



Can Low-Income Americans Afford a Healthy Diet?

Adam Drewnowski and Petra Eichelsdoerfer

As incomes drop and food budgets shrink, food choices shift toward cheaper refined grains, added sugars, and vegetable fats. The first items to drop out of the diet are usually healthy foods – whole grains, lean meats, dairy products, vegetables and fruit. Energy-rich starches, sweets, and fats, many of them nutrient-poor, frequently offer the cheapest way to fill hungry stomachs.

Lower diet quality, sometimes tied to higher energy intakes, separates low-income Americans from the more affluent groups. Higher-income households are more likely to buy whole grains, seafood, lean meats, low-fat milk, and fresh vegetables and fruit. Lower-income households purchase more cereals, pasta, potatoes, legumes, and fatty meats. Vegetables and fruits are often limited to iceberg lettuce, potatoes, canned corn, bananas, and frozen orange juice.

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Energy-dense sweets and fats are cheap, readily available, and convenient. In the absence of kitchen facilities, cooking skills, money or time, they offer satisfying, if sometimes nutrient-poor, options for low-income groups. They also help reduce waste, spoilage, and cooking costs.

Many nutritionists insist that Americans have equal access to healthy foods; they simply need to make an effort. Focusing purely on nutrient needs while excluding social context often leads to low-income consumers receiving recommendations for high-cost foods. A more realistic approach would take food prices, preferences, and social norms into account before issuing dietary advice to the public.

Developing guidelines while taking these many factors into consideration will be the major challenge before the 2010 Dietary Guidelines Committee. Building a case for affordable nutrient rich foods is the purpose of this report.

Achieving Affordable Nutrition

- Food choices are largely driven by taste, cost, and convenience. Dietary guidelines tend to emphasize good nutrition, rarely taking food preferences, food prices, or diet costs into account. *Affordable* good nutrition should be the theme of the 2010 Dietary Guidelines for Americans.
- The ability to follow a healthy diet depends on having sufficient knowledge, money, and time. Low-income families often lack these basic social and material resources. Limited access to healthy foods may be one reason why low-income Americans suffer from the highest obesity rate.
- Rising food costs are a problem, and not only for the poor. Nutrient profiling and new diet optimization techniques can help consumers – and expert committees – identify those nutrient-rich foods that are affordable, good tasting, and part of the mainstream American diet. The Nutrient Rich Food (NRF) index can help consumers calculate nutrients per calorie as well as nutrients per dollar.



Nutritious Diets at Low Cost

Arguments that healthy diets can be obtained at low cost usually make reference to the United States Department of Agriculture food plans. Since 1961, the USDA has published suggested food plans to help Americans make healthier food choices. The Thrifty, Low-Cost, Moderate-Cost, and Liberal Food Plans were created to meet dietary recommendations and the Pyramid guidelines at different cost levels. The plans, intended for households at different levels of income, were developed using retail food prices and computer optimization models.

The lowest-cost Thrifty Food Plan (TFP) is typically described as an affordable healthy diet. In December 2002, the weekly TFP cost for a reference family of four was estimated at \$107.10. Two years later, in December 2006, estimated TFP costs rose to \$121.50 per week. By June 2008, it reached \$588.30 per month, approximately \$20 per day for 2 children and 2 adults. The largest USDA food assistance program, well-known as “food stamps”, is now called the Supplemental Nutrition Assistance Program (SNAP). Maximal monthly 2009 SNAP benefits, set in accordance with estimated TFP costs, are \$588.

Money and time limit the TFP. As a cost-conscious food plan, the TFP emphasizes use of inexpensive foods. **Exhibit 1** shows the energy cost (\$/10MJ) and energy density (MJ/kg) for most of the foods listed in the 1999 TFP weekly menus. Bubble sizes are directly proportional to the amount of energy supplied by each food on a weekly basis. In the 1999 TFP, starches, refined grains, added sugars and fats supplied most of the energy. In food terms, TFP energy largely came from oil, shortening and mayonnaise, white bread, sugar, potatoes and beans. The severely limited fresh produce choices included only oranges, apples, bananas, and grapes as fresh fruits. Energy supplied by lettuce or fresh tomatoes was miniscule, despite advice to eat more fresh vegetables.

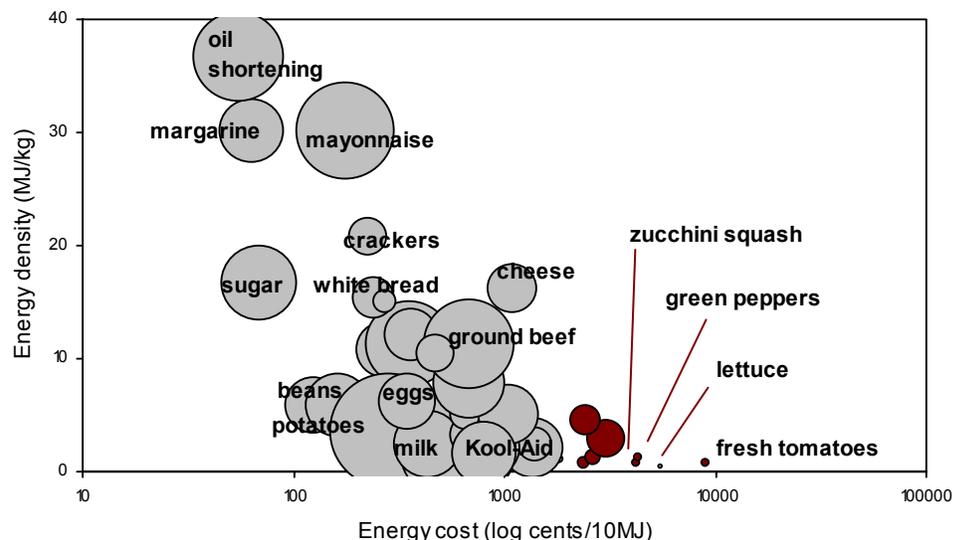
Time poverty and economic poverty go hand in hand. Before large numbers of women entered the labor force, most American households included at least one person with sufficient time to shop for and prepare meals “from scratch.” Earlier TFP versions included some time-consuming recipes. The 2006 TFP recognized a need for more convenience foods. Even after modifications, the estimated time required to purchase, prepare and cook the TFP foods ranges from 9 – 16 hours per week. By contrast, an average American working woman spends about 5 hours per week doing so. Working mothers can follow TFP guidelines and prepare low-cost nutritious foods – or they can have a paying job outside the home – but may be unable to do both.

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Money saving food plans, created using computer optimization programs, typically lead to energy rich but nutrient poor diets. Whenever saving money was given precedence over good nutrition, the resulting food plans were high in cereals, sugars and fats. Simultaneously, these diets

lacked lean meats, dairy products, vegetables and fruit. These food plans not only lacked variety, they were also low on taste and enjoyment. Not by coincidence, they resembled the typical diets eaten by America’s poor. Perhaps the time has come to acknowledge that most people eat the foods affordable to them, that is, they make the best of the options available.

Exhibit 1: The USDA Thrifty Food Plan



The “Dinner Plate of Healthy Foods”

Promoting luxury food items to low-income people is a questionable strategy for public health. In November 2008, researchers based at the Economic Research Service/USDA published a feature article asserting that maximum benefits from the Supplemental Nutrition Assistance program provided low-income households with ample purchasing power for healthy diets. A prominently featured photograph labeled “a dinner plate of healthy foods,” was mostly composed of raw vegetables or crudité’s. The researchers seriously suggested that low-income food assistance recipients should move Brussels sprouts, green beans, sweet red peppers, raw mushrooms and Kalamata olives to the “center of their plates and budgets.”

The UW Center for Public Health Nutrition duplicated the pictured plate, taking into account purchase price, preparation and cooking times, and produce waste. All foods were purchased at a Safeway supermarket either in the amounts shown on the photograph or in the smallest quantity possible. Purchased were 3 Brussels sprouts, 12 green beans, 3 olives, 1 mushroom, 1 red pepper and 1 head of romaine lettuce. Purchases of grated carrots, pasta, and grapes were limited by the smallest purchasable size. Staff members prepared and cooked all items in the Center laboratories, documenting the time required and the amounts of edible leftovers and inedible waste. For all pictured foods, consumption frequencies by Americans were obtained from the 1999 – 2002 National Health and Nutrition Examination Survey (NHANES) database. A

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nutrient composition analysis of the “healthy dinner” was performed using the Food Processor for Windows program (version 8.5.0, ESHA Research, Salem, OR), with results listed in **Exhibit 2**.

The entire “dinner” weighed 458g (1 lb), yet it supplied only 335 kcal, mostly from carbohydrates. Protein content was inadequate (13g); percent energy from fat was only 13% (5g) and energy density of the meal was extremely low at 0.7 kcal/g. Energy density of the typical American diet, without beverages, is around 1.6 kcal/g. The pictured “dinner” was both nutritionally unbalanced and based on infrequently eaten foods.

The minimum purchase price of the fresh vegetables and fruit used to style the ERS plate was \$9.28 for one person. As some foods had to be purchased in minimum quantities, the cost of the pictured dinner dropped for a reference family of 4 (two parents aged 19-50 years and two children, one aged 6-8 years, the other, aged 9-11 years). **Exhibit 3** shows that the estimated cost of purchasing the same foods for 4 people was \$16.69. A more nutritionally balanced meal of affordable nutrient rich foods could have been obtained for less.

Exhibit 4 shows preparation and waste data. Produce needed to be washed, drained, trimmed, cored, sliced and boiled. The noodles required boiling. Estimated preparation time totaled 40 minutes. Amounts of edible leftovers (bagged and refrigerated) and inedible waste were also recorded.

Exhibit 2: ERS/USDA “dinner plate of healthy food” (left) and the CPHN version (right)



USDA/ERS - “A Dinner Plate of Healthy Food”

Source: Golan E, Stewart H, Kuchler F, Dong D. Can low-income Americans afford a healthy diet? *Amber Waves* 2008;6(5):26 – 33. (Photo taken by E. Golan)

**UW-COR’s re-creation of the USDA
“Dinner Plate of Healthy Food”**



Exhibit 3: ERS “dinner plate of healthy food” ingredients, weights and prices

Food	Net purchase weight	Purchase price	Portion shown (g)	Kcal per portion shown	Cost per portion shown	Total price per 4 servings
Romaine lettuce	440	\$1.79	33	6	\$0.13	\$1.79
Brussels sprouts	78	\$0.54	76*	27	\$0.51	\$2.16
Green beans, whole	77	\$0.50	70*	25	\$0.47	\$2.00
Mushroom, Crimini	28	\$0.36	9	2	\$0.12	\$0.72
Carrots, shredded	233	\$1.79	30	12	\$0.23	\$1.79
Whole wheat thin spaghetti, boxed	371**	\$1.50	132*	164	\$0.18	\$1.50
Red pepper	200	\$1.50	48	12	\$0.36	\$3.00
Grapes, green seedless***	120	\$1.03	74	51	\$0.65	\$2.65
Olives	13	\$0.27	13	37	\$0.27	\$1.08
Totals		\$9.28	485	335	\$2.92	\$16.69

*Cooked

**Dry

***Grapes from Metropolitan Market, where they could be purchased in small quantities

Exhibit 4: Recreating USDA’s “dinner plate of healthy food”: time and energy costs

Food	Preparation Method	Tot Prep Time (min)	Waste (g)	Cost per 100 kcal	Frequency of Consumption*
Romaine lettuce	Washed, cut up, raw	4	89	\$2.39	312
Brussels Sprouts	Washed, trimmed, boiled	8	6	\$1.87	5
Green beans, whole	Washed, trimmed, boiled	8	9	\$1.91	71
Mushroom, Crimini	Washed, trimmed, sliced	2	2	\$5.84	100
Carrots, shredded	Ready to serve	1	N/A	\$1.87	1265
Whole wheat thin spaghetti, boxed	Boil until tender	8	N/A	\$0.11	2
Red pepper	Washed, cut up, raw	6	38	\$2.88	69
Grapes, green seedless	Washed, no stems, raw	2	N/A	\$1.27	823
Olives	Ready to serve	1	0	\$0.74	138
Totals		40			

*Reported frequency of consumption, listed in NHANES, as purchased and consumed, without added salt or fat.

Other than shredded carrots, grapes and romaine lettuce, most of the pictured foods were rarely consumed over 2 days by all adults in the NHANES study. The consumption of whole wheat pasta or Brussels sprouts was close to zero. It would have been better to create a low cost dinner plate of affordable nutrient-rich foods that are good tasting, easy to prepare, socially acceptable and part of the mainstream American diet.

What are Affordable Nutrient Rich Foods?

Historically, vegetables and fruit – preferably fresh – were assumed to be the most nutritious of foods.

Golan et al (2008) reiterated the position that even if fresh vegetables and fruit were expensive sources of dietary energy, they provided key nutrients at an affordable cost. But do fresh vegetables and fruit represent the best nutrient value for money? Will low-income households be able to include substantial amounts of fresh produce in affordable diets? The experience of the TFP suggests that they will not.

The new technique of nutrient profiling, combined with analyses of food prices, allows researchers to directly address the all important issues of nutrients per calorie and nutrients per unit cost. Affordable good nutrition is the theme of the day.



The Nutrient Rich Food (NRF) index is an example of nutrient profiling – that is ranking or classifying foods based on their nutrient content. Nutrient profiles calculate the amount of key nutrients the food contains relative to the dietary energy that it provides. Some foods provide more calories than nutrients; nutrient-rich foods provide relatively more nutrients than calories. The NRF index is based on 9 nutrients to encourage: protein, fiber, vitamin A, C and E, calcium, iron, potassium, and magnesium, and on 3 nutrients to limit: saturated fat, added sugar and sodium. All amounts are calculated per 100 kcal of food or per serving size.

One advantage of nutrient density scores is the ability to calculate both nutrients per calorie and nutrients per dollar. In this case, the cost is computed per 100 grams of edible portion, and/or per 100 kcal energy. The resulting value, the “energy cost” of a food can be compared across foods and food groups.

A preliminary search of the Food and Nutrient Database for Dietary Studies (FNDDS), published by the USDA identified a number of affordable nutrient rich foods, based on calories per dollar and dollars per nutrient. Although the Center for Nutrition Policy and Promotion 2001 food prices database is fast becoming obsolete, it is the only national food price database available in the US. Some affordable nutrient rich foods are listed in **Exhibit 5** at right.

Recognizing economic difficulties faced by low-income households may mean less middle-class insistence on local, sustainable organic fresh produce. Key nutrients can also be obtained from frozen or canned vegetables and fruit, juices and soups. It may mean less obsessing about glycemic index and less insistence on costly whole grains. Potatoes, banned from the Women, Infants, and Children (WIC) food package, are a fine source of nutrients, potassium and fiber. It may mean recognizing that not all food processing is automatically bad: some nutrients such as lycopene are actually concentrated in processed foods. It may mean welcoming to the table (again) eggs, beans, milk, cheese, and ground beef. But this time, foods for the new depression can be identified and scored using the new Nutrient Rich Food metric.

Toward Dietary Guidelines for All Americans 2010

Affordable good nutrition means reconciling nutrient density, nutrient cost, and population-wide food

preferences or social norms. Dietary guidelines need to take these diverse factors into account in developing guidelines that are truly applicable to all segments of American society. In particular, the current economic situation demands that the 2010 committee take the food prices and real food choices of real people into account.

Exhibit 5: Some affordable nutrient-rich foods, by food group

Milk & Cheese

- 2% Milk
- Cheese (cheddar, American, or mozzarella)
- Lowfat yogurt (plain or flavored)

Meat & Fish

- Ground beef (lean)
- Chicken (dark meat, thigh & drumstick)
- Canned fish

Eggs

- Whole eggs

Beans & Legumes

- Beans (pinto, calico, red Mexican, black, brown, or Bayo) (dry or canned)
- Refried beans

Nuts & Seeds

- Peanut butter
- Sunflower seeds (hulled)
- Almonds

Grains & Cereals

- Bread & rolls (enriched or made with whole wheat)
- Tortilla (corn or wheat)
- Rice (white)

Fruits

- Bananas
- Apples
- Orange juice (frozen concentrate)
- Fruit juice blends (100% juice)
- Fruit-Vegetable juice blends (100% juice)

Vegetables

- White potatoes (with or without skins)
- Iceberg lettuce
- Tomatoes (canned)
- Corn (canned, not creamed)
- Vegetable juice blends (100% juice)
- Vegetable-Fruit juice blends (100% juice)



The situation facing low-income families is dire and applications for food assistance have already increased in 2009. SNAP benefits are calculated to provide low-income families with sufficient food purchasing power to obtain a nutritious diet. The expectation is that low-income households will spend 30% of their after-taxes income on food, a percentage that has remained unchanged since the 1950s. However, the average percentage of disposable income devoted to food by all consumers today is approximately 5% for foods eaten at home and another 5% for foods eaten away from home, with higher expenditures for transportation, housing, utilities, medical care, and child care. Spending 30% of disposable income on food is a major hardship.

In 2006 a typical family at 130% of the poverty line spent less than \$120 per week on food, 5% below the estimated cost of the TFP. Based on those data, Golan et al (2008) asserted that families receiving SNAP benefits had sufficient purchasing power to afford healthy foods, including luxury fresh produce. However, consistent with our studies, low-income families most likely selected low cost foods that were energy rich but nutrient poor. Although higher food costs do not guarantee better diet quality, reducing food expenditures below a certain amount virtually ensures an energy-dense diet of low nutrient content. Identifying affordable nutrient rich foods becomes a matter of prime concern to dietary guidelines.

Author Information

Adam Drewnowski, PhD, is Director of the Nutritional Sciences Program and Professor of Epidemiology and Medicine at the University of Washington in Seattle. He is the Director of the Center for Public Health Nutrition and the UW Center for Obesity Research and a Joint Member of the Fred Hutchinson Cancer Research Center.

Petra Eichelsdoerfer, ND, MS, RPh, is a post-doctoral research fellow funded through the National Centers for Complementary and Alternative Medicine (NCCAM). She is affiliated with Bastyr University.

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