



# **The Canadian Guide to Nutrition and Cystic Fibrosis**

A Cystic Fibrosis Nutrition Guide  
and Recipe Handbook



Cystic Fibrosis  
Fibrose kystique  
Canada



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# Introduction

Cystic Fibrosis Canada's vision is a world in which cystic fibrosis is no longer a progressive disease. Attainment of this objective requires the collective efforts and commitment of all stakeholders, including individuals with cystic fibrosis, their families/caregivers and the entire healthcare team.

A fundamental element in slowing the progression of chronic diseases is a healthy lifestyle. An essential component of a healthy lifestyle is nutrition. While cystic fibrosis poses some unique challenges related to ensuring that the body gets all of the nutrients it needs, addressing these issues is very achievable and is an important factor in helping people with cystic fibrosis maintain health and fight infection.

A person diagnosed with cystic fibrosis or a caregiver to an individual with cystic fibrosis must promote health by facilitating a healthy lifestyle, starting with good nutrition. It is also important to understand how and why diet requirements for an individual with cystic fibrosis are different from other diets.

This handbook is a guide to inform and support excellent nutrition for people of all ages with cystic fibrosis. The goal is to provide the tools necessary to support and optimize healthy eating, with the overarching goal of attaining and maximizing a healthy lifestyle.



# Acknowledgments

Cystic Fibrosis Canada wishes to acknowledge the important contributions of the following individuals in the development of this handbook:

## **Rachel Freeman, MSc, RD**

Rachel Freeman is a Registered Dietitian with experience working at the Cystic Fibrosis Clinic at McMaster Children's Hospital, Hamilton, Ontario.

*Thank you to Rachel for the contribution to chapter 2 - "Nutrition and Cystic Fibrosis", "Tips to increase calories and protein" in chapter 3 and her enthusiastic interest in assisting Cystic Fibrosis Canada in the production and editing of content in this handbook.*

## **Lisa Brothers, BSc, RD, CDE**

Lisa Brothers is a Registered Dietitian with certification in Diabetes Education. Lisa has experience working at the Cystic Fibrosis Clinic at Eastern Health, St. John's, Newfoundland.

*Thank you to Lisa for the contribution to "Nutrients in Food", "Dietary Fibre", "Fluids and Minerals" in chapter 3 - and her help with editing the handbook for content.*

## **Lisa Mannik, MSc, RD**

Lisa Mannik is a Registered Dietitian with experience working at the Cystic Fibrosis Clinic at St. Michael's Hospital, Toronto, Ontario.

*Thank you to Lisa for editing the handbook for content.*

## **Vanessa Skupsky, MSc, PHC (NP)**

Vanessa Skupsky is a Primary Nurse Practitioner with experience working at Cystic Fibrosis Canada, Toronto, Ontario as Program Advisor-Healthcare.

*Thank you to Vanessa for coordinating the production of this handbook.*

*Thank you to both **Daina Kalnins, MSc, RD** and **Anna Tsang, RN, NP, MSc** for their valued contribution and ongoing long-term support to Cystic Fibrosis Canada.*

*Thank you to Cystic Fibrosis Dietitians across Canada for permission to use **CF Health Matters** (a pamphlet that is written and maintained by the Cystic Fibrosis Dietitians across Canada).*

# An Impact Story



Our vision is a world without cystic fibrosis (CF). Since our establishment in 1960, we have invested over \$235 million in leading research, innovation and care to make this vision a reality. Today, we are closer than ever before to a world without CF.



1960 First research grants are awarded to Dr. Morley Lertzman in Winnipeg and Dr. Victor Marchessault in Montreal.

1962 The annual research grants and awards competition officially launches.



1964 First CF clinic for young adults opens in Montreal.



1965 The Adult CF Advisory Committee is formed.

1967 The world's first successful double-lung transplant on a person with CF takes place in Toronto.

1969 Researchers establish a new therapeutic approach to treat bacterial infections by using alternating courses of different antibiotics.



1987 Over 50 volunteer chapters now support CF Canada, compared to 4 chapters in 1960.



1988 CF Canada successfully advocates for CF newborn screening (NBS) in Alberta. Today, all provinces except Quebec have CF NBS.

1989 The Clinical Fellowship award is introduced to encourage CF training for medical doctors. To date, 16 Clinical Fellows have received the award, and all have gone on to work in a CF clinic.



1992 The estimated median age of survival for Canadians living with CF surpasses 50 years of age.

1999 First philanthropic investment in a company, Laurent Pharma. Laurent is testing Lau7b, a CF drug that targets inflammation and resulted from 10 years of CF Canada funding.

2007 CF Canada publishes 3 papers in peer-reviewed academic journals.



## A WORLD WITHOUT CF

1960

Cystic Fibrosis Canada is established by CF parents Doug and Donna Summerhayes.



1964

Shinerama, a post-secondary school fundraiser, launches. To date, Shinerama has raised over \$26 million for CF research and care.



1967

The clinic Accreditation Site Visit program begins in order to share best practices and ensure consistent high quality care across Canada.

1987

Kin Canada formally adopts CF as a National Service Project. To date, Kin Canada has raised over \$44M for CF Canada.



1989

The CF gene is discovered by CF Canada-funded researchers in collaboration with the U.S. Cystic Fibrosis Foundation.



1997

CARSTAR SIEMENS  
Both CARSTAR Collision & Glass Service and Siemens Canada select CF Canada as their charity of choice.

### WALK TO MAKE CYSTIC FIBROSIS HISTORY

2005

The national walk launches. To date, the walk has raised over \$28 million.

2008

CF Canada launches its Facebook page, providing a forum for communication among members of the CF community and the organization.



2009

CF Canada persuades Health Canada to recommend pancreatic enzymes as "prescription-requiring drugs", saving many individuals with CF about \$20,000 a year.



2014

CF Canada successfully advocates for public drug coverage of Kalydeco®.

### Cystic Fibrosis Canada continues to...

- ✓ Fund leading research projects, fellowships and studentships, national core facilities and targeted research programs and partnerships.
- ✓ Support 42 accredited CF clinics serving over 4,100 Canadians with CF.
- ✓ Advocate for accessible drug coverage and high quality care for CF patients.



# Cystic Fibrosis Canada

Cystic Fibrosis Canada is one of the world's top three charitable organizations committed to finding a cure for cystic fibrosis (CF) and is an internationally recognized leader in funding CF research, innovation and clinical care. Cystic Fibrosis Canada invests more funding in life-saving cystic fibrosis research and care than any other non-governmental agency in Canada. Since 1960, Cystic Fibrosis Canada has invested more than \$244 million in leading research and care. For more information, visit [www.cysticfibrosis.ca](http://www.cysticfibrosis.ca).

Cystic Fibrosis Canada's mission is to help people with cystic fibrosis by:

- Funding research toward the goal of a cure or effective control for cystic fibrosis
- Supporting high-quality cystic fibrosis care
- Promoting public awareness of cystic fibrosis
- Raising and allocating funds for these purposes

# Notes:

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Chapter One

# **What is Cystic Fibrosis?**



Cystic Fibrosis  
Fibrose kystique  
Canada

# What Is Cystic Fibrosis?

Cystic fibrosis (CF) is an inherited disease affecting about one in every 3600 babies born in Canada. Inherited means that cystic fibrosis is passed down from parents to biological children through their genes. In order to have cystic fibrosis, a child must inherit two CF genes (one CF gene from each parent). In most cases, the parents themselves do not have cystic fibrosis.

Cystic fibrosis mostly affects the lungs and digestive system, but cystic fibrosis also affects the sinuses, liver, pancreas and reproductive (sex) organs. Cystic fibrosis is caused when a protein in the cells within the body does not work properly. This protein (called Cystic Fibrosis Transmembrane Regulator protein, or CFTR) works to move salt and water in and out of cells in the body. When the CFTR protein is not functioning properly, it causes mucus in the body to become thicker and stickier. Mucus is normally a thin, slippery material produced by the body to line the insides of tubes in the body (for example, the airway tubes in the lungs and the tubes of the digestive and reproductive systems). When mucus becomes thick and sticky, it can block or plug the tubes in the body.

In the lungs, a buildup of thick or sticky mucus causes breathing problems. The most common problems are coughing and an increase in sputum (also known as phlegm or spit) from the lungs. Thick mucus in the lungs also makes it easier for bacteria to grow, which causes infections in the chest. Over time, these infections can cause damage and scarring in the lungs.

When mucus builds up in the digestive tract, it makes it difficult for the body to digest and absorb nutrients from food. In most people with cystic fibrosis, the small tubes within the pancreas become blocked and damaged. When this happens, digestive enzymes made by the pancreas can no longer reach the intestine.

Treatments have been developed to improve nutrition and absorption of food and, as a result, most deaths related to cystic fibrosis are due to lung disease.



Approximately 4,100 Canadian children, adolescents and adults with cystic fibrosis attend specialized CF clinics. Currently, no cure exists. Every day, research is being done to improve treatment of cystic fibrosis, and with the hope of one day finding a cure.

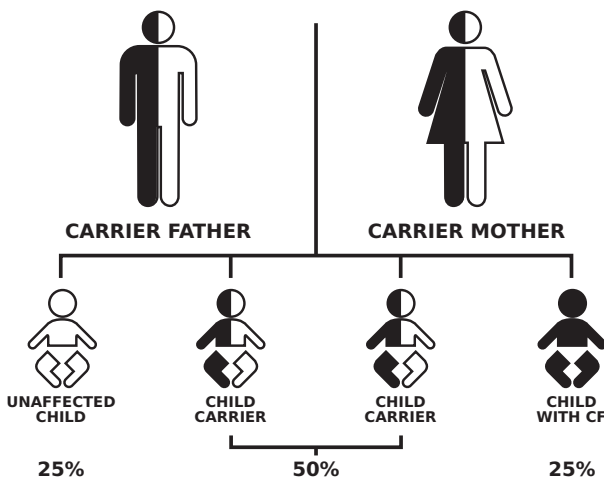
## What Causes Cystic Fibrosis?

Cystic fibrosis is a genetic or inherited disease that individuals are born with. Cystic fibrosis occurs when a child inherits two abnormal genes, one from each parent.

Approximately one in every 25 Canadians\* is a CF carrier, meaning they have one abnormal version of the gene responsible for cystic fibrosis. Carriers do not have, and can never get, cystic fibrosis. In most cases, they are not even aware that they are carriers.

Each time two individuals who are carriers have a biological child together, there is a:

- 👉 25% chance the child will be born with cystic fibrosis (they will have two abnormal CF genes);
- 👉 50% chance the child will not have cystic fibrosis, but will be a carrier (they will have one abnormal CF gene and one normal gene);
- 👉 25% chance the child will not have cystic fibrosis and will not be a carrier (they will have two normal genes).



*\*CF carrier rates vary by ethnicity*

Each pregnancy carries the same risk of a child inheriting an abnormal gene; two parents who are carriers may have several children with cystic fibrosis, or none at all. Carrier status (that is, determining whether an individual or their partner has a CF gene) can be determined through genetic testing. Genetic counselling is available if an individual, their partner or their child is a carrier.





Chapter Two

# **Nutrition and Cystic Fibrosis**

# Nutrition and Cystic Fibrosis

- Rachel Freeman, MSc, RD




## The Importance of Good Nutrition

There is a very strong link between a healthy body weight and good lung function in individuals with cystic fibrosis. Many studies have shown that lung function is better in individuals with cystic fibrosis when they are well nourished. Good nutrition begins at birth, continues throughout the lifespan and is important at all ages. Maintaining good nutrition and a healthy body weight can help keep the immune system strong to fight off infections in the lungs.

A well-balanced, high-calorie, high-protein diet with plenty of salt, fat and extra vitamins helps to keep people with cystic fibrosis healthy.

## The Need for More Calories

Individuals with cystic fibrosis may need between 10% and 50% more calories than people without cystic fibrosis. This is because of:

-  **Poor digestion and absorption:** Even when a person with cystic fibrosis takes replacement enzymes with meals, the digestive tract still may not be able to digest and absorb all of the calories eaten.
-  **The work of breathing and coughing:** It can take many more calories for someone with cystic fibrosis to cough and breathe hard enough to get oxygen to the body to stay healthy.
-  **Infections in the lungs:** the sticky mucus in the lungs of people with cystic fibrosis can make it more difficult than usual for the body to fight off bacteria. The body needs more calories to do this extra work.

Fat is the nutrient with the most calories (more than carbohydrate or protein), so a high-fat diet is recommended.



# The Importance of Collaborating with a Dietitian

The dietitian is an important member of the cystic fibrosis care team. A dietitian's job includes:

- Measuring and weighing a child during each visit to make sure they are growing according to growth charts, or monitoring the weights of adults during each visit to ensure they are maintaining an appropriate weight.
- Teaching people with cystic fibrosis and their caregivers about the relationship between good nutrition and cystic fibrosis, and making sure that each person with cystic fibrosis is getting enough calories, fat, vitamins, calcium and salt to grow normally and fight off infections
- Suggesting ways to boost calorie intake when needed (through food, nutrition supplements or sometimes tube feeds)
- Helping to ensure a person's enzymes are working properly
- Making sure vitamin levels are normal
- Addressing any individual feeding or nutrition issues and other questions as they arise

## Dietary Guidelines for Healthy Eating

Canada's Food Guide is based on a rainbow with each colour representing a different food group (see the end of this chapter). The purpose of this rainbow is to encourage all Canadians to eat a variety of foods from each of the four food groups. This principle also applies to people with cystic fibrosis.

The recommended number of servings that an individual should eat from each food group in a day depends on age and gender. This serving information is found on a chart in Canada's Food Guide.

It is important to note that not all of the recommendations in Canada's Food Guide apply to individuals with cystic fibrosis. The following are some exceptions:



- 🍌 The recommended number of servings of each food group per day may be higher in individuals with cystic fibrosis because of increased calorie requirements.
- 🍌 Individuals with cystic fibrosis usually need a higher-fat diet (35% to 40% of calories from fat) than Canada’s Food Guide recommends for most Canadians (25% to 35% of calories from fat – for more information on fats, refer to the “Healthy Diet, Healthy Fats” section in chapter 3).
- 🍌 Canada’s Food Guide recommends that Canadians limit their salt intake; however, people with cystic fibrosis need MORE salt to replace losses.
- 🍌 Canada’s Food Guide recommends that Canadians select lower-fat milk and dairy products, but individuals with cystic fibrosis usually need higher-fat milk and dairy products because of higher calorie requirements.

## Vegetables and Fruits

The “Vegetables and Fruit” group is at the top of Canada’s Food Guide rainbow. Vegetables and fruits have important nutrients such as vitamins, minerals and fibre. They are usually lowest in fat and calories, but individuals with cystic fibrosis can add healthy fats and oils to give this food group a calorie boost (see chapter 3 for suggestions on how to increase calories and protein).

Vegetables and fruits make up the largest portion of Canada’s Food Guide eating pattern. For optimal health, all Canadians should aim to eat a variety of different fruits and vegetables every day.

## Grain Products

The “Grain Products” group is second in Canada’s Food Guide rainbow. Foods in this group include breads, cereals, pasta, rice and all products made with grain flour. Nutrients provided by grain products include carbohydrates (for energy), B vitamins, iron, zinc and fibre.

Products made with “whole grains” are higher in fibre. Fibre is very important because, with enough fluid, it can help to prevent constipation. This is why Canada’s Food Guide recommends that at least half of grain products consumed are whole grains.





## Milk and Alternatives

The “Milk and Alternatives” group is third in Canada’s Food Guide rainbow. This group provides calcium, zinc, magnesium, potassium, protein, fat, riboflavin and vitamins A, D and B12. Many of these nutrients are important for developing strong bones. This group includes milk, fortified soy beverages, evaporated milk, powdered milk, cheese and yogurt.

## Meat and Alternatives

The “Meat and Alternatives” group is fourth in Canada’s Food Guide rainbow. This group provides important nutrients such as protein, iron, zinc, magnesium, B vitamins and fat. Foods in this group include meat, fish, shellfish, poultry, eggs, legumes (such as chickpeas, kidney beans and lentils), tofu, nuts and seeds.

## Activity Guidelines

Canada’s Food Guide also discusses activity guidelines. It states that Canadian children need to be active for at least 90 minutes each day, and adults need to be active for at least 60 minutes each day. This holds true for all Canadians, with or without cystic fibrosis. For individuals with cystic fibrosis, activity can be an important way to help keep the lungs and the body healthy.

### References

Borowitz, D. “Evidence-Based Guidelines for Management of Infants with Cystic Fibrosis.” *J Pediatric* 2009; 155: S73-93.

“Eating Well with Canada’s Food Guide.” Health Canada (2007).

“Eating Well with Canada’s Food Guide – A Resource for Educators and Communicators.” Health Canada (2007).

Matel, J. “Nutritional Management of Cystic Fibrosis.” *JPEN* 2012; 36: S60-67.

# EXERCISE FOR CF PATIENTS



Exercise can benefit all patients with CF, no matter what their lung function. Exercise is linked to better maintenance of lung function and fewer hospitalizations. It may help in clearing sputum from the airways, improve appetite, and assist in obtaining optimal body weight. Exercise increases muscle strength and functioning, improves bone health and pain management, and relieves stress.

## TIPS



- ✓ Exercise does not replace regular airway clearance (chest physiotherapy). It should be done in addition to regular physiotherapy.
- ✓ Exercise does not need to be continuous; it can be broken up throughout the day to reach the recommended targets.
- ✓ Work with a dietitian to address nutritional needs related to exercise. With proper nutrition, exercise should help with weight gain.
- ✓ Remember the importance of hydration and salt replacement.
- ✓ Consult your treatment team before starting an exercise program.

## 1-6 YEARS OLD

 **60 MIN/DAY**  
OF DEVELOPMENTALLY APPROPRIATE ACTIVITIES



### AEROBIC ACTIVITY AND RESISTANCE TRAINING

Full-body activities that increase breathing and heart rate, and use body weight to increase muscle strength

Jumping, climbing, walking, running, biking, swimming, sports like soccer or basketball, playground activities, like monkey bars or climbing walls



- Play
- Make it fun
- Involve the family
- Try a wide range of activities
- Good stress relief for the whole family

*flip over for more information* →



Based on: Swisher et al., (2015). Exercise & Habitual Physical Activity for People with Cystic Fibrosis: Expert Consensus, Evidence-Based Guide for Advising Patients. *Cardiopulmonary Physical Therapy Journal*, 26(4), 85-98.

FOR MORE INFORMATION AND EXERCISE IDEAS, PLEASE VISIT:

ParticipACTION at [participaction.com](http://participaction.com)

Physical and Health Education Canada at [phecana.ca/sites/default/files/fun\\_fitness\\_activities\\_for\\_kids.pdf](http://phecana.ca/sites/default/files/fun_fitness_activities_for_kids.pdf)

# 7-12 YEARS OLD



## AEROBIC ACTIVITY

30-60 min, at least 3/wk

Should be breathing somewhat hard but still able to carry on a conversation

Walking, running, swimming, biking, dancing, team sports, outdoor adventure activities, active video games

Take classes, join a team, league or club

## 60 MIN/DAY

IN A VARIETY OF ENJOYABLE ACTIVITIES, ESPECIALLY WITH FAMILY OR FRIENDS



## RESISTANCE TRAINING

Activities that use body weight to strengthen muscles and bones

Running, jumping and ball games



Encourage normal motor development, including agility and balance/coordination

**Did you know?** Self-reported exercise participation rates peak at age 10

# 13-18 YEARS OLD



## AEROBIC ACTIVITY

30-60 min, at least 3/wk

Should be breathing somewhat hard but still able to carry on a conversation

Walking, running, swimming, biking, dancing, team sports, outdoor adventure activities, active video games

Take classes, join a team, league or club

## 60 MIN/DAY

IN A VARIETY OF ENJOYABLE ACTIVITIES, ESPECIALLY WITH FAMILY OR FRIENDS



## RESISTANCE TRAINING

Formal resistance training 2-3 times/wk per muscle group; incorporate upper and lower limbs and trunk muscles; complete 1-3 sets of 8-12 reps (weight training must be supervised)



Enable choice of activities that fit individual interests and abilities

**Did you know?** Physical activity rates tend to be lower among adolescents, especially adolescent girls

# 19+ YEARS OLD



## AEROBIC ACTIVITY

30-60 min, at least 3/wk

Should be breathing somewhat hard but still able to carry on a conversation

Walking, running, swimming, biking, dancing, team sports, outdoor adventure activities, active video games

Take classes, join a team, league or club

## 150 MIN/WEEK

OR MORE (PREFERABLY 300 MIN) IN VARIETY OF ACTIVITIES OF CHOICE



## RESISTANCE TRAINING

Formal resistance training 2-3 times/wk per muscle group; incorporate upper and lower limbs and trunk muscles; complete 1-3 sets of 8-12 reps



Consult a healthcare provider for advice on adapting physical activity for complications such as CFRD or low bone density

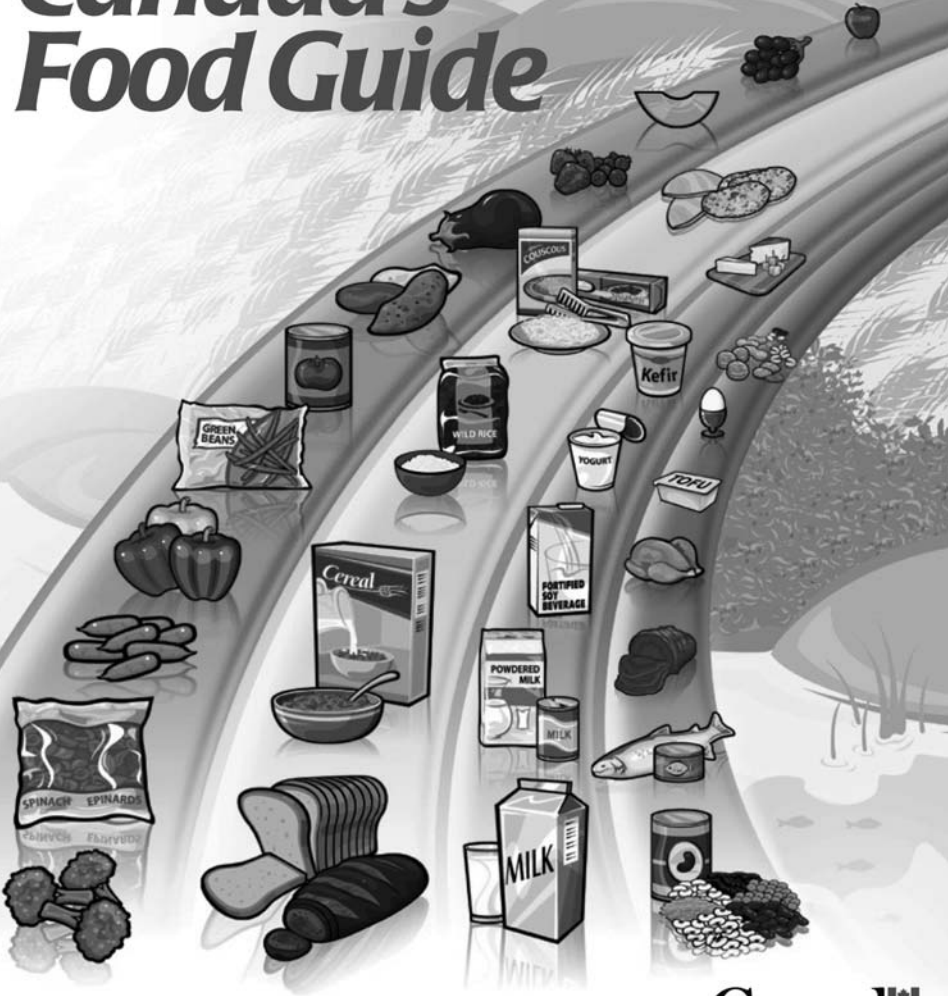


Health Canada Santé Canada

Your health and safety... our priority.

Votre santé et votre sécurité... notre priorité.

# Eating Well with Canada's Food Guide



Canada

## Recommended Number of Food Guide Servings per Day

Age in Years	Children			Teens		Adults			
	2-3	4-8	9-13	14-18		19-50		51+	
Sex	Girls and Boys			Females	Males	Females	Males	Females	Males
<b>Vegetables and Fruit</b>	4	5	6	7	8	7-8	8-10	7	7
<b>Grain Products</b>	3	4	6	6	7	6-7	8	6	7
<b>Milk and Alternatives</b>	2	2	3-4	3-4	3-4	2	2	3	3
<b>Meat and Alternatives</b>	1	1	1-2	2	3	2	3	2	3

The chart above shows how many Food Guide Servings you need from each of the four food groups every day.

**Having the amount and type of food recommended and following the tips in *Canada's Food Guide* will help:**

- Meet your needs for vitamins, minerals and other nutrients.
- Reduce your risk of obesity, type 2 diabetes, heart disease, certain types of cancer and osteoporosis.
- Contribute to your overall health and vitality.





## Chapter Three

# **Managing Your Diet and Staying Healthy**



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Canada



# Managing Your Diet and Staying Healthy

## **Nutrients in Food** - Lisa Brothers, BSc, RD, CDE

As mentioned in chapter 2, eating well and maintaining good nutrition is an important part of the treatment plan for an individual with cystic fibrosis. Consuming a well-balanced, high-calorie diet containing carbohydrates, protein and fat will give the body what it needs to grow.

Food is made up of three main nutrients: carbohydrate, protein and fat.

### **Carbohydrate**

In the body, carbohydrates are broken down into glucose (sugar), which is the main source of energy that fuels the body. Glucose is an essential nutrient because it provides fast energy to the body and is the main source of energy for the brain, heart and nervous system. Carbohydrates are found in many foods, such as breads, cereals, fruit and milk. They are also found in sugar-sweetened foods like candy, cakes, cookies, pop and chocolate. A healthy diet should contain at least 45% of calories from carbohydrates.


### **Protein**

Protein is used by the body to help make and repair cells, build muscle, heal wounds and fight infections. Good sources of protein are meat, fish, poultry, eggs, milk, nuts and soy products (e.g. tofu, fortified soy beverage). At least 20% of calories in a healthy diet should come from protein.

### **Fat**

Fat is a very rich energy source for the body. It provides essential fatty acids (omega-3 and omega-6 fatty acids) that can have a significant impact on inflammation in the body. Fat also insulates organs and is a storage form of extra calories. Fat is mainly found in meat, milk, cheese, butter, oil and margarine. The CF diet should





contain a minimum of 35% of calories from fat. It is important to note that eating too much trans fats may lead to heart disease. Consuming a diet rich in healthy fats is recommended. For more information on trans fats, refer to page 25.

## **Dietary Fibre**

Although dietary fibre is not a nutrient that provides the body with energy, it is an important element in maintaining health. Fibre helps move food through the digestive system to maintain regular bowel movements. Like a broom, it helps to “sweep” wastes out of the body. For the general population, it is recommended that individuals consume at least 25 to 35 grams of dietary fibre every day. For individuals with cystic fibrosis, too much dietary fibre can be harmful due to sticky mucus in the digestive tract. A doctor or dietitian can determine the right amount of fibre for an individual with cystic fibrosis. Dietary fibre is found in whole grain breads and cereals, bran, fruit, vegetables, beans, nuts and seeds.

## **Fluids**

Water makes up more than half the body weight of adults and children. Every cell in the body needs water to work properly, and since the body cannot store water, we must replace it daily. Most of the water we need comes from what we drink, but food also contains water. Individuals with cystic fibrosis need more fluid because of the fluid lost through sweat, urination, digestion and even breathing. Physical activity and the weather can increase fluid requirements. The amount of fluid needed depends on age, weight, activity level, climate and state of health. Most people require at least 1.5 to 2 litres (6 to 8 cups) of fluid every day to prevent dehydration. Dehydration can be very dangerous; signs of dehydration include headache, nausea, vomiting, weakness, irritability, dry mouth and drowsiness. If you experience symptoms of dehydration, contact your CF Clinic immediately or go to the nearest Emergency Department.

## **Minerals**

### **Salt (Sodium Chloride)**

Sodium and chloride are minerals that, together, are known as salt.

Sodium and chloride are called “essential” nutrients and must be supplied by the diet because the body cannot produce them. Salt helps to maintain the body’s fluid balance and helps muscles contract. Inadequate salt intake can reduce appetite; interfere with growth, cause stomach pain, weakness, nausea and headache. People with cystic fibrosis lose extra salt in their sweat, so it is important to eat foods that have a lot of salt and to add salt to meals and snacks.


## Calcium

Calcium is the most abundant mineral in the body. It is also called an “essential” nutrient because it is not produced by the body and must be consumed in the diet. The main job of calcium is to help build strong bones and teeth, but it also plays an important role in helping blood to clot and in keeping muscles and nerves working properly. A person with cystic fibrosis may need up to 1500mg of calcium every day. When calcium intake is low, the body will pull calcium from the bones making them weak and increasing the risk of fractures. Calcium intake can be improved by consuming calcium-rich foods and drinks such as milk, yogurt, cheese, and ice cream. It is important to note that, while many people find it difficult to consume enough calcium, it is possible to get too much. The upper limit of calcium intake varies between 1500 to 3000 mg depending on age. Too much calcium will interfere with the absorption of other minerals and antibiotics in the body.

## Iron

Iron is another “essential” mineral that must either be consumed in the diet or through supplements. Most of the body’s iron is in the blood; it plays an important role in carrying oxygen from the lungs to all of the cells in the body. Insufficient iron in the blood leads to a condition called anemia. Iron intake and absorption can be improved by eating foods that contain a high quality and easily absorbed form of iron called heme iron, found in animal protein such as beef and pork. Non-heme iron is found in other protein foods like beans, lentils, dark green vegetables and enriched and fortified cereals. Non-heme iron is not as easily absorbed by the body as heme iron sources, but both types of iron are important for overall health. Non-heme iron is absorbed better with a source of vitamin C such as orange juice. There is no specific recommendation for daily iron





intake for people with cystic fibrosis as most people can get it from food, but depending on age, 7 to 27mg of iron is needed daily.

## **Zinc**

Zinc is an “essential” nutrient that is involved in over 300 bodily functions. It helps keep the body healthy by working with other nutrients to promote growth, maintain taste and appetite, fight infection, heal wounds and promote sexual development. Zinc also helps the liver release vitamin A into the blood. The best food sources of zinc are oysters, beef and beef liver. Good sources are high protein foods like turkey, cheese, milk and many breakfast cereals which are fortified with zinc. There are no specific zinc intake recommendations for individuals with cystic fibrosis, but depending on age, 1 to 13 mg of zinc is needed every day.

## **Healthy Diet, Healthy Fats**

There are four main types of fatty acids: polyunsaturated fat, monounsaturated fat, saturated fat and trans fat. Most fats that people eat are a combination of these.

### **Polyunsaturated Fats**

*Polyunsaturated* means that there are several unsaturated double bonds in the fat. Polyunsaturated fats are liquid at room temperature. Many common vegetable oils, as well as fish oils, flaxseed, sunflower seeds, soybeans and some nuts contain a lot of polyunsaturated fat. Polyunsaturated fats can be divided into two main types: omega-3 and omega-6 fatty acids. Each type plays an important role in inflammation in the body: omega-3 fatty acids are anti-inflammatory, whereas omega-6 fatty acids are believed to increase inflammation. Most people eat too little omega-3 and a lot of omega-6 polyunsaturated fat. All individuals should increase their dietary intakes of omega-3 fatty acids to improve the omega-3 fatty acid to omega-6 fatty acid balance.

Foods high in omega-3 fatty acids include: fatty fish (such as salmon, mackerel, tuna, herring and sardines) as well as flaxseed, canola oil, and some nuts (such as walnuts and pecans). One type of omega-3 fatty acid is docosahexaenoic acid, or DHA. DHA is found mostly in fatty fish like those listed above, and in human breast milk.

People with cystic fibrosis are known to have very low levels of DHA. Since DHA is important for the normal functioning of the body's cells, a healthy diet should include this fat.

Most omega-6 fatty acids consumed in the diet are from vegetable oils such as corn, safflower or sunflower oils, or from foods made with these oils, such as margarine, baked goods and cereals. Omega-6 fatty acids compete with omega-3 fatty acids for use in the body; therefore, too much omega-6 fatty acids, as is found in the diets of most people in Canada, can be a problem. Try to choose omega-3 fats over omega-6 fats, when possible, to restore the balance of these fats in a healthy diet.

## **Monounsaturated Fats**

Like polyunsaturated fats, monounsaturated fats are an excellent source of energy. *Monounsaturated* means that the fat contains only one unsaturated double bond. Foods rich in monounsaturated fat are generally liquid at room temperature and semi-solid when refrigerated. Olive oil, canola oil and peanut oil are all rich in monounsaturated fat. Other good sources of monounsaturated fat are natural peanut butter, peanuts, almonds and other nuts.


## **Saturated Fats**

Saturated fats have no double bonds. They are solid at room temperature and are found mostly in foods from animals. For most people, saturated fat is considered a "bad fat" because it raises blood cholesterol levels; however, most individuals with cystic fibrosis have low cholesterol levels, so it may not be a problem for them to eat saturated fats in larger amounts. Foods high in saturated fat include red meats (beef, veal, lamb, pork, lard), poultry fat (found in chicken skin), butter, cream, 3.25% milk, cheeses and other dairy products made from whole milk. Saturated plant fats include cocoa butter as well as coconut and palm oils (often called "tropical oils").

## **Trans Fats**





Trans fats are created by food processing companies to increase the shelf life of high-fat processed foods. The process, called *hydrogenation*, turns liquid oil into semi-solid fat. Although some foods (such as milk, cheese and other milk products) contain small





amounts of naturally occurring trans fats that are not harmful, most trans fats are artificial, and foods containing them should be eaten in moderation. *Hydrogenated* or *partially hydrogenated* oils or fats are other names for trans fats.

Trans fats are found in commercial foods such as:

-  bakery products and cookies
-  snack foods like potato chips and crackers
-  commercially fried foods and breaded foods
-  margarine sold as solid “sticks”

Shortening is also a trans fat. It is liquid vegetable oil that has been hydrogenated into a semi-solid fat.

More companies are producing trans-fat-free commercial foods. Look for this claim on food labels. Homemade bakery products made with liquid oil (e.g. canola oil) are free of trans fatty acids. Avoid using shortening. When using margarine, avoid the solid sticks and buy one made from healthy fats such as canola oil.

## Butter vs. Margarine

Recent studies on the potential cholesterol-raising effects of trans fats have raised public concern about the use of margarine and whether other options, including butter, might be a better choice. The softer the margarine, the less trans fat it contains. Butter is rich in both saturated fat and cholesterol, so people who do not have cystic fibrosis should use it sparingly. Neither saturated fat nor cholesterol are problems for most individuals with cystic fibrosis and, as a result, butter can be a healthy choice.

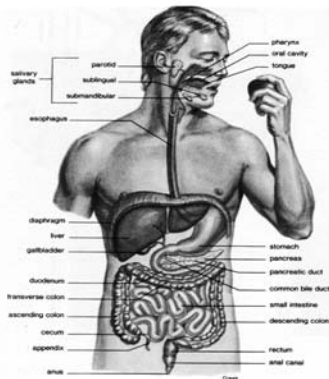
## Why Are Enzymes Needed?

When food is eaten, it goes into the stomach, where it is broken down into small pieces. These small pieces pass into the small intestine. In the healthy body, digestion takes place with the help of bile from the liver and enzymes from the pancreas. The nutrients from the food are then taken in by the body (absorbed) and used for energy and growth.

Food that is not broken down (not digested) passes out of the body in the stools. In most people with cystic fibrosis, the tubes in the pancreas are blocked with the same type of sticky mucus found in the lungs. Pancreatic enzymes cannot get into the small intestines, so food is not properly digested. This leads to poor nutrition and/or poor growth. Most individuals with cystic fibrosis need to take pancreatic enzyme capsules to help with the digestion of food.

## Digestive Tract

Pancreatic enzymes contain the enzymes lipase, protease and amylase, which digest fat, protein and larger sugars such as starch. Enzyme capsules are available in two forms: powder and enteric-coated, and are made by different companies in different strengths. The “number” refers to the amount of lipase in each capsule. The amount of enzymes that a person with cystic fibrosis needs varies with age, body size, and amount and type of food eaten. A CF physician or dietitian will decide the type and dose of enzymes to use, and it may change over time, especially in children.




Powdered enzymes are available in loose powder and tablet forms. Since these enzymes do not have a special coating, some of the enzymes are broken down by acid in the stomach (and therefore do not work anymore). The enzymes that do reach the upper small intestine help to break down and digest food.

Enteric-coated enzyme capsules are used by most children and adults with cystic fibrosis. The coating protects the enzymes from acid in the stomach so that the enzymes reach the

small intestine. The coating may take some time to dissolve, so the enzymes are released further down in the intestine than is normal.

## General Tips for Giving Enzymes to Infants and Children

- 🍷 Enzyme capsules may be swallowed whole. Most children can learn to swallow pills between the ages of three and seven years.

- 
- 🍷 For younger children and infants, the capsules can be opened and given by spoon.
  - 🍏 Enzymes should be given either at the beginning of the meal, or throughout the meal.
  - 🍏 It is recommended to give additional enzymes if more food is eaten approximately one hour after the last enzyme is taken.

## **Giving Enzymes in Powder Form to Infants**

- 🍷 Open the capsule and mix contents with a small amount of applesauce (1/2 to 1 teaspoon) or a small amount of water. Feed the baby the applesauce mixture using a spoon or the water mixture using a small syringe.
- 🍏 Once the enzyme is mixed with food, it must be eaten right away.
- 🍷 Try to mix enzymes with the same food each time. This will mean that the child will only associate that food with enzymes.
- 🍏 Place petroleum jelly around the outside of the baby's mouth to protect the skin in case the baby spits some enzyme out. The petroleum jelly should be wiped away before feeding. This is especially important for mothers who are breastfeeding infants with cystic fibrosis. Otherwise, latching may be difficult.
- 🍷 Clean the inside of the infant's mouth with a large cotton tip or small towel mixed with sterile water to be sure that there is no enzyme left in the gums or under the tongue. If left in the mouth, enzymes can cause the mouth tissue to become sore and bleed.

## **Enteric-Coated Enzymes for Infants**

- 🍷 Open the capsule and mix the beads with applesauce or other strained fruit. Give with a spoon.
- 🍏 Another way to give enteric-coated enzymes to young babies is to place the beads on a spoon or in a small flexible




medicine cup. The beads can then be placed or poured into the back of the baby's mouth before giving them the breast or bottle to feed.

- 👁️ Check the infant's mouth with either a large cotton tip or with a clean finger to see that no beads are left in the mouth at the end of the feeding.
- 👉 Do not crush beads; the coating will be destroyed.
- 🍼 Do not add beads to the baby's bottle. Beads will block the nipple. When babies begin solids, they usually take only a small amount of food. At this point, they do not need any more enzymes than they are already taking with their breastmilk or formula. However, when a baby is eating 50 to 125 ml (1/4 to 1/2 cup) or more of strained food or solids, the amount of enzyme will need to be increased.

Problems that might occur during the first month that a baby is taking enzymes include diaper rash, mouth sores and irritation around the mouth. The CF care team should be informed if any of these symptoms occur. Applying zinc oxide or petroleum jelly in generous amounts to the buttocks can help treat diaper rash.

## Enzymes for Older Children and Adults

- 👁️ Once enzymes are started, weight gain is a good indication that someone with cystic fibrosis is digesting and absorbing their food.
- 👉 For good health and to prevent constipation, it is very important to drink enough fluids. A dietitian can recommend the amount of fluids needed.
- 👉 It is important to adjust enzymes based on the amount of fat consumed in a given meal. A dietitian can help with this.
- 👉 Enzymes are very sensitive to heat and may degrade sooner than the expiry date indicated on the medication bottle. Do not store enzymes in the glove compartment of a vehicle, in a cupboard that is in direct sunshine, in the bathroom or in any place in a house that may be too warm. Enzymes carried loose in a pocket or small container should be discarded once weekly and replaced with a fresh supply from a stock bottle.

- 
- 🍊 If enzymes are completely forgotten at a meal, the enzyme can be taken up to 30 minutes after a meal (although they work best when given with the meal).
  - 🍊 Enzyme capsules should not be chewed, crushed or sprinkled on food.

Stools usually decrease in amount and/or size, and should be less foul-smelling or oily-looking once enzymes are started. The amount of enzyme taken may not be enough if any of the following occurs: loose stools, stooling more often, greasy or floating stools, gas, or stomach pain or cramps. Remember that there are other reasons for loose stools, such as viral or bacterial infections, antibiotics or too much juice. A CF clinician should be contacted if these signs of poor absorption are noticed. It is helpful to check stools regularly even if enzymes have been taken for a significant amount of time.

For toddlers, the average number of bowel movements is 1 to 3 per day, while the average for children or adults is 1 to 2 bowel movements daily.

## **Vitamin Supplementation**

Vitamins A, D, E and K are fat-soluble vitamins. Even when someone with cystic fibrosis takes enzymes with their meals, they can still lose fat in their stool. If they are losing fat, then they are probably also losing vitamins. This is why individuals with cystic fibrosis usually require higher amounts of fat-soluble vitamins than the general population. If vitamin supplements are not taken, the levels of vitamins in the blood can become too low. This is known as a vitamin deficiency.

### **Vitamin A**

Vitamin A has many important roles in the body. It helps with vision at night and allows the eyes to adjust when moving from a dark place to a bright place. Vitamin A deficiency may make it difficult for the eyes to get used to changes in light. A CF physician should be consulted if a vitamin A deficiency is suspected. Vitamin A also helps make skin healthy, helps to fight infection and helps with growth during childhood. It is found in dark green or orange fruits

and vegetables, eggs, liver, and milk. For individuals with cystic fibrosis, food sources are not enough to prevent vitamin A deficiency, so a vitamin supplement is usually recommended.

## **Vitamin D**

Vitamin D comes from two sources: it is made when the skin is exposed to sunlight, and it is also found in foods. Vitamin D helps the body absorb calcium, and helps move calcium from the blood to the bones. Without enough vitamin D, bones can weaken, and the chance of breaking a bone becomes greater. While foods such as eggs and fish contain vitamin D, the most common dietary sources are milk and milk products. A vitamin D supplement is usually recommended to individuals with cystic fibrosis to make sure enough is absorbed into the body every day.

## **Vitamin E**

Vitamin E has become very popular because of its role as an antioxidant. The body goes through many changes and as the body changes – it goes through a process called oxidation. Oxidation produces harmful products that can destroy healthy cells. Vitamin E helps get rid of these harmful products, which is why it is called an antioxidant. A vitamin E deficiency can affect the body's ability to protect itself when sick. For individuals with cystic fibrosis, this may affect their lungs and their ability to breathe. Foods that contain vitamin E include plant oils, margarines, nuts, seeds, and some fruits and vegetables. Diet alone cannot prevent a vitamin E deficiency in people with cystic fibrosis; therefore, a supplement is usually recommended.

## **Vitamin K**








Most of the vitamin K needed by the body comes from a healthy diet. Vitamin K is found in green vegetables, plant oils and margarine. Healthy bacteria in the intestines also produce vitamin K. Even though the bacteria in the intestine are healthy, they can be destroyed by the antibiotics taken for a lung infection. This can affect the amount of vitamin K produced and absorbed on a daily basis. Vitamin K is very important because it helps blood to clot. For example, the time it takes for a cut to stop bleeding is affected by how much vitamin K is in the body: the longer it takes to clot, the less vitamin K the body may have. Vitamin K is also important for proper bone



growth in children. To prevent a deficiency, many people with cystic fibrosis take a supplement that contains vitamin K.

## How to Keep a “Food Record”

If an individual with cystic fibrosis is having trouble gaining weight, a CF dietitian may request that a food record is kept. Writing down all food and drink for three days can help the dietitian understand the food habits and nutrition of an individual with cystic fibrosis. The dietitian can then help to add calories and/or balance meals if needed.

-  Record all food and drink consumed, except for water, for three days in a row. It is better to record during the meal or snack, instead of after the food has been eaten.
-  Include the time of day when the food is eaten and the place where the food is eaten (e.g. home, school, restaurant, watching TV, etc.).
-  Describe the foods accurately and give brand names if possible (e.g. “margarine (Becel), 1 level teaspoon”).
-  Include food labels that contain nutrition information whenever possible (e.g. chocolate bar wrappers, yogurt containers).
-  State whether fruits and vegetables are fresh, canned (water-packed, heavy or light syrup), cooked or frozen.
-  Record the amount of food eaten by using household measures (e.g. cups, teaspoons and tablespoons), or weigh the food.  
*Examples:* **Homogenized milk:** 1/2 cup or 4 oz. or 125 g  
**2% cottage cheese:** 4 level tbsp. or 50 g
-  When weighing meat on a food scale, give a detailed description. Please be sure to weigh the meat after it is cooked. If there is bone in the meat or if there are leftovers, weigh them after eating and subtract from the original weight.

*Example:* **Broiled pork chop**

Total weight with bone: 75 g

Less: bone weight: 21 g

Net weight eaten: 54 g

If weighing is impossible, approximate the number of ounces, or record the measured size of the meat (e.g. 2 in. x 2 in. x 1 in.).

- 🍆 Describe food in detail.

*Example:* **Bologna sandwich**

Whole wheat bread (Dempster's) 2 slices

Bologna 1 slice (50 g)

Mayonnaise (Kraft light) 1 tsp.

Processed cheese (Kraft) 1 slice (30 g)

- 🍌 Be sure to record amounts of additional foods served with cereals or desserts, etc.

*Example:* **Cereal**

Rice Krispies (Kellogg's) 1/2 cup (15 g)

Milk 2% 1/4 cup

Brown sugar 2 level tsp.

- 🍷 Include how the food is prepared, especially for meats, fish, poultry, eggs and vegetables. Methods of preparation include boiling, roasting, baking, broiling, frying or steaming. When frying, record the type of fat or oil used and quantity (subtract any leftover fat or oil).

- 🍎 For mixed dishes like casseroles, stews and baked goods (cookies, cakes, pies, etc.) provide recipes on a separate sheet. Record ingredient quantities, the number of servings made and the portion eaten.

- 🍏 If using commercial baked goods, state brand name and amount eaten.

- 🍎 If eating out, name the restaurant/chain and record foods eaten with portion size. When doing a three-day fecal fat study, it is best not to eat at restaurants unless they are well-known chains such as McDonalds, Harvey's, etc.

- 🌿 Give the name and amount of vitamin and/or mineral supplements if taken.

- 🍷 Record any enzymes taken with each meal.

- 🍷 Record daily bowel movements.







Any questions or concerns should be directed to a CF clinic.

# Tips to Increase Calories, Protein and Nutritional Supplements






- Rachel Freeman, MSc, RD

Individuals with cystic fibrosis have higher calorie needs than individuals without cystic fibrosis, and it can be challenging to meet these needs. Below are suggestions and hints on how to increase the calories and protein in a healthy diet.













## To increase calories:

-  Make sure to have at least three meals and three snacks every day.
-  Include a “meat and alternatives” and/or added fat at every meal and snack.
-  Make sure to include high-calorie drinks (homogenized milk, yogurt drinks, smoothies) with meals and snacks.
-  Limit juice and milk between meals and snacks - this can affect appetite at the next meal or snack.
-  Try to eat more when your appetite is good
-  Avoid foods labelled “light,” “low fat,” “diet,” “calorie reduced” or “0% fat.”








## Fats and Oils






-  Add vegetable oils, butter or margarine to foods when cooking.
-  Toss pasta/rice/vegetables in extra oil, butter or margarine after cooking.
-  Spread butter or margarine on all breads, pitas, tortilla wraps and crackers.
-  Add mayonnaise to salad dressings, sauces, dips and sandwich fillings; mix it with ketchup and mustard.
-  Peanuts and other nuts (including peanut and nut butters) are a great source of healthy fats as well as protein.

## Milk and Dairy Products











-  Drink homogenized milk (3.25% MF [milk fat]) instead of 2%, 1% or skim milk.
-  Choose high-fat yogurts or Greek yogurts (more than 2.5% MF), not 0% fat.
-  Add whipping cream (35% MF) or coffee cream (10% MF) to milk.
-  Use cream to prepare cooked cereals, soups, sauces, custards, puddings, baked goods and mashed potatoes.
-  Add cream to coffee and tea, or use it to make hot chocolate.
-  Add regular sour cream (not low-fat) to potatoes, and use it as a dip for vegetables.
-  Use regular cream cheese as a spread for sandwiches and crackers, and add it to sauces and vegetable dips.
-  Use regular cheese or cheese slices on sandwiches, and try two slices instead of one.
-  Melt cheese onto crackers, toast and pasta, or eat with fruits and vegetables for snacks.
-  Add grated cheese to sauces, scrambled eggs and casseroles.
-  Use whipped cream as a topping for desserts, hot chocolate and fruit.
-  Snack on ice cream, smoothies or milkshakes after dinner.

## Other

-  Add olives to pasta, pizza and salads.
-  Add avocado slices to sandwiches.
-  Add gravy to potatoes and meat.
-  Eat higher-fat meats, and do not trim the fat from meat or remove the skin from poultry.
-  Eat fatty fish more often (e.g., salmon, herring, trout, mackerel, sardines).
-  Choose creamed soups rather than broth-based soups.
-  Buy canned fruit in heavy syrup instead of juice.

- 
-  Use dips, sauces and spreads on everything possible.
  -  Add granola to cereal and/or yogurt, or eat as a snack.
  -  Add dried fruits or dried fruit bars to snacks.
  -  For eating on the run, keep portable high-calorie snacks on hand, such as pudding, dried fruit, nuts, granola bars, energy bars, yogurt or yogurt drinks, bagels, cheese and crackers.

## To increase protein:

-  Make sure each meal and snack has a source of protein chosen from the “Meat and Alternatives” group in Canada’s Food Guide. Many dairy products are also high in protein.
-  Skim milk powder adds protein without changing the flavour of many foods. Try adding it to milk, milkshakes, smoothies, hot cereals, soups, casseroles, mashed potatoes, gravy and baked goods.
-  Whey or soy protein powders can also be added to foods instead of skim milk powder.
-  Try adding tofu to soups, smoothies, salads, sauces and stir-fries.
-  Eggs are very high in protein. Eat them scrambled or fried on their own, or try adding one or two extra eggs to recipes for cookies, muffins and pancakes. Add hard-boiled eggs to salads and sandwiches.
-  Add diced meat or canned fish to salads, soups and casseroles.
-  Add cooked legumes, such as lentils, chickpeas and red or white beans, to soups, casseroles, salads, pasta and other grain dishes.
-  Use hummus (chickpea dip) for vegetables, in wraps and sandwiches or on crackers.
-  Peanuts and nuts (including peanut and nut butters) are good sources of protein as well as healthy fat. Include these often as spreads or snacks on their own.
-  Snack on cottage cheese or cheese.



- 🍴 Use regular cheese or cheese slices on sandwiches; melt cheese onto crackers, toast and pasta; eat cheese with fruits and vegetables for snacks; and add grated cheese to sauces, scrambled eggs and casseroles.
- 🍴 Spread paté on crackers or bread.
- 🍴 Drink eggnog when it is available (not the low-fat kind).

Nutritional supplements (such as Boost, Ensure or Pediasure) may be suggested at some point by a CF clinic doctor or dietitian to help boost calories and protein. Please ask a CF clinic dietitian to help choose the right one depending on age and nutritional needs.

## References

- CF Health Matters. Preventing Dehydration in CF. Toronto, Ontario: Canadian Cystic Fibrosis Dietitians, 2012.
- Cystic Fibrosis Foundation. Salt (Sodium Chloride). United States: CFF Education Committee, 2008.
- Cystic Fibrosis Foundation. Calcium. United States: CFF Education Committee, 2008.
- Cystic Fibrosis Foundation. Iron. United States: CFF Education Committee, 2008.
- Cystic Fibrosis Foundation. Zinc. United States: CFF Education Committee, 2008.
- "Healthy Diet, Healthy Fats."* CF Health Matters. Toronto, Ontario: Cystic Fibrosis Dietitians across Canada (2005).
- "Enzyme Guidelines for Children with Cystic Fibrosis."* CF Health Matters. Toronto, Ontario: Cystic Fibrosis Dietitians across Canada (2005).
- "Enzyme Guidelines for Adults with Cystic Fibrosis."* CF Health Matters. Toronto, Ontario: Cystic Fibrosis Dietitians across Canada (2005).
- "Vitamins and Cystic Fibrosis."* CF Health Matters. Toronto, Ontario: Cystic Fibrosis Dietitians across Canada (2005).
- "How to use a Food Record."* CF Health Matters. Toronto, Ontario: Cystic Fibrosis Dietitians across Canada (2005).



## Chapter Four

# **Medical Conditions Related to Cystic Fibrosis and Nutrition**



Cystic Fibrosis  
Fibrose kystique  
Canada

# Medical Conditions Related to Cystic Fibrosis and Nutrition


## Bone Health

Some people with cystic fibrosis can develop weak bones, which can lead to bone pain, broken bones and changes in the way bones are shaped. This is known as osteopenia or osteoporosis. These problems with bones are not always apparent. Unfortunately, more than half of all teenagers and adults who have cystic fibrosis have osteopenia. Osteoporosis is less common; less than 25% of individuals with cystic fibrosis have this problem. Most people who suffer from osteopenia or osteoporosis who do not have cystic fibrosis are much older, but these conditions seem to affect those with cystic fibrosis at a younger age. As a result, bone mineral density (the thickness of one's bones) is a real concern for anyone with cystic fibrosis and is something that should be monitored.

## Why Do Osteopenia and Osteoporosis Develop?

It is not known why exactly some people with cystic fibrosis develop weak bones. One of the major concerns is how well an individual with cystic fibrosis eats. Some people with cystic fibrosis have a hard time growing and gaining weight because their bodies have trouble digesting food properly. To make healthy bones, a good intake of protein, calories, calcium, phosphorus, vitamin K and vitamin D is needed. If the diet does not include enough of these nutrients when the body is growing, the strength of the bones as an adult will not be as good as it should be. Vitamin D helps the body absorb calcium from the food that is consumed. The best source of vitamin D is not from food, but from the sun. In Canada, during the winter, it is very hard for a person to get enough vitamin D from the sun. Research





has shown that it is common for people with cystic fibrosis to have low levels of vitamin D in their blood. If the levels are low, the body will not absorb enough calcium and the bones will not be as strong as they should be.

Individuals with cystic fibrosis may also have weaker bones due to hormones. A teenager going through puberty has many hormones travelling throughout the body. These hormones help make the bones grow and become strong. Individuals with cystic fibrosis might not enter into puberty until they are in their late teens. This means they may need more time to grow strong bones.

The health of the lungs can also affect bone strength. Having trouble breathing may cause a person with cystic fibrosis to be less active, resulting in weaker bones. Also, a sick body is under a lot of stress. When the body is under stress, it releases cytokines to help fight infection. Cytokines are thought to cause the release of calcium from bones.

Some medications that individuals with cystic fibrosis may have to take can damage the bones. Prednisone, which is a corticosteroid, is known to weaken bones.







## **Cystic Fibrosis-Related Diabetes (CFRD)**

Cystic fibrosis-related diabetes (CFRD) is thought to be caused by damage to the pancreas. Thick mucus clogs the tubes in the pancreas, making it hard for the pancreas to function.

The pancreas is an organ that has two main jobs. The first is to make and secrete a hormone called insulin, and the second is to make and secrete enzymes and other digestive juices.






As individuals with cystic fibrosis are living longer, the number of people who have diabetes is increasing. It seems to be a problem that affects individuals with cystic fibrosis who are above 10 years of age. The type of diabetes that develops as a result of cystic fibrosis is different from other types of diabetes. When hearing about “diabetes” in general, please remember that its treatment is very different from cystic fibrosis-related diabetes.

Common symptoms of CFRD before diagnosis or treatment include:

-  feeling very thirsty
-  weight loss
-  urinating often
-  feeling very hungry
-  lack of energy
-  unexplained decrease in lung function

## Why is it Important to Treat CFRD?

If the symptoms of CFRD are left untreated, they can lead to problems with cystic fibrosis, including:

-  thick mucus that is difficult to clear
-  trouble keeping a healthy weight
-  muscle loss
-  decreased ability to fight infection
-  high blood sugar, which over time may cause damage to the blood vessels in the eyes and kidneys that can lead to blindness or kidney failure.

Be aware that individuals with cystic fibrosis may not know they have diabetes because many of these signs can also be related to illness and lung disease.

For more information on CFRD, contact a CF clinician or physician. They can provide up-to-date information about cystic fibrosis-related diabetes.



## Tube Feedings

Even with high-calorie diets and pancreatic enzymes, some children and young adults are unable to gain the necessary weight for good health. In these circumstances it may be required to supplement the child or young adult's oral intake with tube (enteral) feeding. Usually the tube feeding occurs at night to allow for normal activities during the daytime.

Tube feedings will be discussed during clinic visits if the CF care team thinks that they are necessary.

## Distal Intestinal Obstruction Syndrome (DIOS)

One complication that may affect a person with cystic fibrosis is distal intestinal obstruction syndrome (DIOS). DIOS is a problem with the bowel, or intestine. Food and mucus may partly or completely block the intestine and cause pain and other symptoms. About one in every 10 to 20 individuals with cystic fibrosis gets DIOS at some point during their lives. Speak to a CF team if stomach pain occurs or if bowel movements are less frequent than usual.

### References

*"Bone Health."* CF Health Matters. Toronto, Ontario: Cystic Fibrosis Dietitians across Canada (2005).

*"What You Should Know About CF-Related Diabetes."* CF Health Matters. Toronto, Ontario: Cystic Fibrosis Dietitians across Canada (2005).

*"DIOS."* CF Health Matters. Toronto, Ontario: Cystic Fibrosis Dietitians across Canada (2005).





## Chapter Five

# **Recipes**



# Recipes

## Breakfasts

### Chocolate Chip Pancakes

- |                         |                          |
|-------------------------|--------------------------|
| 1 cup all-purpose flour | 2 tsp. salt              |
| 1/8 cup chocolate chips | 1 cup homogenized milk   |
| 3 tsp. butter, melted   | 1 1/2 tsp. baking powder |
| 1/3 cup white sugar     | 2 eggs, separated        |
| 1/2 tsp. vanilla        |                          |

Sift together flour, baking powder, salt and sugar, and then add chocolate chips. Beat egg whites until stiff. Beat egg yolks until light, then stir in milk, vanilla and butter. Gradually stir egg yolk mixture into flour mixture, and beat until batter is smooth. Fold in egg whites. Batter can be used for pancakes or waffles.

### Sour Cream Pancakes

- |                       |                        |
|-----------------------|------------------------|
| 1 cup flour           | 1 tbsp. sugar          |
| 1 egg                 | 1 tbsp. vegetable oil  |
| 1 tbsp. baking powder | 1 cup homogenized milk |
| 1/4 cup sour cream    |                        |


Combine flour, sugar and baking powder. In a separate bowl, combine egg, oil, milk and sour cream. Make a well in the dry ingredients and add the wet ingredients to the dry. Mix with a whisk until smooth. Pour batter onto a lightly greased griddle. Turn pancakes when tops are covered with bubbles. Serve with maple syrup and topped with whipping cream.

Blueberries or strawberries may be added to the batter, and yogurt may be substituted for sour cream.

### Brunch Casserole

- |                                           |                       |
|-------------------------------------------|-----------------------|
| 1 lb. bacon                               | 2 onions, chopped     |
| 2 cups sliced fresh mushrooms             | 1 tbsp. butter        |
| 4 cups frozen hash brown potatoes, thawed |                       |
| 1 tsp. salt                               | 1/4 tsp. garlic salt  |
| 1/2 tsp. ground black pepper              | 4 eggs                |
| 1 1/2 cups homogenized milk               | 1 pinch dried parsley |
| 1 cup shredded cheddar cheese             |                       |





Place bacon in a large skillet. Cook over medium-high heat until evenly brown. Drain and set aside. Add the mushrooms and onions to the skillet; cook and stir until the onion has softened and turned translucent and the mushrooms are tender, about 5 minutes. Grease a 9 x 13-inch casserole dish with the tablespoon of butter. Place potatoes in bottom of prepared dish. Sprinkle with salt, garlic salt and pepper. Top with crumbled bacon, and then add the onions and mushrooms. In a mixing bowl, beat the eggs with the milk and parsley. Pour the beaten eggs over the casserole and top with grated cheese. Cover and refrigerate overnight. Preheat oven to 400°F (200°C). Bake in preheated oven for 1 hour or until set.

## Eggs Benedict

8 eggs	1 tsp. distilled white vinegar
8 strips Canadian-style bacon	4 English muffins, split
2 tbsp. butter, softened	chopped chives to garnish

## Hollandaise Sauce

4 egg yolks	3 1/2 tbsp. lemon juice
1 pinch ground white pepper	1/8 tsp. Worcestershire sauce
1 tbsp. water	1 cup butter, melted
1/4 tsp. salt	

To make hollandaise: Fill the bottom of a double boiler part way with water. Make sure that water does not touch the top pan. Bring water to a gentle simmer. In the top of the double boiler, whisk together egg yolks, lemon juice, white pepper, Worcestershire sauce and 1 tablespoon water. Add melted butter to egg yolk mixture 1 or 2 tablespoons at a time while whisking yolks constantly. If hollandaise begins to get too thick, add a teaspoon or two of hot water. Continue whisking until all butter is incorporated. Whisk in salt, then remove from heat. Place a lid on pan to keep sauce warm.

Preheat oven on broiler setting. To poach eggs: Fill a large saucepan with 3 inches of water. Bring water to a gentle simmer, then add vinegar. Carefully break eggs into simmering water, and allow to cook for 2 1/2 to 3 minutes. Yolks should still be soft in centre. Remove eggs from water with a slotted spoon and set on a warm plate.

While eggs are poaching, brown the bacon in a medium skillet over medium-high heat and toast the English muffins on a baking sheet under the broiler. Spread toasted muffins with softened butter, and top each one with a slice of bacon, followed by one poached egg. Place 2 muffins on each plate and drizzle with hollandaise sauce. Sprinkle with chopped chives and serve immediately.

## Hash Brown Potatoes

- 3 cups cooked potatoes, chilled and diced
- 1 tsp. grated onion
- 1/2 tsp. pepper
- bacon drippings or butter for cooking liquid
- 1/4 cup cream
- 1 tbsp. chopped parsley
- 1 tsp. lemon juice

Combine potatoes, onion, parsley, pepper and lemon juice. Heat a skillet with 3 tablespoons of bacon drippings or butter. Spread the potato mixture over the skillet. Press it with a bread knife into a cake. Sauté the potatoes slowly, shaking them from time to time to keep them from sticking. When the bottom is brown, cut the potato layer in half and turn over carefully. Pour cream slowly over the potato layer. Brown the second side and serve.

## Breakfast Cheese Grits

- 6 cups water
- 3/4 cup butter
- 2 tsp. seasoning salt
- 1/2 tsp. hot pepper sauce
- 3 eggs, beaten
- 1 1/2 cups quick-cooking grits, dry
- 1 pound processed cheese, cubed
- 1 tbsp. Worcestershire sauce
- 2 tsp. salt


Preheat oven to 350°F (175°C). Lightly grease a 9 x 13-inch baking dish. In a medium saucepan, bring water to a boil. Stir in grits, and reduce heat to low. Cover and cook 5 to 6 minutes, stirring occasionally. Mix in butter, cheese, seasoning salt, Worcestershire sauce, hot pepper sauce and salt. Continue cooking for 5 more minutes, or until the cheese is melted. Remove from heat, cool slightly and fold in eggs. Pour into the prepared baking dish. Bake 1 hour in the preheated oven, or until the top is lightly browned.

## Entrees

### Chicken with Herbed Lemon Sauce

- 3/4 lb. lasagnette pasta or other ribbon pasta
- 2 oz. unsalted butter
- 1/4 cup lemon juice
- 3 tbsp. fresh chives, chopped
- 1 tbsp. plus 1 tsp. fresh thyme, chopped
- 3 1/4 cups cooked chicken, chopped (about 1 lb.)
- 1/3 cup plus 3 tbsp. fresh Parmesan cheese, grated
- 1 tsp. lemon rind, grated
- 1 cup cream





Cook pasta in a large pan of boiling water for 10 minutes or until al dente. Drain. Meanwhile, heat butter, lemon rind and juice in a heavy non-stick pan over medium heat until butter is melted. Add cream, herbs, chicken and cooked pasta. Stir until hot. Serve sprinkled with cheese.

## **Chicken Rolls with Parsley Pesto**

- 8 chicken thigh fillets
- 1 tbsp. plus 1 tsp. coarse-grain mustard
- 8 bacon slices
- 2 tbsp. plus 2 tsp. chopped walnuts or pecans
- 2 cups fresh parsley
- 2 cloves garlic, crushed
- 1/2 cup olive oil
- 2 tbsp. plus 2 tsp. grated Parmesan cheese

Prepare grill or turn on broiler. Place thigh fillets between two sheets of plastic wrap and pound lightly with a mallet or other heavy, flat object to flatten. Spread fillets with mustard and roll up with mustard inside. Wrap each roll with a bacon slice and secure with toothpicks. Grill or broil chicken 10 minutes, then turn and grill or broil another 8 to 10 minutes or until cooked through. Meanwhile, combine nuts, parsley and garlic with half the oil in a food processor or blender and process until smooth. Continue to process while gradually adding remaining oil. Add cheese and mix well. Serve chicken with parsley pesto.

## **Baked Cheesy Pasta**

- 1 lb. dry ziti pasta
- 1 lb. lean ground beef
- 6 oz. provolone cheese, sliced
- 6 oz. mozzarella cheese, shredded
- 2 tbsp. grated Parmesan cheese
- 1 onion, chopped
- 2 (26 oz.) jars spaghetti sauce
- 1 1/2 cups sour cream

Bring a large pot of lightly salted water to a boil. Add ziti pasta and cook until al dente, about 8 minutes; drain. In a large skillet, brown onion and ground beef over medium heat. Add spaghetti sauce and simmer 15 minutes. Preheat the oven to 350°F (175°C). Butter a 9 x 13-inch baking dish. Layer as follows: ziti (1/2 of it), provolone slices, sour cream, sauce mixture (1/2), remaining ziti, mozzarella cheese and remaining sauce mixture. Top with grated Parmesan cheese. Bake for 30 minutes in the preheated oven, or until cheeses are melted.

## Penne with Chicken Alfredo

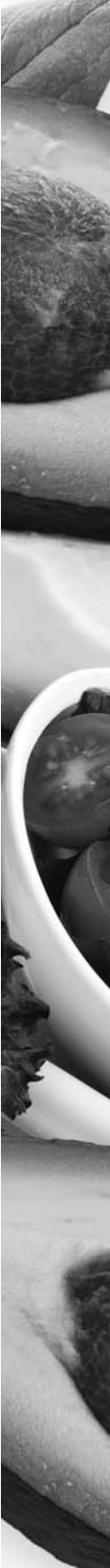
- 1 jar (16 oz.) alfredo sauce      8 oz. dried penne pasta
- 1 can (14.5 oz) diced tomatoes with basil, oregano and garlic
- 1 tbsp. Italian seasoning      1/4 tsp. red pepper flakes (*optional*)
- 2 packages (6 oz. each) refrigerated, cooked chicken breast strips
- 1 can (2.25 oz.) sliced black olives, drained
- shredded Parmesan cheese

In a large pot of boiling salted water, cook pasta according to package directions. Drain well and return to hot pot. Cover; keep warm. Meanwhile, in a medium saucepan, combine alfredo sauce, tomatoes, Italian seasoning and red pepper flakes (*optional*) over medium heat. Stir in chicken and olives. Bring to a simmer; cook for 10 minutes. Serve hot over cooked pasta. Top with Parmesan cheese.

## Chicken Enchilada Quiche

- 1 frozen 9-inch deep-dish pie shell
- 4 eggs
- 1 cup half-and-half or 1 cup homogenized milk
- 1 1/2 cups chicken, finely cubed (or shredded)
- 1 1/2 cups tortilla chips, broken
- 2 cups Monterey Jack cheese, shredded
- 1 cup cheddar cheese, shredded
- 1 cup salsa (chunky)
- 4.5 oz. canned green chilies, drained and chopped
- 1/2 teaspoon salt
- pepper (to taste—*optional*)
- sour cream (served on the side—*optional*)
- salsa (extra served on the side—*optional*)

Heat oven to 350°F (175°C). Transfer refrigerated crust to a 9-inch glass deep-dish pie pan. In a medium bowl, beat eggs. Add half-and-half (or milk) and mix until blended. Stir in chicken, chips, cheeses, 1 cup salsa, green chilies and salt. Pour into pie crust. Sprinkle all over with pepper (*optional*). Bake 55 to 65 minutes or until crust is light golden brown and knife inserted in centre comes out clean. Let stand for 10 minutes before serving. Serve with sour cream and/or salsa if desired.





## Croissant Sausage Sandwiches

- 4 croissants, sliced in half lengthwise
- 1/4 cup prepared mustard
- 1 lb. smoked Polish sausage, sliced lengthwise
- 1/4 lb. Gouda cheese, sliced

Spread mustard over one cut side of each croissant. Divide sausage and cheese equally amongst mustard-coated croissant halves. Top with remaining halves to make sandwiches and serve.

## Crunchy Curried Egg Salad

- 1/2 cup mayonnaise
- 1/2 cup raisins
- 1/3 cup slivered almonds
- 1/2 tsp. curry powder
- 6 hard-boiled eggs, finely chopped

In medium mixing bowl, blend together mayonnaise and curry powder. Stir in eggs, raisins and almonds. Chill. Serve open-faced on rye rounds or Kaiser halves, in pita bread pockets or in hollowed-out tomatoes.

## Egg and Pork Stir-Fry

- 6 eggs
- 1/4 cup homogenized milk
- 1/2 tsp. salt
- 1/4 tsp. pepper
- 3 tbsp. vegetable oil
- 1 clove garlic
- 1 cup pork, cut in thin strips
- 1 cup diagonally sliced celery
- 1/2 cup thinly sliced carrots
- 1 small onion, coarsely chopped
- 1 cup whole green beans
- 2 cups coarsely shredded cabbage

In medium bowl, beat together eggs, milk and seasonings. Heat 1 tablespoon vegetable oil in large frying pan or electric skillet. Add egg mixture and gently scramble eggs until set. Remove eggs from frying pan. Set aside and keep warm. Pour 1 tablespoon oil in same frying pan. Add garlic clove and heat briefly. Discard garlic. Add pork strips and stir-fry until thoroughly cooked, 3 to 5 minutes. Remove pork from frying pan. Set aside and keep warm. In same frying pan add remaining tablespoon of oil. Add carrots and celery and stir-fry for 3 minutes. Add remaining vegetables and cook for another 5 minutes or until all vegetables are tender crisp. Add scrambled eggs and cooked pork. Cover frying pan and heat over low heat until eggs and pork are thoroughly warmed, about 5 minutes.

## Chicken Crunch

- 2 lb. chicken breast
- 3/4 cup homogenized milk
- 1/2 tsp. parsley
- 1/2 tsp. poultry seasoning
- 1 cup finely crushed bread crumbs
- 2 tbsp. melted margarine
- 1 cup cream of mushroom soup
- 1 tbsp. finely chopped onion
- 1/2 tsp. salt

Mix 1/3 cup soup, 1/4 cup milk, onion and parsley. In a separate dish, mix bread crumbs, poultry seasoning and salt. Dip chicken first in soup mixture and then in bread crumb mixture. Place chicken in shallow (12 x 18 x 2-inch) baking dish. Drizzle margarine on chicken. Bake on a rack at 400°F (200°C) for 1 hour. Combine remaining soup and milk. Heat and serve over chicken.

## Children's Scrambled Egg Sandwich

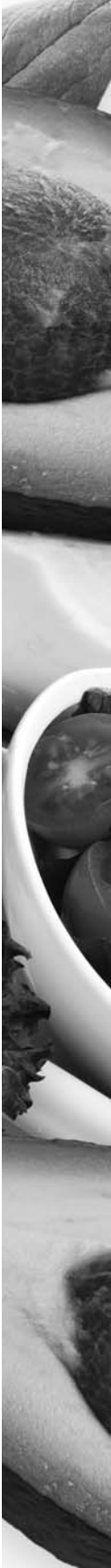
- 2 tbsp. chopped green onions
- 4 hotdog buns, split
- 6 eggs, scrambled
- 3 slices of cheese of your choice cut in triangles

Stir green onions into scrambled eggs. For each sandwich, fill bun with eggs, top with three cheese triangles. Broil until cheese begins to melt.

## Chicken with Mushrooms

- 3 cups sliced mushrooms
- 4 skinless, boneless chicken breast halves
- 1 egg, beaten
- 1 cup seasoned bread crumbs
- 1/2 cup butter
- 2 tbsp. lemon juice
- 6 oz. shredded Parmesan cheese

Preheat oven to 350°F (175°C). Melt butter and mix with lemon juice. Pour half the butter and lemon juice mixture into a 9 x 13-inch pan and place mushroom slices to cover bottom of pan. Combine Parmesan cheese and bread crumbs. Dip chicken into beaten eggs, then roll in bread crumb mixture. Place chicken on top of mushrooms, arranging any remaining mushrooms on chicken. Pour remaining butter and lemon juice mixture over the chicken. Bake in preheated oven for 30 to 35 minutes, or until chicken is no longer pink and juices run clear.



## Tahini Salad

- |                         |                            |
|-------------------------|----------------------------|
| 3 tbsp. Italian parsley | 2 English cucumbers, diced |
| 2 large tomatoes, diced | 2 green onions, diced      |
| 1 green pepper, diced   |                            |

### Dressing

- |                        |                   |
|------------------------|-------------------|
| 1 garlic clove, minced | 3/4 cup tahini    |
| 1/4 cup lemon juice    | 2 tbsp. olive oil |
| sprinkle of dried mint | pinch of salt     |

Combine vegetables and parsley in bowl. Stir together dressing ingredients and adjust seasoning according to individual taste. Toss dressing with vegetables. Chill 30 minutes before serving.

## Butter-Poached Cumin Tilapia

- |                                |                          |
|--------------------------------|--------------------------|
| 6 oz. tilapia                  | 2 tbsp. butter           |
| 1 tbsp. extra virgin olive oil | 3 oz. tomatoes, diced    |
| 2 stalks green onions, sliced  | 1/4 tsp. ground cumin    |
| 1 clove garlic, sliced         | pinch of salt and pepper |

Preheat oven or toaster oven to 400°F (200°C). Sprinkle fish with salt, pepper and cumin. Cover bottom of baking dish with olive oil, then a layer of fish. Break the butter into pieces and sprinkle the fish with 1/2 of it. Place the diced tomato randomly, and place sliced garlic and sliced green onion on top. Spread out the remaining butter and salt and pepper. Bake covered for 8 minutes, then uncover and cook an additional 8 minutes until fish is cooked through.

## Bolognese Meat Sauce with Cream

- |                                         |                        |
|-----------------------------------------|------------------------|
| 1 oz. dried mushrooms                   | 2 tbsp. olive oil      |
| 2 oz. prosciutto or bacon (or pancetta) |                        |
| 1 onion, minced                         | 1 carrot, minced       |
| 1 celery stock, minced                  | 1 lb. lean ground beef |
| 1/4 tsp. red pepper flakes              | 1 tbsp. salt           |
| 2 tbsp. tomato paste                    | 1/2 cup red wine       |
| 3/4 cup to 1 cup heavy cream            | 1 cup beef stock       |

Soak prosciutto or bacon, with mushrooms covered with 1 cup boiling water, for 20 minutes. Drain, saving the liquid, and chop. Heat oil in dutch oven. Add vegetables to prosciutto or bacon and mushroom mixture, and sauté until beginning to brown. Add ground beef, salt and red pepper flakes, and cook about 5 minutes, until brown. Add tomato paste. Reduce heat to low and pour in wine, and beef stock. Simmer until thick, 1 to 2 hours. Stir in cream and heat through.



## Pasta and Anchovy

- 250 g of uncooked spaghetti or linguine
- 2 tbsp. olive oil
- 3 cloves garlic, finely chopped
- 1 dried red chili, crumbled or chopped into small pieces
- 1 can anchovies in oil, drained and finely chopped
- 1/2 cup pitted black olives, roughly chopped
- 1 to 2 cans of diced tomatoes
- basil leaves, to garnish
- additional olive oil, to garnish
- Parmesan cheese, to garnish (optional)

Cook the pasta in boiling, salted water until al dente. Heat a deep frying pan or sauté pan over a medium heat and add olive oil. Fry the garlic, chili and anchovies for 1 to 2 minutes until the garlic is aromatic and the anchovies are beginning to melt into the oil. Add the olives, and tomatoes to the pan and stir over a medium heat for 4 to 5 minutes until everything is well combined. Drain the pasta and toss into the pan with the sauce. Taste and adjust the seasoning as necessary. Serve drizzled with a little olive oil and garnished with basil leaves. Add Parmesan cheese if desired.

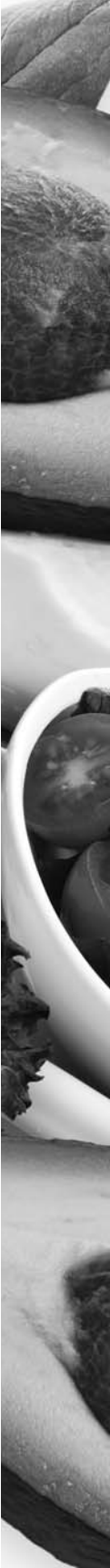
## Zucchini Cake


- |                           |                          |
|---------------------------|--------------------------|
| 1 tbsp. olive oil         | 1 onion, finely chopped  |
| 3 slices bacon, chopped   | 1 large carrot, grated   |
| 1 large zucchini, grated  | 3 eggs                   |
| 1 cup cheese, grated      | 1/4 cup cream            |
| 1/2 cup self-rising flour | salt and pepper to taste |

Heat the oil in a large pan and sauté onion until translucent. Add the bacon and fry until it starts to turn slightly brown. Add the carrot and zucchini and cook for about 2 minutes. Transfer mixture to a bowl and let cool. Beat the eggs, cream and cheese together; season to taste. Stir the egg mixture into the cooled zucchini mixture. Stir in the flour. Grease and flour little muffin or bun pan. Spoon mixture into pan cups. Bake at 350°F (175°C) for 15 to 20 minutes.

## Tater Tot Casserole

- 1 lb. pork sausage
- 2 cans cream of mushroom soup
- 2 cups cheddar cheese
- 1 3/4 cups of frozen tater tots





Cook sausage and drain. Add soup and stir. Put soup mixture onto bottom of 9- x 9-inch pan. Place tater tots on top. Sprinkle cheese over top. Bake at 350°F (175°C) for 30 minutes. Broil the top for a couple of minutes for a little extra crispiness.

## **BBQ Chicken Pizza**

- 1 (12-inch) pre-baked pizza crust
- 1 cup spicy barbecue sauce      1 cup sliced bacon
- 2 skinless, boneless chicken breast halves, cooked and cubed
- 1/2 cup chopped fresh cilantro      1 cup sliced peppers
- 1 cup chopped red onion
- 2 cups shredded cheddar and/or mozzarella cheese

Preheat oven to 350°F (175°C). Place pizza crust on a medium baking sheet. Spread the crust with barbecue sauce. Top with chicken, cilantro, bacon, peppers, onion and cheese. Bake in preheated oven for 15 minutes, or until cheese is melted and bubbly.

## **Crustless Beef and Tomato Quiche**

- 1 lb. ground beef      1 1/2 cups finely chopped onions
- 1/2 tsp. salt      1/4 tsp. pepper
- 1 1/2 cups homogenized milk      3/4 cup biscuit mix
- 3 eggs      1 tomato, sliced
- 1/2 cup (2 oz.) shredded cheddar cheese

Heat oven to 400°F (200°C). Grease a 10-inch quiche pan or 9-inch pie plate. Brown beef and onions. Drain off excess fat. Stir in salt and pepper. Spread beef and onions on bottom of baking dish. Beat milk, biscuit mix and eggs until smooth, about 15 seconds in blender or 1 minute with electrical mixer. Pour into baking dish, then bake for 25 minutes. Top with tomatoes and sprinkle with cheese. Bake until knife inserted in middle comes out clean, about 10 to 15 minutes. Cool 15 minutes before slicing.

## **Burger-Topped Buns**

- 1 1/2 lb. ground beef      1 egg, beaten
- 1 1/2 tsp. salt      1 tbsp. prepared mustard
- 1/4 cup chopped pimento
- 1 cup coarsely crushed potato chips
- 1 small can evaporated milk (2/3 cup)
- 1/4 tsp. pepper      1/4 cup finely chopped onions
- 1/2 cup drained sweet pickle relish
- 6 hamburger buns

Combine all ingredients except buns (mixture will be soft). Split buns and put them, cut side down, on a cookie sheet. Toast lightly under broiler. Remove from oven and turn buns so cut side is up. Spread each bun half with some of the meat mixture (a heaping 1/3 cup per bun). Spread the mixture so it completely covers the buns and extends just a little over the edges. Slip under the broiler for about 5 minutes or until meat is cooked to your liking. Serve immediately.

## **Pork Chop and Potato Bake**

6 pork chops	seasoned salt
1/2 cup homogenized milk	1/2 cup sour cream
1 can (10 3/4 oz.) condensed cream of celery soup	
1/4 tsp. ground black pepper	
1 cup (4 oz.) shredded cheddar cheese	
1 package (24 oz.) thawed hash brown potatoes	
1 can (2.8 oz.) French fried onions	

Brown pork chops in lightly greased skillet. Sprinkle with seasoned salt and set aside. Combine soup, milk, sour cream, pepper and 1/2 teaspoon seasoned salt. Stir in potatoes, 1/2 cup cheese and 1/2 can French fried onions. Spoon mixture into a 9 x 13-inch baking dish. Arrange pork chops over potatoes. Bake covered at 350°F (175°C) for 40 minutes. Top with remaining cheese and onions. Bake uncovered for 5 minutes longer.

## **Cornmeal Batter**

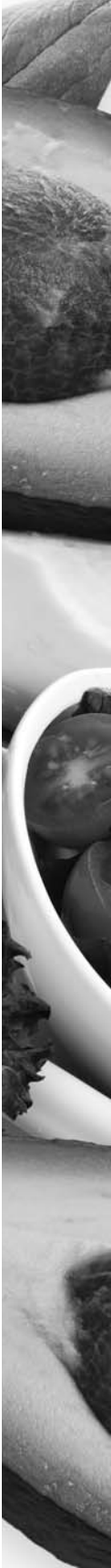
1/2 cup flour	1 tbsp. sugar
1 tsp. baking powder	1 tbsp. oil
1 egg	1/3 cup cornmeal
2 tsp. dry mustard	1/2 tsp. salt
1/2 cup homogenized milk	

Stir all ingredients together well; makes 1 cup of batter.

## **Hotdogs in Cornmeal Batter**

1 lb. hotdog wieners	cornmeal batter
oil for frying	skewers

Dry hotdog wieners on paper towels and insert a skewer into one end of each. Dip in batter, coating completely (pour batter into tall drinking glass for easy coating). Deep fry in hot fat, 375°F (190°C), until golden, about 2 minutes. Drain on paper towels.



## Stuffed Meat Patties with Dressing

1 lb. minced beef	1/4 cup corn flakes
1/4 cup tomato juice	1/4 tsp. pepper
1/4 cup hot water	2 eggs
1/4 tbsp. salt	

Combine ingredients together. Divide in half. Press one half of mixture into six greased individual moulds or muffin tins. Add 1/4 cup dressing (recipe below) to each mould and cover with the remaining meat mixture. Set in a pan of water and bake at 350°F (175°C) for 45 minutes.

### Dressing

1 quart (4 cups) bread crumbs	1/2 cup homogenized milk
1/4 cup chopped onions	1/2 cup butter
1/2 tbsp. sage	salt and pepper to taste

Melt butter and add chopped onions, cooking until they are tender. Add salt, pepper and sage to crumbs. Add onions and butter to bread crumb mixture. Mix lightly. Add milk gradually and combine.

## Avocado Treat

1 large avocado	1 4-oz. can cocktail shrimp
mayonnaise or seafood sauce to taste	

Split ripe avocado in half lengthwise. Mix shrimp and mayonnaise (or seafood sauce) together. Remove pit from avocado and spoon shrimp mixture in the cavity that is left.

## Hot Wheels Pizza

1 1/2 cups warmed homogenized milk	
1 tsp. sugar	1 package (8 oz.) active dry yeast
1/2 tsp. salt	4 cups all-purpose flour
1/4 cup oil	7.5 oz. tomato paste
mozzarella cheese	

Stir sugar into milk, sprinkle mixture with yeast and leave for 3 minutes, then stir well. Sift flour and salt in a large bowl. Add yeast mixture and oil to flour and salt. Combine to form dough. On a floured surface, knead dough until smooth (about 5 minutes). Roll into eight 8-inch pizzas and place on greased cookie sheets. Top with tomato paste and mozzarella cheese. Garnish as desired. Bake at 350°F (175°C) for 30 minutes.

## Chicken Nuggets

1 chicken	1 beaten egg
1/4 tsp. garlic powder	1 tbsp. salt
1 cup bread crumbs	1/8 tsp. pepper
1 tsp. sage	3 cups vegetable oil

Bone chicken, cut into bite-size pieces and dry pieces on paper towel. Place all the chicken pieces in a bowl with the beaten egg and mix until all pieces are coated. Start heating the oil to deep frying temperature in a wok or deep fryer. Combine bread crumbs and seasonings in a bag or large covered container and shake until thoroughly mixed. Place chicken pieces into crumb mix, about 10 at a time, and shake until coated. Drop pieces gently into oil and cook for 3 to 5 minutes. Remove and drain on paper towel.

## Turkey Paprika

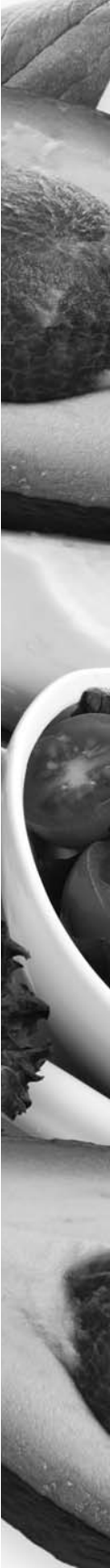
1 cup chopped onion	1/2 cup chopped green pepper
2 tbsp. ketchup	2 1/2 cups cubed cooked turkey
10 oz. can mushroom soup	1 cup homogenized milk
2 tsp. paprika	1/2 cup sour cream
3 cups uncooked egg noodles	3 tbsp. butter

Cook onion and green pepper in butter until tender. Stir in soup, milk, ketchup, paprika and turkey, and simmer for 5 minutes. Stir in sour cream. Meanwhile, cook egg noodles according to package directions. Add some butter to the hot cooked noodles and toss lightly, then spoon turkey mixture onto noodles and serve. Serve with crusty bread and salad.

## Turkey à la King

2 cups cooked turkey, diced	2 tbsp. butter
1/4 lb. fresh mushrooms	1/3 sliced green pepper
1/3 cup flour	1/3 cup cream (10%)
1/3 cup chicken broth	salt and pepper to taste

Melt butter in pan, then add green pepper and mushrooms and cover to simmer for 5 minutes. Remove vegetables from pan and blend flour into the remaining butter, then add cream, broth and seasonings, stirring continuously until sauce boils and thickens. Add turkey and vegetables and cook until turkey is heated.



## Chicken and Broccoli Casserole

- 1 package frozen chopped broccoli, cooked
- 2 cups chopped cooked chicken
- 2 tsp. lemon juice
- 1 can cream of chicken soup
- 1 cup shredded colby cheese
- 1 cup cracker crumbs
- 1/2 cup mayonnaise
- 1/4 cup melted margarine

Place cooked broccoli in bottom of 2-quart casserole dish. Place cooked chicken on top. Mix soup, mayonnaise and lemon juice together and spread over chicken. Top with the shredded cheese. Add cracker crumbs to melted margarine or butter. Pour crumb mixture over cheese. Cook uncovered at 350°F (175°C) for 30 minutes.

## Cookies & Squares

### Chewy Chocolate Chip Cookies

- 3/4 cup butter
- 1 cup brown sugar
- 2 eggs
- 2 cups flour
- 1/2 cup white sugar
- 1 tsp. vanilla
- 1 tsp. baking soda
- 1 tsp. salt

In a mixing bowl, cream together butter, sugar, vanilla and eggs. In another bowl, sift together flour, baking soda and salt. Combine wet and dry ingredients and add 1 cup chocolate chips. Bake at 350°F (175°C) until golden brown.

### Hearty Health Squares

- 3/4 cups honey
- 1 tsp. vanilla
- 3 cups Rice Krispies
- 1 cup peanut butter
- 1 cup chocolate chips
- 1 cup salted peanuts

Cook honey and peanut butter over medium heat, stirring constantly until it just starts to boil. Remove from heat. Add vanilla. Stir in Rice Krispies, chocolate chips and peanuts. Press into 8-inch square pan. Chill 1 hour before cutting.

## Special K Squares

1/2 cup corn syrup	1/2 cup firmly packed brown sugar
1/2 cup peanut butter	1 cup shredded dried coconut
3 cups Special K	

Combine corn syrup and sugar in large saucepan. Cook over medium heat, stirring constantly until sugar is dissolved and mixture bubbles. Remove from heat. Stir in peanut butter; add Special K and coconut, stirring until well coated. Press firmly into a buttered 8-inch square pan. Let stand until cool. Cut into squares.

## Peanut Butter Logs

2 1/2 cups peanut butter	1/2 cup honey
1 cup 100% bran flakes	1 cup skim milk powder
1 cup Rice Krispies	1/2 cup raisins

Combine all ingredients well. Flatten mixture in a large pan. Chill overnight. Cut into 2- x 1-inch servings.

## No-Bake Cookies

3 cups rolled oats	6 tbsp. cocoa
1 cup shredded dried coconut	1/2 cup homogenized milk
1/2 cup butter	2 cups sugar
1/2 tsp. vanilla	

Thoroughly mix rolled oats, coconut and cocoa in large bowl. Heat butter, milk and sugar together in saucepan until almost boiling but do not boil. Pour over dry mixture. Add vanilla, stir well. Drop by spoonful on buttered waxed paper. Chill until firm.

## Cheese Macadamia Cookies

1/2 lb. butter	1/4 lb. Swiss cheese, grated
1 egg	1/2 tsp. salt
1/3 cup chopped macadamia nuts	1 1/2 cups white flour

Blend butter, cheese and egg. Gradually work in flour, salt and nuts. Mould into a roll 1 1/2 inches in diameter, wrap in wax paper and chill until firm. Slice into 1/4-inch rounds and place on cookie sheet. Bake at 400°F (200°C) for 10 to 12 minutes.



## Unbaked Peanut Butter Balls

1 cup peanut butter	1/2 cup skim milk powder
2 tbsp. corn syrup	2/3 cup sugar
1/3 cup chopped peanuts	1/2 cup finely chopped peanuts

Blend all ingredients except 1/2 cup finely chopped peanuts. Shape into 1-inch balls and roll in finely chopped peanuts. Chill.

## Chocolate Chip Roll-Ups

25 graham wafers	1 can condensed milk
shredded dried coconut	1 package small chocolate chips

Crush graham wafers into fine powder. Add sweetened condensed milk and chocolate chips. Form into small balls and roll in shredded coconut. Place balls on cookie sheet and chill in refrigerator until hard.

## Peanut Butter Criss-Crosses

1 cup shortening	1 cup sugar
1 cup brown sugar	2 eggs
1 tsp. vanilla	1 cup peanut butter
2 cups all-purpose flour	1/2 tsp. salt
2 tsp. baking soda	

Cream shortening, sugars, eggs and vanilla. Stir in peanut butter. Stir in dry ingredients. Drop onto an ungreased cookie sheet by spoonful. Press each cookie with the back of a fork to make criss-cross. Bake at 350°F (175°C) for 10 minutes.

## Wheel of Steel

1/3 cup butter	1 cup brown sugar
1/2 cup peanut butter	1 tsp. vanilla
1 egg	1/4 cup wheat germ
3/4 tsp. salt	1/4 tsp. baking soda
3/4 cup whole wheat flour	1/2 cup milk powder
1/4 tsp. baking powder	3 tbsp. milk
1 cup quick oats	3 tbsp. sesame seeds

raisins, chocolate chips, peanuts as desired to make one cupful

Preheat oven to 375°F (190°C). Cream the butter, peanut butter and sugar together until light. Beat in the egg and vanilla. Combine the whole wheat flour, wheat germ, milk powder, salt, baking powder and baking soda. Stir into creamed mixture. Add milk, oats and raisins/chocolate chips/peanuts, and mix well. Place a heaping



tablespoon of the batter on an oiled baking sheet and spread into a circle about 4 1/2 inches in diameter. Sprinkle with one teaspoon of sesame seeds. Leave ample room for cookies to spread. Bake about 12 minutes or until done. Cool on pan 5 minutes and then, using a wide spatula, transfer carefully to rack.

**NOTE:** These can also be dropped by the teaspoonful and flattened with a fork. Bake for 8 to 10 minutes.

## Pastries & Desserts

### Cheese Muffins

2 cups flour	3 tsp. baking powder
1 tsp. salt	1/2 cup sugar
1/2 cup butter	3/4 cup grated cheddar cheese
1 cup homogenized milk	1 egg

Mix and sift flour, baking powder, salt and sugar in a bowl. Cut in butter with two knives to mix. Add grated cheese. Add egg to milk and beat lightly. Pour into dry ingredients all at once and stir quickly. Mix just long enough to moisten dry ingredients - batter will be lumpy. Fill greased muffin tins about 2/3 full. Bake at 400°F (200°C) for 20 to 25 minutes.

### Cheesecake

#### Crust

1 cup graham cracker crumbs	1/4 cup white sugar
1/3 cup melted butter	

#### Filling

3 8-oz. packages of cream cheese	6 eggs
1 1/2 cups white sugar	2 cups sour cream

#### Fruit Topping

2 tbsp. cornstarch	1 tbsp. lemon juice
2 tsp. vanilla	2 cups frozen strawberries
1/2 cup sugar	

Combine graham cracker crumbs, sugar and butter. Press mixture firmly in the bottom and around the greased sides of a 10 x 3-inch spring-form pan. Set aside.

Preheat oven to 325°F, soften cream cheese at room temperature. Cream the cream cheese until smooth. Slowly beat in the 1 1/2 cups sugar. Beat in eggs, one at a time. Add sour cream. Pour mixture



on top of graham cracker crumbs. Bake 60 minutes or until lightly brown. Turn off oven and let cake remain in oven for 30 minutes longer with door open. Remove and cool.

Mix strawberries with lemon juice, sugar, cornstarch and vanilla. Heat until thickened. Pour on cheesecake. Refrigerate.

## **Chocolate Chip Cookie Cake**

2/3 cup butter  
2/3 cup lard or vegetable shortening  
1 cup white sugar  
2 eggs  
3 cups flour  
1 tsp. baking soda  
1 cup brown sugar  
1 tsp. vanilla  
1 tsp. salt  
12 oz. chocolate chips

Cream together butter, lard, sugar, eggs and vanilla. Sift flour, baking soda and salt. Mix all ingredients together and add approximately 12 ounces of chocolate chips. Place in a pizza pan. Bake at 350°F (175°C) until golden brown. This can be used instead of birthday cake – just decorate!

## **Chocolate Chip Muffins**

2 cups flour  
1/2 cup white sugar  
1 cup homogenized milk  
1/3 cup melted butter  
3 tsp. baking powder  
1 cup chocolate chips  
1 egg

Mix together flour, sugar, baking powder and chocolate chips. In a separate bowl, mix milk, melted butter and egg. Combine both mixtures and bake at 350°F (175°C) until golden brown.

## **Cherry Cheese Cupcakes**

16 oz. cream cheese  
2 eggs  
1/2 tsp. vanilla extract  
14 oz. canned sour cherries, drained well  
18 vanilla wafers  
3/4 cup sugar  
1 tbsp. lemon juice

Beat together cream cheese, sugar, eggs, lemon juice and vanilla extract until light and fluffy. Chop very well-drained cherries and stir into cheese mixture. Line muffin pans with large paper cups. Place vanilla wafer in bottom of each cup. Fill cups 2/3 full with cheese mixture. Bake at 375°F (190°C) for 15 to 20 minutes or until set. Cool on rack.

## Chocolate Cheesecake Muffins

### Cream Cheese Filling

3 oz. cream cheese                      2 tbsp. sugar

### Chocolate Batter

1 cup flour                                  1/2 cup sugar  
3 tbsp. unsweetened cocoa powder    2 tsp. baking powder  
1/2 tsp. salt                                3/4 cup homogenized milk  
1 egg, beaten                              1/3 cup cooking oil

In a small bowl, beat cream cheese and 2 tablespoons of sugar until light and fluffy. Set aside. In a large bowl, stir together flour, 1/2 cup sugar, cocoa, baking powder and salt. Make a well in centre of dry ingredients. Combine egg, milk and oil. Add all at once to dry ingredients, stirring just until moistened. Spoon about 2 tablespoons of chocolate batter into each greased muffin cup or paper cup. Drop 1 teaspoon of cream cheese on top and then more chocolate batter. Bake at 375°F (190°C) for 15 to 20 minutes. Dust with powdered sugar if desired.

## Hot Egg Biscuits

2 cups all-purpose flour                1/4 tsp. cream of tartar  
2 tsp. baking powder                    1 tsp. salt  
2 eggs                                        2/3 cup homogenized milk

Preheat oven to 425°F (220°C). In one bowl, sift flour, baking powder, cream of tartar and salt. In another bowl, beat eggs; add milk to eggs and mix. Mix wet and dry mixtures. Pat out dough on floured board, handling as little as possible. Cut with biscuit cutter and place on Teflon cookie sheet. Bake for 10 minutes.

## Spiced Fruit Rice Pudding

1 1/2 cups raw brown rice  
2 1/2 to 3 cups homogenized milk  
1/2 cup honey                              1 1/2 tsp. cinnamon  
1/4 tsp. powdered ginger                1 cup yogurt  
1 egg                                         1/2 tsp. nutmeg  
2 cups of fruit: soaked dried apples, apricots or fresh fruit

Cook rice using milk. Stir in honey, egg, cinnamon, nutmeg and ginger. Oil a 1-quart casserole dish and spread 1/2 rice mixture over the bottom. Place 1/2 the fruit chunks on top. Repeat these two layers and bake 25 minutes at 350°F (175°C). Remove from oven and spread 1 cup yogurt over the top. Chill before serving.



## Mud Pie Tarts

3 tbsp. butter	3 cups miniature marshmallows
3 3/4 cups crisp rice cereal	1/2 cup sugar
3 tbsp. unsweetened cocoa	3 tbsp. cornstarch
1 1/2 cups homogenized milk	chocolate curls
whipped cream	

Melt butter in a large saucepan and add marshmallows. Cook over low heat, stirring constantly until marshmallows are melted and mixture is thoroughly combined. Remove from heat. Add rice cereal and stir until coated. Press equal amounts of marshmallow cereal mixture into 12 large buttered muffin cups to form tart shells. Let stand until set, then remove tart shells from cups. Combine sugar, cocoa and cornstarch in a saucepan. Gradually stir in milk. Cook over medium heat, stirring constantly until mixture comes to a boil and thickens. Reduce heat and cook 2 minutes longer, stirring occasionally. Chill well. Spoon equal amounts into prepared tart shells. Garnish with whipped cream and chocolate curls.

## Impossible Pie

4 eggs	1/2 cup flour
1 cup sugar	2 tsp. vanilla
1/2 cup margarine	2 cups homogenized milk
1 cup dried coconut	

Mix all ingredients thoroughly in a blender or by hand. Pour mixture into a greased 10-inch pie pan. Bake at 350°F (175°C) for approximately 1 hour, until centre tests firm. The flour will settle to form a crust, the coconut forms a topping and the centre is an egg custard filling.

## Potato Cheese Muffins

2 cups all-purpose flour	1/2 cup granulated sugar
4 tsp. baking powder	1 tsp. salt
2 eggs	1/2 cup cooled mashed potato
1/2 cup grated cheddar cheese	1 1/2 cups milk
1/3 cup melted shortening	

In large bowl, combine flour, sugar, baking powder and salt. In mixing bowl, beat eggs well and blend in milk, mashed potatoes, cheese and melted shortening. Add to dry ingredients, stirring just until moist. Spoon batter into muffin tins lined with paper baking cups, filling each to top of paper liner. Bake in 400°F (200°C) oven for 20 minutes or until lightly browned.

## Health Fudge

1 cup peanut butter	1 cup honey
1 cup carob powder	1/2 cup dried coconut
1/2 cup raisins	1/2 cup sunflower seeds
1/2 cup crushed nuts	1/2 cup toasted sesame seeds

Melt peanut butter and honey in heavy saucepan. Do not cook, but blend thoroughly. Add carob powder and mix well. Add all other ingredients. Press into buttered 9 x 11-inch pan. Chill in refrigerator for 2 hours. Cut into squares.

## Super Fridge Fudge

1/2 cup honey	1/2 cup peanut butter
1/2 cup cocoa powder	1 cup chopped nuts
3/4 cup coconut	1 cup sunflower seeds
1/2 cup raisins	

Heat honey and peanut butter. Quickly add cocoa powder and stir. Remove from heat. Add remaining ingredients and mix. Pour into greased 9-inch pan. Refrigerate to harden. Cut in squares and keep in the refrigerator.

## Puddings

### Pudding Mix

2 3/4 cups skim milk powder	1/2 cup cornstarch
1 1/2 cups granulated sugar	1 tsp. salt

Blend these four ingredients together and store in an airtight container.

### Vanilla Pudding

1 1/4 cups homogenized milk
3/4 cup pudding mix with 1/2 cup homogenized milk
1 beaten egg
1 tsp. vanilla flavouring or 1/4 tsp. almond extract

Heat milk (1 1/4 cups) in double boiler. Stir pudding blended with milk (1/2 cup) into hot milk. Cook until it almost boils and thickens. Cook for 1 to 2 minutes longer to ensure cornstarch is cooked. Add some hot liquid to beaten egg while stirring vigorously. Then add this mixture to hot liquid in double boiler and stir well. Add vanilla, stir. Remove from heat. Let cool and chill.



## Chocolate Pudding

Prepare as for vanilla but add 1/4 cup cocoa to 3/4 cup pudding mix. Do not add vanilla.

## Strawberry Pudding

Prepare as for vanilla but add 1 1/2 tbsp. strawberry flavouring at the end instead of vanilla.

## Super Pudding

2 cups homogenized milk    3/4 cup skim dry milk powder  
2 tbsp. vegetable oil        2 4.5 oz packages of instant pudding

Stir milk and oil, add pudding mix and mix well. Pour into dishes of 1/2-cup servings.

## Flavoured Custard

2 eggs, well beaten                      2 cups homogenized milk  
2 tbsp. powdered milk                 1 tsp. vanilla  
2 to 4 tbsp. honey

Combine the milk and powdered milk together, then beat eggs into milk and add honey and vanilla. Pour into oiled custard cups. Place in a pan of hot water filled to halfway up the sides of the cups. Bake 50 minutes at 325°F (165°C).

### Flavours:

- 2 tsp. rum or brandy
- 1 tbsp. carob powder
- peppermint extract (few drops)
- almond extract (few drops)

Or stir in 1/4 to 1/2 cup unsweetened dried coconut or chocolate chips.

# Beverages & Smoothies

## Vanilla Milkshake

- 1 cup homogenized milk
- 1/2 cup vanilla ice cream
- 1 vanilla Carnation Instant Breakfast
- 2 vanilla pudding cups
- 1/4 cup cream (35%)

## Chocolate Milkshake

- 1 cup chocolate milk
- 1/2 cup chocolate ice cream
- 1 chocolate Carnation Instant Breakfast
- 2 chocolate pudding cups
- 1/4 cup cream (35%)

## Strawberry Milkshake

- 1 cup homogenized milk
- 1/2 cup strawberry ice cream
- 1 strawberry Carnation Instant Breakfast
- 2 strawberry pudding cups
- 2 tsp. strawberry flavouring
- 1/4 cup cream (35%)

Blend milk, ice cream, pudding cups and instant breakfast.  
Stir in 35% cream.

## Old-Fashioned Milkshake

- 1 cup homogenized milk or cream
- 1 cup ice cream

Combine ingredients in a blender and blend until smooth.

## Oreo milkshake

- 2 double-stuffed Oreos
- 2 tbsp. marshmallow fluff (cream)
- 1 1/2 cups vanilla ice cream
- 1 cup homogenized milk or cream (depending on desired consistency)

Combine all ingredients in a blender and blend until smooth.

## Peaches and Cream Shake

- 1 cup homogenized milk or cream
- 1 cup vanilla ice cream
- 1/4 tsp. vanilla
- 1 cup canned peaches
- 1/4 tsp. salt

Combine all ingredients in a blender and blend until smooth.



## **Apple Pie à la Mode**

- 1 cup apple pie filling
- 1/2 cup homogenized milk or cream
- 1 cup vanilla ice cream
- dash of cinnamon

Combine all ingredients in a blender and blend until smooth.

## **High-Calorie Breakfast Shake**

- 1 cup half-and-half cream (10%)
- 1 packet Carnation Instant Breakfast
- 3/4 cup ice cream

Combine all ingredients in a blender and blend until smooth.

## **Pudding Shake**

- 1 cup homogenized milk or cream
  - 1/4 cup skim milk powder
  - 1 cup vanilla ice cream (slightly softened)
  - 1/4 package instant pudding mix (any favourite flavour)
- Refrigerate unused portion.

Combine all ingredients in a blender and blend until smooth.

## **Peanut Butter and Banana Shake**

- 1 cup homogenized milk or cream
- 1 package of chocolate instant breakfast powder
- 1/2 ripe banana, sliced
- 1 tbsp. peanut butter
- 1 scoop chocolate or vanilla ice cream
- 3 tbsp. chocolate syrup
- 5 or 6 ice cubes

Combine all ingredients in a blender and blend until smooth.

## **Chocolate-Peanut Butter Shake**

- 1/2 cup homogenized milk or cream
- 3 tbsp. creamy peanut butter
- 3 tbsp. chocolate syrup
- 1 1/2 cups chocolate ice cream

Combine all ingredients in a blender and blend until smooth.

## **Chocolate-Hazelnut Shake**

- 1 cup homogenized milk or cream
- 2 scoops chocolate ice cream
- 3 tbsp. skim milk powder
- 2 tbsp. Nutella (chocolate hazelnut spread)
- 1 tbsp. canola oil
- 4 ice cubes

Combine all ingredients in a blender and blend until smooth.



## Powerccino Shake

- 1 package Instant Breakfast Mix, vanilla flavour
- 1 cup homogenized milk or cream
- 2 scoops coffee-flavoured ice cream
- 3 tbsp. skim milk powder
- 1 tbsp. chocolate syrup, (iced coffee syrup or 1 tsp. instant coffee optional)
- 4 ice cubes

Combine all ingredients in a blender and blend until smooth.

## Hawaiian Sipper

- 1/2 cup coconut milk
- 1/2 cup unsweetened pineapple juice
- dash of ginger
- 1 tbsp. yogurt

Blend together on a high speed for 10 seconds.

## Instant Breakfast Shake

- 1 cup homogenized milk
- 1 package instant breakfast drink
- 1/4 cup egg replacer

Blend all ingredients together well.

## Complete Breakfast

- 1/2 cup orange juice
- 1/4 cup egg replacer or 1/4 cup cottage cheese
- 3/4 cup homogenized milk
- 3 tbsp. wheat germ
- sweetener to taste

Combine all ingredients in a blender and blend until smooth.

## Strawberry-Banana Milk

- 1/2 cup strawberries
- 1 tsp. sugar
- 1/2 ripe banana, sliced
- 1 cup homogenized milk

Combine all ingredients in a blender and blend until smooth.

## Pineapple Buttermilk

- 1/4 ripe banana, sliced
- 1/2 cup buttermilk or 1/2 cup cream
- 1/2 cup can crushed pineapple

Combine all ingredients in a blender and blend until smooth.



## Orange Freeze

3/4 cup orange juice  
1 cup orange sherbet

1 tbsp. lemon juice

Combine ingredients in a blender and blend to desired thickness.

## Ice Cream Soda Float

1/2 cup vanilla ice cream  
3/4 cup root beer, cola or fruit-flavoured soda

Place large scoop of vanilla ice cream in tall glass and add soda until glass is almost full. Serve with straw.

## High-Protein Smoothies

These smoothies are like milkshakes, thin or thick, depending on the temperature.

Blend until smooth:

1 cup cottage cheese  
1 cup yogurt

*Add one of the following combinations:*

- 1 banana, some strawberries, 1 tsp. vanilla, honey to taste
- 1 peach, some strawberries, 1 tsp. vanilla, honey to taste
- 1 banana, 2 tbsp. peanut butter, 1 tsp. vanilla, honey to taste

*Variations:* substitute your favourite fruit or jam. Substitute chocolate or other flavouring for vanilla. If you want it thinner, add homogenized milk or some yogourt. If you want it colder, blend with a cracked ice cube.

## Hot Apple-Spice Eggnog

1/4 cup egg replacer  
1/4 tsp. salt  
dash of nutmeg  
1 1/2 cups scalding hot homogenized milk

2 tbsp. sugar  
1/4 tsp. cinnamon  
1/3 cup apple juice

Combine all ingredients in a blender and blend until smooth.

# Ensure Plus Recipes

## Ensure Cheddar Cheese Soup

1/2 cup water	3/4 cup vanilla Ensure Plus
dash of salt	1 can (11 oz.) cheddar cheese soup
1 tsp. Worcestershire sauce	

Pour soup in saucepan, gradually stirring in water and Ensure Plus. Add remaining ingredients. Heat to serving temperature. Do not boil.

## Ensure Plus Muffins

1 cup rolled oats	1 cup vanilla Ensure Plus
1 egg	1/4 cup vegetable oil
1 tbsp. baking powder	1 cup all-purpose flour
1/2 tsp. salt	1/4 cup brown sugar

Preheat oven to 400°F (200°C). Combine oats and Ensure Plus in a small bowl. Add egg and oil, mix well. Sift flour, baking powder and salt together into a mixing bowl. Add brown sugar, mix well. Add Ensure Plus mixture to dry ingredients. Stir only until dry ingredients are moistened. Pour batter into greased muffin pan, filling each compartment about 3/4 full. Bake in preheated oven for 20 to 25 minutes.



# Cystic Fibrosis Web Resources

The **Cystic Fibrosis Canada** website was developed to help visitors learn more about cystic fibrosis and allow current patients and their families access to all the information they need.

**[www.cysticfibrosis.ca](http://www.cysticfibrosis.ca)**

**Aboutkidshealth** is a website developed by The Hospital for Sick Children to help patients and their families better understand various diseases and their effects on the body.

**[www.aboutkidshealth.ca/En/HealthAZ/ConditionsandDiseases/GeneticDisorders/Pages/Cystic-Fibrosis-CF.aspx](http://www.aboutkidshealth.ca/En/HealthAZ/ConditionsandDiseases/GeneticDisorders/Pages/Cystic-Fibrosis-CF.aspx)**

**Tools + Tips for CF Parents** is part of a website called Happy Heart Families. The website is written by Lisa C. Greene, who is a mom of two kids with cystic fibrosis and a national public speaker, parent educator and writer. This website offers you tips for common topics such as Living with CF, School Issues, and CF Clinic Visits and Hospital Stays, in addition to helpful tips on how to enjoy Disney with CF.

**[www.tipsforcfparents.com](http://www.tipsforcfparents.com)**

**CFChef** is an online nutrition resource sponsored by Abbott Laboratories that allows those touched by cystic fibrosis to share and receive support, recipes and meal tips.

**[www.chef4cf.com](http://www.chef4cf.com)**

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