

CHAPTER 1: NUTRITION AND YOU



CHAPTER OVERVIEW

Chapter 1: Nutrition and You

- 1.1: Impact of Diet and Lifestyle on Health
- 1.2: Defining Nutrition, Health, and Disease
- 1.3: What Are Nutrients?
- 1.4: Calories (Food Energy)
- 1.5: Research and the Scientific Method
- 1.6: Types of Scientific Studies and Nutrition Assessment Methods
- 1.7: Careers in Nutrition
- 1.8: Nutrition and the Media
- 1.9: Assessing Personal Health
- 1.10: A Fresh Perspective- Sustainable Food Systems
- 1.E: Nutrition and You (Exercises)

Chapter 1: Nutrition and You is shared under a [CC BY-NC-SA 4.0](#) license and was authored, remixed, and/or curated by LibreTexts.

1.1: Impact of Diet and Lifestyle on Health

Learning Objectives

- Learn about the lifestyle choices that affect health

Good nutrition, physical activity and a healthy lifestyle are essential for good health. A well established body of research links poor diet and inactivity to a wide range of preventable diseases and premature death. The U.S. Center's for Disease Control (CDC) tracks data about the leading causes of death and disease and provides a wide range of resources for health professionals and the public to support healthier lifestyles.

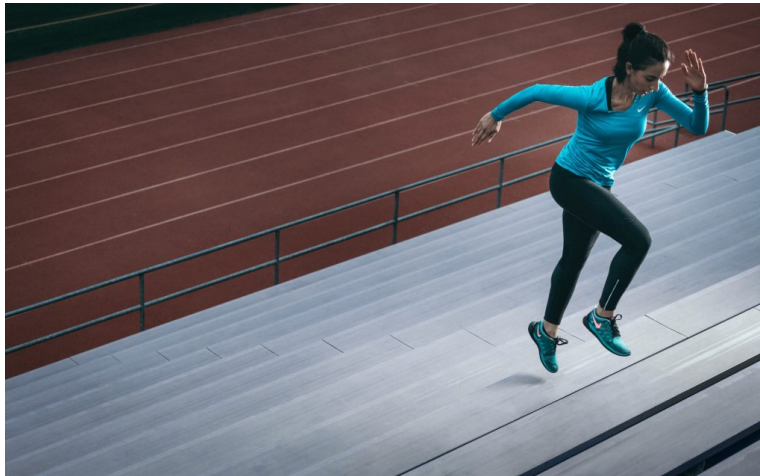


Figure 1.1.1: Image by John Towner on unsplash.com / CC0.

<https://www.cdc.gov/chronicdisease/r.../aag/dnpao.htm>

- 7 of the top 10 leading causes of death in the United States are due to chronic diseases.
- Not eating a healthy diet or getting enough physical activity increases a person's chance of having a chronic disease.
- The United States spends \$147 billion on obesity-related health care costs each year.
- The country spends \$117 billion on health care costs associated with inadequate physical activity each year.
- CDC's nutrition, physical activity, and obesity programs focus on creating lasting changes to make healthy choices the easy choices.

This CDC interactive website can be used to explore data, trends and maps about nutrition, physical activity and obesity in the U.S.

- <https://www.cdc.gov/nccdphp/dnpao/da...aps/index.html>

In addition to nutrition, health is affected by genetics, the environment, life cycle, and lifestyle. A greater discussion of this will follow in subsequent chapters in this book, as there is an enormous amount of information regarding this aspect of lifestyle. Dietary habits include what a person eats, how much a person eats during a meal, how frequently meals are consumed, and how often a person eats out. Other aspects of lifestyle include physical activity level, recreational drug use, and sleeping patterns, all of which play a role in health and impact nutrition. Following a healthy lifestyle improves your overall health.

Physical Activity

In 2008, the Health and Human Services (HHS) released the Physical Activity Guidelines for Americans[1]. The HHS states that "Being physically active is one of the most important steps that Americans of all ages can take to improve their health. The 2008 Physical Activity Guidelines for Americans provides science-based guidance to help Americans aged six and older improve their health through appropriate physical activity." The guidelines recommend exercise programs for people in many different stages of their lifecycle. The HHS reports that there is strong evidence that increased physical activity decreases the risk of early death, heart disease, stroke, Type 2 diabetes, high blood pressure, and certain cancers; prevents weight gain and falls; and improves cognitive

function in the elderly. These guidelines are scheduled for an update in 2018. Also unveiled recently are the Canadian Physical Activity Guidelines, which are available at the website of The Canadian Society for Exercise Physiology[2].

Tobacco and Recreational Drug Use

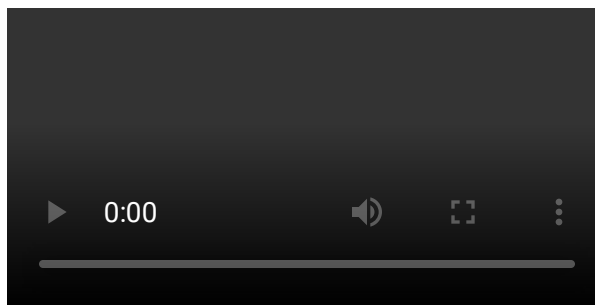
Recreational drug use, which includes tobacco-smoking, electronic smoking device use, marijuana and alcohol consumption along with narcotic and other illegal drug use, has a large impact on health. Smoking cigarettes can cause lung cancer, eleven other types of cancer, heart disease, and several other disorders or diseases that markedly decrease quality of life and increase mortality. In the United States, smoking causes more than four hundred thousand deaths every single year, which is far more than deaths associated with any other lifestyle component[3].

The use of electronic smoking devices such as e-cigarettes and other vaping devices has grown in popularity as an alternative to smoking. However a growing body of scientific research shows growing concern about health risks from use of these products[4]. In addition to highly addictive nicotine, these products contain harmful and potentially harmful ingredients such as:

- ultrafine particles that can damage the lungs
- flavorings that have been linked to serious health problems
- heavy metals and volatile organic compounds

The United States Center's for Disease Control and the Surgeon General have developed the following websites and educational campaigns to education the public about the serious health concerns related to use of these trending devices:

- Electronic Cigarettes - Get the Facts Now: https://www.cdc.gov/tobacco/basic_in...ttes/index.htm
- Know the Risks of E-cigarettes: <https://e-cigarettes.surgeongeneral.gov/>



Also, according to the Centers for Disease Control and Prevention (CDC), excessive alcohol intake causes an estimated seventy-five thousand deaths per year[4]. Staying away from excessive alcohol intake lowers blood pressure, the risk from injury, heart disease, stroke, liver problems, and some types of cancer. While excessive alcohol consumption can be linked to poor health, consuming alcohol in moderation has been found to promote health such as reducing the risk for heart disease and Type 2 diabetes in some people. The United States Department of Health and Human Services (HHS) defines drinking in moderation as no more than one drink a day for women and two drinks a day for men[5].

Illicit and prescription drug abuse are associated with decreased health and is a prominent problem in the United States. The health effects of drug abuse can be far-reaching, including the increased risk of stroke, heart disease, cancer, lung disease, and liver disease[6].

Sleeping Patterns

Inadequate amounts of sleep, or not sleeping well, can also have remarkable effects on a person's health. In fact, sleeping can affect your health just as much as your diet. Scientific studies have shown that insufficient sleep increases the risk for heart disease, Type 2 diabetes, obesity, and depression. Abnormal breathing during sleep, a condition called sleep apnea, is also linked to an increased risk for chronic disease[7].

Discussion Starter

- How might your dietary and lifestyle choices affect your health now and into the future? Which choices are you willing to improve?

Footnotes

1. <https://health.gov/paguidelines/>
2. <http://www.csep.ca/english/view.asp?x=804>
3. Centers for Disease Control and Prevention (CDC). "Smoking and Tobacco Use." http://www.cdc.gov/tobacco/data_stat...lity/Index.htm. Updated December 1, 2016. Accessed September 20, 2017.
4. Talal Alzahrani; Ivan Pena; Nardos Temesgen; Stanton A. Glantz (2018) Association Between Electronic Cigarette Use and Myocardial Infarction, American Journal of Preventive Medicine, Published online:August 22, 2018. DOI: <https://doi.org/10.1016/j.amepre.2018.05.004>
5. Centers for Disease Control and Prevention. "Alcohol and Drug Use." <http://www.cdc.gov/healthyyouth/alcoholdrug/>. Updated June 7, 2012. Accessed September 20, 2017.
6. U.S. Department of Health and Human Services and U.S. Department of Agriculture. 2015 – 2020 Dietary Guidelines for Americans. 8th Edition. <http://health.gov/dietaryguidelines/2015/guidelines/>. Published December 2015. Accessed September 2017.
7. National Institute on Drug Abuse. Health Consequences of Drug Misuse. www.drugabuse.gov/related-to...es-drug-misuse. Updated March, 2017. Accessed September 20, 2017.
8. National Sleep Foundation. Sleep Disorders. <https://sleepfoundation.org/sleep-disorders-problems>. Updated 2017. Accessed September 2017.

Contributor

- [University of Hawai'i at Mānoa Food Science and Human Nutrition Program](#): Allison Calabrese, Cheryl Gibby, Billy Meinke, Marie Kainoa Fialkowski Revilla, and Alan Titchenal

This page titled [1.1: Impact of Diet and Lifestyle on Health](#) is shared under a [CC BY-NC-SA](#) license and was authored, remixed, and/or curated by [The University of Hawai'i](#).

- [1.4: Impact of Diet and Lifestyle on Health](#) by [The University of Hawai'i](#) is licensed [CC BY-NC-SA 4.0](#). Original source: <http://pressbooks-dev.oer.hawaii.edu/humannutrition>.

1.2: Defining Nutrition, Health, and Disease

Learning Objective

- Explain the terms nutrition, health, health promotion, and disease prevention.

You and I are bombarded with images and messages about food everywhere we go. We see super models eating giant burgers, chefs battling to prepare meals, and the top places to burst your belly from consuming atomic chicken wings and deli sandwiches longer than a foot. There are also shows that feature bizarre foods from cultures around the world. How do you use the information from popular network food shows to build a nutritious meal? You don't—these shows are for entertainment. The construction of a nutritious meal requires learning about which foods are healthy and which foods are not-so-healthy, how foods and nutrients function in your body, and how to use scientific resources to make healthful choices for you and those you care about. This text is designed to provide you with the information necessary to make sound nutritional choices that will optimize health and help prevent disease.



© Shutterstock

How do you fill your plate?

The word nutrition first appeared in 1551 and comes from the Latin word *nutrire*, meaning “to nourish.” Today, we define Nutritional science is the investigation of how an organism is nourished, and incorporates the study of how nourishment affects personal health, population health, and planetary health. Nutritional science covers a wide spectrum of disciplines. As a result, nutritional scientists can specialize in particular aspects of nutrition such as biology, physiology, immunology, biochemistry, education, psychology, sustainability, and sociology.

Without adequate nutrition the human body does not function optimally, and severe nutritional inadequacy can lead to disease and even death. The typical American diet is lacking in many ways, from not containing the proper amounts of essential nutrients, to being too speedily consumed, to being only meagerly satisfying. Dietitians are nutrition professionals who integrate their knowledge of nutritional science into helping people achieve a healthy diet and develop good dietary habits. The Academy of Nutrition and Dietetics (AND) is the largest organization of nutrition professionals worldwide and dietitians registered with the AND are committed to helping Americans eat well and live healthier lives. To learn more from the AND's nutritional advice, visit EatRight.Org

Your ability to wake up, to think clearly, to communicate, to hope, to dream, to go to school, to gain knowledge, to go to work, to earn a living, and to do all of the things that you like to do are dependent upon one factor—your health. Good health means you are able to function normally and work hard to achieve your goals in life. For the next few minutes, take some time to view snapshots of the insides of the refrigerators of American mechanics, doctors, school teachers, hunters, short-order cooks, college students, vegans, and more. Visit Mark Menjivar's portrait exhibition, “You Are What You Eat”. Menjivar hopes these images will invoke new thoughts about, “How we care for our bodies. How we care for others. And how we care for the land.” As you look at these images think about your personal health, the health of your family and friends, and the health of this planet. These hopes encompass the inspirations for this book.

Interactive 1.1

Mark Menjivar has traveled around the United States taking photographs of the contents of refrigerators of numerous types of people. The portraits are available for viewing on his website under “You Are What You Eat.” Then click on “Refrigerators” on the left.

Nutrition and Health and Disease

In 1946, the World Health Organization (WHO) defined health as “a state of complete physical, mental, and social well-being, and not merely the absence of disease or infirmity.” This definition was adopted into the WHO constitution in 1948 and has not been amended since. A triangle is often used to depict the equal influences of physical, mental, and social well-being on health (Figure 1.1). Disease is defined as any abnormal condition affecting the health of an organism, and is characterized by specific signs and symptoms. Signs refer to identifying characteristics of a disease such as swelling, weight loss, or fever. Symptoms are the features of a disease recognized by a patient and/or their doctor. Symptoms can include nausea, fatigue, irritability, and pain. Diseases are broadly categorized as resulting from pathogens (i.e., bacteria, viruses, fungi, and parasites), deficiencies, genetics, and physiological dysfunction. Diseases that primarily affect physical health are those that impair body structure (as is the case with osteoporosis), or functioning (as is the case with cardiovascular disease). Mental illnesses primarily affect mental and social well-being.



Figure 1.2.1: The Health Triangle. © Thinkstock

The foods we eat affect all three aspects of our health. For example, a teen with Type 2 diabetes (a disease often brought on by poor diet) is first diagnosed by physical signs and symptoms such as increased urination, thirstiness, and unexplained weight loss. But research has also found that teens with Type 2 diabetes have impaired thinking and do not interact well with others in school, thereby affecting mental and social well-being. Type 2 diabetes is just one example of a physiological disease that affects all aspects of health—physical, mental, and social.

Public Health and Disease Prevention

In 1894, the first congressional funds were appropriated to the US Department of Agriculture (USDA) for the study of the relationship between nutrition and human health. Dr. Wilbur Olin Atwater was appointed as the Chief of Nutrition Investigations and is regarded as the “Father of Nutrition Science” in America. Under his guidance, the USDA released the first bulletin to the American public that contained information on the amounts of fat, carbohydrates, proteins, and food energy in various foods. Nutritional science advanced considerably in these early years, but it took until 1980 for the USDA and the US Department of Health and Human Services (HHS) to jointly release the first edition of *Nutrition and Your Health: Dietary Guidelines for Americans*.

Although wide distribution of the “Dietary Guidelines for Americans” did not come about until the 1980s, many historical events that demonstrated the importance of diet to health preceded their release. Assessments of the American diet in the 1930s led President Franklin D. Roosevelt to declare in his inaugural address on January 20, 1937, “I see one-third of our nation is ill-housed, ill-clad, and ill-nourished.” From the time of Atwater until the onset of the Great Depression, nutrition scientists had discovered many of the vitamins and minerals that are essential for the functioning of the human body. Their work and the acknowledgement by President FDR of the nutritional inadequacy of the American diet evoked a united response between scientists and government,

leading to: the enrichment of flour (adding vitamins and minerals), the development of free or reduced-cost school lunch programs, and advancements of nutrition education in this country.

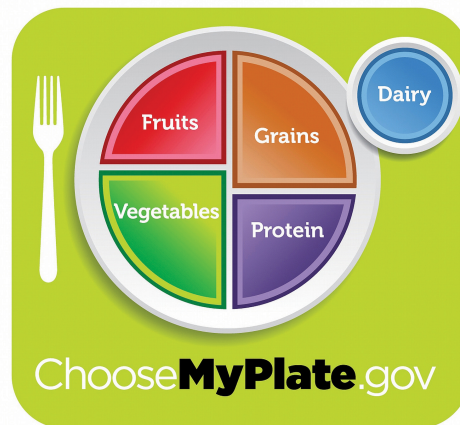


Figure 1.2: The Federal Government's New and Improved Tool of Nutritional Communication

In the latter part of the twentieth century nutrition scientists, public health organizations, and the American public increasingly recognized that eating too much of certain foods is linked to chronic diseases. We now know that diet-related conditions and diseases include: hypertension (high blood pressure), obesity, Type 2 diabetes, cardiovascular disease, some cancers, and osteoporosis. These diet-related conditions and diseases are some of the biggest killers of Americans. The United States Department of Health and Human Services (HHS) reports that unhealthy diets and inactivity cause between 310,000 and 580,000 deaths every single year. According to the United States Department of Agriculture (USDA), eating healthier could save Americans over \$70 billion per year and this does not include the cost of obesity, which is estimated to cost a further \$117 billion per year. Unfortunately, despite the fact that the prevalence of these diseases can be decreased by healthier diets and increased physical activity, the Center for Disease Control (CDC) reports that the federal government spends one thousand times more to treat disease than to prevent it (\$1,390 versus \$1.21 per person each year). In 2015, the newest edition of the [Dietary Guidelines for Americans](#) identified obesity as the number one nutritional-related health problem in the United States and established strategies to combat its incidence and health consequences in the American population. A 2008 study in the journal *Obesity* reported that if current trends are not changed, 100 percent of Americans will be overweight or obese in 2048! Wang Y, et al. "Will All Americans Become Overweight or Obese? Estimating the Progression and Cost of the US Obesity Epidemic." *Obesity* 10, no. 16 (October 2008): 2323–30. <http://www.nature.com/oby/journal/v16/n10/full/oby2008351a.html> In 2011, the US federal government released a new multimedia tool that aims to help Americans choose healthier foods from the five food groups (grains, vegetables, fruits, dairy, and proteins). The tool, called "Choose MyPlate," is available at choosemyplate.gov.

Key Takeaways

- Health is defined as "a state of complete physical, mental, and social well-being, and not merely the absence of disease or infirmity." World Health Organization.
- Disease is defined as any abnormal condition that affects the health of an organism, and is characterized by specific signs and symptoms.
- Disease affects all three aspects of the health triangle.
- Good nutrition provides a mechanism to promote health and prevent disease.
- Diet-related conditions and diseases include: obesity, Type 2 diabetes, cardiovascular disease, some cancers, and osteoporosis.
- It took until the 1980s for the US federal government to develop a diet-related public policy designed to equip Americans with the tools to change to a healthier diet.

Discussion Starters

1. How might the way we nourish our bodies affect planetary health?
2. Debate your classmates: Should the federal government be concerned with what Americans eat?

1.2: Defining Nutrition, Health, and Disease is shared under a [CC BY-NC-SA](#) license and was authored, remixed, and/or curated by LibreTexts.

1.3: What Are Nutrients?

Learning Objective

- Define the word “nutrient” and identify the six classes of nutrients essential for health.
- List the three main energy (Calorie) yielding nutrients and how many Calories each of these nutrients provide.

What is in Food?

Your "diet" is defined as the foods you choose to eat. The diet of most people contains a variety of foods: nuts, seeds, leafy green vegetables and more! The foods we eat contain nutrients. Nutrients are substances required by the body to perform its basic functions. Nutrients must be obtained from diet, since the human body does not synthesize them, or does not synthesize them in large enough amounts for human health. Nutrients are used for many body functions such as: growing, moving your muscles, repairing tissues and much more! There are six classes of essential nutrients required for the body to function and maintain overall health. These six classes of essential nutrients are: carbohydrates, lipids (fats), proteins, water, vitamins, and minerals. Foods also contain non-nutrients. Some non-nutrients appear to be very important for human health, like fiber and antioxidants, some non-nutrients may be harmful to human health such as: preservatives, colorings, flavorings and pesticide residues.

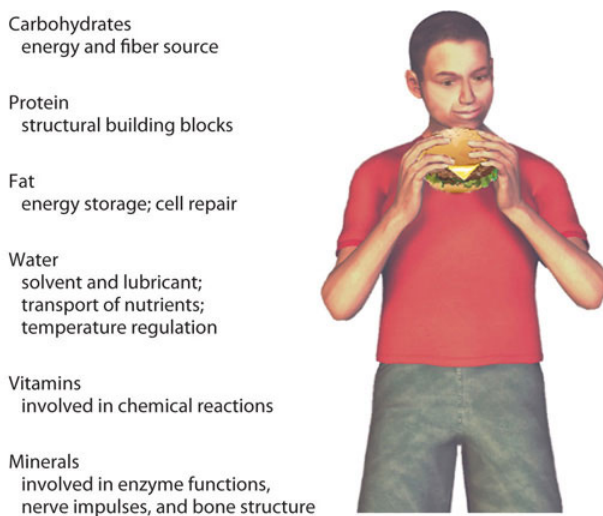


Figure 1.3.1: The Six Classes of Nutrients. Source: <http://www.chemistry.wustl.edu/~edud.../vitamins.html>.

Macronutrients

Nutrients that are needed in large amounts are called macronutrients. There are three major classes of macronutrients: carbohydrates, lipids, and proteins. All three of these nutrients are needed in relatively large amounts AND they contain Calories (note the capital C which indicates kilocalories) which can be "burned" in your body to create energy for your body cells. The energy from these macronutrients comes from their chemical bonds. This chemical energy is converted into cellular energy that is then utilized to perform work, allowing our bodies to conduct their basic functions. A unit of measurement of food energy is the Calorie. The next time you are eating a packaged food, look on the "Nutrition Facts" panel to find out how many Calories you get when you eat one serving of that food. Water is also a macronutrient in the sense that you require a large amount of it, but unlike the other macronutrients it does not yield calories. One other possible component of the diet that can provide Calories is alcohol though it is generally NOT considered to be a nutrient. Alcohol (in the form of ethanol) provides about 7 Calories per gram.

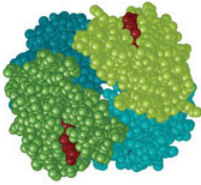
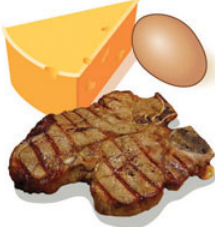
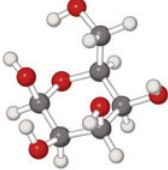
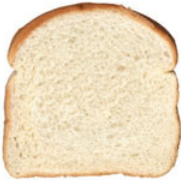


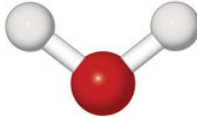

Proteins	Carbohydrates	Lipids	Water
 	 	 	 

Figure 1.3.2: The Macronutrients: Carbohydrates, Lipids, Protein, and Water

Carbohydrates

When you eat a food that contains carbohydrate, like bread for example, you will be receiving approximately 4 Calories for every gram of carbohydrate you eat. Carbohydrates are molecules composed of carbon, hydrogen, and oxygen. The major food sources of carbohydrates are grains, milk, fruits, and starchy vegetables like potatoes. Non-starchy vegetables also contain carbohydrates, but in lesser quantities. Carbohydrates are broadly classified into two forms based on their chemical structure: fast-releasing carbohydrates, often called "simple sugars", and slow-releasing carbohydrates, often called "complex carbohydrates".

Fast-releasing carbohydrates consist of one or two basic sugar units. They are sometimes called "simple sugars" because their chemical structure is fairly simple with only one or two sugar units. If the carbohydrate has one sugar unit we call it a "monosaccharide". Mono means one and saccharide means sugar. Examples of monosaccharides you have heard of are: Glucose (the sugar that is in your blood); Fructose (a sugar commonly found in fruit); and Galactose (a sugar that is found as part of milk sugar). If the carbohydrate has two sugar units we call it a "disaccharide". Di means two and saccharide means sugar. Examples of disaccharides you may be familiar with are: sucrose (table sugar); lactose (milk sugar) and maltose (malt sugar). Sucrose is made of a Glucose linked together with a Fructose. Lactose is made of Glucose linked together with Galactose. Maltose is made of two Glucose molecules bonded together. In order to digest a disaccharide, your body has to break the two sugars apart. We will talk more about this when we discuss lactose intolerance!

Slow-releasing carbohydrates are long chains of simple sugars (polysaccharides) that can be branched or unbranched. Some polysaccharides that you have probably heard of are starch and fiber. During digestion, the body does its best to break down all slow-releasing carbohydrates like starch to simple sugars, mostly glucose. Glucose is then transported to all our cells where it is stored, used to make energy, or used to build macromolecules. Fiber is also a slow-releasing carbohydrate, but it cannot be broken down in the human body and passes through the digestive tract undigested unless the bacteria that live in the large intestine break it down for us.

One gram of carbohydrates yields four Calories of energy for the cells in the body to perform work. In addition to providing energy and serving as building blocks for bigger macromolecules, carbohydrates are essential for proper functioning of the nervous system, heart, and kidneys. As mentioned, glucose can be stored in the body for future use. In humans, the storage molecule of carbohydrates is called glycogen and in plants it is known as starches. Glycogen and starches are slow-releasing carbohydrates.

Lipids

Lipids are also a family of molecules composed of carbon, hydrogen, and oxygen, but unlike carbohydrates, they are insoluble in water. Lipids are found predominately in butter, oils, meats, dairy products, nuts, and seeds, and in many processed foods. The three main types of lipids are triglycerides (triacylglycerols), phospholipids, and sterols. The main job of lipids is to store energy. Lipids provide more energy per gram than carbohydrates (nine Calories per gram of lipids versus four Calories per gram of

carbohydrates). In addition to energy storage, lipids serve as cell membranes, surround and protect organs, aid in temperature regulation, and regulate many other functions in the body.

Proteins

Proteins are macromolecules composed of chains of subunits called amino acids. Amino acids are simple subunits composed of carbon, oxygen, hydrogen, and nitrogen. The food sources of proteins are meats, dairy products, seafood, and a variety of different plant-based foods, most notably soy. The word protein comes from a Greek word meaning “of primary importance,” which is an apt description of these macronutrients; they are also known colloquially as the “workhorses” of life. Proteins provide four Calories of energy per gram; however providing energy is not protein’s most important function. Proteins provide structure to bones, muscles and skin, and play a role in conducting most of the chemical reactions that take place in the body. Scientists estimate that greater than one-hundred thousand different proteins exist within the human body.

Water

There is one other nutrient that we must have in large quantities: water. Water does not contain carbon, but is composed of two hydrogens and one oxygen per molecule of water. Water does not provide any Calories. More than 60 percent of your total body weight is water. Without it, nothing could be transported in or out of the body, chemical reactions would not occur, organs would not be cushioned, and body temperature would fluctuate widely. On average, an adult consumes just over two liters of water per day from food and drink. According to the “rule of threes,” a generalization supported by survival experts, a person can survive three minutes without oxygen, three days without water, and three weeks without food. Since water is so critical for life’s basic processes, the amount of water input and output is supremely important, a topic we will explore in detail in Chapter 7.

Alcohol (not a nutrient)

Alcoholic drinks are a source of Calories even though they are generally not considered nutrients. Alcohol itself provides approximately 7 Calories for every gram consumed. In addition to alcohol, many alcoholic drinks contain carbohydrate as well.

Micronutrients

Micronutrients are nutrients required by the body in lesser amounts, but are still essential for carrying out bodily functions. Micronutrients include all the essential minerals and vitamins. There are sixteen essential minerals and thirteen vitamins (Tables 1.3.1 and 1.3.2 for a complete list and their major functions). In contrast to carbohydrates, lipids, and proteins, micronutrients do not contain Calories. This is often confusing because most people have heard how tired a person will feel if they are low in a micronutrient such as Iron. The tiredness can be explained by the fact that, micronutrients assist in the process of making energy by being part of enzymes (i.e., coenzymes). Enzymes catalyze chemical reactions in the body and are involved in many aspects of body functions from producing energy, to digesting nutrients, to building macromolecules. Micronutrients play many roles in the body.

Minerals

Minerals are solid inorganic substances that form crystals and are classified depending on how much of them we need. Trace minerals, such as molybdenum, selenium, zinc, iron, and iodine, are only required in a few milligrams or less and macrominerals, such as calcium, magnesium, potassium, sodium, and phosphorus, are required in hundreds of milligrams. Many minerals are critical for enzyme function, others are used to maintain fluid balance, build bone tissue, synthesize hormones, transmit nerve impulses, contract and relax muscles, and protect against harmful free radicals.

Table 1.3.1 : Minerals and Their Major Functions

Minerals	Major Functions
Macro	
Sodium	Fluid balance, nerve transmission, muscle contraction
Chloride	Fluid balance, stomach acid production
Potassium	Fluid balance, nerve transmission, muscle contraction
Calcium	Bone and teeth health maintenance, nerve transmission, muscle contraction, blood clotting

Minerals	Major Functions
Phosphorus	Bone and teeth health maintenance, acid-base balance
Magnesium	Protein production, nerve transmission, muscle contraction
Sulfur	Protein production
Trace	
Iron	Carries oxygen, assists in energy production
Zinc	Protein and DNA production, wound healing, growth, immune system function
Iodine	Thyroid hormone production, growth, metabolism
Selenium	Antioxidant
Copper	Coenzyme, iron metabolism
Manganese	Coenzyme
Fluoride	Bone and teeth health maintenance, tooth decay prevention
Chromium	Assists insulin in glucose metabolism
Molybdenum	Coenzyme

Vitamins

The thirteen vitamins are categorized as either water-soluble or fat-soluble. The water-soluble vitamins are vitamin C and all the B vitamins, which include thiamine, riboflavin, niacin, pantothenic acid, pyroxidine, biotin, folate and cobalamin. The fat-soluble vitamins are A, D, E, and K. Vitamins are required to perform many functions in the body such as making red blood cells, synthesizing bone tissue, and playing a role in normal vision, nervous system function, and immune system function.

Table 1.3.1: Vitamins and Their Major Functions

Vitamins	Major Functions
Water-soluble	
B ₁ (thiamine)	Coenzyme, energy metabolism assistance
B ₂ (riboflavin)	Coenzyme, energy metabolism assistance
B ₃ (niacin)	Coenzyme, energy metabolism assistance
B ₅ (pantothenic acid)	Coenzyme, energy metabolism assistance
B ₆ (pyroxidine)	Coenzyme, amino acid synthesis assistance
Biotin	Coenzyme
Folate	Coenzyme, essential for growth
B ₁₂ (cobalamin)	Coenzyme, red blood cell synthesis
C	Collagen synthesis, antioxidant
Fat-soluble	
A	Vision, reproduction, immune system function
D	Bone and teeth health maintenance, immune system function
E	Antioxidant, cell membrane protection
K	Bone and teeth health maintenance, blood clotting

Vitamin deficiencies can cause severe health problems. For example, a deficiency in niacin causes a disease called pellagra, which was common in the early twentieth century in some parts of America. The common signs and symptoms of pellagra are known as the “4D’s—diarrhea, dermatitis, dementia, and death.” Until scientists found out that better diets relieved the signs and symptoms

of pellagra, many people with the disease ended up in insane asylums awaiting death (Video 1.3.1). Other vitamins were also found to prevent certain disorders and diseases such as scurvy (vitamin C), night blindness (vitamin A), and rickets (vitamin D).



Video 1.3.1: This video provides a brief history of Dr. Joseph Goldberger's discovery that pellagra was a diet-related disease.

Food Energy

Though this is only Chapter 1, you have already seen the words "Calories" and "Energy" used several times. In everyday life you have probably heard people talk about how many Calories they burned on the treadmill or how many Calories are listed on a bag of chips. Calories, are a measure of energy. It takes quite a lot of Calories (energy) to keep us alive. Even if a person is in a coma, they still burn approximately 1000 Calories of energy in order for: their heart to beat, their blood to circulate, their lungs to breathe, etc... We burn even more calories when we exercise. The carbohydrates, fats and proteins we eat and drink provide calories for us (and alcohol as well if we choose to consume it). Sometimes people refer to these nutrients as "energy yielding". As you read above, carbohydrates provide 4 Calories for every gram we consume; proteins provide 4 Calories for every gram we consume; fats provide 9 Calories for every gram we consume and alcohol provides 7 Calories of energy for every gram we consume. Vitamins, minerals and water do not provide any calories, even though they are still essential nutrients.

Food Quality: Nutrient Density compared to Calorie Density

One way to think about the quality of your food is to consider how many nutrients you receive from a serving of that food compared to the number of Calories you receive from one serving of the food. For example, a candy bar gives you quite a few Calories but not very many of the essential nutrients. We would say that the candy bar has Calorie density but low Nutrient density. An apple on the other hand, has quite a few essential nutrients but not very many Calories. We would say that the apple has high Nutrient density but low Calorie density.

Please watch the following Ted Ed video called "What is a Calorie" which will describe in more detail what a Calorie is and why you may want to know how many Calories you are consuming compared to how many you are burning each day.



Video: What is a calorie? - Emma Bryce

One measurement of food quality is the amount of nutrients it contains relative to the amount of energy (Calories) it provides. High-quality foods are nutrient dense, meaning they contain lots of the nutrients relative to the amount of Calories they provide. Nutrient-dense foods are the opposite of “empty-calorie” foods such as carbonated sugary soft drinks, which provide many calories and very little, if any, other nutrients. Food quality is additionally associated with its taste, texture, appearance, microbial content, and how much consumers like it.

Food: A Better Source of Nutrients

It is better to get all your micronutrients from the foods you eat as opposed to from supplements. Supplements contain only what is listed on the label, but foods contain many more macronutrients, micronutrients, and other chemicals, like antioxidants that benefit health. While vitamins, multivitamins, and supplements are a \$20 billion industry in this country and more than 50 percent of Americans purchase and use them daily, there is no consistent evidence that they are better than food in promoting health and preventing disease. Dr. Marian Neuhouser, associate of the Fred Hutchinson Cancer Research Center in Seattle, says that “...scientific data are lacking on the long-term health benefits of supplements. To our surprise, we found that multivitamins did not lower the risk of the most common cancers and also had no impact on heart disease.” Woodward, K. “Multivitamins Each Day Will Not Keep Common Cancers Away; Largest Study of Its Kind Provides Definitive Evidence that Multivitamins Will Not Reduce Risk of Cancer or Heart Disease in Postmenopausal Women.” Fred Hutchinson Cancer Research Center. *Center News* 16 (February 2009). http://www.fhcrc.org/about/pubs/center_news/online/2009/02/multivitamin_study.html

Key Takeaways

- Foods contain nutrients that are essential for our bodies to function.
- Four of the classes of nutrients required for bodily function are needed in large amounts. They are carbohydrates, lipids, proteins, and water, and are referred to as macronutrients.
- Two of the classes of nutrients are needed in lesser amounts, but are still essential for bodily function. They are vitamins and minerals.
- One measurement of food quality is the amount of essential nutrients a food contains relative to the amount of energy it has (nutrient density).

Discussion Starters

1. Make a list of some of your favorite foods and visit the “What’s In the Foods You Eat?” search tool provided by the USDA. What are some of the nutrients found in your favorite foods?

<http://www.ars.usda.gov/Services/docs.htm?docid=17032>

2. Have a discussion in class on the “progression of science” and its significance to human health as depicted in the video on pellagra (Video 1.3.1).

1.3: What Are Nutrients? is shared under a [CC BY-NC-SA](#) license and was authored, remixed, and/or curated by LibreTexts.

1.4: Calories (Food Energy)

Food energy is measured in kilocalories (kcal), commonly referred to as calories. This terminology is technically incorrect, but is used so commonly that we will refer to them as calories throughout the course. A **kilocalorie** is the amount of energy needed to raise 1 kilogram of water 1 degree Celsius. A food's kilocalories are determined by putting the food into a bomb calorimeter and determining the energy output (energy = heat produced). The first link below is to an image of a bomb calorimeter and a link to a video showing how one is used.

Web Links

Bomb Calorimeter

Video: Bomb Calorimetry (2:19)

Among the nutrients, the amount of kilocalories per gram that each provide are shown below.

Energy (kcal/g)	No Energy
Carbohydrates (4)	Vitamins
Proteins (4)	Minerals
Lipids (9)	Water

As can be seen, only carbohydrates, proteins, and lipids provide energy. However, there is another energy source in the diet that is not a nutrient... alcohol. Just to re-emphasize, alcohol is NOT a nutrient! But it does provide energy.



Figure 1.112 Wine is a type of alcohol.

The following table lists the energy sources in the diet from lowest calories per gram to the highest calories per gram. Knowing these numbers allows a person to calculate/estimate the amount of calories the food contains if you know the grams of the different energy sources.

Energy Sources (kcal/g)

Carbohydrates → 4

Protein → 4

Alcohol → 7

Lipids → 9

Links

- Bomb Calorimetry - <http://www.youtube.com/watch?v=ohyA9amFfsc>

Contributors and Attributions

- Brian Lindshield (Kansas State University). Content originates from the Human Nutrition (FNDH 400) Flexbook. goo.gl/vOAnR.

This page titled 1.4: Calories (Food Energy) is shared under a CC BY-NC-SA 4.0 license and was authored, remixed, and/or curated by Brian Lindshield via source content that was edited to the style and standards of the LibreTexts platform; a detailed edit history is available upon request.

1.5: Research and the Scientific Method

Learning Objectives

- Learn how to apply research and science to everyday nutrition and health



Figure 1.5.1: Photo by Jonathon Simcoe on unsplash.com / CC0.

Nutritional scientists discover the health effects of food and its nutrients by first making an observation. Once observations are made, they come up with a hypothesis, test their hypothesis, and then interpret the results. After this, they gather additional evidence from multiple sources and finally come up with a conclusion. This organized process of inquiry used in science is called the scientific method.

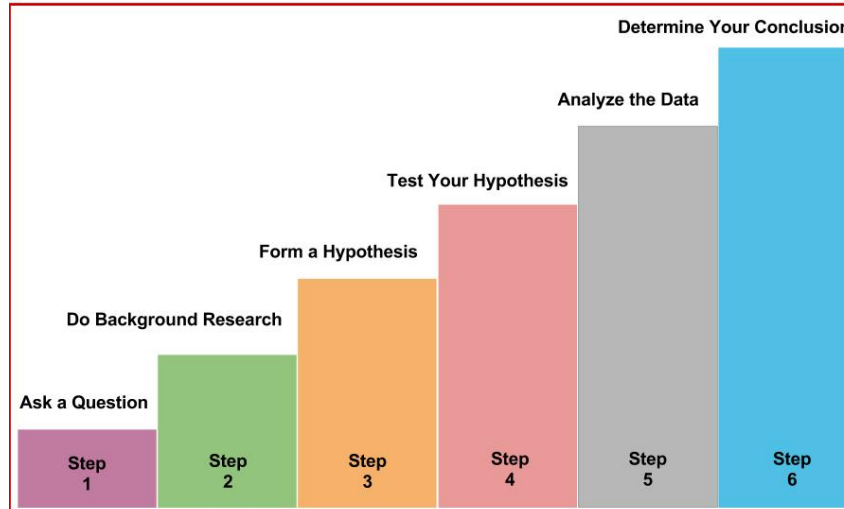


Figure 1.5.2: Scientific Method Steps.

In 1811, French chemist Bernard Courtois was isolating saltpeter for producing gunpowder to be used by Napoleon's army. To carry out this isolation, he burned some seaweed and in the process, observed an intense violet vapor that crystallized when he exposed it to a cold surface. He sent the violet crystals to an expert on gases, Joseph Gay-Lussac, who identified the crystal as a new element. It was named iodine, the Greek word for violet. The following scientific record is some of what took place in order to conclude that iodine is a nutrient.

Observation: Eating seaweed is a cure for goiter, a gross enlargement of the thyroid gland in the neck.

Hypothesis 1: In 1813, Swiss physician Jean-Francois Coindet hypothesized that the seaweed contained iodine, and that iodine could be used instead of seaweed to treat his patients[1].

Experimental test 1: Coindet administered iodine tincture orally to his patients with goiter.

Interpret results 1: Coindet's iodine treatment was successful.

Hypothesis 2: French chemist Chatin proposed that the low iodine content in food and water in certain areas far away from the ocean was the primary cause of goiter, and renounced the theory that goiter was the result of poor hygiene.

Experimental test 2: In the late 1860s the program, "The stamping-out of goiter," started with people in several villages in France being given iodine tablets.

Interpret results 2: The program was effective and 80 percent of goitrous children were cured.

Hypothesis 3: In 1918, Swiss doctor Bayard proposed iodizing salt as a good way to treat areas endemic with goiter.

Experimental test 3: Iodized salt was transported by mules to a small village at the base of the Matterhorn where more than 75 percent of school children were goitrous. It was given to families to use for six months.

Interpret results 3: The iodized salt was beneficial in treating goiter in this remote population.

Experimental test 4: Physician David Marine conducted the first experiment of treating goiter with iodized salt in America in Akron, Ohio.[2]

Interpret results 4: This study was conducted on over four-thousand school children, and found that iodized salt prevented goiter.

Conclusions: Seven other studies similar to Marine's were conducted in Italy and Switzerland, which also demonstrated the effectiveness of iodized salt in treating goiter. In 1924, US public health officials initiated the program of iodizing salt and started eliminating the scourge of goiter. Today, more than 70% of American households use iodized salt and many other countries have followed the same public health strategy to reduce the health consequences of iodine deficiency.

career connection

What are some of the ways in which you think like a scientist, and use the scientific method in your everyday life? Any decision-making process uses some aspect of the scientific method. Think about some of the major decisions you have made in your life and the research you conducted that supported your decision. For example, what brand of computer do you own? Where is your money invested? What college do you attend?

Evidence-Based Approach to Nutrition

It took more than one hundred years from iodine's discovery as an effective treatment for goiter until public health programs recognized it as such. Although a lengthy process, the scientific method is a productive way to define essential nutrients and determine their ability to promote health and prevent disease. The scientific method is part of the overall evidence-based approach to designing nutritional guidelines[3]. An evidence-based approach to nutrition includes[4]:

- Defining the problem or uncertainty (e.g., the incidence of goiter is lower in people who consume seaweed)
- Formulating it as a question (e.g., Does eating seaweed decrease the risk of goiter?)
- Setting criteria for quality evidence
- Evaluating the body of evidence
- Summarizing the body of evidence and making decisions
- Specifying the strength of the supporting evidence required to make decisions
- Disseminating the findings

The Food and Nutrition Board of the Institute of Medicine, a nonprofit, non-governmental organization, constructs its nutrient recommendations (i.e., Dietary Reference Intakes, or DRI) using an evidence-based approach to nutrition. The entire procedure for setting the DRI is documented and made available to the public. The same approach is used by the USDA and HHS, which are departments of the US federal government. The USDA and HHS websites are great tools for discovering ways to optimize health; however, it is important to gather nutrition information from multiple resources, as there are often differences in opinion among various scientists and public health organizations. Full text versions of the DRI publications are available in pdf format at <https://www.nap.edu/>, along with many other free publications.

Footnotes

1. Zimmerman, M.B. Research on Iodine Deficiency and Goiter in the 19th and Early 20th Centuries. *Journal of Nutrition*. 2008; 138(11), 2060–63. jn.nutrition.org/content/138/11/2060.full Accessed September 17, 2017
2. Carpenter, K.J. David Marine and the Problem of Goiter. *Journal of Nutrition*. 2005; 135(4), 675–80. jn.nutrition.org/content/135/...=d06fdd35-566f-42a2-a3fd-efbe0736b7ba Accessed September 17, 2017.
3. Myers E. Systems for Evaluating Nutrition Research for Nutrition Care Guidelines: Do They Apply to Population Dietary Guidelines? *J Am Diet Assoc*. 2003; 12(2), 34–41. <http://jandonline.org/article/S0002-...378-6/abstract>. Accessed September 17, 2017.
4. Briss PA, Zaza S, et al. Developing an Evidence-Based Guide to Community Preventive Services—Methods. *Am J Prev Med*. 2000; 18(1S), 35–43. <https://www.ncbi.nlm.nih.gov/pubmed/10806978>. Accessed September 17, 2017.

Contributors and Attributions

- [University of Hawai'i at Mānoa Food Science and Human Nutrition Program](#): Allison Calabrese, Cheryl Gibby, Billy Meinke, Marie Kainoa Fialkowski Revilla, and Alan Titchenal

This page titled [1.5: Research and the Scientific Method](#) is shared under a [CC BY-NC-SA](#) license and was authored, remixed, and/or curated by [The University of Hawai'i](#).

- [1.6: Research and the Scientific Method](#) by [The University of Hawai'i](#) is licensed [CC BY-NC-SA 4.0](#). Original source: <http://pressbooks-dev.oer.hawaii.edu/humannutrition>.

1.6: Types of Scientific Studies and Nutrition Assessment Methods

Learning Objectives

- Learn about the various types of scientific studies

There are various types of scientific studies on humans that can be used to provide supporting evidence for a particular hypothesis. These include epidemiological studies, interventional clinical trials, and randomized clinical trials. Valuable nutrition knowledge also is obtained from animal studies and cellular and molecular biology research.

Table 1.6.1: Types of Scientific Studies.

Type	Description	Example	Notes
Epidemiological	Observational study of populations around the world and the impact of nutrition on health.	Diets with a high consumption of saturated fat are associated with an increased risk of heart attacks.	Does not determine cause-and-effect relationships.
Intervention Clinical Trials	Scientific investigations where a variable is changed between groups.	Testing the effect of different diets on blood pressure. One group consumes an American diet, group 2 eats a diet rich in fruits and vegetables, and group 3 eats a combination of groups 1 and 2.	If done correctly, it does determine cause-and-effect relationships.
Randomized Clinical Trials	Participants are assigned by chance to separate groups that compare different treatments. Neither the researchers nor the participants can choose which group a participant is assigned.	Testing the effect of calcium supplements on women with osteoporosis. Participants are given a pill daily of a placebo or calcium supplement. Neither the participant nor the researcher know what group the participant is in.	Considered the “gold” standard for scientific studies.
Animal and Cellular Biology	Studies are conducted on animals or on cells.	Testing the effects of a new blood pressure drug on guinea pigs or on the lipid membrane of a cell.	Less expensive than human trials. Study is not on whole humans so it may be not applicable.

Nutrition Assessment

Nutritional assessment is the interpretation of anthropometric, biochemical (laboratory), clinical and dietary data to determine whether a person or groups of people are well nourished or malnourished (overnourished or undernourished). Nutritional assessment can be done using the ABCD methods. These refer to the following:

- Anthropometry
- Biochemical methods
- Clinical methods
- Dietary methods

Anthropometry methods of assessing nutritional status

The word anthropometry comes from two words: Anthro means ‘human’ and metry means ‘measurement’. The different measurements taken to assess growth and body composition are presented below.

To assess growth, several different measurements including length, height, weight, head circumference, mid-arm circumference, skin-fold thickness, head/chest ratio, and hip/waist ratio can be used. Height and weight measurements are essential in children to evaluate physical growth. As an additional resource, the NHANES Anthropometry Procedures Manual (revised January 2004) can be viewed here https://www.cdc.gov/nchs/data/nhanes...s_03_04/BM.pdf

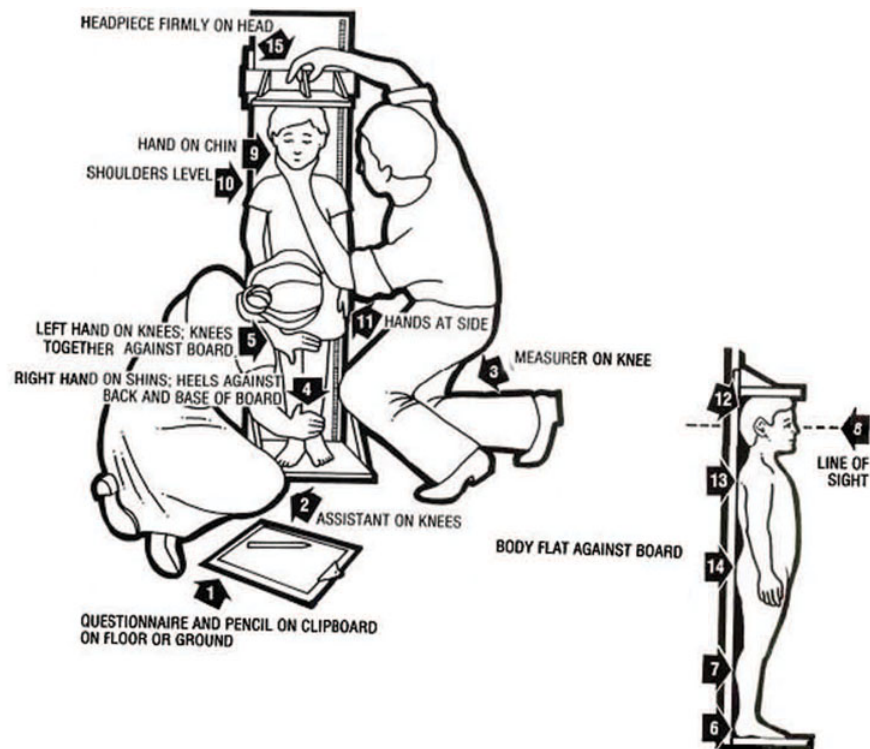


Figure 1.6.1: Measuring Height.

Biochemical methods of assessing nutritional status

Biochemical or laboratory methods of assessment include measuring a nutrient or its metabolite in the blood, feces, urine or other tissues that have a relationship with the nutrient. An example of this method would be to take blood samples to measure levels of glucose in the body. This method is useful for determining if an individual has diabetes.



Figure 1.6.2: Measuring Blood Glucose Levels.

Clinical methods of assessing nutritional status

In addition to the anthropometric assessments, you can also assess clinical signs and symptoms that might indicate potential specific nutrient deficiency. Special attention are given to organs such as skin, eyes, tongue, ears, mouth, hair, nails, and gums. Clinical methods of assessing nutritional status involve checking signs of deficiency at specific places on the body or asking the patient whether they have any symptoms that might suggest nutrient deficiency.

Dietary methods of assessing nutritional status

Dietary methods of assessment include looking at past or current intakes of nutrients from food by individuals or a group to determine their nutritional status. There are several methods used to do this:

24 hour recall

A trained professional asks the subject to recall all food and drink consumed in the previous 24 hours. This is a quick and easy method. However, it is dependent upon the subject's short-term memory and may not be very accurate.

Food frequency questionnaire

The subject is given a list of foods and asked to indicate intake per day, per week, and per month. This method is inexpensive and easy to administer. It is more accurate than the 24 hour recall.

Food Diary

Food intake is recorded by the subject at the time of eating. This method is reliable but difficult to maintain. Also known as a food journal or food record.

Observed food consumption

This method requires food to be weighed and exactly calculated. It is very accurate but rarely used because it is time-consuming and expensive.

Evolving Science

Science is always moving forward, albeit sometimes slowly. One study is not enough to make a guideline or a recommendation, or cure a disease. Science is a stepwise process that builds on past evidence and finally culminates into a well-accepted conclusion. Unfortunately, not all scientific conclusions are developed in the interest of human health, and some can be biased. Therefore, it is important to know where a scientific study was conducted and who provided the funding, as this can have an impact on the scientific conclusions being made. For example, an air quality study paid for by a tobacco company diminishes its value in the minds of readers as well as a red meat study performed at a laboratory funded by a national beef association.

Nutritional Science Evolution

One of the newest areas in the realm of nutritional science is the scientific discipline of nutritional genetics, also called nutrigenomics. Genes are part of DNA and contain the genetic information that make up all of our traits. Genes are codes for proteins and when they are turned "on" or "off," they change how the body works. While we know that health is defined as more than just the absence of disease, there are currently very few accurate genetic markers of good health. Rather, there are many more genetic markers for disease. However, science is evolving, and nutritional genetics aims to identify what nutrients to eat to "turn on" healthy genes and "turn off" genes that cause disease.

Using Science and Technology to Change the Future

As science evolves, so does technology. Both can be used to create a healthy diet, optimize health, and prevent disease. Picture yourself not too far into the future: you are wearing a small "dietary watch" that painlessly samples your blood, and downloads the information to your cell phone, which has an app that evaluates the nutrient profile of your blood and then recommends a snack or dinner menu to assure you maintain adequate nutrient levels. What else is not far off? How about another app that provides a shopping list that adheres to all dietary guidelines and is emailed to the central server at your local grocer, who then delivers the food to your home? The food is then stored in your smart fridge which documents your daily diet at home and delivers your weekly dietary assessment to your home computer. At your computer, you can compare your diet with other diets aimed at weight loss, optimal strength training, reduction in risk for specific diseases or any other health goals you may have. You also may delve into the field of nutritional genetics and download your gene expression profiles to a database that analyzes your genes against millions of others.

Nutrition and the Media

A motivational speaker once said, "A smart person believes half of what they read. An intelligent person knows which half to believe." In this age of information, where instant Internet access is just a click away, it is easy to be misled if you do not know where to go for reliable nutrition information.

Using Eyes of Discernment

"New study shows that margarine contributes to arterial plaque."

“Asian study reveals that two cups of coffee per day can have detrimental effects on the nervous system.”

How do you react when you read news of this nature? Do you boycott margarine and coffee? When reading nutrition-related claims, articles, websites, or advertisements, always remember that one study does not substantiate a fact. One study neither proves nor disproves anything. Readers who may be looking for complex answers to nutritional dilemmas can quickly misconstrue such statements and be led down a path of misinformation. Listed below are ways that you can develop discerning eyes when reading nutritional news.

1. The scientific study under discussion should be published in a peer reviewed journal, such as the Journal of Nutrition. Question studies that come from less trustworthy sources (such as non peer-reviewed journals or websites) or that are not formally published.
2. The report should disclose the methods used by the researcher(s). Did the study last for three or thirty weeks? Were there ten or one hundred participants? What did the participants actually do? Did the researcher(s) observe the results themselves or did they rely on self reports from program participants?
3. Who were the subjects of this study? Humans or animals? If human, are any traits/characteristics noted? You may realize you have more in common with certain program participants and can use that as a basis to gauge if the study applies to you.
4. Credible reports often disseminate new findings in the context of previous research. A single study on its own gives you very limited information, but if a body of literature supports a finding, it adds to credibility.
5. Peer-reviewed articles deliver a broad perspective and are inclusive of findings of many studies on the exact same subject.
6. When reading such news, ask yourself, “Is this making sense?” Even if coffee does adversely affect the nervous system, do you drink enough of it to see any negative effects? Remember, if a headline professes a new remedy for a nutrition-related topic, it may well be a research-supported piece of news, but more often than not, it is a sensational story designed to catch the attention of an unsuspecting consumer. Track down the original journal article to see if it really supports the conclusions being drawn in the news report.

When reading information on websites, remember the following criteria for discerning if the site is valid:

1. Who sponsors the website?
2. Are names and credentials disclosed?
3. Is an editorial board identified?
4. Does the site contain links to other credible informational websites?
5. Even better, does it reference peer-reviewed journal articles? If so, do those journal articles actually back up the claims being made on the website?
6. How often is the website updated?
7. Are you being sold something at this website?
8. Does the website charge a fee?

Trustworthy Sources

Now let’s consider some reputable organizations and websites from which you can usually obtain valid nutrition information.

Organizations Active in Nutrition Policy and Research

Authoritative nutritional news will be based upon solid scientific evidence, supported by multiple studies, and published in peer-reviewed journals. Whatever the source of your nutritional news, remember to apply the criteria outlined above to help ensure the validity of the information presented. Below are some examples of websites which can be considered credible sources for nutritional news.

- US Department of Agriculture Food and Nutrition Information Center. The USDA site fnic.nal.usda.gov has more than 2,500 links to information about diet, nutrition, diet and disease, weight and obesity, food-safety and food-labeling, packaging, dietary supplements and consumer questions. Using this interactive site, you can find tips and resources on how to eat a healthy diet, nutritional information, and a food planner.
- The Academy of Nutrition and Dietetics (AND). The AND promotes scientific, evidenced-based, research-supported food and nutrition related information on its website, <http://www.eatright.org>. It is focused on informing the public about recent scientific discoveries and studies, weight-loss concerns, food safety topics, nutrition issues, and disease prevention.
- Department of Health and Human Services (HHS). The HHS website, HealthFinder.gov, provides credible information about healthful lifestyles and the latest in health news. A variety of online tools are available to assist with food-planning, weight

maintenance, physical activity, and dietary goals. You can also find healthful tips for all age groups, tips for preventing disease, and information on daily health issues in general.

- Centers for Disease Control and Prevention (CDC). The Centers for Disease Control and Prevention (<http://www.cdc.gov>) distributes an online newsletter called CDC Vital Signs which provides up-to-date public health information and data regarding food, nutrition, cholesterol, high blood pressure, obesity, teenage drinking, and tobacco usage.

Contributor

- [University of Hawai'i at Mānoa Food Science and Human Nutrition Program](#): Allison Calabrese, Cheryl Gibby, Billy Meinke, Marie Kainoa Fialkowski Revilla, and Alan Titchenal

This page titled [1.6: Types of Scientific Studies and Nutrition Assessment Methods](#) is shared under a [CC BY-NC-SA](#) license and was authored, remixed, and/or curated by [The University of Hawai'i](#).

1.7: Careers in Nutrition

Learning Objectives

- List some of the jobs available to students who are interested in a career in food and nutrition.

If you are considering a career in nutrition, it is important to understand the opportunities that may be available to you. Both dietitians and nutritionists provide nutrition-related services to people in the private and public sectors. A dietitian is a healthcare professional who has registered credentials and can provide nutritional care in the areas of health and wellness for both individuals and groups. A nutritionist is an unregistered professional who may have the credentials of a dietitian, or may have acquired the knowledge via other avenues. People in both professions work to apply nutritional science, using evidence-based best practices, to help people nourish their bodies and improve their lives.

Becoming a registered dietitian requires a Bachelor's or Master's degree in dietetics, including courses in biology, chemistry, biochemistry, microbiology, anatomy and physiology, nutrition, and food-service management. Other suggested courses include economics, business, statistics, computer science, psychology, and sociology. In addition, people who pursue this path must complete a dietetic internship and pass a national exam. Also, some states have licensure that requires additional forms and documentation. To become a registered dietetic technician you must complete a dietetic technician program that involves supervised practice. Forty-seven states have licensure requirements for registered dietitians and nutritionists. A few remaining states do not have laws that regulate this profession. Bureau of Labor Statistics. "Dietitians and Nutritionists." *Occupational Outlook Handbook, 2010-11 Edition*. Last modified April 7, 2010. Go to [Commission on Dietetic Registration - RD/RDN certification](#) to learn more.

Working in Nutrition

Dietitians and nutritionists plan food and nutrition programs, promote healthy eating habits, and recommend dietary modifications. For example, a dietitian might teach a patient with hypertension how to follow the DASH diet and reduce their sodium intake. Nutrition-related careers can be extremely varied. Some individuals work in the government, while others are solely in the private sector. Some jobs in nutrition focus on working with athletes, while others provide guidance to patients with long-term, life-threatening diseases. But no matter the circumstance or the clientele, working in the field of diet and nutrition focuses on helping people improve their dietary habits by translating nutritional science into food choices.

In the public sector, careers in nutrition span from government work to community outreach. Nutritionists and dietitians who work for the government may become involved with federal food programs, federal agencies, communication campaigns, or creating and analyzing public policy. On the local level, clinical careers include working in hospitals and nursing-care facilities. This requires creating meal plans and providing nutritional guidance to help patients restore their health or manage chronic conditions. Clinical dietitians also confer with doctors and other health-care professionals to coordinate dietary recommendations with medical needs. Nutrition jobs in the community often involve working in public health clinics, cooperative extension offices, and HMOs to prevent disease and promote the health of the local community. Nutrition jobs in the nonprofit world involve antihunger organizations, public health organizations, and activist groups.

Nutritionists and dietitians can also find work in the private sector. Increased public awareness of food, diet, and nutrition has led to employment opportunities in advertising, marketing, and food manufacturing. Dietitians working in these areas analyze foods, prepare marketing materials, or report on issues such as the impact of vitamins and herbal supplements. Consultant careers can include working in wellness programs, supermarkets, physicians' offices, gyms, and weight-loss clinics. Consultants in private practice perform nutrition screenings for clients and use their findings to provide guidance on diet-related issues, such as weight reduction. Nutrition careers in the corporate world include designing wellness strategies and nutrition components for companies, working as representatives for food or supplement companies, designing marketing and educational campaigns, and becoming lobbyists. Others in the private sector work in food-service management at health-care facilities or at company and school cafeterias. Sustainable agricultural practices are also providing interesting private sector careers on farms and in food systems. There are employment opportunities in farm management, marketing and sales, compliance, finance, and land surveying and appraisal.

Working toward Tomorrow

Whether you pursue nutrition as a career or simply work to improve your own dietary choices, what you have learned in this course can provide a solid foundation for the future. Remember, your ability to wake up, to think clearly, communicate, hope, dream, go to school, gain knowledge, and earn a living are totally dependent upon one factor—your health. Good health allows you to function normally and work hard to pursue your goals. Yet, achieving optimal health cannot be underestimated. It is a complex process, involving multiple dimensions of wellness, along with your physical or medical reality. The knowledge you have now acquired is also key. However, it is not enough to pass this nutrition class with good grades. Nutrition knowledge must be applied to make a difference in your life, throughout your life.

Throughout this textbook, we have focused on the different aspects of nutritional science, which helps to optimize health and prevent disease. Scientific evidence provides the basis for dietary guidelines and recommendations. In addition, researchers in the field of nutrition work to advance our knowledge of food production and distribution. Nutritional science also examines the ill effects of malnutrition and food insecurity. The findings that are uncovered today will influence not only what we eat, but how we grow it, distribute it, prepare it, and even enjoy it tomorrow.



Video 1.7.1: Farms of the Future. This video examines the philosophy and science behind vertical farming. Could it provide our nutrients in the future (click to see video)?

Summary and Key Takeaway

There are many paths that one can take to become a professional in the field of nutrition, including working as a nutritionist or becoming a registered dietitian. Some confuse the terms "dietitian" and "nutritionist," and this tends to be erroneous. A nutritionist is a person who advises on matters of food and nutrition impacts on health. In contrast, A dietitian is an expert in the relationship between human nutrition and the regulation of diet; a dietitian alters their patient's nutrition based upon their medical condition and individual needs.

Discussion Starter

1. Compare and contrast nutrition-related careers in the public and private sectors. Discuss which area would most interest you and the reasons why.

1.7: Careers in Nutrition is shared under a [CC BY-NC-SA](#) license and was authored, remixed, and/or curated by LibreTexts.

1.8: Nutrition and the Media

Learning Objectives

- List at least four sources of reliable and accurate nutrition information.

A motivational speaker once said, “A smart person believes half of what they read. An *intelligent* person knows which half to believe.” In this age of information where instant Internet access is just a click away, it is easy to be misled if you do not know where to go for reliable nutrition information. There are a few websites that can be consistently relied upon for accurate material that is updated regularly.



Figure 1.8.1: Right information or wrong information? How can you know? © Shutterstock

Using Eyes of Discernment

“New study shows that margarine contributes to arterial plaque.” “Asian study reveals that two cups of coffee per day can have detrimental effects on the nervous system.” How do you react when you read news of this nature? Do you boycott margarine and coffee? When reading nutrition-related claims, articles, websites, or advertisements always remember that one study does not substantiate a fact. One study neither proves nor disproves anything. Readers who may be looking for complex answers to nutritional dilemmas can quickly misconstrue such statements and be led down a path of misinformation. Listed below are ways that you can develop discerning eyes when reading nutritional news.

1. The scientific study under discussion should be published in a peer-reviewed journal, such as the *Journal of the International Society of Sports Nutrition*. Question studies that come from less trustworthy sources (such as non peer-reviewed journals or websites) or that are not published.
2. The report should disclose the methods used by the researcher(s). Did the study last for three or thirty weeks? Were there ten or one hundred participants? What did the participants actually do? Did the researcher(s) observe the results themselves or did they rely on self reports from program participants?
3. Who were the subjects of this study? Humans or animals? If human, are any traits/characteristics noted? You may realize you have more in common with certain program participants and can use that as a basis to gauge if the study applies to you.
4. Credible reports often disseminate new findings in the context of previous research. A single study on its own gives you very limited information, but if a body of literature supports a finding, it gives you more confidence in it.
5. Peer-reviewed articles deliver a broad perspective and are inclusive of findings of many studies on the exact same subject.
6. When reading such news, ask yourself, “Is this making sense?” Even if coffee does adversely affect the nervous system, do you drink enough of it to see any negative effects? Remember, if a headline professes a new remedy for a nutrition-related topic, it may well be a research-supported piece of news, but more often than not it is a sensational story designed to catch the attention of an unsuspecting consumer. Track down the original journal article to see if it really supports the conclusions being drawn in the news report.

When reading information on websites, remember the following criteria for discerning if the site is valid:

1. Who sponsors the website?
2. Are names and credentials disclosed?
3. Is an editorial board identified?

4. Does the site contain links to other credible informational websites? Even better, does it reference peer-reviewed journal articles? If so, do those journal articles actually back up the claims being made on the website?
5. How often is the website updated?
6. Are you being sold something at this website?
7. Does the website charge a fee?

Trustworthy Sources

Now let's consider some reputable organizations and websites from which you can obtain valid nutrition information.

1. **Centers for Disease Control and Prevention (CDC):** The Centers for Disease Control and Prevention (<http://www.cdc.gov>) distributes an online newsletter called *CDC Vital Signs*. This newsletter is a valid and credible source for up-to-date public health information and data regarding food, nutrition, cholesterol, high blood pressure, obesity, teenage drinking, and tobacco usage.
2. **The Academy of Nutrition and Dietetics (AND):** The AND promotes scientific evidenced-based, research-supported food and nutrition related information on its website, <http://www.eatright.org>. It is focused on informing the public about recent scientific discoveries and studies, weight-loss concerns, food safety topics, nutrition issues, and disease prevention.
3. **US Department of Agriculture (USDA):** The USDA site fnic.nal.usda.gov has more than twenty-five hundred links to dietary, nutrition, diet and disease, weight and obesity, food-safety and food-labeling, packaging, dietary supplement and consumer questions sites. Using this interactive site, you can find tips and resources on how to eat a healthy diet, my Foodapedia, and a food planner, among other sections.
4. **US Department of Health and Human Services (HHS):** The HHS website, HealthFinder.gov, provides credible information about healthful lifestyles and the latest in health news. A variety of online tools are available to assist with food-planning, weight maintenance, physical activity, and dietary goals. You can also find healthful tips for all age groups, tips for preventing disease, and on daily health issues in general.
5. **Dietitians of Canada:** Dietitians of Canada, <http://www.dietitians.ca/>, is the national professional association for dietitians. It provides trusted nutrition information to Canadians and health professionals.
6. **Health Canada:** Health Canada, <http://www.hc-sc.gc.ca/index-eng.php>, is the Federal department that helps Canadians improve their health. Its website also provides information about health-related legislation.

Key Takeaways

- Reliable nutritional news will be based upon solid scientific evidence, supported by multiple studies, and published in peer-reviewed journals. Be sure the website you use for information comes from a credible and trustworthy source, such as the USDA Food and Nutrition Center, the HHS, and the CDC.

Discussion Starter

1. Discuss why it is important to get information from proper and credible sources and not to rely upon single study findings.

1.8: Nutrition and the Media is shared under a [CC BY-NC-SA](https://creativecommons.org/licenses/by-nc-sa/4.0/) license and was authored, remixed, and/or curated by LibreTexts.

1.9: Assessing Personal Health

Learning Objectives

- Discuss ways of assessing your personal health status and your diet.
- Set a goal to adopt, maintain, or improve a nutrition-related practice.
- Formulate an effective, long-term, personal health and nutrition plan.

You may remember that when you were younger your mother or grandmother made you swallow that teaspoonful of cod liver oil because she said it was good for you. You don't have to have a PhD to know some of the basic ways you can adapt your life to be healthier. However, the mainstream media inundates the American population with health cures and tips, making it confusing to develop the best plan for your health. This section will equip you with tools to assess and improve your health. To find some other reliable sources on health see video below.

Exercise 1.9.1: Quackwatch!

With all of the false Nutrition information out there, we need to be able to figure out which websites are reliable and which ones are simply quackery (false nutrition information)! Here is a website which will help you figure out who is trying their best to give you good information on nutrition and health and who is lying!

<https://quackwatch.org/04ConsumerEdu...nonrecorg.html>

Personal Health Assessment

One of the easiest places to begin a personal health assessment is by examining the results from your last physical. Often a person will leave the doctor's office without these results. Remember that the results belong to you and having this information on hand provides you with much of what you need to keep track of your health. During a physical, after obtaining weight and height measurements, a nurse will typically examine blood pressure. Blood pressure is a measurement of the forces in the arteries that occur during each heart beat. It is a principle vital sign and an indicator of cardiovascular health. A desirable blood pressure is 120 over 80 mmHg. In most circumstances a physical includes blood tests, which measure many health indicators, and you have to request the results. Once you have the results in hand, it is good practice to file them in a binder so you can compare them from year to year. This way you can track your blood-cholesterol levels and other blood-lipid levels and blood-glucose levels. These are some of the more general measurements taken, but in many instances blood tests also examine liver and kidney function, vitamin and mineral levels, hormone levels, and disease markers. Your doctor uses all of these numbers to assess your health and you can use them to play a more active role in keeping track of your health.



Figure 1.9.1: Don't forget to get the results of your physical the next time you visit your doctor. They will help you keep track of your health. (National Cancer Institute, an agency part of the National Institutes of Health; Linda Bartlett (Photographer)).

Hearing and vision are additionally part of a general health assessment. If you wear glasses, contacts, or a hearing aid you already are aware of how important it is to know the results of these exams. If you have not experienced vision or hearing problems yet your likelihood of experiencing them markedly increases over the age of forty. Another component of overall health is oral health. The health of your teeth, gums, and everything else in your mouth are an integral component of your overall health. This becomes

apparent when a person experiences a tooth infection, which if left untreated significantly impairs physical, mental, and social well-being.

Other indicators of health that you can measure yourself are body mass index (BMI) and fitness. BMI is simply a ratio of an individual's weight and height. More specifically BMI is calculated using an individual's body weight (in kilograms, or kg) divided by the square of their height (in meters) and the unit of measurement is kg/m^2 . You can calculate this yourself or use one of the many BMI calculators on the web (see Interactive). BMI is a standardized measurement that indicates if a person is underweight, of normal weight, overweight, or obese and is based on data from the average population. It has some limitations. One limitation is that it does not take into account how much of your weight is made up of muscle mass, which weighs more than fat tissue. BMI and other measurements of body composition and fitness are more fully discussed elsewhere.

The personal health assessment has focused primarily on physical health, but remember that mental and social well-being also affect health. During a physical, a doctor will ask how you are feeling, if you are depressed, and if you are experiencing behavioral problems. Be prepared to answer these questions truthfully, so that your doctor can develop a proper treatment plan to manage these aspects of health. Interactive 1.8 provides some tools to assess your mental and social well-being.

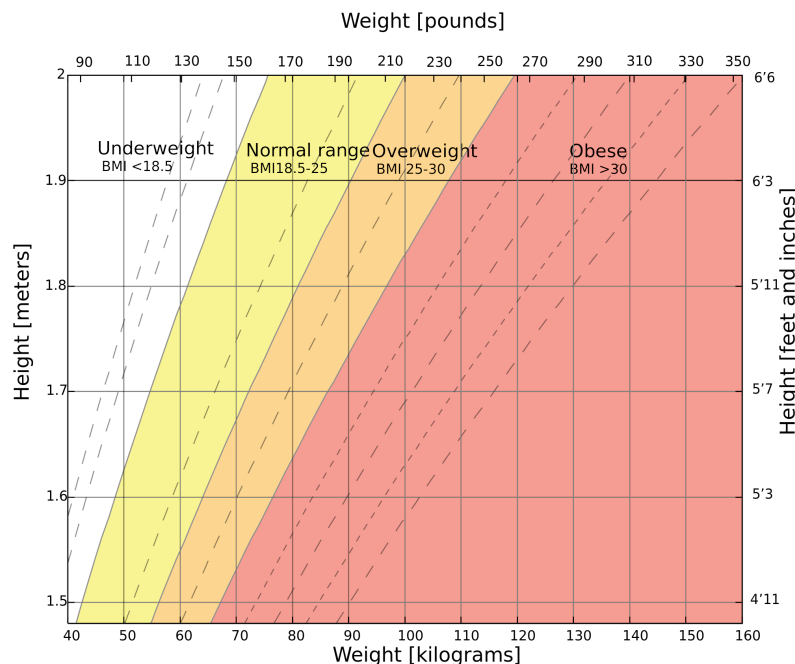


Figure 1.9.2: A graph of body mass index is shown above. By lining up weight and height you can find out in which range an adult person falls. Left of normal range means too thin, to the right of normal means too fat. Dashed lines give a rough idea of how much too thin or how much too fat a person is. (Public Domain).

Taking charge of your health will pay off and equip you with the knowledge to better take advantage of your doctor's advice during your next physical. Health calculators, such as those that calculate BMI, ideal weight, target heart rate among many others, and personal health assessments will help you to take charge of your health, but they should not take the place of visiting your doctor.

Dietary Assessment

The first step in assessing your diet is to find out if the foods you eat are good for your health and provide you with all the nutrients you need. Begin by recording in a journal what you eat every day, including snacks and beverages. Then visit the USDA website, <http://www.choosemyplate.gov/myplate/index.aspx>, which has various tools to help you assess your diet. You can track calories over time, diet quality, and find many other tools to evaluate your daily food consumption. The questions these tools can help answer include: How much food do you have to eat to match your level of activity? How many calories should you eat? What are the best types of food to get the most nutrients? What nutrients are contained in different foods? How do you plan a menu that contains all the nutrients you need? Make the first step and assess your diet. This book will provide you with interactive resources, videos, and audio files to empower you to create a diet that improves your health.

Family Medical History

Because genetics play a large role in defining your health it is a good idea to take the time to learn some of the diseases and conditions that may affect you. To do this, you need to record your family's medical history. Start by simply drawing a chart that details your immediate family and relatives. Many families have this and you may have a good start already. The next time you attend a family event start filling in the blanks. What did people die from? What country did Grandpa come from? While this may be a more interesting project historically, it can also provide you with a practical tool to determine what diseases you might be more susceptible to. This will allow you to make better dietary and lifestyle changes early on to help prevent a disease from being handed down from your family to you. It is good to compile your information from multiple relatives.

Lifestyle Assessment

A lifestyle assessment includes evaluating your personal habits, level of fitness, emotional health, sleep patterns, and work-life balance. Many diseases are preventable by simply staying away from certain lifestyles. Don't smoke, don't drink excessively, and don't do recreational drugs. Instead, make sure you exercise. Find out how much to exercise by reading the *2008 Physical Activity Guidelines for Americans*. There is a wealth of scientific evidence that increased physical activity promotes health, prevents disease, and is a mood enhancer. Emotional health is often hard to talk about; however a person's quality of life is highly affected by emotional stability. Harvard's Women's Health Watch notes six reasons to get enough sleep: Sleep promotes healthy brain function, while lack of sleep can cause weight gain and increase appetite, decrease safety (falling asleep while driving), make a person moody and irritable, decrease health of the cardiovascular system and prevent the immune system from functioning well. Harvard Health Publications. "Importance of Sleep: Six Reasons Not to Scrimp on Sleep." *Harvard's Women's Health Watch* (January 2006). © 2000–2012 Harvard University. http://www.health.harvard.edu/press_releases/importance_of_sleep_and_health Finding balance between work and life is a difficult and continuous process involving keeping track of your time, taking advantage of job flexibility options, saying no, and finding support when you need it. Work-life balance can influence what you eat too.

Key Takeaways

This section equips you with some tools to assess your lifestyle and make changes towards a healthier one.

- **Step 1.** Take charge of tracking your personal health.
- **Step 2.** Assess your diet and identify where it can be changed to promote health and prevent disease.
- **Step 3.** Start finding out the medical history of your family and identify the diseases you may be more susceptible to getting.
- **Step 4.** Assess your lifestyle by evaluating your personal habits, emotional health, sleep patterns, and work-life balance.
- **Step 5.** Start living a healthier life.

Discussion Starters

1. What websites in Interactive 1.8 did you find to be the most helpful in the assessment of your health?
2. Share your comments on these tools with your classmates and get their opinions, too.

1.9: Assessing Personal Health is shared under a [CC BY-NC-SA](#) license and was authored, remixed, and/or curated by LibreTexts.

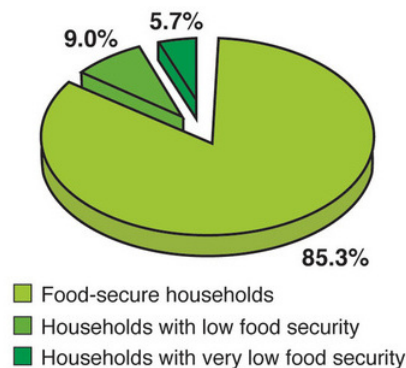
1.10: A Fresh Perspective- Sustainable Food Systems

Learning Objective

- Discuss some approaches to building a sustainable food system in your community.

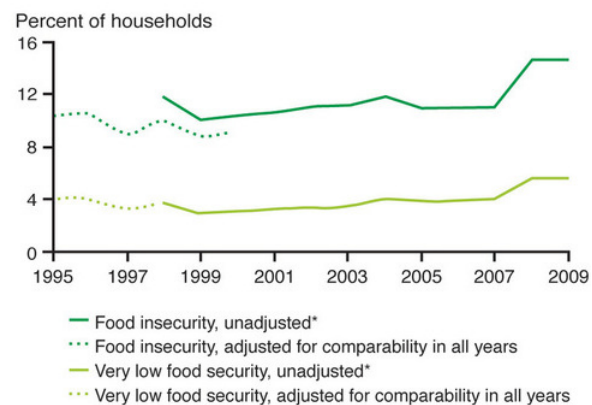
The science of nutrition includes the study of how organisms obtain food from their environment. An ecosystem is defined as the biological and physical environments and their interactions with the community of organisms that inhabit those environments as well as the interactions among the organisms. Human nutrition and the health of the world's ecosystem are interdependent, meaning that what we eat and where we get it from affects the world. In turn the health of the earth influences our health. The term sustainability is used to indicate the variety of approaches aimed at improving our way of life. Sustainability promotes the development of conditions under which people and nature can interact harmoniously. It is based upon the principle that everything needed for human survival depends upon the natural environment.

Food security status of U.S. households, 2009



Note: Food-insecure households include those with low food security and very low food security.

Trends in prevalence rates of food insecurity and very low food security in U.S. households, 1995–2009



*Data as collected (unadjusted) in 1995–97 are not directly comparable with data collected in 1998 and later years.

Figure 1.10.1: Food Security Status in the United States. Building a sustainable food system will help enforce measures to ensure that everyone on the planet has enough food to eat. Source: Calculated by ERS using data from the December 2009 Current Population Survey Food Security Supplement.

A major theme of sustainability is to ensure that the resources needed for human and environmental health will continue to exist. A healthy ecosystem, one that is maintained over time, is harmonious and allows for social and economic fulfillment for present and future generations. Nutritious foods come from our ecosystem and to ensure its availability for generations to come, it must be produced and distributed in a sustainable way. The American Public Health Association (APHA) defines a sustainable food system as “one that provides healthy food to meet current food needs while maintaining healthy ecosystems that can also provide food for generations to come with minimal negative impact to the environment.” American Public Health Association. “Towards a Healthy, Sustainable Food System.” *Policy Statement Database*. Policy no. 200712 (November 6, 2007). www.apha.org/advocacy/policy/...lt.htm?id=1361 It also states that the attributes of a sustainable food system are:

- availability
- accessibility
- affordability to all
- humane
- just

A sustainable food system does not just include the food and those who consume the food, but also those that produce the food, like farmers and fishermen, and those who process, package, distribute, and regulate food. Unfortunately, we have a long way to go to build a sustainable food system.

The Challenges

The most prominent challenge to building a sustainable food system is to make food available and accessible to all. The Food and Agricultural Organization of the United Nations (FAO) states the right to food is a fundamental human right and its mission is to assist in building a food-secure world. Food security in America is defined as the “access by all people at all times to enough food for an active, healthy life.” US Department of Agriculture, Economic Research Service. “Food Security in the United States: Key Statistics and Graphics.” Last updated June 4, 2012. www.ers.usda.gov/Briefing/FoodSecurity/#food_secure As of 2009, 14.9 percent of households, or 17.4 million people in the United States, had very low or low food security and these numbers have risen in recent years (Figure 1.10.2). Food and Agricultural Organization of the United Nations. “Food Security: Concepts and Measurement.” In *Corporate Document Repository*, ID: 144369. 2003. www.fao.org/docrep/005/y4671e/y4671e06.htm

Food security is defined by the FAO as existing “when all people, at all times, have physical, social, and economic access to sufficient, safe, and nutritious food which meets their dietary needs and food preferences for an active and healthy life.” Food and Agriculture Organization of the United Nations. “How Does International Price Volatility Affect Domestic Economies and Food Security?” In *The State of Food Insecurity in the World*. 2011. www.fao.org/publications/sofi/en/ The FAO estimates that 925 million worldwide were undernourished in 2010. Although there was a recent decline in overall food insecurity (attributable mostly to a decline in undernourished people in Asia), the number of undernourished people world-wide is still higher than it was in 1970, despite many national and international goals to reduce it.

Another challenge to building a sustainable food system is to supply high-quality nutritious food. The typical American diet does not adhere to dietary guidelines and recommendations, is unhealthy, and thus costs this country billions of dollars in healthcare. The average American diet contains too many processed foods with added sugars and saturated fats and not enough fruits, vegetables, and whole grains. Moreover, the average American takes in more kilocalories each day than ever before. This shift of the population toward unhealthy, high-calorie diets has fueled the obesity and diet-related disease crisis in this nation. Overall the cost of food for the average American household has declined since the 1970s; however, there has been a growth of “food deserts.” A food desert is a location that does not provide access to affordable, high-quality, nutritious food. One of the best examples of a “food desert” is in Detroit, Michigan. The lower socioeconomic status of the people who live in this city does not foster the building of grocery stores in the community. Therefore, the most accessible foods are the cheap, high-caloric ones sold in convenience stores. As a result, people who live in Detroit have some of the highest incidences of obesity, Type 2 diabetes, and cardiovascular disease in the country.

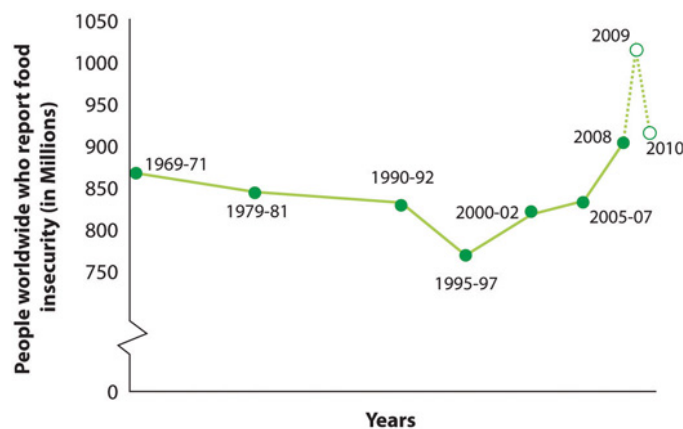


Figure 1.10.2: Food Insecurity: A Global Perspective. Source: Calculated by ERS based on Current Population Survey Food Security Supplement data.

A fourth challenge to building a sustainable food system is to change how we produce, process, and distribute food. Large agribusiness, complex industrial processing, and massive retail conglomerations distort the connection we have between the food on our plate and where it came from. More food is being produced in this nation than ever before, which might sound good at first. However, some factors that have contributed to higher food production include using genetically engineered plants, excessive use of herbicides and pesticides, and the selective promotion of only a few crops by the policy of crop-specific subsidies (money given to farmers by the federal government). The subsidies are given toward the support of only about eight crops, most notably corn and soybeans. This policy diminishes the variety of crops, decreases biodiversity among crops, and supports large agribusiness while disadvantaging small- and medium-sized farms. Additionally, the whole system of food production, processing, and distribution is lengthy, requiring a great deal of energy and fossil fuels, and promotes excessive use of chemicals to preserve foods during

transportation and distribution. In fact, the current US food system uses approximately 22 percent of the energy in this country and is responsible for at least 20 percent of greenhouse gas emissions. Canning, P. et al. “Energy Use in the US Food System.” US Department of Agriculture, *Economic Research Report*, no. ERR-94 (March 2010).

Solutions to the Challenges

While these challenges are daunting there are many potential solutions that are gaining momentum in the United States. The APHA advocates expanding the infrastructure for locally grown food, improving access to healthy and local food for low-income Americans, providing education on food origin and production, building up the livelihoods of local farmers, and using sustainable farming methods. Detroit is currently a “food desert,” but there is a fantastic example of how to positively impact the growth of a sustainable food system within the city. It is called the Eastern Market and it is a six-block inner city market with over 250 vendors marketing local produce, meat, seafood, plants, fresh-cut flowers and much, much more. Unlike many urban farmers’ markets it sells foods that are of better quality and lower prices than grocery stores. Its forty-thousand visitors every Saturday demonstrate its success as a community-based way to foster good nutrition, good health, and social interaction.

Tools for Change

Ten Steps You Can Take to Help Build a Sustainable Food System in Your Community

1. Eat a “low-carbon diet.” This is one where the foods that you eat require less energy and fuel to produce, process, and distribute than other foods.
2. Join a community-based farmers’ market.
3. Have a garden at home and join a network of home gardeners. Find out how by visiting the USDA website on gardening: <https://www.nal.usda.gov/topics/home-gardening> and the National Garden Association: <http://www.garden.org/>.
4. Compost your food and garden waste. Learn some of the essentials of composting by visiting “Composting at home,” a fact sheet provided by Ohio State University (<http://ohioline.osu.edu/hyg-fact/1000/1189.html>).
5. Buy local food—make at least 10 percent of your food purchases local and share what you know about local food with friends and family.
6. Pool your resources with family and friends to purchase locally.
7. Drink tap water instead of bottled water.
8. When purchasing foods, choose the ones with less packaging.
9. Support state initiatives that support local farmers and build infrastructure to sell more healthy food.
10. When dining out, ask what nutrients are in the food and where the food labels are on the menu (to encourage the restaurants to label). Also, visit the restaurant’s website as the information may be posted there with a space for comments.

These are some great steps to build a more sustainable food system for you and your family, friends, neighborhood, community, city, state, nation, and world. For more solutions, watch Video1.10.1.

Throughout this book we will highlight multiple steps you can take toward building a sustainable food system in the Tools for Change sections, so stay tuned.



Figure 1.10.3: You can do your part in building a sustainable environment by literally starting in your own backyard. © Shutterstock

Video 1.10.1: Sustainable Food Systems

This link brings you to an educational video on sustainable food systems.



ENG reporting on how and where students can learn about sustainable agriculture, sustainable food systems, and education in sustainability.

Key Takeaways

- Sustainability promotes the development of conditions under which people and nature can interact harmoniously. It is based upon the principle that everything needed for human survival depends upon the natural environment. A sustainable food system includes not only the food and those who consume the food, but also those who produce food (such as farmers and fishermen), and process, package, distribute, and regulate food.
- The challenges to building a sustainable food system are many, from providing affordable and accessible food, to supplying nutritious, high-quality, low-cost food regardless of socioeconomic status, to changing the ways foods are produced, processed, and distributed.
- There are many solutions to the challenges of building a sustainable food system. Some of the solutions are to: expand the infrastructure for locally grown food, improve access to healthy and local food for low-income Americans, provide education on food origin and production, build up the livelihoods of local farmers, and use sustainable farming methods.
- You can take action individually and locally to help build a sustainable food system.

Discussion Starters

1. Share with each other in the classroom some of the things you might have already done to help build a sustainable food system in your community.
2. Form debate teams in the classroom and have a formal debate on the topic of the regulation of food. One side must present the reasons it is beneficial for the government to regulate food. The other side will argue the reasons it is better for people to grow their food locally.

1.10: A Fresh Perspective- Sustainable Food Systems is shared under a [CC BY-NC-SA](#) license and was authored, remixed, and/or curated by LibreTexts.

1.E: Nutrition and You (Exercises)

Study Questions:

1. What does Essential mean?
2. What are the 6 classes of essential nutrients? Put a star by the MOST essential nutrient.
3. How many of the 6 classes of essential nutrients are present in the food you eat?
4. Which of the nutrients give you Calories?
5. If you ate a food that contained: 10 grams of Carbohydrate, 10 grams of Fat and 10 grams of Protein, how many Calories would that food contain (approximately)? *Hint: Use 4 Calories per gram of Carbohydrate, 9 Calories per gram of Fat and 4 Calories per gram of Protein*
6. Is Alcohol a nutrient? Does Alcohol give you Calories?
7. When it comes to nutrients, is it “the more the better”? Why or Why not?
8. Are there “good foods” and “bad foods”? Why or Why not?
9. What are “phytochemicals”?
10. What is meant by the term “serving size”? *For example, a “serving size” of potato chips is 1 ounce or about 15 chips.*
11. What is your opinion of the role of the federal government in promoting health and preventing disease in Americans?

Expand Your Knowledge

1. Conduct an assessment of your diet. Begin by recording what you eat every day, including snacks and beverages, in a journal. Then visit the website, myfitnesspal.com which has tools to help you assess your diet and exercise. Calculate how many Calories you are eating in a day compared to how many are suggested for you per day.
2. Conduct an informal survey of five of your friends and family members. Create a questionnaire with ten to fifteen questions pertaining to their perception of food, their favorite food shows, what restaurants they frequent, what they purchase from the grocery store each week, etc. Ask questions about their general eating habits and record the answers. Next, get a camera and take pictures of the insides of their refrigerators. What have you learned about their eating habits? What advice would you give them? Review all the material and put it together in a report. Be prepared to share your findings.
3. Define eight steps your community can take to build a more sustainable food system. Visit the websites of Toronto’s and California’s plans to help provide you with some good ideas to accomplish the challenge. Toronto’s plan for a sustainable food system: wx.toronto.ca/inter/health/fo...s%20report.pdf
California’s plan for a sustainable food system: www.vividpicture.net/

1.E: Nutrition and You (Exercises) is shared under a [CC BY-NC-SA](https://creativecommons.org/licenses/by-nc-sa/4.0/) license and was authored, remixed, and/or curated by LibreTexts.