



Dietary Guidelines for American II/II
*Evidence-based Policies for Creating a Healthy Eating Pattern
 Based on USDA Dietary Guideline*

AGSC 5540: Food Policies and Regulations
9-9-2021

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Today's Game Plan

- History of Food Safety Regulations
 - Last part of DGA with three exercises
- Course Assignments and Exam:**
- Term Paper Progress: Due today
 - Teaching fellows will email you grade and feedback
 - Mid-term Exam: 10/7/2021 in person

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Food Safety Regulations in the United States A Historical Perspective

Safe food is one of the top ten public health achievements in 20th century (CDC, 2021).

Fascinating video from Victorian times:

<https://www.youtube.com/watch?v=8AQ0RETHsJk&list=PL>

Some estimates - 0.5 million children died from milk contamination with Bovine TB in Victorian era.



Important Food Safety Dates

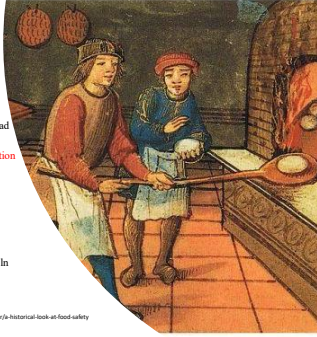
- September is Food Safety Education Month
- June 7 Global Food Safety declared by the United Nation (started 2019)

Source: Institute of Food Technologists: <https://www.ift.org/news-and-publications/blog/2019/September/a-historical-look-at-food-safety>

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Food Safety Regulations in the United States A Historical Perspective

- First document **global food safety Law**: The Assize of Bread in 1202
- Was proclaimed by King John of England in 1202 (**Adulteration of bread with ingredients such as ground peas or beans**)
- **First document American food safety Law**:
- 1646: American colonists **enacted a replica** of the Assize of Bread regulation
- 1785: **Massachusetts Act Against Selling Unwholesome Provisions**
- 1862: USDA and FDA Formed by President Abraham Lincoln
- 1862 to 1890 Merrill Act for Land-grant institutions



Source: Institute of Food Technologists. <https://www.ift.org/news-and-publications/ftmag/2010/September/a-historical-look-at-food-safety>

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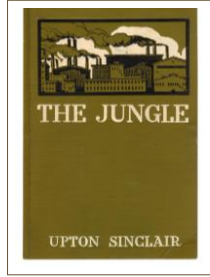
Food Safety Regulations in the United States A Historical Perspective

1906: Pure Food and Drug Act

Prevented the manufacture, sale, or transportation of **adulterated or misbranded** foods, drugs, medicines, and liquors.

1906: Federal Meat Inspection Act

Prohibited the sale of **adulterated or misbranded** meat and meat products for food and ensured that meat and meat products were slaughtered and processed under sanitary conditions.



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Food Safety Regulations in the United States A Historical Perspective



1938 – Pure Food and Drug Act Revised

Congress passed a complete revision of the 1906 Pure Food and Drug Act in 1938.

The Federal Food, Drug, and Cosmetics Act of 1938

Contained several new provisions:

- Requiring safe tolerances be set for unavoidable poisonous substances.
- Authorizing standards of identity, quality, and fill-of-container for foods
- Authorizing factory inspections
- Adding the remedy of court injunctions to the previous penalties of seizures and prosecutions.



Photo courtesy: <https://study.com/academy/lesson/federal-food-drug-and-cosmetics-act-definition-and-history.html>

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Food Safety Regulations in the United States A Historical Perspective

- **1949** – “Procedures for the Appraisal of the Toxicity of Chemicals in Food” Published
The FDA published its first **guidance to industry**: “Procedures for the Appraisal of the Toxicity of Chemicals in Food.” This gave the FDA a way to **influence industry actions without mandating specific requirements**.
- **1957** – **Poultry Products Inspection Act Passed**
Congress passed the Poultry Products Inspection Act which mandated the inspection of poultry products sold in **interstate commerce**, in response to the expanding market for **ready-to-cook and processed poultry products**.



USAID Funded trip, Dominican Republic. Photo Courtesy: A. Fouadkhah

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Food Safety Regulations in the United States A Historical Perspective

- **1958** – **Federal Food, Drug, and Cosmetics Act of 1938 Amended**
The Federal Food, Drug, and Cosmetics Act of 1938 was amended to include the **Food Additive Amendment**, due to consumer concerns about the impact of unknown chemicals in the food they consumed. The amendment ensured the safety of ingredients used in processed foods.
- **1962** – **Consumer Bill of Rights Introduced**
President John F. Kennedy proclaimed the Consumer Bill of Rights, which stated that consumers have a right to safety, to be informed, to choose, and to be heard. These rights have a direct correlation to the many food safety acts and amendments that preceded it, and that were yet to come. **[Transparency, front of package labeling?]**



Source: Institute of Food Technologists. <https://www.ift.org/news-and-publications/blog/2019/september/a-historical-look-at-food-safety>

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Food Safety Regulations in the United States A Historical Perspective



- **1967** – **Fair Packaging and Labeling Act Enacted**
The Fair Packaging and Labeling Act was enacted to prevent **unfair or deceptive packaging** and labeling of many household products, including foods. The Act requires the identification of the commodity, the **name and location** of the manufacturer, packer, or distributor, and the **net quantity** of contents in terms of weight, measure, or numerical count.
- **1970** – **Centers for Disease Control (CDC) Began Keeping Records on Foodborne Illness**
The Centers for Disease Control (CDC) began **keeping records on foodborne illness** related deaths in the U.S., marking the beginning of modern data collection on foodborne illness outbreaks.

Source: Institute of Food Technologists. <https://www.ift.org/news-and-publications/blog/2019/september/a-historical-look-at-food-safety>

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Food Safety Regulations in the United States A Historical Perspective

- **1973 – First Major Food Recall in U.S.**
The first major food recall in the U.S. occurred, following a nationwide illness outbreak from canned mushrooms. More than 75 million cans of mushrooms were removed from store shelves.
- **Botulism, *C. botulinum*, 12D requirement**
- **Now concern: Honey and infant botulism under age of 12 months**
- **1977 – Food Safety and Quality Service Created**
The Food Safety and Quality Service was created to perform meat and poultry grading and inspection. It was later reorganized and renamed the **Food Safety and Inspection Service (FSIS)** in 1981.



Source: Institute of Food Technologists <https://www.ift.org/news-and-publications/blog/2020/september/a-historical-look-at-food-safety>

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Food Safety Regulations in the United States A Historical Perspective

- **1992-1993: *Escherichia coli* O157:H7 outbreak in Pacific Northwest**
Major concern and changes in meat industry. HUS in kids under the age of 5.
- **1996 – Pathogen Reduction/HACCP Systems Landmark Rule Issued**
FSIS issued its landmark rule, Pathogen Reduction/HACCP Systems. The rule focuses on the prevention and reduction of microbial pathogens on raw products that can cause illness. HACCP was implemented in all FSIS- and state-inspected meat and poultry slaughter and processing establishments across the nation, between January 1997 and January 2000.
- **1997 – Food and Drug Modernization Act Amended**
In 1997, the Food and Drug Modernization Act amended the Federal Food, Drug, and Cosmetic Act. Among the major provisions in the Act is an expansion of the FDA's authority to regulate health and nutrient content claims, and to establish processes related to the food contact substances in new products.



Source: Institute of Food Technologists <https://www.ift.org/news-and-publications/blog/2020/september/a-historical-look-at-food-safety>

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Food Safety Regulations in the United States A Historical Perspective

- **2000 – Global Food Safety Initiative (GFSI) Created**
Food industry leaders created the Global Food Safety Initiative (GFSI) to collaboratively drive industry improvement to reduce food safety risks and increase consumer confidence in the delivery of safe food.
- **2011 – Food Safety Modernization Act (FSMA) Signed Into Law**
The Food Safety Modernization Act (FSMA) was signed into law. FSMA enables the FDA to focus on food safety preventive measures rather than being reactionary when an outbreak occurs. The FDA will have a legislative mandate to require comprehensive, science-based preventive controls across the food supply, including: mandatory preventive controls for food facilities, mandatory produce safety standards, and the authority to prevent intentional contamination. In addition, FSMA provides the FDA with the necessary tools for inspection, compliance, and incident response.
- **2019 – Blueprint for a New Era of Smarter Food Safety**
The FDA announced its intention to develop a **Blueprint for a New Era of Smarter Food Safety** addressing several areas including traceability, digital technologies, and evolving food business models. Emphasis on emerging technologies.
[Very early in development: Plan for New processing methods, packaging material, temperature control, e-commerce]
[Public hearing, advisory committee, curriculum development, public hearing, and legislation approval...]



Source: Institute of Food Technologists <https://www.ift.org/news-and-publications/blog/2020/september/a-historical-look-at-food-safety>

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*Public Health Burden of food and diet-related
chronic diseases*

- **Hypertension**
- 74.5 million Americans—**34 percent** of U.S. 15 adults—have hypertension (another **36% prehypertension**).
- **36%** of American adults have prehypertension—blood pressure numbers that are higher than normal, but not yet in the hypertension range.
- Hypertension is a **major risk factor** for heart disease, stroke, congestive heart failure, and kidney disease.
- Dietary factors that increase blood pressure include **excessive sodium and insufficient potassium intake**, overweight and obesity, and excess alcohol consumption.



(<1% of American adults meet the joint sodium and potassium guideline)

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*Public Health Burden of food and diet-related
chronic diseases (continued)*

- Cardiovascular Disease**
- 81.1 million Americans—**37 percent** of the population—have cardiovascular disease.
 - **Major risk factors** include high levels of **blood cholesterol and other lipids**, **type 2 diabetes**, **hypertension** (high blood pressure), **metabolic syndrome**, **overweight and obesity**, **physical inactivity**, and tobacco use.
 - **16 percent** of the U.S. adult population have high total blood cholesterol.



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Public Health Burden of food and diet-related chronic diseases (continued)

- **Diabetes**
- Nearly 24 million people—almost **11 percent** of the population—**ages 20 years and older** have 17diabetes.
- The **vast majority of cases are type 2 diabetes**, which is heavily influenced by **diet and physical activity**.
- About 78 million Americans—**35 percent** of the U.S. adult population **ages 20 years or older**—have **pre-diabetes**.
- **Pre-diabetes** (also called impaired glucose tolerance or impaired fasting glucose) means that blood glucose levels are higher than normal, but not high enough to be called diabetes.



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Public Health Burden of food and diet-related chronic diseases (continued)

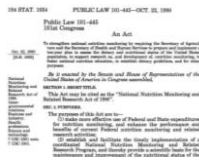
- **Cancer**
 - **Almost one in two men and women**—approximately **41 percent** of the population—will be diagnosed with cancer during their lifetime.
- Osteoporosis**
- **One out of every two women and one in four men ages 50 years and older** will have an osteoporosis-related fracture in their lifetime.
 - About **85 to 90 percent of adult bone mass** is acquired by the age of **18 in girls** and the age of **20 in boys**.
 - Adequate **nutrition** and regular participation in **physical activity** are important factors in achieving and maintaining optimal bone mass.



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National Nutrition Monitoring and Related Research Act of 1990

- Poor diet and physical inactivity
- Epidemic of overweight and obesity
 - Men, women and children
 - All segments of the society
- Poor diet and physical inactivity: a **leading cause of premature morbidity and mortality**
- **Absence of harmonized national policy and guidelines for food, nutrition and health**
- Lead to enactment of:
 - **National Nutrition Monitoring and Related Research Act of 1990**



(Public Law 101-445, Title III, 7 U.S.C. 5301 et seq.)

<https://www.gpo.gov/fdsys/pkg/STATUTE-104/pdf/STATUTE-104-Pg1034.pdf>

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What is USDA Dietary Guideline?

- National Nutrition Monitoring and Related Research Act of 1990 Requires:
 - United States Department of Agriculture (USDA)
 - Department of Health and Human Services (DHHS)
- Review and Update Dietary Guidelines for Americans (DGA) every five years
- Prior to NNMRR Act of 1990, DGA existed in less volumes editions:
 - Earliest revision, Wilbur Olin Atwater, 1894
 - The revisions of 1980 and 1985, less extensive than post NNMRR Act
- Current DGA has two main concepts of:
 - Maintain calorie balance over time to achieve and sustain a healthy weight (quantity of diet) avoiding positive energy balance
 - Consuming nutrient-dense foods and beverages (quality of diet)
- Current DGA promotes two eating patterns of:
 - USDA Food Patterns
 - DASH (Dietary Approaches to Stop Hypertension) Eating Plan



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DGA main concepts

- Maintain calorie balance over time to achieve and sustain a healthy weight (quantity of diet)
 - Decrease the calories consumption
 - Increase the calories expenditure through physical activity
- Consuming nutrient-dense foods and beverages (quality of diet)
 - Reduction in consumption of:
 - Sodium,
 - Calories from solid fats,
 - Added sugars,
 - Refined grains.
 - Increase in consumption of:
 - Vegetables, fruits, and whole grains,
 - Fat-free or low-fat milk and milk products,
 - Seafood, lean meats and poultry, eggs,
 - Beans and peas, and nuts and seeds.



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Foods and Nutrients to Increase

- Many Americans do not eat the array of foods that will provide all needed nutrients while staying within calorie needs.
- In the United States, foods with intakes are lower than recommended for
 - Vegetables,
 - Fruits,
 - Whole grains,
 - Milk and milk products,
 - Oils
- As a result, dietary intakes of several nutrients are lower than recommended (nutrients of public health concern):
 - Potassium,
 - Dietary fiber,
 - Calcium,
 - Vitamin D.
- Several other nutrients for specific population groups:
 - Folic acid for women who are capable of becoming pregnant
 - Supplement for the elderly



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Foods and Nutrients to Increase General Recommendations

- Increase **vegetable and fruit intake**.
- Eat a **variety of vegetables**, especially **dark-green and red and orange vegetables and beans and peas**.
- Consume at **least half** of all grains as **whole grains**.
- **Increase whole-grain** intake by replacing refined grains with whole grains.
- Increase intake of **fat-free or low-fat milk and milk products**, such as milk, yogurt, cheese, or fortified soy beverages.
- Choose a **variety of protein foods**, which include **seafood, lean meat and poultry, eggs, beans and peas, soy products, and unsalted nuts and seeds**.



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Foods and Nutrients to Increase General Recommendations

- Increase the **amount and variety of seafood** consumed by choosing seafood **in place of some meat and poultry**.
- **Replace protein foods that are higher in solid fats** with choices that are lower in **solid fats** and calories and/or are sources of **oils**. (**80/20 ground meat**)
- Use **oils to replace solid fats** where possible.
- Choose foods that provide more **potassium, dietary fiber, calcium, and vitamin D**, which are nutrients of concern in American diets.
- These foods include **vegetables, fruits, whole grains, and milk and milk products**.



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Foods and Nutrients to Increase Recommendations Specific Age Groups

Women capable of becoming pregnant

- Choose foods that supply **heme iron**, which is more readily absorbed by the body, additional **iron sources**, and **enhancers of iron absorption** such as vitamin C-rich foods.
- Consume **400 micrograms (mcg) per day of synthetic folic acid** (from **fortified foods and/or supplements**) in addition to food forms of folate from a varied diet.
- [*Low childhood mortality in the United States*]
- [*Since 1998, folic acid (B9) required breads, cereals, pasta, flour, rice, cornmeal and other processed grain products*] *Whole Grain Cereals Vs. Processed Cereals ... Pizza Crust?*

Women who are pregnant or breastfeeding

- Consume **8 to 12 ounces of seafood per week** from a variety of seafood types.
- Due to their **methyl mercury content**, **limit white (albacore) tuna to 6 ounces per week** and do not eat the following four types of fish: tilefish, shark, swordfish, and king mackerel.
- If **pregnant, take an iron supplement as recommended** by an obstetrician or other health care provider.

Individuals ages 50 years and older

- Consume foods **fortified with vitamin B12**, such as **fortified cereals, or dietary supplements**.



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Foods and Nutrients to Increase Overview

- **Current evidence supporting the health benefits associated with increased:**
 - Vegetables
 - Fruits
 - Whole grains
 - Fat-free or low-fat milk and milk products
 - Seafood
 - Oils
- **An important underlying principle:**
 - Control calories to **manage body weight** while making choices to support these food and nutrient recommendations.
- Source of an array of **bioactive food compounds** with beneficial **physiological, behavioral, and immunological effects** (e.g. curcumin in turmeric etc.).
- The best way to do this is to consume foods in **nutrient-dense** forms.



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Foods and Nutrients to Increase Overview (continued)

- **What are nutrient-dense foods?**
 - Nutrient-dense foods provide **vitamins, minerals, and other substances** that may have positive health effects, with relatively few calories.
 - They are **lean or low in solid fats**.
 - **Minimize or exclude added solid fats, added sugars, and added refined starches**
 - Nutrient-dense foods also **minimize or exclude added salt or other compounds high in sodium**.
 - Ideally, they are in forms that retain naturally occurring **components such as dietary fiber**.
- **Examples of nutrient-dense foods:**
 - Vegetables
 - Fruits
 - Whole grains
 - Fat-free or low-fat milk and milk products
 - Seafood
 - Lean meats and poultry
 - Eggs, beans and peas (legumes)
 - Nuts and seeds that are prepared **without added solid fats, sugars, starches, and sodium**



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Exercise 1

- According to DGA, what are the food categories that American Adults would need to increase in their diet?
- What are the nutrients of public health concern in American Adults?
- What is the nutrient of concern in women of childbearing age according to USDA DGA?
- What are the DGA general recommendation for:
- Women capable of becoming pregnant?
- Women who are pregnant or breastfeeding?
- Individuals ages 50 years and older?
- What are the characteristics of nutrient dense foods and what are the nutrient dense foods?

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Foods and Nutrients to Increase Fruits and Vegetables

2 and 1/2 cups of vegetables and fruits per day

• **Three reasons to eat more vegetables and fruits based on DCA guidelines:**

(1) Most vegetables and fruits are **major contributors** of a number of **under-consumed nutrients**:

- **Folate,**
- **Magnesium,**
- **Potassium,**
- **Dietary fiber,**
- **Vitamins A, C, and K** (Fat soluble vitamins: A, D, E, and K vs. Water soluble vitamins)



(2) Based on NHANES epidemiological data, they are **association with reduced risk of many chronic diseases**:

- **At least 2 and 1/2 cups of vegetables and fruits per day is associated with a reduced risk of cardiovascular disease, including heart attack and stroke.**
- **Some vegetables and fruits may be protective against certain types of cancer (colon cancer)**



(3) Most vegetables and fruits, **when prepared without added fats or sugars, are relatively low in calories.**

[Dressing?!!]

- **Eating them instead of higher calorie foods** can help adults and children achieve and **maintain a healthy weight.**

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Foods and Nutrients to Increase Fruits and Vegetables

Current intake of recommended amounts of vegetables:

- Almost all Americans ages 2 years and older, usual intake **falls below amounts recommended.**

Current intake of recommended amounts of fruits:

- Most Americans 2 to 3 years of age consume recommended amounts of total fruits.
- Americans ages 4 years and older **do not consume recommended amounts of total fruits.**
- Children ages 2 to 18 years and adults' ages 19 to 30 years consume **more than half of their fruit intake as juice.**

DCA perspective of fruit juice:

- Although 100% fruit juice can be part of a healthy diet, **(Heat treatment and bioactive compounds)**
- **Juice lacks dietary fiber**
- **If then consumed in excess can contribute extra calories.**



The majority of the fruit recommended should come from whole fruits:

- **Fresh fruits**
- **Canned fruits**
- **Frozen fruits (comparable to fresh fruits)**
- **Dried forms**
- **When juices are consumed, 100% juice should be encouraged. (Deceptive advertisements? 100% vitamin C?)**
- **To limit intake of added sugars, fruit canned in 100% fruit juice is encouraged over fruit canned in syrup.**

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Foods and Nutrients to Increase Fruits and Vegetables

DCA has two additional specific sections for:

- **Beans and peas**
- **The content of juice in juices**

Beans and Peas:

- Beans and peas are the mature forms of legumes (**High in raffinose and stachyose sugars**).
- **They include:** kidney beans, pinto beans, black beans, garbanzo beans (chickpeas), lima beans, black-eyed peas, split peas, and lentils.
- **Beans and peas are excellent sources of:**
 - **Protein**
 - **Nutrients, such as iron and zinc, similar to seafood, meat, and poultry. (Major problem in Global health Zinc and Iron and Iod)**
 - **Dietary fiber and nutrients such as potassium and folate**



• Because of their high nutrient content, beans and peas may be **considered both as a vegetable and as a protein food.** Individuals can count beans and peas as either a vegetable or a protein food.

Exception:

- **Green peas and green (string) beans are not considered to be "Beans and Peas."** (they low in protein, but very functional protein in food industry)
- **Green peas** are similar to other **starchy vegetables** and are grouped with them.
- **Green beans** are grouped with **other vegetables** such as onions, lettuce, celery, and cabbage because their nutrient content is similar to those foods.



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Foods and Nutrients to Increase Fruits and Vegetables



DGA note on the content of juice in juice products

- The percent of juice in a beverage may be found on the package label, such as "contains 25% juice" or "100% fruit juice." (made from concentrate, much lower nutritional quality)
- Heat treatment could eliminate nearly all vitamin C and many bioactive food compounds [High Pressure processing??]
- Some labels may say they provide 100% of a nutrient, such as "provides 100% Daily Value for vitamin C."
- Unless the package also states it is "100% juice," it is not 100% juice.
- Sweetened juice products with minimal juice content, such as juice drinks, are considered sugar-sweetened beverages rather than fruit juice (WONF, N&A flavored). HFCF???



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Foods and Nutrients to Increase Grains

- Whole grains include the entire grain seed, usually called the kernel.
- The kernel consists of three components—the bran, germ, and endosperm.
- If the kernel has been cracked, crushed, or flaked, then, to be called a "whole grain" a food must retain the same relative proportions of these components as they exist in the intact grain (minimally processed)
- (1) Whole grains are consumed either:
 - Single food (e.g., wild rice or popcorn)
 - Ingredient in foods (e.g., in cereals, breads, and crackers).
- Some examples of whole-grain: buckwheat, bulgur, millet, oatmeal, quinoa, rolled oats, brown or wild rice, whole-grain barley, whole rye, and whole wheat.
- (2) Refined grains have been milled to remove the bran and germ from the grain.
 - This is done to give grains a finer texture and improve their shelf life, but it also removes dietary fiber, iron, and many B vitamins.
- (3) Enriched grains are grain products with B vitamins (thiamin, riboflavin, niacin, folic acid) and iron added.
- Most refined-grain products are enriched (Pizza?).



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Foods and Nutrients to Increase Whole Grains

Whole Grains

- Source of nutrients such as iron, magnesium, selenium, B vitamins, and dietary fiber.
- Whole grains could vary considerable in dietary fiber content
- Choosing whole grains that are higher in dietary fiber has additional health benefits (Absorption of Cholesterol, sugar, and saturated fats and GI cancers)

Health Benefits: (NHANES epidemiological data)

- Moderate evidence: Whole-grain intake may reduce the risk of cardiovascular disease
- Moderate evidence: Associated with a lower body weight
- Limited evidence: Reduced incidence of type 2 diabetes



- At least half of recommended total grain intake (6 oz per day) should be whole grains.
- Less than 5 percent of Americans consume the minimum recommended amount of whole grains
- On average, Americans eat less than 1 ounce-equivalent of whole grains per day

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Foods and Nutrients to Increase Whole Grains

Recommendations:

- Replace many **refined-grain** foods with **whole-grain** foods
- When **refined grains** are eaten, they should be **enriched**
- Individuals may choose to consume **more than half of their grains as whole grains**

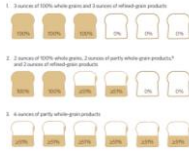
Very important! If 100% whole grains is consumed in diet:

- To ensure nutrient adequacy, individuals who consume all of their grains as whole grains should include some that have been **fortified with folic acid**, such as some **ready-to-eat whole-grain cereals**.
- This is particularly important for women who are capable of becoming pregnant.

Specific Recommendations:

- At least **half of total grains** as whole grains can be met in a number of ways (Figure).
- The relative amount of grain in the food can be inferred by the placement of the grain in the **ingredients list**.
- The whole grain should be the **first ingredient** or the **second ingredient, after water**.
- For foods with **multiple whole-grain ingredients**, they should appear near the **beginning of the ingredients list**.

- Many grain foods contain both whole grains and refined grains (advertisements could be very misleading)
- Foods with at least **5% percent of the total weight as whole-grain ingredients** contain a substantial amount of whole grains.
 - Another example is foods with at least **8 grams of whole grains per ounce-equivalent**.



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Foods and food component to reduce Summary- Refined Grains

- On average, Americans consume 6.3 ounce-equivalents of refined grains per day
- The recommended amount of refined grains is no more than **3 ounce-equivalents** per day
- **OUNCE-EQUIVALENTS**
 - 1 slice of bread
 - 1 cup of ready-to-eat cereal
 - ½ cup of cooked rice, cooked pasta, or cooked cereal *Further recommendation:*
- At least 50% of grains to be from whole grain sources
- **Whole Grains** (the bran, germ, and endosperm): whole-wheat flour, bulgur (cracked wheat), oatmeal, whole cornmeal, and brown rice. *[At least 8 gram of whole gram per oz]*



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Foods and food component to increase Milk and Milk Products

Milk and milk products contribute nutrients, such as:

- Calcium
- Vitamin D (for products fortified with vitamin D)
- Potassium

Health benefits based epidemiological studies:

- **Moderate evidence:** improved bone health, especially in children and adolescents.
- **Moderate evidence:** reduced risk of cardiovascular disease and type 2 diabetes
- **Moderate evidence:** lowering blood pressure in adults.



Suggested Intake (fat-free or low-fat milk and milk products):

- **3 cups per day:** adults and children and adolescents ages 9 to 18 years
- **2 and ½ cup per day:** children ages 4 to 8 years
- **2 cups:** children ages 2 to 3 years

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Foods and food component to increase
Milk and Milk Products

Intake of milk and milk products, including fortified soy beverages, is less than recommended amounts for:

- Most adults
- Children
- Adolescents ages 4 to 18 years
- Many children ages 2 to 3 years
- In general, intake is lower for females than for males and declines with age

Current intake:

- Almost half of the milk and milk product intake in the United States comes from cheese (some have as high as 30% fat)
- The majority of current fluid milk intake comes from reduced fat (2%) or whole (full-fat) milk



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Foods and food component to increase
Milk and Milk Products

Recommendation:

- Choosing fat-free or low-fat milk and milk products provides the same nutrients with less solid fat and thus fewer calories.

Benefits of Fat-free or low-fat fluid milk or yogurt:

(fat-free about 80 Kcal per cup vs 150 for whole milk)

- More nutrient per calorie (more nutrient dense) i.e. potassium, vitamin A, and vitamin D
- Less cholesterol and saturated fats (and less salt in cheese products)
- For individuals who are lactose-intolerant, low-lactose and lactose-free milk products are recommended.
- Soy beverages fortified with calcium and vitamins A and D are considered part of the milk and milk products group because they are similar to milk both nutritionally and in their use in meals. (New studies caution for two main isoflavones, genistein and daidzein)



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Exercise 2

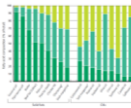
- Based on DGA guidelines what are the three reason to increase consumption of fruits and vegetables?
- What is the current status of fruits and vegetables consumption in the United States?
- Based on American Dietary Guidelines what are the health benefits are Beans and peas? Are they considered as vegetable or protein foods?
- According to Dietary Guidelines for Americans (DGA) what are the whole grains, refined grains, and enriched grains?
- According to Dietary Guidelines for Americans (DGA) what proportion of whole grain and/or how many grams of whole grain would need to be in one ounce-equivalent of product to have substantial benefits associated with whole grains?
- What are the health benefits of low-fat or fat-free dairy products?

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Foods and food component to increase Oils

Fats with a high percentage of monounsaturated (MUFA) and polyunsaturated (PUFA) fatty acids are usually liquid at room temperature and are referred to as "oils"

- Replacing some saturated fatty acids with unsaturated fatty acids lowers both total and low-density lipoprotein (LDL) blood cholesterol levels.
- Main sources of Oils:
 - Oils are naturally present in foods such as olives, nuts, avocados, and seafood.
 - Other common oils are extracted from plants, such as canola, corn, olive, peanut, safflower, soybean, and sunflower oils
- Processed Foods: mayonnaise, oil-based salad dressings, and soft (tub or squeeze) margarine with no trans fatty acids
- Coconut oil, palm kernel oil, and palm oil are high in saturated fatty acids
- Partially hydrogenated oils contain trans fatty acids.
- For nutritional purposes, they should be considered solid fats.



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Foods and food component to increase: Oils

Americans consume more solid fats but less oil than is desirable.

- 15-30% daily caloric from Fat
- Less than 10% from saturated fats

Some suggestions:

- Soft margarine instead of butter or stick margarine.
- Replacing meats and poultry with seafood or unsalted nuts.
- Using vegetable oils instead of solid fats, such as butter, in cooking (soy oil=vegetable oil on products label)

Nutrition Facts	
Serving Size 1 Tbsp (15 mL)	
Amount Per Serving	
Total Fat	10g 20%
Saturated Fat	4g 8%
Cholesterol	0mg 0%
Sodium	0mg 0%
Total Carbohydrate	0g 0%
Dietary Fiber	0g 0%
Sugars	0g 0%
Protein	0g 0%

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Impossible Burger VS. **Beyond Burger**

Nutrition Facts

Serving Size 1 patty (87g)

Amount Per Serving

Total Fat 16g 32%

Saturated Fat 7g 14%

Cholesterol 0mg 0%

Sodium 10mg 2%

Total Carbohydrate 3g 6%

Dietary Fiber 0g 0%

Sugars 0g 0%

Protein 15g 30%

Nutrition Facts

Serving Size 1 patty (87g)

Amount Per Serving

Total Fat 20g 40%

Saturated Fat 10g 20%

Cholesterol 0mg 0%

Sodium 10mg 2%

Total Carbohydrate 3g 6%

Dietary Fiber 0g 0%

Sugars 0g 0%

Protein 15g 30%

80% LEAN 20% FAT Ground Beef

Nutrition Facts

Serving Size 1/2 lb (113g)

Amount Per Container

Total Fat 20g 40%

Saturated Fat 8g 16%

Cholesterol 100mg 20%

Sodium 20mg 4%

Total Carbohydrate 0g 0%

Dietary Fiber 0g 0%

Sugars 0g 0%

Protein 20g 40%

93% LEAN 7% FAT Ground Beef

Nutrition Facts

Serving Size 1/2 lb (113g)

Amount Per Container

Total Fat 8g 16%

Saturated Fat 3g 6%

Cholesterol 40mg 8%

Sodium 20mg 4%

Total Carbohydrate 0g 0%

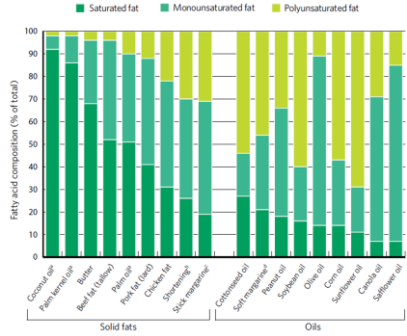
Dietary Fiber 0g 0%

Sugars 0g 0%

Protein 20g 40%

GENESIS R&D Software for Food Processors

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DGA Recommendation: Foods and food component to increase Dietary Fiber

- Dietary fiber is the **non-digestible form of carbohydrates** and lignin.
- Dietary fiber naturally occurs in plants:**
 - *Helps provide a feeling of fullness*
 - *Important in promoting healthy laxation*
 - *Limits abortion of cholesterol and fats and sugars*



- Some of the best sources of dietary fiber are:**
 - *Beans and peas, such as navy beans, split peas, lentils, pinto beans, and black beans.*



- Additional sources of dietary fiber are:**
 - *Vegetables, fruits, whole grains, and nuts.*
- All of these foods are consumed below recommended levels in the typical American diet.

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Foods and food component to increase Dietary Fiber

- Health benefits based on epidemiological studies (naturally occurring fibers):**
 - Reduce the risk of **cardiovascular disease**
 - Obesity
 - Type 2 diabetes
 - Promoting healthy **lipid profiles**
 - Promoting healthy **glucose tolerance**
 - Ensure normal gastrointestinal function
- Fiber is sometimes **added to foods** and it is **unclear** if added fiber provides the same health benefits as naturally occurring sources (**clinical equipoise and expenses**)



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Foods and food component to increase
Dietary Fiber

- Most Americans **greatly under consume dietary fiber**
 - Typical intake averages **only 15 g per day**.
 - The **Allowable Intake (AI) for fiber is 14 g per 1,000 calories, or 25 g per day for women and 38 g per day for men.**
- Breads, rolls, buns, and pizza crust** made with **refined flour**:
- *Are not among the best sources of dietary fiber*
 - *But currently contribute substantially to dietary fiber consumption because they are ubiquitous in typical American diets.*
- To meet the **recommendation for fiber**, Americans should increase their consumption of:
 - Beans and peas,
 - Other vegetables, fruits,
 - Whole grains, and other foods with naturally occurring fiber.
 - *Whole grains vary in fiber content.*
 - The **Nutrition Facts label** can be used to compare whole-grain products and find choices that are higher in dietary fiber.



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Foods and food component to increase
Protein Foods

- **Protein foods** include **seafood, meat, poultry, eggs, beans and peas, soy products, nuts, and seeds.**
- In addition to protein, these foods contribute **B vitamins** (e.g., niacin, thiamin, riboflavin, and B6), **vitamin E, iron, zinc, and magnesium** to the diet. (**1/3 of world population iron deficient**)
- However, **protein also is found in some foods** that are classified in other food groups (e.g., **milk and milk products**).
- The **fats in meat, poultry, and eggs** are considered **solid fats**, while the fats in **seafood, nuts, and seeds** are **considered oils**.
- **Meat and poultry** should be consumed in lean forms to **decrease intake** of solid fats.
- **Some Americans need to increase their total intake of protein foods**, while **others are eating more than is recommended**. (around 1 gram per Kg of weight)
- **Meat, poultry, and eggs** are the **most commonly consumed protein foods**,
- **Seafood, beans and peas, soy products, nuts, and seeds** are consumed in **proportionally smaller amounts**.



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Foods and food component to increase
Protein Foods

- Health Benefit from epidemiological studies:
- **Moderate evidence** indicates that eating **peanuts** and **certain tree nuts** (i.e., walnuts, almonds, and pistachios) reduces risk factors for **cardiovascular disease** when consumed as part of a diet that is nutritionally adequate and within calorie needs.
- Because nuts and seeds are **high in calories**, they should be eaten in **small portions** and used to **replace** other protein foods, like some meat or poultry, rather than being added to the diet.
- **Protein has building blocks: Amino Acids, (9 to 10) some are essential**
- Animal protein typical considered **"perfect"**: containing all essential AA
- Plant-based proteins are mostly consider **"imperfect"**: missing essential AA
- Plant proteins could be **match to have "perfect" profile**: i.e. wheat protein and peanut butter



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Foods and food component to increase
Seafood

- Contains “perfect” protein and non-saturated fats (essential AA and PUFA)
- An intake of 8 or more ounces per week (less for young children)
- About 20% of total recommended intake of protein foods
- Mean intake of seafood in the United States is approximately 3 1/2 ounces per week
- An increased intake is recommended



Concern:

- Health risks associated with methyl mercury, a heavy metal found in seafood in varying levels
- Certain species of fish should be limited

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Foods and food component to increase
Seafood

- Seafood contributes a range of nutrients:
- Omega-3 fatty acids: eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA).
- A very essential nutrients in early stages of life:
 - During fetal growth and development
 - Early infancy
 - Childhood



Therefore, recommendation:

- Women who are pregnant or breast-feeding consume at least 8 and up to 12 ounces of a variety of seafood per week, from choices that are lower in methyl mercury.
- Women who are pregnant or breastfeeding should not eat four types of fish because they are high in methyl mercury. (Tilefish, Shark, Swordfish, and King mackerel). Methyl mercury could affect cognitive performance of newborns
- Women who are pregnant or breastfeeding can eat all types of tuna, including white (albacore) and light canned tuna, but should limit white tuna to 6 ounces per week because it is higher in methyl mercury.

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Nutrients of Public Health Concern
Potassium

- Dietary potassium can lower blood pressure by blunting the adverse effects of sodium on blood pressure.
- Other possible benefits: reduced risk of developing kidney stones and decreased bone loss
- The Adequate Intake (AI) for potassium for adults is 4,700 mg per day.
- AIs are amounts of a nutrient that are adequate for almost everyone in the population
- Available evidence suggests that African Americans and individuals with hypertension especially benefit from increasing intake of potassium.
- Few Americans, including all age-gender groups, consume potassium in amounts equal to or greater than the AI.
- Individuals with kidney disease and those who take certain medications, such as ACE inhibitors, should consult with their health care provider for specific guidance on potassium intake. (Main limitation for potassium enrichment of foods or substitution of sodium chloride in diet)
- Dietary sources of potassium are found in all food groups, notably in vegetables, fruits, and milk and milk products.



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Nutrients of Public Health Concern Calcium

- Adequate calcium status is important for optimal **bone health**.
- Calcium serves vital roles in **nerve transmission, constriction and dilation of blood vessels, and muscle contraction**.
- Significant number of Americans have **low bone mass, a risk factor for osteoporosis**, which places them at risk of bone fractures. (**50% and 25% of women and men over 50, respectively**)
- **Age groups of particular concern due to low calcium intake from food include:**
 - Children ages 9 years and older,
 - Adolescent girls,
 - Adult women,
 - Adults ages 51 years and older.
- Calcium recommendations may be achieved by consuming recommended levels of **fat-free or low-fat milk and milk products** and/or consuming alternative calcium sources (**3 cups for adults**)
- **Removing milk and milk products from the diet requires careful replacement** with other food sources of calcium, including **fortified foods. (Calcium for vegetarians same for b12 and iron)**
- Calcium in some plant foods is well absorbed, but consuming **enough plant foods to achieve the RDA may be unrealistic for many.**
- About **85 to 90 percent of adult bone mass** is acquired by the age of **18 in girls** and the age of **20 in boys**.



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Nutrients of Public Health Concern Vitamin D

- Adequate vitamin D status is important for health.
- Extreme lack of vitamin D (i.e., vitamin D deficiency) results in **rickets in children** and **osteomalacia (softening of bones) in adults**.
- Adequate **vitamin D** also can help reduce the **risk of bone fractures. (Fat soluble, toxicity concern in high doses)**
- Although **dietary intakes of vitamin D are below recommendations**, recent data from the National Health and Nutrition Examination Survey (NHANES) indicate that **more than 80 percent of Americans have adequate vitamin D** blood levels.
- Vitamin D is unique in that **sunlight on the skin** enables the body to make vitamin D.



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Nutrients of Public Health Concern Vitamin D

- In the United States, most **dietary vitamin D** is obtained from **fortified foods**, especially **fluid milk and some yogurts**.
- **Some other foods and beverages**, such as breakfast cereals, margarine, orange juice, and soy beverages, also are **commonly fortified** with this nutrient.
- **Natural sources** of vitamin D include some kinds of **fish** (e.g., salmon, herring, mackerel, and tuna) and **egg yolks**, which have smaller amounts. It also is available in the form of **dietary supplements**.
- The RDAs for vitamin D, which assume **minimal sun exposure**, are **600 IU (15 mcg)** per day for **children** and most adults and **800 IU (20 mcg)** for adults older than 70 years.
- As intake increases above **4,000 IU (100 mcg) per day**, the potential risk of adverse effects increases.



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Additional nutrients of concern for specific groups:
Iron

- **Substantial numbers of women** who are capable of becoming pregnant, including adolescent girls, are **deficient in iron**.
- They can **improve their iron status** by choosing foods that supply **heme iron**, which is more readily absorbed by the body, as well as additional **iron sources and enhancers** of iron absorption such as **vitamin C-rich foods**.
- **Sources of heme iron** include lean meat and poultry and seafood.
- **Sources of non-heme iron include:** beans, lentils, and spinach, as well as foods enriched with iron, such as most breads and cereals.
- Non-heme iron is **not as readily absorbed** by the body.
- **Women who are pregnant** are advised to take an **iron supplement** as recommended by an obstetrician or other health care provider.



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Additional nutrients of concern for specific groups:
Folate

- **Folic acid fortification** in the United States has been successful in reducing the incidence of **neural tube defects**.
- However, **many women capable of becoming pregnant still do not meet the recommended intake for folic acid**.
- All women capable of becoming pregnant are advised to consume **400 mcg of synthetic folic acid** daily (from **fortified foods and/or supplements**) in addition to food forms of folate from a varied diet.
- **Women who are pregnant** are advised to consume **600 mcg of dietary folate** equivalents daily from all sources.
- **Natural sources of food folate** include beans and peas, oranges and orange juice, and dark-green leafy vegetables such as spinach and mustard greens.
- Folic acid is the form added to foods such as **fortified grain products** (*Breakfast cereals, granola etc.*)



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Additional nutrients of concern for specific groups:
Vitamin B12

- On average, Americans ages 50 years and older **consume adequate vitamin B12**.
- Nonetheless, a substantial proportion of individuals ages 50 years and older may have **reduced ability to absorb naturally occurring vitamin B12**.
- However, the **crystalline form of the vitamin is well absorbed**.
- Therefore, individual's ages 50 years and older are encouraged to include **foods fortified** with vitamin B12, such as **fortified cereals, or take dietary supplements**.



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Foods and food component to increase Summary

- Many Americans do not eat the **variety and amounts of foods** that will provide **needed nutrients** while **avoiding excess calorie** intake.
- They should **increase their intake** of vegetables, fruits, whole grains, fat-free or low-fat milk and milk products, seafood, and oils.
- **These food choices** can help promote **nutrient adequacy**, **keep calories in control**, and **reduce risks of chronic diseases**.
- They provide an **array of nutrients**, including those of **public health concern: potassium, dietary fiber, calcium, and vitamin D**.
- It is important that **while increasing intake of these foods**, Americans make choices that minimize intake of calories from **solid fats and added sugars**, which provide few essential nutrients.



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Last Chapter: Building Healthy Eating Patterns Chapter Outline

- **Healthy eating Patterns**
 - Research on *dietary approaches to stop hypertension (dash)*
 - Research on *Mediterranean-style eating patterns*
 - Research on *vegetarian eating patterns*
- Common **elements of the healthy eating patterns** examined
- Principles for **achieving a healthy eating Pattern**
- Focus on **nutrient-dense foods**
- Remember that **beverages** count
- Follow **food safety principles**
- Consider the role of **supplements and fortified foods**
 - *Vitamin D*
 - *Folic acid*
 - *Vitamin B12*
 - *Iron supplements for pregnant women*



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Building Healthy Eating Patterns Research on Dietary Approach to Stop Hypertension (DASH)

- The **DASH** eating pattern and its **variations** have been tested in **clinical trials**.
- In these studies, **specific foods are provided and health impacts monitored over time**.
- **Prospective studies** also have been conducted in groups of people who make their own food choices, to identify and evaluate eating patterns that are similar to DASH.
- **DASH emphasizes** vegetables, fruits, and low-fat milk and milk products
- Includes whole grains, poultry, seafood, and nuts



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Building Healthy Eating Patterns
Research on Dietary Approach to Stop Hypertension (DASH)

- DASH patten is typically:
- Low in **sodium, red and processed meats, sweets, and sugar-containing beverages**
- One of the original DASH study diets also was lower in **total fat** (27% of calories) than typical American intakes
- DASH-style patterns lowered **blood pressure**, improved **blood lipids**, and reduced **cardiovascular disease** risk compared to diets that were designed to resemble a typical American diet.
- **Eating patterns that are similar to DASH** also have been associated with a reduced risk of cardiovascular disease and **lowered mortality**.



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Building Healthy Eating Patterns
Research on Research on Mediterranean-style Eating Patterns

- A large number of cultures and agricultural patterns exist in countries that **border the Mediterranean Sea**, so the "Mediterranean diet" is not one eating pattern.
- **No single set of criteria** exists for what constitutes a **traditional Mediterranean eating pattern**.
- In **general terms**, it can be described as an eating pattern that **emphasizes vegetables, fruits and nuts, olive oil, and grains** (often whole grains).
- Only **small amounts of meats and full-fat milk and milk products** are usually included.
- It has a high **mono-unsaturated to saturated fatty acid intake ratio** and often includes **wine** with meals.
- Associated with a **low risk of cardiovascular disease** over time.
- In most studies, individuals with a higher **Mediterranean diet score** had reduced **cardiovascular disease** risk factors, reduced incidence of cardiovascular disease, and a **lower rate of total mortality**.



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Building Healthy Eating Patterns
Research on Vegetarian Eating Pattern

- The types of vegetarian diets consumed in the United States vary widely.
- **Vegans** do not consume any animal products.
- **Lacto-ovo** vegetarians consume milk and eggs.
- Some individuals eat diets that are primarily vegetarian but may include small amounts of meat, poultry, or seafood (**flexitarians**).
- Vegetarian-style eating patterns have been associated with **improved health outcomes**:
 - *Lower levels of obesity*
 - *Reduced risk of cardiovascular disease*
 - *Lower blood pressure*
- On average, vegetarians consume:
 - *Lower proportion of calories from fat (particularly saturated fatty acids)*
 - *More fiber*
 - *More potassium*
 - *More vitamin C*
 - **Major Challenge: Calcium, protein, folic acid, B12, Zinc, Vitamin A**



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Building Healthy Eating Patterns Common elements of the healthy eating patterns

- Healthy eating patterns around the world are diverse
- **Some common threads exist**
 - They are abundant in **vegetables and fruits**.
 - Many emphasize **whole grains**.
 - They include moderate amounts and a variety of foods **high in protein** (seafood, beans and peas, nuts, seeds, soy products, meat, poultry, and eggs).
 - They include only **limited amounts of foods high in added sugars and fats**.
 - May include **more oils than solid fats**.
 - Most are **low in full-fat milk and milk products**.
 - Some include **substantial amounts of low-fat milk and milk products**.
 - In some patterns, **wine is included with meals**.
- Compared to typical American diets, these patterns tend to have:
 - **High unsaturated to saturated fatty acid ratio**
 - **High dietary fiber and potassium content**
 - **Relatively low in sodium** compared to current American intake.



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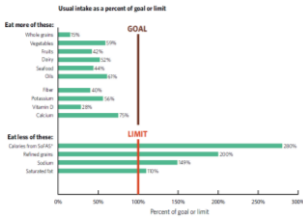
Building Healthy Eating Patterns Common elements of the healthy eating patterns

- The recommendations in these chapters, summarized:**
- **Limit calorie intake** to the amount needed to attain or maintain a healthy weight for adults, and for appropriate weight gain in children and adolescents.
 - Consume foods from all food groups in **nutrient-dense forms** and in recommended amounts.
 - Reduce intake of **solid fats** (major sources of **saturated and trans fatty acids**).
 - **Replace solid fats with oils** (major sources of polyunsaturated and monounsaturated fatty acids) when possible.
 - Reduce intake of **added sugars**.
 - Reduce intake of **refined grains** and replace some refined grains with **whole grains**.
 - **Reduce intake of sodium** (major component of salt).
 - If consumed, **limit alcohol intake to moderate levels**.
 - Increase intake of **vegetables and fruits**.
 - Increase intake of **whole grains**.
 - Increase intake of **milk and milk products** and replace whole milk and full-fat milk products with fat-free or low-fat choices to reduce solid fat intake.
 - Increase **seafood** intake by replacing some meat or poultry with seafood.



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Building Healthy Eating Patterns Common elements of the healthy eating patterns



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Four Principles for achieving a healthy eating Pattern
(1) focus on nutrient-dense foods

- A healthy eating pattern focuses on nutrient-dense foods:
- Vegetables
- Fruits
- Whole grains
- Fat-free or low-fat milk and milk products
- Lean meats and poultry, seafood
- Eggs, beans and peas, and nuts and seeds that are prepared without added solid fats, sugars, starches, and sodium.
- **Combined into an eating pattern**, these foods can provide the full range of essential nutrients and fiber



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Four Principles for achieving a healthy eating Pattern
(1) focus on nutrient-dense foods

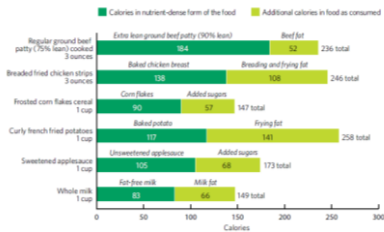
- **Solids fats and sugars** could be used to **improve palatability** of **nutrient dense foods**:
 - **Whole-grain breakfast cereals** that contain **small amounts of added sugars**
 - **Cuts of lean meat** that are **marbled with fat**
 - **Poultry** cooked with **skin on**
 - **Vegetables** topped with **butter**
 - **Sprinkled with sugar, and fat-free chocolate milk**



- Another benefit of consuming **nutrient dense foods**: **Limiting calorie**
- **1 gram of protein: 4 Kcal**
 - **1 gram of carbohydrate: 4 Kcal**
 - **1 gram of alcohol: 7 Kcal**
 - **1 gram of fat/oil: 9 Kcal**

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Four Principles for achieving a healthy eating Pattern
(1) focus on nutrient-dense foods



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Four Principles for achieving a healthy eating Pattern
 (2) Calories from beverages

- **Beverages** contribute substantially to overall dietary and caloric intake for most Americans.
- Although they provide needed water, many beverages **add calories** to the diet **without providing essential nutrients**.
- Currently, American adults ages 19 years and older consume an average of about **400 calories per day as beverages**.
- The major types of beverages consumed by adults, in descending order by average caloric intake, are: **regular soda, energy, and sports drinks; alcoholic beverages; milk (including whole, 2%, 1%, and fat-free); 100% fruit juice; and fruit drinks.**
- Children **ages 2 to 18 years** also consume an **average of 400 calories** per day as beverages. The major beverages for children are **somewhat different** and, in order by average caloric intake, are: **milk (including whole, 2%, 1%, and fat-free); regular soda, energy, and sports drinks; fruit drinks; and 100% fruit juice.**



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Four Principles for achieving a healthy eating Pattern
 (3) Follow food safety principles

- Ensuring food safety is an important principle for building healthy eating patterns.
- Foodborne illness affects more than **48 million individuals in the United States every year**.
- Leads to **128,000 hospitalizations and 3,000 deaths**.
- The proportion of outbreaks that can be attributed to unsafe food safety practices in the **home is unknown**, but is assumed to be substantial.

Preventive Measures:

- **Washing hands**
- **Rinsing vegetables and fruits**
- **Preventing cross-contamination**
- **Cooking foods to safe internal temperatures**
- **Storing foods safely in the home kitchen are the behaviors most likely to prevent food safety problems.**



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Four Principles for achieving a healthy eating Pattern
 (3) Follow food safety principles

Four basic food safety principles are:

- **clean hands**, food contact surfaces, and vegetables and fruits.
- **Separate raw, cooked, and ready-to-eat** foods while shopping, storing, and preparing foods.
- Cook foods to a **safe temperature**.
- **Chill (refrigerate)** perishable foods promptly.

High risk of foods for foodborne diseases:

- **Raw (unpasteurized) milk, cheeses, and juices;**
- **Raw or undercooked animal foods**, such as seafood, meat, poultry, and eggs;
- **Raw sprouts.**
- These foods are recommended to be avoided.



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Four Principles for achieving a healthy eating Pattern
(4) Role of supplement and fortified foods

- A fundamental premise of the **Dietary Guidelines** is that **nutrients should come primarily from foods**.
- Intact **nutrient-dense foods**, typically contain the essential vitamins and minerals and fiber
- So it is **recommended meet their nutrient requirements**:
- **Healthy eating pattern** that includes nutrient-dense forms of foods
- **Balancing calorie intake**
- **Balancing energy expenditure**
- **Dietary supplements or fortification** of certain foods may be advantageous in **specific situations**



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Four Principles for achieving a healthy eating Pattern
(4) Role of supplement and fortified foods

- **Vitamin D:**
 - For many years, *most fluid milk has been fortified with vitamin D*
 - *Vitamin D increases calcium absorption*
 - *Prevent the disease "rickets".*
 - *Vitamin D-fortified milk is now the major dietary source of vitamin D for many Americans.*
- Other beverages and foods that often are fortified with **vitamin D** include:
 - *Orange juice*
 - *Soy beverages*
 - *Yogurt*
- As intake increases above 4,000 IU (100 mcg) per day, the potential risk of adverse effects increases (**Fat Soluble**)



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Four Principles for achieving a healthy eating Pattern
(4) Role of supplement and fortified foods

- **Folic Acid:**
 - More recently, **folic acid fortification of enriched grains** was mandated to reduce the incidence of **neural tube defects** (serious birth defects of the brain and spine).
 - Subsequently, folate intake has increased substantially.
 - It is recommended that all women who are capable of becoming pregnant consume **400 mcg per day of folic acid** from these **fortified foods or from dietary supplements**, in addition to eating food sources of folate.



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Four Principles for achieving a healthy eating Pattern
(4) Role of supplement and fortified foods

Vitamin B12:

- Foods fortified with the crystalline form of vitamin B12, such as fortified cereals, or vitamin B12 supplements, are **encouraged for individuals older than age 50 years**
- A substantial proportion of elderly individuals may have **reduced ability to absorb naturally occurring vitamin B12**
- The ability to absorb the **crystalline form** is not affected by age
- In addition, **vegans** should ensure adequate intake of vitamin B12 through fortified foods or supplements.



Iron supplements for pregnant women:

- **Iron supplementation** during pregnancy is routinely recommended for pregnant women to help meet their **iron requirements**.
- Obstetricians often monitor the need for iron supplementation during pregnancy

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Exercise 3

- What are the natural food contain oil, the common oils, and foods mainly composed oil in American diet?
- What are the main food contributors to American Dietary fiber?
- What is the current recommendation for consumption of seafood?
- What is the recommended daily allowance of Vitamin D and what is the maximum recommended level of consumption per day?
- What are the main elements of DASH diet, what it stands for and what are the health benefit associated with DASH-style diet?
- Comparing the American Style Diet with eating patterns with substantial health benefits, name 10 dietary element could be increased and 4 that could be limited to enhance the healthfulness of a western-type diet.
- What are the calorie content of one gram of protein, carbohydrate, alcohol, and fat?
- What are the preventive measures and four basic principles of food safety discussed in DGA? What high risk foods are specifically mentioned to be avoided?
- What are the target population recommended to take Vitamin B12 supplement? And Why?

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Additional Resources



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Additional Resources:

Centers for Disease Control and Prevention:

<https://www.cdc.gov/odhss/csehb/8sept/8s1978/8s1978.pdf>

Center for Food Security and Public Health, Iowa, Zoonotic Diseases:

<http://www.cfsph.iastate.edu/Zoonoses/>

Food and Agriculture Organization of the United Nation:

<http://www.fao.org/emergencies/emergency-types/transboundary-animal-diseases/en/>

Principles of Epidemiology
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An Introduction
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