CFW FEATURE

The New Food Guide Pyramid: Recommendations on Grains, Fruits, and Vegetables[1]

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The old USDA Food Guide Pyramid recommended daily consumption of 6–11 servings of bread, cereal, rice, and pasta from a variety of whole and enriched grains, 3–5 servings of vegetables, and 2–4 servings of fruits (47). It also recommended 2–3 servings of milk, yogurt, and cheese, 2–3 servings of meat, poultry, fish, dry beans, eggs, and nuts, and sparing use of fats, oil, and sweets.

Although the pyramid illustrated the components of a healthy diet, it was criticized for not emphasizing the need for daily exercise and maintaining a healthy body weight. In addition, consumers had a difficult time understanding and following the recommendations (18,34,46) and confused the large portions typically served and consumed as part of their meals with servings suggested in the pyramid. Meal planning based on this pyramid also was challenging because there were too many servings recommended (15–26 per day), and serving sizes were difficult to figure out. Finally, although the fat group was at the apex of the pyramid, indicating it was a small component of a healthy diet, fat was also a significant component of each food group.

Redesign of the Food Guide Pyramid

In 2005 the USDA, Center for Nutrition Policy and Promotion, redesigned the food guide pyramid to make it easier for consumers to use (48). The nutritional goals of the new pyramid are to meet 100% of the RDA for protein, vitamins and minerals and increase consumption of fiber, while consuming <30% of total calories from fats (<10% of calories from saturated fats), ≤300 mg of cholesterol, and ≤2,400 mg of sodium.

In the redesigned pyramid, there is a shift from servings per day to specific measurements, e.g., cups and ounces. The new pyramid is based on the varying needs of people at different ages and with different activity levels and is designed to help consumers choose the foods and amounts that are right for them. At the website www.mypyramid.gov, consumers can enter their age, gender, and physical activity level in the "My Pyramid Plan" box and receive recommendations on total calories, as well as recommendations on specific quantities of grains, vegetables, fruits, milk, meat and beans, and oils. Recommendations include information on how to make smart selections from every food group, find a balance between food and physical activity, and obtain the most nutrition from calories consumed.

Tables I and II list specific recommendations based on gender, age, and physical activity. For example, for males with active lifestyles at ages 4–5, 16–18, and 66–90 years, the recommended total caloric intake is 1,600, 3,200, and 2,200-2,400, respectively. For females with active lifestyles, the recommended caloric intake at ages 5–6, 14–30, and 61–90 years is 1,600, 2,400, and 1,800–2,000, respectively. Specific recommendations on exercise and consumption of foods by category are also made. For example, moderate to vigorous physical activity for 30–60 min/day is recommended for healthy living. The pyramid also recommends that males and females 4 years of age or older consume 3 cups of milk per day for healthy, strong bones. In addition, grains should provide 60% of calories consumed, mainly in the form of complex carbohydrates. Half of the servings of grains consumed should be from whole grains to increase dietary fiber intake and derive benefits from nutrients present in the bran and germ. Regular consumption of whole grains, fresh fruits, and deeply colored vegetables has been linked to maintaining ideal body weight and healthy bowel function, as well as lowering the risk of premature degenerative diseases. The sidebar summarizes information provided in the new pyramid.

Importance of Whole Grains

Individuals who follow vegetarian dietary lifestyles have shown a lower risk of premature degenerative diseases. Jenkins and coworkers (13) reported that a vegetarian diet contains many natural products that prevent lipid and diabetic abnormalities. Many population studies (10–12,24,25,32,33,35,43) have found an inverse association between whole-grain intake and the risk of some chronic diseases, including ischemic heart disease (IHD), type II diabetes, and total mortality. Fraser and coworkers (7) showed that whole grains can help lower the risk of atherosclerosis by lowering plasma LDL and total cholesterol. Whole-grain consumption resulted in 10% lower fasting insulin compared with consumption of refined grains (40). The risk of type II diabetes was 30–36% lower for those in the highest quintile for cereal-fiber intake compared with those in the lowest quintile and 21–27% lower for those in the highest quintile for whole-grain intake (38). Insulin sensitivity was higher and incidence of type II diabetes was lower with high intakes of whole grains, cereal fiber, and total dietary fiber, and total body fat (as measured by body mass index) was lower (36,37,42). The relative risk (RR) of diabetes was less than 50% (0.60 versus 1.31) for whole-grain relative to refined-grain consumption when highest versus lowest quintiles were compared (8,31).

Cleveland and coworkers (5) reported that U.S. adults consume an average of 6.7 servings of grain products per day but that only 8% of the population consumes 3 servings of whole grains daily. Inclusion of whole gains in place of refined grains in the diet would reduce the risk of many diseases. In the new food guide pyramid emphasis is placed on whole grains because Americans are not meeting their dietary requirements for grains and fiber and need to increase their grain consumption by 20–25% and dietary fiber consumption by 40–50%.

Importance of Fruits and Vegetables

Vegetarian diets also have been associated with reduced risk of premature degenerative diseases, including cardiovascular disease (CVD) (24,45). Plant foods and their nutrients influence CVD risk factors, such as blood lipids, lipoproteins, blood pressure, and lipid peroxidation, and thereby lower mortality from CVD. Plant foods are rich in

[1] The mention of firm names or trade products does not imply that they are endorsed or recommended by the U.S. Department of Agriculture over other firms or similar products not mentioned.

DOI: 10.1094/CFW-51-0104

phytonutrients such as allicin, polyphenols, isoflavones, and anthocyanins, which have been linked to lower risk of CVD (17, 26,49).

Scientific findings support the importance of consuming fruits and vegetables. For example, consumption of vegetable leaves and stalks has been shown to lower plasma LDL and total cholesterol (7). Total deaths from CVD (RR = 0.54) and fatal myocardial infarction (RR = 0.25) were lower when the highest quartile for consumption of carotene-containing fruits and vegetables was compared with the lowest quartile (9). Joshipura and coworkers (15) reported that the median consumption of fruits and vegetables in the highest quintile was 5–6 servings daily, and the RR for degenerative diseases was 31% lower (0.69) compared with those in the lowest quintile. Key and coworkers (23) reported that daily consumption of fresh fruit was associated with significantly reduced mortality from IHD (24% reduction; RR = 0.76). Individuals in the 90th percentile consumed four times as much fruit and two times as much vegetable compared with those in the 10th percentile, and their RR for IHD was 15% lower (27).

Ness and Powles (39) reported that nine of 10 ecological studies, two of three case-controlled studies, and six of 16 cohort studies found a significant protective effect against coronary heart disease (CHD) for individuals following a diet of fruits and vegetables. An increase of as little as 1 serving/day of fruit or vegetable was associated with a 6% lower risk of ischemic stroke. Cardiovascular mortality and total mortality were significantly lower among men with high fruit consumption, until the age of 70, during a 16-year follow-up study (44). Liu and coworkers (30) reported that for increasing quintiles of total fruit and vegetable intake (median servings per day: 2.6, 4.1, 5.5, 7.1, and 10.2), the corresponding RR was 1.0, 0.78, 0.72, 0.68, and 0.68, respectively. Higher fruit and vegetable intake resulted in a lower risk of myocardial infarction, with an adjusted RR of 0.62 for extreme quintiles. Men who consumed at least 2.5 servings of vegetables per day had a RR of 0.77 for CHD compared with men in the lowest category (<1 serving/day) (29).

Ford and Mokdad (6) observed that for participants consuming 5 or more servings of fruits and vegetables per day compared with those consuming none, diabetes risk was 27% lower (RR = 0.73). Consuming fruits and vegetables at least three times per day compared with less than once per day was associated with 27% lower stroke incidence, 42% lower stroke mortality, 24% lower IHD mortality, 27% lower CVD mortality, and 15% lower all-cause mortality (1, 2). Steffen and coworkers (42) observed that the hazards of death were 1.08, 0.94, 0.87, and 0.78, respectively, for fruit and vegetable consumption quintiles 2–5.

For the top 20% of men consuming fruits, berries, and vegetables, the RR for death

New Pyramid Recommendations

Grain Group

Any food made from wheat, rice, oats, cornmeal, barley, or other cereal grain is a grain product, e.g., breads, pastas, oatmeal, breakfast cereals, tortillas, and grits. Grains are divided into two subgroups: whole and refined. Whole grains contain the entire grain kernel—bran, germ, and endosperm. Refined grains are milled to remove the bran and germ, produce a finer texture, and improve shelf life. Milling also removes dietary fiber, iron, and many B vitamins, so many refined grains are enriched with B vitamins and iron. At least 50% of the grain group should be provided by whole-grain foods. This group should provide 60% of calories consumed.

Vegetable and Fruit Groups

Vegetables may be raw or cooked; fresh, frozen, canned, or dried/dehydrated; or whole, cut-up, or mashed. They are organized into five subgroups (dark green, orange, dry beans and peas, starchy, and others) based on nutrient content. Fruits may be fresh, canned, frozen, or dried and may be whole, cut-up, or pureed.

Milk, Yogurt, and Cheese Group

All fluid milk products and many foods made from milk are part of this food group. Foods made from milk products that retain their calcium content are part of the group, while foods made from milk products that have little to no calcium, e.g., cream cheese, cream, and butter, are not. Most milk group choices should be fat-free or low fat.

Meat, Poultry, Fish, Dry Beans, Eggs, and Nuts Group

All foods made from meat, poultry, fish, dry beans or peas, eggs, nuts, and seeds are considered part of this group. Most meat and poultry choices should be lean or low fat. Fish, nuts, and seeds contain healthy oils and should be chosen instead of meat or poultry. Select fish rich in omega-3 fatty acids, such as salmon, trout, and herring. Avoid liver, organ meats, and egg yolk, which are high in cholesterol. Check product labels for statements such as "self-basting" or "contains added salt solution," which mean that a sodium-containing solution has been added to the product. Sunflower seeds, almonds, and hazelnuts are the richest sources of vitamin E in this food group.

Oils Group

Oils, fats that are liquid at room temperature, come from many different plants, including canola, corn, cottonseed, olive, safflower, soybean, and sunflower, and fish. Foods naturally high in oils include nuts, olives, some fish, and avocados. Foods that are mainly oil include mayonnaise, certain salad dressings, and soft margarine. Most oils are high in monounsaturated or polyunsaturated fats and low in saturated fats. Oils from plant sources do not contain cholesterol. A few plant oils, however (e.g., coconut oil and palm kernel oil), are high in saturated fats and, for nutritional purposes, should be considered solid fats. Solid fats, fats that are solid at room temperature, come from many animal foods and can be made from vegetable oils (e.g., butter, tallow, chicken fat, lard, stick margarine, and shortening).

Discretionary Calories

You need a certain number of calories to keep your body functioning and provide energy for physical activities. Solid fats, added sugars, alcohol, and extra food servings from any food group make up discretionary calories. Most discretionary calorie allowances are very small (100–300 cal), especially for those who are not physically active.

Physical Activity

Physical activity is any movement of the body that uses energy. For health benefits, physical activity should be moderate or vigorous and add up to >60 min/day for an active healthy lifestyle. Vigorous activities include running or jogging (5 miles/hr), bicycling (>10 miles/hr), swimming (freestyle laps), aerobics, walking very fast (4.5 miles/hr), heavy yard work (e.g., chopping wood), weight lifting (vigorous), and basketball. Moderate activities include walking briskly (≥3.5 miles/hr), hiking, gardening or yard work, dancing, golfing, bicycling (<10 miles/hr), and weight training (light).

Maintaining Healthy Body Weight

Maintaining a healthy body weight is essential. If one consumes more calories than needed for maintenance, growth, and activity, the unused calories are stored as fat. Excess body weight can create a predisposition to premature degenerative diseases. Healthy body weight is related to body mass index (BMI), a measure of body fat based on height and weight that applies to adults. It measures the weight (kg)/height (m^2) ratio. BMI categories include underweight ≤ 18.5; normal weight = 18.5–24.9; overweight = 25–29.9; and obese ≥ 30. The pyramid can be used to plan menus that include a variety of food groups daily and all food groups over a week and restrict calories consumed to those needed to maintain an active lifestyle and BMI < 25.

from all causes was 0.66, 0.59, and 0.68, respectively, compared with men in the lowest 20% (41). Persons in the highest quintile of fruit and vegetable intake had a RR of 0.80 for CHD compared with those in the lowest quintile (16). Each increase (1 serving/day) in intake of fruits or vegetables was associated with a 4% lower risk of CVD. Eating green leafy vegetables and fruits rich in vitamin C had a protective effect against CHD.

Regular consumption of fruits and vegetables reduced the risk of CVD, stroke, Alzheimer's disease, cataracts, and functional declines associated with aging (28). Johnsen and coworkers (14) reported that persons in the top quintile of fruit and vegetable intake (median: 673 g/day) had a risk ratio of 0.72 for ischemic stroke relative to persons in the bottom quintile (median: 147 g/day).

In several studies (3,19–22), the risk of IHD was significantly lower among vegetarians compared with nonvegetarians. Chang-Claude and coworkers (4) reported that vegetarians and persons leading health-conscious lifestyles reduced their mortality from many diseases by 50%. The additive and synergistic effects of the phytochemicals found in whole grains, fruits, and vegetables and their potent antioxidant activities can help lower the risk of many diseases.

Summary

In 2005 the USDA redesigned its Food Guide Pyramid to make it easier for consumers to use. Recommendations include information on how to make smart selections from every food group and obtain the most nutrition from calories consumed based on the varying needs of people at different ages and with different activity levels. Emphasis is placed on whole grains because Americans are not meeting their dietary requirements for grains and fiber. Regular consumption of whole grains, fresh fruits, and deeply colored vegetables has been linked to maintaining ideal body weight and healthy bowel function, as well as lowering the risk of premature degenerative diseases (e.g., CVD) and some chronic diseases (e.g., IHD, type II diabetes, CHD, and total mortality).

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Table I. Food recommendations for males with an active lifestyle

Age (years)	Activity (min)	Grains (oz)	Vegetables (cups)	Fruits (cups)	Milk (cups)	Meat and Beans (oz)	Oil (tsp)	Extra Calories	Total Calories
2	>60	3	1	1	2	2	3	165	1,000
3	>60	5	1.5	1.5	2	4	4	170	1,400
4, 5	>60	5	2	1.5	3	5	5	130	1,600
6, 7	>60	6	2.5	1.5	3	5	5	195	1,800
8, 9	>60	6	2.5	2	3	5.5	6	265	2,000
10, 11	>60	7	3	2	3	6	6	290	2,200
12, 76–90	>60	8	3	2	3	6.5	7	360	2,400
13, 56–75	>60	9	3.5	2	3	6.5	8	410	2,600
14, 36–55	>60	10	3.5	2.5	3	7	8	425	2,800
15, 19–35	>60	10	4	2.5	3	7	10	510	3,000
16–18	>60	10	4	2.5	3	7	11	650	3,200
56–65	30–60	8	3	2	3	6.5	7	360	2,400
66–90	30–60	7	3	2	3	6	6	290	2,200

Table II. Food recommendations for females with an active lifestyle

Age (years)	Activity (min)	Grains (oz)	Vegetables (cups)	Fruits (cups)	Milk (cups)	Meat and Beans (oz)	Oil (tsp)	Extra Calories	Total Calories
2	>60	3	1	1	2	2	3	165	1,000
3, 4	>60	5	1.5	1.5	2	4	4	170	1,400
5, 6	>60	5	2	1.5	3	5	5	130	1,600
7–9	>60	6	2.5	1.5	3	5	5	195	1,800
10, 11, 61–90	>60, 30–60	6	2.5	2	3	5.5	6	265	2,000
12, 13, 31–60	>60	7	3	2	3	6	6	290	2,200
14–30	>60	8	3	2	3	6.5	7	360	2,400
61–90	30–60	6	2.5	1.5	3	5	5	195	1,800

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