

Achieving Healthy Nutrient Intakes

The Contributions of Lean Beef

June 2002

Current Science for Your Practice

This issue of Nutrition Perspective focuses on the eating habits of Canadians and current evidence on the role of key nutrients in promoting optimal health. Strategies are highlighted to help Canadians meet essential nutrient requirements based on a balanced approach to healthy eating.

Balancing food choices is essential for achieving healthy nutrient intakes. A lack of balance may compromise physical and cognitive development, energy metabolism, heart health and immunity and may also contribute to obesity. The *Healthy Eating with Z-I-P* consumer fact sheet, that accompanies this issue of Nutrition Perspective, highlights key nutrients for optimal energy metabolism, growth and immunity. It can be used to encourage people to strike a healthy balance.

NEWS YOU CAN USE ON HEALTHY EATING AND LEAN BEEF

Each food and food group supplies its own set of nutrients. Lean red meats, such as beef, are an important source of highly available iron and zinc, high quality protein and B-vitamins - nutrients that are essential for optimal health at every stage of life.

- Iron and zinc are essential for children's healthy growth and development.
- Lean beef can easily be part of a heart healthy diet to lower cholesterol.
- Iron, zinc, protein and B-vitamins play key roles in energy metabolism.
- Mild zinc deficiencies, that are difficult to diagnose, compromise immunity.
- Balanced diets, that include lean beef, help meet our needs for essential nutrients.

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HOW HEALTHY ARE CANADIAN EATING HABITS?

Dietary guidelines to promote optimal health emphasize the importance of a balance of foods from all four food groups as recommended by *Canada's Food Guide to Healthy Eating (CFGHE)*.^{1,2,3} Recent research indicates that the eating patterns of many Canadians lack the necessary balance to meet their daily requirements for essential nutrients, especially iron, calcium and folate.⁴

- Half of Canadians eat fewer than the minimum servings from at least one food group.^{4,5}
- On average, about one third of our daily energy (calories) and fat comes from "Other Foods".^{5,6}

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Low Intakes of Iron, Calcium and Folate

Recent food intake data from the *Food Habits of Canadians (FHC)* study, and Quebec⁷ and Nova Scotia⁸ nutrition surveys indicate low or marginal intakes of iron, calcium and folate.⁴ Average iron and calcium intakes in the Saskatchewan Nutrition Survey were also lower than recommendations.⁹

Focus on Fat - Changing Nutrition Issues

The FHC study indicates that Canadians have successfully reduced their mean fat intake to 30% of energy.^{5,6} However, in the average Canadian diet, more energy and fat comes from the “Other Foods” category than any one of the four food groups.⁵ To strike a healthier balance without increasing fat intake, Canadians should be encouraged to focus on meeting serving recommendations with nutrient dense foods from the four food groups and decrease their intake of “Other Foods” that are high in energy and fat.

One Third of Energy and Fat comes from “Other Foods”⁵

Examples:

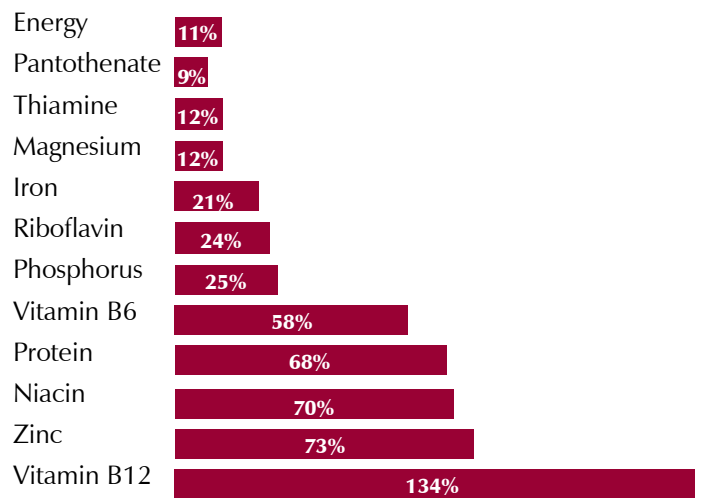
- ⇒ fats and oils (butter, margarine and salad dressing)
- ⇒ snack foods (chips and candies)
- ⇒ dessert items (pastries, cakes, cookies and pies)
- ⇒ carbonated beverages and fruit drinks

Nutrition Strategy for Healthy Nutrient Intakes

Many Canadians with low intakes of iron, calcium and folate could benefit from eating more nutrient dense foods from the four food groups. Education about the displacement of food group selections by “Other Foods”, that are high in energy and fat, is a good starting point to help people understand how they can better balance their food choices to meet their nutrient needs.⁴

Nutrient Contributions of Beef

Percentage of daily Recommended Nutrient Intakes provided by a 100 gram serving of cooked lean beef (approximately 125 g uncooked)*



* These figures are based on the average of 23 cuts and are expressed as a percentage of the daily Recommended Nutrient Intakes (RNI) of an adult female. RNIs were used as Recommended Dietary Allowances have yet to be established for energy and protein.

Table 1: Percentage of population not eating minimum servings recommended by Canada's Food Guide to Healthy Eating⁴

	GRAIN PRODUCTS 5-12 SERVINGS	VEGETABLES AND FRUIT 5-10 SERVINGS	MILK PRODUCTS 2-4 SERVINGS	MEAT AND ALTERNATIVES 2-3 SERVINGS
Female Adults (18 to 65 years)	30%	58%	62%	46%
Male Adults (18 to 65 years)	33%	50%	54%	26%
Female Teens (13 to 17 years)	44%	44%	56%	57%
Male Teens (13 to 17 years)	29%	57%	50%	38%

Iron Resources

Iron for all Ages - Iron for Health is a resource for health professionals which includes practice tips and information on function, deficiency, populations at risk, dietary recommendations, absorption and safety. Complementary client pamphlets on iron issues for infants, adolescent females and adult women are also available. To view a copy visit: www.beefinfo.org/pdf/IAAH.pdf

HEALTHY GROWTH AND DEVELOPMENT

Key Nutrients for Healthy Pregnancy Outcomes

More than 50% of Canadian women surveyed in the FHC study ate fewer than the minimum number of servings recommended by *CFGHE* for food groups rich in iron, calcium and folate.⁴ Data also indicate that one in four Canadian women fail to meet the Recommended Dietary Allowance for zinc.⁵ Red meats, such as beef, are one of the best sources of highly bioavailable iron and zinc, two nutrients of critical importance for healthy physical and cognitive development.¹⁰

Iron - Pregnancy Outcomes and Child Development

Iron deficiency in pregnancy increases the risk of pre-term delivery and subsequent low birth weight.¹¹ In children, iron deficiency is associated with developmental delays and behavioural disturbances.¹⁰ In addition, research suggests that iron deficiency in the early years may have long-lasting effects.^{12,13}

Zinc - Essential for Healthy Fetal Development

Fetal growth and birth weight have also been associated with maternal zinc intake.¹⁴ Maternal consumption of animal foods rich in zinc has been positively associated with higher neonatal attention scores.¹⁵ Zinc repletion during the first 8 weeks of life has been shown to improve behavioural ratings in low-birth-weight infants.¹⁶

For more information on "Nutrition for a Healthy Pregnancy National Guidelines for the Childbearing Years" visit:

www.hc-sc.gc.ca/hppb/nutrition/pub/pregnancy/e_index.html

Risk of Iron and Zinc Deficiency in Infancy

The risk of iron deficiency increases after 6 months of age if infants are without an additional source of iron.¹⁷ Recently, the risk of zinc deficiency in the second half of the first year has also been noted in breastfed infants.¹⁸ A review of common feeding practices found that early complementary foods are typically iron-fortified, but low in zinc.¹⁸

Nutrition Strategy for Infants Over 6 Months:

One strategy to promote adequate intakes of iron and zinc is to introduce meat as an early complementary food in the second half of the first year. Several studies of breastfed infants older than 6 months suggest that increased meat intake helps infants meet both iron and zinc requirements.¹⁸

For more information on "Nutrition for Healthy Term Infants" visit: www.hc-sc.gc.ca/hppb/childhood-youth/cyfh/homepage/nutrition/index.html

Growth-Limiting Zinc Deficiencies and Bone Health

Marginal zinc status limits normal bone formation and growth.¹⁹ Although mild zinc deficiency usually goes undiagnosed, studies have found growth-limiting mild zinc deficiency in apparently healthy children in Canada and the United States. Increased zinc intake significantly improved growth in a Canadian study of short, but otherwise healthy boys, ages 5 to 7.²⁰

Zinc Resources

Nutrition Perspective for health professionals on Zinc includes a review of the health consequences of mild zinc deficiency, populations at risk and dietary strategies to promote adequate intakes among Canadians. The Zinc fact sheet for the public explains how a lack of zinc can affect health and provides tips to help people meet their needs for zinc. To view a copy visit:

www.beefinfo.org/pdf/NPZD_P.pdf

Iron and Zinc Affect Children's Learning Ability

Memory and learning ability were improved when iron deficiency was corrected in a study of teenage girls.²² Cognitive performance also improved in school-age children, with increased zinc intake, when other nutrient deficiencies were also corrected.²³⁻²⁵ Girls who restrict their energy intakes by dieting and limiting their intakes of meat, fish and poultry are at higher risk of iron and zinc deficiency.²⁶

Nutrition Strategies to Boost Iron and Zinc Intakes

- ▶ Follow *Canada's Food Guide to Healthy Eating*.
- ▶ Eat 2 to 3 servings of Meat and Alternatives daily.
- ▶ Enjoy foods rich in highly bioavailable iron and zinc such as lean red meats like beef more often.
- ▶ Include meat with meals to enhance iron and zinc absorption from plant sources.
- ▶ Eat fruits and vegetables rich in Vitamin C, like citrus fruits and juices, to enhance iron absorption.

ENERGY METABOLISM

Key Nutrients for Optimal Energy Metabolism

Eating a balanced diet promotes optimal energy metabolism:

- ▶ A healthy balance of carbohydrate, fat and protein is recommended.
- ▶ Iron plays a vital role in carrying oxygen to body cells and tissues.
- ▶ Zinc is essential for many enzymes involved in energy metabolism and aids in muscle recovery and tissue repair after exercise.
- ▶ B-vitamins are needed to help release energy from the food we eat.

Nutrition Strategy for Healthy Energy Metabolism

Lean meats, like beef are an important source of highly bioavailable iron and zinc, B-vitamins (such as niacin, B₆ and B₁₂) as well as high quality protein. Insufficient iron can result in fatigue and a lack of zinc can increase susceptibility to infection.

DRI Report Recommends Increased Iron for Women

The Dietary Reference Intakes (DRI) are a set of four dietary reference intake values. The Recommended Dietary Allowance (RDA) for a nutrient is set at a level that will meet the needs of most (97-98%) individuals in a specific life-stage and gender group. The RDAs for iron for women are set at a higher intake level than previous recommendations. Estimated Average Requirement (EAR) is the level estimated to meet the requirement of half the individuals and is used to estimate adequate intakes within a group.²⁷

Recommended Dietary Allowance for Iron²⁷

Menstruating girls (14 -18 years)	15 mg/day
Menstruating women	18 mg/day
Pregnant women	27 mg/day

Iron Deficiency - An Important Concern for Women

The DRI report on iron states that iron deficiency is an important concern for women, particularly pregnant women, in Canada and the United States.²⁷ A recent analysis of the food intake data from Santé Quebec, found that 24% of women (19-50 years of age) had intakes below the EAR, and that 72% of women had available iron intakes below the EAR for absorbed iron.²⁸

Vegetarians are Advised to Double Iron Intakes

Vegetarians need to consume up to twice as much dietary iron to meet their daily requirement since the absorption of iron from plant foods is low compared to that from meat, fish or poultry.²⁷

For more information on the Dietary Reference Intake Reports visit: www.national-academies.org/subjectindex/hea.html

HEALTHY IMMUNE SYSTEMS

Mild Zinc Deficiency Compromises Immunity

Zinc plays an essential role in the development and maintenance of a healthy immune system.²⁹ An adequate zinc status helps the body resist infections caused by bacteria, viruses and fungi.³⁰ Even mild zinc deficiency, in the absence of overt signs of zinc deficiency, may have adverse effects on the immune system and increase susceptibility to infection.³¹ Studies have shown that immune function can be restored with the correction of zinc deficits.³¹

SOURCES OF EASILY ABSORBED ZINC

- Beef and other red meats
- Poultry, chicken, fish
- Liver
- Oysters, shellfish and other seafood
- Eggs

SOURCES OF LESS WELL ABSORBED ZINC

- Whole grains:
 - ▶ wheat
 - ▶ oatmeal
 - ▶ barley
- Legumes
- Soy products

DIETARY STRATEGIES TO PROMOTE HEART HEALTH

Heart Health Guidelines Emphasize Balance

Heart health guidelines recommend a balanced approach consistent with *CFGHE*.^{1,2} Diets with adequate intakes of grain products, vegetables and fruit, that are rich in complex carbohydrates, fibre and antioxidants, have been associated with a lower risk of heart disease.³²⁻³⁴ Guidelines also recommend 2 to 4 servings of lower-fat milk products and 2 to 3 servings of lean meats and alternatives to meet nutrient requirements.^{1,2}

Lean Meats Fit Easily in Heart Healthy Diets

Lower fat diets that include lean beef can be as effective in lowering total cholesterol (TC) and LDL cholesterol (LDL-C) as lower fat diets with chicken or fish.³⁵⁻⁴¹ Trials conducted with both healthy and hyperlipidemic adults have demonstrated that lean beef can be a part of lower fat diets to significantly lower TC and LDL-C.³²⁻⁴¹ Lean meat was equally as effective as plant-based soy protein for improving blood lipid profiles, arterial compliance, blood pressure and plasma leptin with weight reduction in obese women on isocaloric diets.⁴²

Nutrition Strategy for Heart Healthy Diets with Lean Meats

Canadian Guidelines for the Management and Treatment of Dyslipidemia recommend following CFGHE.²

- ▶ Use low-fat cooking techniques - broil, barbecue, roast, microwave on a rack, and stir-fry in a non-stick pan.
- ▶ Enjoy 2 to 3 servings of Meat and Alternatives each day.
- ▶ A 100 g serving of meat is about the size of a deck of cards.
- ▶ Trim all visible fat from meat and remove skin from poultry.

Half the fat in Lean Beef is Monounsaturated

Monounsaturated fatty acids account for half of the fat in lean beef, primarily in the form of oleic acid like that found in olive oil. Saturated fatty acids account for just under half of the fat in beef and a significant proportion is in the form of stearic acid. Although stearic acid is a saturated fatty acid, it raises HDL cholesterol and has little effect on LDL cholesterol levels.⁴³ A recent report on dietary fats notes that when the oleic and stearic acid content of beef is considered, there is relatively little left to affect blood cholesterol levels.⁴⁴

Table 2: Fatty Acid Profile of Lean Beef Per 100 g cooked, lean only

TYPE OF FATTY ACID	GRAMS	% OF FAT	EFFECT OF BLOOD CHOLESTEROL
Monounsaturated Oleic Acid	3.99 3.36	50.6% of total FA 84.2% of MUFA	↓ LDL-C and have little or no effect on HDL-C
Saturated Stearic Acid	3.56 1.08	45.2% of total FA 30.3% of SFA	↑ Total-C and ↑ LDL-C Except Stearic Acid which ↑ HDL-C and has little effect on LDL-C
Polyunsaturated	0.34	4.1% of total FA	↓ Total-C and ↓ LDL-C

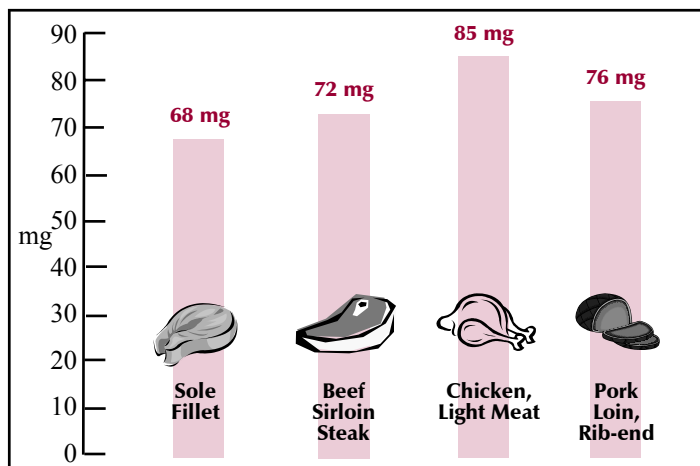
Source: Canadian Nutrient File, 2001.

For detailed nutrient data on beef, visit Nutrition & Health at: www.beefinfo.org

Protein Choices for Healthy Dietary Cholesterol Intakes

Canadian Guidelines for the Management and Treatment of Dyslipidemia recommend less than 300 mg of dietary cholesterol per day.¹ A variety of lean protein choices fit well within these recommendations, including lean beef. For example, 100 g (3½ oz) of lean broiled beef sirloin steak trimmed of visible fat has only 72 mg of cholesterol. The cholesterol from foods has a much smaller effect on blood cholesterol than trans and saturated fat intake.

Cholesterol Content of Common Protein Choices



Lean Beef Qualifies for Health Check™

All cuts of beef, except short ribs, trimmed of all visible fat, qualify for Health Check™. Meats must be lean with no more than 10% fat to display the Health Check™ symbol. Lean and extra lean ground beef also meet Health Check™ criteria for ground meats, with no more than 17% and 10% fat, respectively.

Nutrition Information:

Fresh Beef Cuts: On average, per 100 grams TRIMMED serving (raw): Energy 620kJ/147 calories, Protein 22 grams, Fat 5.9 grams, Carbohydrate 0 grams

Ground Beef: On average, per 100 grams ground beef (raw):

Extra Lean: Energy 650 kJ/155 Calories, Protein 21 grams, Fat 7.3 grams, Carbohydrate 0 grams

Lean: Energy 910 kJ/216 Calories, Protein 19 grams, Fat 15 grams, Carbohydrate 0 grams

The Beef Information Centre financially supports the Health Check™ education program of the Heart and Stroke Foundation. This is not an endorsement. For more information, see www.healthcheck.org

Health Check™ is a food information program developed by the Heart and Stroke Foundation of Canada to help Canadians make healthy food choices.

Additional information for health professionals is available in the Nutrition Perspective on "Heart Healthy Eating Strategies – How Lean Beef Fits" at : www.beefinfo.org/pdf/NPHES_P.pdf

All figures based on 100 g broiled or roasted, trimmed of visible fat
Source: Canadian Nutrient File, 2001.

DIETARY STRATEGIES FOR CANCER PREVENTION

Vegetables and Fruit and Whole Grains Associated with Cancer Prevention

It has been estimated that 20-30% of all cancers may be related to what you eat⁴⁵; and 30-40% of all cancers may be related to the combination of diet, body weight, and physical activity. There is widespread agreement that sufficient evidence exists to recommend increased intakes of vegetables and fruit to help protect against cancer.⁴⁶

Lack of Association Between Meat Intake and Colorectal Cancer

While some studies identify the consumption of fat and meat as a risk factor for some types of cancer, others, using similar methodologies, show no relationship between meat intake and risk of cancer. Key et al. re-analyzed data from five prospective studies comparing cause of death in vegetarians and non-vegetarians.⁴⁷ They concluded that, due to the lack of association between vegetarianism and colorectal cancer mortality, meat (and fish) may have little effect on the development of cancer.⁴⁷ The strongest evidence linking diet to cancer is between higher intakes of vegetables and fruits and lower risk of cancer. Increasing vegetable and fruit intakes to 5 to 10 servings daily as part of a balanced eating pattern may reduce the risk of certain cancers.

Growing Interest in Conjugated Linoleic Acid

Conjugated linoleic acid (CLA) is a group of dietary fatty acids found in meat and milk products from ruminant animals. Animal studies have demonstrated that CLA inhibits carcinogen-induced mammary tumours.⁴⁸ Although human studies have been limited, CLA has been found to inhibit the growth of tumour cells in human breast tissue.⁴⁹ In addition, results from a recent clinical trial suggest that CLA affects fatty acid metabolism and may reduce the proportion of body fat in men and women.⁵⁰ Although it is too premature to draw definitive conclusions about the protective benefits of CLA, this is a growing area of interest.

Additional information for health professionals is available in the Nutrition Perspective on "Cancer Risk and Red Meat Intake – What are the Issues?" at: www.beefinfo.org/pdf/NPCR_P.pdf

Nutrition Strategy for Cancer Prevention

The Canadian Cancer Society encourages Canadians to follow *CFGHE*. Eat plenty of whole grains, vegetables and fruit and choose lower-fat milk products and leaner meat and alternatives. Regular physical activity and healthy weights are also recommended.

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Healthy Eating with Z-I-P!

Consumer Fact Sheet

Feeling zapped? You may need to add some **Z-I-P!**

Essential nutrients zinc, iron, protein and B-vitamins are key to keeping your body working at its best.

Zinc - to boost your immune system

Iron - to carry oxygen to all parts of your body and help your body use energy

Protein - to build and repair your body

B-vitamins - to help your body use energy

Boost your immune system! Zinc helps to build and maintain a strong immune system. Healthy zinc intakes help your body resist and fight infections. Mild zinc deficiency may lower your resistance to infection and limit children's growth.

Be energized! Iron helps carry oxygen to your cells and B-vitamins help release energy from food. Low iron levels may leave you feeling tired and may limit children's learning ability. Protein gives you some of the energy you need to stay healthy.

Go for growth! Protein provides the building blocks your body needs to grow and repair tissue. Zinc and iron are essential for children's healthy growth and development.

Back to Balance! Each food group provides a unique set of essential nutrients – each with their own special role. Much like you need all the pieces of a puzzle to create a complete picture. You need a variety of foods from all four food groups in *Canada's Food Guide to Healthy Eating (CFGHE)* for complete nutrition.

To strike a healthy balance - choose the recommended number of servings from each food group in CFGHE. Visit CFGHE to learn more about serving sizes at www.hc-sc.gc.ca/hppb/nutrition

One in two Canadians eat fewer than the recommended number of servings from at least one of the four food groups.

Four Food Groups For Healthy Eating:

Their key nutrients work together for a healthy balance!

Milk Products

2-4 servings/day

Protein, Calcium, Vitamins A & D and B-vitamins

Vegetables & Fruit

5-10 servings/day

Carbohydrate, Fibre and Vitamins C & A

Grain Products

5-12 servings/day

Carbohydrates, Fibre, B-vitamins, Iron and Zinc

Meat & Alternatives

2-3 servings/day

Protein, Iron, Zinc and B-vitamins

Example: Meat & Alternatives are an important source of iron and zinc, B-vitamins & protein. If you eat fewer than the recommended 2 to 3 servings of Meat & Alternatives daily, you may not get enough of some nutrients such as iron and zinc.

Tips to Add Z-I-P!

Most people get enough protein, but meeting iron and zinc needs can be more of a challenge - especially for women, children and older adults. Choosing your protein choices wisely can help you get the iron and zinc you need.

Iron and zinc are found in a wide variety of foods. However, the iron and zinc in meat, poultry and fish is absorbed more easily than the iron and zinc from plant foods. Plus, including meat with meals helps boost iron and zinc absorption from plant sources.

HERE ARE SOME WAYS TO BOOST YOUR IRON AND ZINC INTAKES:

- ▶ Follow *Canada's Food Guide to Healthy Eating*. Eating the recommended servings from each food group can help you get a healthy balance of essential nutrients.
- ▶ Enjoy foods rich in highly bioavailable iron and zinc such as lean red meats, fish and poultry.
- ▶ Include meat, fish and poultry with meals to increase the amount of iron and zinc your body can absorb from plant foods.
- ▶ Eat fruits and vegetables rich in vitamin C, like citrus fruits and juice, with meals to increase the amount of iron your body can absorb.
- ▶ Drink tea or coffee in between rather than with meals, since these drinks decrease iron absorption.

For more ways to achieve healthy nutrient intakes or to find a registered dietitian in your area visit:

www.dietitians.ca

RECIPE IDEA TO ADD MORE Z-I-P!

Add more zip to your day and tantalize your tastebuds with this quick & easy recipe.

WEEKNIGHT ITALIAN SOUP

INGREDIENTS

1 lb	500 g	Beef Stir-Fry Strips or Fast-Fry Steak, cut into thin strips, ¼ inch (5mm), 1½ inches (4cm) long
3 tbsp	45 mL	Worcestershire sauce
1	1	can (28 oz/796 mL) stewed tomatoes
1	1	can (12 oz/341 mL) canned corn
1 cup	250 mL	beef broth
1	1	large clove garlic, minced
1 tsp	5 mL	dried basil
1/4 cup	50 mL	thinly sliced fresh basil (optional)
		grated parmesan cheese (optional)


PREPARATION TIME: 5 minutes **COOKING TIME:** 15 minutes

DIRECTIONS: Toss beef with 2 tbsp (30 mL) Worcestershire sauce, set aside. In large saucepan combine tomatoes, corn (including liquid), broth, garlic, dried basil, remaining 1 tbsp (15 mL) Worcestershire sauce and pepper to taste. Bring to boil; cover and reduce heat to low. Simmer 5-10 minutes. Turn heat off and stir in beef; cover and let stand 5 minutes to cook beef. Stir in fresh basil and garnish with cheese, if desired. Serve immediately with crusty bread.

NUMBER OF SERVINGS: 4 - 5 SERVINGS

NUTRITION INFORMATION PER SERVING

253	Calories	5.5 g	Fat
25 g	Protein	30 g	Carbohydrates





This nutrition resource is brought to you by the registered dietitians at the Beef Information Centre. Questions about beef? Visit www.beefinfo.org or call 1-888-248-BEEF or contact your local Beef Information Centre in Vancouver, Calgary, Regina, Winnipeg, Mississauga, St. Laurent or Bedford. May be reproduced without permission provided no changes are made and credit is given. Printed in Canada. September 2002 (1).