Chapter 1

1.1 What is Nutrition?

- **Nutrition** – the study of food, including
  - How food nourished our bodies
  - How food influences our health
- Nutrition is a relatively new discipline of science.
- Nutrition research focuses on supporting health and preventing and/or treating chronic diseases.
- Nutrition involves study of the following:
  - Food consumption
  - Food digestion
  - Food absorption
  - Food storage
  - Factors that influence eating patterns
  - Recommended amounts of types of food
  - Food safety
  - The global food supply

1.2 How Does Nutrition Support Health?

- Nutrition supports health and wellness
- **Wellness** – A multidimensional, active process by which people make choices to enhance their lives
  - Includes: physical, emotional, social, occupational, and spiritual health
- Critical components of wellness
  - Nutrition
  - Physical activity

1.3 Wellness

1.3.1 Physical Health

Includes nutrition and physical activity.

1.3.2 Spiritual Health

Includes spiritual values and beliefs.

1.3.3 Emotional Health

Includes positive feelings about one's self and life.

1.3.4 Social Health

Includes family, community, and social environment.

1.3.5 Occupational Health

Includes meaningful work or vocation.

1.4 Nutrition and Chronic Disease Prevention

- Nutrition can prevent disease
  - Nutrient-deficiency diseases:
    - scurvy (Vitamin-C deficiency)
    - pellagra
  - Three chronic diseases strongly associated with poor nutrition:
    - Heart disease
    - Stroke
    - Diabetes
  - Diseases in which nutrition plays a role:
    - Osteoarthritis
    - Osteoporosis
- Obesity is the primary link between poor nutrition and mortality

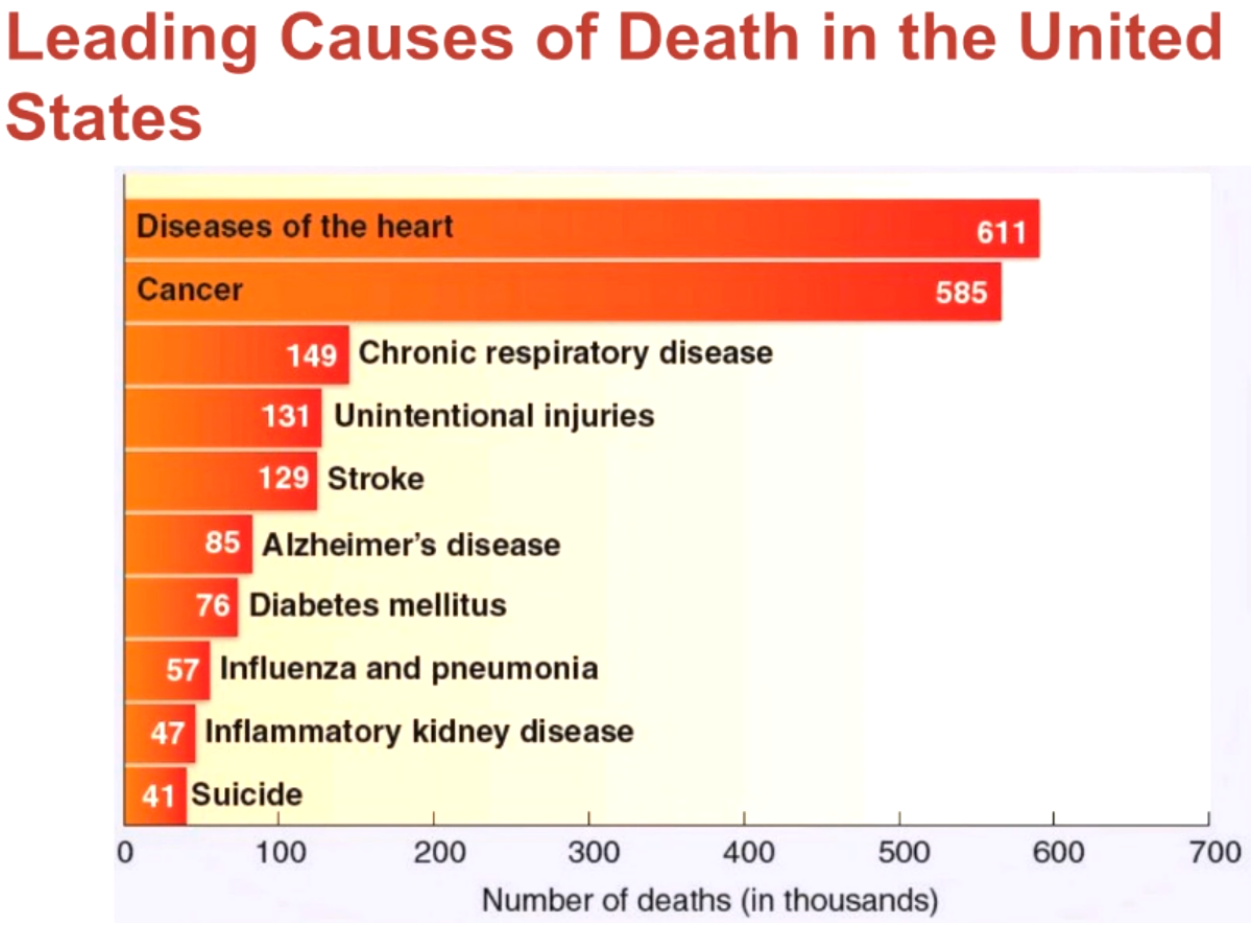
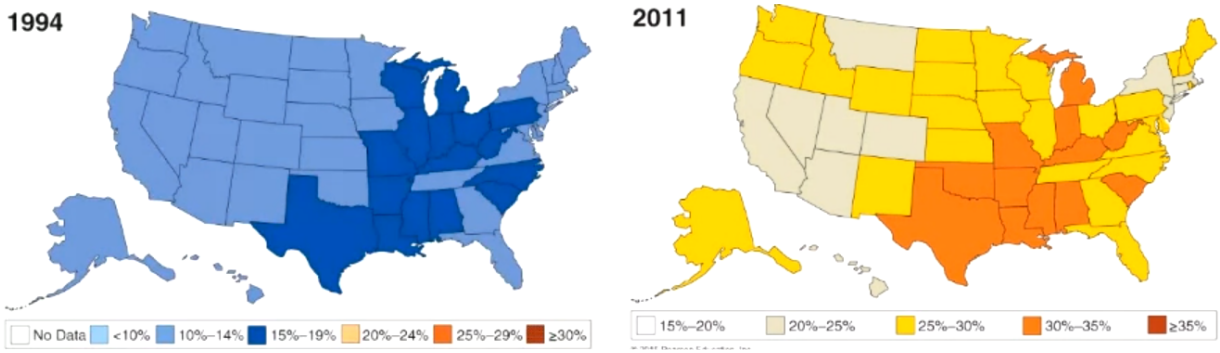


Figure 1.1: Leading Causes of Death in the United States



(a) Obesity rates per U.S. state in 1994.

(b) Obesity rates per U.S. state in 2011.

Figure 1.2: A 15-year difference between obesity rates in the United States.

1.5 Healthy People 2020

- Nutrition is so important that it has become a national goal

- The *Healthy People* plan, revised every decade, identifies goals and objectives to reach by 2020.

1.5.1 Goals of Healthy People 2020

- Attain high-quality, longer lives free of preventable disease, disability, injury, and premature death
- Achieve health equity, eliminate disparities, and improve the health of all groups
- Create social and physical environments that promote good health for all
- Promote quality of life, healthy development, and healthy behaviors across all life stages

Table 1.1: Weight, Nutrition, and Physical Activity Objecives from *Healthy People 2020*

Topic	Objective Number and Description
Weight status	NWS-8. Increase the proportion of adults who are at a healthy weight from 30.8% to 33.9%. NWS-9. Reduce the proportion of adults who are obese from 34.0% to 30.6%. NWS-10.2. Reduce the proportion of children aged 6 to 11 years who are considered obese from 17.4% to 15.7%.
Food and nutrient composition	NWS-14. Increase the contribution of fruits to the diets of the population aged 2 years and older. NWS-15. Increase the variety and contribution of vegetables to the diets of the population aged 2 years and older.
Physical activity	PA–1. Reduce the proportion of adults who engage in no leisure-time physical activity from 36.2% to 32.6%. PA–2.1. Increase the proportion of adults who engage in aerobic physical activity of at least moderate intensity for at least 150 minutes per week, or 75 minutes per week of vigorous intensity, or an equivalent combination from 43.5% to 47.9%. PA–2.3. Increase the proportion of adults who perform muscle-strengthening activities on 2 or more days of the week from 21.9% to 24.1%.

Data adapted from: *Healthy People 2020 (U.S. Department of Health and Human Services).*

1.6 What Are Nutrients?

- **Nutrients** – chemicals in foods that are critical to human growth and function

- There are six groups of essential nutrients found in foods:
  - Carbohydrates
  - Vitamins
  - Fats and oils
  - Minerals
  - Proteins
  - Water
- **Macronutrients** – nutrients required in relatively large amounts (grams)
  - Provide energy
  - Carbohydrates, fats and oils, proteins
- **Micronutrients** – nutrients required in smaller amounts

1.7 Macronutrients Provide Energy

- We measure energy in kilocalories (kcal)
- **Kilocalorie** – amount of energy required to raise the temperature of 1 kg of water by 1°C
- On food labels, "Calorie" actually refers to kilocalories.

1.7.1 Carbohydrates

- Provide 4 kcal per gram.

Functions

Primary energy source of fuel for the body, especially for the brain

Composed of

Chains of carbon, hydrogen, and oxygen

Best Sources

Whole grains, vegetables, fruits

1.7.2 Vitamins

Functions

Important source of energy at rest during low-intensity exercise

Composed of

Carbon, hydrogen, and oxygen

Best Sources

Vegetable oils, butter and dairy products

1.7.3 Fats and oils

- Fats are composed of lipids, molecules that are insoluble in water
- Provide 9 kcal per gram.
- Fats are an important source of fuel for our bodies during times of rest or low-intensity exercise
- Our bodies can store fat which can be used for energy while we are not eating
- Source of fat-soluble vitamins and essential fatty acids

Functions

Support tissue growth, repair and maintenance

Composed of

Amino acids made up of carbon, hydrogen, oxygen and nitrogen

Best Sources

Meats, dairy products, seeds, nuts, legumes

1.7.4 Minerals

Functions

Assist with release of macronutrients; critical to building and maintaining bone, muscle, and blood; support immune function and vision

Composed of

fat-soluble and water-soluble compounds

Best Sources

fruits, vegetables, dairy products, meats

1.7.5 Proteins

Functions

Assist with fluid regulation and energy production; maintain health of blood and bones; rid body of harmful by-products of metabolism

Composed of

Single elements such as sodium, potassium, calcium or iron

Best Sources

Fruits, vegetables, dairy products, meats

1.7.6 Water

Functions

Ensures proper fluid balance; assists in regulation of nerve impulses, body temperature, and muscle contractions

Composed of

Hydrogen and oxygen

Best Sources

Water, juices, soups, fruits, vegetables