

Fibre

Applicable to: Nurses, Physicians and Other Health Professionals

Recommendations

The daily recommendations for fibre intake are:

Males		Females	
Age (years)	Fibre per day (g)	Age (years)	Fibre per day (g)
1-3	19	1-3	19
4-8	25	4-8	25
9-13	31	9-18	26
14-50	38	19-50	25
Over 50	30	Over 50	21
		Pregnant	28
		Breastfeeding	29

Source: Food and Nutrition Board, Institute of Medicine. Dietary reference intakes for energy, carbohydrate, fibre, fat, fatty acids, cholesterol, protein, and amino acids [document on internet]. 2005 [cited 2009 Jan 13]; Available from:

http://riley.nal.usda.gov/nal_display/index.php?info_center=4&tax_level=4&tax_subject=256&topic_id=1342&level3_id=5141&level4_id=10588

- Eat more foods higher in fibre:
 - Eat a variety of vegetables, fruit, whole grains, and legumes (beans, peas, lentils) daily.
 - Compare food labels (Nutrition Facts table) to choose foods with more fibre. Choose foods with more than 2 grams per serving.
- Increase fibre in the diet slowly.
- Eat fibre every day to reduce gas and bloating.
- Adults should drink at least 9 to 12 cups (2.25 to 3 litres) of fluid each day.
- Promote fibre-containing foods rather than supplements as the best way to get the fibre needed.

Health Benefits

In 2012 Health Canada recognized the following physiological effects of dietary fibre:¹

- improves regularity of bowel movements by increasing stool bulk
- reduces blood cholesterol levels (total cholesterol and/or low-density lipoprotein)
- helps to manage blood glucose and/or insulin levels
- provides a small amount of energy (calories) through fermentation in the colon

Other physiological effects of fibre may be recognized by Health Canada as evidence becomes available.

Dietary patterns that are high in fibre and whole grain foods have been associated with lower risk for coronary heart disease and improved diet quality, and with a potentially protective effect on bowel health relating to cancer and other bowel diseases.^{2,3,4,5} In addition, dietary fibre may increase satiety, thereby reducing calorie intake and improving weight management.^{2,5}

Fibre

Applicable to: Nurses, Physicians and Other Health Professionals

Key Questions**What is fibre?¹**

Health Canada has published an updated definition of fibre. The definition recognizes two kinds of fibre:

1. Carbohydrates with three or more saccharide units that naturally occur in foods of plant origin and that are not digested and absorbed by the small intestine. These are all edible plant substances that have a history of use as food, and that have been processed or cooked using conventional processes. They include fruits, vegetables, pulses, seeds, nuts, cereals, legumes.
2. Accepted novel fibres. Novel fibres are ingredients manufactured to be sources of dietary fibre. They are synthetically produced, or are obtained from natural sources which have not commonly been used as dietary fibre, or which have been processed to change the properties of the fibre. Accepted novel fibres must have demonstrated at least one of the physiological effects listed in the *Health Benefits* section above. The term "novel fibre" is used only during the pre-market review. After a novel fibre source has been accepted by Health Canada it is called a dietary fibre and is included in the total fibre amounts on the Nutrition Facts table on food packages.

Some substances, such as lignin, waxes, phytate, and tannin are not carbohydrates, but are an integral part of dietary fibre. Therefore, they are included in the definition of dietary fibre when they are part of plant cell walls, but cannot be called dietary fibre if they are isolated and added to a food.

Colonic fermentation of fibre produces energy-yielding nutrients, mainly short chain fatty acids, which are used by epithelial cells of the colon and by other parts of the body. Two calories per gram is the energy value that Health Canada has assigned to dietary fibre, unless there is scientific evidence of a different energy value for a specific type of fibre. For example, the fibre portion of wheat bran is recognized by Health Canada as having 0.6 calories/gram; wheat bran itself has 2.4 calories/gram. Two calories per gram of fibre must be included in the calorie declaration in the Nutrition Facts table on food packages.

How can individuals meet the fibre intake recommendations?

For the recommended intakes of fibre, refer to the table in the "recommendations" box at the beginning of this guideline.

Dietary fibre is found in plant foods. All vegetables and fruits, whole grains, bran cereals, and legumes have some fibre. Meat, fish, poultry, and milk products have no dietary fibre, but still offer good nutrition.

Fibre requirements can be met by eating more whole grains, legumes, vegetables, fruit, nuts, and seeds. For adults, this means eating a minimum of 7 servings of Vegetables and Fruits and a minimum of 6 servings of Grain Products daily, and often eating meat alternates such as beans, peas, and lentils.⁶ For children, meeting fibre requirements means eating a minimum of 4 servings of Vegetables and Fruit and a minimum of 3 servings of Grain Products daily, as well as eating meat alternates often.⁶

There should be an emphasis on eating whole grains plus foods that are higher sources of fibre. (See '*What foods are higher sources of fibre?*' below). Canada's Food Guide recommends that at least half of the recommended servings of Grain Products be whole grain every day.⁶

Fibre

Applicable to: Nurses, Physicians and Other Health Professionals

Tips to follow when increasing fibre in the diet:

- Increase fluid intake when increasing fibre intake.^{5,7} Refer to *General Healthy Eating for Children and Adults* guideline for fluid requirements.
- Increase fibre intake slowly to allow the bowel time to adapt.⁵
- Choose whole grain breads, cereals, and crackers, whole grain pasta, bulgur, quinoa, and brown rice.
- Eat a high fibre cereal every day.
- Use extra vegetables in casseroles, on pizza, or in soups and salads.
- Choose vegetables or fruit at every meal and snack. Eat the skins or peels where appropriate.
- Eat fresh fruit instead of drinking juice.
- Add bran to hamburger patties, coating mixes, casseroles, cookies, or cereals.
- Regularly eat dishes that have legumes, such as beans, peas and lentils.
- Add kidney beans, chickpeas, and lentils to soups, casseroles, salads, and spaghetti sauce.
- Replace half or all of the flour in baking with whole wheat, oat, or barley flour.
- Add fruit to cereal such as raisins, bananas or berries (strawberries, blueberries and/or raspberries).
- Add cut-up, crushed, pureed or dried fruit to muffins and cookies when baking.
- Add 1 to 2 tablespoons (15 to 30 mL) whole or ground flaxseed to cereal, applesauce, pudding or in juice.
- Eat nuts, seeds and nut butters (such as peanut butter) in small amounts.

Can consumers find foods higher in fibre by looking at food labels?

Yes, consumers can find foods higher in fibre by looking at food labels. Consumers should compare the Nutrition Facts tables on food packages to find foods with higher amounts of fibre.

The amount of fibre in the Nutrition Facts table includes both naturally occurring fibres and accepted novel fibres, as well as soluble and insoluble fibres.¹ The calorie value of 2 calories per gram of fibre must be included in the calorie declaration in the Nutrition Facts table.¹

Consumers should also look for one of three nutrient claims on packages: Source of Fibre (at least 2 grams of fibre per serving), High Source of Fibre (at least 4 grams fibre per serving), or Very High Source of Fibre (at least 6 grams fibre per serving). See the table in the '*What foods are higher sources of fibre?*' section below.⁸

What foods are higher sources of fibre?

In addition to comparing the Nutrition Facts tables on food labels, individuals should look for foods with the nutrient content claims in the table below.⁸ Examples of foods that meet the requirements for each of the fibre nutrient content claims are also listed.⁹

Fibre

Applicable to: Nurses, Physicians and Other Health Professionals

Serving size = ½ cup (125 mL) unless other amounts are listed

Fibre source	Very high source of fibre At least 6 grams fibre per serving	High source of fibre At least 4 grams fibre per serving	Source of fibre At least 2 grams of fibre per serving
Vegetables		<ul style="list-style-type: none"> • peas, green • potato, baked with skin, medium • artichoke, medium • edamame 	<ul style="list-style-type: none"> • sweet potato, yam • winter squash, parsnip, turnip • spinach, okra, broccoli, Brussels' sprouts, carrots, green beans or corn, cooked
Fruit		<ul style="list-style-type: none"> • pear with skin, medium • raspberries • blackberries 	<ul style="list-style-type: none"> • apple, kiwi, banana, orange, medium • apricot, fresh (3), canned ½ cup (125 mL), and dried ¼ cup (60 mL) • blueberries, strawberries • cooked rhubarb • dates, figs or prunes, dried, ¼ cup (60 mL) • grapefruit, papaya, ½ medium
Grain Products	<ul style="list-style-type: none"> • All Bran Buds®, ½ cup (75 mL) • Fibre One® cereal • All Bran Original® or 100% bran cereal • wheat bran, natural • Raisin Bran® cereal, 1 cup (250 mL) • Shreddies® cereal, 1 cup (250 mL) • Shredded Wheat®, 2 biscuits • Shredded Wheat 'n Bran®, Spoon Size, 1 cup (250 mL) 	<ul style="list-style-type: none"> • All Bran Flakes®, 1 cup (250 mL) • Corn Bran® cereal, 1 cup (250 mL) • oat bran, cooked, ¾ cup (175 mL) • Red River® cereal, cooked, ¾ cup (175 mL) • oat bran muffin, homemade, medium • Weetabix®, 2 biscuits • hulled barley • wheat berries 	<ul style="list-style-type: none"> • bread: whole grain whole wheat, rye, or pumpernickel bread, 1 slice • oatmeal, cooked, ¾ cup (175 mL) • whole grains: barley, bulgur, cracked wheat, buckwheat, whole wheat pasta, medium grain brown rice, quinoa, cooked • pita, whole wheat, ½ • bran muffin, homemade, medium • popcorn, air-popped, 2 cups (500 mL)

Fibre

Applicable to: Nurses, Physicians and Other Health Professionals

Fibre source	Very high source of fibre At least 6 grams fibre per serving	High source of fibre At least 4 grams fibre per serving	Source of fibre At least 2 grams of fibre per serving
Meat Alternatives	<ul style="list-style-type: none"> • beans or lentils, cooked, ¾ cup (175 mL) • chickpeas, cooked, ¾ cup (175 mL) • chia seeds, 2 Tbsp (30 mL) 	<ul style="list-style-type: none"> • almonds, sesame seeds, ¼ cup (60 mL) • edamame (green soybeans) • split pea soup, 1 cup (250 mL) • split peas, ¾ cup (175 mL) • flax seeds, ground, 2 Tbsp (30 mL) • hummus, ¼ cup (60 mL) 	<ul style="list-style-type: none"> • nuts: brazil nuts, hazelnuts, macadamia, peanuts, pecans, pistachios, walnuts, ¼ cup (60 mL) • peanut butter, 2 Tbsp (30 mL) • seeds: pumpkin or sunflower, ¼ cup (60 mL)

Fibre amounts from Canadian Nutrient File, 2010. Fibre amounts are from product labels where brand names are listed.

Why should fluid intake be increased with an increase in fibre intake?

The relationship between fibre and fluid is not completely understood. There are some studies that indicate high fibre diets increase fecal water loss significantly.¹⁰

The Academy of Nutrition and Dietetics (formerly the American Dietetic Association) recommends that individuals increase fluid intake when increasing fibre intake to replace the fecal fluid losses that occur with higher stool weight.⁵ Individuals should meet at least the minimum daily fluid requirements for their age group (*refer to guideline: General Healthy Eating for Children and Adults*).

What is the difference between soluble and insoluble fibre?

Many higher fibre foods contain both soluble and insoluble fibre.

Soluble fibre is a soft fibre that dissolves in water. It helps lower blood cholesterol and control blood sugars.⁵ Soluble fibre can also be helpful in alleviating constipation.¹¹

Best sources of soluble fibre are oat bran, oatmeal, legumes such as beans and lentils, apples, strawberries, citrus fruits, barley and psyllium husks (added to cereals such as All Bran Buds®).

Insoluble fibre does not dissolve in water. It helps prevent constipation, keeps the digestive system healthy and may lower the risk of certain cancers and heart disease.⁵

Best sources of water insoluble fibre are wheat bran, whole grain foods such as whole grain breads and cereals, vegetables and fruits (especially those with seeds and skins) and legumes, such as peas, beans and lentils.

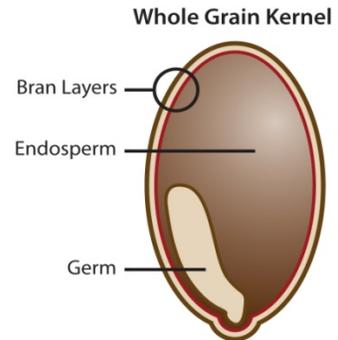
Refer to Guideline: Vegetable and Fruit Intake

Fibre

Applicable to: Nurses, Physicians and Other Health Professionals

What is a whole grain?

Whole grains¹² are made of the entire grain kernel. The kernel has three parts: the outer bran layer, the endosperm and the germ. Each part has important nutrients.



Refined grains have all or part of the bran and germ removed. They don't have important nutrients like fibre, vitamins, and minerals. Examples of refined grains are white flour, white rice, grits, and cream of wheat.

Some refined grains have been enriched, which means that some vitamins and minerals that were lost during processing are added back. Many refined grains are enriched with iron and some B vitamins. An example of an enriched grain is white flour. Enriched refined grains are still missing some nutrients that are found in whole grains.

Whole grains provide carbohydrates, fibre, protein, B vitamins, iron, zinc, magnesium, and plant compounds called phytonutrients.

Canada's Food Guide recommends that everyone should make at least half of their grain products whole grain each day.⁶ Eating whole grains regularly has health benefits, some of which are not yet clearly understood. Some studies indicate that higher consumption of whole grains results in a lower risk of Type 2 diabetes, cardiovascular disease, and weight gain.¹³

Are all whole grains higher sources of fibre?

All whole grains have fibre; many whole grains, but not all, are higher sources of fibre. Some whole grains, such as long grain brown rice, have less than the 2 grams fibre per serving⁹ required to be called a *Source of fibre*. (Note: *medium* grain brown rice is a *Source of fibre*; see table in 'What foods are higher sources of fibre?' section above). Individuals should read the Nutrition Facts tables on food packages, and choose whole grain products with higher amounts of fibre.

How can individuals be sure they are eating whole grains?

The best way to know if a food is really whole grain is to read the ingredient list.

- Choose grain products with whole grains listed as the first grain ingredient.
- In the ingredient list, the grains below should have the words **whole** or **whole grain** in front of their name.^{8,14}
 - whole grain whole wheat
 - whole rye
 - whole grain (or hulled) barley
 - whole wheat berries
 - whole spelt

Fibre

Applicable to: Nurses, Physicians and Other Health Professionals

- The grains below don't need the words **whole** or **whole grain** in front of them because they are used only as whole grains in foods.^{8,14}

<ul style="list-style-type: none"> • amaranth • buckwheat • bulgur • cornmeal • cracked wheat 	<ul style="list-style-type: none"> • kamut • millet • oats and oatmeal • popcorn • quinoa 	<ul style="list-style-type: none"> • sorghum • sprouted wheat • teff • triticale • wild or brown rice
--	--	--

- When a food package says the food is whole grain, read the ingredient list to find out for sure. The food might have some whole grains and some refined grains.
- Foods with the following words in the ingredient list may have little or no whole grain in them.¹⁵
 - bran
 - degerminated corn meal
 - durum wheat
 - enriched flour
 - multigrain
 - organic flour
 - pearl barley
 - semolina
 - stoneground
 - wheat
 - wheat flour
 - wheat germ

More tips to find whole grain foods

- Whole wheat bread is made with whole wheat flour. In Canada, whole wheat flour may have much of the germ removed. 100% whole wheat bread may not be whole grain, but is still a healthy choice.¹² Look for bread and bread products made with whole grain whole wheat.
- Multi-grain foods have more than one kind of grain, but they may not be whole grains. Read the ingredient list to find out if there are any whole grains in the food.
- Barley comes in a few different forms.
 - Pearl barley is a refined grain.
 - Pot barley has some of the bran layer removed.
 - Whole grain (or hulled) barley has the bran, endosperm, and germ.
 - Pot and hulled barley are healthy choices.
- Don't let the colour of the grain product fool you. Just because a food like bread is brown does not mean it is a whole grain. The brown colour could be from added ingredients like molasses.
- Amaranth, flax, and wild rice are seeds, not grains; however, they are used like grains and are very nutritious.

Should individuals take fibre supplements or laxatives?

The best way for an individual to get the fibre needed in their diet is from fibre-containing foods.⁵ Although some fibre supplements may be helpful, few have been studied for physiological effectiveness. Also, fibre supplements and laxatives lack many nutrients found in higher fibre foods.

Fibre

Applicable to: Nurses, Physicians and Other Health Professionals

Soluble fibre may be helpful in alleviating constipation.¹¹ It is safe to use concentrated fibre sources such as Metamucil®, plain Prodiem®, or inulin powders such as Benefibre® (For more information about inulin see *Are there other sources of dietary fibre?* section below.) Starting with a half or a quarter of the regular dose and increasing slowly is recommended. It is important to drink lots of fluid when taking a fibre supplement. Commercial laxatives should not be used long term. If constipation is an ongoing problem a physician should be consulted.

Refer to Guideline: Constipation

Are there any other sources of dietary fibre?

Inulin is a starchy substance (oligosaccharide) found in a wide variety of fruits, vegetables, and herbs. It is commonly obtained by soaking chicory roots in hot water.¹⁶ Inulin was called a novel fibre before it was accepted for use in food by Health Canada.

Inulin is a prebiotic because it promotes the growth of specific beneficial types of bacteria in the large intestine. It has been shown to decrease constipation and hypertriglyceridemia; there is no significant evidence of other health benefits.¹⁶ Inulin has been reported to cause flatulence, bloating, gastrointestinal cramps, and intestinal noises.¹⁶

Inulin is now added to some cereals, granola bars, yogurts, and other products that contain the following ingredients:¹⁶

- chichory extract
- chichory inulin
- dahlia extract
- dahlia inulin
- fructo-oligosaccharides
- fructooligosaccharides
- long-chain oligosaccharides
- oligosaccharides
- prebiotic

Because inulin is an accepted source of fibre, it is included in the fibre amount in the Nutrition Facts table on food packages, and consumers cannot tell how much of the fibre is from inulin.

Evidence about the safe use of prebiotics such as inulin during pregnancy is minimal. However, there is a lack of evidence suggesting harm.^{17,18,19,20} If a pregnant woman is considering consuming prebiotics, it would be prudent to do so in moderation and in common food products, or under physician/dietitian guidance.

Refer to guideline: Pregnancy

Are there any handouts on fibre I can use with my clients?

Refer to approved provincial Alberta Health Services nutrition handouts to support patient education. For more information, contact Nutrition.Resources@albertahealthservices.ca

FibreApplicable to: Nurses, Physicians and Other Health Professionals

References

1. Health Canada. Policy for Labelling and Advertising of Dietary Fibre-Containing Food Products [Internet]. 2012 February [cited 2012 Oct 23]. Available from: <http://www.hc-sc.gc.ca/fn-an/legislation/pol/fibre-label-etiquetage-eng.php#a1>
2. American Heart Association Nutrition Committee, Lichtenstein AH, Appel LJ, Brands M, Daniels S, Franklin B et al. Diet and lifestyle recommendations revision 2006. A scientific statement from the American Heart Association Nutrition Committee. *Circulation*. 2006 114(1):82-96
3. Fletcher B, Berra K, Ades P, Braun LT, Burke LE, Durstine JL et al. Managing abnormal blood lipids: A collaborative approach. *Circulation*. 2005;112(20):3184-209.
4. World Cancer Research Fund / American Institute for Cancer Research. Food, Nutrition, Physical Activity, and the Prevention of Cancer: a Global Perspective. Washington, DC: AICR, 2007.
5. Slavin JL. Position of the American Dietetic Association: Health implications of dietary fiber. *J Am Diet Assoc*. 2008;108(10):1716-31.
6. Health Canada. Eating Well with Canada's Food Guide [document on internet]. 2007.[cited 2012 Dec 12] Available from: http://www.hc-sc.gc.ca/fn-an/food-guide-aliment/index_e.html
7. Committee on Scientific Evaluation for Dietary Reference Intakes. Dietary reference intakes for water, potassium, sodium, chloride and sulfate [book on internet]. Washington (DC): National Academies Press. 2004 [cited 2012 Dec 12]; Available from: http://books.nap.edu/openbook.php?record_id=10925&page=R1
8. Canadian Food Inspection Agency. Guide to Food Labelling and Advertising [document on Internet]. [updated 2012 Jan 12; cited 2012 Oct 25]. Available from: <http://www.inspection.gc.ca/food/labelling/guide-to-food-labelling-and-advertising/eng/1300118951990/1300118996556>
9. Health Canada. Canadian Nutrient File, 2010 [database on internet]. 2010 [cited 2012 Dec 12]. Available from: <http://webprod3.hc-sc.gc.ca/cnf-fce/index-eng.jsp>
10. Otten JJ, Hellwig JP, Meyers LD, editors. Dietary Reference Intakes: The Essential Guide to Nutrient Requirements. Washington (DC): The National Academies Press; 2006
11. Escott-Stump S. Nutrition and diagnosis-related care. 6th ed. Lippincott Williams & Wilkins; 2008.
12. Health Canada. Whole Grains – Get the Facts [document on Internet]. [updated 2012 July 12; cited 2012 Oct 31]. Available from: <http://www.hc-sc.gc.ca/fn-an/nutrition/whole-grain-entiers-eng.php>
13. Qing Ye E, Chacko SA, Chou EL, Kugizaki M, Liu S. Greater whole-grain intake is associated with lower risk of Type 2 diabetes, cardiovascular disease, and weight gain. *J. Nutrition*. 2012;142:1304-13
14. Duyff RL. American Dietetic Association. Complete Food and Nutrition Guide. 4th ed. Hoboken: John Wiley & Sons; 2012
15. Beck L. Foods That Fight Disease: A nutrition guide to staying healthy for life. Toronto: Penguin Canada; 2008. p. 142-143.
16. Natural Medicines Comprehensive Database [database on internet]. Inulin. [about 2 screens]. 2012 [updated 2012 Feb 24; cited 2012 Oct 31]. Available from: [http://www.naturaldatabase.com/\(S\(fu1hrm55x42fwn554qirokid\)\)/nd/Search.aspx?cs=CHA&s=ND&pt=100&id=1048&ds=&name=INULIN](http://www.naturaldatabase.com/(S(fu1hrm55x42fwn554qirokid))/nd/Search.aspx?cs=CHA&s=ND&pt=100&id=1048&ds=&name=INULIN)
17. Henquin, JC. Reproduction toxicity: Study on the influence of fructooligosaccharides on the development of foetal and postnatal rat. Raffinerie Tirlemontoise Internal Report. 1988

Applicable to: Nurses, Physicians and Other Health Professionals

18. Sleet, R, Brightwell J. FS-Teratology Study in Rats. Raffinerie Tirlemontoise Internal Report. 1990.
19. van Vlies N, Hogenkamp A, Thijssen S, Dingjan GM, Knipping K, Garssen J, et al. Effects of short-chain galacto- and long-chain fructo-oligosaccharides on systemic and local immune status during pregnancy. [J Reprod Immunol](#). 2012 Jun;94(2):161-8.
20. Desbaurds N, Goubeyre P, Haure-Mirande V, Darmaun D, Champ M, Bodinier M. Impact of prenatal prebiotic consumption on gestating mice and their offspring: a preliminary report. *British Journal of Nutrition*. 2012 May;107(9):1245-8