



## SPORT NUTRITION

Do you pack nutrition  
as part of your equipment?

Check out these tips on  
food intake & fluid replacement  
for athletes and  
active individuals.

# Carbohydrate: the fuel of champions

Carbohydrate is stored as glycogen in muscles and liver. Glycogen is the "quick energy" for muscle activity. Do you get enough carbohydrate?

## How much carbohydrate do I need?

Carbohydrate is found in a variety of foods in every food group. More active individuals need more carbohydrate. Use the table below to help you get enough carbohydrate and meet all your other nutrient needs.

RECOMMENDED NUMBER OF FOOD GUIDE SERVINGS PER DAY*			
FOOD GROUP	AESTHETIC SPORTS (e.g. gymnastics)	MOST ATHLETES	ENDURANCE SPORTS (e.g. cross-country skiing)
VEGETABLES & FRUIT	Minimum 6-7	8-14+	15+
GRAIN PRODUCTS	Minimum 6-7	8-14+	15+
MILK & ALTERNATIVES	Minimum 3	3-4	4-6
MEAT & ALTERNATIVES	Minimum 2-3	2-3	3-4

Adapted from Coaching Association of Canada ([www.coach.ca](http://www.coach.ca)) for teens and adults (ages 14+ years)

\*See [www.healthcanada.gc.ca/foodguide](http://www.healthcanada.gc.ca/foodguide) for examples of Food Guide Servings

## How can I maximize muscle glycogen—the quick energy for muscle activity?

In addition to eating a high carbohydrate diet regularly, athletes involved in longer duration and/or intense activity can take the steps outlined below.

- Eat or drink high carbohydrate foods (i.e. fruit/fruit juice, fruit yogurt, crackers, chocolate/flavoured milk, bagels, cereal, low fat granola bars), ideally within the first 15–30 minutes of finishing activity.
- Consume several high carbohydrate snacks in the 2–4 hours after exercise. Be sure to follow up your snacks with a high carbohydrate meal (see the best carbohydrate food choices listed on this page).
- Include rest days after hard training or prior to competition (along with adequate carbohydrate intake), to ensure maximum filling of muscle energy stores. Remember, muscle glycogen stores take 24–48 hours to refill completely.
- Recent research has shown that chocolate milk is as effective (or better!) than commercial products designed for recovery from a rigorous workout. In addition to helping replace lost fluids, the amount of carbohydrate and protein in chocolate milk is ideal for exhausted muscles.

## BEST CARBOHYDRATE FOOD CHOICES

The best carbohydrate food choices are nutritious high carbohydrate foods from the four food groups. Foods such as fruit, potatoes, bread, pasta, rice, cereal, legumes, milk (regular, chocolate or flavoured), and fruit flavoured yogurt are preferred to less nutritious, high carbohydrate foods like sugar, candy and soft drinks, and meet your other nutrient needs.

**NOTE: Consume enough carbohydrate-rich foods before, during and after long, intense activity.**

## Why are carbohydrate foods so important?

Muscle glycogen depletion can occur during long, steady, intense activity (e.g. marathon running, cycling, cross-country skiing) and strenuous, intermittent bouts of exercise (e.g. hockey, volleyball, basketball, soccer).

Depletion can also occur over several days during training camps, tournaments, or repeated endurance training sessions without consuming enough dietary carbohydrate.

- Depleted glycogen stores lead to reduced endurance, fatigue and exhaustion.
- Eating carbohydrate foods is the only way to maintain and refill muscle glycogen stores.
- Carbohydrate needs vary from person to person (even within a specific sport). The recommended number of Food Guide Servings needs to be determined on an individual basis.

# Fluid: a constant need

## How much do I need?

1. Drink the recommended amount of fluid every day (see chart below).

RECOMMENDED DAILY FLUID INTAKE FROM BEVERAGES			
TEENS		ADULTS	
14-18 YEARS		19+ YEARS	
(FEMALE)	(MALE)	(FEMALE)	(MALE)
1.8L (8 CUPS)	2.6L (11 CUPS)	2.2L (9 CUPS)	3L (13 CUPS)

Source: Dietary Reference Intakes for Water, Potassium, Sodium, Chloride and Sulfate. National Academy of Sciences, 2004

2. Consume additional fluid with activity and in warm conditions.

## After Exercise:

Quenching thirst may not satisfy the body's need for fluid. Follow these guidelines to ensure adequate rehydration:

- Drink 1.5 litres of fluid for each kg of weight loss during exercise (or 3 cups of fluid for each pound).
- Monitor urine colour and amount. A small amount of dark urine is a sign of dehydration. Plenty of pale urine during the day is a sign of sufficient fluid intake.

**NOTE: Consuming milk, juice, soup, etc. "counts" as part of fluid intake.**

## What about "Sport Drinks"?

### During activity:

- Plain, cool water is sufficient for events or workouts lasting **one hour or less**. Consume plenty of plain, cool water before, during and after exercise.
- Beverages containing about 4–8% carbohydrate are beneficial when intense physical activity lasts **longer than one hour**, as the carbohydrate they contain helps to maintain blood glucose levels. Check the labels of purchased sport drinks; look for approximately 40–80 g of carbohydrate (glucose, glucose polymer, maltodextrin and/or sucrose) per 1 litre of prepared beverage.
- If you plan to use a commercial sport drink during an event, try it first in training.
- Make your own sport drink: mix equal volumes of fruit juice and water, and add a small "pinch" of salt.

### After activity:

- The carbohydrate-to-protein ratio and fluid in chocolate milk make it a great recovery beverage. It provides carbohydrate to refuel muscles, protein to help muscle repair and fluid & electrolytes for rehydration.

## Why is fluid so important?

Fluid's most important role during activity is body temperature regulation. Active muscles generate heat, which must be removed. The evaporation of sweat from skin is the most effective way to cool the body. Heavy or prolonged sweating can lead to dehydration which is a major cause of fatigue and poor performance. It increases the risk of cramps, heat exhaustion and life threatening heat stroke. Dehydration can also delay recovery after exercise.



## Protein: fact & fiction

An important function of protein in the diet of active individuals is to build, repair and maintain muscle tissue.

Those involved in strenuous endurance or strength training experience an increased requirement for protein (approximately 1½–2 times that of sedentary individuals). This extra need for protein is **easily** met through food. Follow Canada's Food Guide—it has a generous allowance for protein that covers even the highest protein need. Consume at least the recommended number of Food Guide Servings in Milk & Alternatives and Meat & Alternatives.

- Meat, fish, poultry, milk, cheese, eggs, or a combination of legumes, grains, nuts and seeds provide excellent quality protein and other essential nutrients.
- Protein beyond the body's requirement is broken down for use as energy or stored as fat. Excess protein can also contribute to fluid loss.

## Vitamins, minerals & other healthy stuff

To consume the most vitamins, minerals and other health protective compounds from food, choose a wide variety of foods and consume at least the recommended number of Food Guide Servings from each food group every day.

Follow specific Food Guide tips to make the healthiest choices, i.e.,

- eat at least one dark green and one orange vegetable each day
- make at least half of your grain products whole grain each day
- drink skim, 1% or 2% milk each day
- have meat alternatives such as beans, lentils and tofu often
- eat at least 2 Food Guide Servings of fish each week

For athletes who choose to use a supplement, a "multi" type preparation, taken once a day, is the safest practice. In accordance with the Food Guide recommendations, everyone over 50 should take a 400 IU (10 µg) vitamin D supplement each day.

## Iron and performance

Some individuals (especially active females) are prone to iron deficiency, which can lead to anemia. Anemia can cause excessive fatigue during workouts, slow recovery and lack of energy. This is understandable, as iron in red blood cells is responsible for delivering oxygen to working muscles. The following information will help maximize the body's iron stores:

- Consume plenty of iron-containing foods (meat, legumes, dark green vegetables, dried fruit and enriched grains). NOTE: The iron in meat is more readily absorbed than other sources.
- Consume meat, fish or poultry, or a vitamin C-containing food (e.g., oranges, strawberries, tomatoes) with non-meat sources of iron (e.g., legumes, grains) to enhance iron absorption.
- Tea and coffee contain compounds that decrease the amount of iron your body can absorb from non-meat sources. Avoid consuming tea or coffee with your meal. (If drinking these beverages, have them at least one hour before or after your meal).

A physician can monitor iron status with comprehensive blood tests. Follow directions if a supplement is prescribed. Do not take iron supplements without a physician's advice. Men especially should heed this advice, as men typically have adequate iron. Supplementation can lead to excess iron and serious health consequences.

# Eating at competition time

## The Pre-Event Meal

It's important that meals eaten before competition are high in carbohydrate, low in fat and consumed 2–3 hours before the event. Fat takes longer to digest and may lead to discomfort if eaten close to strenuous activity. Consume fluid with the meal. Avoid gas forming or unfamiliar foods and alcohol.

Fibre may also need to be limited since it takes longer to digest or moves too quickly through the digestive tract if you are nervous before an event. Both situations may lead to discomfort during an event.

Examples of pre-event meals:

- Cereal, milk, fruit, toast
- Yogurt, bagel, fruit
- Soup, sandwich with lean meat, milk
- Small portion of pasta with tomato sauce
- Toast, egg, milk

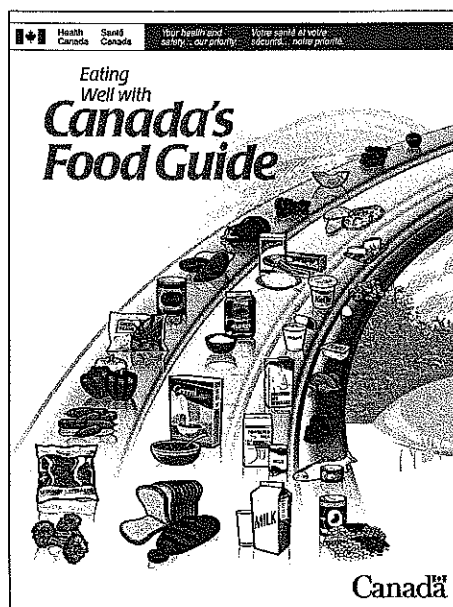
Choose smaller amounts of similar foods if there is less than 2–3 hours before the event.

## Maintaining Your Training Diet Away From Home

- If **travel** time is longer than a few hours, **pack snacks** (sandwiches, bagels, milk, chocolate milk, yogurt, juice, fruit, cereal bars, cheese, crackers, peanut butter) rather than having to purchase whatever is available at gas stops. Carry a full bottle of water.
- If **meals** are consumed **en route**, plan stops in advance to ensure that good food choices are made (choose a restaurant that serves pasta or thick crust pizza instead of fries & burgers). Do not consume alcohol prior to competing.
- If travelling by **plane**, drink plenty of water during the flight. Even a few hours in the air can cause significant dehydration. Take your own water bottle and pack your own snacks.

- Eat a good **dinner** the night before competition begins, or a substantial lunch if the first event is in the evening. A meal high in carbohydrates is ideal for energy (pasta's great). Consume lots of fluids.
- At **restaurants**, to ensure a balanced, high carbohydrate, lower fat meal, order extra rolls, rice, pasta, or baked potato (instead of fries), milk or juice, salad dressing on the side or toast lightly buttered. Go easy on the sauces or mayonnaise when ordering sandwiches or burgers. Avoid battered, deep-fried meat and fish.
- If competition or games take place throughout the day, athletes may not have the time or inclination to eat normal "meals." In this case, schedule **snacks** around events to maintain energy levels. Find out in advance what the canteen will sell or if stores and restaurants nearby will be open. If available food is not satisfactory, you may wish to take your own. Non-perishable items like juice, fruit, crackers, bagels, cheese—even a jar of peanut butter and a loaf of bread help ensure the energy consumed also supplies the nutrients so important to good performance. Pack a cooler with milk, yogurt, and juice.
- Keep a large jug of **water** or sport drink with cups on hand for drinks during and between events. Consume water regularly during the day in addition to soups, milk, juice and other fluids.
- Eat **supper** after a full day of competition, even if tired. This helps ensure the body is well-fuelled for the next day of competition. Include carbohydrate foods and fluids.
- Athletes too **nervous** or upset to eat much during competition should know what they are able to tolerate (even if it's just soup, milk, sport drinks or juice). Be sure these choices are available. Meal replacement beverages (e.g. Boost™, Ensure™) may be useful.

# Eating for energy? Use Canada's Food Guide!



The "formula" for a peak performance diet is no secret. Canada's Food Guide is the starting point to plan food choices.

- Choose at least the **recommended number of Food Guide Servings** suggested in each food group every day for basic healthy eating (see table below).
- Choose more servings of **VEGETABLES & FRUIT** and **GRAIN PRODUCTS** to meet the higher energy needs associated with strenuous activity. These food groups provide the **carbohydrate** for muscle fuel.
- Choose a **variety** of foods from each group every day as no single food or food group supplies all the nutrients athletes and active individuals need. Remember that pills, powders or nutritional supplements cannot replace food.

RECOMMENDED NUMBER OF FOOD GUIDE SERVINGS PER DAY						
FOOD GROUP	TEENS		ADULTS			
	14-18 YEARS (FEMALE)	(MALE)	19-50 YEARS (FEMALE)	(MALE)	51+ YEARS (FEMALE)	(MALE)
VEGETABLES & FRUIT	7	8	7-8	8-10	7	7
GRAIN PRODUCTS	6	7	6-7	8	6	7
MILK & ALTERNATIVES	3-4	3-4	2	2	3	3
MEAT & ALTERNATIVES	2	3	2	3	2	3

## VEGETABLES & FRUIT

### EXAMPLES OF 1 FOOD GUIDE SERVING

- ½ cup (125 mL) fresh, frozen or canned vegetables or fruit
- 1 medium piece fruit or vegetable
- 1 cup (250 mL) raw leafy greens
- ½ cup (125 mL) 100% juice

"Nature's Vitamin Pill", these foods are excellent sources of vitamins, minerals and other health protectors that can aid muscle repair.

**Eat at least one dark green and one orange vegetable each day.**

## GRAIN PRODUCTS

### EXAMPLES OF 1 FOOD GUIDE SERVING

- 1 slice of bread
- ½ cup (125 mL) cooked rice or pasta
- ½ bagel or flatbread
- Cereal: 1 oz (30 g) cold; ¾ cup (175 mL) hot

The carbohydrates in grain products are an important muscle fuel source for exercise and essential for recovery.

**Make at least half of your grain products whole grain each day.**

## MILK & ALTERNATIVES

### EXAMPLES OF 1 FOOD GUIDE SERVING

- 1 cup (250 mL) milk
- ¾ cup (175 mL) yogurt
- 1½ oz (50 g) cheese

The carbohydrate-to-protein ratio and fluid in chocolate milk make it a great recovery beverage.

**Drink skim, 1% or 2% milk each day; drink fortified soy beverage if you do not consume milk.**

## MEAT & ALTERNATIVES

### EXAMPLES OF 1 FOOD GUIDE SERVING

- 2½ oz (75 g) cooked fish, shellfish, poultry or lean meat, cooked
- ¾ cup (175 mL) cooked legumes or tofu
- 2 eggs
- 2 T (30 mL) peanut butter or other nut butter
- ¼ cup (60 mL) shelled nuts or seeds

These foods provide protein—essential for building and repairing muscle and other tissue. The iron in red meat is well absorbed and legumes are a great source of carbohydrate.

**Have meat alternatives (beans, lentils and tofu) often. Eat at least 2 Food Guide Servings of fish each week.**

## LIMIT CONSUMPTION OF...

foods that contain energy, but provide little nutrition... cakes, pastries, candy, chocolate, donuts, ice cream and frozen desserts, french fries, potato chips, nachos and other salty or high fat snacks, soft drinks.

# Are your food choices “sport smart”?

At the end of the day, use the space below to write down everything you’ve eaten: all meals, snacks and beverages. Include as much detail as possible. This is your Food Record.

MORNING

MID - DAY

EVENING

## How Fit is Your Foodstyle?

Compare your Food Record to Canada’s Food Guide and answer these questions:

- Have you consumed at least your recommended number of Food Guide Servings in each food group? .....  YES  NO
- Do you eat a variety of foods? .....  YES  NO
- Have you consumed extra fruit, starchy vegetables and grain products for energy? .....  YES  NO

If you answered “no” to any of these questions, how will you improve? Write your plan here:

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## How is Your Carbohydrate Intake?

Check your Food Record and answer these questions:

- Are most of your carbohydrate foods from food groups (e.g. bread, pasta, rice, cereal, legumes, fruit, milk, chocolate milk, yogurt) vs. candy or sweets? .....  YES  NO
- Are you consuming enough carbohydrate foods for your training level? (See “How much carbohydrate do I need?” in Carbohydrate: the fuel of champions) ..  YES  NO

If you answered “no” to any of these questions, how will you improve? Write your plan here:

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## How is Your Fluid Intake?

Check your Food Record and answer these questions:

- Do you drink fluids during workouts, practices or events? .....  YES  NO
- Did you drink at least 2 L (8 cups) of fluid throughout the day (includes juice, milk, soups)? .....  YES  NO
- Do you produce plenty of pale-coloured urine during the day? .....  YES  NO

If you answered “no” to any of these questions, how will you improve? Write your plan here:

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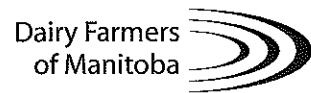


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