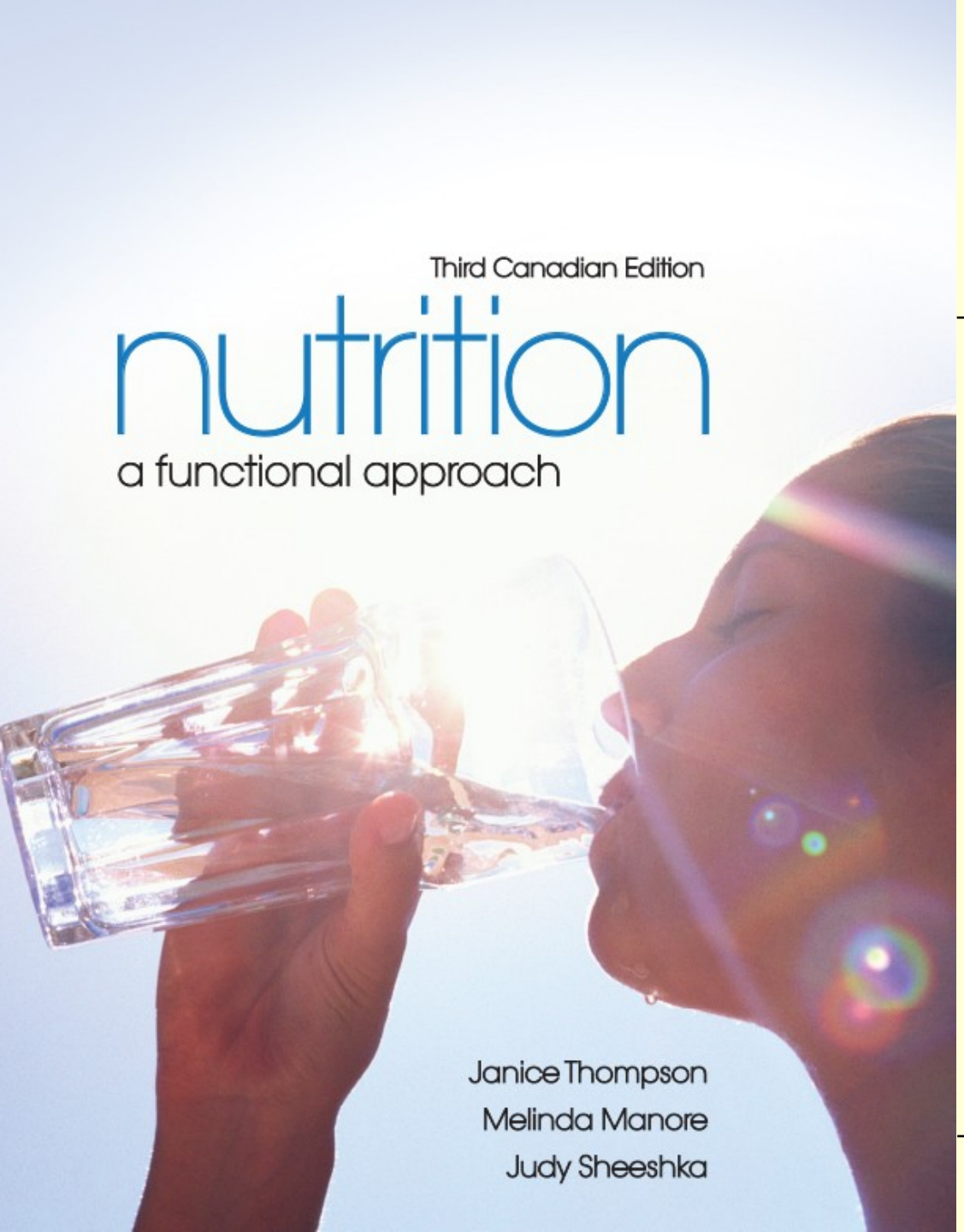


CHAPTER

2

Designing a Healthful Diet and In Depth

A Healthful Diet

A healthful diet is

- Adequate
- Moderate
- Balanced
- Varied

A Healthful Diet Is Adequate

An adequate diet provides enough energy, nutrients, fibre, vitamins, and minerals to support a person's health

A diet adequate in many nutrients can still be inadequate in a few nutrients

A Healthful Diet Is Moderate

Another key to a healthful diet is moderation

A healthful diet contains the right amounts of foods for maintaining proper weight

A Healthful Diet Is Balanced

A balanced diet contains the right combinations of foods to provide the proper proportions of nutrients

A Healthful Diet Is Varied

Variety refers to eating many different types of foods each day

A healthful diet is not based on only one or a few types of foods

Designing a Healthful Diet

Tools for designing a healthful diet may include

- Food Labels
- Dietary Guidelines
- Logo Programs
- Food Guides

Food Labels

In Canada, food labels are required on most products

These labels can include

- Ingredient list [required]
- Nutrition Facts table [required]
- Nutrient Content claims
- Health claims

Food Labels: Exemptions

TABLE 2.1 Examples of Foods Exempt from Carrying Nutrition Information

- foods such as spices and coffee, where the amounts of nutrients required on the label would be "0"
- alcoholic drinks (with an alcohol content of more than 0.5%)
- fresh vegetables or fruits, with no added ingredients
- fresh meats
- foods sold at roadside stands, craft shows, flea markets, fairs, or farmers' markets by the person who prepared and processed them
- individual servings of food sold for immediate consumption, such as salads and sandwiches, that have not been treated or packaged to extend their durable life
- one-bite candies or desserts
- prepackaged individual portions of food intended to be served with meals or snacks by a restaurant or other commercial enterprise
- some cow and goat milk products sold in refillable glass containers

Source: Canada Gazette, Vol. 137, No. 1, January 1, 2003, "Food and Drug Act: Regulations Amending the Food and Drug Regulations," B.01.401, http://canadagazette.gc.ca/partII/2003/20030101/html/sor11-e.html (accessed January 2006). Reproduced with the permission of the Minister of Public Works and Government Services Canada, 2012.

Table 2.1

Food Labels

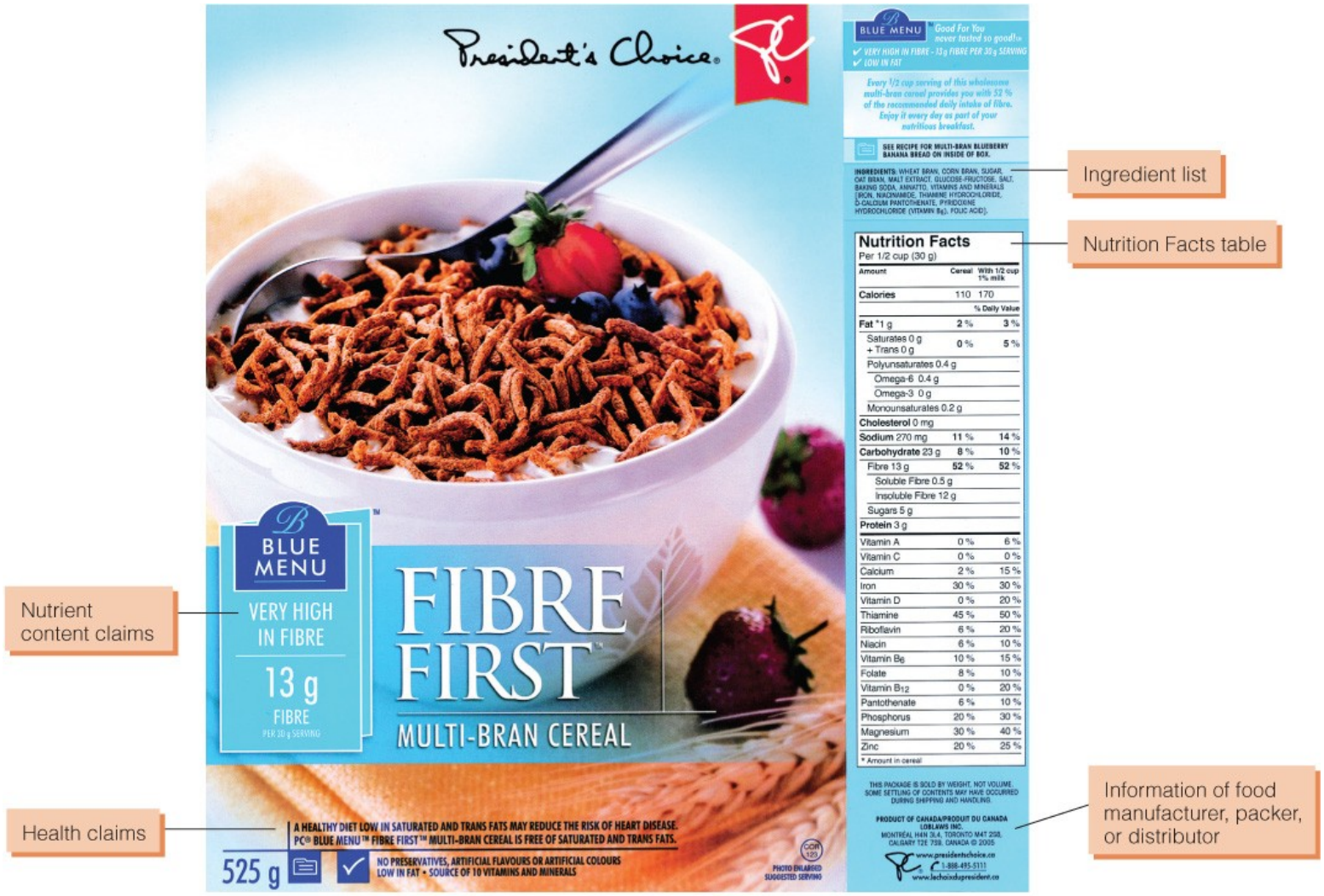


Figure 2.1 The four main parts of a food label and the contact information. (Courtesy of President's Choice®, www.presidentschoice.ca.)

Nutrition Facts Table

The Nutrition Facts table in standard format contains required nutrition information

This information can be used in planning a healthful diet

Nutrition Facts

Per 125 mL (87 g)

Amount	% Daily Value
Calories 80	
Fat 0.5 g	**1** %
Saturated 0 g + Trans 0 g	**0** %
Cholesterol 0 mg	
Sodium 0 mg	**0** %
Carbohydrate 18 g	**6** %
Fibre 2 g	**8** %
Sugars 2 g	
Protein 3 g	

Vitamin A	2 %	Vitamin C	10 %
Calcium	0 %	Iron	2 %

Figure 2.2a

Nutrition Facts Table

1. Serving size and servings per container

- Serving sizes can be used to plan appropriate amounts of food

- Standardized serving sizes allow for comparisons among similar products

Nutrition Facts Table

2. List of nutrients

- Calories
- Fat (total; saturated and trans)
- Cholesterol
- Sodium
- Carbohydrate (total; fibre, sugars)
- Protein
- Vitamin A, vitamin C, calcium, iron

Nutrition Facts Table

3. Percent Daily Values (%DV)

- Describes how much a serving of food contributes to your total intake of a nutrient
- Based on a diet of 2000 Calories per day
- Can be used to determine if a product is low or high in a particular nutrient

Nutrition Facts Table

4. Footnote

- Appears in expanded format label only
- Informs that %DV are based on a 2000-Calorie diet
- Illustrates differences in recommendations between a 2000-Calorie and 2500-Calorie diet

Standards to Calculate %DV

TABLE 2.4 Standards Used to Calculate the % Daily Value (2000 Calories or 8400 kJ)

Vitamin or Mineral Nutrient	Units	Persons 2 Years of Age or Older	Infants and Children Less than 2 Years Old
(a) Recommended Daily Intake			
Vitamin A	RE[a]	1000	400
Vitamin D	µg[b]	5	10
Vitamin E	mg[c]	10	3
Vitamin C	mg	60	20
Thiamin, thiamine, or vitamin B_1	mg	1.3	0.45
Riboflavin, or vitamin B_2	mg	1.6	0.55
Niacin	NE[d]	23	8
Vitamin B_6	mg	1.8	0.7
Folacin, or folate	µg	220	65
Vitamin B_{12}	µg	2	0.3
Pantothenic acid, or pantothenate	mg	7	2
Vitamin K	µg	80	30
Biotin	µg	30	8
Calcium	mg	1100	500
Phosphorus	mg	1100	500
Magnesium	mg	250	55
Iron	mg	14	7
Zinc	mg	9	4
Iodide	µg	160	55
Selenium	µg	50	15
Copper	mg	2	0.5
Manganese	mg	2	1.2
Chromium	µg	120	12
Molybdenum	µg	75	15
Chloride	mg	3400	1000

Nutrient	Amount
(b) Reference Standards	
Fat	65 g
The sum of saturated fatty acids and trans fatty acids	20 g
Cholesterol	300 mg
Carbohydrate	300 g
Fibre	25 g
Sodium	2400 mg
Potassium	3500 mg

[a] RE = retinol equivalents [b] µg = micrograms [c] mg = milligrams [d] NE = niacin equivalents.
Source: Canadian Food Inspection Agency. Reproduced or adapted with the permission of the Minister of Pubic Works and Government Services Canada, 2012.

Table 2.4

Logo Programs

- Assist Canadians with nutritious food choices, e.g., Heart and Stroke Foundation's Health Check

- Process is voluntary, and food manufacturers pay a lifetime fee and annual licensing fee

™ The Health Check logo, Health Check word mark, and Heart and Stroke Foundation word mark are trademarks of the Heart and Stroke Foundation of Canada used under license.

Nutrient Claims

Health Canada has approved several claims related to health and disease

A nutrient must be related to a disease or health condition for which people are at risk, e.g., osteoporosis, hypertension

Nutrient Claims

TABLE 2.2 Examples of Common Nutrient Content Claims

- Claims of "free" mean that the number of kJ (kcal) or the amount of a nutrient is nutritionally insignificant in a specified amount of food. For example, to be "sodium free," a product has to contain less than 5 mg of sodium per serving. "Free of sugar" means that a product has less than 50 mg of sugar and fewer than 17 kJ (5 kcal) per serving. Other wording can be used instead of "free of sugar": "no sugar," "0 sugar," "contains no sugar," and "sugar free" all mean the same thing on a label.
- "Low" means there is a small amount of a nutrient present in 1 serving. For example, "low fat" indicates the product contains 3 g of fat or less per serving.
- "Reduced" indicates that there is at least 25% less of a nutrient in 1 serving, compared to the "original" product or a similar product. For example, Christie's Ritz 25% Less Fat™ crackers have 25% less fat than the original Ritz™ crackers. Kellogg's Frosted Flakes 1/3 Less Sugar™ cereal has 33% less sugar than the original Frosted Flakes™ product.
- "Source" means that there is a significant amount of a nutrient in 1 serving. For example, a product must contain 2 or more grams of dietary fibre to be called a "source of fibre."

Source: Health Canada. 2003. Frequently Asked Questions About Nutrition Labelling. http://hc-sc.gc.ca/fn-an/label-etiquet/nutrition/educat/te_quest-eng.php#18. (accessed September 2008).

Table 2.2

Disease Risk Reduction Claims

TABLE 2.3 Disease Risk Reduction Claims Permitted on Food Labels

Psyllium Products and Blood Cholesterol Lowering
Primary statement: "[serving size from Nutrition Facts table in metric or common household measures] of (Brand name) [name of food] with psyllium supplies/provides X% of the daily amount of the fibres shown to help reduce/lower cholesterol." For example: "1 cup (30 g) of Brand X cereal with psyllium supplies 50% of the daily amount of fibres shown to help lower cholesterol." The "daily amount" referred to in the primary statement is 7 grams psyllium fibre.
Oat Products and Blood Cholesterol Lowering
Primary statement: "[serving size from Nutrition Facts table in metric and common household measures] of (Brand name) [name of food] [with name of eligible fibre source] supplies/provides [X% of the daily amount] of the fibres shown to help reduce/lower cholesterol." For example: If the eligible fibre source is a food itself: "1 cup (X g) of Quaker Oatmeal supplies X% of the daily amount of the fibres shown to help reduce cholesterol" If the eligible fibre source is an ingredient: "1 muffin (X g) with oat bran provides X% of the daily amount of the fibres shown to help lower cholesterol" The "daily amount" referred to in the primary statement is 3 grams beta-glucan oat fibre.
Plant Sterols (Phytosterols) and Blood Cholesterol Lowering
Primary statement: "[serving size from Nutrition Facts table in metric and common household measures] of [naming the product] provides X% of the daily amount of plant sterols shown to help reduce/lower cholesterol in adults." Two additional statements that could be used in combination or alone: 1. "Plant sterols help reduce [or help lower] cholesterol." 2. "High cholesterol is a risk factor for heart disease." The "daily amount" referred to in the primary statement is 2 grams.
Calcium and Osteoporosis
"A healthy diet with adequate calcium and vitamin D, and regular physical activity, help to achieve strong bones and may reduce the risk of osteoporosis. (Naming the food) is an excellent source of calcium and vitamin D." There are five other slight variations in wording allowed for this claim.
Fruits, Vegetables and Cancer
"A healthy diet rich in a variety of vegetables and fruit may help reduce the risk of some types of cancer." The following are excluded from this claim: potatoes, yams, cassava, plantain, corn, mushrooms, mature legumes and their juices, jams and jellies, olives, and powdered fruits and vegetables.
Dietary Fat, Saturated Fat, Cholesterol, Trans Fatty Acids and Coronary Heart Disease
"A healthy diet low in saturated and trans fats may reduce the risk of heart disease. (Naming the food) is low in saturated and trans fats."
Sodium and Hypertension
"A healthy diet containing foods high in potassium and low in sodium may reduce the risk of high blood pressure, a risk factor for stroke and heart disease. (Naming the food) is a good source of potassium and is low in sodium." There are five other slight variations in wording allowed for this claim.

Source: Health Claim Assessments. Health Canada, 2010. Minister of Public Works and Government Services Canada, 2012.

Table 2.3

Food Guide

Eating Well with Canada's Food Guide (2007)

- Originated as *Canada's Official Food Rules* in 1942

- Designed to reduce the risk of chronic disease and obesity and to help people get all of the nutrients they need for good health

- Available in English, French, and 10 additional languages

Food Guide

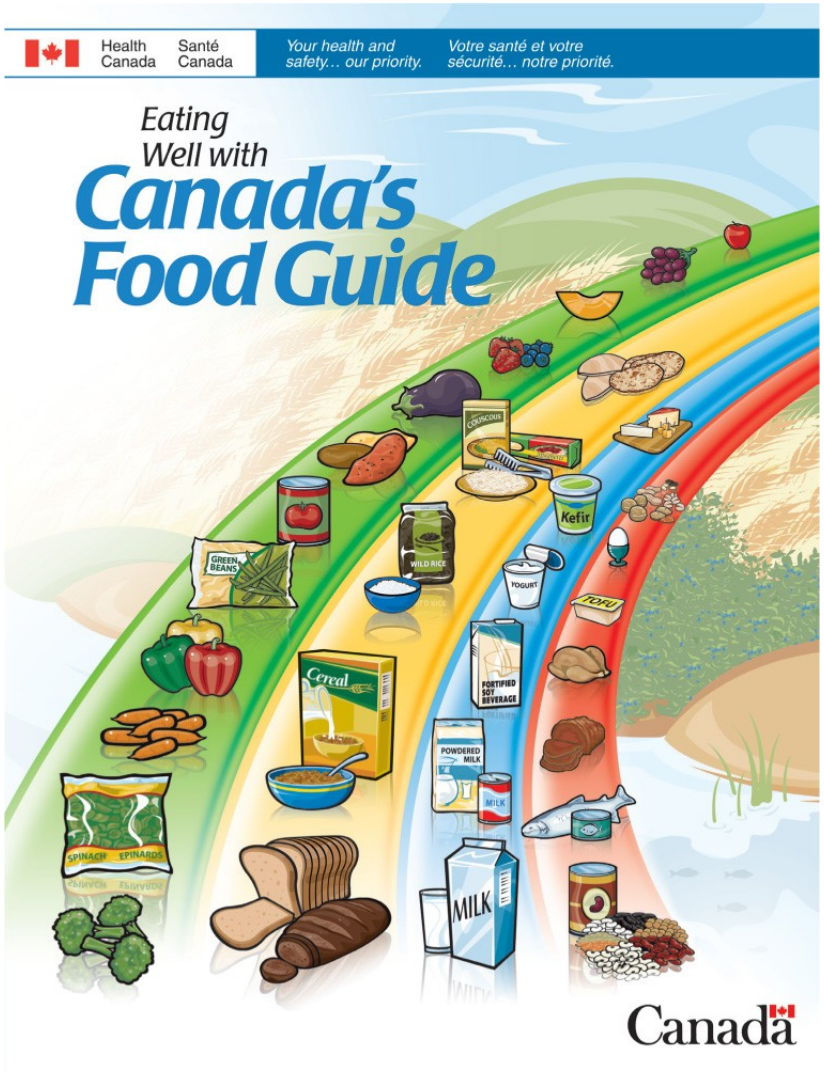


Figure 2.5 *Eating Well with Canada's Food Guide* cover. The four arcs of the rainbow represent the four food groups.

Source: Eating Well with Canada's Food Guide, http://www.hc-sc.gc.ca/fn-an/food-guide-aliment/index-eng.php. © Her Majesty the Queen in Right of Canada, represented by the Minister of Health Canada, 2007. HC Pub.:4651, Cat.:H164-38/1-2007E, ISBN:0-662-44467-1.

Figure 2.5

Food Guide

Food groups

- Vegetables and Fruit
- Grain Products
- Milk and Alternatives
- Meat and Alternatives

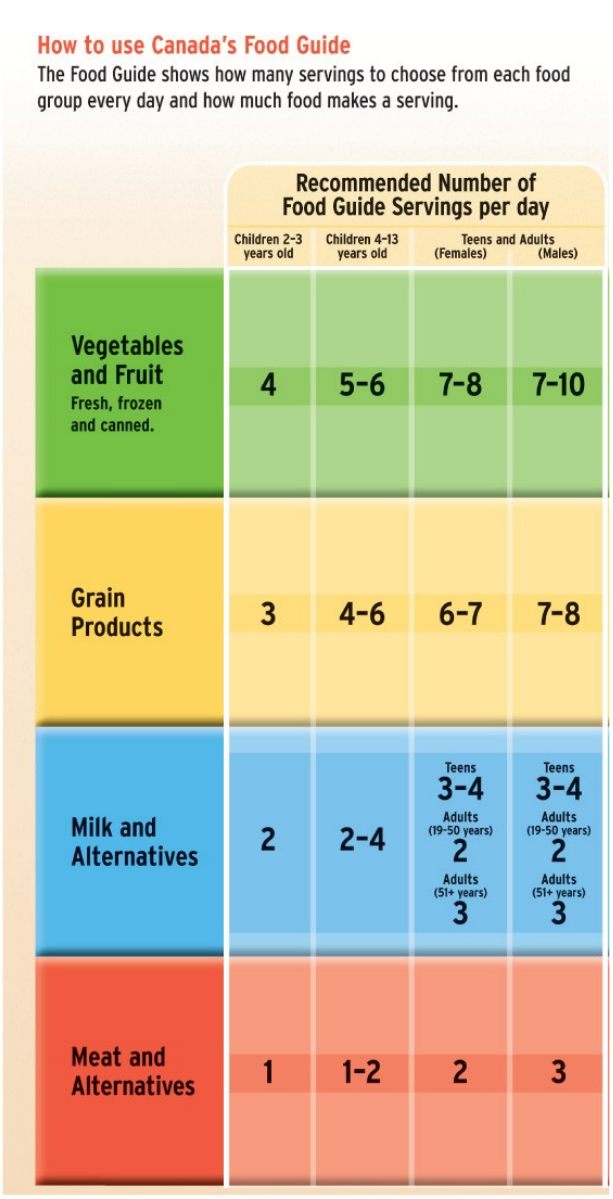
Food Guide

Food Guide Servings for 9 age/gender groups

- Children: 2-3 yrs, 4-8 yrs, 9-13 yrs
- Teens: 14 – 18 yrs (males, females)
- Adults: 19-50 yrs (males, females)
  51 + yrs (males, females)

Food Guide

Figure 2.6 *Eating Well with Canada's Food Guide* recommended number of *Food Guide* servings per day from each of the four food groups.
Source: Recommended Number of Food Guide Servings Per Day, http://www.hc-sc.gc.ca/fn-an/food-guide-aliment/basics-base/quantit-eng.php, Health Canada, 2007. Reproduced with the permission of the Minister of Public Works and Government Services Canada, 2012.



How to use Canada's Food Guide

The Food Guide shows how many servings to choose from each food group every day and how much food makes a serving.

	Recommended Number of Food Guide Servings per day			
	Children 2–3 years old	Children 4–13 years old	Teens and Adults (Females)	Teens and Adults (Males)
Vegetables and Fruit Fresh, frozen and canned.	4	5–6	7–8	7–10
Grain Products	3	4–6	6–7	7–8
Milk and Alternatives	2	2–4	Teens 3–4; Adults (19–50 years) 2; Adults (51+ years) 3	Teens 3–4; Adults (19–50 years) 2; Adults (51+ years) 3
Meat and Alternatives	1	1–2	2	3

Figure 2.6

Food Guide

Serving Sizes

- There is no standardized definition of a serving size for any food
- A serving size as defined in Canada's Food Guide may not be equal to a serving size listed on a food label

Food Guide

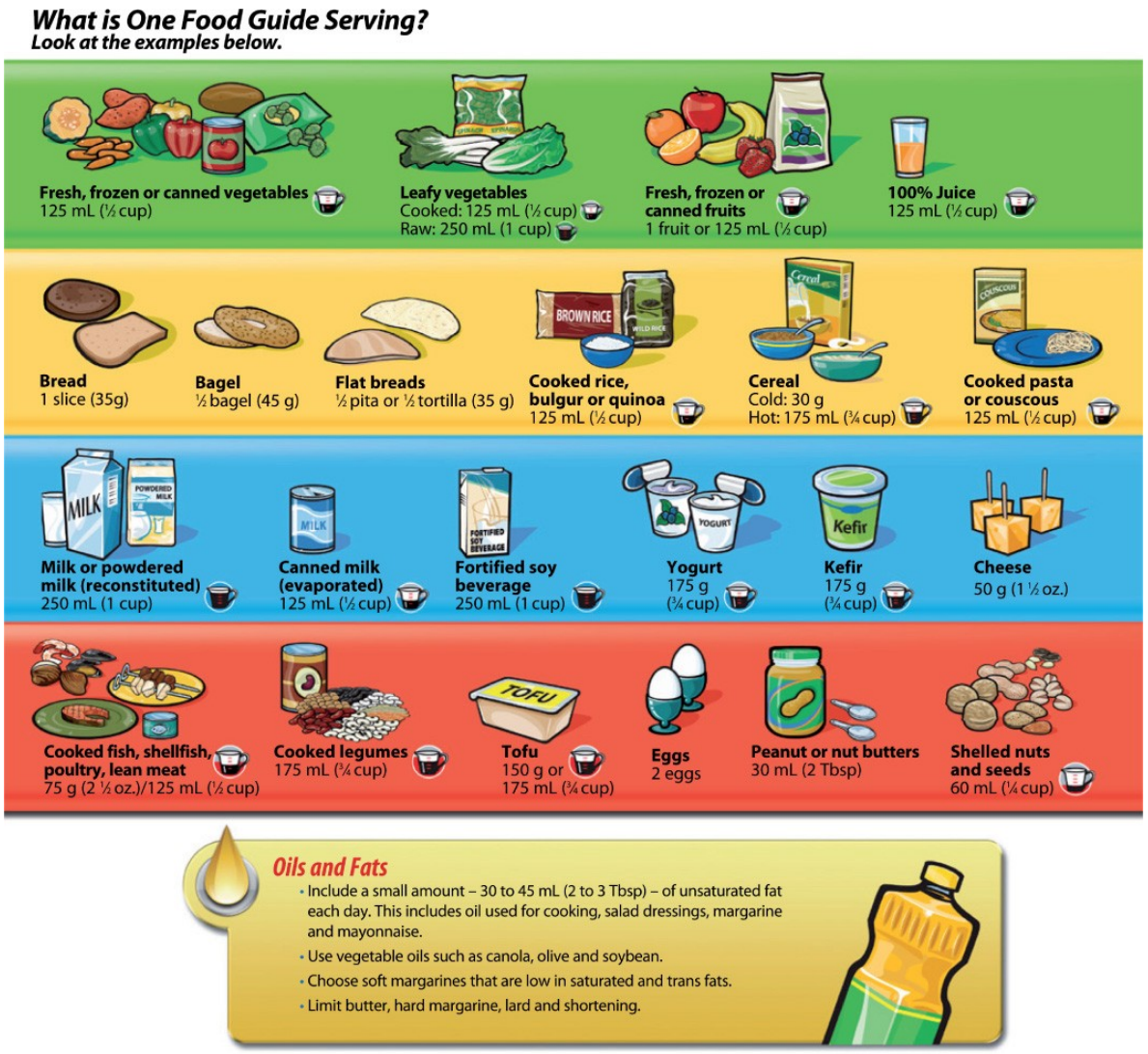


Figure 2.7 *Eating Well with Canada's Food Guide* suggested serving sizes. The amount shown for each food represents one food guide serving.

Source: Eating Well with Canada's Food Guide. Health Canada, 2011. Minister of Public Works and Government Services Canada, 2012.

Figure 2.7

Practical Portion Sizes

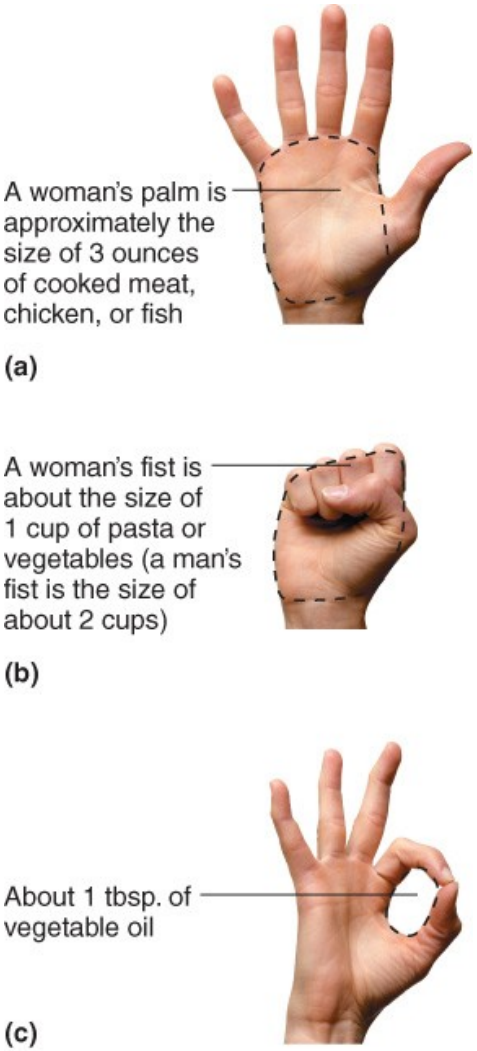


Figure 2.8 Use your hands to help you estimate the serving sizes of common foods.

Figure 2.8

Food Guide

Vegetables and Fruit

- Choose 1 dark green and 1 orange vegetable each day
  - Go for dark green vegetables, such as broccoli, romaine lettuce, and spinach
  - Go for orange vegetables, such as carrots, sweet potatoes, and winter squash
- Choose vegetables and fruit prepared with little or no fat
  - Enjoy vegetables steamed, baked, or stir-fried instead of deep-fried
- Have vegetables and fruit more often than juice

Food Guide

Grain Products

- Make at least half your grain products whole grain each day
  - Eat a variety of whole grains, such as barley, brown rice, oats, quinoa, and wild rice
  - Enjoy whole grain breads, oatmeal, or whole wheat pasta
- Choose grain products that are lower in fat, sugar, or salt
  - Compare the Nutrition Facts table on labels to make wise choices
  - Enjoy the true taste of grain products, i.e., use sauces and spreads sparingly

Food Guide

Milk and Alternatives

- Drink skim, 1%, or 2% milk each day
  - Have 500 mL of milk each day for adequate vitamin D
  - Drink fortified soy beverages if you do not drink milk
- Select lower-fat milk alternatives
  - Compare the Nutrition Facts table on yogurts or cheeses to make wise choices

Food Guide

Meat and Alternatives

- Have meat alternatives, such as beans, lentils and tofu, often
  - Choose such fish as char, herring, mackerel, salmon, sardines and trout
- Eat at least 2 Food Guide Servings of fish each week

Food Guide

Meat and Alternatives (continued)

- Select lean meat and alternatives prepared with little or no added fat or salt
  - Trim the visible fat from meats. Remove the skin on poultry
  - Use cooking methods, such as roasting, baking, or poaching, that require little or no added fat
  - If you eat luncheon meats, sausages, or prepackaged meats, choose those lower in salt (sodium) and fat

Food Guide

Recommendations for oils and fats

- Include a small amount – 30 to 45 mL (2 to 3 Tb) – of unsaturated fat each day
- Use vegetable oils, such as canola, olive, and soybean
- Choose soft margarines that are low in saturated and trans fats
- Limit butter, hard margarine, lard, and shortening

Food Guide

Advice for different ages and stages

Children

- Serve small nutritious meals and snacks each day
- Do not restrict nutritious foods because of their fat content

Women of childbearing age

- Take a multivitamin containing folic acid every day

Men and women over 50

- Take daily vitamin D supplement of 10μg(400 IU)

Food Guide

Eating Well with Canada's Food Guide

First Nation, Inuit, and Métis

- For the first time, Canada has produced a food guide specifically for Aboriginal peoples

Food Guide

Figure 2.10 *Eating Well with Canada's Food Guide: First Nation, Inuit and Métis.*

Source: Eating Well with Canada's Food Guide: First Nations, Inuit and Métis. Health Canada, 2007. Reproduced with the permission from the Minister of Health.

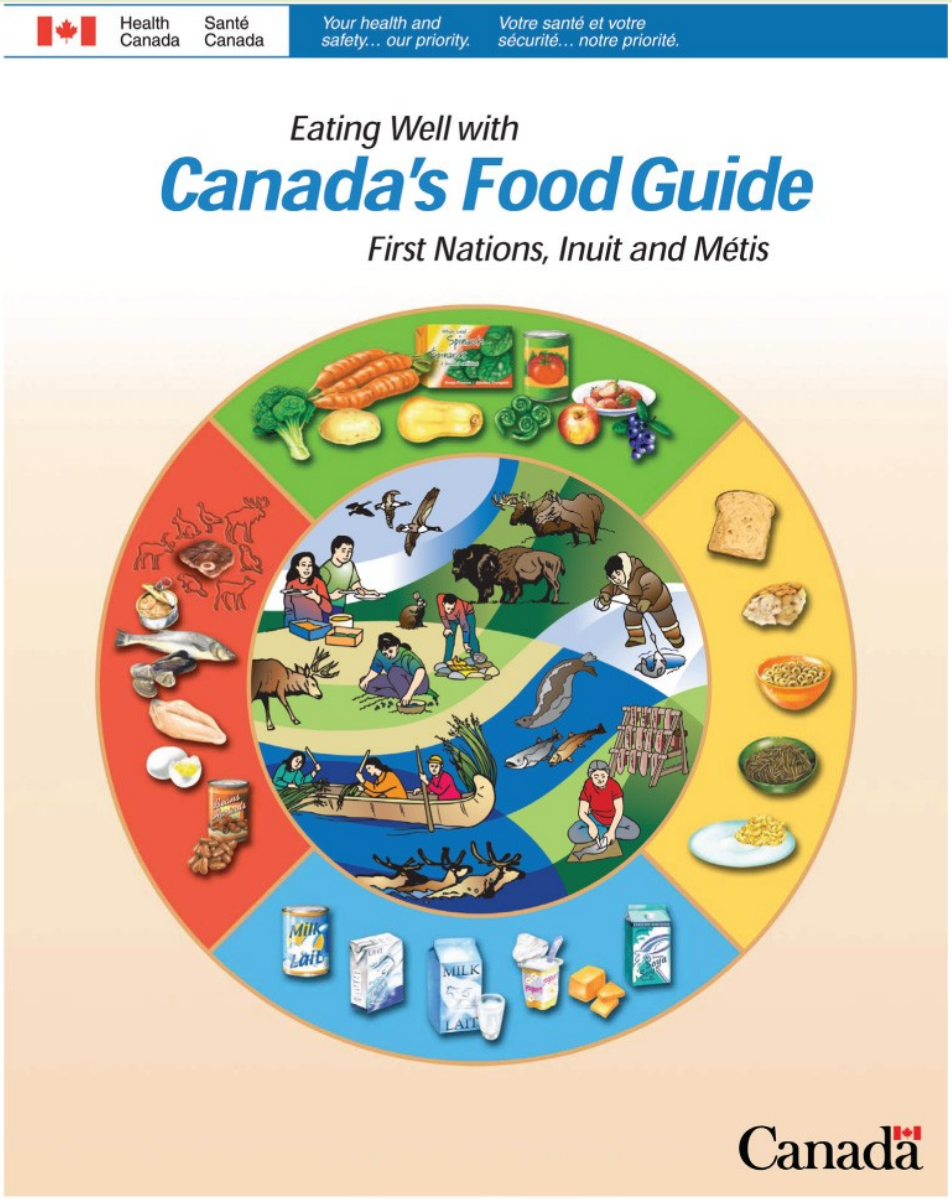


Figure 2.10

Food Guide

Other Food Guides in North America include

- Vegetarian Food Guide for North America
- Mediterranean Diet Pyramid

Mediterranean Diet Pyramid

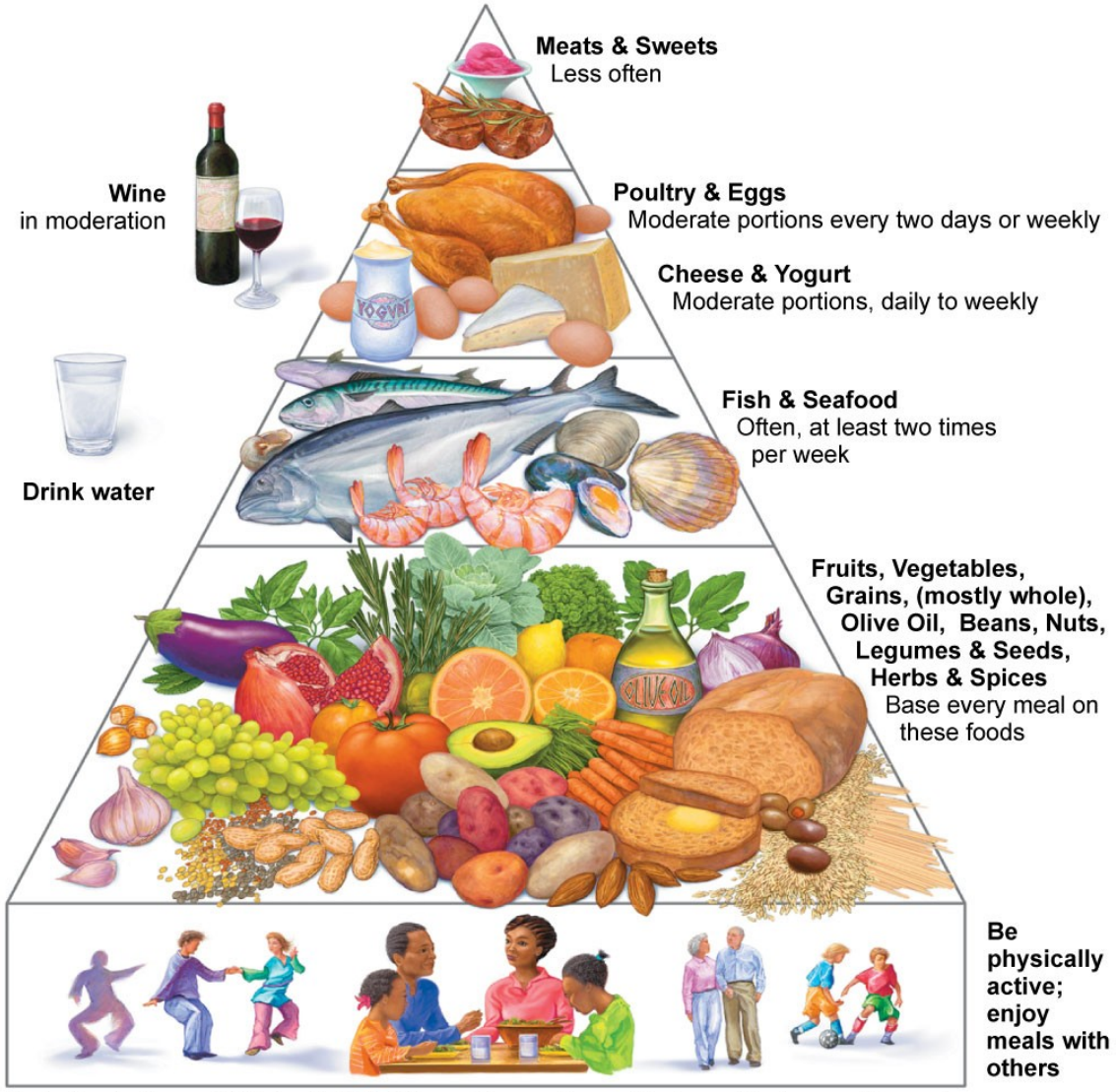


Figure 2.12

Diet Plans

When making choices in each food group, nutrient dense foods are the best choice

Nutrient density: the relative amount of nutrients per Calorie of food

Low vs. High Nutrient Density

(a)

(b)

Figure 2.13 Examples of foods that are low and high in nutrient density. **(a)** Three chocolate sandwich cookies; **(b)** The combination of one medium banana and 125 mL (1/2 cup) fresh blackberries. Each bowl of food provides approximately 600 kJ (145 kcal). The cookies provide 230 kJ (56 kcal) from fat (6.2 grams), 1 gram of fibre, and very few vitamins and minerals. The fruit combination provides almost 7 grams of fibre, 32 kJ (8 kcal) from fat (0.85 grams), and a significant amount of other nutrients, such as potassium (608 mg), vitamin A (21 RE), and vitamin C (26 mg). For our limited daily energy budget, the fruit is richer in nutrients (more nutrient-dense) and a more healthful choice. (Calculated using USDA Nutrient Database for Standard Reference, Release 15, September 2002.)

Figure 2.13

Can Eating Out Be Part of a Healthful Diet?

Eating in restaurants often involves

- High-fat foods
- Large portion sizes

A restaurant meal can be equivalent to the recommended fat or calorie intake for an entire day

Eating Right When You're Eating Out

Tips for restaurant meals

- Avoid breaded or fried foods
- Order salad (with dressing on the side) instead of soup
- Ask for steamed vegetables
- Substitute vegetables for potatoes or rice
- Avoid cream sauces or cheese sauces
- Order small portions (such as appetizers)

In Depth: Phytochemicals

What are phytochemicals?

- Compounds in foods found in plants that are thought to be beneficial to health
- Not considered nutrients (substances necessary to sustain life)
- More than 5000 phytochemicals have been identified

In Depth: Phytochemicals

What are phytochemicals? (continued)

- No daily recommended intakes have been established

- Links have been shown to reduced risk for cardiovascular disease, cancer, diabetes, Alzheimer's, cataracts, and age-related decline

In Depth: Phytochemicals

Phytochemical	Health Claims	Food Source	
Carotenoids: alpha-carotene, beta-carotene, lutein, lycopene, zeaxanthin, etc.	Diets with foods rich in these phytochemicals may reduce the risk for cardiovascular disease, certain cancers (e.g., prostate), and age-related eye diseases (cataracts, macular degeneration).	Red, orange, and deep-green vegetables and fruits, such as carrots, cantaloupe, sweet potatoes, apricots, kale, spinach, pumpkin, and tomatoes	
Flavonoids:[1] flavones, flavonols (e.g., quercetin), catechins (e.g., epigallocatechin gallate or EGCG), anthocyanidins, isoflavonoids, etc.	Diets with foods rich in these phytochemicals are associated with lower risk for cardiovascular disease and cancer, possibly because of reduced inflammation, blood clotting, and blood pressure and increased detoxification of carcinogens or reduction in replication of cancerous cells.	Berries, black and green tea, chocolate, purple grapes and juice, citrus fruits, olives, soybeans and soy products (soy milk, tofu, soy flour, textured vegetable protein), flaxseed, whole wheat	
Phenolic acids:[1] ellagic acid, ferulic acid, caffeic acid, curcumin, etc.	Similar benefits as flavonoids.	Coffee beans, fruits (apples, pears, berries, grapes, oranges, prunes, strawberries), potatoes, mustard, oats, soy	
Phytoestrogens:[2] genistein, diadzein, lignans	Foods rich in these phytochemicals may provide benefits to bones and reduce the risk for cardiovascular disease and cancers of reproductive tissues (e.g., breast, prostate).	Soybeans and soy products (soy milk, tofu, soy flour, textured vegetable protein), flaxseed, whole grains	
Organosulfur compounds: allylic sulfur compounds, indoles, isothiocyanates, etc.	Foods rich in these phytochemicals may protect against a wide variety of cancers.	Garlic, leeks, onions, chives, cruciferous vegetables (broccoli, cabbage, cauliflower), horseradish, mustard greens	

[1] Flavonoids, phenolic acids, and stilbenes are three groups of phytochemicals called phenolics. The phytocemical Resveratrol is a stilbene. Flavonoids and phenolic acids are the most abundant phenolics in our diet.
[2] Phytoestrogens include phytochemicals that have mild or anti-estrogenic action in our body. They are grouped together based on this similarity in biological function, but they also can be classified into other phytochemical groups, such as isoflavonoids.

Figure 1 In Depth