Chapter 1

Food Choices and Human Health
Introduction

Nutrition

Science

Studying nutrition

- Why care about nutrition?
- What are the nutrients in food?
- What constitutes a nutritious diet?
- How do we know what we know about nutrition?
- How do people go about making changes?
- **Food**: any substance that the body can take in and digest that will enable it to stay alive and grow.
- **Nutrition**: study of nutrients in foods and in the body.
- **Diet**: foods (including beverages) that a person eats and drinks.
- **Nutrients**: parts of food that are important for the body to function.
A Lifetime of Nourishment

- The foods you choose have a cumulative effect.
- As you age you will see and feel those effects.
- Your body continuously renews itself by building muscle, bones, skin and blood and replacing old tissues with new ones.
- Best foods
  - Support your body’s growth & maintenance
  - Malnutrition
    - Deficiencies, imbalances, and excesses
The Diet and Health Connection

- Diet affects your health both today and in the future.
- Tobacco and alcohol are the other 2 habits that can affect your health.
- **Chronic diseases**: long duration degenerative diseases characterized by deterioration of body organs.
  - Ex: heart disease, diabetes, some cancers, dental disease, adult bone loss.
  - Connected with poor diet

### Table 1-1: Leading Causes of Death, U.S.

<table>
<thead>
<tr>
<th>Cause</th>
<th>Percentage of Total Deaths</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Heart disease</td>
<td>26.5%</td>
</tr>
<tr>
<td>2. Cancers</td>
<td>22.8%</td>
</tr>
<tr>
<td>3. Strokes</td>
<td>5.9%</td>
</tr>
<tr>
<td>4. Chronic lung disease</td>
<td>5.3%</td>
</tr>
<tr>
<td>5. Accidents</td>
<td>4.7%</td>
</tr>
<tr>
<td>6. Alzheimer’s disease</td>
<td>3.1%</td>
</tr>
<tr>
<td>7. Diabetes mellitus</td>
<td>2.9%</td>
</tr>
<tr>
<td>8. Pneumonia and influenza</td>
<td>2.6%</td>
</tr>
<tr>
<td>9. Kidney disease</td>
<td>1.8%</td>
</tr>
<tr>
<td>10. Blood infections</td>
<td>1.4%</td>
</tr>
</tbody>
</table>
Genetics and Individuality

- Genetics and nutrition affect diseases to varying degrees
- Human genome has been identified
- Genome has our genetic information
- Consists of 35,000 genes and supporting materials.
- Genome establishes the entire sequence of our genes in our DNA
Other Lifestyle Choices

- Tobacco & alcohol use
- Substance abuse
- Physical activity
- Sleep
- Stress
- Environmental factors
Health People 2010: Nutrition Objectives for the Nation

- U.S. Department of Health and Human Services
- Nutrition and food-safety objectives
  - Improvements
    - Food borne infections
    - Some cancers
  - Declines
    - Heart disease
    - Overweight people diagnosed with diabetes
Your body uses **energy**: the capacity to do work.

Energy comes indirectly from the sun.

Plant derived foods get their energy that they stored from the sun.

Plant eating animals get their energy the same way.
The Human Body and Its Food

- Body needs 6 kinds of nutrients that comes from food
- 4 out of the 6 are organic, they have carbon that is taken from living things
Elements in the Six Classes of Nutrients

The nutrients that contain carbon are organic.

<table>
<thead>
<tr>
<th></th>
<th>Carbon</th>
<th>Oxygen</th>
<th>Hydrogen</th>
<th>Nitrogen</th>
<th>Minerals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Carbohydrate</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fat</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Protein</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Vitamins</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓a</td>
</tr>
<tr>
<td>Minerals</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>
Meet the Nutrients

- Human body & food
  - Same materials
  - Different arrangements
  - Food and nutrients are measured in grams
Meet the Nutrients

- **Energy-yielding nutrients**: body can use the energy they have.
  - Carbohydrates – 4 cal/g
  - Fats – 9 cal/g
  - Proteins – 4 cal/g
- Vitamins and minerals only help with body processes such as: digesting food, moving muscle, getting energy from carbs, fats, and proteins.
  - Provide no energy
  - Some are essential
- **Essential nutrients**: nutrients body can't make for itself (or can't make fast enough. Must get from food in order to prevent deficiencies.
- Essential nutrients are found in all 6 classes of nutrients.
Can I Live on Just Supplements?

- **Elemental diets**: diet that has purified ingredients of known chemical composition.
  - Administered to severely ill people

- “Real food” is superior to supplements
  - Nutrients and other parts of food interact w/each other in the body to function in harmony.
What does food offer that can't be provided through a needle or a tube?
Answer

- Digestive organs weaken and grow smaller when not used.
- Digestive organs also release hormones in response to foods.
- Hormones send messages to the brain that makes a person feel satisfied.
The Abundance of Foods to Choose From

- Whole foods
- Typical consumption
  - Fruits
  - Vegetables
- Types of foods
  - Fast, processed, functional, staple
How, Exactly, Can I Recognize a Nutritious Diet?

- Five characteristics
  - Adequacy
  - Balance
  - Calorie control
    - Intakes should not exceed need
  - Moderation
    - Not abstinence
  - Variety
Why People Choose Foods

- Eating is an intentional act
- Factors influencing food-related choices
  - Traditional and ethnic foods
  - Convenience
  - Physical factors
  - Psychological factors
  - Social factors
  - Philosophical factors
The Science of Nutrition

- Nutrition
  - Field of knowledge composed of organized facts
    - Active, changing, and growing body of knowledge
  - The scientific approach
    - Systematic process to answer questions
- Scientific challenge
  - Theories
The Scientific Method

1. **Observation & Question**: Identify a problem to be solved or ask a specific question to be answered.

2. **Hypothesis & Prediction**: Formulate a hypothesis—a tentative solution to the problem or answer to the question—and make a prediction that can be tested.

3. **Experiment**: Design a study and conduct the research to collect relevant data.

4. **Results & Interpretations**: Summarize, analyze, and interpret the data; draw conclusions.

5. **Hypothesis Supported**: Develop a theory that integrates conclusions with those from numerous other studies.

6. **Hypothesis Not Supported**: Return to a question for further exploration or experimentation.

7. **New Observations & Questions**: Continue the cycle with new observations and questions.
Types of Studies

- Case study
  - Examples
- Epidemiological study
  - Correlation
- Intervention study
  - Blind studies
- Laboratory study
  - Example
Examples of Research Design
Can I Trust the Media to Deliver Nutrition News?

- Training of news media
  - Sensationalism
- Be a trend watcher
- Read news with an educated eye
  - Published in peer-reviewed journal
  - Description of research methods & subjects
  - Findings presented in context of previous research
National Nutrition Research

- National Health and Nutrition Examination Surveys (NHANES)
  - What people eat
  - Recording of health status

- Continuing Survey of Food Intakes by Individuals (CSFII)
  - What people eat for two days
  - Comparing foods eaten with recommendations
A Guide for Behavior Change

- Behavior change takes substantial effort
- Six stages of change
- Assessment and goals
  - Realistic goals
- Obstacles to change
  - Competence
  - Confidence
  - Motivation
# Stages of Behavior Change

<table>
<thead>
<tr>
<th>Stage</th>
<th>Characteristics</th>
<th>Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Precontemplation</td>
<td>Not considering a change, have no intention of changing; see no problems with current behavior.</td>
<td>Collect information about health effects of current behavior and potential benefits of change.</td>
</tr>
<tr>
<td>Contemplation</td>
<td>Admit that change may be needed; weigh pros and cons of changing and not changing.</td>
<td>Commit to making a change and set a date to start.</td>
</tr>
<tr>
<td>Preparation</td>
<td>Preparing to change a specific behavior, taking initial steps, and setting some goals.</td>
<td>Write an action plan, spelling out specific parts of the change. Set small-step goals; tell others about the plan.</td>
</tr>
<tr>
<td>Action</td>
<td>Committing time and energy to making a change; following a plan set for a specific behavior change.</td>
<td>Perform the new behavior. Manage emotional and physical reactions to the change.</td>
</tr>
<tr>
<td>Maintenance</td>
<td>Striving to integrate the new behavior into daily life and striving to make it permanent.</td>
<td>Persevere through lapses. Teach others and help them achieve their own goals. (This stage can last for years.)</td>
</tr>
<tr>
<td>Adoption/Moving On</td>
<td>The former behavior is gone and the new behavior is routine.</td>
<td>After months or a year of maintenance without lapses, move on to other goals.</td>
</tr>
</tbody>
</table>
Adequate Nutrients Without Excessive Calories

- Evaluate nutrient density
  - Vegetables have high nutrient density
- Time for food preparation
  - Options to save time
  - Foods to avoid
- Combining foods into meals
A Way to Judge Which Foods Are Most Nutritious

![Nutritious Breakfast vs. Doughnut Breakfast graph]

- **Nutritious Breakfast**
  - Higher Nutrient Density
  - Contribution to daily need (%)
  - Energy, Calcium, Iron, Vitamin A, Vitamin C

- **Doughnut Breakfast**
  - Lower Nutrient Density
  - Contribution to daily need (%)
  - Energy, Calcium, Iron, Vitamin A, Vitamin C
Sorting the Imposters from the Real Nutrition Experts

Controversy 1
Information Sources & Costs of Wrong Choices

- Quackery
- Sources of nutrition information
  - Television and magazines
- Nutrition-related products and services
  - Billions in customer dollars
- Identifying quackery
Earmarks of Nutrition Quackery

- **Too good to be true**: Enticingly quick and simple answers to complex problems. Says what most people want to hear. Sounds magical.

- **Suspensions about food supply**: Urges distrust of the current methods of medicine or suspicion of the regular food supply. Provides “alternatives” for sale under the guise of freedom of choice. May use the term “natural” to imply safety.

- **Testimonials**: Support and praise by people who “felt healed,” “were younger,” “lost weight,” and the like as a result of using the product or treatment.

- **Fake credentials**: Uses title “doctor,” “university,” or the like but has created or bought the title—it is not legitimate.

- **Unpublished studies**: Scientific studies cited but not published in reliable journals and so are not critically examined.

- **Logic without proof**: The claim seems to be based on sound reasoning but hasn’t been scientifically tested and shown to hold up.

- **Persecution claims**: Claims of persecution by the medical establishment or claims that physicians “want to keep you ill so that you will continue to pay for office visits.”

- **Authority not cited**: Studies cited sound valid but are not referenced, so that it is impossible to check and see if they were conducted scientifically.

- **Motive: personal gain**: Those making the claim stand to make a profit if it is believed.

- **Advertisement**: Claims are made by an advertiser who is paid to promote sales of the product or procedure. (Look for the word “Advertisement,” in tiny print somewhere on the page.)

- **Latest innovation/Time-tested**: Fake scientific jargon is meant to inspire awe. Fake “ancient remedies” are meant to inspire trust.
Identifying Valid Nutrition Information

- Characteristics of scientific research
  - Properly designed scientific experiments
  - Inadequacy of anecdotal evidence
  - Animal findings applied to humans
  - Careful with generalizations
  - Report of findings in scientific journals
Credible Source of Nutrition Information

- American Dietetic Association
  - www.eatright.org
- National Council Against Health Fraud
  - www.ncahf.org
- American Council on Science and health
  - www.acsh.org
Nutrition on the Net

- Judging website credibility
  - Who is responsible for the site?
  - Do the names and credentials of information providers appear?
  - Are links with other reliable information sites provided?
  - Is the site updated regularly?
  - Is the site selling a product or service?
  - Does the site charge a fee to gain access?
True Nutrition Experts

- American Dietetic Association (ADA)
  - Registered dietitian (RD)
  - Certified diabetes educator
  - Public health nutritionist
  - Dietetic technician
    - Dietetic technician registered
True Nutrition Experts

- Credentials
  - Accredited institution
  - Licensing