

infoaging guides

HEALTHY AGING



NUTRITION

An introduction to aging science brought to you by the
American Federation for Aging Research

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WHAT ARE NUTRITION AND MALNUTRITION?

Nutrition describes the process of providing the body with the nourishment it needs to sustain health and growth. Nutritional science is the study of how the body responds to diet.

Malnutrition is a physical state in which a person has become ill because of continual over- or under-eating, or whose body has

become chemically unbalanced either because of poor diet or an inability to absorb or metabolize one or more essential nutrients. Recent studies have shown that one in four older Americans suffer from poor nutrition.

In the elderly, malnutrition can lead to weight loss, decreased strength, weakened immune response, confusion, and disorientation. It can also aggravate frailty and debilitation. Recent research shows that poorly nourished older adults make more trips to the doctor, hospital, and emergency room than do their well-nourished counterparts, and their hospital stays, on average, are nearly twice as long and cost \$2,000 to \$10,000 more.

Up to 16 percent of community-dwelling older adults are undernourished, as are up to 60 percent of those living in long-term care facilities or hospitalized for acute illness. At the other end of the spectrum, about 60 percent of older men are overweight, as are 50 percent of older women.

Good nutrition is a critical part of successful aging, yet one in three people aged 65+ have diet-related deficiencies. Factors that contribute to high rates of malnutrition include:

- Bad eating habits
- Dental/oral health problems
- Lack of knowledge about nutrition
- Depression
- Social isolation
- Poverty
- Sensory losses
- Age-related changes
- Medication interactions (drug-drug and drug-nutrient)
- Underlying medical conditions causing increased energy expenditure, mal-digestion, or mal-absorption
- Restrictive diets
- Dependency on others for meal preparation or feeding
- Alcohol/substance abuse

Poor nutritional intake can lead to a number of health-related problems. They include:

- Depressed immune function (which leads to an increased risk of infection and slower wound healing)
- Anemia
- Fatigue
- Orthostatic hypotension (a drop in blood pressure, primarily associated with dehydration, that can lead to fainting)
- Poor bone quality and strength
- Decreased muscle strength
- Pressure sores
- Swelling of the feet and ankles
- Depressed thyroid function
- Increased risk of harmful drug interactions



CHOOSING A HEALTHFUL DIET

Until recently, the United States Department of Agriculture (USDA) relied on its Food Guide Pyramid to illustrate how to apportion six food groups in your diet. However, in June 2011, the USDA replaced the pyramid with [MyPlate](#), an icon based on the familiar image of a dinner plate, divided into four correctly sized portions of protein, grains, vegetables, and fruits, with dairy as a side dish.

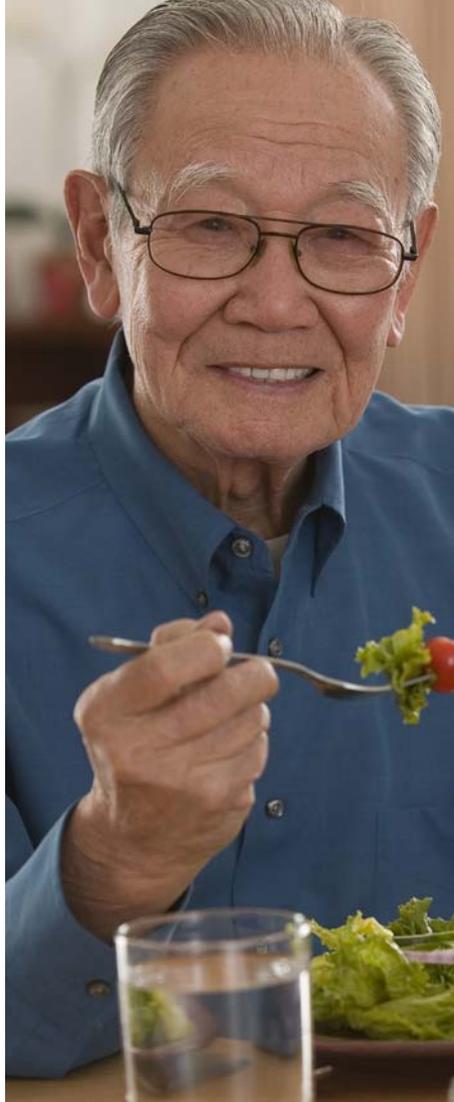
The icon is intended to help promote healthful eating, based on the USDA's *2010 Dietary Guidelines for Americans*. Everything on the ChooseMyPlate Web site (Daily Food Plan, Food Tracker, Food Planner, etc.) was developed by nutritionists, dietitians, economists, and policy experts at the U.S. Department of Agriculture.

NUTRITION AND AGING

While MyPlate is generally a good starting point in planning how to meet individual nutritional needs, older adults may need to do a little more homework. The lifestyle of an active 70-year-old differs considerably from that of a 90-year-old nursing home resident, and each is likely to have different nutritional needs. So how we determine how to meet those needs?

Recommended Dietary Allowance (RDA)

You may have noticed the acronym RDA on the labels of various foods. RDA stands for *recommended dietary allowance* (not *daily* allowance, as many people believe). The RDAs, established in 1941, recommend minimum daily amounts of essential nutrients. RDAs have been established for protein, 11 vitamins, and 7 minerals.



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RDAs, however, have some limitations, especially for older adults:

- They are based on the known needs of adults under age 50
- They are based on healthy populations and do not take into account the different nutritional needs of those who are ill
- They are not adjusted for drug-diet or nutrient-diet interactions

Dietary Reference Intakes (DRIs)

Our nutritional knowledge has advanced a great deal since the development of the RDAs, and taking that into consideration, the [Food and Nutrition Board of the National Academy of Sciences](#) has developed a more sophisticated set of dietary guidelines called [dietary reference intakes \(DRIs\)](#). These offer minimum recommendations by age group—including 50 to 70 and over 70 years of age— as well as maximum allowable dosages.

The DRIs emphasize nutritional needs to optimize health and reduce risk of chronic diseases. They also specify the levels of nutrients that can help reduce the risk of cardiovascular disease, osteoporosis, and certain cancers.

Supplements

Millions of Americans take a daily multivitamin as a kind of shortcut to ensuring that they're getting all of the nutrients they need. If you have a varied diet that mainly includes vegetables, whole grains, and fruits, you may not need to supplement in this way. However, according to the [National Institute on Aging](#) (NIA), people aged 50+ may need some extra supplementation with four nutrients. Check with your doctor or dietician to determine if you need additional amounts of the following:

Vitamin B12. Vitamin B12 helps keep your red blood cells and nerve cells healthy. Older people may have trouble absorbing it from foods, so a supplement may be helpful.

Calcium. Calcium makes bones strong and can help keep them from fracturing. As people grow older, their bones begin to lose calcium at an increased rate. Supplementing and increasing

intake of calcium rich foods, such as low-fat dairy products, green leafy vegetables (kale, broccoli, collard greens, etc.), and soy milk fortified with calcium.

Vitamin D. Vitamin D helps calcium do its work. The human body makes this vitamin when the skin is exposed to sunlight. Older individuals, however, may not be able to get enough vitamin D in this way, and many are deficient. Drinking fortified low-fat milk may help, as may taking a supplement. Be sure to check with your doctor before increasing vitamin D intake, because taking too much may be harmful.

Vitamin B6. Vitamin B6 is involved in the production and transport of chemicals in the brain and has a major role in how our body uses energy. The richest sources of vitamin B6 include fish, beef liver and other organ meats, potatoes and other starchy vegetables, and fruit (other than citrus).

HYDRATION

Getting enough water into your body is fundamental to sound nutrition and good health. In fact, every system in the human body depends on water to function. Here are a few of the many roles it plays:

- Carries nutrients and oxygen to cells
- Helps prevent constipation
- Helps regulate body temperature
- Flushes waste from the liver and kidneys
- Helps protect the body's major organs
- Lubricates the joints

- Is an important component of eye, nose, and mouth tissue

In older adults, adequate water intake is vital to managing diabetes and can help reduce risk for urinary tract infections, incontinence, kidney stones, heart disease, cognitive impairment, falls, poor oral health, and a number of other illnesses.

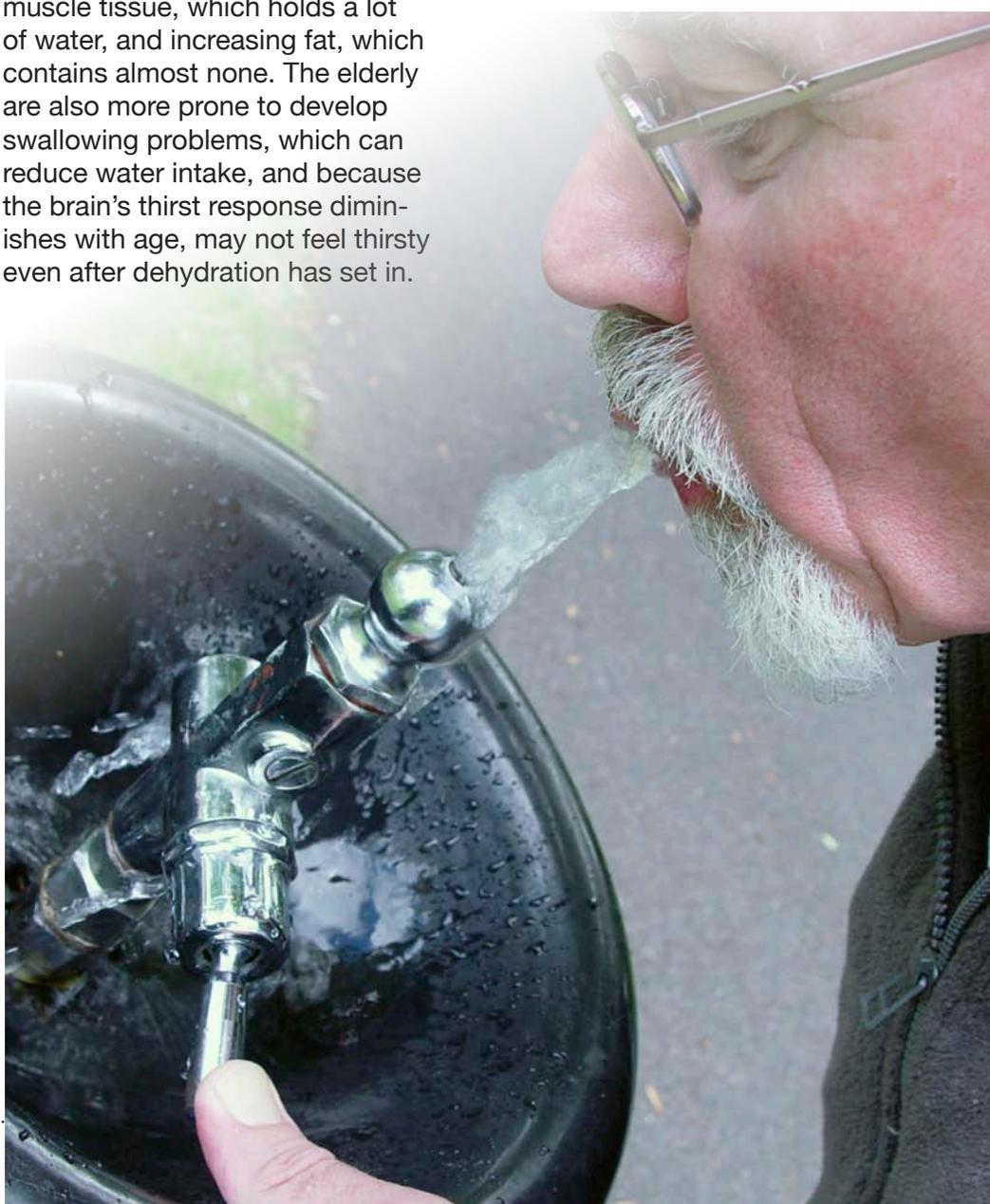
Poor hydration

Because water is so important to good health, dehydration—excessive water loss from the body—can be injurious and even deadly. It can happen at any age, but older adults are particularly at risk. As the body grows older, its metabolism slows, reducing muscle tissue, which holds a lot of water, and increasing fat, which contains almost none. The elderly are also more prone to develop swallowing problems, which can reduce water intake, and because the brain's thirst response diminishes with age, may not feel thirsty even after dehydration has set in.

Dehydration reduces blood volume in the body, which in turn triggers the nervous system to constrict the blood vessels. The heart then responds by beating faster in an effort to get more blood to tissue, but it can't pump efficiently enough to compensate. As a result, the brain, liver, and kidneys don't get enough flow. In extreme cases, these organs may deteriorate and fail, leading to death.

Causes

Dehydration can result from anything that causes the body to lose more fluid than it takes in. Some of the most common culprits are listed on the following page.



- Physical exertion that causes sweating
- Hot or humid weather
- Heated air indoors
- High altitude
- Fever
- Vomiting
- Diarrhea
- Medications such as diuretics, laxatives, ACE inhibitors, anti-psychotic drugs, cholinesterase inhibitors
- Diabetes
- Draining wounds
- Mood disorders (e.g., depression) that decrease appetite
- Self-restricted fluid intake to avoid incontinence or need to urinate
- Consuming foods that are high in water content, such as vegetables, fruits (especially watermelon), yogurt, and flavored gelatin
- Consuming fluids regularly, even in the absence of any thirst sensation
- Increasing fluid consumption during illness
- Increasing fluid consumption during and after stressful physical activities such as exercise
- Increasing fluid consumption when the ambient temperature is warm or humid, whether indoors or outdoors

OVERWEIGHT AND OBESITY

The body gets its operating fuel in the form of calories, which it uses to run metabolic processes and support physical activity. Weight gain happens when an individual takes in more calories than he or she burns, leaving the excess for storage in fat cells. Too much weight gain can lead to health problems. How much is too much? The current assessment tool for determining healthful/unhealthful weight is called the body mass index (BMI). You can calculate your BMI [here](#). A BMI greater than 25 indicates overweight; greater than 30 indicates obesity.

Research has shown that as weight increases, the risks for the following conditions also increase:

- Coronary heart disease
- Type 2 diabetes
- Cancers (endometrial, breast, and colon)
- High blood pressure
- High total cholesterol
- High triglycerides levels

- Stroke
- Liver and gallbladder disease
- Sleep apnea and respiratory problems
- Osteoarthritis
- Gynecological problems (abnormal menstruation, infertility)

According to the [Centers for Disease Control and Prevention \(CDC\)](#), one-third of all adults in the U.S. are obese. In 2008, the last year for which figures are available, medical costs associated with obesity reached about \$147 billion.

Conversely, losing weight by consuming a healthful diet may:

Lower your blood pressure.

Moderate weight reduction can lower blood pressure. However, if you put the weight back on, your blood pressure will go back up.

Help your diabetes.

The incidence of type 2 diabetes increases with rising BMI or body mass index; 94 percent of type 2 diabetes in women ages 30 to 64 is associated with obesity. Among those with diabetes, weight loss can lower blood sugar levels and reduce or eliminate the need for medications. According to results from the [“Nurses’ Health Study.”](#) published in the *Journal of the American Medical Association*, women have another option for improving their chances of avoiding diabetes: eating nuts and peanut butter. During a 16-year period, participating women who ate nuts or peanut butter at least five times a week were nearly 25 percent less likely to develop type 2 diabetes than women who never ate those foods. The study’s authors recommended that women replace poor sources of calories, such as refined grains

Symptoms

It’s important to catch dehydration early. Increased fluid intake will usually solve mild to moderate cases, but extreme cases need emergency medical attention. Symptoms include:

- Dry mouth
- Sunken eyes
- Rapid heartbeat
- Fever
- Low blood pressure
- Constipation
- Decreased appetite
- Rapid weight loss
- Loss of skin elasticity
- Disorientation or confusion

Prevention

Some older adults become dehydrated due to age-related changes in their bodies over which they have no control. However, many can take steps to prevent the condition from occurring. These steps include:

and red meat, with nuts to avoid increasing caloric intake when increasing nut consumption.

Reduce your risk of cancer.

Obesity is associated with a higher mortality from all types of cancer. Obese men have higher rates of mortality from colon and prostate cancer, while obese women have higher rates of mortality from breast, endometrial, cervical, ovarian, and gall bladder cancer. The type of food you eat may also influence your risk of developing this disease. Researchers at Simmons College in Boston, Massachusetts, found that over a 12-year period, women with the highest intake of “Western” style foods—characterized as red and processed meats, sugary foods and desserts, french fries, and refined grains—were nearly [50 percent more likely to develop colon cancer](#) than were women consuming diets rich in fruits, vegetables, whole grains, nuts, fish, and poultry.

Reduce your bad (LDL)

cholesterol. Losing weight will reduce your LDL (bad) cholesterol and increase your HDL (good) cholesterol levels. An improvement in your cholesterol levels will reduce your risk of heart attacks and strokes.

Another factor influencing obesity-related health risks is the distribution of fat on your body. It is better to resemble a pear than an apple. Women tend to have more buttock and hip fat (pear shape), while men have more abdominal fat (apple shape). The major diseases and conditions related to being overweight are associated with increased abdominal fat.

Despite all of the benefits of losing weight, a few extra pounds (no more than 10 percent of your

optimal body weight as determined by your BMI) aren't always a bad thing. In fact, after age 65, a little additional weight may reduce your risk of disability and increase your longevity.

If you decide you need to lose weight, then be sure to do it safely. Each year there is a new diet or diet pill to lose weight. Extreme diets can be dangerous, especially in older persons.

Drastic reductions in food intake can result in vitamin and nutrient deficiencies, as well as dehydration.

[Losing weight by consuming a healthful diet may lower blood pressure, help control diabetes, reduce risk of cancer, and reduce bad \(LDL\) cholesterol.](#)



WOMEN'S HEALTH INITIATIVE STUDY RESULTS: THE EFFECT OF LOW-FAT DIET

The largest-ever [clinical trial](#) of a low-fat diet, as reported in the *Journal of the American Medical Association*, was part of the [Women's Health Initiative \(WHI\)](#), a 15-year project sponsored by the National Institutes of Health National Heart, Lung and Blood Institute. Three separate studies made up the initiative: a randomized clinical trial, an observational study, and a community prevention study. The clinical trial consisted of a hormone therapy (HT) component, a dietary modification component, and a calcium/vitamin D (CaD) component.

The dietary modification component evaluated the effect of a low-fat, high fruit, vegetable, and grain diet on the prevention of breast cancer, colorectal cancer, and heart disease. To study the impact of diet modifications, researchers followed 48,835 women aged 50 to 79 for an average of 8.1 years. The study group consisted of women who followed a low-fat dietary plan that required participants to reduce intake of total fat calories to the study's goal of 20 percent. In the study group, no differentiation was made between “good” fats—those found in fish, nuts, and vegetable oils—and “bad” fats, such as saturated fat and trans fat. The control group consisted of women who followed their normal dietary patterns. Women in both groups began the study at the same level of fat intake—35 to 38 percent of calories from fat. By the end of the first year, women in the study group reduced average total fat intake to 24 percent of calories from fat. By the end of the sixth year, the average total fat intake

of women in the study group crept back up to 29 percent of calories from fat. The control group averaged 35 percent of calories from fat at year one and 37 percent at year six.

With this setup, researchers found that women in the study group had a nine percent lower risk of breast cancer than women in the control group. However, the difference was not large enough to be statistically significant. Researchers were also unable to detect significant differences in the rates of colorectal cancer, heart disease, or stroke between the study group and the control group.

The dietary modification component of the WHI also studied how increased carbohydrate intake affected weight gain among participating women. This aspect of the research was included because a number of popular diet books have suggested that a diet low in fat and high in carbohydrates from vegetables, fruits, whole grains, and other fiber-rich foods are contributing to the rise in obesity. However, the study found that a high-carbohydrate, low-fat eating pattern does not increase body weight, triglycerides, or indicators of increased risk of diabetes.

THE FUTURE OF NUTRITION RESEARCH

Central to future research in nutritional science will be the question of whether the diseases of aging or perhaps even aging itself can be prevented and/or delayed by proper nutrition. Scientists will look at what specific components of food are important and how that information can be used to determine recommended daily allowances and dietary reference intakes.

The actual value of supplementation, in addition to a diet rich in nutrients, needs to be determined in a scientifically rigorous manner, so research will continue to tease out the effects of particular vitamins and other supplements on a variety of diseases and conditions, as well as on the aging process more generally. Investigators will also explore the effects of food on target genes or other components of cell metabolism—a relatively new area of research.

With regard to older adults, determining the components of good nutrition represents only one piece of the puzzle. Because the elderly population includes many individuals who have difficulty with swallowing or digestion, ways to deliver nutrition is likely to become another area of expanding research.



According to the [National Institute on Aging \(NIA\)](#), people aged 50+ may need some extra supplementation with four nutrients: vitamin B12, calcium, vitamin D, and vitamin B6.

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