

# Harvard School of Public Health

## The Nutrition Source

### Food Pyramids: What Should You Really Eat?

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#### Introduction

More than a decade and a half ago, the U.S. Department of Agriculture (USDA) created a powerful and enduring icon: the Food Guide Pyramid. This simple illustration conveyed in a flash what the USDA said were the elements of a healthy diet. The Pyramid was taught in schools, appeared in countless media articles and brochures, and was plastered on cereal boxes and food labels.

Tragically, the information embodied in this pyramid didn't point the way to healthy eating. Why not? Its blueprint was based on shaky scientific evidence, and it barely changed over the years to reflect major advances in our understanding of the connection between diet and health.

With much fanfare, in 2005, the USDA retired the old Food Guide Pyramid and replaced it with MyPyramid, a new symbol and "interactive food guidance system." The new symbol is basically the old Pyramid turned on its side.

The good news is that this dismantles and buries the flawed Pyramid. The bad news is that the new symbol doesn't convey enough information to help you make informed choices about your diet and long-term health. And it continues to recommend foods that aren't essential to good health, and may even be detrimental in the quantities included in MyPyramid.

As an alternative to the USDA's flawed pyramid, faculty members at the Harvard School of

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Public Health built the Healthy Eating Pyramid. It resembles the USDA's in shape only. The Healthy Eating Pyramid takes into consideration, and puts into perspective, the wealth of research conducted during the last 15 years that has reshaped the definition of healthy eating.

## Pyramid Building



In the children's book *Who Built the Pyramid?*, (1) different people take credit for building the once-grand pyramid of Senwosret. King Senwosret, of course, claims the honor. But so does his architect, the quarry master, the stonecutters, slaves, and the boys who carried water to the workers.

The USDA's MyPyramid also had many builders. Some are obvious—USDA scientists, nutrition experts, staff members, and consultants. Others aren't. Intense lobbying efforts from a variety of food industries also helped shape the pyramid.

In theory, the USDA pyramid should reflect the nutrition advice assembled in the [Dietary Guidelines for Americans](#). According to the USDA, the guidelines "provide authoritative advice for people two years and older about how good dietary habits can promote health and reduce risk for major chronic diseases."

This document, which by law must be revised every five years, aims to offer sound nutrition advice that corresponds to the latest scientific research; indeed, on April 10, 2008, the USDA and the U.S. Department of Health and Human Services announced [plans](#) to form the advisory committee for the 2010 version of the guidelines. The panel assembled to create the guidelines usually generates 100 or so pages of dense nutrition-speak. This document is translated into a reader friendly [brochure](#) aimed at helping the average person choose a balanced and healthy diet. Of far greater importance, the Dietary Guidelines for Americans set the standards for all federal nutrition programs, including the school lunch program, and helps determine what food products Americans buy. In other words, the guidelines influence how billions of dollars are spent each year. So even minor changes can hurt or help a food industry.

According to federal regulations, the panel that writes the dietary guidelines must include nutrition experts who are leaders in pediatrics, obesity, cardiovascular disease, and public health. Selecting the panelists is no easy task, and is subject to intense lobbying from organizations such as the National Dairy Council, United Fresh Fruit and Vegetable Association, Soft Drink Association, American Meat Institute, National Cattlemen's Beef Association, and Wheat Foods Council. (2)

## Dietary Guidelines 2005: Two Steps Forward, One Step Back

Released in early January 2005, the Dietary Guidelines for Americans 2005 continues to reflect the tense interplay of science and the powerful food industry. Several of the recommendations in the current version represent important steps in the right direction:

- The current guidelines emphasize the importance of controlling weight, which was not adequately addressed in previous versions. And they continue to stress the importance of physical activity.
- The recommendation on dietary fats makes a clear break from the past, when all fats were considered bad. The guidelines now emphasize that intake of trans fats should be as low as possible and that saturated fat should be limited. There is no longer an artificially low cap on fat intake. The latest advice recommends getting between 20 and 35 percent of daily calories from fats and recognizes the potential health benefits of monounsaturated and

polyunsaturated fats.

- Instead of emphasizing "complex carbohydrates," a term used in the past that has little biological meaning, the new guidelines urge Americans to limit sugar intake and they stress the benefits of whole grains.

Others remain mired in the past:

- The guidelines suggest that it is fine to consume half of our grains as refined starch. That's a shame, since refined starches, such as white bread and white rice, behave like sugar. They add empty calories, have adverse metabolic effects, and increase the risks of diabetes and heart disease.
- In terms of protein, the guidelines continue to lump together red meat, poultry, fish, and beans (including soy products). They ask us to judge these protein sources by their total fat content, and "make choices that are lean, low-fat, or fat-free." This ignores the evidence that these foods have different types of fats. It also overlooks mounting evidence that replacing red meat with a combination of fish, poultry, beans, and nuts offers numerous health benefits.
- The recommendation to drink three glasses of low-fat milk or eat three servings of other dairy products per day to prevent osteoporosis is another step in the wrong direction. Of all the recommendations, this one represents the most radical change from current dietary patterns. Three glasses of low-fat milk a day amounts to more than 300 extra calories a day. This is a real issue for the millions of Americans who are trying to control their weight. What's more, millions of Americans are lactose intolerant, and even small amounts of milk or dairy products give them stomachaches, gas, or other problems. This recommendation ignores the lack of evidence for a link between consumption of dairy products and prevention of osteoporosis. It also ignores the possible increases in risk of ovarian cancer and prostate cancer associated with dairy products.

## The USDA Pyramid, Brick by Brick

Distilling nutrition advice into a pyramid was a stroke of genius. The shape immediately suggests that some foods are good and should be eaten often, and that others aren't so good and should be eaten only occasionally. The layers represent major food groups that contribute to the total diet. MyPyramid tries to do this in an abstract way, and fails.



Six swaths of color sweep from the apex of MyPyramid to the base: orange for grains, green for vegetables, red for fruits, a teeny band of yellow for oils, blue for milk, and purple for meat and beans. Each stripe starts out as the same size, but they don't end that way at the base. The widths suggest how much food a person should choose from each group. A band of stairs running up the side of the Pyramid, with a little stick figure chugging up it, serves as a reminder of the importance of physical activity.

MyPyramid contains no text. According to the USDA, it was "designed to be simple," and details are at MyPyramid.gov. Unless you've taken the time to become familiar with the Pyramid, though, you have no idea what it means. Relying on the

Web site to provide key information—like what the color stripes stand for and what the best choices are in each food group—guarantees that the millions of Americans without access to a computer or the Internet will have trouble getting these essential facts.

The USDA also chose not to put recommended numbers of servings on the new Pyramid because these differ from individual to individual according to weight, gender, activity level and age. Instead, it offers personalized Pyramids at [MyPyramid.gov](http://MyPyramid.gov).

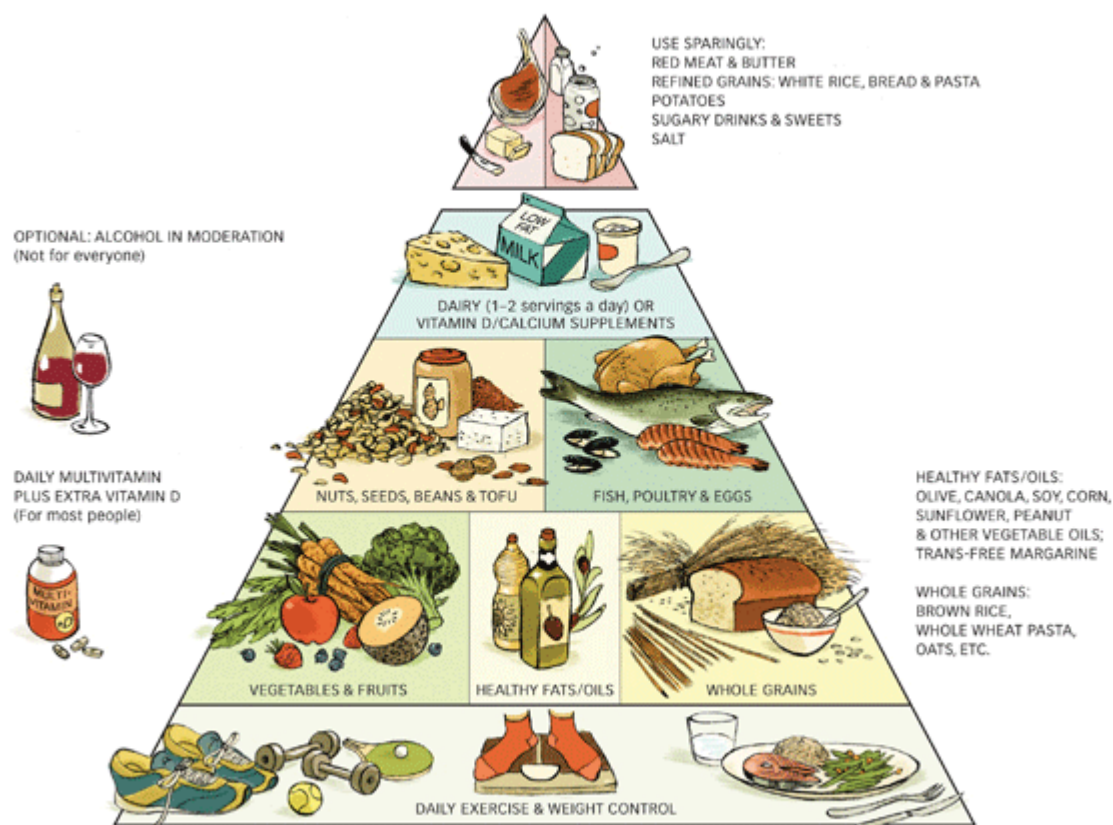
## Building a Better Pyramid

If the only goal of MyPyramid is to give us the best possible advice for healthy eating, then it should be grounded in the evidence and be independent of business.

Instead of waiting for this to happen, nutrition experts from the Harvard School of Public Health created the Healthy Eating Pyramid, and updated it in 2008. The Healthy Eating Pyramid is based on the best available scientific evidence about the links between diet and health. This new pyramid fixes fundamental flaws in the USDA pyramid and offers sound information to help people make better choices about what to eat. (View a [larger PDF](#) image of the new pyramid, in a separate window.)

# THE HEALTHY EATING PYRAMID

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Adapted from *Eat, Drink, and Be Healthy* by Walter C. Willett, M.D. and Patrick J. Skerrett (2005)  
Free Press/Simon & Schuster Inc.

The Healthy Eating Pyramid sits on a foundation of daily exercise and weight control. Why?

These two related elements strongly influence your chances of staying healthy. They also affect what you eat and how your food affects you.

Exercise and weight control are also linked through the simple rule of energy balance: Weight change = calories in – calories out. If you burn as many calories as you take in each day, there's nothing left over for storage in fat cells, and weight remains the same. Eat more than you burn, though, and you end up adding fat and pounds. Regular exercise can help you control your weight, and it is key part of any weight-loss effort.

## Related Articles

### [Getting to Your Healthy Weight:](#)

Science based advice on weight control

### [5 Quick Tips for Getting More Physical Activity:](#)

How to fit exercise into your life

The other bricks of the Healthy Eating Pyramid include the following:

### Whole Grains



carbohydrates

The body needs carbohydrates mainly for energy. The best sources of carbohydrates are whole grains such as oatmeal, whole wheat bread, and brown rice. They deliver the outer (bran) and inner (germ) layers along with energy-rich starch. The body can't digest whole grains as quickly as it can highly processed carbohydrates such as white flour. This keeps blood sugar and insulin levels from rising, then falling, too quickly. Better control of blood sugar and insulin can keep hunger at bay and may prevent the development of type 2 diabetes. Plus, a growing body of research suggests that eating a diet rich in whole grains may also protect against heart disease.

### Healthy Fats and Oils



fats

Surprised that the Healthy Eating Pyramid puts some fats near the base, indicating they are okay to eat? Although this recommendation seems to go against conventional wisdom, it's exactly in line with the evidence and with common eating habits. The average American gets one-third or more of his or her daily calories from fats, so placing them near the foundation of the pyramid makes sense. Note, though, that it specifically mentions healthy fats

and oils, not all types of fat. Good sources of healthy unsaturated fats include olive, canola, soy, corn, sunflower, peanut, and other vegetable oils, trans fat-free margarines, nuts, seeds, avocados, and fatty fish such as salmon. These healthy fats not only improve cholesterol levels (when eaten in place of highly processed carbohydrates) but can also protect the heart from sudden and potentially deadly rhythm problems.

### Vegetables and Fruits



vegetables / fruits

A diet rich in vegetables and fruits has bountiful benefits. Among them: It can decrease the chances of having a heart attack or stroke; possibly protect against some types of cancers; lower blood pressure; help you avoid the painful intestinal ailment called diverticulitis; guard against cataract and macular degeneration, the major causes of vision loss among people over age 65; and add variety to your diet and wake up your palate.

### Nuts, Seeds, Beans, and Tofu

These plant foods are excellent sources of protein, fiber, vitamins, and minerals. Beans include black beans, navy beans, garbanzos, lentils, and other beans that are usually sold dried. Many



kinds of nuts contain healthy fats, and packages of some varieties (almonds, walnuts, pecans, peanuts, hazelnuts, and pistachios) can now even carry a label saying they're good for your heart.

### **Fish, Poultry, and Eggs**



**protein**

These foods are also important sources of protein. A wealth of research suggests that eating fish can reduce the risk of heart disease, since fish is rich in heart-healthy omega-3 fats. Chicken and turkey are also good sources of protein and can be low in saturated fat. Eggs, which have long been demonized because they contain fairly high levels of cholesterol, aren't as bad as they've been cracked up to be. In fact, an egg is a much better breakfast

than a doughnut cooked in an oil rich in trans fats or a bagel made from refined flour. People with diabetes or heart disease, however, should limit their egg yolk consumption to no more than 3 a week. But egg whites are very high in protein and are a fine substitute for whole eggs in omelets and baking.

### **Dairy (1 to 2 Servings Per Day) or Vitamin D/Calcium Supplements**



**calcium/milk**

Building bone and keeping it strong takes calcium, vitamin D, exercise, and a whole lot more. Dairy products have traditionally been Americans' main source of calcium and, through fortification, vitamin D. But most people need at least 1,000 IU of vitamin D per day, far more than the 100 IU supplied by a glass of fortified milk. (See the multivitamins section, below, for more information on vitamin D needs.) And there are other healthier ways to get calcium than from

milk and cheese, which can contain a lot of saturated fat. Three glasses of whole milk, for example, contains as much saturated fat as 13 strips of cooked bacon. If you enjoy dairy foods, try to stick mainly with no-fat or low-fat products. If you don't like dairy products, taking a vitamin D and calcium supplement offers an easy and inexpensive way to meet your daily vitamin D and calcium needs.

### **Use Sparingly: Red Meat and Butter**

These sit at the top of the Healthy Eating Pyramid because they contain lots of saturated fat. Eating a lot of red meat may also increase your risk of colon cancer. If you eat red meat every day, switching to fish, chicken, or beans several times a week can improve cholesterol levels. So can switching from butter to olive oil. And eating fish has other benefits for the heart.

### **Use Sparingly: Refined Grains—White Bread, Rice, and Pasta; Potatoes; Sugary Drinks and Sweets; Salt**

Why are these all-American staples at the top, rather than the bottom, of the Healthy Eating Pyramid? White bread, white rice, white pasta, other refined grains, potatoes, sugary drinks, and sweets can cause fast and furious increases in blood sugar that can lead to weight gain, diabetes, heart disease, and other chronic disorders. Whole grain carbohydrates cause slower, steadier increases in blood sugar that don't overwhelm the body's ability to handle carbohydrate. The salt shaker is a new addition to the "Use Sparingly" tip of the Healthy Eating Pyramid, one that's based on extensive research linking high-sodium diets to increased risk of heart attack and stroke.

### **Multivitamin with Extra Vitamin D (For Most People)**



A daily multivitamin, multimineral supplement offers a kind of nutritional backup, especially when it includes some extra vitamin D. While a

multivitamin can't in any way replace healthy eating, or make up for unhealthy eating, it can fill in the nutrient holes that may sometimes affect even the most careful eaters. You don't need an expensive name-brand or designer vitamin. A standard, store-brand, RDA-level one is fine for most nutrients—except vitamin D. In addition to its bone-health benefits, there's growing evidence that getting some extra vitamin D can help lower the risk of colon and breast cancer. Aim for getting at least 1,000 IU of vitamin D per day; multiple vitamins are now available with this amount. (Many people, especially those who spend the winter in the northern U.S. or have darker skin, will need extra vitamin D, often a total of 3,000 to 4,000 IU per day, to bring their blood levels up to an adequate range. If you are unsure, ask your physician to check your blood level.) Look for a multivitamin that meets the requirements of the USP (U.S. Pharmacopeia), an organization that sets standards for drugs and supplements.

### **Optional: Alcohol in Moderation (Not for Everyone)**



alcohol

Scores of studies suggest that having an alcoholic drink a day lowers the risk of heart disease. Moderation is clearly important, since alcohol has risks as well as benefits. For men, a good balance point is one to two drinks a day; in general, however, the risks of drinking, even in moderation, exceed benefits until middle age. For women, it's at most one drink a day; women should avoid alcohol during pregnancy.

### **Forget about Numbers and Focus on Quality**



You'll notice that the Healthy Eating Pyramid does not give specific advice about the numbers of cups or ounces to have each day of specific foods. That's because it's not meant to be a rigid road map, and the amounts can vary depending on your body size and physical activity. It's a simple, general, flexible guide to how you should eat when you eat.

There's just one basic guideline to remember: A healthy diet includes more foods from the base of the pyramid than from the higher levels of the pyramid. Within this guideline, however, there's plenty of flexibility for different styles of eating and different food choices. A vegetarian can follow the Healthy Eating Pyramid by emphasizing nuts, beans, and other plant sources of protein, and choosing non-dairy sources of calcium and vitamin D; someone who eats animal products can choose fish or chicken for protein, with occasional red meat.

Choosing a variety of fresh, whole foods from all the food groups below the "Use Sparingly" category in the Healthy Eating Pyramid will ensure that you get the nutrients you need. It will also dramatically lower your salt intake, since most of the salt in the U.S. diet lurks in processed food—canned soups, frozen dinners, deli meats, snack chips, and the like.

Perhaps the only foods that are truly off-limits are foods that contain trans fat from partially hydrogenated oils. Luckily, in the U.S. and Canada, trans fats must be listed on nutrition labels. More and more food manufacturers, restaurants, and even entire communities are going trans fat-free, making it easier to avoid this health-damaging type of fat.

### **Other Alternatives**

The Healthy Eating Pyramid summarizes the best dietary information available today. It isn't set in stone, though, because nutrition researchers will undoubtedly turn up new information

in the years ahead. The Healthy Eating Pyramid will change to reflect important new evidence.

This isn't the only alternative to the USDA's MyPyramid. The Asian, Latin, Mediterranean, and vegetarian pyramids promoted by [Oldways Preservation and Exchange Trust](#) are also good, evidence-based guides for healthy eating. The Healthy Eating Pyramid takes advantage of even more extensive research and offers a broader guide that is not based on a specific culture. The original Healthy Eating Pyramid is described in greater detail in *Eat, Drink, and Be Healthy: The Harvard Medical School Guide to Healthy Eating*, by Walter C. Willett, M.D. (the Fredrick John Stare Professor of Epidemiology and Nutrition in the Departments of Nutrition and Epidemiology at Harvard School of Public Health) with Patrick J. Skerrett (published by Free Press, 2005).

## Failing the Test

Back in the 1990s, the USDA's Center for Nutrition Policy and Promotion created the Healthy Eating Index "to measure how well American diets conform to recommended healthy eating patterns." (3) In its original form, this score sheet used five elements from the longstanding USDA Food Guide Pyramid (number of daily servings of grains, vegetables, fruits, meat, and dairy products) and five from the 1995 Dietary Guidelines for Americans (total fat in the diet, percentage of calories from saturated fat, cholesterol intake, sodium intake, and variety of the diet). A score of 100 meant following the federal recommendations to the letter while a score of 0 meant totally ignoring them. (The USDA has since [updated](#) the score sheet to reflect the Dietary Guidelines for Americans 2005.)

To see how well the principles embodied in the Healthy Eating Pyramid stacked up against the government's advice, Harvard School of Public Health researchers created an Alternate Healthy Eating Index with a scoring system similar to the USDA's index. They then compared the two indexes, using information about daily diets collected from more than 100,000 female nurses and male health professionals taking part in two long-term studies.

Men who scored highest on the USDA's original Healthy Eating Index (meaning their diets most closely followed federal recommendations) reduced their overall risk of developing heart disease, cancer, or other chronic disease by 11 percent over 8 to 12 years of follow-up compared to those who scored lowest. Women who most closely followed the government's recommendations were only 3 percent less likely to have developed a chronic disease. (4)

In comparison, scores on the Alternate Healthy Eating Index did appear to correlate more closely with disease in both sexes. Men with high scores (those whose diets most closely followed the guidelines in the Healthy Eating Pyramid) were 20 percent less likely to have developed a major chronic disease than those with low scores. Women with high scores lowered their overall risk by 11 percent. Men whose diets most closely followed the Healthy Eating Pyramid lowered their risk of cardiovascular disease by almost 40 percent; women with high scores lowered their risk by almost 30 percent.

"The new USDA dietary pyramid is a lost opportunity to help Americans make informed choices about diet and long-term health," says Dr. Willett. "It's clear that we need to rebuild the pyramid from the ground up, not just tip it on its side and dress it up with new colors. Every American deserves it."

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