine (1 tsp) Diet margarine (1tbsp) Fat-free margarine* Mayonnaise: reduced -calorie (1 tbsp) regular (1 tsp) fat-free*</p> <p>Creamy salad dressings: reduced -calorie (1 tbsp) regular (2 tsp) fat-free*</p> <p>Vegetable oils (1 tsp)</p> <p>Nuts: cashews(1 tbsp) or 2 whole almonds (6 whole) peanuts (20 smaller or 10 large) peanut butter (2 tsp) cashew butter (2 tsp) walnuts (2 whole) pistachios (18 whole) other nuts (1 tbsp)</p> <p>Seeds: sesame (1 tbsp) sunflower (1 tbsp) pumpkin (2 tsp) Olives (10)</p>	<p>Any in excess of recommended amounts.</p>
<p>* Some "fat-free" items contain trace amounts of fat and should not be eaten indiscriminately. Check food labels and/or consult food manufacturer for individual items.</p>		

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	<p><i>Saturated Fats</i> Bacon (1 slice) Bacon fat (1 tsp) Butter (1 tsp) Whipped butter (2 tsp) Chitterlings (1/2 oz) Shredded coconut (1 tbsp) Cream: light, coffee, table (2 tbsp) heavy whipping (1 tbsp) Sour cream (2 tbsp) Cream cheese: light (2 tbsp) regular (1 tbsp) Coffee whitener: liquid (2 tbsp) powder (1 tbsp) Lard (1 tsp) Shortening (1 tsp) Salt Pork (1/4 oz) Oils: coconut (1 tsp) palm (1 tsp)</p>	
<p>Fruits 2-4 servings/d (fat/serving: trace)</p> <p>Lean meat and meat substitutes For 50-g-fat diet, 6 oz/d For 25-g-fat diet, 4 oz/d (fat serving: 3 g) Recommended preparation methods are broiling; roasting, grilling or boiling; weigh meat after cooking.</p> <p>Note: All visible fat and poultry skin should be trimmed prior to eating. Amount stated denotes cooked portion</p>	<p>Fresh, frozen , canned, or dried fruit; fruit juices</p>	<p>Avocado in excess of amount allowed on fat list</p>
<p>Fish</p>	<p>All fresh, frozen, or canned in water: crab lobster, scallops, shrimp, clams, oysters, tuna: herring (uncreamed or smoked); sardines (canned, drained); salmon (canned in water)</p>	<p>Tuna (packed in oil), salmon (packed in oil)</p>
		(continued)

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Poultry	Chicken, turkey, Cornish hen	Duck, goose
Veal	All cuts are lean except those listed under foods to avoid	Cutlets (ground or cubed)
Lean beef	USDA select or choice grades such as round, sirloin, and flank steak; tenderloin; chopped beef	Most USDA prime cuts, such as ribs, corned beef, ground beef, roasts (rib, chuck, rump); most steak including cubed, T-bone and Porterhouse; meatloaf
Lean pork	Fresh, canned, cured, or boiled ham; Canadian bacon; tenderloin	Spareribs; ground pork; pork sausage (parry or link); chops; loin roast; Boston butt; cutlets; ham hocks; pigs' feet; chitterlings
Lean lamb	Arm, foreshank, leg, loin, and shank cuts	Patties (ground lamb), blade, rib, and shoulder cuts
Luncheon meats	95% fat-free; lean ham, turkey or beef	Luncheon meats such as bologna, salami, pimento loaf
Legumes	Cooked or canned without added fat	Legumes cooked with added fat
Soy Products	Natto (3 1/2 oz = 11 g fat); tempeh (3 1/2 oz = 8 g fat); tofu (3 1/2 oz = 9 g fat);	All other cakes, cookies, pies, and pastries; pudding made with whole milk or eggs; cream puffs and eclairs; ice cream
Cheese	Any cottage cheese; low-fat cheeses made with skim milk and containing 3 g of fat or less per oz; parmesan cheese, grated (2 tbsp = 1 oz), ricotta cheese, part skim	All regular cheeses including: American, blue, brie, cheddar, colby, monterey jack, and Swiss
Milk 2 or more servings/d (fat/serving: trace)	Skim milk, skim buttermilk, powdered and evaporated skim milk; nonfat yogurt	1%, 2%, whole milks, buttermilk made with whole milk; chocolate milk; cream; regular evaporated milk; whole milk yogurt
Eggs In moderation (fat/serving: trace)	Egg whites and fat-free egg substitutes	Egg yolks
Potatoes and potato substitutes As desired (fat/serving: trace)	Potatoes; rice; barley; noodles without yolks; spaghetti, macaroni; and other pastas	Fried potatoes; fried rice; potato chips; chow mein noodles; items prepared with added fat, such as au gratin potatoes, unless fat is deducted from fat allowance
Soups As desired (fat/serving: trace)	Fat-free broth; fat-free vegetable soup; cream soup made with skim milk and allowed fat; packaged dehydrated soups	All others

(continued)

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Sweets In moderation (fat/serving: trace)	Sugar; honey; jelly; jam; marmalade; molasses; maple syrup; sour balls; gum drops; jelly beans; marshmallows; hard candy; cocoa powder	Candies made with bitter, coconut, chocolate, or cream
Vegetables 3-5 servings/d (fat/serving: trace)	All fresh, frozen, or canned vegetables prepared without fats or sauces containing fat	Buttered, au gratin, creamed, or fried vegetables unless made with allowed fat
Miscellaneous In moderation (fat/serving: trace)	Ketchup; chili sauce; vinegar; pickles; vanilla; unbuttered popcorn; white sauce made with skim milk and allowed fat; mustard; all herbs and seasonings; apple butter	Olives and nuts in excess of specified portion; cream sauces; gravies; buttered popcorn

ADEQUACY - The diet is adequate in all nutrients based on the 1989 recommended Dietary Allowances. Prolonged diarrhea or steatorrhea may lead to nutrient deficiencies including calcium, iron, magnesium, potassium, zinc, fat soluble vitamins (A, D, E, and K), folic acid, and vitamin B-12. While other water-soluble vitamin deficiency states are rarely associated with malabsorption, the vitamin B complex is also sometimes supplemented.

Vitamin and mineral deficiencies can be treated with supplements and control of causative factors. Medium-chain triglycerides can be incorporated to provide additional calories.

Table 2 contains a sample menu for diet allowing 25 g of fat.

TABLE 2

SAMPLE MENU FOR FAT-RESTRICTED DIET (25g of fat)

BREAKFAST	LUNCH	DINNER
Orange juice (1 cup)	Fat-free vegetable soup (1 cup)	Tossed green salad (3 1/2 oz)
Whole-grain cereal (3/4 cup)	Saltine crackers (4)	Fat-free salad dressing (1 tbsp)
Banana (1 medium)	Sliced turkey breast (2 oz)	Broiled boneless skinless chicken breast (3 oz)
Whole-wheat toast (1 slice)	Whole-wheat bread (2 slices)	Herbed brown rice (1/2 cup)
Diet margarine (1/2 tsp)	Mustard (1/2 tbsp)	Steamed broccoli (1/2 cup)
Jelly or jam (2 tbsp)	Fat-free mayonnaise (1 tbsp)	Whole-grain roll (1)
Skim milk (1 cup)	Sliced tomatoe (1/2 medium)	Diet margarine (1/2 tsp)
Coffee/tea	Lettuce	Jelly or Jam (1 tbsp)
	Fresh fruit salad (1/2 cup)	Fruit ice (1/2 cup)
	Graham crackers (4)	Meduim apple (1)
	Skim milk (1 cup)	Coffee/tea
	Coffee/tea	
	SNACK	
	Canned peaches (1 cup)	
	Nonfat plain yogurt (1/2 cup)	

APPROXIMATE NUTRIENT ANALYSIS

Energy (keal)	2,173.7	Phosphorus (mg)	1,888.4
Protein (g)	100.2	Potassium (mg)	5,256.9
(18.4% of keal)		Sodium (mg)	3,100.4
Carbohydrate (g)	414.2	Zinc (mg)	13.9
(76.2% of keal)		Vitamin A (µg RE)	2,863.7
Total fat (g)	24.1	Vitamin C (mg)	223.5
(10.0% of keal)		Thiamin (mg)	2.3
Saturated fatty acids (g)	6.6	Riboflavin (mg)	2.8
Monounsaturated fatty acids (g)	8.0	Niacin (mg)	33.2
Polyunsaturated fatty acids (g)	5.8	Folate (µg)	670.1
Cholesterol (mg)	111.1	Vitamin B-6 (mg)	3.7
Calcium (mg)	1,237.5	Vitamin B-12 (µg)	6.0
Iron (mg)	16.2	Dietary fiber (g)	43.7
Magnesium (mg)	560.1	Water-insoluble fiber (g)	31.2